

HISTORIC TRENDS IN LAND SUBDIVISION ACTIVITY IN SOUTHEASTERN WISCONSIN

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•THE SOUTHEASTERN Wisconsin region, comprising 7 counties lying north of the Illinois-Wisconsin state line and west of the Lake Michigan shoreline, is one of the large urbanizing regions in the United States. The region has an area of 2,689 square miles, a population of 1.8 million people, and contains 153 general purpose local units of government, including Milwaukee, the twelfth largest city in the United States. The region, which contains 3 contiguous standard metropolitan statistical areas, as defined by the U. S. Bureau of the Census, is in many ways typical of most metropolitan areas of the United States.

Urban development has been taking place within southeastern Wisconsin since about 1840. For more than a century, this development occurred basically in the form of an outward expansion of the existing urban centers of the region and appeared in mapped form as a succession of narrow, concentric growth rings. From 1940 to 1950, urban development within the region continued to take place in a concentric pattern around the existing urban centers, but, in addition, fingers of development pointing outward from the larger central cities began to form. These fingers generally followed major highway routes, major stream valleys, and the Lake Michigan shoreline. This period also witnessed an intensification of urban development activity in the rural areas of the region, particularly around the shorelines of the many lakes.

From 1950 to 1970, a dramatic change occurred in the pattern of urban development. Contributing to this change were the pent-up housing demand present in the post-World War II years, an increase in automobile ownership and use, the accelerated construction of high-speed and all-weather highways, the widespread availability of electric power and telephone communication, the utilization of the septic tank as a means of on-site sewage disposal and of the shallow well as a means of on-site water supply, and the large-scale availability of relatively low-cost suburban land. The basic pattern of growth in evidence from 1940 to 1950 continued; but large, scattered tracts of rural lands were subdivided for urban use, and often equally large tracts of land were left between the old and the new development. This leapfrogging of development led to the use of the phrase "urban sprawl," defined as highly dispersed, low-density urban development. During this 20-year period, more than 190,720 acres of land were converted from rural to urban use within the 2,689-square-mile southeastern Wisconsin region, a 216 percent increase in such use. The population increase during this same period amounted to 515,468, a 42 percent increase. The overall population densities of the developed area of the region, which had peaked at about 11,500 persons per square mile in 1920, declined to about 8,500 persons per square mile in 1950 and to about 4,000 persons per square mile in 1970, or by about 53 percent.

The timing and spacing of land development within the region were examined in a historic platting study undertaken by the Southeastern Wisconsin Regional Planning Commission—the official area-wide planning agency for southeastern Wisconsin. Information was collected on quantity, character, rate, and geographic location of land sub-

division activity within the region during the 50-year period from 1920 through 1969. The study had the following objectives:

1. To determine the number of land subdivision plats recorded within the southeastern Wisconsin region since 1920 and to measure the amount of land committed to development in these plats;
2. To determine the temporal and the spatial distribution of land subdivision activity within the region since 1920 and since 1957 to determine the relation to sanitary sewerage service; and
3. To evaluate changing land subdivision design practices in terms of average subdivision size, average lot size, linear miles of streets created, type and amount of other dedicated lands, and chronological sequence and spatial distribution of various types of subdivision development patterns, such as grid, curvilinear, or cluster.

This paper presents a descriptive analysis of platting activity within the region for the 50-year study period. The analysis is presented in 4 sections: subdivision platting activity by successive time periods, development patterns of the subdivisions, uses of the land within the subdivisions, and platting activity related to sewerage service. The use allocation presents a discussion of the acreage actually devoted in the subdivision plats to lots or building sites, the area devoted to street right-of-way, and the area devoted to other dedicated uses such as park and school sites.

The Wisconsin Statutes require that for all land subdivisions an accurate plat be prepared by a registered land surveyor and recorded with the county register of deeds. The recorded plats provided the source of the data analyzed in this paper, a source that was unusually precise, accurate, complete, and reliable.

Within the southeastern Wisconsin region in 1970, urban land uses totaled 528.6 square miles, or 20 percent of the total area of the region. Of this 528.6-square-mile area, 244.2 square miles, or 46 percent, were devoted to residential use. The area of all residential plats studied totaled 146.9 square miles, or 60.1 percent of the total residential land area in the region.

PLATTING ACTIVITY IN THE REGION

In the 50-year period from 1920 through 1969, there were 4,907 residential subdivision plats recorded within the region. These subdivisions encompassed a total area of 94,050 acres and contained an average of about 19 acres each (Table 1). The most active period was the 1950-1959 post-World War II decade within which 1,797 plats, or 37 percent of the total, were recorded. The second most active period was the 1920 to 1929 predepression decade within which 1,367 plats, or 28 percent of the total, were recorded. Together these 2 periods accounted for nearly two-thirds of all residential subdivision plats recorded within the region since 1920, and the combined acreage platted during these 2 periods accounts for approximately 66 percent of the total acreage platted since 1920. The 1930-1939 depression decade, when only 215 plats were recorded, and the 1940-1949 World War II decade, when 444 plats were recorded, together account for less than 14 percent of the total plats recorded and for less than 12 percent of the total acreage platted since 1920. These 2 time periods also exhibit the lowest average subdivision plat area of 16.3 and 16.7 acres respectively.

PATTERNS OF DEVELOPMENT

Three residential subdivision patterns were identified for the purposes of the platting study on the basis of the predominant street layout used in the subdivision (Fig. 1):

1. The grid pattern has a predominance of straight streets intersecting at approximately right angles, is generally laid out approximately in the cardinal directions, has fairly uniform rectangular lots fronting on the gridiron streets, and often has alleys that provide a secondary means of access to the rear of each lot.
2. The curvilinear pattern has a predominance of curved streets, the locations of which have been adapted to the terrain, and frequently contains a variety of lot sizes and shapes fronting on loops, cul-de-sacs, through streets, and curvilinear streets.

3. The cluster pattern has a preponderance of groups or clusters of wedge-shaped lots around loop, cul-de-sac, and bulb streets and by open spaces called "commons" between these groups.

Grid Pattern

The most prevalent subdivision pattern within the region since 1920 has been the grid pattern, which accounted for 3,698 of the recorded subdivisions, or 75.4 percent of the total plats recorded. The 56,094 acres of land platted for such grid development accounted for 59.6 percent of the total acreage platted. The curvilinear pattern accounted for 1,203 recorded subdivisions, or 24.5 percent of the total plats recorded, and for 37,335 acres, or 39.7 percent of the total platted acreage. The cluster pattern of development, which is a more recent platting innovation within the region, accounts for less than 1 percent of either the number of plats recorded or the total area platted. Although the greatest number of grid subdivisions was recorded in the 1950's, the greatest amount of acreage was platted under the grid pattern during the 1920's. The average size of the grid-pattern subdivision has been decreasing since 1920.

Curvilinear Pattern

The 1950 decade accounted for the greatest number of curvilinear residential subdivisions and the greatest amount of acreage platted. The depression years from 1930 through 1939 and the war years from 1940 through 1949 combined accounted for less than 10 percent of the curvilinear subdivisions recorded and acreage platted. The average size of the curvilinear-pattern subdivision increased from 29.7 acres in the 1920's to 32.2 acres in the 1950's. A decrease in the average size during the 1960's reflects perhaps the development of smaller tracts of land that may have been bypassed during earlier periods. Although the average size of the grid subdivision has been decreasing, the average size of the curvilinear subdivision, with the exception of the 1960's, has been increasing. Moreover, since the 1950's, more acreage has been platted under the curvilinear pattern than under the grid pattern, even though there were fewer curvilinear subdivisions recorded in that period. Consequently, even though grid subdivisions account for the greater proportion of recorded subdivisions, the curvilinear subdivisions currently account for the greater amount of acreage platted.

Cluster Pattern

The cluster subdivision is only a very recent design innovation in southeastern Wisconsin. As of 1969, only 6 such subdivisions had been recorded. They encompass 621 acres and were all recorded in the 1960-1969 period. The most significant fact concerning such subdivisions is the large average size of approximately 103 acres.

USES OF LAND IN PLATTED AREA

The intended use of land within recorded residential subdivision plats fell into 3 major categories: residential building sites or lotted areas, dedicated areas, and nonlotted areas. Table 2 gives the number of acres set aside for these uses during each decade:

1. The lotted areas consist of recognizable land divisions identified as numbered lots specifically intended for residential building development.
2. The dedicated areas consist of land areas designated specifically for public or semipublic streets, alleys, pedestrian walks, other public ways, drainageways, schools, parks, commons, buffer zones, planting strips, sites for utility facilities (such as water storage tanks and sewage pumping stations), and sites for various types of recreational uses (such as bridle paths, boat landings, beaches, or water channels and impoundments).
3. The nonlotted areas consist of land divisions not designated for some specific public or semipublic use and apparently not intended, at the time of recordation, for development into residential building lots. Many of these areas were designated simply as "outlots," and most of them obviously represented remnants of land that the road pattern or lotting pattern rendered inaccessible or unusable as building sites at the

Table 1. Residential subdivisions recorded and platted.

| Decade | Population* | Total | | | | | | | | | | | | | | | | | | |
|--------------|-------------|---------------|--------------|------------------|---------------|--------------|--------------|---------------|--------------|-------------|---------------|-------------|--------------|---------------------|-------------|--------------|-------------|---------------|-------------|--------------|
| | | Subdivisions | | | | | | Grid Pattern | | | | | | Curvilinear Pattern | | | | | | |
| | | Acres Platted | | | Subdivisions | | | Acres Platted | | | Subdivisions | | | Acres Platted | | | | | | |
| | | Num-ber | Per-cent | Avg Size (acres) | Num-ber | of Total | of Grid | Num-ber | of Total | of Grid | Num-ber | of Total | of Curvli. | Num-ber | of Total | of Curvli. | | | | |
| 1920 | 783,681 | 1,367 | 27.9 | 21.0 | 28,726 | 30.6 | 1,227 | 89.8 | 33.2 | 20.0 | 24,569 | 85.5 | 43.8 | 140 | 10.2 | 11.6 | 29.7 | 4,157 | 14.5 | 11.1 |
| 1930 | 1,006,118 | 215 | 4.4 | 16.3 | 3,509 | 3.7 | 188 | 87.4 | 5.1 | 14.3 | 2,682 | 76.4 | 4.8 | 27 | 12.6 | 2.2 | 30.6 | 827 | 23.6 | 2.2 |
| 1940 | 1,067,699 | 444 | 9.0 | 16.7 | 7,435 | 7.9 | 356 | 80.2 | 9.6 | 13.1 | 4,660 | 62.7 | 8.3 | 88 | 19.8 | 7.3 | 31.5 | 2,775 | 37.3 | 7.4 |
| 1950 | 1,240,618 | 1,797 | 36.6 | 18.7 | 33,603 | 35.7 | 1,268 | 70.6 | 34.3 | 13.1 | 16,594 | 49.4 | 29.6 | 529 | 29.4 | 44.1 | 32.2 | 17,009 | 50.6 | 45.6 |
| 1960 | 1,573,620 | 1,094 | 22.1 | 19.2 | 20,777 | 22.1 | 659 | 60.8 | 17.8 | 11.5 | 7,589 | 36.5 | 13.5 | 419 | 38.7 | 34.8 | 30.0 | 12,567 | 60.5 | 33.7 |
| Total | | 4,907 | 100.0 | 19.2 | 94,050 | 100.0 | 3,698 | 75.4 | 100.0 | 15.2 | 56,094 | 59.6 | 100.0 | 1,203 | 24.5 | 100.0 | 31.0 | 37,335 | 39.7 | 100.0 |

Note: During the 1960's, there were 6 cluster residential subdivisions, or 0.5 percent of the 1960 total and 0.1 percent of the overall total. They included 621 platted acres, or 3.0 percent of the 1960 total and 0.7 percent of the overall total.

*At the beginning of the decade. Regional population in 1970 was 1,756,086.

Figure 1. Subdivision development patterns.



Table 2. Acreage in residential subdivision land use categories.

| Decade | Dedicated | | | | | | | | | | | | | | | | Other | |
|--------------|---------------|-------------|---------------|-------------|------------|----------------|--------------|------------|--------------------|-------------|-------------------------|-------------|----------------------|------------|----------------------------|-------------|--------------|------------|
| | Lotted* | | Streets* | | Alleys* | | Total* | | Parks ^b | | Recreation ^b | | Schools ^b | | Miscellaneous ^b | | Nonlotted* | |
| | Num-ber | Per-cent | Num-ber | Per-cent | Num-ber | Per-cent | Num-ber | Per-cent | Num-ber | Per-cent | Num-ber | Per-cent | Num-ber | Per-cent | Num-ber | Per-cent | Num-ber | Per-cent |
| 1920 | 20,006 | 69.6 | 6,832 | 23.8 | 491 | 1.7 | 474 | 1.7 | 264 | 55.7 | 179 | 37.8 | 12 | 2.5 | 19 | 4.0 | 923 | 3.2 |
| 1930 | 2,595 | 74.0 | 748 | 21.3 | 40 | 1.1 | 25 | 0.7 | 19 | 76.0 | 6 | 24.0 | - | - | - | - | 101 | 2.9 |
| 1940 | 5,526 | 74.3 | 1,475 | 19.8 | 28 | 0.4 | 148 | 2.0 | 101 | 68.2 | 25 | 16.9 | 6 | 4.1 | 16 | 10.8 | 258 | 3.5 |
| 1950 | 24,713 | 73.5 | 7,377 | 22.0 | 89 | 0.3 | 433 | 1.3 | 236 | 54.5 | 37 | 8.5 | 39 | 9.0 | 121 | 28.0 | 991 | 2.9 |
| 1960 | 15,419 | 74.2 | 4,207 | 20.2 | 8 | - ^d | 530 | 2.6 | 156 | 29.4 | 161 | 30.4 | 4 | 0.8 | 209 | 39.4 | 613 | 3.0 |
| Total | 68,259 | 72.6 | 20,639 | 21.9 | 656 | 0.7 | 1,610 | 1.7 | 776 | 48.2 | 408 | 25.3 | 61 | 3.8 | 365 | 22.7 | 2,886 | 3.1 |

*Percentage is of total area platted that decade.

^bPercentage is of other dedicated areas platted that decade.

^cLess than 0.5 acre.

^dLess than 0.05 percent.

Table 3. Characteristics of platted residential lots.

| Decade | Total | | | | | | Grid Pattern | | | | | Curvilinear Pattern | | | | |
|--------------|----------------|--------------|------------------|------------|------------|-------------------------|----------------|------------------|------------|------------|-------------------------|---------------------|------------------|------------|------------|-------------------------|
| | Num-ber | Per-cent | Avg ^a | Width (ft) | Depth (ft) | Area (ft ²) | Num-ber | Avg ^a | Width (ft) | Depth (ft) | Area (ft ²) | Num-ber | Avg ^a | Width (ft) | Depth (ft) | Area (ft ²) |
| 1920 | 155,658 | 53.0 | 114 | 41 | 125 | 5,125 | 140,405 | 115 | 40 | 123 | 4,920 | 15,253 | 109 | 55 | 142 | 7,810 |
| 1930 | 10,833 | 3.7 | 50 | 59 | 152 | 8,968 | 8,382 | 45 | 58 | 152 | 8,816 | 2,451 | 91 | 64 | 154 | 9,856 |
| 1940 | 17,696 | 6.0 | 40 | 73 | 165 | 12,045 | 11,339 | 32 | 73 | 165 | 12,045 | 6,357 | 72 | 75 | 166 | 12,450 |
| 1950 | 72,090 | 24.7 | 40 | 86 | 155 | 13,330 | 40,472 | 32 | 86 | 155 | 13,330 | 31,618 | 60 | 96 | 163 | 15,648 |
| 1960 | 37,776 | 12.8 | 35 | 97 | 160 | 15,520 | 18,075 | 27 | 83 | 145 | 12,035 | 19,068 | 46 | 111 | 175 | 19,425 |
| Total | 294,053 | 100.0 | 60 | 62 | 140 | 8,680 | 218,673 | 59 | 53 | 133 | 7,049 | 74,747 | 62 | 88 | 162 | 14,256 |

Note: Width, depth, and area are dimensions of a typical lot. A lot was selected as being typical of each subdivision, and widths and depths were weighted, averaged, and then multiplied to yield the typical dimensions for each time period.

^aPer subdivision.

time of initial subdivision. Many of the larger areas in this category were found to have been further subdivided into building sites through "replatting" at later dates.

Lotted Areas

The 4,907 residential subdivisions recorded during the 50-year period contained 294,053 residential lots (Table 3) covering 68,259 acres. During the 1920's, 53 percent of the total number of lots were platted and 20,006 acres of residential land were set aside for lots, but that acreage is less than one-third of the 68,259 acres set aside for lots during the entire 50-year period. The 1950's accounted for 37 percent of all plats recorded, 36 percent of all the acreage platted, 37 percent of the residential acreage recorded, but 25 percent of the lots created. This suggests a subdivision design trend toward larger average lot sizes.

The proportion of residential land within the recorded plats has not varied appreciably during the entire period. It reached a low of 69.6 percent in the 1920's and a high of 74.3 percent in the 1940's (Table 2). The average during the entire study period was 72.6 percent.

The timing and spatial distribution of land development are the most important factors influencing efficient and economical provision of public services. Closely linked to these factors are subdivision size and lot size. The size of a residential lot will greatly influence not only type, style, and price range of the structure to be placed on the site but also quantity and quality of public services that can be economically provided to the site. Typical lot sizes have been increasing steadily since the 1920's, when the typical lot contained approximately 5,125 ft² (Table 3). By the 1960-1969 period, the typical lot had more than tripled in size and contained approximately 15,520 ft². During the entire study period, the typical lot dimensions have also changed significantly, principally in the front footage dimensions. During the 1920's, when most of the lots were created, a typical lot measured approximately 40 ft wide by 125 ft deep. In the 1960's, a typical lot measured approximately 97 ft wide by 160 ft deep. As the average lot size increased, the average number of lots per platted subdivision decreased, dropping from an average of 114 lots per subdivision in the 1920's to an average of 35 lots per subdivision in the 1960's.

Grid Pattern—The grid pattern of residential subdivision accounted for the creation of 218,673, or 74 percent, of the lots platted within the region during the 50-year study period. The grid pattern of development also shows a steady decrease in the average number of lots created per subdivision and a gradual increase in the typical lot size until the 1960's when there was a slight decrease. The average front footage or width of the typical lot increased from 40 ft in the 1920's to 83 ft in the 1960's.

Curvilinear Pattern—The curvilinear pattern of residential subdivision accounted for the creation of 74,747, or about 25 percent, of the lots platted within the region during the study period. The average number of lots per recorded subdivision decreased, but the average size of the typical lot increased. Most of the change in lot area is attributable to an increase in the lot width from 55 ft in the 1920's to 111 ft in the 1960's.

Cluster Pattern—Only 6 cluster subdivision plats were recorded, and these 6 plats accounted for the creation of 633 residential lots. The typical cluster pattern of development contained an average of 106 lots measuring approximately 96 ft in width and 139 ft in depth. The typical lot area was approximately 13,300 ft², which, as intended by this design type, represents a smaller average lot size than the curvilinear pattern of development.

Area Dedicated for Streets

During the study period, there were 20,639 acres, or 22 percent, of land dedicated for street right-of-way through the recordation of plats (Table 2). The average subdivision contained 4.2 acres of land so dedicated (Table 4). The street centerline measurement of the dedicated rights-of-way totaled 2,837 linear miles, an average of 0.7 mile per recorded subdivision. The greatest number of acres for street right-of-way was dedicated in the 1950's, but the greatest number of linear miles was created

during the 1920's. Of the total land platted in the 1920's, 23.8 percent was dedicated to streets. During that same period, more than 33 percent of the grid pattern of residential subdivisions was recorded. These subdivisions rely heavily on the uniform and regular street pattern as a design element. The proportion of land dedicated for street right-of-way within the recorded subdivision plats has decreased from 23.8 percent in the 1920's to 20.2 percent in the 1960's, a significant reduction in such an important subdivision design element as streets.

Grid Pattern—In grid subdivisions, the 1920-1929 period was the most active in terms of acreage recorded and linear miles of street right-of-way and acreage dedicated; however, the greatest number of grid subdivisions was recorded in the 1950-1959 period. The linear miles of street right-of-way dedicated in subdivision plats have decreased consistently during the study period, but the proportion of acreage dedicated for street right-of-way has remained relatively stable. This suggests a growing tendency for wider street right-of-way to be dedicated.

Curvilinear Pattern—The 1950-1959 period was the most active period for recording curvilinear subdivisions. This period also accounted for the largest average street right-of-way acreage per recorded plat and for nearly half of the total linear miles of streets created within curvilinear subdivisions during the study period.

Cluster Pattern—The 6 cluster subdivision plats encompassed 621 acres of land, of which 101 acres, or 16.3 percent, were dedicated for street right-of-way, an average of 16.8 acres, or 2.4 linear miles per recorded subdivision.

Area Dedicated for Alleys

Only 1,052 subdivisions, or 21 percent of the total, contained land area dedicated for alleys. Moreover, the proportion of land dedicated for alley rights-of-way during the study period decreased from 1.7 percent of the total acreage recorded in the 1920-1929 period to less than 0.1 percent in the 1960-1969 period. More than 90 percent of the alley right-of-way was located in grid subdivisions. It is evident that the alley, once considered essential to the design layout of a subdivision, is now rarely incorporated into a subdivision layout.

Area Dedicated for Uses Other Than Streets and Alleys

Approximately 1,610 acres of land within platted residential subdivisions, or 1.7 percent of the total area, were dedicated for purposes other than street and alley rights-of-way. The uses of this acreage are given in Table 2. More than 51 percent of the land dedicated for purposes other than streets and alleys within platted subdivisions was located in curvilinear subdivisions, 37 percent was located in grid subdivisions, and 12 percent was located in cluster subdivisions. Moreover, 60 percent of the land dedicated for parks, 39 percent of the land dedicated for other recreation uses, and 67 percent of the land dedicated for schools was located in curvilinear subdivisions. Not all platted residential subdivisions contained land areas dedicated for public uses. As a matter of fact, only 740, or about 15 percent, of the 4,907 subdivisions recorded during the study period contained land areas dedicated for purposes other than streets and alleys, and many of these contained areas dedicated for several types of uses, such as schools, parks, and pedestrian ways.

Nonlotted Areas

Table 2 gives the nonlotted acreage of recorded plats since 1920; the proportion remained fairly constant throughout the study period. Of this acreage, 58 percent was located in grid subdivisions, 37 percent was located in curvilinear subdivisions, and 5 percent was located in cluster subdivisions.

PLATTING ACTIVITY RELATED TO SANITARY SEWERAGE SERVICE

The 1955 Wisconsin Legislature revised the Wisconsin Platting Act. One of the significant revisions required subdivision plats not served by sanitary sewers to be approved by the Wisconsin Board of Health. This revision permitted an evaluation of

Table 4. Linear miles and acreage of dedicated street right-of-way.

| Decade | Total | | | | | Grid Pattern | | | | | Curvilinear Pattern | | | | |
|--------|--------------------|------------------|---------|----------|------------------|--------------|------------------|---------|-----------------------|------------------|---------------------|------------------|---------|-----------------------|------------------|
| | Miles ^a | | Acres | | | Miles | | Acres | | | Miles | | Acres | | |
| | Num-ber | Avg ^b | Num-ber | Per-cent | Avg ^b | Num-ber | Avg ^b | Num-ber | Per-cent ^c | Avg ^b | Num-ber | Avg ^b | Num-ber | Per-cent ^c | Avg ^b |
| 1920 | 1,027.3 | 0.8 | 6,832 | 23.8 | 5.0 | 885.0 | 0.7 | 5,901 | 24.0 | 4.8 | 142.3 | 1.0 | 931 | 22.4 | 4.5 |
| 1930 | 102.6 | 0.5 | 748 | 21.3 | 3.5 | 76.4 | 0.4 | 569 | 21.2 | 3.0 | 26.2 | 1.0 | 179 | 21.6 | 4.6 |
| 1940 | 204.7 | 0.5 | 1,475 | 19.8 | 3.3 | 127.1 | 0.4 | 911 | 19.5 | 2.6 | 77.6 | 0.9 | 564 | 20.3 | 4.9 |
| 1950 | 858.8 | 0.5 | 7,377 | 22.0 | 4.1 | 493.9 | 0.4 | 3,789 | 22.8 | 3.0 | 464.0 | 0.9 | 3,588 | 21.1 | 4.7 |
| 1960 | 543.6 | 0.5 | 4,207 | 20.2 | 3.9 | 224.5 | 0.3 | 1,718 | 22.6 | 2.6 | 304.8 | 0.7 | 2,388 | 19.0 | 5.3 |
| Total | 2,837.0 | 0.6 | 20,639 | 21.9 | 4.2 | 1,806.9 | 0.5 ^c | 12,888 | 23.0 | 3.5 | 1,015.8 | 0.8 | 7,650 | 20.5 | 4.9 |

^aBased on measurement of center line of dedicated right-of-way.^bPer subdivision.^cOf acreage recorded in that pattern.**Table 5. Residential plats and lots recorded with and without public sewerage facilities available — 1957-1969.**

| Pattern | Plats | | | | | | Lots | | | | | |
|-------------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|
| | Total | | With | | Without | | Total | | With | | Without | |
| | Num-ber | Per-cent | Num-ber | Per-cent | Num-ber | Per-cent | Num-ber | Per-cent | Num-ber | Per-cent | Num-ber | Per-cent |
| Grid | 995 | 61.5 | 828 | 68.7 | 167 | 40.5 | 26,752 | 46.5 | 23,202 | 51.8 | 3,550 | 27.8 |
| Curvilinear | 616 | 38.1 | 372 | 30.9 | 244 | 59.2 | 30,201 | 52.4 | 21,008 | 46.9 | 9,193 | 71.9 |
| Cluster | 6 | 0.4 | 5 | 0.4 | 1 | 0.3 | 633 | 1.1 | 594 | 1.3 | 39 | 0.3 |
| Total | 1,617 | 100.0 | 1,205 | 100.0 | 412 | 100.0 | 57,586 | 100.0 | 44,804 | 100.0 | 12,782 | 100.0 |

the subdivision platting activity that took place during the 1957-1969 period with respect to the provision of sanitary sewerage service. Although there is no question that many recorded subdivisions were developed prior to 1957 without provision for sanitary sewerage facilities, records concerning this fact were not required and thus were not available for the years prior to 1957.

During the period from 1957 through 1969, there were 1,617 residential subdivisions encompassing 30,051 acres recorded within the region (Table 5). Nearly three-fourths of those recorded were provided with public sanitary sewerage facilities, and more than one-fourth were provided with on-site soil absorption sewage disposal systems for the lots platted. During this period, 59 percent of the recorded subdivisions that had no public sewerage provided were of the curvilinear pattern and about 41 percent were of the grid pattern. Many subdivisions that had no public sanitary sewerage facilities available at the time of recordation and initial development have subsequently been provided with such public facilities, often at considerable additional cost to both the private property owners and the local units of government concerned.

More than 77 percent of the lots created during the 1957-1969 period were provided with public sewerage facilities, and nearly 52 percent of these were in grid subdivisions. About 22 percent of the lots were not provided with public sewerage facilities, and nearly 72 percent of these were located in curvilinear subdivisions.

SUMMARY AND CONCLUSIONS

For more than 100 years, from 1840 to 1950, urban development took place within the southeastern Wisconsin region by a generally continuous outward expansion of the urban centers established early in the settlement of the region. From 1950 to 1970, however, a dramatic change occurred in this pattern of urban development: Large, scattered tracts of rural lands were subdivided for urban use and resulted in a highly dispersed, discontinuous, low-density development pattern that has become known as urban sprawl. To provide information on the changes brought about by the location and timing of this urban land development process, a study was undertaken by the Southeastern Wisconsin Regional Planning Commission of the quantity, character, rate,

and geographic location of residential land subdivision activity within the region during the 50-year period from 1920 through 1969. A review of the changes in the Wisconsin platting laws governing the subdivision of land over this period was also conducted. The findings of the study are summarized below.

Total Subdivisions

The 50-year period witnessed the recordation within the southeastern Wisconsin region of 4,907 residential subdivision plats encompassing 94,050 acres of land and accounting for the creation of 294,050 residential lots and the dedication of 20,639 acres of street right-of-way, 656 acres of alley right-of-way, 776 acres of park land, 408 acres of other recreation land, and 61 acres of land for school purposes. More than half of the subdivisions recorded and of the acreage platted during the 50-year period were recorded and platted since 1950, but only 35 percent of the lots were created since 1950, indicating both a trend toward larger lots and increased platting activity during the past 20 years. Although the acreage of the average subdivision remained nearly constant during the 50-year period, the number of lots per subdivision decreased from an average of 114 lots per subdivision in the 1920's to an average of 35 lots per subdivision in the 1960's. The typical lot size increased from approximately 5,100 ft² in the 1920's to approximately 15,500 ft² in the 1960's.

Grid Subdivisions

The grid pattern was used for 3,698 subdivisions, or 75 percent of the total recorded, and accounted for 56,094 acres, or 60 percent of the total acreage platted. In those subdivisions, 218,673 residential lots, or 74 percent of the total number, were created, and about 1,800 linear miles of street right-of-way, or nearly 64 percent of the total, were dedicated. Although most subdivisions platted within the region were of the grid pattern, the proportion has decreased steadily since 1920. Since 1950, the grid subdivision has accounted for less than half of the total acreage platted. Also during the 1960's, lots in grid subdivisions accounted for fewer than half of the total lots created, indicating a decreased reliance on the grid pattern for land subdivision. Moreover, the average size of the grid subdivision has also been decreasing since 1920, as has the average number of lots per subdivision. In the 1920 through 1929 period, the average grid subdivision was 20 acres in size and contained an average of 115 lots. By the 1960's, the average grid subdivision was 11 acres and contained an average of only 27 lots. The typical grid subdivision has followed the trend indicated earlier in that the typical lot area has increased from approximately 5,000 ft² in the 1920's to approximately 12,000 ft² in the 1960's. The principal change affecting the lot area occurred in the typical lot frontage, which increased from 40 ft to approximately 80 ft during the 50-year period.

Curvilinear Subdivisions

During the study period, the curvilinear residential subdivision design was used for 1,203 subdivisions, or nearly 25 percent of the total recorded, and accounted for 37,335 acres, or nearly 40 percent of the total acreage platted. In those subdivisions, 74,747 residential lots, or 25 percent of the total number, were created and 1,016 linear miles of street right-of-way, or nearly 36 percent of the total street mileage, were dedicated. The curvilinear pattern accounted for 10 percent of the recorded subdivisions, 15 percent of the platted acreage, and 10 percent of the lots created in the 1920's. By the 1960's, the curvilinear pattern accounted for 39 percent of the recorded subdivisions, 60 percent of the platted acreage, and 52 percent of the lots created. The average size of the curvilinear subdivision has increased from 29 acres in the 1920's to 30 acres in the 1960's. The average number of lots per subdivision, however, has decreased from 109 in the 1920's to 46 in the 1960's. The typical lot area has increased from approximately 7,800 ft² in the 1920's to 19,400 ft² in the 1960's. The principal change affecting the lot area was the lot frontage, which increased from 55 ft in the 1920's to about 110 ft in the 1960's.

Cluster Subdivisions

The cluster residential subdivision design has been introduced into the region only since 1960 and has been used for only 6 subdivisions, or less than 1 percent of the total recorded. It accounted for 621 platted acres, or less than 1 percent of the total acreage platted; created 633 residential lots, or less than 1 percent of the total lots created; and resulted in the dedication of 14 linear miles of street right-of-way, or less than 1 percent of the total street mileage dedicated. Although it has had only a limited application in the region to date, the average cluster subdivision contains about 103 acres, an average of 106 lots, and a typical lot area of approximately 13,300 ft².

Provision of Sewerage Service

A special effort was made to determine the amount of platting activity that took place outside established public sanitary sewerage service areas; this revealed that 412 recorded plats, or 40 percent of the total number platted during the entire period, required review and approval by the Wisconsin Board of Health because no provisions were made for public sanitary sewerage service to the lots created. Moreover, of these 412 subdivisions, 240, or 58 percent, were located in quarter sections within which more than 50 percent of the area was covered by soils having severe or very severe limitations for such residential development. Of those 240, 131 were located in quarter sections wherein the entire land area was covered by soils having severe or very severe limitations for residential development requiring on-site sewage disposal.