Subdivision Street Design Standards and Specifications

Department of Public Works
Engineering Division

Metropolitan Nashville and Davidson County
Tennessee

Final Version

June 3, 2009

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1. PURPOSE, TITLE AND AUTHORITY

1.1. General Purpose

The purpose of these standards and regulations are to provide reasonable design and construction guidelines for the streets, roads, alleys, sidewalks, and transportation infrastructure within the jurisdictional area, promoting Complete Streets principles, economy, durability, safe, and efficient traffic movement without undue congestion.

Standards and regulations are implemented for the interest of safety, convenience, and prosperity of the community in the use of the streets roads and within the Metropolitan Area.

These rules and regulations govern the construction of both public and private roads, streets, and alleys, and shall apply to all areas within the jurisdiction of the Metropolitan Government.

Areas not included are the incorporated boundaries of Belle Meade, Berry Hill, Forest Hills, Goodlettsville, Oak Hill and Lakewood.

1.2. Authority

The authorization of these regulations is granted to the Department of Public Works by the Metro Charter, Chapter 4, Section 8.402, ordinances 78-840, 78-843, and subsequent amendments by the Metro Council. The authority has been conferred to the Metro Government by the Tennessee General Assembly by Title 13, Section 13-3-101 through Section 13-3-304 and Section 13-3-401 through Section 13-3-411, and Title 7, Section 31, of the *Tennessee Code Annotated*, as amended, and other pertinent statutes for the establishment of regulations governing the subdivision of land, and street transportation system.

1.3. Planning Commission Approval Required

Construction plans for the layout of any new streets, roads, and alleys not previously platted, will require a preliminary plat of subdivision, or concept plan approval from the Metro Planning Commission prior to final construction plan approval by the Department of Public Works as required by TCA 13-3-406**.** The construction of new streets along rights of ways platted prior to the existence of the Metropolitan Planning Commission will be required to meet all current construction specifications and guidelines.

1.4. Compatibility

If any provisions of these regulations and any other provisions of law impose overlapping or contradictory requirements, or contain any restrictions covering any of the same subject matter, that provision which is more restrictive or imposes higher standards or requirements shall govern. These regulations do not relieve the applicant from provisions of any other applicable codes, ordinances, or regulations of any agency or department. Any conflicts, errors, or omissions in the approval of any application shall not relieve the applicant from compliance with these specifications of the Department of Public Works, or any other regulatory agency with jurisdiction over the project.

1.5. Variances

If the Department of Public Works concludes that extraordinary hardships or practical difficulties may result from strict compliance with these regulations, a variance from these regulations may be granted, provided that such variance shall not have the effect of nullifying the intent and purpose of these regulations. The Department shall make findings based upon the evidence presented to it in each specific case that:

- The granting of the variance shall not be detrimental to the public safety, health, or welfare or injurious to other property or improvements in the neighborhood in which the property is located.
- The conditions upon which the request for a variance is based are unique to the property for which the variance is sought and are not applicable generally to other property.
- Because of the particular physical surroundings, shape, or topographical conditions of the specific property involved, a particular hardship to the owner would result, as distinguished from a mere inconvenience, if the strict letter of these regulations were carried out.

- In approving variances, the Department of Public Works may impose such conditions as in its judgment, shall secure substantially the objectives, standards, and requirements of these regulations.

1.5.1. Procedure

A petition for any such variance shall be submitted to the Department of Public Works in writing by the developer's engineer along with the initial filing of the construction plans. The petition shall state fully the grounds for the application and all of the facts upon which the petitioner is relying, including documentation of the hardship.

1.6. Non-Compliance

Any submitted construction plans deemed to be in non-compliance with the standards and regulations of the Department of Public Works will be returned for correction. Unapproved plans are not eligible for a grading permit and subsequently not eligible to begin construction. Any work commencing without the approval of the Department of Public Works will be issued a Stop Work Order, and shall be subject to additional legal action.

2. DEFINITIONS AND ABBREVIATIONS

2.1. Purpose

To eliminate ambiguity by providing a full definition of certain words, phrases, and abbreviations, which are used in these regulations. This section is also used to denote all applicable specifications used or referenced within this document.

2.2. Definitions

Wherever used in these General Provisions or in the other Contract Documents, the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

ALLEY – Title 12.04.010 Metro Code: "Alley" means a street or highway intended to provide access to the rear or side of lots or buildings in urban districts and not intended for the purpose of through vehicular traffic.

ACCESS DRIVE AISLE - A privately owned and maintained passageway generally 24 feet wide for two-way traffic, with or without shared parking along it (not individual driveways), providing ingress and egress to multi-family or commercial units.

COMPLETE STREETS - Streets designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists, and bus riders of all ages and abilities are able to safely move along and across a complete street. A broad coalition of advocates and transportation professionals working to enact complete streets policies across the country. www.completestreets.org

CONTEXT SENSITIVE SOLUTIONS – A collaborative process involving all stakeholders that fits its applicable setting and respects design objectives for safety, environment, efficiency, and maintenance, while integrating community values and objectives.

CONTRACTOR – The person, firm or corporation with whom the DEVELOPER has executed an Agreement; or, the person, firm or corporation performing work to meet Metro Specifications.

CUL-DE-SAC – The appropriate terminal for a local street having only one outlet. This terminal shall allow the convenient reversal of traffic movement.

DEPARTMENT OF PUBLIC WORKS – The Metropolitan Government of Nashville and Davidson County, Department of Public Works (MPW).

DEVELOPER – The person, firm or corporation who undertakes any and all actions covered by these regulations.

DRIVEWAY – A general term denoting the path used for ingress and egress from a single residence or commercial property to a public or private right of way or roadway.

EASEMENT - The right of a person or entity to access and use, for a specific purpose, the land owned by another person or entity.

ENCROACHMENT AGREEMENT – A license agreement granted by the Metropolitan Government to a private entity for the encroachment into, onto, over, or under the public right-of-way.

ENGINEER- An engineer certified and registered by the State of Tennessee Board of Architectural and Engineering Examiners pursuant to T.C.A. Title 62, Chapter 2, licensed to practice engineering in the State of Tennessee.

GRADING PERMIT – The permit issued by the Stormwater Division of the Water Services Department of the Metropolitan Government of Nashville and Davidson County, authorizing the grading, movement, and placement of material on a specific site.

HIGHWAY- Title 12.04.120 Metro Code: "Highway" means the entire width between the boundary lines of every way publicly maintained when any part thereof is open to the use of the public for purposes of vehicular travel.

INSPECTOR- The authorized representation of the Metro Department of Public Works assigned to make detailed inspection of any or all portions of the work or materials therefore.

METRO – The Metropolitan Government of Nashville and Davidson County, or its designated representative.

MPW - The Metropolitan Government of Nashville and Davidson County Department of Public Works.

PEDESTRIAN EASEMENT - A right-of-way easement dedicated to the Metropolitan Government primarily for pedestrian movement. Any activity by the property owner that restricts said easement shall require an Encroachment Agreement be granted by the Metropolitan Government.

PERMIT- Written authorization from the Department of Public Works to perform the stipulated work.

PLANS - The drawings which show the character and scope of the work to be performed.

PRIVATE ROAD OR DRIVEWAY – Title 12.04.275 Metro Code: "Private road or driveway" means every way or place in private ownership and used for vehicular travel by the owner and those having express or implied permission from the owner, but not by other persons.

Note: Private roads or driveways are not dedicated to or accepted for maintenance by the Metropolitan Government.

PROJECT – The entire construction to be performed as provided in the Contract Documents.

PUBLIC STREET- Title 12.04.375 Metro Code: "Street" means the entire width between boundary lines of every way publicly maintained when any part thereof is open to the use of the public for the purposes of vehicular travel.

Note: Public streets are both dedicated to and accepted for maintenance by the Metropolitan Government of Nashville and Davidson County.

RIGHT-OF-WAY – The entire area reserved for the purpose of constructing or maintaining the roadway and its appurtenances.

ROADWAY – Title 12.04.315 Metro Code: "Roadway" means that portion of a highway improved, designed or ordinarily used for vehicular travel, exclusive of the berm or shoulder. In the event a highway includes two or more separate

roadways, the term "roadway," as used in this title, shall refer to any such roadway separately but not to all such roadways collectively.

SHOP DRAWINGS – All drawings, diagrams, illustrations, brochures, schedules and other data which are prepared by the Developer's Contractor, a subcontractor, manufacturer, supplier or distributor, and which illustrate the equipment, material, or some portion of the work.

STANDARD DETAILS – The Department of Public Works graphical specifications consisting of written, technical description of materials, equipment, construction system, standards and procedures as applied to the work.

SUBCONTRACTOR – An individual, firm or corporation having a direct contract with CONTRACTOR or with any other Subcontractor for the performance of a part of the work at the site.

SUBDIVISION - Title 17.04.060 Metro Code: "Subdivision" means any subdivision of land as provided in Section 13-3-401 et seq. and Section 13-4-301 et seq., Tennessee Code Annotated.

SUPPLIER – Any person or organization who supplies materials or equipment for the work (including that fabricated to a special design), but who does not perform labor at the site.

SURVEYOR - A land surveyor certified and registered by the State of Tennessee Board of Examiners for Land Surveyors pursuant to T.C.A. Title 62-18-105(d), licensed to practice land surveying in the State of Tennessee.

WORK – Any and all obligation, duties and responsibilities necessary to the successful completion of the Project assigned to or undertaken by the Developer's Contractor under the Contract Documents including all labor, materials, equipment and other incidentals, and the furnishings thereof.

2.3. Abbreviations

The following is a list of abbreviations used within the technical specifications. The appropriate designation shall refer to the latest edition or update published by that organization.

AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act of 1990
ANSI	American National Standard Institute
ASTM	American Society for Testing and Materials

MPC	Metropolitan Planning Commission
MPW	Metropolitan Department of Public Works
MUTCD	Manual on Uniform Traffic Control Devices
NGVD	National Geodetic Vertical Datum
TDOT	Tennessee Department of Transportation

3. STREET DESIGN STANDARDS AND SPECIFICATIONS

3.1. Purpose

The purpose of this section is to assure that sound development will take place in Nashville and Davidson County by the establishment of minimum standards for use in the design of subdivision streets. The following requirements are minimum standards of design; the engineer is encouraged to design beyond these levels when appropriate.

3.2. Applicable Specifications and Standard Drawings

A. All city, county, state and federal laws, ordinances or regulations relating to the work to be performed.

B. The following specifications of The Department of Public Works shall apply, and can be found at http://www.nashville.gov/pw/drawings/index.htm.

02225 Structures for Earthwork and Pipes
02500 Paving and Surfacing
02520 Cement Concrete Curb, Gutter, and Combined Curb and Gutter
02522 Cement Concrete Sidewalks, Driveways, and Median Pavement
02523 Detectable Warnings
02720 Storm Sewers and Drain Systems
330523 Guidelines for Horizontal Directional Borings

C. Department of Public Works Standard Drawings ST-series, available online at http://www.nashville.gov/pw/drawings/index.htm.

D. Tennessee Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition.

Tennessee Department of Transportation, Standard Specifications for Road and Bridge Construction, latest edition, technical specification only, shall apply and become a part of these specifications whenever these specifications do not adequately cover the work to be done. In the event there is a conflict between these specifications and TDOT Specifications, MPW specifications shall govern, unless the construction is on a state route.

E. AASHTO Policy on the Geometric Design of Highways and Streets, latest edition

F. AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads (ADT ≤ 400)

G. Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD),

H. U.S. Department of Transportation, Federal Highway Administration (FHWA)

I. The Americans with Disabilities Act

J. Metro Water Services, Stormwater Division

K. The Downtown Streetscape Plan available at www.nashville.gov/pw/drawings/index.htm

L. Strategic Plan for Sidewalks and Bikeways available at http://pw.nashville.gov/ims/stratplan/default.aspx, must also be incorporated into all proposed subdivisions if they are deemed applicable by MPW. That determination will be made based on the current guidelines of the respective programs.

M. City of Portland Oregon, Green Streets Design Details Appendix G.3 - http://www.portlandonline.com/shared/cfm/image.cfm?id=202917

Green Streets design details may be used when it is desirable to incorporate water quality features into the roadway design. A geotechnical study of the soil and subsurface conditions prepared by the appropriate licensed professional will be required. Public Works specifications will apply as relates to pavement, curb, sidewalk materials, and dimensions.

3.2.1. Approvals

All roadway plans shall be prepared and submitted to the Department of Public Works in duplicate bearing the stamp of the Tennessee Registered Professional Engineer.

A letter of transmittal along with the construction plans for streets and roads including grading and drainage plans shall be submitted by the developer or his engineer, for approval by the Department of Public Works.

The approval on the construction plans shall be good the same time period as the preliminary plat of subdivision, or concept plan, but shall not exceed two years, unless the Department of Public Works determines that work is proceeding at a reasonable pace, and standards in effect are essentially the same as at the original time of approval.

All construction within the right-of-way shall be in compliance with the Americans with Disabilities Act (ADA) in effect at the time in which the activities are performed.

Plats of subdivision recorded prior to the existence of the Metro Planning Commission that contain unbuilt streets shall be subject to current construction standards and specifications.

Final approval and acceptance of streets and roads by the Department of Public Works will not be granted until all work has been completed in accordance with the approved plans. The final top coat of asphaltic concrete surface shall not be placed prior to the completion of 75% of the homes along the street and no later than 90% of the homes or building construction, unless directed by or specifically approved by the Department of Public Works.

3.3. Residential Street Classifications

For the purpose of these specifications, residential streets and roads shall be classified as follows:

3.3.1. Collector Street

Title 17.04.060 Metro Code: "Collector street" means a street designated as such on the adopted collector street plan or otherwise classified as such by the metro traffic engineer based on traffic volumes.

3.3.2. Local Street

Title 17.04.060 Metro Code: "Local street" means a street designed to provide vehicular access to abutting property and to discourage through traffic.

Note: Also a minor street or road that carries local traffic to a collector or arterial street and generally has two or more open ends allowing ingress and egress to other streets.

3.3.3. Minor Local Street

Title 17.04.060 Metro Code: "Minor local street" means a street that is a dead end or loop street providing service to no more than fifty single family residential lots or sixty-five multi-family units.

3.3.4. Loop Streets

A local street having two (2) open ends with each end generally connecting with the same street. No other streets intersect between its two (2) ends, and lots or property front on both sides of the street.

3.3.5. Cul-de-sac Street

A local street having only one (1) open end providing no access to another street. The closed end provides a turnaround circle for vehicles. No other street intersects between the two (2) ends, and lots or property front on both sides of the street.

3.4. Commercial Streets

Commercial and mixed use street cross sections will be considered on a case by case basis. See Section 3.6. for design standards.

3.5. Street Cross Sections

Typical street cross sections and dimensions have been selected to ensure a quality neighborhood street design for the residents, community, and all users of the streets. Selection of the appropriate cross section should be based on Complete Streets principals using a context sensitive solution that considers all likely users, demand for on-street parking, intensity of development along the street, and traffic volume.

Local residential streets must provide adequate width for emergency vehicles, school buses, and other vehicles to safely maneuver around parked cars.

In general the more on-site parking provided, via longer driveways, rear or side loading garages, larger lots, shared/guest parking, etc., the narrower the allowed cross-section. It should be noted however that excessive on-street parking on any cross section in residential areas prohibits the use of automated trash collection devices when alleys are not available, and will not be approved.

Generally one of four residential cross sections will apply for both public and private streets:

3.5.1. ST-251 (Narrow) Minor Local cross section

This cross section **may** be used if **ALL** of the below apply:

- net densities along the street does not exceed 9 units per acre and lots are at least 50 feet wide
- there is sufficient on-site parking to allow for three vehicles per unit single family, or 2.5 vehicles per unit multi-family
- little or no on-street parking is anticipated
- there are alternative parallel routes available
- block length is a maximum of 750 feet
- the street serves a maximum of 50 single family units or 65 multi-family units
- there is no potential for future extension
- use is residential only, no mixed use

3.5.2. ST-252 (Medium) Local Street cross section

This cross section is the **default** cross section for local residential streets.

- average ADT generally does not exceed 3500 vehicles
- intermittent on-street parking is anticipated
- may be used for light commercial or mixed use

3.5.3. ST-252B – (Medium) Local Street with parking both sides

- average ADT generally does not exceed 3500 vehicles
- parking is anticipated along both sides of the street
- when on-site parking provides for less than two (2) vehicles per unit

3.5.4. ST-253 (Wide) Collector cross-section

This cross section is to be used when:

- extensive parking along both sides of the street is anticipated and;
- warranted by vehicle volumes and/or street classification, or
- a center turn lane is desirable.

3.5.5. ST-255 Non Curb and Gutter Cross Section

When it is found to be in the public's interest, a non-curb street design cross section may be permitted in low-density residential zoning, and the actual density of development along the subject street is less than 2 units per acre.

3.5.6. Non-Standard Cross Sections

The use of non-standard cross sections may be permissible in unique developments such as an Urban Design Overlay (UDO),Neo-Traditional neighborhood (TND), or when Green Streets principles are desirable (see Section 3.2, J). Non-standard cross sections are not to be used in routine subdivision designs. Complete Streets principles shall apply, with considerations given to all potential users of the streets.

Whenever non-standard cross sections are proposed, the developer and the professional engineer designing the streets must meet with the Department of Public Works to discuss the project requirements prior to the official submittal of a preliminary plat of subdivision, or concept plan application to the Metro Planning Department. When a Traffic Impact Study is required, the evaluation of non-standard cross sections shall be included with the study.

At the time of submittal of the development application to the Planning Department, an engineering analysis of the non-standard cross sections from a traffic engineer must be submitted with the plans, including but not be limited to: cross sections with scalable dimensions, projected street traffic volumes, on-street parking demand, turn movement templates, complete streets functionality, and compliance with nationally recognized street design standards. Justification must be provided for proposing non-standard streets. No variances will be allowed on paving standards.

When incomplete, inadequate, or unapproved documentation is submitted, the Department of Public Works Standard cross sections will apply.

Combining minimum dimensions on adjacent elements to reduce street width in such a way as to compromise the safety and convenience of the users will not be allowed.

Varying the street width by minimal amounts such that an excessive number of cross sections are produced will not be permitted.

In no case shall any street be less than 24 feet face of curb to face of curb. The MPW standard paving thickness along with curb and gutter details shall apply as shown on ST-252.

The Department of Public Works will make the final determination as to the appropriateness of any non-standard street cross section.

Non- Standard Specifications:

- Travel lanes 9-12 feet
- One-way divided street travel lanes 16 feet
- Parking lanes 7-9 feet
- Bike lanes 4-7 feet
- Sidewalks 5-18 feet
- Grass strips 4-12 feet

3.5.7. Condominium Developments

Where private streets for condominium developments are designed to look and function as public streets with individual driveways from the street serving each unit, the street shall be constructed to public street design standards for width, curb and gutter, sidewalk and pavement details.
When the design is a private access drive aisle with adjacent shared parking, the drive aisle shall be 24 feet in width and have a extruded mountable or post curb, the pavement details shall conform to public street standards.

3.6. Street Design Standards

All geometric design criteria shall conform to the AASHTO Policy on the Geometric Design of Highways and Streets, latest edition, unless otherwise stated in these specifications.

3.6.1. General Guidelines

- Incorporate traffic calming into the design without using external devices or abrupt geometry
- Consider pedestrians, motorists, bicyclists, on-street parking, bus, transit, and all street users
- Use the proper AASHTO design speed for the street classification
- Do not exceed maximum grades
- Choose comfortable and safe horizontal and vertical curves
- Reduce grades on the minor road at intersections
- Maintain intersection sight distance and visibility triangles on corner lots
- Separate horizontal curves and vertical curves whenever possible.
- Avoid a horizontal curve that begins or ends near the crest of a vertical curve, such that the driver does not see the change in alignment
- Avoid a horizontal curve at the bottom of a long vertical grade
- Do not make an uncomfortable vertical profile by using a series of up and down curves
- Do not use compound vertical curves or short tangent sections between vertical curves
- Do not combine minimum lane widths with minimum curb radii

3.6.2. Traffic Calming

Vehicular speeding poses a health and safety threat to other drivers and pedestrians. Historically, police enforcement has been the predominate method used to control speeding. Unfortunately, this approach is most effective only while an officer is present, and the benefit is short term.

The most effective form of traffic calming is to control vehicle volumes and speed through proper street layout. This can be achieved by limiting the uncontrolled length of local and collector streets. Uncontrolled length means stop condition to stop condition. This shall be the primary means of traffic calming in the design of new developments. Large developments shall show planned intersection stop control on the overall preliminary plan set. The use of traffic calming measures other than street layout will be considered on a case by case basis.

- The maximum uncontrolled length for a local street should be 800 feet
- The maximum uncontrolled length for a collector should be 1500 feet

All traffic calming methods require approval by the Department of Public Works Traffic Engineer.

3.6.3. Design Speed

The following minimum design speed shall be used:

- Minor Local Street 20 MPH
- Loop Street over 1200' 30 MPH
- Local Street 30 MPH
- Collector 35 MPH

3.6.4. Grades and Cross-Slopes

Maximum grades shall be approved by MPW as follows:

- Collector Streets shall have maximum grades of 8% residential and a maximum grade of 6% in a non-residential context.

- Local Streets shall have maximum grades of 10% residential and a maximum grade of 8% in a non-residential context.

- Minor Local Streets shall have maximum grades of 12%.

- All streets shall have a centerline crown of 4" above the front edge of the gutter as shown the standard drawings.

Steeper grades than herein specified may be permitted for a Minor Local Street and for a Residential Local Street when such is necessary to lessen environmental impacts resulting from designs to meet lesser grades, provided all other design criteria are satisfied. Documentation of the environmental impact will

be required, and must include an alternative design certified by the design professional. In no case shall any grade exceed fifteen percent (15%) for a minor local road, or twelve percent (12%) for residential Local Road. Minimum grades on all roads shall be no lees than one percent (1%).

3.6.5. Horizontal and Vertical Curves

All horizontal and vertical curves shall conform to the AASHTO Policy on the Geometric Design of Highways and Streets, latest edition. All curve data shall include the typical data necessary to evaluate the design speed of the curve as well as the intended design speed for the respective horizontal or vertical curve.

3.6.6. Low Speed Horizontal Curves

On horizontal curves where design speeds are less than 30 mph, the tangents of the curve shall not exceed the length of the centerline radius. The centerline radius of curved segments shall not be less than 90 feet for a 20 MPH design speed. Short tangents between curves or reverse curves are generally not allowed.

3.6.7. Superelevation

Generally, subdivision streets shall not be superelevated. It is however the responsibility of the design engineer to evaluate the need for superelevation and provide provisions in the design where necessary, or as required by MPW.

3.6.8. Sight Distance

Sight distance along streets and at intersections shall be not less than the minimum horizontal and vertical distances as specified in the AASHTO Policy on the Geometric Design of Highways and Streets, latest edition, for the class of street and design speed under consideration.

Specified areas along intersection approach legs and across their included corners should be clear of obstructions that might block a driver's view of potentially conflicting vehicles. There are many things that can interfere with sight distance such as: curves, grades, bridges, retaining walls, trees, vegetation, cut slopes, fences, signs, building, and parked cars.

The submittal of field run profiles, photographs, and other data will be required for all new streets proposing to connect with an existing street, to determine adequate intersection sight distance and stopping sight distance, if existing contours and/or other features indicate sight distance to be near the minimum or less. In the event that sight distance is inadequate, mitigations will be required prior to the approval of the street connection.

3.6.9. Cul-de-sacs

Terminal treatments shall be required on all streets and roads having only one outlet. These treatments shall be approved as follows:

- All cul-de-sacs shall be designed to accommodate emergency and service vehicles as well as passenger cars. Exceptions to the turnaround requirements may be made for short streets, up to 150 feet long, measured from the edge of pavement of the intersecting street, where emergency and service vehicles are able to back out with relative ease.

- All circular cul-de-sacs of 50 feet or greater radius on permanent dead-end streets shall have a hollow-core turnaround as per the ST-331 drawing.

- Temporary turnarounds shall have a mountable extruded curb installed if the future extension is not part of the same development.

- All cul-de-sac designs shall be approved by MPW.

3.6.10. Curb Return Radii

The minimum radius for a curb or the edge of pavement at the corner of a property with residential zoning shall be 25 feet for angles of 90 degrees or less. Minimum radius of a curb shall be 75 feet for angles greater than 90 degrees.

3.6.11. Intersections

All intersections shall be designed using the following criteria:

- Intersecting streets shall meet at a 90-degree angle wherever possible. Where natural or manmade obstacles prevent a standard intersection, intersecting streets may have a centerline angle of not less than 75 degrees.

- Street Jogs with centerline-to-centerline offset distance shall be a minimum of 150 feet for local streets and 300 feet for collector streets.

- The minimum radius of corner lines (radius returns) of intersecting streets must support all anticipated traffic without encroaching onto the gutter lines. Radius lengths will also determine handicap ramp placement, see standard drawings and details. Any proposed radii smaller than 25 feet will require a turning template drawing to be submitted to show functionality of the design.

- Where a street approach to an intersection is horizontally curved, there shall be a 100-foot minimum straight tangent as measured from the ultimate edge of pavement to the point of curvature. For the purposes of this requirement, the ultimate edge of pavement is that point to which the pavement will extend when the street is built to its full dimension conforming to the standards for its assigned classification.

- Residential streets must have a minimum tangent grade of 50 feet in length when tying into another street. The tangent grade shall be a maximum of 3%. Under extreme environmental conditions a maximum grade of 5% will be allowable for a minor local road.

3.6.12. Turn Lanes

All turn lane additions must by accompanied by a Traffic Study outlining the warrant for the lane addition and the required storage length. The lane and associated taper must be designed by the provisions in the MUTCD and AASHTO Policy on the Geometric Design of Highways and Streets.

3.6.13. Roundabouts

A roundabout is a circular intersection where the entering traffic yields the right-of-way to the circulating traffic. This type of intersection is appropriate in residential developments for its many aesthetic and safety benefits.

Conditions for roundabout installation:

- Locations where traffic signals are not warranted
- Four-way stop intersections
- Intersections with more than four legs
- Intersections with high left-turn flows
- Intersections with unusual geometry
- Intersections with changing traffic patterns
- Locations where storage capacities for signalized intersections are restricted
- Intersections that are important from an urban design or visual point of view

All design criteria shall follow the FHWA and the MUTCD guidelines for striping, signage, and geometry.

3.6.14. Retaining Walls

Walls supporting the roadway are generally not recommended in residential areas. In such cases where retaining walls are necessary, they should be located a distance from the right-of-way equal to their height, and may not be placed along the right-of-way in a manner to preclude access to street frontage of the adjacently owned property. Walls must be designed by a licensed structural engineer, and conform to the TDOT Earth Retaining Structures Manual, latest edition. Detailed plans showing concrete placement and steel bar reinforcement for all cast in place structures must be included.

Independent inspection and geotechnical reports from a MPW approved inspection and testing firm must be provided on a daily basis during construction to the MPW at the owners expense.

Upon completion a “Certification” letter insuring the structure was constructed in conformance with all applicable plans and specifications, must be submitted and stamped by a licensed engineer with the testing firm who provided the inspections.

3.6.15. Bridges and Culverts

Bridges and culverts shall be TDOT standard box or slab type culverts, precast structures, or cast in place design structures. Detailed plans showing concrete placement and steel bar reinforcement for all cast in place structures must be included. All structures must be designed using the current TDOT methods for structural design. Include in the submittal a copy of all design calculations and structural design notes for review.

All bridges and culverts providing storm drainage or stream crossings must be accompanied by detailed drainage calculations used to size the structure. This must be done by accepted industry standards showing existing and proposed water surface elevations for all applicable design storms. At no time can the placement of a proposed structure increase the water surface elevation on adjacent properties at any storm event causing a detrimental impact on that property. For all stream crossings, a copy of the necessary permits from TDEC must be included.

Independent inspection and geotechnical reports from a MPW approved inspection and testing firm must be provided on a weekly basis to the MPW during construction at the owners expense

Upon completion a “Certification” letter insuring the structure was constructed in conformance with all applicable plans and specifications, must be submitted and stamped by a licensed engineer with the testing firm who provided the inspections.

3.7. Construction Plan Requirements

Maximum plan sheet size shall be 24" X 36"

Plans shall be neat in appearance and of such professional quality as these specifications indicate. These plans at a minimum shall include a cover sheet, typical section, grading, drainage, erosion control plan and plan-profile sheet, signage and pavement markings, and construction details for the proposed improvements.

3.7.1. Cover Sheet

The cover sheet shall include the following items:

- Name of the subdivision or development
- MPC Number
- Map and Parcel number
- Council District
- Any and all previous names
- Name of Developer, including physical address, contact person, phone number, and e-mail address
- Name of the engineer, including physical address, contact person, phone number, and e-mail address
- Key map drawn to scale of not less than 1" = 2000' showing all streets within a one mile radius of the subdivision.
- Engineers Seal

3.7.2. Typical Cross Section Sheet

The typical section shall include the following items:

- Typical roadway cross section of any proposed streets within the development using MPW Standard Drawings and numbers, as appropriate.
- Proposed paving detail.
- Proposed Right of Way width.

3.7.3. Grading and Drainage Sheets

The grading and drainage sheets shall include the following items:

- All requirements of the Metro Stormwater Division

- A complete plan of the proposed development at a scale no less than (one inch) = 100' (one hundred feet). This plan is to include existing and proposed contours at intervals no greater than 2' (two feet) (NGVD to be

used exclusively). Contours shall extend to the centerline of all roads bordering the site.

- Where drainage ultimately enters the groundwater via a sinkhole or drainage well, the drainage well, and the drainage area tributary to the sinkhole or drainage well shall be delineated.

- Existing building on the property.

- Existing and proposed impervious surface.

- Existing and proposed drainage structures, including inlets, catch basins,

- Junction boxes, pipes, culverts, cross drains, headwalls, and outlet facilities. This plan should show size, type, slope, invert elevation, and quantity indicated of all structures.

- Any proposed swale ditches, channel changes, or improvements, with typical section and length of change indicated.

- Any high water or flood lines, either calculated or observed in the vicinity of the proposed development, and the source of said line or elevation indicated.

- All fill areas indicated as such, with the limits and elevation indicated.

- At least one benchmark located, with the proper elevation indicate (NGVD to be used exclusively).

- Where special structures such as box culverts, bridges, retaining walls or junction boxes are proposed, detail plans showing dimensions, reinforcement, spacing, cross-sections, elevations, and other pertinent information shall be submitted. For all structures designed by an engineer, please include all structural design notes and calculation sealed by a registered engineer.

- All plans requiring engineering calculations (e.g., subsurface drainage design, structural plans) shall be signed and sealed by a registered engineer licensed in the State of Tennessee.

3.7.4. Plan and Profile Sheets

The plan and profile sheets shall include the following items:

- Horizontal Scale shall be no larger than 1”=20’ and no smaller than 1”=50’ feet for proposed new streets. All improvements to existing streets shall be drawn at a scale of 1” = 20’. Vertical scale shall be no less than 1” = 5’.

- All existing utilities, drainage structures, pavement, shoulder, striping, and planimetric data shall be clearly shown.

- Existing topography and surface features including existing contours at a maximum interval of 2'.

- Existing drainage structures, including inlets, catch basins, junction boxes, pipes, culverts, cross drains, headwalls, and outlet facilities. This plan shall show size, type, slope, and invert elevation of all structures.

- All proposed pavement, infrastructure, curbs, guardrails, signage, etc. shall be clearly shown as proposed improvements. All proposed pavement shall be shaded to provide clarity. All proposed striping shall be thermoplastic marking and conform to all current MUTCD, MPW, and TDOT requirements with regard to location, placement, and material.

- All proposed utility relocations shall be clearly shown and labeled on both the plan and the profile sheets.

- All existing and proposed property, easement and right-of-way lines shall be shown. All private easements for lot access shall be labeled as such.

- Plan section including the street and right-of-way plotted to the proper scale with stationing shown, and matching that of the profile section as nearly as possible.

- Where conventional roadway sections are used, the stabilization required for the roadside ditches, including the linear extent and type of stabilization required.

- All horizontal control points on or pertaining to the proposed centerline, such as PC, PI, and PT; all low points and streets intersections as to station and elevation.

- The centerline shall include all horizontal curve data appropriate to determine design speed by the AASHTO guidelines.

- Roadway profiles plotted to the same scale as identified above and including the proposed centerline finish grade profile, in addition to the existing centerline profile.

- All vertical control points on or pertaining to the proposed profile such as P.V.C., P.V.I., and P.V.T.; all low points and streets intersections as to station and elevation.

- The profile shall include all vertical curve data appropriate to determine design speed by the AASHTO guidelines.

- The profile shall also include all proposed drainage structures, their location, and their elevation. All existing and proposed subsurface utility locations.

Omission of any of the hereto-mentioned requirements for detailed plans shall deem these plans as being incomplete, and shall be returned to the Developer, or his engineer, for completion before review.

3.7.5. Signage and Striping Plan Sheet

A signage and striping plan is required for all new subdivision construction plans. This plan is to show all regulatory, warning, and guide signs proposed. These signs must follow the guidelines set for in the MUTCD with regard to size, height, shape, color, and reflectivity.

All sign faces shall be made of retro-reflective sign materials (example 3M™ Diamond Grade Reflective), conforming to the requirements of Manual on Uniform Traffic Control Devices, MUTCD.

Street signs to have six inch white letters on a nine inch green aluminum blade.

Private street signs shall have the addition of the word “Private” in black on yellow to one end of the sign, and otherwise to be identical to public street signs.

3.7.6. Signalization Plans

Signalization plans are required to meet the standards set forth the by the Public Works Traffic Engineer. Check for guidelines prior to initiating design.

3.7.7. Detour / Road Closure Plan

Detours and closures of existing streets should be avoided whenever possible. Any time a closure is necessary a detailed plan of the detours and specific closures must be submitted. This plan is to include all traffic control required on the existing streets per the MUTCD section with regard to Temporary Traffic Control. Coordination with nearby schools will be required. The developer must also obtain a permit from the MPW Utility Coordinator. It will be at the sole discretion of that office as to time restrictions, additional required traffic control, and necessity of police officers during the closures.

3.8. Subsurface Exploration

Any available data obtained concerning subsurface materials or conditions, which are based upon soundings, test borings, or test pits for use in design of the project shall be submitted and considered as part of the plans and specifications.

4. Construction Requirements

4.1. Purpose

The purpose of this section is to assist in insuring that sound construction practices will take place in Nashville and Davidson County by the establishment of minimum standards for use in subdivision construction.

4.2. Revision of Construction Plans

Should prior to, or during construction, necessary changes be anticipated or required that would constitute a revision of the plans already approved by the Department of Public Works, plans shall be revised with said changes shown, and resubmitted in duplicate, along with a letter stating why such changes are believed necessary. MPW reserves the right to re-review the entire set of plans in the light of the requested changes.

Omission of any of the hereto mentioned requirements for detailed plans shall deem these plans as being incomplete, and shall be returned to the Developer, or his engineer, for completion before review.

4.3. Notice of Activities

The Engineering Division of the Metropolitan Department of Public Works shall be notified, in writing, at least three days prior to construction in order that the inspector representing MPW may be scheduled to inspect any and all proposed work.

4.4. Temporary Suspension of Work

Metro may suspend work wholly, or in part, for such period or periods as he may deem necessary in order to protect the work, or upon failure of the Developer to carry out or perform provisions of these specifications or Metro ordinances.

If it becomes necessary to temporarily suspend work for an indefinite period, the Developer shall store the materials in such a manner that they will not obstruct or impede the use of the public right-of-way. The Developer shall take every precaution to prevent damage to the work performed, provide suitable drainage of the project, and erect temporary structures where necessary to support traffic or protect materials and equipment. All erosion control measures, both temporary and permanent must be maintained and functioning throughout the suspension. Where traffic control is required within public rights-of-way the MPW Engineering Division shall be contacted and approve the proposed plan.

4.5. Permit Required for Work in Public Right of Ways

All work within existing public right-of-ways requires an excavation permit from the Department of Public Works prior to commencement.

4.6. Removal and Disposal of Obstructions

Unless instructed otherwise on the approved plans, the Contractor shall remove existing structures, materials and obstructions, which interfere with the new construction and dispose of excavated materials in a manner acceptable to the MPW and the Metro Health Department.

4.6.1. Materials Found on Project

Stone, gravel and soils found in the excavation may be used in the new construction, providing such materials meet the requirements of Section 02220 and 02225. Use of excavated materials for backfill and embankment shall be subjected to the approval of the Developers Engineer and Metro. All materials deemed suitable shall be stockpiled and may be reused in the project at a later date and different location.

4.6.2. Sinkholes

The developer or contractor must notify MPW within 24 hours of the discovery of any sinkhole. Plans must then be developed to repair the condition and be permitted through both MWS and The Tennessee Department of Environment and Conservation. All repairs under or near a roadway or building envelope must be done in the presence of a licensed Geotechnical Engineer. The engineer is to provide a written report to MPW and any other required agencies for each individual repair area outlining the nature of the sinkhole and the repair method used. This report is to include any other pertinent information as well as the seal of the engineer that prepared the report.

4.7. Clearing and Grubbing

The area to be cleared shall be maintained within the limits shown on the approved construction plans. Care is to be taken to leave individual trees or groups of trees that are not to be disturbed standing and unharmed. All areas within roadway cross sections shall be cleared as to remove all debris and vegetation to allow for roadway construction.