Morphological change through residential redevelopment: Detroit, 1951-2000

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Abstract. *This study examines the morphological changes that occur when residential redevelopment takes place in severely deteriorated inner-city areas. Six large redevelopments completed between 1990 and 2000 in Detroit, Michigan, USA are examined. Seven morphological characteristics of the new housing are compared with those of the housing that existed in 1951.*

Key Words: Detroit, morphological change, urban design, redevelopment, urban decline

In the decades following the Second World War, extensive urban redevelopment occurred in many European, East Asian, and North American cities. In Europe and East Asia, redevelopment primarily occurred in those cities that had been damaged during the war (Bullock, 2002; Ikonnikov, 1988; Hein *et al*., 2003), while in North America, particularly the United States, redevelopment primarily occurred in older, industrial cities that were deemed to be suffering from urban decline (Bradbury *et al*., 1982; Fogelson, 2001).

In the United States, most older industrial cities have continued to decline despite further redevelopment. Large cities like Detroit, St. Louis, and Cleveland have each lost hundreds of thousands of residents and tens of thousands of housing units since the 1960s. One major consequence of this decline is the well-known landscape of vacant lots and abandoned houses of inner-city areas. In the hardest-hit inner-city areas a majority of older buildings have been demolished.

In the 1990s, however, some declining cities began to experience renewed activity in their inner-city housing markets. In some formerly declining areas, new housing was constructed on land that had been vacant for decades. To some scholars, this new redevelopment activity heralded the revitalization of the inner city (Grogan and Proscio, 2000; Hudnut, 1998; Kromer, 2000). Other scholars were more sceptical, noting the problems caused by the gentrification of inner-city neighbourhoods (Abu-Lughod, 1994; Smith, 1996).

Whether or not the redevelopment of inner-city neighbourhoods of the 1990s constituted a true 'comeback', its significant physical impact could not be ignored. The abundance of vacant land and low land values in some areas enabled many new inner-city redevelopments to be quite large, extending over several street blocks. Unlike the American redevelopment of the 1960s, in which new buildings generally directly replaced older structures, much of the inner-city redevelopment of the 1990s occurred on land that had been vacated incrementally through urban decline over several years.

Because of the abundance of vacant inner-city land, the redevelopment of the 1990s was subject to fewer spatial constraints, enabling developers to abandon existing street and lot layouts and to reconfigure them in new ways. The resulting morphological changes, as will

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be seen in this paper's examination of redevelopment in Detroit, Michigan, were significant at the levels of both the individual building lot and the street block.

Previous studies

Previous studies of morphological change in American inner cities have found both widespread building demolition and redevelopment at lower densities. Scheer and Ferdelman's study of Over-the-Rhine in Cincinnati (2001) found that over 50 per cent of all structures were lost between 1956 and 1991. This loss was attributed to several factors, including road widenings, redevelopment, clearance for parking lots, and institutional expansion. The result was an inner city neighbourhood that was reduced in building density as well as in developable land. Redevelopment in Over-the-Rhine was limited during this period and Scheer and Ferdelman did not closely examine the morphological characteristics of new construction.

Moudon's study of redevelopment and adaptation in San Francisco's declining Alamo Square area (1986, pp.130-1) found significant differences between the 'spatial structure' of residences constructed in the 1920s and those constructed in the 1960s. While 1920s development was characterized by tight building lots and relatively predictable building form, that of the 1960s was characterized by 'erratic, unpredictable, and even chaotic' street-block forms because lot size and building form constraints were removed. In part because they had larger lots, new buildings occupied less of their site and could be configured in almost 'random' configurations within these larger lots.

What caused redevelopment in these two areas to shift from a dense, pedestrian-oriented spatial structure toward an automobile-oriented, lower-density one? Scheer and Ferdelman (2001) attributed some of this change to the need for additional parking and open space. Moudon (1986, p.109) found that the majority of new open space created by redevelopment was required for changed building code standards and what she called 'new principles of building organization'. These changed principles included additional semi-public or private open space and parking lots or garages adjacent to residences. Other factors unassociated with particular structures also contributed directly to the reduction of space available for development in Alamo Square, including an increased demand for space for roads and on-street parking, a reduction in demand for new buildings because of economic decline, and an increased demand for space for parks.

A cultural preference for suburban neighbourhood amenities may also have contributed to the demand for private open space in these inner-city areas. Warner's (1962) study of residential development of the late-nineteenth and early-twentieth centuries in Roxbury, Massachusetts, found that the design of this housing was guided by a social preference that he called the 'rural ideal' (Warner, 1962, p.11). Warner argued that the addition of suburban features like detached wooden houses, front and back yards, and porches to Boston's urban housing provided this housing with attributes of the rural ideal and helped satisfy residents' yearning for suburban amenities.

In the United States, in the period after the Second World War, there was an explosion of new residential suburban neighbourhoods influenced by the rural ideal (Jackson, 1984) and the suburban home became the dominant model for new American residential construction. Could the rural or suburban ideal, widespread in American society by the 1990s, have influenced housing design in deteriorated inner-city areas as well? If it existed, this influence would be seen in characteristics like lower densities, increased private open space, and the orientation of structures toward automobiles. This paper, part of a larger investigation of inner-city redevelopment and morphological change, presents evidence that the suburban ideal did indeed influence the form of new housing constructed in Detroit in the 1990s.

Detroit, Michigan

The city of Detroit, Michigan was selected as the location for the study because it is one of the largest declining cities in the United States, as measured by losses of population and housing. Census data show that since 1950, Detroit has lost approximately half of its population, shrinking from 1 849 568 people in 1950 to 951 270 people in 2000. This population loss was accompanied by the loss of housing to abandonment, arson, and demolition (Chafetz, 1990). Between 1950 and 2000 Detroit lost approximately 30 per cent of its housing, shrinking from 522 430 units to 375 096 (US Bureau of the Census, 1950; US Census Bureau, 2000). This loss resulted in significant amounts of vacant land. Today, the city has at least 38 000 vacant lots (Kaffer, 2005).

Although Detroit lost almost 35 000 net housing units during the 1990s (US Census Bureau, 1990, 2000), several Detroit neighbourhoods also experienced substantial new housing construction during this decade. By the early 1990s, conditions had improved to the extent that new housing construction was feasible in neighbourhoods that had not had new development for decades. Almost all of these redevelopments occurred on vacant land that had once been primarily residential. Because Detroit had abundant vacant land, many of its new redevelopments were quite large. Some numbered over 100 dwellings and occupied multiple street blocks. As a result, the largest Detroit redevelopments of the 1990s often reshaped not only the interiors of individual street blocks, but the street layouts and block dimensions themselves.

Research questions and study method

This study sought answers to a number of questions. How did the lot- and block-level form of Detroit's largest 1990s housing redevelopments differ from those of the neighbourhoods existing on the site prior to decline? Did Detroit's 1990s redevelopments replicate earlier lot- and street-block patterns, or establish new ones? Which morphological characteristics were altered, and to what degree?

To answer these questions, the study examined six housing redevelopments constructed in Detroit during the 1990s. Each redevelopment site had previously been occupied by housing, so the morphological characteristics of the redevelopments of the 1990s could be directly compared with those of the same areas in 1951, the first available year of map data prior to the beginning of substantial decline in Detroit (around 1960). Both lot- and block-level characteristics were examined in order to provide a broad portrait of morphological change. Seven characteristics (dwelling density, land-use mix, dwelling mix, tenure mix, lot coverage, street-block design, and lot design) were examined; the first five were measured quantitatively, and the latter two were assessed qualitatively.

The study method had three components. The first was to select which housing redevelopments should be measured. The second was to select morphological characteristics for measurement; and the third was to examine and measure the characteristics of the selected redevelopments.

Selected redevelopments

Between 1990 and 2000 over 40 large (> 20 unit) new housing redevelopments were constructed on vacant land within the city limits of Detroit. Because urban decline occurred on a city-wide level in Detroit, no determination was made of which Detroit neighbourhoods might be considered 'inner-city': all redevelopments constructed within the city limits were considered for the study. The few 1990-2000 developments constructed on land that had not been occupied in 1951 were excluded from the study. The six largest redevelopments completed during the 1990s were selected: two of these (Circle Drive Commons and Campau Farms) are adjacent to one another and are shown by a single symbol on Figure 1. Summary information for the selected redevelopments is provided in Table

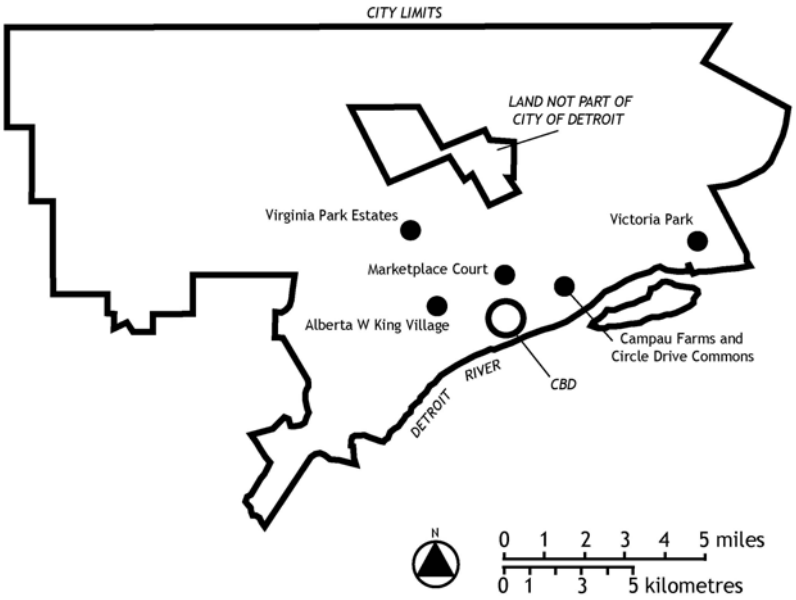

Figure 1. Location of the six largest housing redevelopments constructed in Detroit, Michigan, between 1990 and 2000.

Table 1. The largest redevelopments for housing in Detroit, 1990-2000

Name of redevelopment	Construction date	Housing type	Number of dwellings
Circle Drive Commons	1991	Multi-family	128
Alberta W. King Village	1998	Multi-family	120
Marketplace Court	1995	Multi-family	120
Campau Farms in Elmwood Park	1996	Single-family (attached)	180
Victoria Park	1991	Single-family (detached)	157
Virginia Park Estates	1995	Single-family (detached)	45

1. The redevelopments were composed of three different housing types: multi-family housing (apartments), attached single-family housing, and detached single-family housing.

Morphological characteristics

For each redevelopment, the following seven characteristics were measured in both 1951 and 2000:

1. *Dwelling density*, measured in dwellings per acre of developable land;
2. *Land-use mix*, measured as the percentage of building lots that were residential;
3. *Dwelling-type mix*, measured as the percentage of dwellings in either single-family

detached, single-family attached, 2-4 unit multi-family, or 5+ unit multi-family structures;
4. *Tenure mix*, measured as the percentage of dwellings that were owner-occupied;
5. *Lot coverage*, measured as the percentage of developable land occupied by structures;
6. *Street-block design*, measured as the presence or absence of culs-de-sac, grid networks, interior roadways, or other alterations to the street network;
7. *Lot design*, measured as the presence or absence of garages, parking lots, and fencing and/or planting.

Detroit redevelopment data were collected from diverse periodicals, including *Crain's Detroit Business*, the *Detroit Free Press*, and the *Detroit News*. Additional development data were collected from building permits provided by the Detroit Department of Planning and Economic Development, and from the Michigan Capital Fund for Housing. Visual information for redevelopments was gathered from site visits, aerial photographs, and from Sanborn fire insurance maps. Aerial photographs were one metre in resolution and dated approximately from mid-2000. Visual information for 1951 was gathered from Sanborn maps. Dwelling density and lot coverage calculations were made from digital plans of developments drawn at full scale in AutoCAD software from digital photographs or from digitized Sanborn maps.

Morphological characteristics were measured according to the following criteria. Dwelling density was calculated from polygons drawn to the centre lines of the development's perimeter streets and to adjacent property lines. If the redevelopment occupied only a single street block, density figures were calculated from the dimensions of the block. All lots within the site were included in the area calculation, including those occupied by non-residential uses.

Land-use and dwelling counts were determined from the publications cited above and from field observations, and from Sanborn maps for 1951 developments. Mixed-use buildings (commercial on ground floor, residential above) were considered to be commercial. Land-use percentages represent the number of lots, not the land area, dedicated to a certain land use as a proportion of the total number of lots on the site.

Figures for tenure type were gathered from various periodical sources for 1990-2000 redevelopments. For 1951, tenure type was estimated as follows: single-family detached and single-family attached housing types were assumed to be owner-occupied; 2-4 unit multi-family housing types were assumed to have 1 owner-occupied unit and the remainder rented; and multi-family structures of 5 or more units were assumed to be 100 per cent rented.

Lot coverage calculations were made for the entire site for 1990-2000 redevelopments and from a representative sample of lots for 1951. Lot coverage calculations were generated only for the lots themselves: street and alley areas were not included, except for internal roadways or parking lots in 1990-2000 redevelopments.

Because design features at the level of the street block and lot were highly visible and substantial, their exact dimensions were not calculated. Architectural elements linked to building style (fenestration, entry location, material, ornament, etc.) were not examined.

In the measurement of change between 1951 and 2000, two morphological characteristics (density and lot coverage) were assigned positive or negative values according to whether they underwent an increase or decrease in the characteristic, and three (land use, dwelling type, and tenure type) were assigned change values with no positive or negative values.

Morphological change through redevelopment

In 1951, the six redevelopment sites represented typical portions of Detroit's residential urban fabric. Located in different neighbourhoods of the city (Figure 1), the sites had been constructed at different times and had consequently experienced different patterns of change and redevelopment up to that time. All of the redevelopment sites had a land-use mix

composed of different proportions of housing in residential and mixed-use structures, small commercial structures and occasional small industrial facilities. Housing types were also diverse. Most sites contained a mixture of multi-family dwellings, two-family houses, and single-family houses. Redevelopments located in older areas of the city (Rand McNally & Co., 1896), such as Marketplace Court and Alberta King Village, were relatively close to Detroit's downtown and in 1951 had higher percentages of non-residential buildings than the other sites. Newer neighbourhoods, such as the Victoria Park area, were primarily composed of small residential structures, with few commercial structures or large multi-family residential buildings. The diversity of dwelling types reflected a parallel diversity of tenure types, in which home-ownership and rented housing were located in close proximity.

In 1951, each site had a relatively high percentage of its developable land occupied by structures, ranging from 30 to 50 per cent. The block- and lot-level design of sites was relatively consistent: each site was organized on a simple rectilinear block plan penetrated by alleys. Public open space was rare or non-existent, and private open space was limited to the land immediately surrounding individual structures. Residential structures always faced a public street and were located in close proximity to these public ways. Automobile access to building lots, if it existed at all, was confined to rear access via an alley, and any parking on building lots occurred in rear-facing garages or parking lots behind structures.

Figures 2 to 6 compare each redevelopment site in 1951 and 2000, and provide the basis for the discussion of individual morphological characteristics that follows.

Redevelopment between 1951 and 2000 extensively reshaped the lot and street-block structure of all six sites to resemble that of suburban neighbourhoods. Residential suburban site planning in the United States, as characterized by Hayden and Wark (2004), is typified by characteristics such as automobile dependency, pedestrian-unfriendly site planning, relatively low lot coverage, significant amounts of private open space around structures, and detached single-family houses and garden apartment buildings. The morphological changes observed on all six study sites could be termed 'inner-city suburbanization'. Detroit's 'inner-city suburbs' of the 1990s resembled suburbs in form but not in location, as they were close to the Central Business District (CBD) of Detroit instead of at the city's outer fringe.

In 2000, each redevelopment site was composed of only residential land uses, and each contained only a single type of housing. Lot coverages were much lower, and redevelopments were isolated from their surroundings by perimeter parking or open space. Block- and lot-level design characteristics were consistent with this. Pedestrian access was reduced in favour of access by automobile. Automobile access was given priority by the creation of front parking lots, private roads, and front-facing garages for individual dwellings. To permit the circulation of automobiles and their storage in large numbers on building lots, each redevelopment site's street blocks were reconfigured. In some cases (Figures 3 and 4) parking was located in perimeter or central parking areas, while in others (Figures 5 and 6), parking was associated with individual dwellings. Individual redevelopment structures generally faced private open space, parking, or private roads instead of public streets, which were separated from redevelopments by fences, landscaping and open space. Whereas the 1951 redevelopment sites had been typical city blocks within a wider, interconnected cityscape, the 2000 redevelopments were all self-contained enclaves whose site and lot design isolated them from the surrounding city.

Dwelling density

In 1951, most sites had similar dwelling densities, except for Virginia Park, whose 1951 density was much higher because of the site's large number of apartment buildings

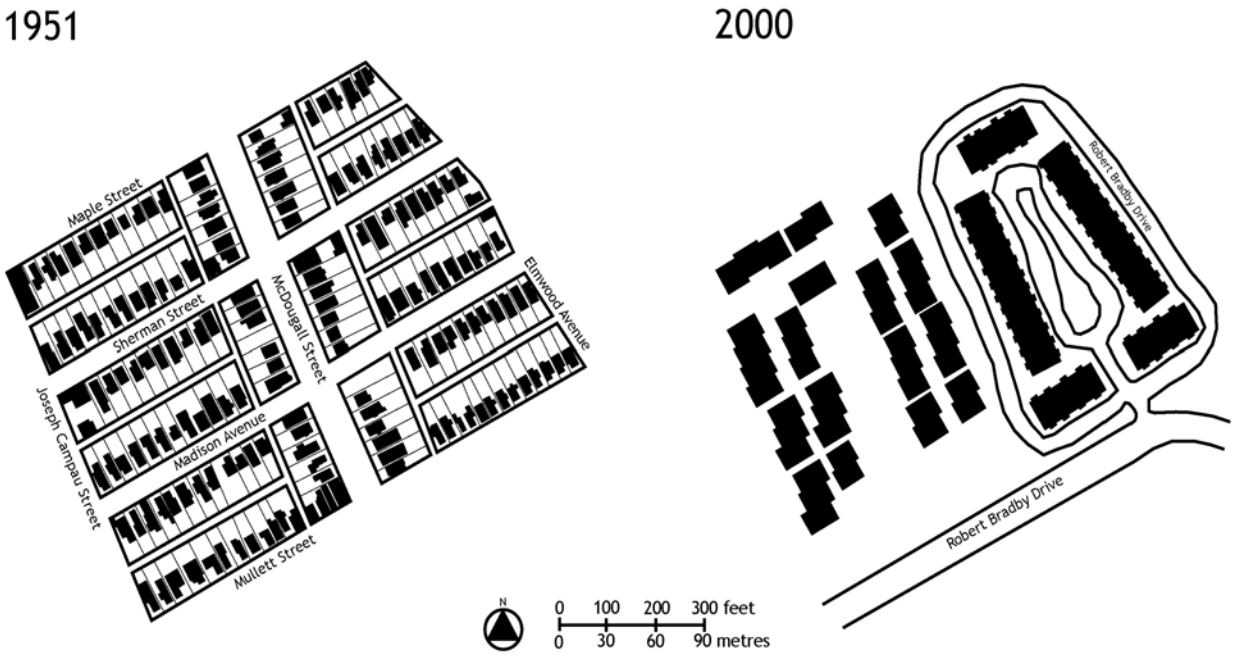

Figure 2. Circle Drive Commons and Campau Farms sites in 1951 and 2000.

Figure 3. Alberta King Village site in 1951 and 2000.

(Table 2). While average dwelling densities decreased by 34 per cent through redevelopment, three redevelopments actually had higher densities in 2000 than in 1951. In these cases, the 1951 mix of single-family and multi-family dwellings was replaced by multi-family or attached single-family dwellings, with a resulting higher dwelling density. However, two detached single-family redevelopments (Victoria Park and Virginia Park Estates) had densities in 2000 that were between only 10 and 20 per cent of their 1951 densities. Their extremely low dwelling densities skewed the sample to produce the large average decrease in dwelling density.

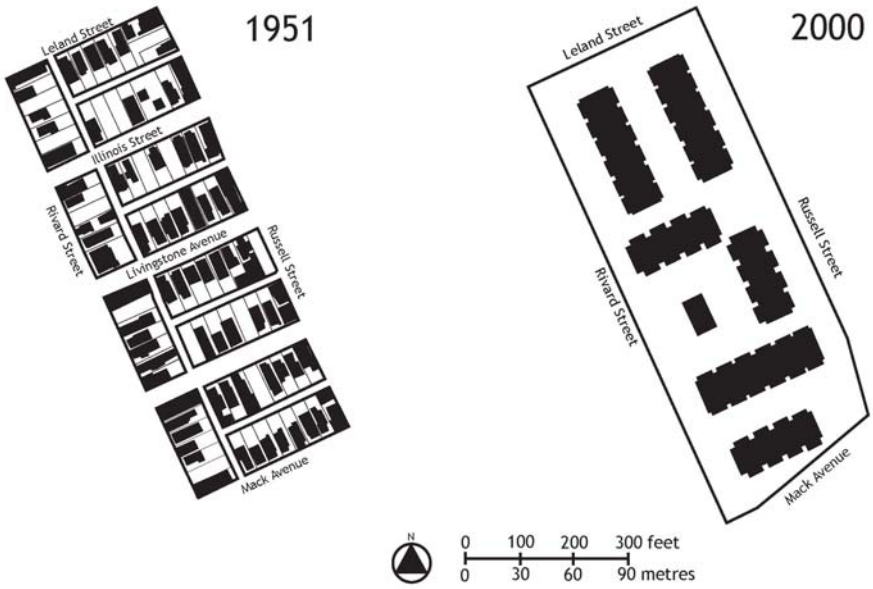

Figure 4. Marketplace Court site in 1951 and 2000.

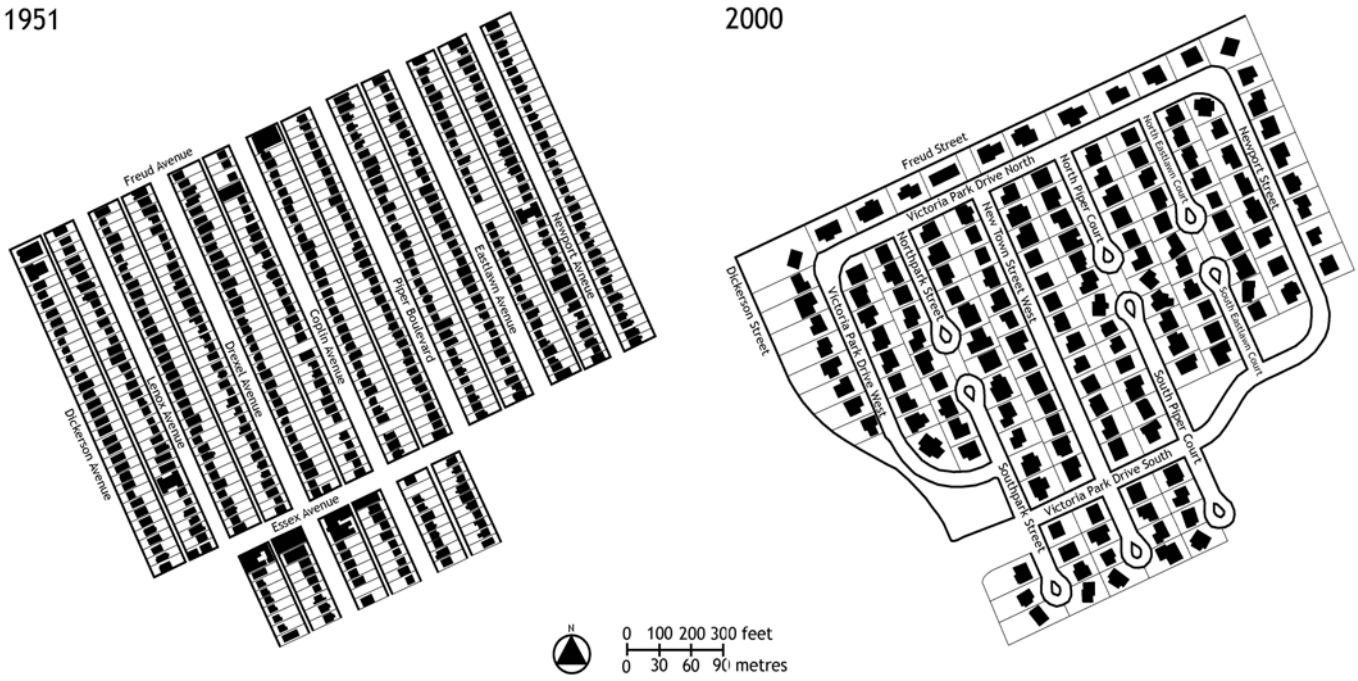

Figure 5. Victoria Park site in 1951 and 2000.

Land-use mix

All redevelopment sites were entirely residential in 2000. This was a substantial change from the land-use mix of these sites in 1951, when every site possessed some commercial development (Table 3), and some, particularly Marketplace Court and Alberta King Village, were substantially mixed-use (81 per cent residential and 86 per cent residential

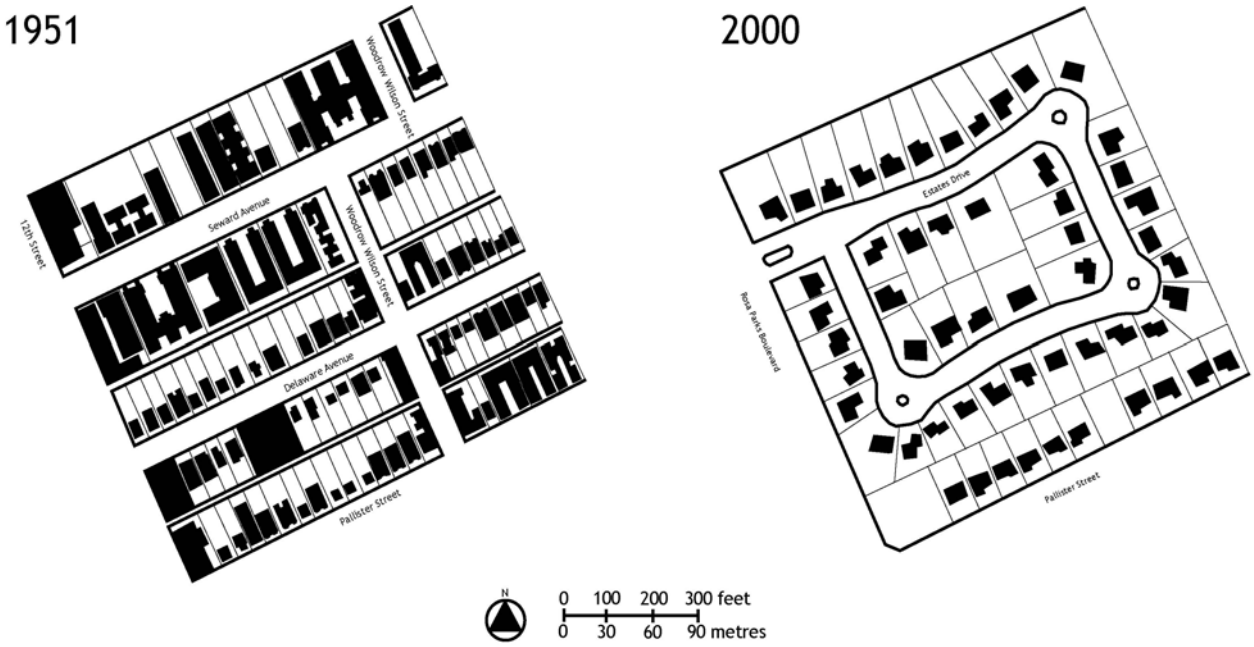

Figure 6. Virginia Park Estates in 1951 and 2000.

Table 2. Dwelling density changes, 1951-2000

	Dwelling density (dwellings per acre)		Percentage change
	1951	2000	1951-2000
Circle Drive Commons	11.4	13.2	+10
Alberta King Village	9.3	8.1	-13
Marketplace Court	11.5	12.6	+10
Campau Farms in Elmwood Park	11.2	16.0	+43
Victoria Park	13.4	2.9	-78
Virginia Park Estates	27.8	2.8	-90
Mean	14.1	9.3	-34

respectively). The land-use mix of 1951 operated at two scales. First, most buildings and lots were small, with a relatively fine-grained pattern within each street block, permitting the mixing of uses within a single street block, though this was not universal. Secondly, many individual structures were mixed-use, with residences located above a commercial or even a small industrial structure. Neither of these land-use patterns occurred in redevelopment. The design of redevelopment blocks and structures contributed to this land-use homogenization. Redeveloped street blocks were larger, and the spatially isolated single-family houses and apartment buildings could not easily accom-

Table 3. Land-use mix changes, 1951-2000

Redevelopment	Percentage residential 1951	2000	Percentage change 1951-2000
Circle Drive Commons	99	100	1
Alberta King Village	86	100	14
Marketplace Court	81	100	19
Campau Farms in Elmwood Park	94	100	6
Victoria Park	98	100	2
Victoria Park Estates	94	100	6
Mean	92	100	8

Table 4. Changes of dwelling-type mix, 1951-2000

	1951 (per cent)				2000 (per cent)			
	Single-family		Multi-family		Single-family		Multi-family	
	detached	attached	2-4 units	5+units	detached	attached	2-4 units	5+units
Circle Drive Commons	50	0	50	0	0	100	0	0
Alberta King Village	48	0	48	4	0	0	0	100
Marketplace Court	35	0	65	0	0	0	0	100
Campau Farms in Elmwood Park	54	0	46	0	0	100	0	0
Victoria Park	48	0	48	4	100	0	0	0
Virginia Park Estates	4	5	19	72	100	0	0	0

modate retail uses.

Dwelling-type mix

Dwelling types were diverse in both 1951 and 2000 (Table 4). The primary difference was that in 1951, dwelling types were diverse at both the lot- and street-block level, while in 2000, dwelling types were diverse only at the site level. In 1951 sites often possessed multiple dwelling types, ranging from single-family houses to multi-family houses within a single street block. In 2000 each redevelopment site possessed only one type of dwelling.

Two shifts were of particular interest. The first was that the percentage change in dwelling types was high for all developments (91 per cent on average). This indicated that redevelopment constituted a substantial change in dwelling type for all sites, either away from or toward a multi-family or single-family

model. Virginia Park Estates, which was 100 per cent single-family in 2000, had only 4 per cent of its dwellings in these types of structures in 1951, while Marketplace Court, which had no buildings containing 5 or more dwellings in 1951, was redeveloped with 100 per cent of its buildings of this type. While the change in dwelling types was substantial for all redevelopments, there was no consistent shift toward multi-family or single-family buildings.

The second significant shift was that structures containing 2-4 dwellings, which accounted for approximately 20 per cent of all structures in 1951, were entirely absent in the redevelopments. In 1951, structures containing 2-4 dwellings often coexisted in a single street block with structures containing both larger and smaller numbers of dwellings, producing a diverse range of housing in a single street block. In contrast, in 2000 these highly differentiated street blocks had been replaced by homogeneous clusters of identical housing types.

Tenure mix

Changes in tenure mix (Table 5) mirrored the changes observed in land-use and dwelling-type mixes. The diversity of tenure patterns in 1951 was replaced by large, homogeneous tracts of owner-occupied dwellings or rented apartments. Most 1951 sites contained a variety of dwelling types and therefore of tenure types, with multi-family rented, owner-occupied, and multi-family structures with mixed tenures in a single street block or in adjoining street blocks. In contrast, redevelopments were composed of new structures of the same dwelling type, and were therefore either all owner-occupied or all rented. Not only were redevelopment street blocks filled with structures with the same tenure type, but the tenure types of individual structures were internally homogeneous as well. The elimination of the 2-4 unit dwelling type between 1951 and 2000 removed the only dwelling type that provided a mix of tenures within a single structure (owner-occupied apartments with accessory rental units).

Lot coverage

On average, lot coverages dropped over 50 per cent through redevelopment (Table 6). Both single-family and multi-family redevelopments had high lot coverage reductions, but lot coverage reductions did not have a direct relationship to dwelling density changes. The two redevelopments of detached houses (Victoria Park and Virginia Park Estates) had very high reductions in dwelling density but average lot coverage reductions, reflecting a higher lot coverage per dwelling in 2000 than in 1951. This increase occurred because these sites were redeveloped with large single-family houses. The remaining redevelopments had either small decreases in dwelling density or increases, reflecting lower lot coverages per dwelling in 2000 than in 1951. The overall decrease occurred because sites that had a diversity of dwellings in 1951, including many single-family houses, were redeveloped with homogeneous multi-family or attached single-family houses, providing a higher number of dwellings but occupying less land. In all redevelopments, reduced lot coverage provided additional space for private or public open space, parking lots, and interior roads.

Street-block design

Shifts in street-block design were dramatic between 1951 and 2000. The 1951 pattern was composed of a fairly regular rectangular street grid penetrated by alleys and lined by relatively small structures facing the street, such as that of Alberta King Village (Figure 3). This pattern was abandoned in all of the redevelopments examined. Redevelopments generally combined most or all of the street blocks on the site into a single superblock. Structures were placed in the interior of these blocks facing interior drives or parking areas. The lower lot coverage of these superblocks permitted outer areas of the superblocks to be used as open space, perimeter roads or

Table 5. Tenure mix changes, 1951-2000

	Percentage owner-occupied	
	1951	2000
Circle Drive Commons	73	100
Alberta King Village	47	0
Marketplace Court	68	0
Campau Farms in Elmwood Park	77	100
Victoria Park	73	100
Virginia Park Estates	14	0

Table 6. Lot coverage, 1951-2000

	1951 coverage (per cent)	2000 coverage (per cent)	Percentage change 1951-2000
Circle Drive Commons	45.3	25.2	-44
Alberta King Village	42.3	11.8	-72
Marketplace Court	57.4	26.0	-55
Campau Farms in Elmwood Park	45.3	25.2	-44
Victoria Park	43.0	18.9	-56
Virginia Park Estates	28.5	12.6	-56
Mean	43.6	20.0	-54

parking, as at Marketplace Court and Circle Drive Commons (Figures 7 and 8).

The two redevelopments for single-family houses, of Virginia Park and Victoria Park, provided perhaps the most extreme examples of street-block design shifts. These redevelopments provided limited site access via a single road. The 1951 street blocks were reconfigured or eliminated, and interior circulation was reshaped into loop roads and culs-de-sac reminiscent of suburban subdivisions (Figure 9).

All street-block design changes occurring through redevelopment acted to separate the redevelopments from their surroundings. In 2000, structures were isolated at the centre of sites and surrounded by 'moats' of green space or parking. Roads were reconfigured to allow for only one or two means of entrance to the site. In all six redevelopments examined, the street-block designs bore a strong resemblance to that of suburban street-block design.

Why did redevelopments isolate themselves from their context? In some cases, such as

Figure 7. Perimeter parking lot at Marketplace Court. Photograph by the author, 2002.

Figure 8. Perimeter planting and parking lot at Circle Drive Commons. Photograph by the author, 2002.

Figure 9. Street reconfigured as cul-de-sac at Victoria Park. Photograph by the author, 2001.

Victoria Park and Virginia Park, the surrounding area had severely decayed, with abandoned and deteriorating older houses in close proximity to the redevelopments. In these instances site design changes visually screened and physically separated the redevelopments from their problematic surroundings. In other cases, such as Marketplace Court, the entire surroundings had also been redeveloped. Surrounding wide roads and automobile-oriented housing seemed to encourage a similar response in the study site redevelopments.

Lot design

Changes of orientation and means of access to redevelopment structures were particularly a consequence of changes to lot-level design features. The most significant change occurring between 1951 and 2000 was the shift from a pedestrian to an automobile orientation. While some structures in 1951, particularly single-family houses, provided parking for cars in rear lots or in rear-facing garages, most multi-family structures at that time did not provide on-site parking. In strong contrast, all redevelopments not only provided parking for all dwellings but gave priority to this means of transport by orienting structures to parking facilities and interior roads. Although all redevelopments were conceivably accessible by pedestrians, their lot design clearly communicated their automobile orientation. The importance of automobile access was symbolically announced by the prominent placement of attached front-accessed garages in Virginia Park Estates and Victoria Park (Figure 10), and by parking lots located in front of the entrances of the other redevelopments.

The shift toward automobile access was mirrored by the changed orientation of redevelopments away from public streets. In 1951, almost all structures were located on small lots and faced directly onto public streets. At the rear of their lots, structures faced alleys or other structures. Redevelopments abandoned this orientation to public roads in favour of structures facing semi-enclosed open spaces, interior roads, or parking lots (Figure 11), and instead addressed public streets with their rear façades (Figure 12).

Figure 10. Housing with street-facing attached garages at Virginia Park Estates. Photograph by the author, 2001.

The separation from the public realm noted previously was accentuated in five of the six redevelopments examined by the perimeter placement of fences and/or landscaping and even earthen berms (Figure 13). These design measures, combined with the physical withdrawal of redevelopment structures from surrounding streets, visually and functionally emphasized the separation between redevelopments and their context.

Conclusions

The urban redevelopment of the 1990s brought about significant changes to Detroit's urban landscape. In the city's largest housing redevelopments, a new residential pattern was established based on the transformation of typical Detroit city blocks and street patterns into suburban-type enclaves. Redevelopment brought about a process of inner-city suburbanization, where urban redevelopments emulated patterns of suburban land use, and lot and street-block design.

The morphological changes required to reshape the 1951 Detroit urban pattern into the inner-city suburban 2000 redevelopment pattern were substantial. Structures existing on the site in 1951 were entirely demolished. Existing street and alley networks and existing street-block patterns were almost entirely eliminated or reconfigured. Many morphological characteristics widespread in 1951 – mixed land uses, diverse housing types, pedestrian access, and orientation of structures to public streets – were abandoned. In short, redevelopment between 1951 and 2000 almost entirely reshaped the existing urban structure wherever it occurred.

Did substantial morphological change occur in other redeveloped areas of the city? The six redevelopments examined comprised 750, or approximately 30 per cent, of the approximately 2400 dwellings added across the city through large redevelopments between 1990 and 2000. Without measuring additional smaller redevelopments, one can conclude that inner-city suburbanization was extensive, but not that it was ubiquitous, in the residential neighbourhoods of Detroit redeveloped during the 1990s.

Figure 11. Housing facing private drive at Campau Farms. Photograph by the author, 2002.

Figure 12. Housing backing onto public road at Alberta King Village. Photograph by the author, 2001.

Figure 13. Fencing and perimeter berm at Victoria Park. Photograph by the author, 2001.

The large-scale reconfiguration of street blocks in existing urban areas was relatively rare in the United States in the 1990s, in part because the cost of eliminating or shifting existing utilities, public ways, and property boundaries was great. The six redevelopments examined therefore represent something of a puzzle. Why did Detroit's public agencies, or private developers, go to such great lengths to reconfigure large areas of the city? What policies, economic, or social forces were acting in the 1990s to promote inner-city suburbanization in Detroit? To what degree was inner-city suburbanization a function of the popular rural ideal motivating suburban development in the United States? These important questions of causality will be addressed in detail in a subsequent study.

The evidence presented in this paper indicates that extensive morphological change is occurring in Detroit. Since Detroit is far from being the only declining city in the United States, these findings argue for additional research into the morphological changes occurring through urban decline and redevelopment in other American cities. As older American cities continue to lose population, the morphological changes of many inner-city areas may ultimately mirror those observed in Detroit.

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Approaches in urban morphology

The Proceedings of the New Researchers' Forum held in Newcastle upon Tyne during the 2004 ISUF Conference were published in 2005. Entitled *Approaches in urban morphology*, the volume of proceedings is edited by Michael Barke and published by Northumbria University, Newcastle upon Tyne (ISBN 1861353294).

This publication brings together six of the papers presented at the 2004 conference. Most are developed from recently- or nearly-completed PhD research. Whilst many of the traditional concerns of urban morphology are represented in the collection, most also demonstrate important re-orientations in morphological research, both conceptually and in terms of methodology. Although the broad topics under consideration are generally familiar to scholars of urban morphology, the approaches and thinking demonstrated by the New Researchers are fresh and original.

Aspects covered include GIS and Caniggian ideology; French fringe belts; urban form and sustainability; morphologies of fragmentation and continuity; the delimitation of morphological regions; and alternative approaches to urban conservation.

The publication is available from Dr Michael Barke, Division of Geography, School of Applied Sciences, University of Northumbria, Newcastle upon Tyne NE1 8ST, UK. The price is £5.00 (plus postage and packing).