

GENERAL POLICY AND PROCEDURE

DEPARTMENT OF PUBLIC SERVICE
DIVISION OF INFRASTRUCTURE MANAGEMENT
CITY OF COLUMBUS, OHIO

SUBJECT: Residential Street
Pavement Design

EFFECTIVE DATE: December 1, 2014
PAGES: 4
By: Tracie Davies

I. **Applicability.** This policy shall be applicable to the design of pavement for all public streets classified as residential, including alleys in the City of Columbus.

II. **Effective Date.** This policy as revised and effective December 1, 2014 shall apply to all residential roadway engineering drawings submitted to the Public Service Department for initial review after the effective date.

III. **Limitation on Use.** The use of multiple pavement types for any one class of roadway is not permitted in any section of a given development. A section of a development is defined by the proposed subdivision plat. The roadway class is defined by a range of Ultimate Average Daily Traffic shown in Table 1: Residential Pavement Design Options.

IV. **Definitions.**

A. **Working Day.** A working day is hereby defined as any weekday, Monday through Friday that is not a city holiday.

V. **Pavement Design Options.** The City of Columbus has specified pavement designs for residential streets. The designs are categorized by pavement material type, "standard" and "soil-stabilized", and ultimate expected maximum average daily traffic. Refer to Table 1: Residential Pavement Design Options for this information.

A. Pavement Design with "Standard" Option.

If an owner/developer has elected the "standard" pavement design option, the owner/developer shall select an appropriate pavement design from Table 1: Residential Pavement Design Options using the Ultimate Average Daily Traffic. Pavement buildups are based on subgrade support that has been properly prepared in accordance with City of Columbus Construction and Materials Specifications (CMSC), Item 204 Subgrade Compaction.

B. Pavement Design with "Soil-Stabilized" Option.

If an owner/developer selects the option of utilizing "soil-stabilized" pavement design, such determination shall be based upon engineering analysis of soil samples obtained from various representative locations within the roadway construction limits throughout the proposed residential development section. The owner/developer shall submit said analysis for review and acceptance to the Chief Plans Official, Engineering Section, Building & Zoning Services Department (One Stop Shop) at the time of initial plan review submittal. The analysis report shall include the site map showing locations of soil

samples taken, soil type identification, analysis of the soil samples for suitability for soil stabilization, and a recommendation for applicable soil stabilization. Such analysis shall be performed and signed and sealed by an Ohio-registered professional engineer practicing in geotechnical engineering. Obtain written acceptance from the City Material Engineer before continuing with the mixture design test procedure. Allow seven days for the review. Once approval is received to proceed with the soil-stabilization option, a Mixture Design Report, including a mix design for each anticipated soil type, shall then be submitted to the City Material Testing Laboratory no less than 45 days in advance of stabilization operations. The City Material Engineer will review the Mixture Design Report and provide written approval or rejection. Approval must be obtained before plans are signed. If rejected, the consulting engineer must address the comments and re-submit the analysis as indicated above. Refer to CMSC Item 206 Chemically Stabilized Subgrade.

VI. **Alley Pavement Design.** The recommended pavement designs for alleys shall be selected from the ADT of 1,501-3,500 traffic loading category of Table 1: Residential Pavement Design Options; however, for a CIP project, the alley pavement material type will be provided in the scope.

VII. **Plan Review.**

A. General. The owner/developer shall provide on the engineering drawings submitted for initial review the ultimate average daily traffic (ADT) volumes for each street segment in the proposed project. The ADT volumes shall be submitted on an exhibit showing the proposed and existing streets for this and all adjoining developments. Said ADT volumes shall represent full build-out of the project and abutting properties. Streets connecting to existing, planned and future developments shall include full build-out traffic volumes from those developments. The distribution of these ADT volumes shall also be indicated on the exhibit. Residential collector and higher-classification streets in the projects shall include ADT for all through traffic and locally generated traffic. All residential engineering drawings shall have a typical section depicting the street pavement design selected.

B. "Soil-Stabilized" Pavement Design. If the owner/developer has elected the "soil-stabilized" pavement design alternative, the roadway engineering drawings shall show all necessary typical details, plan notes and directions to the contractor specifying the pavement design selected for the project.

VIII. **Construction.**

A. General. All pavement and subgrade construction shall comply with the approved engineering drawings and specifications for the project. All applicable sections of City of Columbus Construction and Material Specifications, current edition shall be followed. Construction of soil subgrade shall be performed according to the requirements of CMSC Item 204 Subgrade Compaction.

B. "Soil-Stabilized" Pavement Design. Selecting a soil-stabilized pavement design commits an owner/developer to a more rigorous subgrade preparation process than a "standard" pavement design or soil modification. Testing, sampling and construction of stabilized soil subgrade shall be conducted according to the requirements of CMSC Item 206 Chemically Stabilized Subgrade.

IX. **Soil Modification.** If during the Construction Phase it becomes necessary for the Contractor to modify/stabilize the soil in order to aid subgrade compaction by drying out wet areas, and improve the working platform, no reduction in the pavement design shall be permitted. Testing, sampling and construction of modified/stabilized soil subgrade shall be conducted according to the requirements of CMSC Item 206 Chemically Stabilized Subgrade. The unconfined compressive strength testing requirements may be waived. Soil modification is the option of the owner/developer. The owner/developer shall obtain the recommendation of an Ohio-registered professional engineer practicing in geotechnical engineering, and submit the recommendation and laboratory control data to the Construction Material Testing Manager for review and approval at least by 12:00 PM, two (2) working days before commencing soil modification.

X. **Roller Compacted Concrete.** Roller-Compacted Concrete (RCC) design and construction shall be in accordance with City of Columbus Supplemental Specification 1523 Roller Compacted Concrete Pavements. RCC shall only be used with the composite pavement buildup option.

XI. **Revision History.**

- **July 8, 2002**
- **February 28, 2003**
- **May 31, 2005**
- **April 15, 2006**
- **December 1, 2014**

APPROVED BY:



DIRECTOR

11/11/14

DATE

Table 1. Residential Pavement Design Options

Average Daily Traffic	Typical Application	Pavement Component	Standard				Soil-Stabilized			
			FD Asphalt	Concrete, 4,000 psi	Composite	Flexible	FD Asphalt	Concrete, 4,000 psi	Composite	Flexible
0 - 500	Typically mini-greens streets and cul-de-sac streets with no future extensions possible	AC Surface*	1.25		1.25	1.25	1.25		1.25	1.25
		AC Intermediate**	1.50		1.50	1.50	1.50		1.50	1.50
		Item 301	5.25			3.25	3.25			3.00
		Item 304				6.00				6.00
		Item 306			6.00				6.00	
		Item 452		6.00				6.00		
	Constructed Thickness	8.00	6.00	8.75	12.00	6.00	6.00	8.75	11.75	
501 - 1,500	Typically short one to two-block long loop streets with no future extensions possible	AC Surface*	1.25		1.25	1.25	1.25		1.25	1.25
		AC Intermediate**	1.50		1.50	1.50	1.50		1.50	1.50
		Item 301	5.75			3.75	3.75			3.00
		Item 304				6.00				6.00
		Item 306			6.00				6.00	
		Item 452		6.00				6.00		
	Constructed Thickness	8.50	6.00	8.75	12.50	6.50	6.00	8.75	11.75	
1,501 - 3,500	Typically through streets serving one or more neighborhoods or abutting properties, but no non-residential uses. And alleys.	AC Surface*	1.25		1.25	1.25	1.25		1.25	1.25
		AC Intermediate**	1.50		1.50	1.50	1.50		1.50	1.50
		Item 301	7.25			5.25	4.75			3.75
		Item 304				6.00				6.00
		Item 305			6.50				6.50	
		Item 452		7.00				7.00		
	Constructed Thickness	10.00	7.00	9.25	14.00	7.50	7.00	9.25	12.50	
> 3,500		Use ODOT Design Method for Ultimate Design ADT ***								

Pavement

Material Types

FD Asphalt = Full depth asphalt on prepared subgrade

Concrete = 4,000 psi strength PCC concrete on prepared subgrade

Composite = 3,000 psi strength PCC (Item 306) concrete base with two-layer asphalt surface, or 3,500 psi strength RCC (SS 1523) concrete base with two-layer asphalt surface, or 4,000 psi strength PCC (Item 305) concrete base with two-layer asphalt surface

Flexible = Asphalt on compacted aggregate base

Notes:

Item numbers refer to Columbus Construction and Material Specification section

-Item 305 with Class C Concrete: Min. 28-day compress. strength of 4,000 psi

-Item 306 with Class F Concrete: Min. 28-day compress strength of 3,000 psi

-Load Transfer devices are not to be used in concrete pavement (Item 305, 306, 451, 452) with thicknesses 7 inches and less

-Subgrades are to be properly prepared in accordance with Item 204 Subgrade Compaction

*AC Surface = Item 448 Asphalt Concrete, Surface Course (Medium Traffic), PG64-22

**AC Intermediate = Item 448 Asphalt Concrete, Intermediate Course (Medium Traffic), PG64-22

*** Ultimate Design ADT refers to Average Daily Traffic (ADT) with percent trucks breakdown per ODOT for full build-out of development, including through traffic.