CUYAHOGA COUNTY ENGINEER
TOWNSHIP SUBDIVISION STREET
DESIGN STANDARDS AND IMPROVEMENT
PLAN REQUIREMENTS

September 3, 2008

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I. IMPROVEMENT PLANS FOR TOWNSHIP SUBDIVISION STREETS

The following improvement plan requirements DO NOT govern storm sewers, sanitary sewers, waterlines, storm water pollution, erosion control and retention basins. The Cuyahoga County Sanitary Engineer shall be consulted for improvement plan requirements for sanitary sewers and waterlines. The Cuyahoga County Engineer's Highway Design Department shall be consulted for improvement plan requirements for storm sewers, storm water pollution, erosion control and retention basins.

A. Improvement Plan Form

All plans shall be drawn in ink or computer drafted onto standard size 22" x 34" trimmed mylars at the scales specified below with a 1/2" to 3/4" border on the top, bottom and on the right side, and a 2" border on the left side for binding purposes. Use a lettering guide and scale not less than Braddock No. 5 (3/16" high letters) for proposed work and not less than No. 4 (1/8" high letters) for existing information. Use an open type letter sufficiently heavy to make a good print.

B. Improvement Plan Contents

The improvement plans shall be sufficiently dimensioned and detailed to delineate the contemplated work in such a manner that it can be clearly and uniformly interpreted by the engineers and the contractors. Clarity, completeness and conciseness are essential so as to avoid misinterpretation. The improvement plan submission shall include, but not necessarily be limited to the following:

1. Title Sheet: The Title Sheet shall contain:

   a. Subdivision name, township, original lot and permanent parcel numbers.
   b. Name and Seal of Professional Engineer.
   c. Names, addresses and telephone numbers of owners and subdividers.
   d. The following certification:

   APPROVAL BY CUYAHOGA COUNTY ENGINEER

   Approved by the Cuyahoga County Engineer this _____ day of _____, ____. This approval is limited to the street alignments, profiles, typical sections, grading and paving within the public rights-of-way and to the storm drainage and storm water management improvements for the entire project site.

   _____
   Cuyahoga County Engineer

   e. A Location Map to show general location of the project with respect to intersecting roads, township boundaries, railroads, major streams, etc. It shall be of sufficient scale to identify the project limits with the scale and north arrow shown.

f. A conventional signs legend defining the symbols and lines used throughout the plans shall be shown on the Title Sheet or elsewhere in the plans.
g. An index of the sheets contained in the improvement plans.

h. The following note:

"Underground Utilities"

Two (2) working days before you dig call 800-362-2764 (Toll-free) Ohio Utilities Protection Service (OUPS), non-members must be called directly, and 800-925-0988 (Toll-Free) Ohio Oil and Gas Producers Underground Protection Service (OGPUPS).

2. Plans and Profiles

Plans and profiles of all streets shall be prepared on half-plan and half-profile mylar, with the street plan at the top of the sheet and the profile at the bottom.

Horizontal scale shall not be less than 1" = 50' (1" = 20' or 1" = 30' are preferrable) and vertical scale not less than 1" = 5' unless otherwise approved by the Cuyahoga County Engineer.

The plan portion of the sheet shall minimally show the locations of all existing and proposed street centerlines, centerline stationing, bearings, street names or letter designations, sublot numbers, right-of-way lines, pavement lines, easement lines, construction limits, storm and sanitary sewer lines, inlets, manholes, drainage structures, water lines, valves, hydrants and appurtenances, sidewalks, fences, buildings, trees, ornamental shrubs, monuments, private utilities (above and below ground), PC and PT of all horizontal curves together with curve data, appropriate reference notes, bench marks-one per sheet minimum, flow arrows, a title block, scale and north arrow.

The profile portion of the sheet shall minimally show the existing ground profile at the centerline, the proposed centerline profile grade with percentage shown to hundredths, all vertical curve data including the calculated stopping sight distance for both sag and crest curves, existing centerline elevations every 50' (half station) and at abrupt changes, proposed profile elevations every 50' (25' for vertical curves), all proposed and existing longitudinal storm, sanitary and water line profiles and flow elevations at their connecting structures, bridges and/or culverts and all underground utilities in accordance with ORC 153.64.

3. Stationing and Bench Marks

Stationing, corresponding to plan stationing, shall be shown on the profile and Cleveland Regional Geodetic Survey (CRGS) elevations shall be indicated thereon. Location and description of the bench mark(s) used shall be shown in a box, either on

the plan or profile portion of the sheet. One benchmark every 500 feet shall be shown.

4. Typical Sections

The typical section(s) of the proposed roadway selected from these standards shall preferably be on a separate sheet but may be included with other construction details. The typical section(s) shall show all roadway conditions encountered such as right-of-way width, easement width, pavement width/depth, sidewalk width/depth, berm/tree lawn width, location of curbs, underdrains, storm sewers, sanitary sewers, water mains, valves and hydrants, service connections, utilities, inlets, guardrails, etc.

The horizontal scale shall be 3/8" = 1'-0" and the vertical scale may be exaggerated to show the thickness and item description of each layer of roadway material (a legend should be used for this purpose).

The Cuyahoga County Engineer's "Minimum Construction Standards For Township Subdivision Streets (Local)", including the typical section(s), may be directly inserted into the improvement plans. These drawings may be accessed from the Cuyahoga County Engineer's website (www.cuyctyengineers.org) as ACAD-2008 *dwg* files. Note that the longitudinal storm, sanitary, watermain and utility lines shall generally be located out from beneath the pavement. However, their exact locations and depths shall be as specified by the appropriate agencies and subsequently shown on the typical section(s), cross-sections and plan and profiles, as necessary.

5. Construction Details and Notes

Construction notes and details for all special types of construction not satisfactorily covered in the specifications or elsewhere in the plans shall be included on a separate sheet or sheets. Notes shall include information on design standards, traffic maintenance, utilities, roadway, pavement, storm drainage, sanitary sewers, water work and other work relative to the improvements. Details shall include retaining walls, storm sewers/structures, ditches, sanitary sewers/structures, water work, driveways, drive profiles, intersections, cul-de-sacs, guardrails, barricades, street lighting, tree planting, traffic control plans, maintenance of traffic plans, storm water management plans and all other special conditions. When utilizing the County construction drawings, the Ohio Department of Transportation (ODOT) standard construction drawings or ODOT supplemental specifications, they shall be listed on the Title Sheet or elsewhere in the plans with the pertinent copies of drawings or specifications directly attached to each set of final construction prints.

6. Cross Sections

Cross-sections at intervals not to exceed 50 ft. (normally drawn at even half stations) shall be required for all roadway construction using a vertical and horizontal scale of

1" = 5'-0", unless otherwise approved by the Cuyahoga County Engineer. Proposed and existing storm, sanitary, watermain and private underground utility lines and/or structures shall be shown and located as to offset from the centerline and elevation on each cross-section in concurrence with their same locations on the plan and profile sheets. Existing private and public underground utilities shall be shown on both the cross-sections and plan and profiles whenever relocation work or protective measures are deemed likely occurrences as per ORC 153.64.

II. TOWNSHIP SUBDIVISION STREET DESIGN STANDARDS

A. The Cuyahoga County Planning Commission shall determine the classification (local, collector, arterial) of streets within the proposed subdivision.

Table 1 presents the standards which shall be adhered to in the design of local streets in newly subdivided areas. Design standards for collector and arterial streets shall conform to the most recent edition of the American Association of State Highway Officials' (AASHTO) "Policy on Geometric Design of Highways and Streets" and/or the current edition of the Ohio Department of Transportation's Location and Design Manual, subject to the interpretation and approval of the Cuyahoga County Engineer.

B. Additional Street Design Standards for Cul-de-Sac Streets

1. The minimum right-of-way diameter of a cul-de-sac turnaround shall be one hundred twenty (120) feet for residential streets and one hundred fifty (150) feet for commercial and industrial streets.

2. The minimum pavement diameter for a cul-de-sac turnaround shall be eighty six (86) feet for residential streets and one hundred (100) feet for commercial and industrial streets.

3. Center islands within cul-de-sacs are not permitted unless otherwise granted by a variance of these standards.

C. Horizontal and Vertical Alignment

All changes in vertical and horizontal alignment for Township subdivision streets shall be connected by vertical and horizontal curves as specified in Table 1 for local streets. For collector and arterial streets, see Design Standards reference in Section IIA.

D. Intersection Design Standards

1. Streets shall be laid out so as to intersect as nearly as possible at right angles. A proposed intersection of two (2) new streets of less than seventy five (75) degrees shall not be acceptable.

2. Proposed new intersections along one side of an existing street shall, wherever practicable, coincide with any existing intersections on the opposite side of such street.

3. Closely spaced offset (jogged) intersections are undesirable. Any such jogs shall be located so as not to impede through traffic due to conflicting left-turn movements. Intersecting street jogs with centerline offsets of less than two hundred (200) feet shall not generally be permitted.

4. Intersections with arterial roads from subdivided areas shall be spaced at a minimum of five hundred (500) feet.

5. Intersections involving junctions of more than two streets shall be avoided.

6. The intersection area should be kept free of obstacles. The driver of a vehicle approaching an intersection should have an unobstructed view of the entire intersection and sufficient lengths of intersecting roadways to permit the driver to anticipate and avoid potential collisions. Sight distances at intersections with six different types of traffic control are presented in chapter nine (9) of AASHTO's "A Policy on Geometric Design of Highways and Streets" (2004 edition).

7. The alignment of intersecting streets shall be maintained for a distance of one hundred (100) feet from the point of centerline intersection. Intersections should not be situated on a sharp horizontal curve.

8. Grades of more than three (3) percent shall not be permitted within one hundred (100) feet of an intersection. Intersections should not be situated just beyond short crest vertical curves.

III. INSPECTION OF IMPROVEMENTS DURING CONSTRUCTION

The Cuyahoga County Engineer must inspect and subsequently approve all roadway alignments, profiles, typical sections, grading and paving within the streets rights-of-way. An inspection application and appropriate inspection fee deposit must be filed with the Cuyahoga County Engineer's Construction Department prior to the start of inspection activities.

TABLE 1
LOCAL STREET DESIGN STANDARDS*

	Residential	Commercial & Industrial
Minimum Right-of-Way width (feet)	60	80
Minimum Pavement width (feet) (From back of curb to back of curb)	26	30 (1)
Design Speed (mph)	30	35
Posted Speed (mph)	25 (2)	25 (2)
Maximum Grade (%)	7	5
Minimum Grade (%)	0.5	0.5
Cross Slope (feet/feet)	0.02	0.02
Maximum Degree Curve for Horizontal Curves (degrees)	17.25 (17°-15'-00")	11.25 (11°-15'-00")
Minimum Horizontal Curve Radius (feet)	333 (3)	510 (3)
Minimum Vertical Curve "K" (4)		
Crest	20	30
Sag	40	50
Minimum Stopping Sight Distance (MSSD) - (feet)	200	250
Minimum Curb Radius (feet)		
Type of Streets Intersecting:		
Local - Local	37	50 (5)
Local - Collector/Arterial	50 (5)	55 (5)
Minimum Vertical Clearance (feet)	14.5	14.5
Minimum Horizontal Clearance from face of curb (feet)	1.5 (6)	1.5

TABLE 1 NOTES:

(1) On-street parking will not be permitted. Each lot shall have adequate off-street parking facilities. Where on-street parking is permitted by variance of these standards, an additional eight (8) feet of pavement width per side is required.

(2) Per Section 4511.21(K)(5) of the ORC, the Board of Township Trustees must declare reasonable and safe prima-facia speed limits by resolution. Speed limits so adopted by the Board become effective when appropriate signs giving such notice are erected.

(3) Values were determined based on a quarter inch/foot (0.02) normal cross slope (without superelevation), per the guidelines recommended in the "Sharpest Curve without Superelevation" for Low-Speed Urban Roads Section, Chapter III, of AASHTO's "A Policy on Geometric Design of Highways and Streets" (2004 edition). Superelevation is not required on local streets in residential and commercial areas; it should be considered on local streets in industrial areas to facilitate safe operation. Where superelevation is used, street curves should be designed for a maximum superelevation rate of 0.04.

(4) The constant "K" equals the minimum vertical curve length (L) in feet divided by the algebraic difference in the percent rate of grade (A), and L = A x K. For low point sag and high point crest locations, keep the curve length as short as possible to maximize longitudinal drainage slopes through the curve area.

(5) Equivalent three-centered compound curve designs may be used in lieu of simple radii curve to more appropriately fit the turning paths of buses and trucks.

(6) When an "ODOT Type 3-A" roll over curb is permitted in lieu of the typically installed "ODOT Type 2-A" 6 inch high barrier curb, a 4' -0" minimum horizontal clearance is required.

* Also see the Cuyahoga County Engineer's "Minimum Construction Standards for Township Subdivision Streets (Local)". These drawings may be directly inserted into the improvement plans. These drawings may be accessed from the Cuyahoga County Engineer's website (www.cuyctyengineers.org) as ACAD 2008 *dwg* files.