Analyzing Urban Structure in Pittsburgh with Network Models and Cartography

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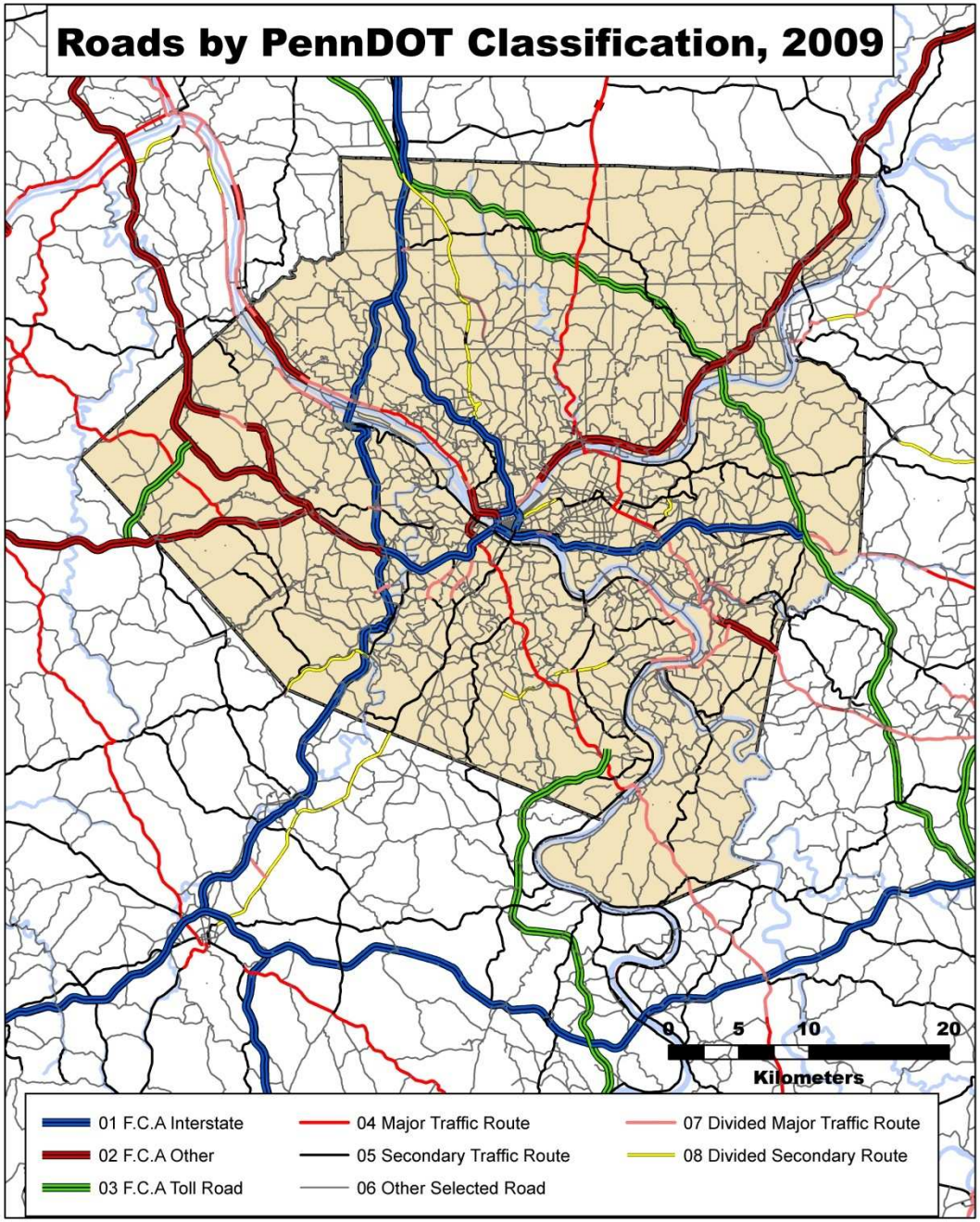
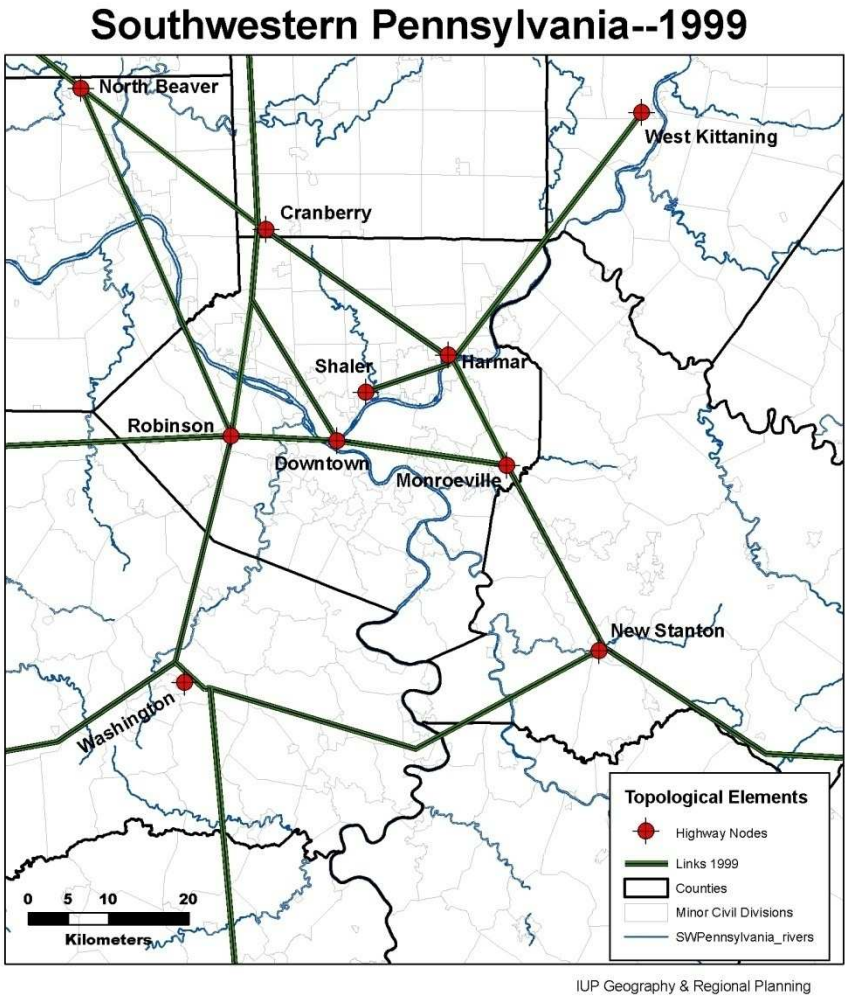
The intra-metropolitan transportation of Pittsburgh is dominated by a system of controlled access highways.



Pitt UCSUR brown bag seminar—20 January 2012.

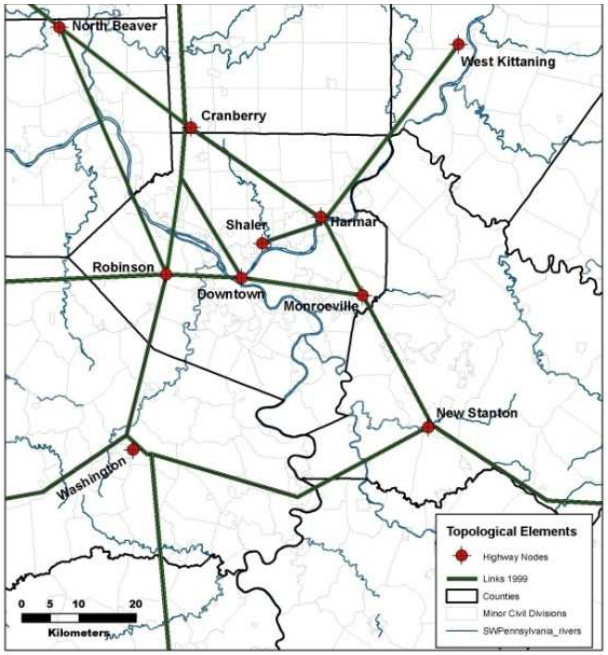
Pittsburgh MSA:			1999 Topology for Controlled Access Highways								
C1	Cran	Down	Harm	Monr	NewS	NorB	Robi	Shal	Wash	WesK	
Cran											
Down											
Harm											
Monr											
NewS											
NorB											
Robi											
Shal											
Wash											
WesK											
10											

Direct connectivity (C1) matrix: mark 1 in each cell that represents a one-link path on the map—in other words passes through no other node. Sum rows (or columns) to get the 'degree' of each node and sum across rows (or columns) to get the aggregate accessibility.



Pittsburgh MSA: 1999 Topology for Controlled Access Highways

		C1	Cran	Down	Harm	Monr	NewS	NorB	Robi	Shal	Wash	WesK	
Cranberry	=	Cran		1	1			1	1				4
Downtown	=	Down	1			1			1				3
Harmer	=	Harm	1			1				1		1	4
Monroeville	=	Monr		1	1		1						3
New Stanton	=	NewS				1					1		2
North Beaver	=	NorB	1						1				2
Robinson	=	Robi	1	1				1			1		4
Shaler	=	Shal			1								1
Washington	=	Wash					1		1				2
West Kittaning	=	WesK			1								1
			10	4	3	4	3	2	2	4	1	2	1	13



Pittsburgh MSA: 2009 Topology for Controlled Access Highways

(1980 Topology for Controlled Access Highways)

		C1	Cran	Down	Harm	Monr	NewS	NorB	Robi	Shal	Smon	Wash	WesK	
Cranberry	=	Cran		1	1			1	1					4
Downtown	=	Down	1			1			1					3
Harmer	=	Harm	1			1				1			1	4
Monroeville	=	Monr		1	1		1							3
New Stanton	=	NewS				1					1			2
North Beaver	=	NorB	1						1					2
Robinson	=	Robi	1	1				1				1		4
Shaler	=	Shal			1									1
South Mon	=	Smon					1					1		2
Washington	=	Wash							1		1			2
West Kittaning	=	WesK			1									1
		11	4	3	4	3	2	2	4	1	2	2	1	14
			(2)	(2)	(3)	(3)	(2)		(3)	(1)		(2)		

Emax=(.5*V)*(V-1) 55 Black 2003, p. 78.

gamma--E/Emax 0.255

Gamma declines from .321 in 1980 to .255 in 2009. This indicates a decline In aggregate efficiency of the network.