

INTRODUCTION

These guidelines set forth the procedures, specifications and requirements for land development or land disturbing activities in the unincorporated portions of Clayton County, Georgia. The guidelines address erosion control, grading, stormwater management, water quality, driveway specifications, and road construction for commercial and residential construction projects. They do not address zoning, landscaping, water and sewer or building construction procedures. Sewer plans are reviewed regarding location in relationship to state waters and water quality buffers and for erosion control. All water and sewer design plans are reviewed separately by the Clayton County Water Authority. The guidelines also outline procedures for plan review, permitting and inspection.

The guidelines are administered by the Land Development Section of the Transportation and Development Department. Decisions regarding implementation of these criteria are made by the Director of Transportation and Development or his representative; these decisions can be appealed in writing to the Clayton County Board of Commissioners. A goal of the Land Development Section is to ensure that construction projects in Clayton County are designed and built in a manner to:

- enhance public safety;
- enhance traffic flow patterns;
- minimize environmental impacts such as erosion;
- minimize drainage or flooding problems; and
- provide a high quality of construction within the County rights-of-way which minimizes future maintenance needs.

The objective of this manual is to provide guidance, assistance and direction to developers, surveyors and engineers when designing projects in Clayton County to help us achieve the goals listed above.

The guidelines also address the requirements of several County ordinances adopted by the Board of Commissioners. These ordinances include the Soil Erosion and Sedimentation Control Ordinance, Flood Damage Prevention Ordinance, Subdivision Ordinance, and the Stormwater Management Ordinance. Copies of these ordinances are included in this manual. Questions regarding the interpretation of these guidelines and ordinances should be directed to the Land Development Engineer. For more details regarding stormwater system designs, you may also refer to the Georgia Stormwater Management Manual.

PLAN REVIEW AND PERMITTING

PLAN REVIEW PROCESS

Permits are required for all land development or land disturbing activities in Clayton County, except for agricultural operations. The Land Development Section issues Land Disturbance Permits for clearing and grading. An approved set of construction plans is required before permits are issued. The flow charts on the following pages illustrate the normal order of plan review and permitting for projects in Clayton County. The process is also discussed below. Appendix A includes information and contacts for other County Departments involved in this process.

Four sets of construction plans, a submittal form and the plan review and permit fee should be submitted to the following location.

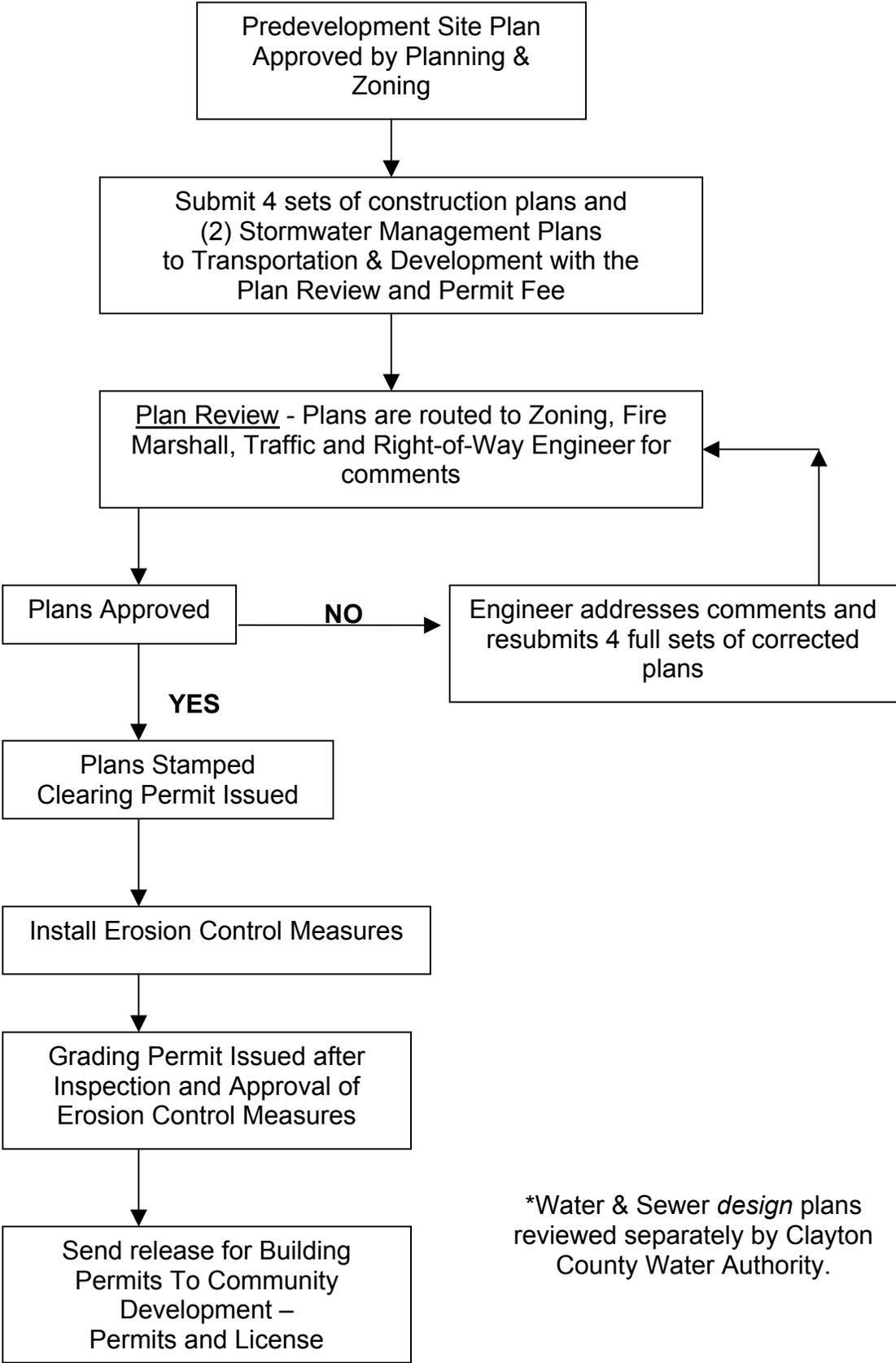
Clayton County Transportation and Development
Land Development Section
7960 N. McDonough Street
Jonesboro, Georgia 30326

Plans may be submitted anytime Monday through Friday, 8:00 a.m. to 5:00 p.m. Plans submitted after 4:00 p.m. will not be placed in routing until the following business day. A copy of the submittal form can be obtained from the Land Development Office and is included in the plan review checklist (see Appendix B). The property owner's name, company, address and phone number must be

provided because the State Erosion and Sedimentation Control Act requires that land development permits be issued to property owners only. The Act also requires that all ad valorem taxes owed on the subject property are paid before a permit is issued. A copy of the submittal form is forwarded to the Tax Assessors Office for review. For subdivisions, a preliminary plat should be approved by Planning and Zoning before submitting construction plans. For commercial development, a preliminary site plan should be approved by Planning and Zoning before submitting construction plans.

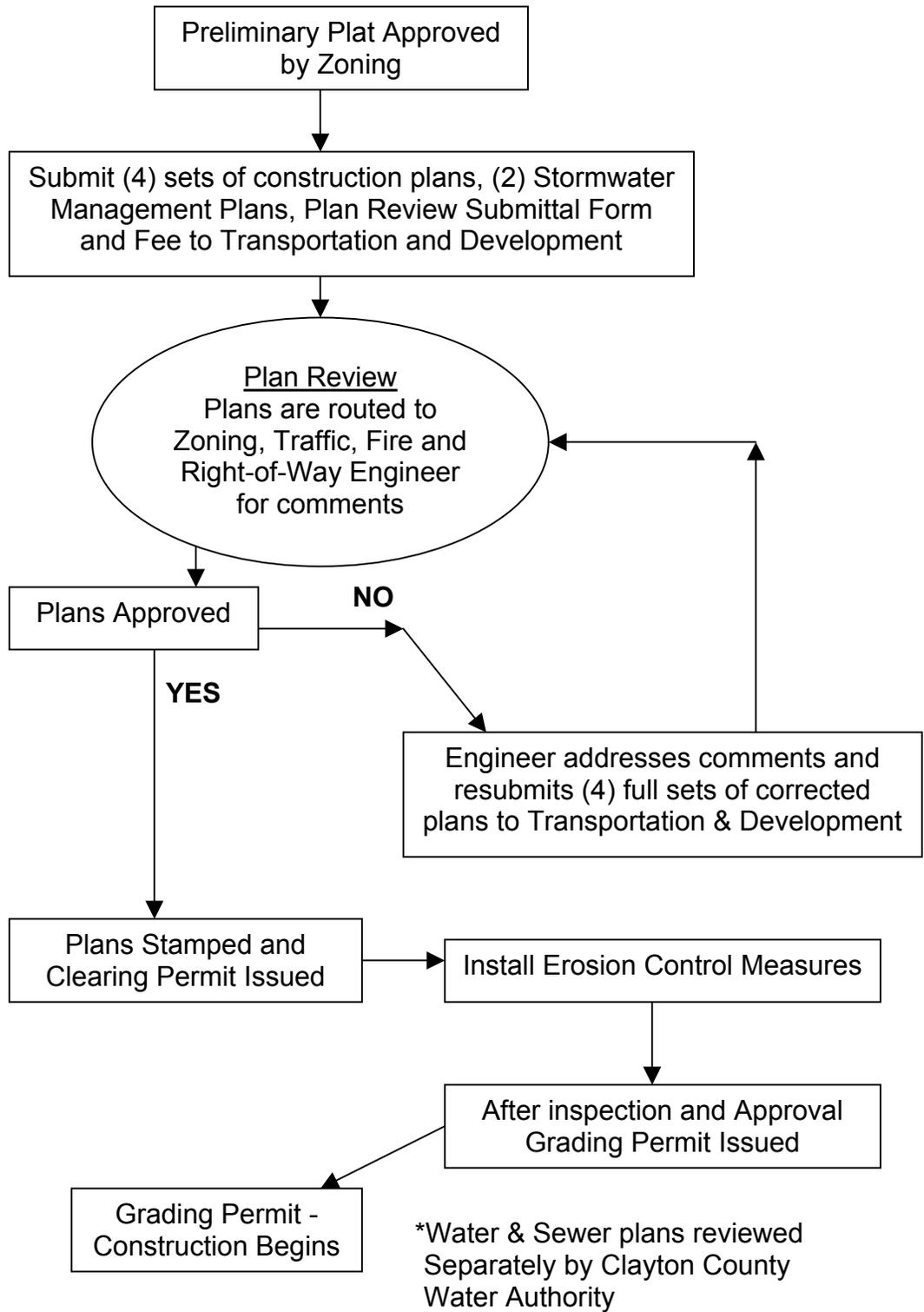
The construction plans are routed to Planning & Zoning, the Fire Marshall, Traffic Engineering, and the Right-of-Way Engineer for comments. The Land Development Section reviews the plans for grading, stormwater, floodplain management, right-of-way improvements and erosion control features. The Land Development Section will compile all comments and schedule a plan review meeting with the design engineer and/or developer when this process is complete. You will be notified when the plan review is complete and a meeting will be scheduled at your earliest convenience.

FIGURE 1. Flow Chart for Single Site Plan Review and Permitting



*Water & Sewer *design* plans reviewed separately by Clayton County Water Authority.

FIGURE 2. Residential, Commercial and Industrial Subdivision Plan Review and Permitting



Plan Review and Permitting Fees

Fees must be paid with the initial plan review submittal and are assessed as follows:

Commercial and Industrial Single Site

Development and

Commercial and Industrial Subdivisions **\$50/acre**

Minimum fee - \$ 200, maximum fee - \$ 1,000

Residential Subdivision Development **\$10/lot**

Minimum fee = \$200, maximum fee = \$1,000

Additional fees will be assessed on projects after the initial plan review and one re-submittal review. All plan review comments are to be addressed in the first re-submittal by revision to the plans or an explanation of the omission of the requested revision. Any revisions to the plans other than those requested in the plan review and in response to County comments are to be accompanied by a written description and explanation of the changes.

Plan Requirements

All plans are to be prepared and stamped by a licensed professional surveyor, architect, landscape architect or professional engineer registered in the State of Georgia; drainage calculations and the stormwater management plan must be stamped by a registered professional engineer or landscape architect. Plans should include the following basic information.

- ◇ A **Site Plan** with an accurate boundary survey and sufficient topography (two foot contour intervals) to determine existing conditions. The site plan should show

the location of any existing and proposed structures and improvements and include environmental features such as State Waters, state waters buffers, water quality buffers, the 100 year flood plain limits and elevations, floodway limits, and wetlands boundaries. Include statements on the plan addressing the presence or absence of these environmental features. This plan should also include driveway locations, road signage type (custom or County-installed), and the location of proposed improvements to County roads.

- ◇ A **Grading Plan** delineating the clearing limits, the extent of grading and the existing and proposed contours.
- ◇ A **Stormwater Management Plan, meeting the criteria in the Georgia Stormwater Management Manual**, that includes existing and proposed drainage structures and easements, a pipe design chart, an evaluation of pre-developed and post-developed runoff to determine the need for detention and an evaluation of downstream impacts. For all new developments, a long term plan for protecting stormwater quality should be included. The **Stormwater Quality Plan** shall be developed to minimize the impact of the development on stormwater quality. This can be achieved by minimizing impervious surfaces and/or the use of stormwater structural controls. Clayton County requires all new development designs to utilize the WISE model to insure that runoff from the development meets the County's target for total suspended solids (TSS) loading. The WISE model can assist the design professional in the selection of the most efficient best management practices for achieving the TSS loading criteria. The WISE model is available on the Clayton County web page or through the Environmental Section of Transportation and Development.

- ◇ An **Erosion and Sediment Control Plan** that provides best management practices consistent with the current Manual for Erosion and Sediment Control in Georgia.

A detailed plan review checklist that covers each of the areas listed above in more detail is included in Appendix B.

The Planning and Zoning Office, of the Department of Community Development, reviews the tree preservation plans, the landscaping plans, parking space dimensions and interior lane widths. The Fire Marshall will also review the site plan.

Plans will be reviewed in general with respect to the areas listed above; specific details and calculations may not be checked. Plan approval does not obligate the County to accept the work, nor does it relieve the developer from compliance with any other County, State or Federal ordinances. Plan approval does not relieve the developer from the responsibility for damages to adjacent or downstream property resulting from his development.

PERMITS

A Land Disturbance Permit is required before any clearing or grading activity is conducted. No permits will be issued until construction plans have been approved and the Tree Preservation Ordinance has been addressed. Some sites may require the staking and flagging of buffers before a permit can be issued. Two types of

Land Disturbance Permits are issued by this office; **Clearing** and **Grading** permits. The following table lists the type of permit and applicable activities.

Table 1. Permits and associated activity

Clearing	Authorizes clearing activities and the installation of erosion control measures. Buffers and tree preservation areas must first be flagged and inspected.
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Grading	Issued after all erosion control measures are installed and inspected, required before the building permit is issued for commercial and industrial development.
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Please note that Building permits for single site commercial and industrial development are not issued by the Community Development Department until the Grading permit has been issued by the Land Development Section of Transportation and Development. Permits should be posted on the site. Grading permits will not be issued until all erosion and sediment control measures are installed and approved and the contractor has a set of approved plans. Activities conducted without the necessary permits will be subject to Stop Work Orders or other enforcement action provided for by County Ordinances. A permit is valid until

construction is complete or for six months from the plan approval date, if the site is not active. After six months, the permit will be revoked and reapplication and re-approval of plans will be necessary before the permit can be reinstated or a new one issued. The developer will be required to update plans to address any new standards or regulations.

The developer and engineer are responsible for obtaining any other applicable permits from other agencies. The Land Disturbance Permits issued by the Land Development Section do not authorize other activities such as dredging or filling of wetlands, inert landfill operations, State Route driveways, etc. Permits for these activities are the responsibility of the developer to obtain. The United States Army Corps of Engineers is the authorizing agency for activities associated with wetlands disturbances. The Georgia Department of Natural Resources, Environmental Protection Division is the authorizing agency for landfill operations and variances to State Waters Buffer requirements. All work within the Georgia Department of Transportation right-of-way is to be reviewed and approved by the State.

ROAD DESIGN STANDARDS AND CRITERIA

STREET DESIGN

The standards and specifications in this manual are provided to establish criteria for developers and engineers in the preparation of plans for road and street construction or improvements in commercial, industrial and residential subdivisions. These standards apply primarily to undivided subdivision streets. Variances to these standards may be granted by the Director of Transportation and Development depending on the proposed property use, the type and volume of traffic, and topographic features. Alternative criteria may be established by the Director for single lane streets or roadways with four or more lanes of traffic. The geometric standards in this manual or those recommended by the Director are generally consistent with The American Association of State Highway and Transportation Officials (AASHTO) book, A Policy on Geometric Design of Highways and Streets. The design criteria for two or three lane undivided streets are listed below in Table 2. Intersecting streets designed with the use of an eyebrow cul-de-sac shall intersect at 90 degrees. All alignments other than 90 degrees shall be constructed as a curve, with a 200 ft. minimum radius.

Table 2. Basic Standards for Undivided 2 and 3 Lane Subdivision Streets

	Residential	Commercial/ Residential Collector	Industrial
Pavement Width (ft)	24	24	36
Curb & Gutter (in)	24	24	30
Total Width (ft)	28 (24) ⁴	28	41
R/W Width (ft)	50 (60) ²	60	60
Cul-de-sac radius to BOC (ft)	40	60	60
Cul-de-sac R/W radius (ft)	50	75	75
Pavement Thickness, E or F (in)	2	1.5	1.5
Binder Thickness, type B (in)	-	2	3
Base Thickness - GAB (in)	6	6	8
Maximum Grade (%)	12	12	12
Minimum Grade (%)	1.5	1.5	1.5
Minimum Vertical Curve Factor	10 ³	10 ³	10 ³
Intersection Sight Distances			
Min. Sight Distance <= 35 mph	250 ¹	250 ¹	250 ¹
Min. Sight Distance > 35 mph	Per AASHTO ¹	Per AASHTO ¹	Per AASHTO ¹
Minimum Horizontal Curve (ft)	200	Per AASHTO	Per AASHTO
Crown (in/ft)	0.25	0.25	0.25
Minimum sub-grade and base compaction (%)	100	100	100

¹ Intersecting sight distance and stopping sight distance shall be noted on all construction plans for developments encompassing existing streets, proposed streets and proposed driveway locations.

² 60 feet for roadway without curb and gutter, Clayton County Standard 302

³ Multiply algebraic difference in grades times factor to get vertical curve length in feet

⁴ 24' pavement without curb and gutter, Clayton County Standard 302

The typical sections and detailed specifications for these types of streets are found in Appendix D, Clayton County Standard Details 301, 302, 303 and 304. Sidewalk is to meet Standard Details 102 or 103. All construction in existing or future rights-of-way should meet Georgia DOT specifications if no specific County standard applies.

Please refer to the Clayton County Subdivision Ordinance for additional requirements for subdivision streets. The ordinance recommends that subdivisions have two points of access and provide for interconnection to similar adjacent land uses. Plans are to include consideration of tying to existing stub-out streets in adjacent subdivisions. The streets should be laid out to discourage through traffic.

Streets should also be laid out to discourage excessive speed. Long straight tangent roadway sections are not recommended. Where applicable, side streets designed to intersect main streets near other existing or proposed streets should be aligned to intersect at one location, thus creating a four-leg intersection instead of two closely spaced three-leg intersections. The development may also be responsible for other on-site as well as off-site improvements to ensure the safe and efficient movement of vehicles and pedestrians.

The maximum length of cul-de-sac streets should be 800 feet. Larger subdivisions should be designed to accommodate school bus traffic, long cul-de-sac streets may need a 50 foot radius on the cul-de-sac to allow for the bus to turn around.

Special Design Subdivisions

Traffic Calming Devices & Conservation Zoning

Traffic Calming devices may be installed on residential streets where the posted speed limit is no greater than 25 mph. The implementation of traffic calming devices should not be used as a mitigation tool for street layout. It should be used as a tool to augment street design to ensure conformance to the 25 mph speed limit. There are two types of calming devices available, a traffic circle that is located at intersections, and a mid-block diverter that is located at mid-blocks. Detailed specifications for these traffic calming devices are found in Clayton County Standard Details 501, 502, and 503.

Traffic calming devices are recommended between roadway sections greater than 700 feet of straight travel lanes, but may be required at lesser intervals if so desired by the Director of Transportation and Development. They may be designed on horizontal and/or vertical curves only if adequate sight distance is provided. Traffic circles may be installed at intersections with a minimum sight distance of 250 feet.

Roadway signage installed by Clayton County or the Developer within traffic calming devices to direct traffic in the proper travel lanes must remain erected at all times.

Permanent structures will not be allowed within the traffic calming devices without prior approval of the Director.

Landscaped vegetation within traffic calming devices must not exceed two and one-half (2½) feet at maximum maturity height. All vegetation must be planted so that no part of it will exceed the perimeter of the traffic calming device. All maintenance associated with the landscaping within the traffic calming device is the responsibility of the Homeowner's Association.

Each traffic calming device incorporates a one-foot concrete strip inside the back of curb as shown in the standard details. This strip may be concrete, inlaid brick, or any other type of mountable, transversable material approved by the Director.

High back curb and gutter is required for all streets except as noted below. Residential streets in subdivisions with one (1.0) acre or larger lot minimums may be constructed without curb and gutter. These streets will require twenty-four (24) feet of paving and sixty (60) foot rights-of-way to include the space for road-side drainage ditches (Clayton County Standard 302).

Sidewalks may be required on major thoroughfares and in some developments to satisfy pedestrian safety and needs. Sidewalks are required on one side of all interior streets in all residential subdivisions (except in Agricultural zoning), adjacent to public parks, open spaces, adjacent to commercial facilities, areas designated as walk areas by the Clayton County Board of Education, and along the existing right-of-way of the adjacent County roadway. Sidewalks will also be required on both sides of public streets for condominiums and town home developments. Sidewalks will be required along frontage of all commercial developments. When sidewalks are required, they will be planned and constructed in accordance with details of Clayton County Standard No. 102 or 103. Other sidewalk needs will be determined by the Director of Transportation and Development. Clayton County also requires ADA compliant ramps be provided in the center of all intersection radii containing sidewalk. Also, ADA ramps for mid block locations and other logical pedestrian crossings which will be determined during plan review.

Temporary cul-de-sacs are required on stub-out streets that exceed three hundred (300) linear feet in length or that provide access to three or more lots. The cul-de-

sac must be constructed with a minimum of a twenty five-foot radius and may be required to maintain the standard typical section.

Residential Collectors are entrance streets into a large subdivision, which collect traffic from the majority of lots within the subdivision. The typical section for this type of roadway should meet the specifications in Clayton County Standard No. 301. The designation of a roadway as a Residential Collector will be determined by the Director.

Street lighting is required in all residential development. A completed street light petition is to be submitted to the Street Light Coordinator for processing. The lighting design will be provided by Georgia Power. The developer is responsible for the expense of installing the street light fixtures.

As-built drawings are to be submitted as electronic files for all dedicated streets as a part of the final plat process. Contact the Geographic Information System Manager, Transportation and Development Department, for format requirements.

Commercial driveways should be constructed with concrete according to County Standard No. 205 or Georgia DOT Standard No. 9031J (6" depth for light commercial and 8" depth for heavy commercial/industrial). Concrete can be omitted in areas without curb and gutter, and as determined by the Director if using a heavy duty paving specification similar to County Standard No. 304. Recommended driveway widths and radii are given in County Standard No. 205.

Driveway locations are evaluated on a case-by-case basis considering vertical and horizontal curves and sight distance, traffic conditions and proximity to other intersections or driveways. Where applicable, driveways should align with other adjacent streets or driveways to intersect at one location, thus creating a four-leg intersection.

All **pavement markings** are to be in accordance with the MUTCD (Manual of Uniform Traffic Control Devices) standards and shall meet the requirements of the standard details and the Standard Specifications for Road and Bridge Construction, Georgia Department of Transportation. The pavement marking material is to be thermoplastic or to be determined by the Director and shall be indicated on the construction plans. All long lines (i.e. center, lane and edgelines) are to be 5 inches in width and the centerline should have a 4-inch space between lines. Striped long lines (more than 150 linear feet) are to be applied by a highway type truck mounted machine. All pavement markings are to be pre-lined by the contractor and inspected by the County prior to application of paint or thermoplastic. See Appendix C for more information regarding pavement markings.

All **traffic signage** to be placed in the County right-of-way is to be made of retro-reflective sheeting, high intensity material or equivalent, and meet MUTCD standards. Plans should indicate the type of signage to be used, whether purchased from the County or custom signage. Plans should also indicate the approximate location and type of signage for each development. See Appendix C, for more information about traffic signage. All commercial development driveway cuts shall

provide 36 inch Stop Signs at street intersections. All residential developments shall provide 30 inch Stop Signs at street intersections.

STORMWATER MANAGEMENT AND DESIGN

STORMWATER MANAGEMENT PLAN

An effective stormwater management plan must be prepared for all developments. This plan should ensure that adequate drainage facilities are provided for the site and that impacts on downstream properties are minimized. All plans and hydrology studies associated with drainage design must be stamped and signed by a registered professional engineer or landscape architect with a current license in Georgia. The plan should outline existing and proposed drainage conditions and downstream drainage receiving systems. **The plan should be developed to minimize downstream flooding and erosional impacts** by evaluating pre-developed versus post-developed peak flows, times to peak, and velocities. The downstream impact analysis is to include capacity analyses for all downstream structures to the ten-percent point. (See Figure 4 on pg. 29)

For all new developments, a plan should be developed to minimize the impact of the development on **stormwater quality**. This can be achieved by minimizing impervious surfaces and/or the use of stormwater structural controls. The Georgia Stormwater Management Manual contains more guidance on stormwater management and stormwater quality, best management practices. The specific requirements for the stormwater management plan are discussed in the following sections. **The plan should contain the following items:**

- **A Hydrology study** of pre-developed versus post-developed peak flows, hydrographs, and velocities. Apply the ten percent rule, as outlined in the Georgia Stormwater Management Manual, to evaluate downstream impacts. Follow the hydrologic methods as outlined in the manual.

- A **drainage plan** showing all existing and proposed stormwater pipes, structures, ditches, swales, ponds and easements. A pipe chart including the design information including design storm, intensity, time of concentration, acreage to structure, total acreage to system, flow to structure, total pipe flow, pipe sizes, types, velocity in system, and discharge velocity.

- If **storage facilities** are proposed, a design of the structure and outlet devices, routing calculations, and hydrographs.

- A **Stormwater Quality Plan** is required for all new sites. The plan shall be developed to minimize the impact of the development on stormwater quality. Clayton County requires all new development designs to utilize the WISE model to insure that runoff from the development meets the County's target for total suspended solids (TSS) loading. The WISE model can assist the design professional in the selection of the most efficient Best Management Practices (BMP) for achieving the TSS loading criteria.

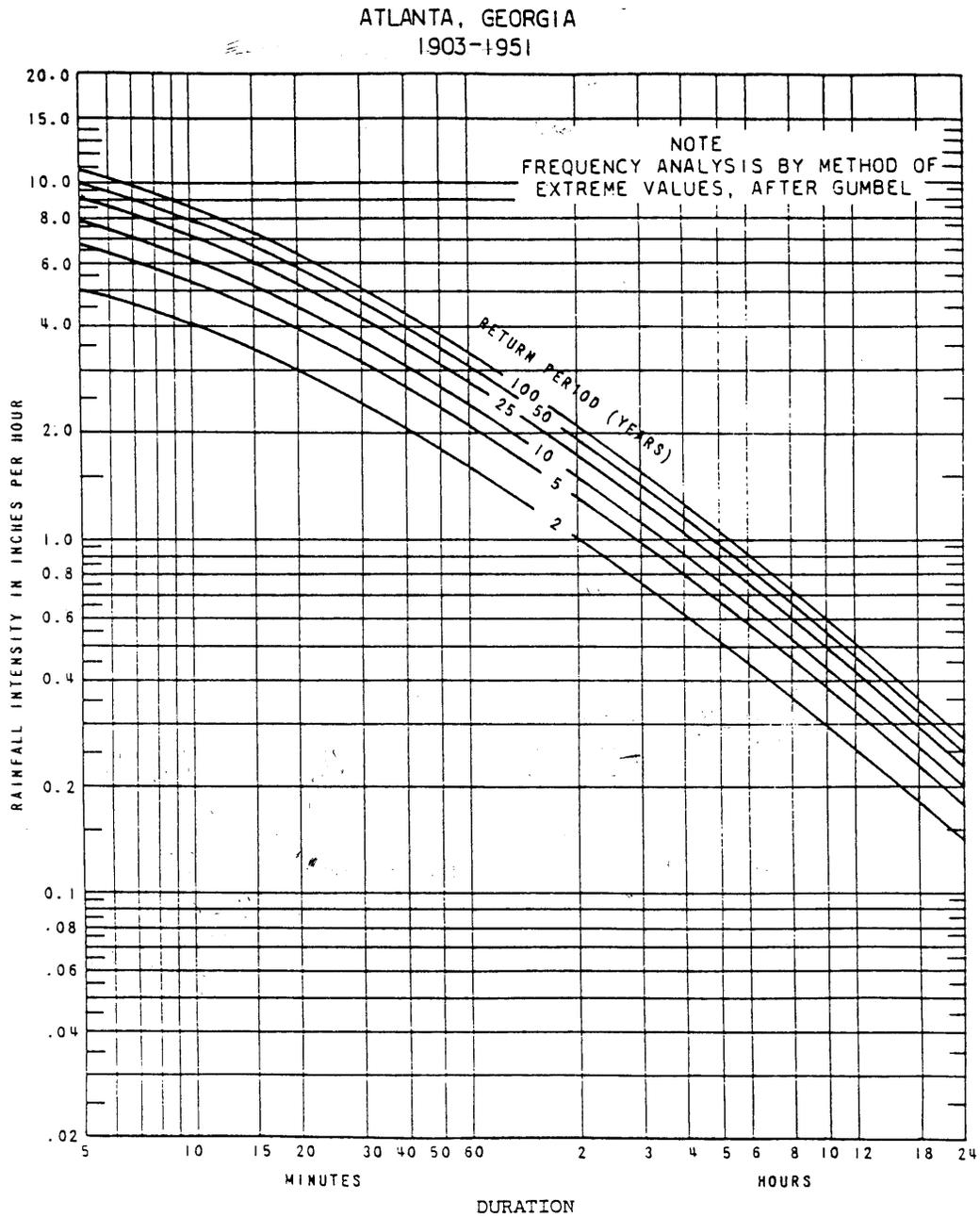
Design Storm Information

All drainage facilities should be designed for the **twenty-five (25) year storm**. **All culverts, open channels and storage facilities should be checked for the 100-year storm flooding potential and downstream impacts.** Storage facilities should be checked to insure they adequately control the discharge from the two, five, ten, and twenty-five year storms. The facility and the emergency overflow device designs are to provide storage capacity to retain the one hundred year storm.

The rainfall intensities for Clayton County (Atlanta, Georgia) used for determining peak flows when utilizing methods such as the Rational Equation for pipe design are found in the Weather Bureau Technical Paper No. 25 (Figure 3). The 24-hour rainfall totals for different storm frequencies for Clayton County from U.S. Weather Bureau TP-40 are given below.

2-year storm	3.7 inches
5-year storm	4.8 inches
10-year storm	5.7 inches
25-year storm	6.6 inches
50-year storm	7.6 inches
100-year storm	7.9 inches

FIGURE 3. Weather Bureau Technical Paper No. 25.



DRAINAGE DESIGN

Drainage systems and inlet structures should be designed to accommodate the twenty-five (25) year peak discharge. Pipes and structures should be designed according to appropriate Georgia DOT standards and/or Clayton County standards. A list of common standards used in stormwater system construction is found in the Table of Contents for Standards and Specifications and these standards are included in this publication.

Pipe Systems

A drainage schedule or **pipe chart** will be required and should contain adequate information to assure that all drainage systems are properly identified, sized and located. Pipe charts should include the following information:

Pipe ID	Structure type at each end of pipe
Drainage area	Runoff coefficient
Time of concentration	Rainfall intensity (twenty-five year storm)
Design discharge	Pipe roughness coefficient
Pipe slope	Inlet invert
Outlet invert	Pipe length
Pipe diameter	Headwater Depth
Velocity	Pipe gage
Pipe material	Pipe coating

The following criteria also apply to the design of drainage systems in residential subdivisions and any commercial system which connects to the County's right-of-way system.

- In residential subdivisions, stormwater pipes carrying water from the street must extend to a minimum of:
 - 1) to within 10 feet of the rear property line or vegetated buffer if required;
 - 2) 140 feet from the back of curb; or
 - 3) the 100 year flood plain boundary.
- All inlet and discharge points must provide a concrete headwall or a flared end section for longitudinal systems.
- All discharge points are to have rip-rap for energy dissipation. For any discharge in excess of 5 fps, a special design velocity dissipator should be provided as described in the Georgia Stormwater Management Manual.
- **Junction boxes** are required where there are changes in direction, slope, size or material of pipes. All junction boxes should contain access covers (metal ring and cover) for maintenance purposes.
- **Minimum pipe size** in the County right-of-way is 18 inches, except for residential driveway pipes, which may be 15 inches.
- Pipe systems should be designed to maintain a **minimum velocity** of 3 feet per second.
- When using **coated corrugated metal pipe** in the right-of-way; the system should be designed to prevent any joints from being placed under the pavement.

The following **pipe types** are accepted for use within the Clayton County right-of-way or as part of a system that connects to the County's right-of-way.

Minimum 14 gauge type I bituminous coated corrugated metal pipe (no joints under pavement)

Reinforced concrete pipe

Minimum 14 gauge corrugated metal pipe with aluminized coating (no joints under pavement)

HDPE meeting Clayton County Standards and Specifications

Only RCP or HDPE in flowing streams/outlet devices

All pipes located outside the right-of-way must be contained in a **drainage easement**. The easement width must be a minimum of twenty feet or two times the depth of the bottom of the pipe in feet. No permanent structure can be built in this easement.

Open Drainage Ditches

Drainage ditches are to be provided to prevent stormwater flow from one lot onto another except within a designated drainage easement. Open ditches located outside the right-of-way should be contained in a **drainage easement** at least twenty (20) feet in width. The drainage easement should be wide enough to contain the ditch and side slopes. Open drainage ditches must be designed with maximum side slopes of **4:1**, see detail 401 in Appendix D.

Design open drainage ditches to accommodate the total volume of the stormwater discharge. Ditch profiles and cross sections may be required for review in some instances. Open drainage ditches must be located outside tree save areas or any other required buffer area.

Refer to the Georgia Stormwater Management Manual for appropriate velocities for different types of channel materials. Velocities should be calculated for open channels to determine if additional stabilization is required. Provide energy dissipators to maintain a non-erosive velocity in grassed ditches/swales.

Roadway Drainage Design

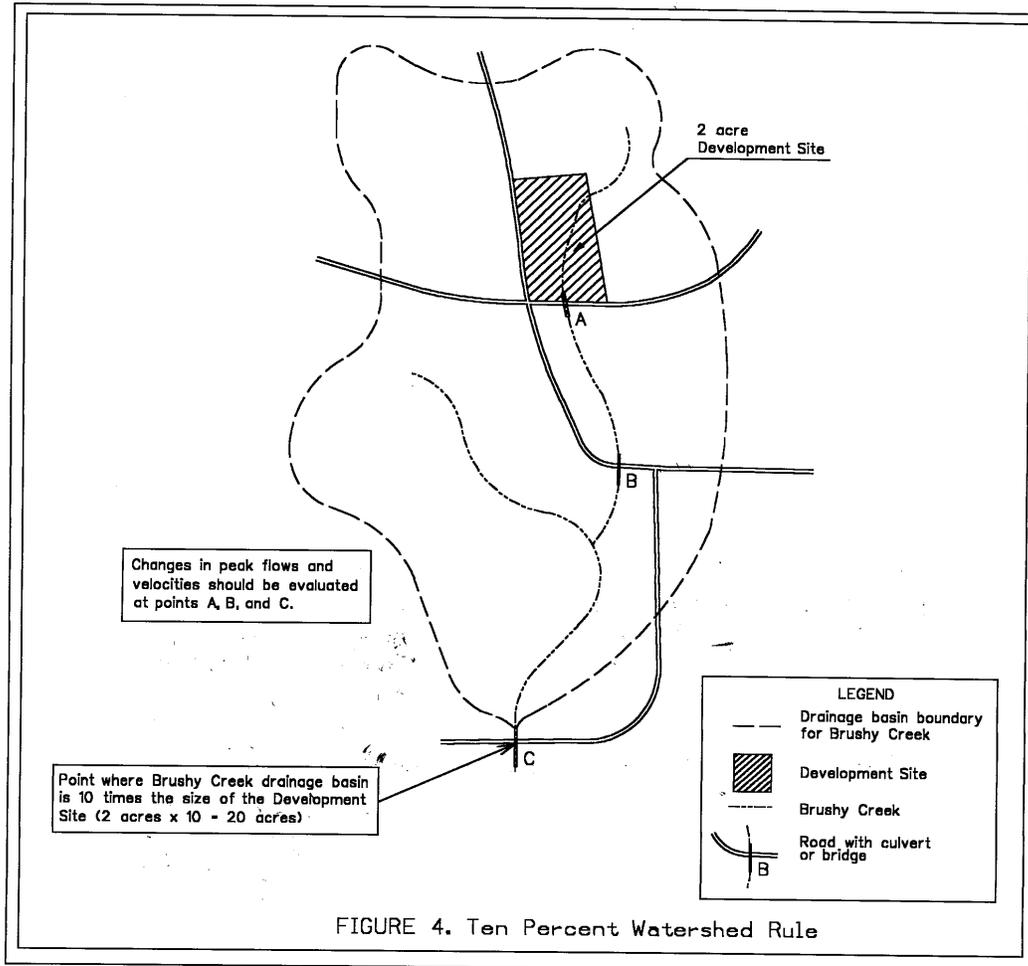
Only high-back curb and gutter is accepted in Clayton County. **Catch basins** should be located no more than 400 feet apart or a distance that will allow no more than an eight foot gutter spread from the face of the curb for twenty-five (25) year peak flows. All other requirements are discussed above.

STORMWATER STORAGE FACILITIES

Stormwater storage facilities are required if the hydrology study determines that detrimental downstream impacts will result after development without storage facilities. **Detrimental downstream impacts** could include flooding of existing stormwater structures, flooding of structural property, increased flooding of private property below the development site, and increased stream bank erosion because of

high velocity flows. The hydrology study should evaluate the downstream system to a point where the proposed developed area being studied is one-tenth of the overall watershed for the downstream system (Figure 4). **The hydrology study should also consider the areas upstream of the point of analysis to be fully developed based on their current zoning classification.**

FIGURE 4. Ten Percent Watershed Rule.



If it is determined that storage is necessary, the structure should be designed and built to insure that the post-developed rate of runoff will not exceed the pre-developed rate of runoff for storm frequencies of 2, 5, 10 and 25 years. The need for emergency overflow facilities for the hundred-year storm should be evaluated. The emergency overflow device is to provide storage for the one hundred year storm event. All outlet pipes from detention ponds should be RCP or HDPE.

The storage ponds should be designed with side slopes of 3:1 or flatter. The pond should be included in the landscaping plan for the development. Storage facilities greater than four feet in depth must be enclosed behind a five-foot security fence. The fence is to be located twenty feet outside the one hundred-year ponding elevation and limits. In residential developments, the storage pond should be contained within a drainage easement that extends twenty feet outside the hundred-year ponding elevation and includes access to a public right-of-way. The twenty-foot access easement cannot be located over a designated drainage easement. Provide a minimum sixteen-foot double gate access to the pond through the fence. Clayton County will consider accepting detention ponds in residential developments if they are designed and constructed in a manner to provide for convenient maintenance and meet other design criteria as established by the Land Development Section.

The property owner must maintain ponds located on commercial property. Future inspections may be conducted by the County to insure the pond is being maintained to design conditions. An as-built certification prepared by a professional engineer must be submitted for each storage facility before the site can be accepted.

Underground and parking lot storage facilities are also acceptable on commercial property. Underground facilities must include appropriate access structures for future maintenance and cleaning. Parking lot storage should not pond water deeper than two (2) feet.

Centralized or regional detention may be approved for multiple sites provided that the facility is constructed and certified before a certificate of occupancy is issued for any development. Regional or centralized storage facilities should be contained in an easement similar to residential facilities.

STORMWATER QUALITY MANAGEMENT

All developments must provide a plan for minimizing the discharge of pollutants in stormwater runoff. This can be achieved by minimizing the amount of impervious surfaces directly connected to drainage systems, by utilizing structural controls or a combination of both.

Structural controls can be multi-purpose facilities, which provide both water quantity and water quality benefits and even recreational opportunities. Structural controls for water quality control should not be used as temporary sediment basins during construction because this can damage their efficiency by clogging filtering devices with silt. When limiting impervious surface percentages to avoid the need for structural controls, **deed restrictions will be required to insure these areas are not developed later without stormwater quality structural controls.** Structures

built on commercial properties are required to be maintained by the owner and are subject to future inspections by County personnel.

For more information regarding the design of stormwater quality structural controls, refer to the [Georgia Stormwater Management Manual](#).

Residential Developments

The table below shows the type of stormwater quality management plan required based on the zoning classification.

A, ER, RS-180A, RS-180	no structural controls required
RS-110, RS-110M, RG-75 (single family)	no structural controls required if streams and primary drainage ways have a fifty (50) foot undisturbed buffer on each side and directly connected impervious areas are minimized
RS-65, RG-75 (two family) RM, RMTH, RMH	structural controls required - treat 1st half-inch of runoff or provide a fifty foot undisturbed water quality buffer on streams and primary drainage ways

PUD (Planned Unit Dev.) overall stormwater quality management plan can be developed with a combination of structural and non-structural controls or plan for each zoning parcel prepared when developed

Note: Only runoff from developed areas must be treated. It may be necessary to separate runoff from these developed areas from other runoff and water from off-site to minimize the size of structural controls.

Commercial/Industrial Developments

Impervious surfaces > 70% (Per Watershed) treat 1st half-inch of runoff from developed areas

Impervious surfaces of 40-70% treat 1st half inch

OR

maintain fifty (50) foot undisturbed buffers along streams and major drainage ways, and velocity dissipation devices utilized to slow velocities from pipes or curb outlets to < 4 fps

Impervious surfaces <40% (Per Watershed) no structural controls required velocity dissipation for flows in excess of 4 fps maintain twenty-five (25) foot undisturbed buffer on all perennial streams – deed

restrictions/covenants to be recorded prior to plan approval

Stormwater Quality Management

Several Federal and State water quality programs require that local governments take the initiative to control water quality conditions in their local streams, rivers and lakes. The streams and rivers in Clayton County also serve as our source of drinking water. The County, in coordination with the Clayton County Water Authority, has conducted detailed assessments of water quality conditions of our streams and rivers and identified how these conditions will change in the future. In order to meet the goals of Federal and State water quality programs and to maintain the quality of our drinking water supplies a pollutant loading target was developed to control the runoff from new development. Other watershed management programs are aimed at correcting problems in areas of existing development. Total suspended solids (TSS) runoff is the parameter used to evaluate new developments. Total suspended solids is a good indicator of most other pollutants because they usually are attached to the soil particles that are suspended in the runoff during rain events. The pollutant loading target for Clayton County for TSS for all new projects is 65 lbs/acre/year. The pollutant loading target for Clayton County for TSS for redeveloped projects is 100 lbs/acre/year.

Clayton County requires all new development designs to utilize the WISE model to insure that runoff from the development meets the County's target for TSS loading. The WISE model can assist the design professional in the selection of the most efficient best management practices for achieving the TSS loading criteria. The WISE model is a simple spreadsheet tool that calculates TSS loadings based on proposed land use for the new development site. The model can demonstrate the value of minimizing impervious and disturbed areas by reducing the need for structural stormwater quality controls. The model and guidance for its use can be obtained on CD from the Environmental Engineer, Clayton County Transportation and Development, for \$10.00 or can be downloaded free of charge from the County's website.

Once it has been determined what kind, if any, of structural controls will be required to meet the TSS loading criteria, the designer should refer to the [Georgia Stormwater Management Manual](#) for guidance on designing these structures.

ENVIRONMENTAL CONSIDERATIONS

EROSION AND SEDIMENT CONTROL PLANS

No land disturbing activity should be conducted until the County has approved an erosion and sediment control plan and has issued a Land Disturbance Permit. The Clayton County Soil Erosion and Sedimentation Control Ordinance defines **land disturbing activity**; for general purposes this is any activity that involves the removal of trees by the roots or changing the existing grades of the property by excavating or filling.

When developing an erosion and sediment control plan you should refer to the current version of the Manual for Erosion and Sediment Control in Georgia for standards and specifications. Plans must clearly identify all “State Waters” and provide a 25 foot buffer on each side of the State Waters. Management of activities within the State Waters buffers is to meet the requirements as stated in Georgia House Bill 1426. Any planned disturbance of the State Waters buffer, other than for road crossings, will require a variance which must be issued by the State Environmental Protection Division. Mass grading will not be permitted unless the developer agrees to stabilize the site, including all disturbed areas, prior to Clayton County approving the development plans. Plans should also indicate the limits of clearing. An approved **Tree Preservation Plan** will also be required before a land disturbing permit is issued.

WETLANDS

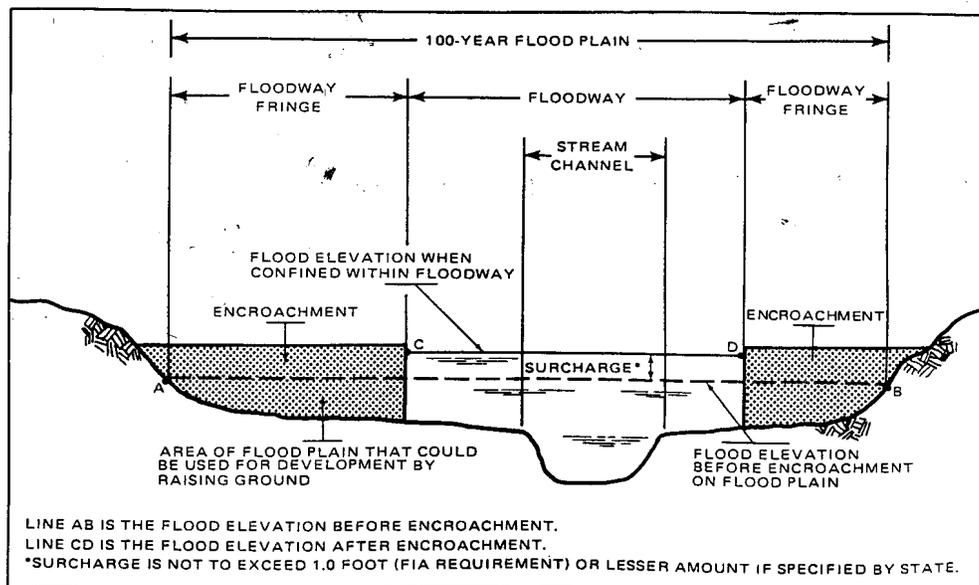
Plans should identify any wetlands on the property or immediately adjacent to the development site. The Director of Transportation and Development or his designee will use the National Wetlands Inventory Map of the U. S. Department of the Interior Fish and Wildlife Service to identify the presence of wetlands at a development site. If necessary, the Developer will be requested to submit a site specific Wetlands Identification prepared by the United States Army Corps of Engineers and/or his qualified Wetlands Specialist. If wetlands disturbance is indicated at the development site, Clayton County will not issue a Land Disturbance Permit until documentation has been provided to show the applicant has approval from the United States Army Corps of Engineers in the form of a "Letter of Permission" or a Section 404 permit. Wetlands containing standing water could be considered State Waters and a buffer variance may be required to disturb these areas.

FLOODPLAINS

All regulated floodplain areas should be identified on the plans. The plans should refer to the current FEMA flood insurance rate map (FIRM) panel. The elevation of the 100-year floodplain should be accurately and clearly identified on the plans. Elevations should be provided every 100 feet or at lot lines if less than 100 feet between lines. The minimum lot size area for RS-65 and RG-75 must be provided outside the limits of and above the 100 year floodplain elevation. The minimum lot size for RS-110 should have a minimum of 8000 square feet of lot outside of the floodplain.

The Clayton County Flood Damage Prevention Ordinance and Federal Emergency Management Agency regulations allow for filling of certain portions of the floodplain with approved plans and permits. When filling of the 100-year **floodway fringe** (Figure 5) is proposed, the extent and volume of fill must be indicated. The County discourages any filling of the floodplain and may require one to one compensatory cuts for any filling or require detailed hydraulic modeling. Fill cannot be placed in the **floodway** without a detailed hydrologic and hydraulic study to determine the impacts of this activity and providing a “No-Rise” certificate for review by the Federal Emergency Management Agency and Clayton County. The finished floor elevation of any structure proposed in the floodplain must be elevated a minimum of 2 feet above the 100 year floodplain elevation for a minimum distance of 20 feet from the floodplain.

FIGURE 5. The Floodway and Floodway Fringe.



INERT LANDFILLS

When using significant amounts of broken concrete, cured asphalt or similar materials as fill, the site may require an inert landfill permit from the State Environmental Protection Division. The State defines inert landfills as “a disposal facility accepting only wastes that will not or are not likely to cause production of leachate of environmental concern. Such wastes are limited to earth and earth-like products, concrete, cured asphalt, rock, bricks, yard trimmings, limbs and leaves. This definition excludes industrial and demolition waste not specifically listed above.” Bury pits on residential construction sites are also considered inert landfills and must be shown on final plats. Recent amendments to the State’s Solid Waste Management rules require that inert landfills, including bury pits, must be located at least 100 linear feet from structures or the property line. Organic material which will decompose will not be allowed as fill under or near the foundation of any structure or under any paved surface or drainage easement.

CONSTRUCTION AND INSPECTION

GENERAL

Construction should not begin until all plans have been approved and a Clearing Permit has been issued. All buffers and tree save areas must also be flagged and inspected by the Director's representative before any clearing is done. A grading permit will not be issued until appropriate erosion controls are installed and a set of approved plans are on the site.

All items of construction shall be in accordance with the approved plans and specifications. The finished work shall be in reasonable close conformity to the approved lines and grades. All materials incorporated in the work are required to meet the applicable specifications. The developer may be required to provide certified engineering or inspection documents to substantiate that the work, or various items of the work, are constructed in accordance with the approved plans. The developer may also be required to provide certified test results or invoices to assure that the various materials are in accordance with the specifications.

The Director's representative may inspect any or all phases of the work or he may designate other professionals to fulfill certain inspection obligations. The developer or contractor may be required to furnish assistance or equipment for certain inspection activities. Assistance will normally be of the nature to determine the accuracy of certain lines, grades, or cross sectional dimensions or to determine test load capabilities of soils, bases, or pavements.

Routine inspections may be on a scheduled or unscheduled basis. Routine inspections will normally be scheduled to coincide with the normal and regular construction activities. However, the Director's representative may require some construction activities be scheduled to coincide with a scheduled inspection visit. In general, the following types of inspections will be conducted by the County. The contractor should contact the County inspector twenty-four (24) hours before an inspection is required.

Subdivisions

- Flagging of buffers
- Erosion control
- Stormwater system installation - Check pipe type, size, bands and grouting
- Curb set up
- Sub-grade - check crown and compaction; proper equipment on site
- Base - check crown and compaction; proper equipment on site
- Paving – subgrade and base adequately prepared; proper equipment on site
- Pre-final inspection - check stabilization, drainage, curbing and paving

Commercial

- Flagging of buffers
- Erosion control
- Stormwater system installation (if it connects to the County Right-of-Way)

- Improvements to County Right-of-Way (grading, curb, road widening or construction, driveways)
- Final inspection for Certificate of Occupancy

The Director's representative will work with the developer and his design engineer to resolve questions which arise that concern the interpretation of Clayton County specifications. The Director's representative will also evaluate and determine the quality of materials that is furnished and the acceptability of the work. Developers or owners may request that the Director of the Department of Transportation and Development review any decision of the Director's representative. The Clayton County Board of Commissioners is ultimately responsible for the review of any decision that remains unresolved.

EROSION AND SEDIMENT CONTROL

Effective best management practices are an essential part of each phase of every construction activity. The developer will take those measures necessary to insure that erosion is minimized and that siltation of adjacent lands, streams, watercourses, or lakes is prevented or held to a minimal and acceptable level. All State Waters buffers must be flagged before clearing begins. Erosion controls should be installed immediately as an area is cleared.

The Director's representative will conduct frequent sediment control inspections. The developer will be notified of all erosion or sediment control deficiencies and

given the opportunity to make the necessary corrections. Failure to make the necessary corrections in the allotted time may result in the Director issuing a Stop Work Order. The Stop Work Order will prohibit any and all construction activities from proceeding until the sediment control procedures are corrected. Persistent violators of the Clayton County Soil Erosion and Sediment Control Ordinance may be cited for violation of this County Ordinance.

CLEARING

Clearing shall not begin until all buffers are accurately located. Clearing shall consist of the removal and disposal of undesirable items or objects from the limits of clearing or right-of-way. These items include trees, logs, brush, rubbish, trash, and other debris lying on the earth's surface. Sediment control measures are to be installed during this phase of construction and must be maintained throughout the project.

GRADING

The grading items outlined in these guidelines are primarily related to roadway and street construction. Grading as related to areas outside the right-of-way will be in accordance with the approved plans. The following requirements are established for unclassified excavation, backfill, and embankment.

- A) **Unclassified Excavation.** This classification consists of all roadway and drainage excavation and the subsequent removal and disposal of all unsuitable material. Unsuitable materials such as highly organic soils, peat, muck, high volume change soils, and highly plastic soils, will be removed from the limits of the road bed and front slopes. Rocks and boulders that are uncovered within the limits of the roadway will also be removed. Excavated areas will be backfilled and compacted with suitable materials.
- B) **Pipe and Culvert Backfill.** Drainage pipes and culverts will be backfilled with materials that meet the Georgia Department of Transportation Specification for Roadway Materials, Section 810, Roadway Materials, Class I or Class II. Backfills will be constructed in six to twelve inch vertical layers and thoroughly compacted. The compacted dry weight per cubic foot for each layer of backfill will be at least ninety-five percent of the maximum laboratory dry weight per cubic foot.
- C) **Embankment.** Areas that are to contain embankment will be cleared and grubbed before any fill material is deposited in the immediate area. All trees, stumps, roots, vegetation, brush, and debris will be removed. The original surface will be scarified to a depth of six (6) inches. In general, embankments shall be built as outlined herein, however construction procedures will vary with the various soils and conditions as indicated below. Suitable materials will be deposited and spread in uniform layers. The layer will be graded to uniform thickness of six (6) to nine (9) inches in depth. Each layer will be brought to a moisture content that is proper to

enhance compaction efforts. The top twelve (12) inches of the embankment will be compacted to a least one hundred (100) percent of the maximum laboratory dry density. Each lift that is below the top twelve (12) inches will be compacted to a density of at least ninety-five (95) percent of maximum laboratory dry density. Layers of fill that are more than ten (10) feet below the top of the embankment will be compacted to at least ninety (90) percent of maximum laboratory density. All density tests will be based upon AASHTO T 99 method of test.

D) **Slopes.** The slope for embankments will be in accordance with the typical section and details approved with the plans. The maximum slope for other embankment shall be 2H:1V for Commercial/Industrial development, 4:1 for Residential development so the future homeowner can maintain it.

CURB AND GUTTER

Curb and gutter will be constructed with class "B" Portland Cement Concrete that is supplied by an Approved Ready Mix Concrete Plant that is listed on the Georgia Department of Transportation list of Approved Ready Mix Concrete Plants. The developer, upon the Director's request, will require the concrete supplier to submit a certified delivery ticket with each load of concrete that is used in the curb and gutter. The delivery ticket will certify the quantity of concrete, the concrete mix proportions, and the class of concrete delivered. The developer will retain the certified tickets and make them available to the inspector.

The grade at which curb and gutter is to be placed will be prepared as established on the approved plans. All soft, loose, yielding, or unsuitable material will be removed from within the curb lines. In general, curb and gutter will be constructed in substantial compliance with the requirements for Georgia Standard Specifications, Miscellaneous Concrete, Section 441 Standard Specifications, Georgia Department of Transportation. However, it is not the intent of these specifications to place restrictions on concrete placement equipment, curb machines, or concrete curb and gutter forms. It is the intent of these guidelines to emphasize the importance of the horizontal and vertical alignment of the in-place curb and gutter. Curb alignment contributes to proper street drainage and must be carefully controlled. The vertical string line tolerance must not exceed one-quarter (1/4) inch in ten (10) feet along the gutter line and one-eighth (1/8) inch in ten (10) feet along the curb line. Gutter surfaces will be finished to present a uniform appearance.

GRADED AGGREGATE BASE

Base will be prepared and constructed in accordance with the approved plans or according to details specified in the Clayton County Standard Nos. 301, 302, 303, or 304. The base will be placed upon a prepared sub-grade. The sub-grade will be constructed in accordance with the approved plans, and it will be tested for compaction immediately prior to base construction. Graded aggregate base (GAB) is acceptable as a roadway base, roadway sub-base, or shoulder base. Aggregate for graded aggregate bases will meet the requirements established in the Georgia Department of Transportation, Standard Specifications, Section 815. The material

will be supplied by a producer currently listed on the Georgia Department of Transportation “List of Approved Coarse Aggregate Producers”.

The aggregate will meet the following specifications

<u>SIEVE #</u>	<u>% PASSING BY WEIGHT</u>
2”	100
1 ½”	97 - 100
¾”	60 - 100
#10	25 - 45
#60	5 - 30
#200	0 - 15

Graded aggregate bases will be constructed in accordance with techniques that meet the applicable requirements of Section 310 of the Georgia Department of Transportation, Standard Specifications. The construction techniques will also produce a homogenous base that is free of irregularities and uniform in density as determined by Standard Proctor Test conducted in accordance with ASTM D 698 or AASHTO T 99. Inspectors will verify that the proper equipment for preparing the subgrade (motor grader, vibratory roller, rubber tire roller, rubber tire loader, water wagon) and the base (motor grader, sheepsfoot compactor, or steel roller, water wagon) is on-site.

SOIL CEMENT BASE

Soil cement base is acceptable as a roadway base by the Clayton County Department of Transportation and Development. Approval to use soil cement base may be granted if a soil cement design is submitted and approved as a part of the original construction plans or as a separate request before construction of the base begins. Request made after the approval of the construction plans should be made at least (10) ten days prior to the beginning of base construction. The design must be prepared by a certified professional testing laboratory and must include a soil cement design analysis and job mix formula. The design must meet the requirements of Sections 810 and 814 of the Georgia Department of Transportation, Standard Specifications.

The typical section thickness for compacted soil cement shall follow that which is required for graded aggregate base as specified in the Clayton County Standard No. 301, 302, 303, or 304. Construction of the soil cement base must meet the requirements in Section 301 of the Georgia Department of Transportation, Standard Specifications. The preparation of the soil cement base shall be done under the supervision of a certified professional testing laboratory. A report from the laboratory should be submitted after the completion of the base and must provide sufficient information to assure that requirements of the approved design and construction methods were as specified. Certified delivery tickets should also be submitted to verify the quantity of Portland Cement delivered to the site. Asphalt should not be applied over the soil cement base until the report has been submitted to and

approved by the Director of Transportation and Development or his designated representative.

HOT ASPHALTIC CONCRETE PAVEMENTS

Pavement surface courses and pavement binder courses for streets or roads will be a designed type of bituminous plant mix asphaltic concrete. The plans will designate the type, thickness, and width of each pavement course on a Typical Section Plan Sheet. The Typical Section Plan Sheet will specify the pavement criteria required in table 2 for Basic Standards for Undivided Two and Three Lane Subdivision Streets.

Bituminous plant mix asphalt that is used within the right-of-way for streets that are proposed for dedication to Clayton County will be furnished by a producer that is approved on the Georgia Department of Transportation's Qualified Products List No. 45, List of Approved Hot Mix Asphalt Plants. Each load of plant mix asphalt that is incorporated into the pavement system will be certified by the producer on the plant's official certified delivery ticket.

Plant mix asphalt will be placed on prepared surfaces that conform to the lines, grades, and thickness shown in the Typical Cross Sections. The gutter edge should be covered with a tack coat before placing asphalt. The placement, spreading, rolling, and compaction operations of asphaltic plant mix for street construction will be in general agreement with the intent of the Georgia Department of Transportation, Standard specification, Section 411, Hot Mix Asphaltic Concrete Construction. The construction operation must result in an acceptable pavement system that is uniform in appearance, free of defects, and true to lines and grades. The pavement will also be compacted to the specified density. Super-pavement meeting Georgia D.O.T. specifications will be accepted for use in Clayton County.

SIGNING

All roadway signing must be installed to meet County standards and specifications prior to street acceptance by the Clayton County Board of Commissioners. All signs must meet or exceed minimum reflectivity, standards of shape, size, color, legend size, and style as set forth in the Manual of Uniform Traffic Control Devices (MUTCD).

Sign location shall be reviewed by the Traffic Engineering Section on the construction plans. Upon completion of construction, the developer has three options:

- 1) Pay the County to manufacture and install the signage; or
- 2) Pay the County to manufacture the plates only, which developers install on custom posts; or
- 3) Manufacture and install his own sign plates and posts to Clayton County Specifications.

This should be noted on the approved construction plans.

County Manufactured and Installed

Once the developer has provided a final plat, the Director's representative will determine the signage required and inform the developer of the actual sign material costs. This will normally be done with the pre-final inspection letter. The developer should pay the County as soon as possible to insure timely placement of the signs. Payment of signage costs is required before streets can be accepted by the County.

Developer Installed (Custom Signage)

When the final plat is submitted, the Director's representative will inform the developer of the location and type of signage required. The developer must then install the signage to County specification before the streets can be accepted by the County.

Please refer to Appendix C for more details on sign materials and construction.

ACCEPTANCE OF STREETS, ROADWAYS, AND DRAINAGE SYSTEMS

The developer will provide a statement on the final plat that certifies that all streets, curbing, shoulders, and drainage systems will be maintained by the developer for a period of twenty-four months. The costs of providing these maintenance services will be the developer's responsibility for the two year period that begins on the date the final plat is accepted by the Board of Commissioners. Coring data for the roadway pavement are to be provided prior to accepting the final plat.

The statement on the final plat shall be worded as follows:

“The developer warrants the streets, curbing, drainage systems, signs, and shoulders within the right-of-way to be free from defects in materials and workmanship for a period of twenty-four months from the date of acceptance by Clayton County.”

The developer will also provide a statement on the final plat that holds him responsible for the overall sediment and erosion control for the development.

The statement on the final plat shall be worded as follows:

“The developer will be held responsible for the erosion control for the referenced development until all lots are completed and stabilized.”

The developer must also provide a statement regarding the signage on his development.

The statement on the final plat shall be worded as follows:

“If Clayton County installs the signage on behalf of the developer, the County relinquishes all maintenance responsibility for a period of 24 months as dictated in the developer’s final plat warranty.”

Prior to acceptance, the developer is required to add to the final plat and sign the Developer Maintenance Agreement.

The statement on the final plat should be worded as follows:

“The Developer agrees that he will be responsible for the monitoring and maintenance of all major drainage easements and the removal of all temporary sediment ponds at a time requested by the Director of Transportation and Development or his designee. If this responsibility is transferred through the sale of the property, it should be verified through a contractual agreement and such agreement copied to the Director of Transportation and Development. Failure to do so will not relieve the Developer of his responsibility.

Developer”

Clayton County Water Authority has also requested that the developer provide a warranty statement for all sanitary sewer and water distribution system improvements.

The statement on the final plat shall be worded as follows:

“The developer warrants all sanitary sewer and water distribution system improvements donated to Clayton County Water Authority for

ownership and maintenance to be free from defects in materials and workmanship for a period of twenty-four months from the date of acceptance of these improvements by the Water Authority.”

Wetlands statements and detention pond statements are to be included on the final plat when appropriate.

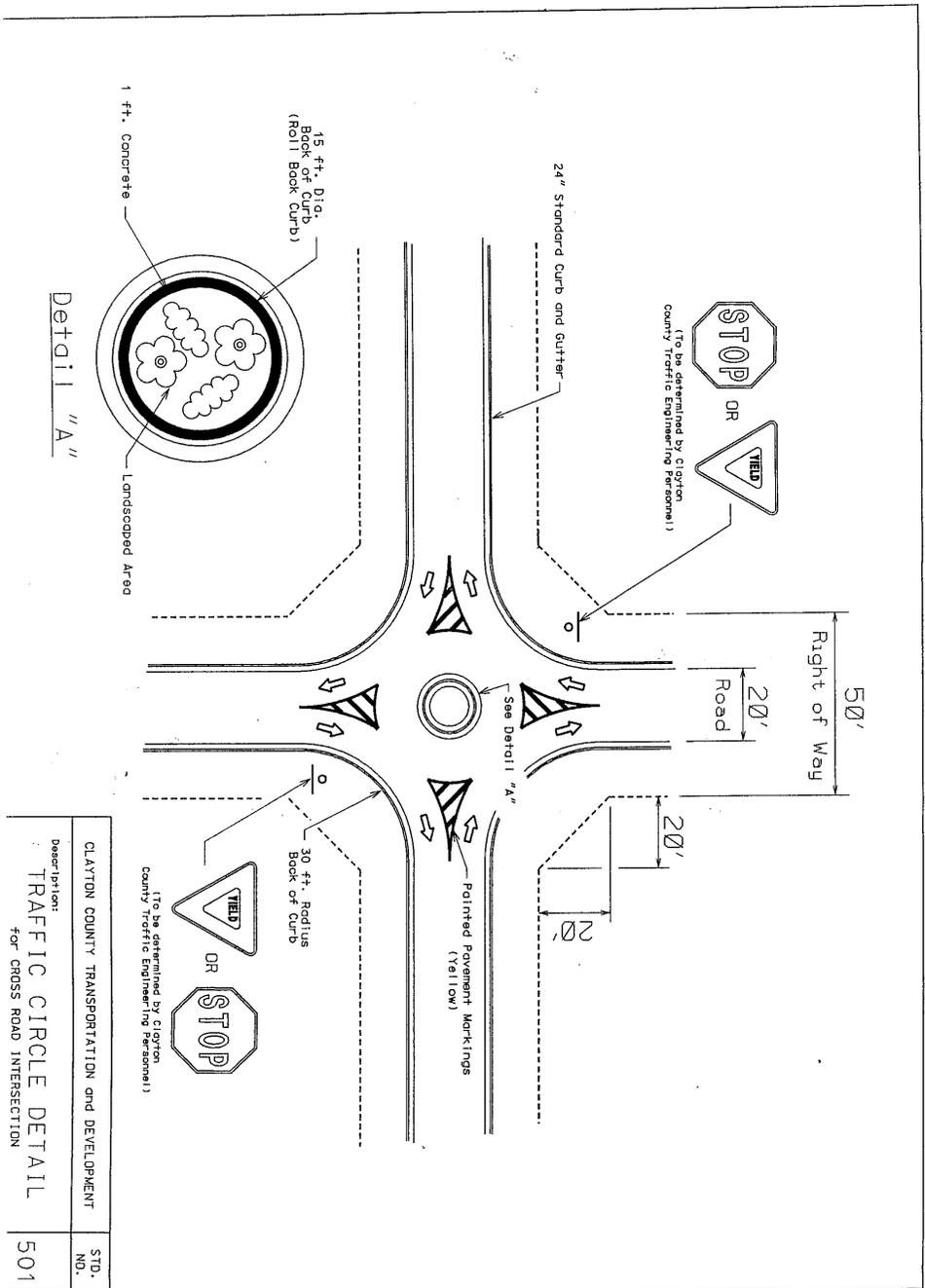
When the developer submits the final plat and the streets have been paved, the Director’s representative will conduct a pre-final inspection of the subdivision and prepare a punch list of items, which need to be completed or repaired. All construction items, drainage systems, signage, and erosion control measures should be in place and completed before the Director recommends approval of the final plat. No building permits can be obtained until the final plat has been approved.

CERTIFICATE OF OCCUPANCY FOR COMMERCIAL PROJECTS

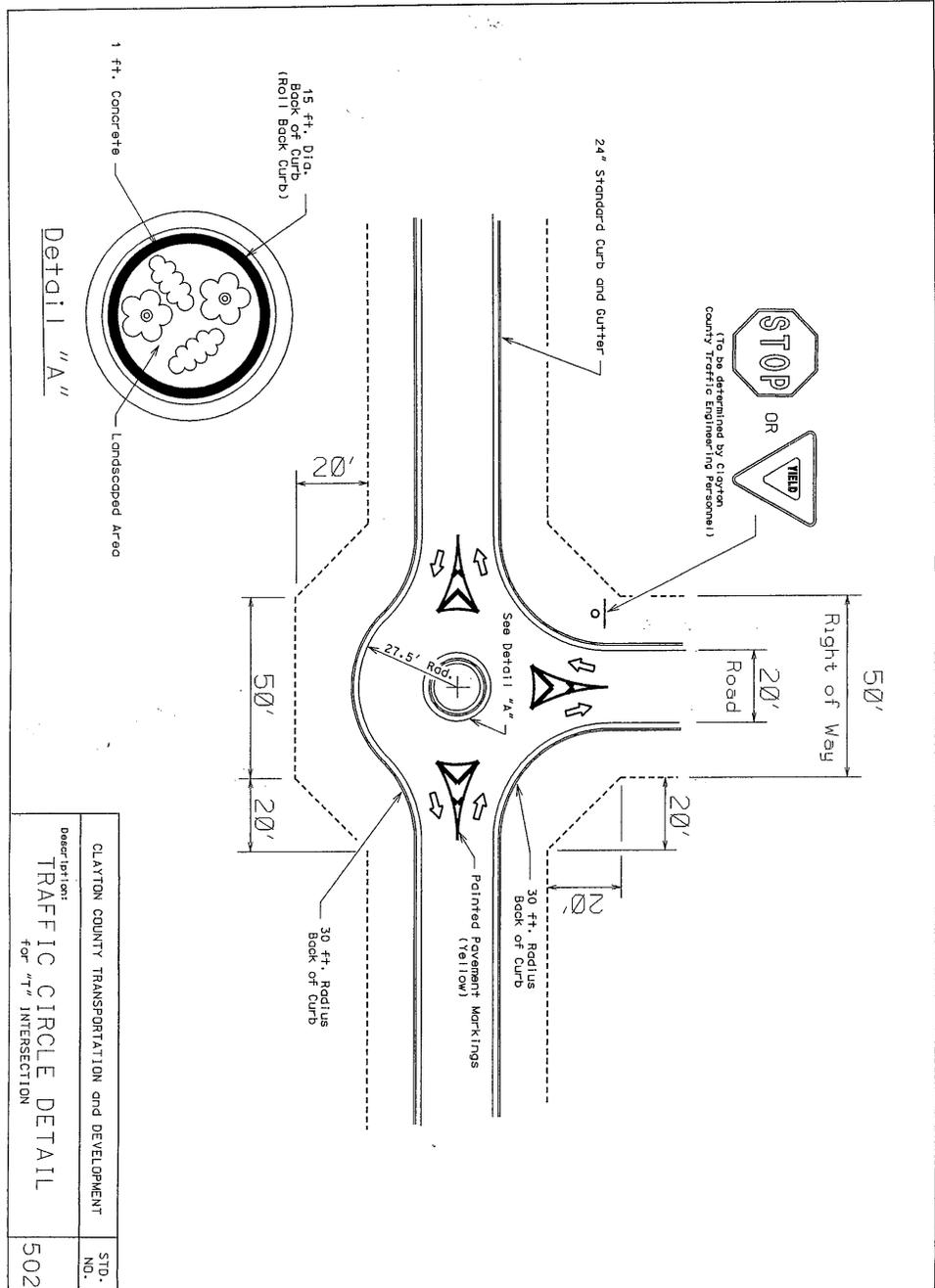
Certificates of Occupancy are issued by the Community Development Department after all Departments involved in the construction process have signed off; this includes the Transportation and Development Department. The following items are inspected by Transportation and Development and must be complete before the Certificate of Occupancy is approved.

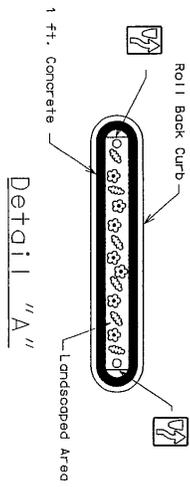
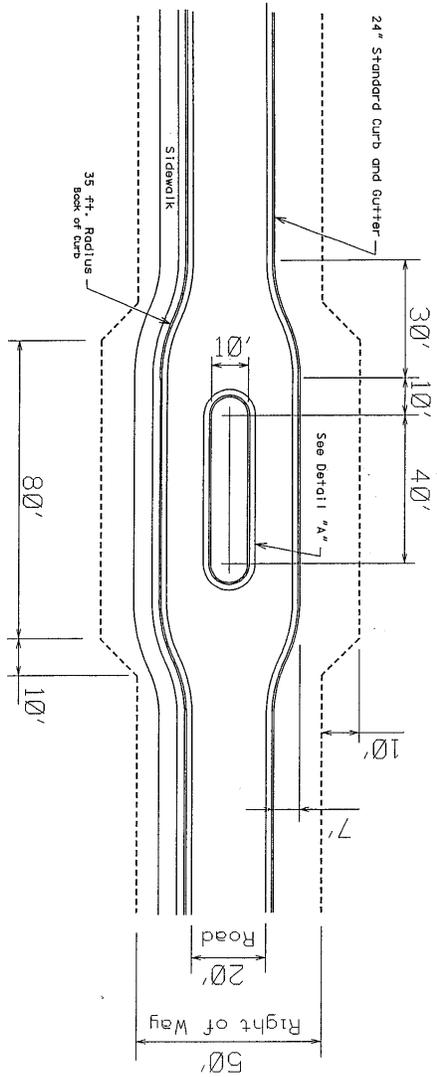
- Curbing and paving improvements in the County right-of-way
- Sidewalk improvements within the County right-of-way
- Concrete driveway apron

- Drainage improvements that are within or connect to the County right-of-way
- Detention pond (including certification by a professional engineer)
- Buffers
- Stabilization of all disturbed areas



CLAYTON COUNTY TRANSPORTATION and DEVELOPMENT	STD. NO.
Description: TRAFFIC CIRCLE DETAIL for CROSS ROAD INTERSECTION	501





CLAYTON COUNTY TRANSPORTATION and DEVELOPMENT	STD. NO.
Description:	
MID-BLOCK DIVERTER	503