



City of Columbus  
Mayor Michael B. Coleman

# Public Service Department

Linda K. Page, Director

## MEMORANDUM

TO: All designers and builders of residential streets

FROM: Randall J. Bowman, P.E.  
Assistant Administrator/City Engineer *RJB*

SUBJECT: Residential Street Pavement Design

DATE: February 27, 2003

The City has revised its policy on residential street pavement design. The newly revised document is available for viewing and download at the Transportation Division website located at [www.cmhdot.com](http://www.cmhdot.com). The revised policy becomes effective February 28, 2003.

Certain changes and additions to the Residential Street Pavement Design policy have been made by the City based on experiences with the policy in 2002 and ongoing research and cooperation with the construction industry. The City of Columbus Transportation Division strives to improve its procedures to reflect good business practice while providing quality services to residents and the building community. The revised policy maintains quality standards for residential street construction, promoting lower-cost roadway infrastructure provided to the community without forfeiting long-term performance.

Major changes in this revision include:

- Updated procedural timeframes and deadlines to reflect experience with policy during 2002 construction season. For the City to accurately process reports, field changes and recommendations from geotechnical engineers, some deadlines were increased.
- Updated and renamed Table 1. Changes to composite and concrete pavement options made to reflect experiences during 2002 construction season and ongoing input from various construction industry representatives.
- Replaced references to "Design & Plan Services Engineer" with "Design & Plan Services Section Manager"
- Corrected confusing grammar throughout the document.
- Reflected updates to procedures in Figures 1 and 2.

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614-645-7602 Facilities Management Division  
614-645-8281 Fleet Management Division  
614-645-7620 Refuse Collection Division  
614-645-8376 Transportation Division

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City Hall/90 West Broad Street, Rm. B-16/Columbus, Ohio 43215-9001  
423 Short Street/Columbus, Ohio 43215-5614  
2100 Alum Creek Drive, Columbus, Ohio 43207-1714  
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# GENERAL POLICY AND PROCEDURE

DEPARTMENT OF PUBLIC SERVICE  
TRANSPORTATION DIVISION  
CITY OF COLUMBUS, OHIO

**SUBJECT:** Residential Street  
Pavement Design

**EFFECTIVE DATE:** February 28, 2003  
**PAGES:** 7  
**By:** RJB

- I. Applicability.** This policy shall be applicable to the design of pavement for all public streets included with residential development in the City of Columbus.
- II. Effective Date.** This policy shall apply to all residential roadway engineering drawings submitted for review to the Public Service Department Transportation Division.
- 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. Provision for Residential Streets Under Review.** This provision shall apply only to those residential street engineering drawings submitted for review prior to the effective date, but not yet approved. If the owner/developer desires to update the engineering drawings under review to comply with this policy, the owner/developer shall submit the required documents with the next plan review submittal to the Transportation Division as explained in the Design section below.
- V. Provision for Residential Street Drawings Approved Prior to Revised Effective Date.** This provision shall apply only to those residential streets that have engineering drawings approved prior to the effective date of this policy. The owner/developer may update the approved engineering drawings to comply with this policy if the roadway subgrade has not been constructed (cut or filled) to final elevation.
- 1. 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.

**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	Item 404	1.25		1.50	1.25	1.25		1.50	1.25
		Item 402	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	7.50	12.00	6.00	6.00	7.50	11.75
501 - 1,500	Typically short one to two-block long loop streets with no future extensions possible	Item 404	1.25		1.50	1.25	1.25		1.50	1.25
		Item 402	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	7.50	12.50	6.50	6.00	7.50	11.75
1,501 - 3,500	Typically through streets serving one or more neighborhoods or abutting properties, but no non-residential uses	Item 404	1.25		1.25	1.25	1.25		1.25	1.25
		Item 402	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			7.00				6.50	
		Item 452		7.50				7.00		
		Constructed Thickness	10.00	7.50	9.75	14.00	7.50	7.00	9.25	12.50
> 3,500	Use ODOT Design Method for Ultimate Design ADT * *									

FD Asphalt = Full depth asphalt on prepared subgrade

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

Composite = 2,500 psi = 2,500 psi strength PCC concrete base with asphalt surface

Flexible = Asphalt on compacted aggregate base

Minimum pavement component layers:

Item 404: 1.25 inches

Item 402: 1.50 inches

Item 301: 3.00 inches

Item 304: 6.00 inches

Item 305: 6.00 inches

Item 306: 6.00 inches

Item 452: 6.00 inches

Item numbers refer to Columbus Construction and Material Specification section

\* Item 306 with Class B (Modified) Concrete: Min. 28-day compress strength of 2,500 psi

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

**VI. Pre-Design When Reserving "Soil-Stabilized" Option.**

A. General. Before submitting engineering drawings to the Transportation Division for review, the owner/developer shall decide whether to reserve the option of "soil-stabilized" pavement design in the final engineering drawings. Refer to Figure 1: Selecting Pavement Design Options for a graphical representation of the process to select alternate pavement designs.

B. Reserving "Soil-Stabilized" Pavement Design Option. If an owner/developer elects to reserve 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 site. The owner/developer shall submit said analysis to the Design & Plan Services Section Manager for review and concurrence at least two weeks in advance of submitting engineering drawings for review. 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. It is strongly suggested the owner/developer meet with the Transportation Division Construction Materials Manager prior to preparing soils reports.

**VII. Plan Review.**

A. General. The owner/developer shall provide with the engineering drawings for review ultimate average daily traffic (ADT) volumes for each street segment in the proposed project. 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. 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 be provided with a "standard" pavement design. Project quantities and pay items shall be broken out for each pavement design option.

B. "Soil-Stabilized" Pavement Design. If the owner/developer has elected to reserve 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 options selected for the project. No more than two "standard" pavement designs and one "soil-stabilized" pavement design (total of three options) shall be provided on the engineering drawings. Bonds and inspection fees shall include the cost of the most expensive pavement design alternative if more than one pavement design is provided on the engineering drawings.

### **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.

B. Selecting "Standard" Pavement Design. Following approval of the engineering drawings and at least seven (7) calendar days prior to constructing (cut or filling) the roadway subgrade to final elevation, the owner/developer shall submit revised construction drawings showing the final selected pavement design option to:

Design & Plan Services Section Manager  
Transportation Division  
109 North Front Street  
Columbus, Ohio 43215  
Fax: 614-645-6938

C. Selecting "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. In addition to the notification requirements stated above, the owner/developer shall obtain soil samples approximately 45 calendar days prior to conducting soil stabilization operations. The samples shall be obtained at the depth of the proposed subgrade at representative locations along all residential streets proposed for soil-stabilization. A sufficient number of samples shall be taken to ensure control data (moisture-density field relationship curves), developed in the laboratory, represent field conditions, and to account for any change in soil type. A mix design shall be submitted for each anticipated soil type. The analysis shall be provided to the Design & Plan Services Section Manager for review and approval no less than 21 calendar days prior to soil stabilization operations. Testing, sampling and construction of stabilized soil subgrade shall be conducted according to the requirements of Supplemental Specification 1503.

**IX. Soil Modification.** Soil modification shall be defined as an optional mechanical and chemical treatment of a soil subgrade and constructed in compliance with Supplemental Specification 1502 and City of Columbus Construction and Material Specifications. No reduction in the pavement design or any credit to the owner/developer shall be permitted for conducting soil modification. 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 Design & Plan Services Section Manager for review and approval at least two (2) working days before commencing soil modification. Refer to Figure 2: Selecting Soil Modification for a graphical representation of the process to select soil modification.

**X. Density Testing.** Density of asphalt and aggregate layers constructed under this policy shall be tested and verified according to Supplemental Specifications 1501 and 1542.

**XI. Construction Substitutions.** Following written owner/developer notification to the Design & Plan Review Section Manager of selecting a pavement design, no substitutions of pavement design or pavement materials shall be allowed.

**XII. Warranty.** Pavements listed in Table 1: Residential Pavement Design Options constructed according to this policy shall be guaranteed by the developer/owner for a period not less than two (2) years from date of acceptance of the street.

**XIII. Reference Materials.** Extensive study and analysis was conducted from June, 2001 through January, 2002 by a committee composed of Transportation Division staff; representatives of the building industry, design engineering, and geotechnical engineering communities; and Resource International, Inc., a geotechnical and pavement design consulting firm retained by the City of Columbus. Study reports, graphs, assumptions and other background documents are on file in the office of the City Engineer.

**XIV. Revision Notes.**

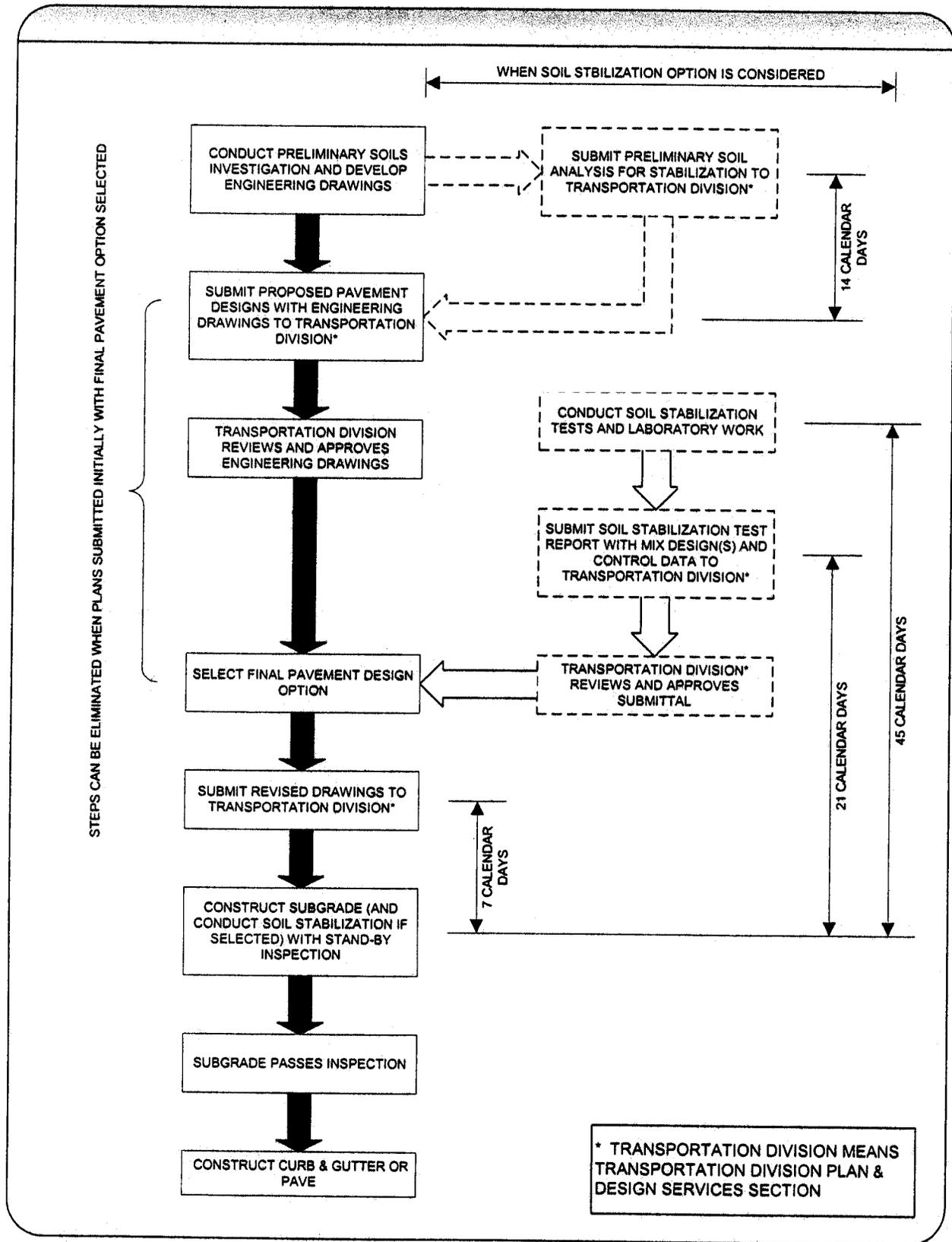
A. **February 28, 2003:**

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2. Updated and renamed Table 1. Changes to composite and concrete pavement options made to reflect experiences during 2002 construction season and ongoing input from various construction industry representatives.
3. Replaced references to "Design & Plan Services Engineer" with "Design & Plan Services Section Manager".
4. Corrected confusing grammar throughout the document.
5. Reflected updates to procedures in Figures 1 and 2.

**XV. Revision History.**

- **July 8, 2002**
- **February 28, 2003**

**Figure 1: Selecting Pavement Design Options**



**Figure 2: Selecting Soil Modification**

