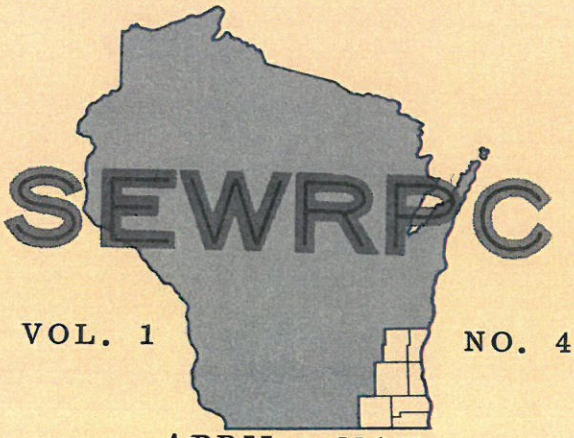
TECHNICAL RECORD



VOL. 1 NO. 4

APRIL - MAY

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* * THE APPLICATION OF SOIL STUDIES TO REGIONAL PLANNING * CODING * INVENTORY OF EXISTING OUTDOOR RECREATION FACILITIES AND HISTORIC SITES IN SOUTHEASTERN WISCONSIN * * * INVENTORY OF POTENTIAL PARK AND RELATED OPEN SPACE SITES * *

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

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THE TECHNICAL RECORD

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A BACKWARD GLANCE

by Richard E. Rehberg, Editor

THE ELECTRIC INTERURBAN RAILWAY

Reference to famous electric rapid transit systems, immediately brings to mind such systems as the New York subway or the Chicago "El". But, to those who lived, worked and played in southeastern Wisconsin a decade or two ago, "rapid transit" meant the network of high standard electric interurban lines radiating from Milwaukee. Symbol of an exciting and colorful era, the electric interurban railroad was a hybrid rail system utilizing one, two or three coach overhead-powered electric trains that, as the name implies, provided fast, efficient transit from city to city.

At the turn of the century, there were 383[1] miles of electric interurban trackage in Wisconsin. Of that, 76 miles comprised a network in the Lake Winnebago area, 52 miles consisted of Illinois based lines including the North Shore Railway, the Rockford-Beloit-Janesville interurban and the Geneva Lake line. Two short lines from upper Michigan also crossed the state border. Over 250 miles of trackage, however, belonged to the Milwaukee Electric Railway & Light Company (TMER&L) with four major routes serving six of the seven counties in the Region as well as Sheboygan and Jefferson Counties.

THE RISE AND FALL OF THE MILWAUKEE ELECTRIC

Today, suburban commuters in the Milwaukee metropolitan area drive to work over expressways and freeways, some of which are built on the former right-of-way[2] of one of America's finest electric interurban systems--the "Milwaukee Electric Railway" or "The TM" as it was affectionately known for over 50 years (1896-1951)[3]. An integrated system of street and interurban electric railway lines, the "Milwaukee Electric Railway" in its Prime operated 7 million car miles annually and carried 31 million riders a year to work and play at a nickel a head. It is an example of an important mode of transportation that has been replaced by the multi-lane ribbons of concrete that now cross and recross its scattered remains at countless places in southeastern Wisconsin. (See Map 1, page 12.)

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1 All mileage figures presented are "route" miles as opposed to "track" miles since some lines were multi-track.

2 Portions of the west expressway (I-94) to Waukesha have been constructed on original right-of-way of the TMER&L. (See Figure 1.)

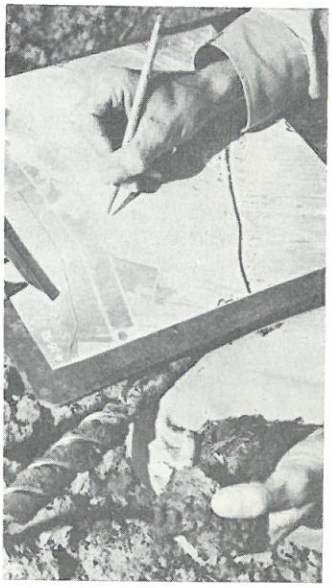
3 "The TM" was a local nickname derived from the unusual use of "The" in the title, TMER&L. TMER&L was later changed to TMER&T (T for transport) when the Wisconsin Electric Power Company was ordered by the federal government to devest itself of its street and interurban railway holdings.

Continued on page 12

THE APPLICATION OF SOIL STUDIES TO REGIONAL PLANNING

by Kurt W. Bauer, Executive Director
Southeastern Wisconsin Regional Planning Commission

INTRODUCTION



Under the SEWRPC regional land use-transportation planning program, it is proposed to develop, test and evaluate, not one, but several alternative long-range land use plans, each accompanied by its supporting transportation system plan. It is further proposed that the selection of the most desirable plan from among these alternatives be based, among other things, upon a careful assessment of the effects of each particular alternative plan on the natural resource base. This emphasis on the natural resource base is perhaps the singularly most important factor which makes the land use-transportation study in southeastern Wisconsin unique among the major transportation studies presently underway throughout the country. This emphasis requires the collection and analysis of a great deal more information concerning the natural resource base and its ability to sustain urban development than has been collected in major land use-transportation studies before. Such data includes definitive information on surface and groundwater resources; topography and wetlands; vegetation and wildlife; historic, scientific and cultural sites; and--the subject of this article--definitive data on soils.

NEED FOR THE STUDY

Soil properties exert a strong influence on the manner in which man uses land. Soils are an irreplaceable resource, and mounting pressures upon land are constantly making soil more and more valuable. Historically, the study of soils has been directed primarily at single problems and little attention has been given to soil potentials on a comprehensive area-wide basis. A need, therefore, exists in any comprehensive regional planning program to examine not only how soils are used, but how they can best be used and managed. This requires a regional soil suitability study which can be used to:

1. Aid in the selection and development of desirable spatial distribution patterns for residential, commercial, industrial, agricultural and recreational development.

2. Make preliminary estimates of the engineering properties of soils that will aid in the selection of highway, railway, airport and pipeline locations, and in planning detailed soils investigations for such transportation facility route location studies.

3. Make preliminary estimates of the agricultural and non-agricultural plant material, and of the natural wildlife relationship

properties of soils that will aid in planning for the reservation of permanent agricultural and recreational green belts and open spaces.

4. Make preliminary estimates of the suitability of soils for private on-site sewage disposal facilities, agricultural and urban drainage systems, foundations for buildings and structures (including transportation facilities), water storage reservoirs and embankments.

5. Locate potential sources of sand and gravel and other mineral resources.

6. Correlate engineering properties with soil types to develop information for broad, area-wide land use planning.

An area-wide soil suitability study is not intended to, and does not, eliminate the need for foundation investigations and laboratory testing of soils for the design and construction of specific major engineering works. Rather, it is intended that the study be used primarily in comprehensive, area-wide planning to assure that planned regional settlement patterns are adjusted to the natural resource base. (See Figure 1.)

At the time of the creation of the Southeastern Wisconsin Regional Planning Commission, a general soil survey had not been prepared for the Region as a whole. General soil surveys, however, had been completed at various times in the past for each of the seven counties within the Region. Modern standard soil surveys, covering approximately 38 percent of the Region, had also been completed in connection with the preparation of basic farm conservation plans; such basic farm conservation plans being in fact, the rural equivalent of the urban comprehensive community development plan.

On the basis of this prior work, it was established that soils having questionable characteristics for on-site sewage disposal were widespread throughout the Region, with over 51 different soils series of an estimated 250 soils series within the Region found to be troublesome in this respect. Urban development undertaken in disregard of these soil conditions had actually created severe environmental problems within the Region, with the result that severe restrictions had been placed on the development of new subdivision plats in certain areas of the Region by the State Board of Health. It was further estimated that, in some portions of the Region lying within the immediate path of urbanization, up to one-third of the area might consist of poorly drained soils not suitable for urban development. More normal distributions of such wet soils in other parts of the country are represented by from one-fifth to one-tenth of the area being covered by such soils. U. S. Bureau of Public Roads' data from selected soil samples also reflected the questionable adequacy of many soils within the Region as foundations for transportation system structures.

The Region lies within a wholly glaciated area and this glacial geology creates highly complex soil relationships and extreme variability and intermingling of soils within very small areas. The usefulness of generalized soil maps is, therefore, severely limited; and detailed operational soil surveys are an absolute prerequisite for sound development planning. Adequate soil suitability data is particularly important in rela-

Figure 1

CONDITIONS RESULTING FROM IMPROPER USE OF SOILS

1. Example of Footing and Foundation Failure Due to Construction on Soils With Inadequate Bearing Strength.

2. Example of Severe Erosion Due to Poor Soil Management.

3. Example of Footing and Foundation Failure Due to Construction on Unstable Soils.

Photos courtesy of the Soil Conservation Service.

tionship to application of the regional land use model being developed by the Commission. The amount of land within each quarter section suitable for urban development is a necessary input to the model and this essential input cannot be properly provided without data from a detailed operational soil survey.

Procedure

After careful consideration it was decided that the standard soil survey of the Soil Conservation Service, U. S. Department of Agriculture, together with interpretations for regional planning purposes, was required to meet the regional land use-transportation study needs.

These surveys are based upon careful field and laboratory studies of the physical, chemical and biological properties of the soils and include the preparation of maps showing the locations of the various types of soils and reports which describe each soil type and its properties. The surveys are carried out by experienced soil scientists and constitute a very valuable basic scientific inventory having multiple planning and engineering uses. A cooperative agreement was, therefore, negotiated with the Soil Conservation Service for the completion of standard soil surveys of the entire area within the Region together with the provision of necessary interpretations for comprehensive planning purposes.

WORK SPECIFICATIONS

Specifications governing the soil survey work were drawn by the SEWRPC staff for incorporation in the interagency agreement. These contained the following salient provisions:

Mapping and Photography

Base maps prepared by the Commission under its initial planning program were to be made available to the Soil Conservation Service, and, in order to assure full compatibility with the Commission's planning work, maximum utilization of these maps in the conduct and presentation of the work was specified.

The specifications also noted that the Commission had recently (April 1963) completed new vertical aerial photography of the entire Region.[1] This photography was obtained at two scales:

1. High altitude photography at a negative scale of 1" = 6,000' from which rectified photographic enlargements were prepared on dimensionally stable cronar base material at a scale of 1" = 2,000' (1:24,000), thus matching the Commission's base maps. Each such rectified enlargement is centered over a survey township and covers the entire township.

2. Low altitude photography was obtained at a negative scale of 1" = 2,000'. Ratioed photographic enlargements of these negatives were prepared on dimensionally stable cronar base material at a scale of 1" = 400' (1:4800), using a

1 "Aerial Photographs and Their Use in The Land Use Inventory," Technical Record; SEWRPC, Vol. 1 - No. 2.

300 line per inch screen. Each such ratioed enlargement is centered over the common corner of four U. S. Public Land Survey sections and entirely covers the four sections. Diazo prints of these enlargements can be readily prepared for use as field sheets.

Negatives of all photography were made available to the Soil Conservation Service, and maximum utilization of this photography in the conduct and presentation of the soil survey was also specified.

Generalized Soil Survey

The Soil Conservation Service was asked to prepare up-to-date generalized soils maps of the entire Region. These maps were to be based upon existing soils data, compiled upon base maps furnished by the Commission, and were to be accompanied by a suitable legend and table of interpretations for comprehensive planning purposes. While of extremely limited usefulness, the generalized soil maps are intended to serve in the interim between the initiation of the project and completion of the necessary detailed surveys.

Operational Soil Survey

The Soil Conservation Service agreed to conduct standard soil surveys (detailed operational soil surveys) covering all those areas of the Region where such surveys had not previously been conducted, estimated at approximately one million acres. Such surveys were to be carried out in full conformance with the latest standard operational procedures of the Soil Conservation Service as set forth in the U. S. Department of Agriculture's Soil Survey Manual.

Boundaries of soil mapping units were to be identified on prints of aerial photographs, and all mapped soil areas identified by a suitable legend. Field mapping is actually being accomplished on aerial photographs prepared from Commission negatives at a scale of 1" = 1,320', each field sheet covering an area of six square miles (six U. S. Public Land Survey sections). It was further specified that all previously completed mapping was to be transferred to such current photography. The Commission was to be furnished, on a work progress basis, with one copy of the completed field sheets. In addition, a reproducible half-tone negative of the completed field sheets was to be prepared on dimensionally stable cronar base material at a scale of 1" = 2,000', matching that of the Commission's base maps. The reproducible negatives are suitable for the preparation of blue-line or black-line prints by diazo process and clearly show the soils mapping with delineations and identifying symbols so that the prints may be used for planning and engineering purposes on a work progress basis. (See Figure 3, page 9.)

Finished photo maps are to be prepared to accompany the published standard U. S. Department of Agriculture soil survey reports at a scale of 1" = 1,320', again utilizing negatives provided by the Commission. Each finished photo map is to cover an area of six square miles (six U. S. Public Land Survey sections). Key planimetric features, such as highways, railroads, streams, lakes, cemeteries and major structures are to be identified on the finished photo maps as are the U. S. Public Land Survey township, range and section lines. (See Figure 2.)

Figure 2

SAMPLE OF THE STANDARD PHOTO MAP PUBLISHED BY THE U. S. DEPARTMENT OF AGRICULTURE (SCALE 1" = 1,320')

Negatives for this illustration supplied by the Soil Conservation Service.

Soils Data and Data Interpretations

The soils maps are to be accompanied by a soil survey report containing the following information:

1. Background information on the mapped area, including physiography, geology, climate, cultural characteristics and generalized soil areas.

2. Soil formation and classification, including slope data.

3. Soil descriptions, including typical profiles for each series and relationship of mapping units to series.

4. Agricultural soil properties, including soil capabilities, crop yield estimates and crop adaptation.

5. Wildlife soil relationship properties, including capability to sustain various plant and animal species.

6. Non-agricultural plant material soil relationships, including suitability for lawns, golf courses, playgrounds, parks and open space reservations.

7. Water management properties, including identification of areas subject to flood hazard, stream overflow, ponding, concentrated runoff and relationship to run-off characteristics.

8. Engineering properties, including depth of horizons, liquid limit, plastic limit, plasticity index, maximum dry density, optimum moisture content, mechanical analysis, AASHO and Unified classifications, percolation rate, bearing strength, shrink-swell ratio, corrosion potential, susceptibility to frost action and erosion, depth to water table, estimated depth to bedrock (if within approximately 20 feet of the ground surface) and runoff characteristics.

Interpretations of this data are to include:

1. Suitability ratings for potential intensive and extensive residential development, commercial, industrial, transportational, natural and developed recreational and agricultural uses.

2. Adaptability ratings for use in the natural condition for septic tank disposal fields, building foundations, trafficability, surface stabilization, road and railway subgrade and earthwork.

3. Adaptability ratings for use as a source material for road base, backfill, sand or gravel, topsoil and water reservoir embankments and linings.

4. Estimated ratings significant to flooding potential, runoff and watershed characteristics, depth to water table, susceptibility to erosion, bearing strength, percolation rate and susceptibility to frost action.

5. Suitability for wildlife habitat and habitat improvement, lawns, golf courses, playgrounds, and parks and open areas with permanent vegetation.

All of the data collected and all of the interpretations are to be summarized in tabular form suitable for ready use in planning and engineering analyses. (See Figure 3.)

Reports

The Soil Conservation Service further agreed to provide two types of published reports setting forth the complete results of the soil surveys and interpretative data. The first type, containing all of the data specified above, is to follow the format of the Commission's planning publications and will be issued on a work progress basis. The second will consist of the standard U. S. Department of Agriculture soil survey publications and will follow the latest standards for such reports. All final reports are to be published by county with the exceptions of Racine and Kenosha, and Milwaukee and Waukesha Counties which may be combined in two reports.

Preparation of Interpretative Maps

The Commission staff, utilizing the data provided by the soil surveys, will prepare interpretative maps suitable for planning purposes. These maps will be prepared by county as an overlay to the Commission's base maps at a scale of 1" = 2,000' (1:2400), and will be reduced for publication at 1" = 4,000' (1:4800). (See Figure 3.)

Interpretative maps for planning purposes will be prepared for the following potential land uses: agriculture, large lot residence development without public sanitary sewer service, small lot residence development without public sanitary sewer service, residential development with public sanitary sewer service (see Figure 3), industry, transportation route location, intensely developed recreation and reservation type recreation. Each interpretative map will reflect the following five suitability ratings: very good, good, fair, poor and not suitable. These terms are defined as follows:

1. Very good: little or no limitations on use.

2. Good: slight limitations on use, easy to overcome during development.

3. Fair: moderate limitations on use, can be overcome with careful design and good management.

4. Poor: severe limitations on use, suitability questionable and very difficult to overcome during development.

5. Not suitable: severe limitations that lead to serious problems and make use generally unsound.

In addition a slope map will be prepared using the following slope ranges: 0 through 1 percent, over 1 through 5 percent, over 5 through 8 percent, over 8 through 11 percent, over 11 through 14 percent, over 14 through 19 percent, over 19 through 29 percent and over 29 percent. Other interpretative maps for planning and engineering purposes based upon quantitative soil properties readily suggest themselves and may be

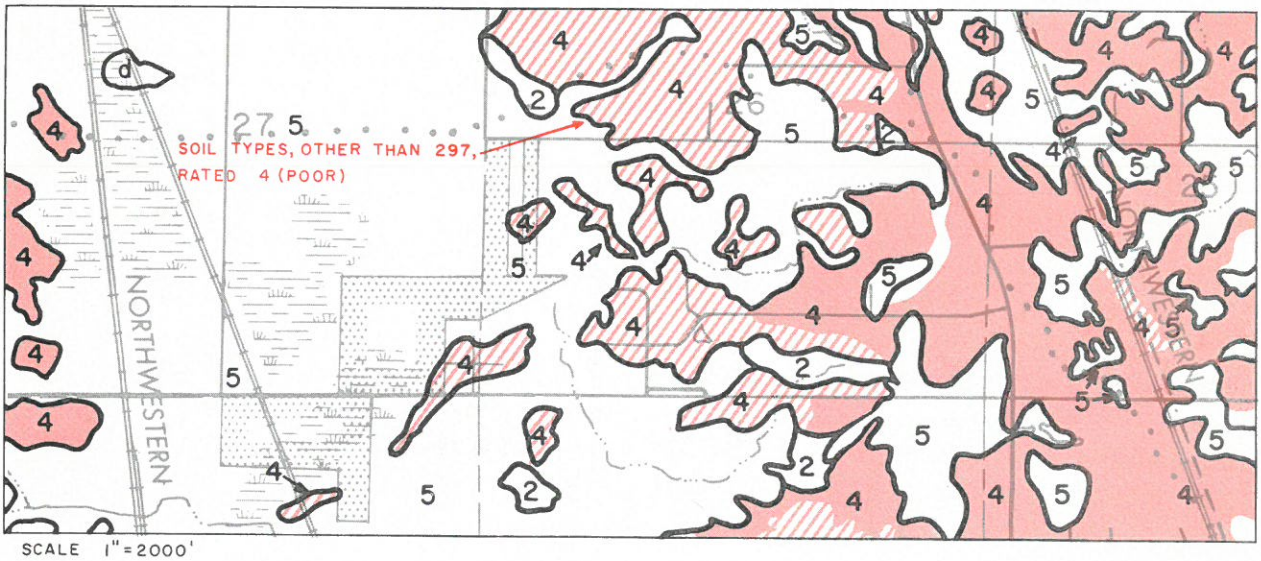
Figure 3

MAPPING OF SOIL INTERPRETATIONS

SCALE 1"=2000'

EXAMPLE OF SOIL SUITABILITY RATING TABLE FOR PRIMARY LAND USES

Soil Types	Agriculture		Residential						Industry		Transportation		Recreation			
			With Sanitary Sewers		Less Than 1 Ac. Lots Without San. Sewers		1 Ac. Lots or Larger Without San. Sewers						Intensively Developed		Extensively Developed	
	Rating	Code No.	Rating	Code No.	Rating	Code No.	Rating	Code No.	Rating	Code No.	Rating	Code No.	Rating	Code No.	Rating	Code No.
297	Good	2	Good	2	Poor	4	Poor	4	Fair	3	Poor	4	Good	2	Good	2
297X	Good	2	Good	2	Poor	4	Fair	3	Fair	3	Fair	3	Fair	3	Good	2
298	Good	2	Not Suitable	5	Not Suitable	5	Not Suitable	5	Poor	4	Poor	4	Poor	4	Not Suitable	5
299	Good	2	Fair	3	"	5	"	5	Poor	4	Poor	4	Fair	3	Fair	3



SCALE 1"=2000'

prepared as the regional planning work progresses to more definitive phases.

It is proposed that the interpretative areas will be measured by quarter section using cutouts and an analytical balance reading to the nearest one ten-thousandth of a gram. Percentage and total areas of each of the various suitability groupings within each U. S. Public Land Survey section will be so determined, coded and transferred to punch cards for processing, tabulation and use in planning analyses and model applications.

Progress

Progress to date has not only been impressive, but has given rise to a great deal of respect on the part of the Commission for the Soil Conservation Service. This respect has grown out of, not only appreciation of the diversified resources at the disposal of the Soil Conservation Service, but out of the unusually high levels of competence and enthusiasm demonstrated by their personnel in the discharge of that agency's obligations to the Commission. In spite of a two months' late start, the work has progressed slightly ahead of schedule with approximately 307,360 acres mapped in the first working season and 36,797 acres of older surveys converted (see Table 1). In order to expedite this work, five field offices were established by the Soil Conservation Service and staffed by 15 experienced soil scientists working under the administrative direction of Mr. Howard C. Hass, S. C. S. Area Conservationist.

Table 1

SOIL SURVEY PROGRESS REPORT BY COUNTY
(area in acres)

County	New Mapping Completed in 1963	New Mapping Remaining to be Done	Revisions & Conversions in 1963	Revisions & Conversions Remaining to be Done
Kenosha	7,660	114,234	---	52,826
Milwaukee	50,160	35,000	4,240	920
Ozaukee	38,040	42,613	13,995	16,301
Racine	65,230	100,824	---	49,626
Walworth	54,105	52,341	8,370	19,970
Washington	55,248	131,000	9,337	48,663
Waukesha	36,920	203,000	855	105,000
TOTALS	307,363	679,012	36,797	293,306

Costs

The complete cost of the regional soil surveys, not including, however, the preparation of interpretative maps on final published reports, is estimated at $260,000. This cost includes the conversion of approximately 654,000 acres of existing detailed soil surveys to SEWRPC specifications and the preparation of new surveys covering approximately 1,000,000 acres of previously unsurveyed area. Approximately 67,000 acres of disturbed soils in the most intensely developed areas of the Region will not be mapped.

Unit costs for new surveys approximate $128.00 per square mile of mapped area with conversion costs approximating $59.00 per square mile of converted area, not including the preparation of interpretative maps of final published reports.

CONCLUSION

The Southeastern Wisconsin Regional Planning Commission in its commitments to the Federal and state governments has indicated that it would produce not one, but several alternative regional land use-transportation plans and that it would evaluate the effects of each alternative plan on the underlying natural resource base. This represents an unique effort to relate the preparation of area-wide urban development plans to the natural resource base, thus avoiding future development problems and further deterioration of the regional environment. The regional soil survey being undertaken is one of the most important tools through which this adjustment of urban development plans to the resource base will be accomplished. The effort in southeastern Wisconsin represents the first program in the United States, and perhaps in the world, to provide detailed operational soil surveys suitable for comprehensive planning purposes over an entire urbanizing Region.

In addition to providing one of the most important inputs to the preparation of the regional plans themselves, the soil survey work will provide the basis for many development decisions by Federal, state and local units of government and by private investors. The soils data provided to date on a work progress basis are already being put to use by engineers, conservationists, sanitarians, farmers and foresters throughout the Region, as well as by the Commission staff. It is proving to be one of the soundest capital investments that could have been made. Since these soil surveys are a basic scientific inventory, they provide valuable information needed for local urban land use planning, highway location and design, park and open space planning, subdivision layout and design, planning and design of sewage disposal facilities, for sound application of official mapping, zoning and other land use controls, as well as for agricultural and forest land use planning and management. If soil properties as revealed by a detailed operational soil survey are ignored during plan formulation, not only will expensive obstacles to plan implementation occur, but irreparable damage may be done to the land and water resources of the community.

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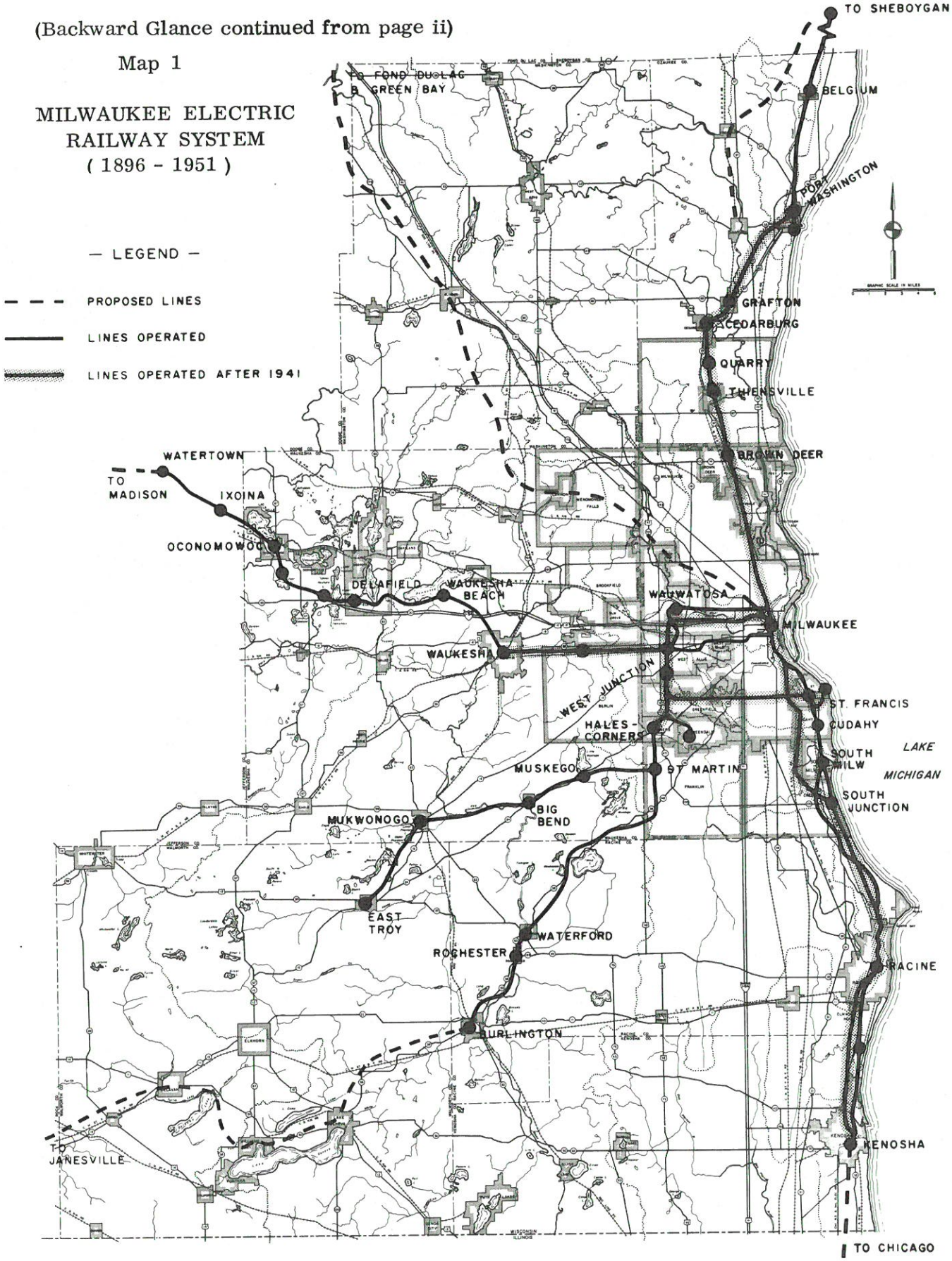
(Backward Glance continued from page ii)

Map 1

MILWAUKEE ELECTRIC RAILWAY SYSTEM (1896 - 1951)



Continued on page 29

CODING

by Wade G. Fox, Cartography and Design Supervisor
and Robert L. Fisher, Coding Supervisor

INTRODUCTION

Previous Technical Record articles have described the various origin and destination (O & D) surveys conducted as part of the SEWRPC regional land use-transportation study.[1] In order to permit the information collected in these surveys to be used in the planning process, the information had to be prepared for electronic data processing (EDP). Such preparation required the reduction of all of the information to a numeric form through a coding operation. (The term coding as used herein is defined as the translation of written information, contained on the O & D survey forms, into numeric form suitable for EDP.)

The O & D information was obtained through five surveys utilizing nine different data collection forms. (For clarity, each such data collection form will be herein referred to as a schedule.) Following is a list of the O & D surveys and the schedules used in their execution:

O & D Survey	Schedule
Home Interview	Address Summary
	Internal Trip Report
	Household History
	Personal Opinion
Truck and Taxi	Trip Report
External Roadside	Trip Report
Household Postal Questionnaire Survey	Address Summary
	Trip Report
Truck & Taxi Postal Questionnaire Survey	Trip Report

[1] For details see Technical Record; SEWRPC, Vol. 1 - No. 2 and Vol. 1 - No. 3.

Cumulatively, about 4.6 million individual bits of information were collected on the nine types of schedules. The accurate and expeditious translation of this high aggregation of data to numeric code was the prime responsibility of the coding section.

Secondary responsibilities of this section included: 1. the preparation of an accurate and complete set of geographic coding guides, and 2. the processing of all questionnaires handled during the household and truck and taxi postal surveys.

These secondary responsibilities did not affect the organization of the coding section to any great extent, but did affect work scheduling and the over-all duration of the coding operation.

Timing

Although some of the coding sections work responsibilities overlapped the sequence of the major operations, their time duration may be listed as follows:

1. Preparation of geographic coding, 2 1/2 months.

2. Processing the household and truck and taxi postal questionnaires, 1 1/2 months.

3. Special handling of external survey schedules, 1/2 month.

4. Coding of O & D survey schedules, 6 months.

The preparation of the geographic coding guides, a necessary prerequisite to actual coding operations, began in April 1963 and was completed in June 1963. Processing of the questionnaires for the household postal questionnaire survey began in mid-May 1963 and was completed by the end of that month. The actual coding of the O & D survey schedules did not start until June 1963. Moreover, in the latter part of that month, coding was interrupted in order to process the truck and taxi postal questionnaires for mailing. Normal coding was resumed in July 1963 and continued virtually uninterrupted until completed in February 1964. A two-week period was required during November 1963 for the purpose of testing the validity of the external survey sample rate.[2] Throughout the coding operation, the questionnaires returned from respondents of the postal surveys were processed and edited by coding personnel.

CODING SECTION ORGANIZATION

Organizationally, the coding section was a part of the Cartography and Design Division. This organizational placement of the coding section was not to conform to any inherent logic of the organizational structure itself, but rather to take full advantage of the knowledge and experience of the Cartography and Design Supervisor in the execution of the coding work. The coding section was further functionally organized into three major subsections: "general coding," "geographic coding" and "map look-up coding." In addition, a quality control section and a clerical section were provided as part of the personnel complement. Each major subsection operated under the direction

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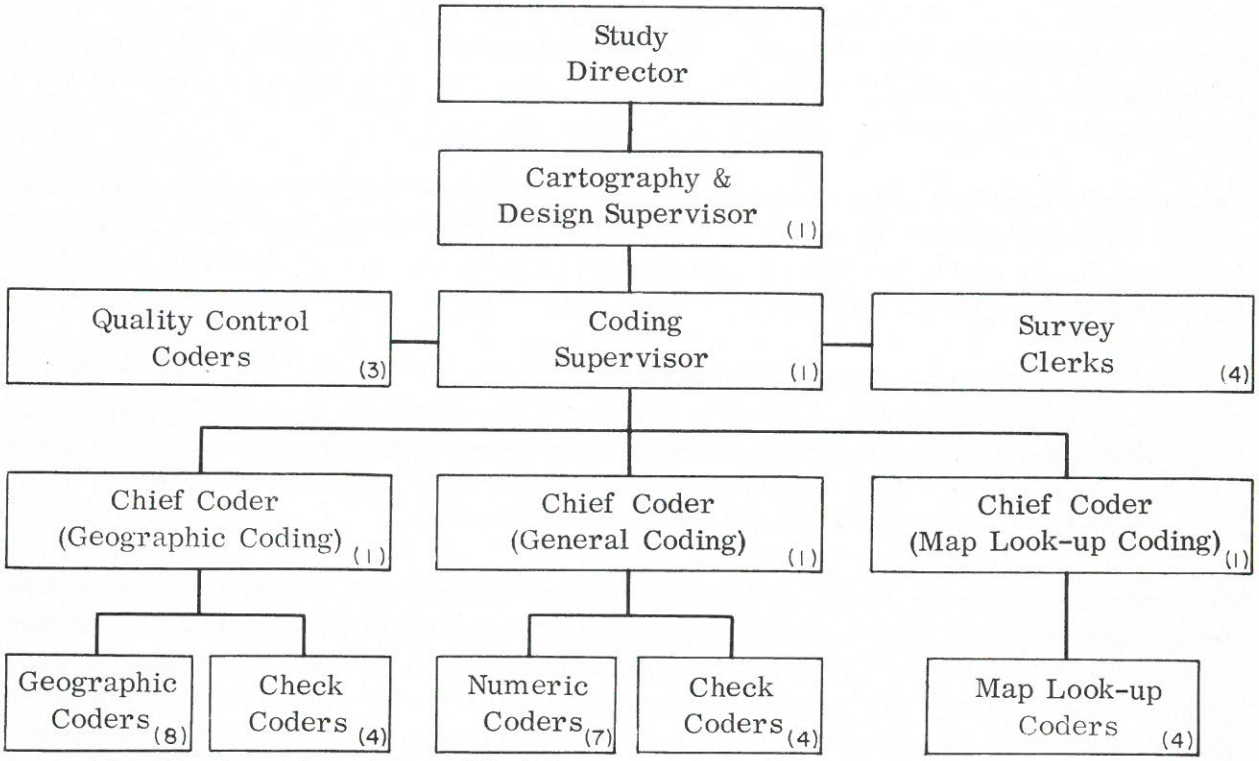
2 For details see "Conducting the External Survey," Technical Record; SEWRPC, Vol. 1 - No. 3.

of a chief coder who was responsible for the operation and control of survey schedules processed through his subsection. The chief coders and the quality control subsection and clerical staff reported directly to the coding supervisor. The coding supervisor was responsible to the cartography and design supervisor, as shown in Figure 1.

Figure 1

CODING SECTION ORGANIZATIONAL CHART



(2) = Number of positions filled during peak employment.

Description of Coding Subsections

Each of the major coding subsections and the quality control and clerical staff were assigned specific coding duties. A description of these duties follows:

Geographic Coding: The geographic coding subsection was responsible for the accurate coding of all geographic locations entered on the schedules. Each location was assigned a geographic code that properly located it within boundaries of the Region or beyond these boundaries. In addition, the geographic coding subsection was responsible for the preparation of the numerous geographic coding guides used to code the geographic locations.

General Coding: The general coding subsection was responsible for the accurate coding of all other information contained on the survey schedules. This subsection was also responsible for the preparation of the general numeric coding guides used in their operation. Personnel within the general coding subsection were trained as specialists in a particular general coding operation. For example, two coders were

assigned the sole responsibilities of coding land use data on all schedules processed through general coding subsection. Others specialized in occupation-industry coding, time coding, truck business-industry coding and truck commodity coding.

Map Look-up Coding: The map look-up coding subsection functioned in a trouble shooting capacity. Using maps, directories, street guides and other reference material, this subsection attempted to locate and code all those geographic locations which the geographic coding subsection was unable to complete.

Clerical Subsection: The clerical staff was responsible for maintaining control of all schedules processed by the coding section and thereby performed the necessary "bookkeeping" operations.

Quality Control Subsection: The quality control staff was responsible for maintaining a high degree of coding accuracy. This subsection checked all schedules for errors and inconsistencies in the general coding operation by comparing check coding forms with the coded survey schedules.

Recruiting and Training Coding Personnel

Practically all of the persons hired to fill the coding sections personnel complement were sent to the Commission from the Wisconsin State Employment Office in Waukesha. The employment office contacted, screened and tested each person prior to making an interview appointment for them with the Commission.

The coders were hired in two groups: the first consisting of the geographic coders and the chief coders, and the second of the general coders and the quality control and clerical staff personnel. The initial task of the first group was to prepare the geographic coding guides. The chief coders aided in supervising the preparation of these guides and helped to prepare the coding manual and general coding guides. As noted, the general coding personnel were subsequently specialized in individual coding operations. At the peak of coding production, a total of 35 coders, excluding the C & D supervisor and the coding supervisor, were employed in the coding operations.

Training of the general coding personnel concentrated on reviewing the coding manual, studying the coding guides and coding of specially prepared sample schedules. The coding of the practice schedules under the direction of the coding supervisor was found to be the most beneficial type of training the coders received. The training period for the general coders was two days and, at the end of that time, they were considered proficient enough to begin coding the survey schedules. The geographic coders, on the other hand, required little formal training since the experience gained through the preparation of the geographic coding guides (described below) permitted these coders to begin productive work immediately.

PREPARATION OF THE GEOGRAPHIC CODING GUIDES

One of the most important functions of the coding section was to accurately code the location of each geographically related piece of information reported during the data collection surveys. To enable coders to accomplish this expediently, it was necessary to have a complete series of accurate geographic coding guides at their disposal.

Since a field listing program[3] was not conducted during the land use-transportation study, it was necessary for the coding section to prepare all the necessary geographic coding guides.

Gathering Source Data

As a starting point for the preparation of the geographic coding guides, it was necessary to obtain street maps, telephone directories, street directories, industrial directories, street atlases, plat books and other related information pertaining to the 146 minor civil divisions within the 2,688 square mile seven-county Region. The first phase of the inventory was accomplished by sending letters to all municipal clerks, postmasters, local chambers of commerce, business organizations, and selected municipal engineering and planning agencies within the Region requesting the desired data. The over-all response to these letters was very good and a large library of source data was compiled. Where information obtained in this manner was found to be inadequate it was supplemented by field surveys.

Preparing Source Maps

Before the geographic coding guides could be compiled, it was necessary to prepare a series of maps delineating the area units used for geographic control of all O & D survey data. These were prepared from large scale cadastral maps provided by local municipal engineering departments and from municipal highway aid maps provided by the State Highway Commission of Wisconsin.

The U. S. Public Land Survey section and/or quarter section[4] lines were superimposed on sepia prints of these maps and a seven-digit geographic code assigned to each section and/or quarter section.[5] With this completed, the maps were ready for the posting of street addresses.

Using all source data available, street addresses were posted on the sepia prints using reproducible ball point pens. Sheets of non-smearing orange carbon were placed under the sepia maps to permit a double image (front and back) of the street numbers, thus insuring good reproduction quality.

House numbering systems were in effect and street addresses, therefore, available for all of the home interview survey area. In some of the rural areas of the Region, however, house numbering systems were not in effect and street addresses were unavailable. In such areas, it was necessary to obtain maps of the rural free delivery routes from the post offices serving these areas.

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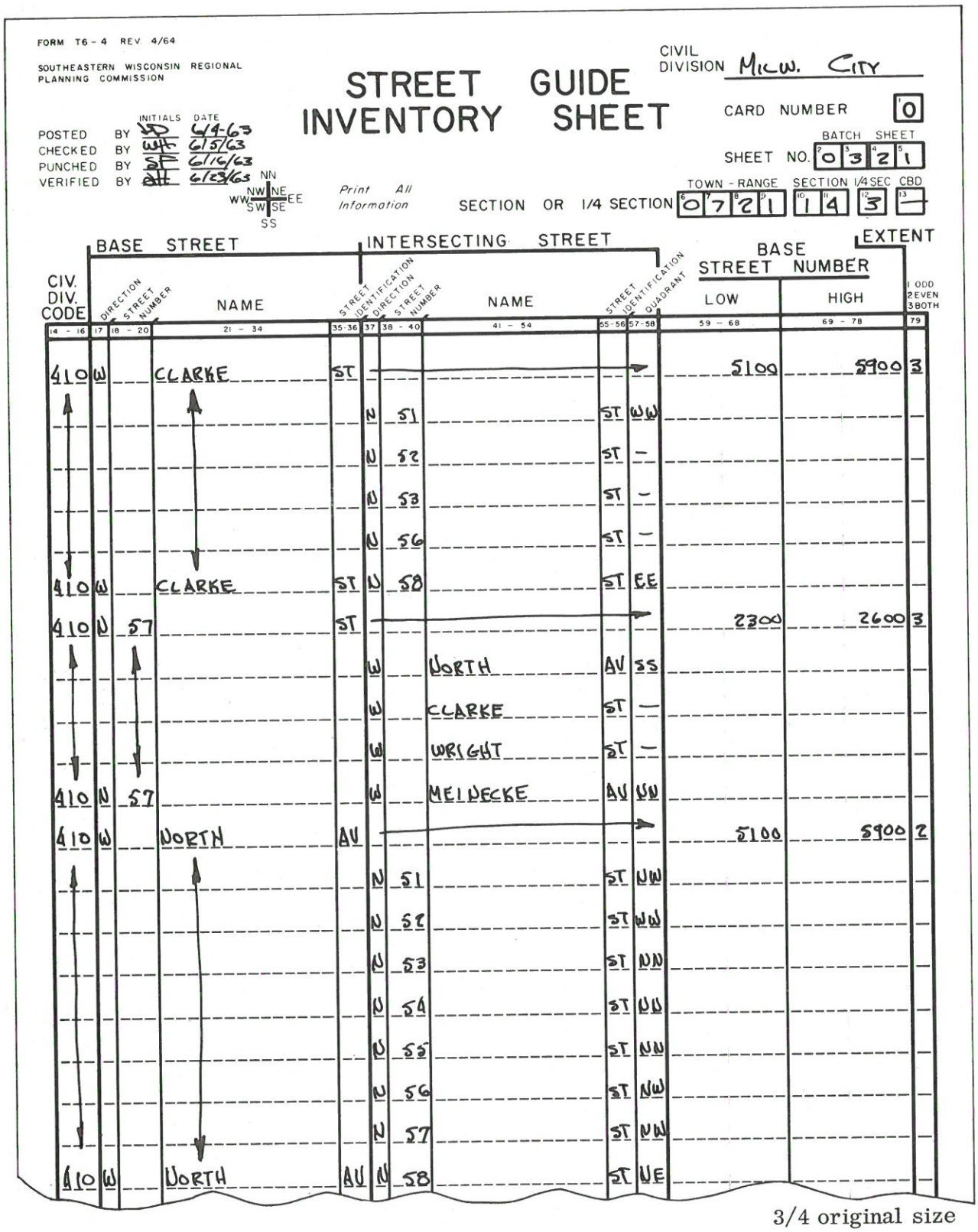
3 Normally, field listings prepared for the home interview sample selection and for the land use inventory are also used to prepare the required geographic coding guides.

4 See "Backward Glance," Technical Record: SEWRPC, Vol. 1 - No. 2.

5 In the home interview survey area and in intensely developed areas outside of this area, the basic unit of geographic delineation was the quarter section. Outside of these areas the section became the basic unit of geographic delineation.

Figure 2

STREET GUIDE INVENTORY FORM



FORM T6 - 4 REV. 4/64

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

STREET GUIDE INVENTORY SHEET

CIVIL DIVISION Mlcw. City

CARD NUMBER 10

SHEET NO. BATCH 0321 SHEET

	INITIALS	DATE
POSTED BY	KD	4-4-63
CHECKED BY	WH	6/5/63
PUNCHED BY	SP	6/14/63
VERIFIED BY	AH	6/13/63

NN NW NE WW EE SW SE SS

Print All Information

SECTION OR 1/4 SECTION

TOWN - RANGE 0721 SECTION 14 1/4 SEC 3 CBD —

CIV. DIV. CODE	BASE STREET: DIRECTION	BASE STREET: STREET NUMBER	BASE STREET: NAME	INTERSECTING STREET: STREET IDENTIFICATION	INTERSECTING STREET: DIRECTION	INTERSECTING STREET: STREET NUMBER	INTERSECTING STREET: NAME	INTERSECTING STREET: STREET IDENTIFICATION	INTERSECTING STREET: QUADRANT	EXTENT: BASE STREET NUMBER: LOW	EXTENT: BASE STREET NUMBER: HIGH	1 ODD 2 EVEN 3 BOTH
14 - 16	17	18 - 20	21 - 34	35-36	37	38 - 40	41 - 54	55-56	57-58	59 - 68	69 - 78	79
410	W		CLARKE	ST						5100	5900	3
					N	51		ST	WW			
					N	52		ST	—			
					N	53		ST	—			
					N	56		ST	—			
410	W		CLARKE	ST	N	58		ST	EE			
410	N	57		ST						2300	2600	3
					W		NORTH	AV	SS			
					W		CLARKE	ST	—			
					W		WRIGHT	ST	—			
410	N	57			W		MEINECKE	AV	NN			
410	W		NORTH	AV						5100	5900	2
					N	51		ST	NW			
					N	52		ST	WW			
					N	53		ST	NN			
					N	54		ST	NW			
					N	55		ST	NW			
					N	56		ST	NW			
					N	57		ST	NW			
410	W		NORTH	AV	N	58		ST	NE			

3/4 original size

After street addresses were posted on the maps covering the home interview survey areas, prints were reproduced and the 1960 census tract boundaries and numbers added to complete the maps. This set of maps was then used as the source for the assignment of geographic codes to the home interview sampled household. Each household was located by street address on the map and a black dot marked at its location. The geographic code (quarter section) and the census tract of the location were then posted to the sample. This "dotted" set of maps was used for preliminary analysis and control of the geographic distribution of household samples within the home interview survey area.

A second set of maps, covering all civil divisions in the Region, was used to prepare the geographic coding guides. A complete inventory of each civil division in the Region was made to record the house number ranges for each street block within each section or quarter section. The special form used for this inventory is shown in Figure 2. From these inventory forms, the data processing center prepared punch cards and listed the street address guide and street intersection guide used for coding geographic locations (see Figure 3).

For coding purposes, the street address guides and the street intersection guides were assembled in books by county. Three books were required to make up the Milwaukee County guides, Waukesha County required two books and each of the other five counties were booked individually. A total of about 30,000 street address ranges and 70,000 street intersections were geographically located in the Region as a result of this process.

Figure 3

EXAMPLE OF GEOGRAPHIC CODING GUIDES

STREET ADDRESS

CIV. DIV.	QUARTER SECTION	EXTENT	STREET ADDRESS LOW	TO	HIGH	STREET NAME
410	0721-23-3	3	1200		1600	57 St N
410	0721-23-2	3	1900		2200	57 St N
410	0721-14-3	3	2300		2600	57 St N
410	0721-14-2	3	2700		3000	57 St N
410	0721-11-3	3	3300		3400	57 St N
410	0721-11-2	3	3500		3800	57 St N
410	0721-02-2	3	4400		4700	57 St N
410	0821-35-3	3	4800		5100	57 St N

STREET INTERSECTION,

CIV. DIV.	QUARTER SECTION	INTERSECTING STREET	QUADRANT	STREET NAME
410	0721-23-3	MCKINLEY AV W		57 ST N
410	0721-14-3	MEINECKE AV W	NN	57 ST N
410	0721-11-2	MELVINA ST W		57 ST N
410	0721-11-2	NASH ST W		57 ST N
410	0721-23-2	NORTH AV W	NN	57 ST N
410	0721-14-3	NORTH AV W	SS	57 ST N
410	0721-11-3	NORWOOD PL N		57 ST N

Other Geographic Coding Guides

Not all geographic locations obtained from the O & D surveys were in the form of a listed street address or street intersection. If the street address or street intersection of the origin or destination of a trip was unknown to the interviewers, the interviewers were instructed to obtain the name of a prominent public or semi-public building, place of business, industry or other geographic identification. To enable this type of location to be coded, a "trip generator" guide was prepared listing the names and locations of trip generators such as churches, schools, stores, places of employment, shopping centers and the like. In all, a total of 18,000 places were so listed and geographically located. The Wisconsin Telephone Company's punch card file of commercial accounts was found to be extremely useful as a data source for the preparation of this guide. Additional geographic coding guides prepared consisted of the "local place name" guide and the "external coding" guide. The local place name guide listed, within the Region, the geographic location of lakes, subdivisions, unincorporated villages and the like. The external coding guide consisted of two parts. One part identified by a special eight-digit code every city, village and township within Wisconsin (but outside of the Region) and within the State of Illinois. The second guide identified by a five-digit code locations within the United States by city and county, and outside the United States by Dominion and Country. Combined, these guides located about 10,000 places.

Compiling the various geographic coding guides required approximately 184 man-weeks to complete, including approximately 30 man-weeks expended by the data processing division in the preparation of the punch cards and information listings. The costs incurred are listed in another portion of this article.

PREPARATION OF THE CODING MANUAL[6]

The coding manual was prepared to meet four objectives:

1. To give the coders a brief over-all view of the SEWRPC regional land use-transportation study and the role coding plays in the execution of that study.

2. To instruct the coders in the internal operation of the coding section and the general procedures to be followed in the coding operations.

3. To present a detailed description of the coding requirements and procedures for each of the O & D survey schedules.

4. To provide, in appendix form, all the general numeric coding guides used during coding of all information other than geographic locations.

The preparation of the coding manual and general coding guides was not as large an undertaking as the preparation of the geographic coding guides. The general coding guides, prepared as part of the manual, generally followed the standard format used

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6 For further details see Procedural Manual No. 6 - Coding; SEWRPC, April 1964 (Revised).

for other O & D surveys, and included occupation-industry guide, time of day guide, land use guide, truck commodity guide and truck business-industry guide.

Guides, used in other O & D studies, were used as a source in the preparation of much of the general coding guides. The standard O & D land use codes, however, required some revisions in order that the trip information coded would be compatible with SEWRPC existing land use inventory.

WORK LOAD

Table 1 provides an indication of the high volume of data processed by the coding section. Preparation of data for EDP required approximately 925 man-weeks for coding and 68 man-weeks for keypunching.

Table 1

PRELIMINARY SUMMARY OF DATA PROCESSED THROUGH THE CODING SECTION AND THE ESTIMATED NUMBER OF ITEMS CODED

Name of Survey Schedule	Units Processed	Items Coded
Internal Address Summary	17,757 schedules	300,000
Internal Trip Report	120,790 trips	2,200,000
External Trip Report	43,369 trips	560,000
Truck & Taxi Trip Report	22,930 trips	275,000
Household History	15,930 schedules	400,000
Personal Opinion	1,360 schedules	20,000
Household Postal Questionnaire, Address Summary	11,117 schedules	60,000
Household Postal Questionnaire, Trip Report	68,400 trips	675,000
Truck & Taxi Postal Questionnaire, Trip Report	10,500 trips	105,000
ESTIMATED TOTAL NUMBER OF ITEMS CODED		4,600,000

Of the 4.6 million items coded, about 560,000 were geographic locations; the remainder were general coding items. It should be noted that not every item coded required a search in the coding guides. For example, it was quite common that a geographic

code for a home address, once found in the coding guide, could then be used to code either the origin or destination of about half of the trips reported by the trip maker. All codes entered on the schedules, however, were reviewed by quality control personnel for accuracy, neatness and logic.

WORK FLOW

The flow of material within the SEWRPC coding section is graphically set forth in Figure 4. The procedure may at first appear complicated. Actual operations, however, proved its effectiveness.

As would be expected in the handling of any large volume of material, control was a major concern. To minimize this problem, all schedules were processed through the coding section in "batch" form. (A batch being a group of schedules from one of the five O & D surveys.) A home interview and the truck and taxi survey batch was one day's work for one interview district. An external survey batch was one day's work at a roadside station, a household postal survey batch was all of the questionnaires returned from households in a particular post office delivery area and a truck and taxi survey batch was all of the questionnaires returned from a particular civil division. For convenience, the questionnaires in the two postal surveys were grouped in lots of 50. Each batch was assigned a unique identification number which was repeated on every schedule contained within the batch. This assured the proper replacement of stray data and permitted fast recall of the source data during processing.

The batch, although very suitable for handling schedules between major coding subsections, was too large for processing within a coding subsection. For coding purposes, the schedules within a batch were divided among the coders. To eliminate confusion, the home interview and the truck taxi survey batches (one day's work for a district) were further separated into "lists." Each of these lists contained one day's work for one interviewer. An external survey's batch (one day's work at one roadside station) was separated into hour periods. The postal surveys' batches never contained more than 50 questionnaires and were, therefore, processed in batch form.

Processing a Typical Batch

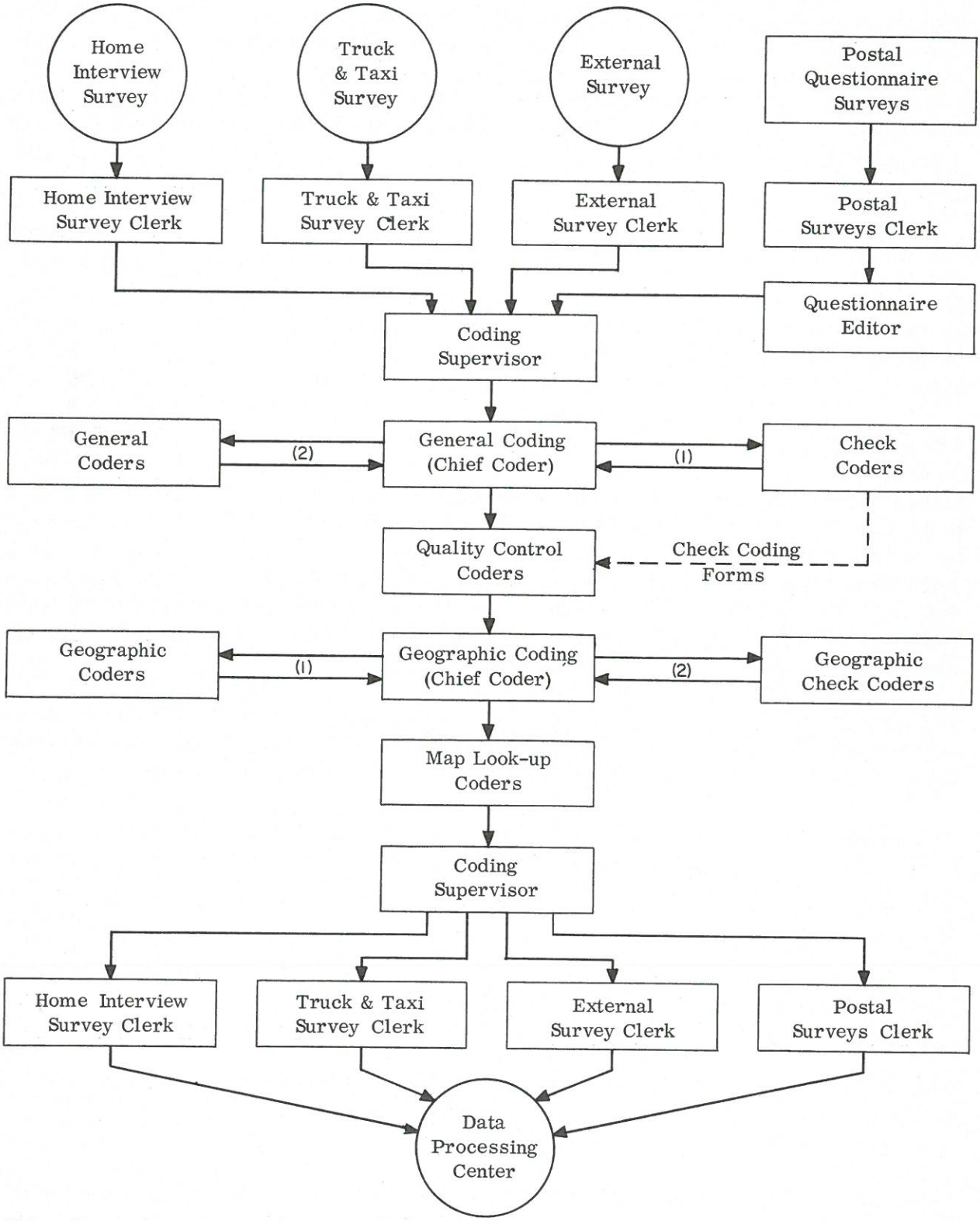
The coding operation may best be understood through a description of the processing of a typical home interview survey batch.

A home interview batch was received in the coding section by the clerk assigned to that survey. The survey clerk accounted for each schedule contained in the batch, and then signed a hand receipt. A copy of the receipt was kept by the survey clerk and the original was returned to the home interview survey office. Next, a batch control form was prepared, noting the number of schedules by type (completed or non-interview), and the number of trips reported on the schedules. Each schedule was checked, and if all were considered adequate, the batch was reassembled and forwarded to the coding supervisor for further processing.

Work load permitting, the batch was given to the chief coder of the general coding function. The chief coder then distributed the schedules by list to the check coders.

Figure 4

CODING SECTION WORK FLOW DIAGRAM



Note: Items shown in a circle are operations outside the coding section.

(2) Represents the sequence of work flow within the subsection.

Using forms that were replicas of the home interview schedules, the check coder coded each general coding item on the check form (no codes were entered on the schedules). When the schedules within a list were completed, the check coding forms were sent to the quality control coder where they were temporarily filed. The schedules were then returned to the chief coder who channeled them to the schedule coders. These coders reviewed the schedules and entered the codes in the appropriate boxes. After the schedules were processed through all general coding operations, they were returned to the chief coder for review. When all lists for the batch were returned to the chief coder, the batch was checked to insure all schedules were enclosed and then given to the quality control coders.

The quality control coders checked the coded schedules against the check coding forms, discrepancies were noted and any errors found corrected. The quality control coders filled out daily reports which evaluated the coding quality of all general coding personnel. General coders who consistently made errors were notified and the correct procedures explained. Once all schedules were processed through quality control, the batch was forwarded to the chief coder of the geographic coding subsection.

The geographic chief coder distributed the schedules by list to the geographic coders. As the geographic coding was completed for the schedules within a list, they were returned to the chief coder who gave the schedules to the check coders for verification of each geographic code posted (no check coding form was used). Discrepancies on the schedules were noted and corrections made. If the geographic coder or the check coder could not find a location in the geographic coding guides, it was noted on map look-up forms. These coded schedules and the appropriate map look-up forms were given to the chief coder for verification that all schedules were enclosed and then forwarded to the chief coder of the map look-up subsection.

The map look-up coders searched for the locations noted on the map look-up forms and entered the correct geographic code on the schedule. When all locations noted on the map look-up forms were coded, the batch was forwarded to the coding supervisor.

The coding supervisor conducted a random check of the schedules contained in the batch, then returned the batch to the home interview survey clerk. A complete accounting of all schedules was again made and the number of trips counted and checked against the original batch control form. Adjustments in the totals were made on the form to agree with the coded schedules. In addition, the schedules were scanned for uncoded boxes and other discrepancies. When the survey clerks were satisfied that all of the schedules were accounted for in the batch, and that each schedule was adequately coded, the batch was taken to the data processing center.

Internal Control Procedures

To evaluate the speed and accuracy of the coding personnel and to provide a system of control within the coding section, several special forms were developed and used. The most important of these special forms was the interview batch transmittal form attached to each batch processed through the coding section. This form had space to record the time and date each list or hour period was coded within each major coding

function, and by whom. In addition, trip and other summary totals were recorded by list or hour period.

Five check coding forms were developed for use during the coding of the O & D surveys data. The purpose of these forms was to perfect general coding efficiency by providing a check of each coder's work. As the general coders became proficient, the amount of check coding was reduced until it was finally stopped. Another form which was developed to assist in evaluating quality and quantity of work produced by each coder was the coder's weekly production report. The remainder of the forms used internally within the coding section were, basically, date oriented.

CODING AND RELATED COST

The total estimated cost of coding all survey schedules was about $78,000. This cost included: preparation of the coding guides (excluding EDP cost); coding of all surveys schedules; and other costs, such as, supplies, equipment, directories, printing and related items. An itemized list of the coding costs is provided below. This list does not include rent, administrative and other overhead costs, but does include costs incurred by the data processing center.

Estimated Coding Cost

A. Preparation of Coding Guides		
1. Geographic coding guide (salaries)	$10,000	
2. Manuals and general coding guides (salaries and other costs)	2,000	
Subtotal	12,000	$12,000
B. Coding of Survey Schedules (salaries)		
1. Home interview survey (all schedules)	31,400	
2. Truck and taxi survey	8,800	
3. External (roadside) survey	10,500	
4. Household postal questionnaire survey	11,800	
5. Truck and taxi postal questionnaire survey	2,260	
Subtotal	64,760	64,760
C. Supplies, Equipment and Related Cost		1,500
Total Coding Cost		$78,260

Estimated Data Processing Center Cost

A. Preparation of Geographic Coding Guides

1. Preparing punch cards (salaries)	$ 4,200	
2. Punch card stock	130	
3. Processing punch cards (salaries)	525	
4. Machine rental (all machines involved)	1,110	
5. Paper stock and supplies	1,080	
6. Contractual keypunching	1,055	
Subtotal	8,100	$ 8,100

B. Preparing Punch Cards From Survey Schedules

1. Salaries (keypunching, verifying, and supervision)		
a. Home interview survey	6,600	
b. Truck and taxi survey	1,050	
c. External (roadside) survey	1,290	
d. Household postal questionnaire survey	1,720	
e. Truck and taxi postal questionnaire survey	300	
Subtotal	10,960	10,960
2. Punch card stock		410
3. Machine rental (keypunches and verifiers)		1,840
Total Data Processing		$21,310
Total Coding and Data Processing		$99,570

Estimated Unit Cost

The unit costs given below for the coding and EDP of the home interview survey data include costs for the address summary, internal trip report, household history and personal opinion schedules, and for this reason are comparatively higher than the other unit costs given.

	Coding	EDP Processing	Total
A. Home Interview Survey (preliminary)			
1. Cost per interview (17,757)	$1.77	$0.45	$2.22
2. Cost per trip (120,790)	0.26	0.07	0.33
B. Truck & Taxi Survey (preliminary)			
1. Cost per interview (4,250)	2.07	0.31	2.38
2. Cost per trip (22,930)	0.38	0.06	0.44
C. External (roadside) Survey (preliminary)			
1. Cost per trip (43,369)	0.24	0.04	0.28
D. Household Postal Questionnaire Survey (preliminary)			
1. Cost per questionnaire (11,117)	1.06	0.18	1.24
2. Cost per trip (68,400)	0.17	0.03	0.20
E. Truck & Taxi Postal Questionnaire Survey (preliminary)			
1. Cost per questionnaire (3,011)	1.33	0.12	1.45
2. Cost per trip (10,500)	0.22	0.04	0.26

The unit costs do not include preparation of the coding manual or guides, supplies, equipment, rent, administrative and other overhead costs. Machine rental and card cost are included in the EDP costs. Costs involved in the contingency checks of the O & D data are not included in the above estimates. A future issue of the Technical Record will describe and evaluate the contingency checks carried out by the SEWRPC.

Problems Encountered and Their Solutions

Considering the volume of data processed and the number of different schedules coded, very little difficulty was encountered in the coding operations. The standard O & D data collected by personal interview was completed with a minimum amount of delay. The only major problem encountered was the coding of the land use at trip origin and destination. This difficulty was caused by the need to classify selected land uses in a regional or local grouping. For example, it was necessary in the institutional land use classification to distinguish grade schools and junior high schools from high schools and colleges. Commonly, the land use reported on the survey schedules was simply "school." Therefore, it was necessary to look up the address of the school and classify it as local or regional.

Editing and coding of the postal questionnaires disclosed a considerable amount of trouble and difficulty due to insufficient address data. The respondents commonly listed their post office rural route number instead of an identifiable geographic location. To overcome this difficulty, post offices in the Region were contacted and maps prepared locating the rural routes they served.

Perhaps the most troublesome area, with respect to coding, however, were the household history schedules. The household history schedule was a unique schedule newly devised for the SEWRPC study. As might be expected with any new data collection device, not all of the possible implications were foreseen when the form was drafted. For this reason, it was necessary to create additional codes and special punches during the coding operation. Memorandums were distributed to coding personnel and SEWRPC staff describing any change or addition to the household history coding procedure.

The household history schedule was designed to record any change in home or work location and related data of the head of the sampled household over a thirteen-year period (1950-1963), and thus provided the SEWRPC with a picture of the long term internal migration patterns within the Region. The recall of a historic address and/or company name was often difficult for the respondent. This difficulty was passed on to the coding section in the form of inaccurate and/or insufficient information on historic home or work locations. To cope with this problem, it was necessary in some cases to call the respondent and obtain a better description of the historic location. This situation created a considerable amount of trouble until older maps and directories were obtained. This data plus the coders' personal historic knowledge of the Region permitted the completion of the coding of these locations.

SUMMARY

The coding section was organized to process a large volume of data as accurately and expediently as possible. Thirty-five coders were employed during the peak coding period, and 925 man-weeks were required to code the 4.6 million pieces of information contained on the O & D survey schedules.

The coding section was functionally divided into three major coding subsections--general coding, geographic coding, and map look-up coding. A chief coder was in charge of each subsection and directly responsible to the coding supervisor. A quality control and clerical staff, also directly responsible to the coding supervisor, completed the coding section.

In addition to normal coding operations, the coding section was responsible for preparing geographic coding guides necessary for the coding operations. Accumulatively, these guides recorded over 125,000 places listing the code for each geographic location. About 154 man-weeks were required to prepare these guides (not including EDP time). Another responsibility of the section was the processing of the household and truck and taxi questionnaires for the postal surveys. Processing the questionnaires required about 64 man-weeks to complete.

The nine different schedules used during the five O & D surveys were processed through the coding section in batches, the batch being the basis for the control of the coding operations. This method of control was found to be very effective.

The total estimated cost of coding all survey schedules was about $78,000, not including administrative cost, rent and other overhead items. Of this over $64,500 was expended for salaries, $1,500 for supplies, equipment and related cost, and $12,000 for the preparation of coding guides. Electronic data processing (EDP) costs for preparing punch cards of the survey schedules was $13,210. Of this $10,960 was expended for salaries, $410 for punch cards and $1,840 for machine rentals. Preparing the punch cards and listing the geographic coding guides cost the data processing center about $8,100.

No conclusions can be made on the accuracy of the coding at this time. A future issue of the Technical Record will present and evaluate the errors found during the extensive contingency checks.

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(Backward Glance continued from page 12)

ELECTRICITY REPLACES HORSES

The Milwaukee Electric Railway system had its beginning in 1890, nearly 20 years before the first automobile appeared on the streets of Milwaukee. Milwaukeeans thrilled at the sight of the first "electrified horse car" as it emerged from the Electric Company horse car barn. It then traveled "silently, at 15 miles per hour over the downtown route and returned without incident," according to a newspaper account of the event.

In 1896, the Milwaukee Electric Railway and Light Company was incorporated through the efforts of H. H. Villard, who had completed the Northern Pacific Railway and was founder of Edison General Electric. The TMER&L, under the leadership of John L. Beggs, soon purchased all property and assets of the Milwaukee Street Railway including 173 closed cars, 140 open cars and 100 miles of track.

YEARS OF GROWTH

Beggs envisioned a network of electric interurban lines, radiating from Milwaukee and covering the entire state. His immediate goal was to build four short lines to emanate like spokes in a wheel from Milwaukee to Beloit, Janesville, Madison and Sheboygan, and a trunk line from Chicago to Green Bay. Although this dream was never fully realized, system development, under his leadership, made great strides. The "Beggs" years (from 1895 to 1909) were years of ra-

Continued on page 30

(Backward Glance continued from page 29)

pid expansion and modernization as the line grew and prospered. System expansion included construction of the following lines:

1895 - Line from Milwaukee to Wauwatosa, 12 miles.

1897 - Line from Milwaukee to Racine and Kenosha, 35 miles (ten years before the Chicago, North Shore and Milwaukee Electric Railway was constructed to this area.)

1898 - Line extended from Wauwatosa to Waukesha, 18 miles.

1899[4] - Line extended from Waukesha to Waukesha Beach, 5 miles.

1902 - Downtown station completed at N. 3rd Street and W. Michigan Street.

1903 - Line from Milwaukee to Hales Corners, 11 miles.

1904 - Line extended from Hales Corners to St. Martins and Muskego Lake, 7 miles.

1905 - Acquired the existing Milwaukee Northern Electric Railway from Milwaukee to Port Washington, 29 miles. (Construction of this line began in 1904 and was completed in 1907.)

1907 - Line extended from St. Martins to East Troy, 36 miles.

1908 - Line extended from Waukesha Beach to Oconomowoc and Watertown, 28 miles, a total of 50 miles from Milwaukee.

1909 - Final expansion occurred with the construction of a 21-mile branch from East Troy to Burlington and a 28-mile segment from Port Washington to Sheboygan.

Although initial construction of major routes ended in 1909, many major improvements were made after that date. Several segments of the system were converted from operation over city streets to operation completely on private

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4 Also constructed in 1899 was the 11-mile Chicago, Harvard & Geneva Lake Railway between Harvard and Lake Geneva. Though it was never connected with Chicago, it provided an important service to vacationers from Illinois. (Abandoned in 1934.)

Continued on page 38

INVENTORY OF EXISTING OUTDOOR RECREATION FACILITIES AND HISTORIC SITES IN SOUTHEASTERN WISCONSIN

by Theodore F. Lauf, Research Analyst

INTRODUCTION

The regional land use plans now being prepared by the Southeastern Wisconsin Regional Planning Commission (SEWRPC) necessarily involve consideration of park and open space reservation. In order to weigh the need for additional public and private outdoor recreation facilities, a knowledge of the extent to which these facilities presently exist throughout the Region must be obtained. As a means to this end, on August 8, 1963, the SEWRPC, the Wisconsin Conservation Commission and the Wisconsin Department of Resource Development entered into an interagency "Memorandum of Understanding on Park and Open Space Planning in the Southeastern Wisconsin Region," whereby these three agencies agreed, among other things, to carry out cooperatively an existing and potential outdoor recreation facility inventory within the Region.

Waukesha County Parks and Planning Commission Photo

As part of this agreement, the SEWRPC agreed to provide data on the location, amount and type of all existing outdoor recreation facilities in the Region. Included as an integral part of the inventory of existing outdoor recreation facilities, was an inventory of sites having potential historic and scientific value. The primary objective of the inventory was to identify, classify and map all existing outdoor recreation sites and all existing and potential historic and scientific sites for comprehensive regional planning purposes. Such sites must, of course, receive due consideration in land use and transportation planning so that valuable recreational resources are not inadvertently destroyed through poorly located urban land use development or transportation facility construction.

To make the collection of recreation and historic data as inclusive as possible, each inventory was conducted independently.

INVENTORY OF OUTDOOR RECREATION FACILITIES

In order to meet the needs of the SEWRPC, the scope of the inventory of existing outdoor recreation facilities was drawn to include:

1. The identification and delineation of all existing major park, open space and other outdoor recreation sites within the Region, whether publicly or privately owned.

2. The classification of these sites with respect to their location, ownership and physical characteristics.

Collection of Existing Data

Preliminary research indicated there was little published information concerning outdoor recreation facilities that could be adapted to the inventory needs. Most of the studies available for use as source material were either not up-to-date, did not include private facilities or were presented on a regional level.

To avoid duplication of efforts by other groups concerned with outdoor recreation in the Region, the available source material collected by such agencies was carefully evaluated and used wherever possible in the data collection phase. The following public agencies supplied data which was found very useful in the inventory of the existing outdoor recreation facilities:

1. The Milwaukee County Park Commission supplied an up-to-date map and descriptive material of all existing public park facilities under their jurisdiction.

2. The Park Department of the City of Kenosha supplied a copy of the History and Resume compiled by the Kenosha Parks System in May 1963.

3. The Walworth County Recreation Agent supplied unpublished data that his office had collected to be used as a basis for a future recreation inventory of Walworth County.

4. The Waukesha County Park and Planning Commission supplied a copy of their 1960 publication, Inventory of Park and Outdoor Recreation Facilities.

The following private organizations also supplied very useful data supplementing the governmental sources:

1. The Milwaukee Journal provided a directory of publicly and privately owned campgrounds.

2. The Wisconsin Golf Association supplied a list of existing golf courses in operation during 1963, and the Milwaukee Journal furnished a supplementary list of golf courses that had been opened since the 1963 list had been compiled.

3. The Wisconsin Section of the American Camping Association provided a Directory of Wisconsin Privately Operated Campgrounds.

4. The executive secretary-treasurer of the Wisconsin Camping Association updated a 1960 list of children's camps operating within the Region.

Collection of New Data

Due to the incomplete nature of the existing data, the collection of additional data was required. This additional data was collected in two studies.

The first study had as its objective the updating of existing county source material and the supplementing of this existing data with new information concerning certain categories of facilities omitted from the original source material. The second study

had as its objective the collection of original data in those counties where data concerning outdoor recreation facilities had not been previously compiled in any form.

The first study was applied to Milwaukee, Walworth and Waukesha counties. As noted, these counties had compiled comprehensive recreation data in the form of descriptive material and/or maps. It was, therefore, merely required to collate the data provided by private organizations with the existing governmental data, check the results against the SEWRPC's land use inventory and submit the findings to public officials in the local communities for recommended additions or deletions.

Good cooperation was obtained from local officials in the respect that approximately 75 percent of the findings were checked and returned by them. The up-to-date information for the communities not responding was further checked reviewing the private recreation organization data as well as data obtained from the existing land use inventory.

The second study was applied to the other four counties within the Region: Kenosha, Ozaukee, Racine and Washington. These counties did not have any existing recreation information compiled at the county level. To obtain the necessary information, a meeting was scheduled in each county with one or more officials known to have a broad knowledge of the location of recreation facilities in that county. Several days prior to the meeting, a list of the desired categories of the outdoor recreation facilities was sent to the officials in order to provide advance knowledge of the information that was desired. As the categories of recreation facilities were discussed during the meeting, each facility was defined, inventoried with regard to its location, size, ownership and use, and plotted on a SEWRPC county base map. All data was then reviewed and classified in the SEWRPC office, transferred to inventory forms for uniform use and then transferred to the data processing division for key punching.

Data Classification

Data classification involved consideration of eight factors important to any consideration of outdoor recreation facilities. (See Figure 1.) Proper consideration of these factors assured consistency of results with those of other recreation studies presently being undertaken by the SEWRPC and with studies presently underway by the Wisconsin Conservation Commission and the Wisconsin Department of Resource Development. The eight factors considered were:

1. Location: The geographic location of each existing site was plotted on SEWRPC base maps and given an identification number, and thereby numerically coded to civil division, township, range, section and quarter section. When a site was larger than a section or quarter section, the site was coded to the section or quarter section that contained a major portion of the facility.

2. Ownership: The ownership of each facility was classified as either public or private. The ownership of public facilities was further classified as one of four types: community, township, county or state. Private facilities were further classified as either private (restricted to members), organizational or commercial.

Figure 1

EXAMPLE OF A COMPLETED INVENTORY OF EXISTING RECREATION AREAS FORM

FORM T4-9 11/63
S E W R P C

SOUTHEASTERN WISCONSIN REGIONAL
LAND USE - TRANSPORTATION STUDY

CHECKED BY ____ INITIALS ____ DATE
PUNCHED BY ____ INITIALS ____ DATE
VERIFIED BY ____ INITIALS ____ DATE

INVENTORY OF EXISTING RECREATION AREAS

CARD NO. 1 6 8 | INTERPETER: TL | DATE: 7/15/64 | FIELD OFFICE: ✓

LOCATION — CIVIL DIVISION: 72 | TOWNSHIP: 05 | RANGE: 18 | SECTION: 34 | 1/4 SEC.: 4 | SITE NUMBER: 031

1. OWNERSHIP OF FACILITY

[7] 6

1. Community
2. Township
3. County
4. State
5. Private
6. Organizational
7. Commercial

REMARKS: YMCA

CON'T ON PAGE 4 ( )

2. PRIMARY USE OF THE FACILITY

[18][19] 05 1st
[20][21] 03 2nd
[22][23] 13 3rd

01. Amusement Park
02. Athletic Field
03. Beach
04. Boat Landing, Marina Yacht Club
05. Camp (Youth, Day, Nature)
06. Campground
07. Fish Hatchery
08. Golf Course
09. Gun Club-Sportsmens Club
10. Historic Site or Marker
11. Park (Playground, Ballfield, Picnic Area, Etc.)
12. Race Track, Go Cart Track
13. Recreation Building
14. Ski Club
15. Hunting Grounds (Game Preserve Conservation Area)
16. Tennis Club
17. Zoo
18. Other

REMARKS: PHANTOM LAKE
YMCA CAMP

CON'T ON PAGE 4 ( )

3. SIGNIFICANT RELATED RESOURCE

[24] 1

1. Lake
2. Swamp or Marsh
3. River or Stream
4 Topography
5. Woodland
6. Other - See Remarks

REMARKS: PHANTOM LAKE

CON'T ON PAGE 4 ( )

4. ROAD DESCRIPTION

[25] 7

1. Interstate
2. U. S. Highway
3. State Highway
4. County Trunk
5. Town Road
6. City Street
7. Private Road

REMARKS:

CON'T ON PAGE 4 ( )

5. SIZE OF FACILITY -- TO THE NEAREST ACRE

[26][27][28][29] 0041

REMARKS:

CON'T ON PAGE 4 ( )

6. POSSIBILITY OF EXPANSION

[30] 1

1. Yes
2. No
3. Present Size Adequate for Potential Demand
4. Not Applicable

REMARKS:

CON'T ON PAGE 4 ( )

7. UNFAVORABLE EXPOSURE

[31] —

1. Encroaching Urbanization
2. Noise
3. Foul Odors
4. Poor Water Quality
5. Lack of Interest

REMARKS: GOOD ENVIRONMENT FOR A CAMP

CON'T ON PAGE 4 ( )

1/2 original size

3. Use: The primary use of the facility as well as secondary uses were coded with regard to the following detailed categories:

   a. Amusement Parks.
   b. Athletic Fields.
   c. Beaches.
   d. Boat Landings (Marinas, Yacht Clubs).
   e. Youth Camps, Day Camps.
   f. Campgrounds, Camping Areas.
   g. Fish Hatcheries.
   h. Golf Courses.
   i. Gun Clubs, Sportsman's Clubs.
   j. Historic Sites, including monuments, buildings and sites having been given official recognition by an official historic society.
   k. Parks.
   l. Race Tracks, Go-Cart Tracks, Drag Strips.
   m. Recreation Buildings auxiliary to existing outdoor recreation facilities.
   n. Ski Areas, Winter Sports Areas.
   o. Hunting Grounds, Game Preserves, Conservation Areas.
   p. Tennis Clubs.
   q. Zoological and Botanical Gardens.

4. Significant Related Resources: The proximity of natural features that might add interest to or enhance the desirability of the various types of outdoor recreation facilities were determined by consulting with governmental officials, the use of the U.S.G.S. 7 1/2 minute quadrangel maps, the SEWRPC 1" = 400' scale aerial photograph prints and individual field examination.

5. Road Description: Each road or highway leading to a facility was classified according to the agency having jurisdiction over the route.

6. Size: The area of each facility was recorded to the nearest acre. The size was obtained from county plat books or by measurement on the Commission's 1" = 400' scale aerial photographic enlargements.[1]

7. Possibility of Expansion: The Commission's 1" = 400' scale aerial photograph enlargements were examined to determine if undeveloped areas existed adjacent to the facility and thus provided space for future expansion.

8. Unfavorable Exposure: Examination of the aerial photograph enlargement prints also provided knowledge concerning the proximity of detracting features adjacent to or near each outdoor recreation facility. Examples of features that were regarded as detracting from the value of a recreation facility included: unsightly commercial and industrial developments, dumps, sewage treatment

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1 "Aerial Photographs and Their Use in The Land Use Inventory," Technical Record; SEWRPC, Vol. 1 - No. 2.

plant facilities and active quarrying operations. As can be seen, this unfavorable exposure can be from heavy traffic generations as well as facilities that exude foul odor or create noise, smoke and dust. (See Figure 1.)

Compilation of Collected Data

All data obtained in this inventory was compiled on summary forms and submitted to data processing for key punching onto IBM cards. Numerous pertinent summaries will be prepared at a later date as the regional land use plans are developed. A preliminary graphic compilation was also completed by mapping the sites onto SEWRPC 1" = 5208' (1:62,500) scale county base maps. This information will later be used to plot the areas in symbolic form on other county and regional base maps.

Duration of the Inventory

The inventory of existing outdoor recreation facilities was developed in two phases:

1. Data collection and classification.

2. Mapping and coding.

Approximately four man-weeks were necessary for the data collection and classification phase. Much of the time spent in this phase was devoted to checking outdoor recreation facilities with the land use inventory to be certain the two inventories were consistent. The mapping of the facilities and the coding of the data onto inventory forms took approximately six man-weeks.

HISTORICAL SITE INVENTORY

As urbanization continues in southeastern Wisconsin, many sites of distinct historical significance may be threatened by destruction. In order to identify such sites so that they may be protected from inadvertent destruction and loss, an historic sites inventory was included in the existing outdoor recreation facilities inventory.

To obtain a comprehensive list of marked sites and unmarked sites of historical value, the SEWRPC enlisted the aid of the various historical societies in the Region. Through correspondence and meetings with the historical societies, the purpose of the inventory was explained and their aid solicited. After the meetings, the historical societies, working in conjunction with the Supervisor of Local History of the State Historical Society, designated on SEWRPC county base maps all sites believed to be of historic or scientific value. This description also included a detailed description of the location and its history.

Compilation of Collected Data

All data obtained in this survey was also classified and numerically coded on inventory forms according to its location and types. (See Figure 2.) The types of sites were classified with regard to three general categories:

1. Cultural Features: Certain significant objects or features other than single buildings created by past generations. This category included various early settlements in southeastern Wisconsin and the many Indian mounds.

2. Natural Features: Significant botanical, hydrographic or physiographic areas. (The most prominent type of natural features in southeastern Wisconsin are areas of glacial deposition.)

3. Buildings: Significant buildings representing a phase or specific event in the history of southeastern Wisconsin.

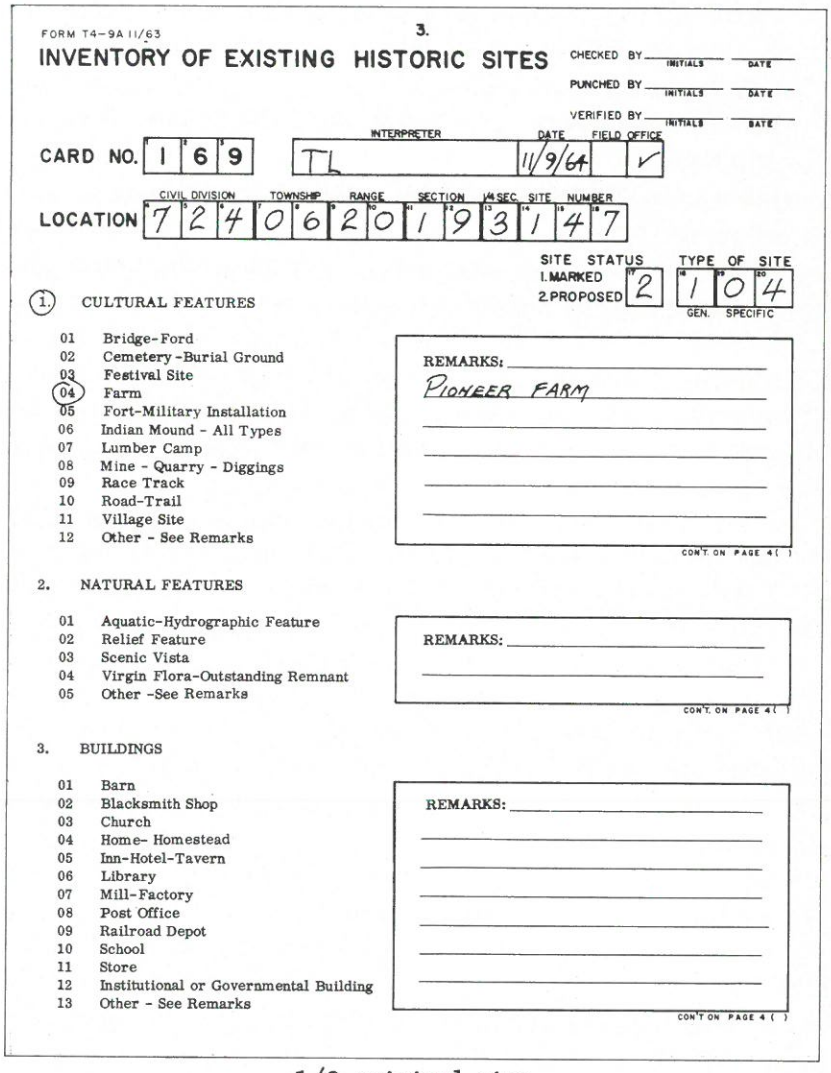
The data from the maps compiled by the historical societies was transferred to reproducible county base maps, and the original map plus a copy of the Commission's reproduction were returned to the society for review and any additions or corrections.

Duration of the Study

The data collection of the historic site inventory took approximately twelve man-weeks. This period included acquainting the historical societies with the inventory, sending the base maps to the societies for plotting of significant historic sites and their return. Three man-weeks were required to map sites on reproducible base maps and to code numerically each site onto inventory summary forms.

Figure 2

EXAMPLE OF A COMPLETED INVENTORY OF EXISTING HISTORICAL SITES FORM



FORM T4-9A 11/63

3.

INVENTORY OF EXISTING HISTORIC SITES

CHECKED BY ____ INITIALS ____ DATE

PUNCHED BY ____ INITIALS ____ DATE

VERIFIED BY ____ INITIALS ____ DATE

CARD NO. 1 6 9 | INTERPRETER: TL | DATE: 11/9/64 | FIELD OFFICE: V

LOCATION: CIVIL DIVISION 7 | TOWNSHIP 2 4 | RANGE 0 6 | SECTION 2 0 | 1/4 SEC. 1 | SITE NUMBER 9 3 1 4 7

SITE STATUS: 1. MARKED 2. PROPOSED 2

TYPE OF SITE: GEN. 1 | SPECIFIC 0 4

(1.) CULTURAL FEATURES

01 Bridge-Ford
02 Cemetery-Burial Ground
03 Festival Site
(04) Farm
05 Fort-Military Installation
06 Indian Mound - All Types
07 Lumber Camp
08 Mine - Quarry - Diggings
09 Race Track
10 Road-Trail
11 Village Site
12 Other - See Remarks

REMARKS: PIONEER FARM

CON'T. ON PAGE 4( )

2. NATURAL FEATURES

01 Aquatic-Hydrographic Feature
02 Relief Feature
03 Scenic Vista
04 Virgin Flora-Outstanding Remnant
05 Other -See Remarks

REMARKS:

CON'T. ON PAGE 4( )

3. BUILDINGS

01 Barn
02 Blacksmith Shop
03 Church
04 Home- Homestead
05 Inn-Hotel-Tavern
06 Library
07 Mill-Factory
08 Post Office
09 Railroad Depot
10 School
11 Store
12 Institutional or Governmental Building
13 Other - See Remarks

REMARKS:

CON'T ON PAGE 4 ( )

1/2 original size

CONCLUSION

The fact that the inventory of existing outdoor recreation facilities carried out by the SEWRPC marked the first time all such recreation facilities in the southeastern Wisconsin Region were enumerated is significant in itself. However, the correlation of an inventory showing the status of land immediately available for leisure time activities, coupled with economic and population studies and projections, intensifies the significance of this inventory. It provides a sound basis for forecasting future outdoor recreation needs in southeastern Wisconsin.

The data obtained in these inventories also provides a basis for weighing the need for the provision of additional outdoor recreation facilities in the Region. This inventory, coupled with the information being collected in the SEWRPC potential park and open space site inventory (see page 39), the existing land use inventory and the inventories of the Wisconsin Conservation Department and the Wisconsin Department of Resource Development will be a prime factor in determining the type and location of proposed park areas and open space facilities.

* * * * * * *

(Backward Glance continued from page 30)

right-of-way, thus converting parts of the system to a "rapid" transit system. In the late 1920's, with Beggs again at the helm as president of the company, a seven-mile rapid transit line over private right-of-way was completed to bring the western lines into downtown Milwaukee. Two and four tracks wide, it was accomplished at a cost of approximately $2 million. With this improvement, trains could operate at high speeds into and out of the heart of downtown Milwaukee. At the time, no other city the size of Milwaukee (1930 population, 578,249) could boast such a civic asset. In addition, construction was begun on a subway at the downtown end of the Waukesha line to eliminate a few remaining blocks of city street operation between 6th and Clybourn and 3rd and Michigan. The Racine-Kenosha line was rebuilt to high standards in 1929 on a new location, and conversion of the Sheboygan line to rapid transit standards was begun. A freight belt line was also begun so that coal trains could be handled around the city.

More than $6.26 million dollars had been spent on these projects when the depression halted all expansion, and labor riots caused considerable damage and loss of revenue. This marked the turning point between aggressive expansion and development under Beggs' management and the ensuing contraction and decline ending in eventual abandonment of the entire system.

THE ROLLING STOCK

In the early days of the line, a variety of double end wooden railroad-roof interurban cars were used as rolling stock. Many were designed for multiple-unit operation. Later, these were completely rebuilt in the company's Cold Spring shops, being converted to single and steel sheeted cars. Only a few all-steel cars were ever used by the road; four being acquired new from St. Louis in

Continued on page 47

INVENTORY OF POTENTIAL PARK AND RELATED OPEN SPACE SITES

by Karl W. Holzwarth, Landscape Architect[1]

The Southeastern Wisconsin Regional Planning Commission is presently engaged in a regional land use-transportation study. This study is intended to provide two of the key elements of a comprehensive plan for the physical development of the Region, a land use plan and a transportation plan. Identification and consideration of both the existing and potential high quality park and other open space areas must be an essential part of any land use planning operation. Such consideration as a part of the land use planning operation is not directed at the preparation of a regional park and open space plan, but rather at the identification of all existing and potential major park and related open space sites within the Region. These selected sites may then be protected through sound land use planning from inadvertent destruction, poor highway location, land subdivision or other poorly placed urban development. Thus, the over-all environmental quality of the Region can be conserved and enhanced through the wise use and protection of some of its most precious natural resources.

The importance of natural resources having recreational potential to the over-all quality of the environment in the Region becomes evident when it is realized that the present outdoor recreation facilities in southeastern Wisconsin serve a Region which comprises only 5 percent of the state's total land area, yet contains over 40 percent of the state's total population. Even more significantly, this seven-county Region over the last decade accounted for 64 percent of the total population increase of the entire state. The Region further draws large numbers of people seeking outdoor recreation from the Chicago metropolitan area which has a population of approximately seven million people.

The Southeastern Wisconsin Regional Planning Commission, Wisconsin Conservation Department and Wisconsin Department of Resource Development share responsibilities for and are all engaged in planning efforts related to park and other open space reservation and development within the Region. To provide a cooperative and coordinated planning effort, these three agencies executed a "Memorandum of Understanding on Park and Open Space Planning in the Southeastern Wisconsin Region" in August 1963. In this memorandum, all three agencies

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[1] Assigned to SEWRPC staff by the Wisconsin Conservation Department, Park Planning Section.

agreed to cooperate in a regional park and other open space inventory by contributing their specialized staff services and available information. This article specifically describes the method of inventorying the potential park and related open space sites conducted under this agreement as a part of the regional land use-transportation study. The inventory of existing park and related open space sites conducted under this agreement is the subject of another article in this issue of the SEWRPC Technical Record.

To simplify reading and achieving space economy, all future references to the Southeastern Wisconsin Regional Planning Commission, Wisconsin Department of Resource Development and Wisconsin Conservation Department will be respectively cited as SEWRPC, DRD and WCD. Also, although the term "open space" refers to any area that has not been converted to residential, business or industrial development, its use in this report will be limited to those sites which directly contribute features that enhance the park potential of any sites and such sites will be referred to as "related open space".

Contributions of the SEWRPC to the inventory include: (1) Aerial photography, base maps, data collection forms and data processing services necessary for compiling and analyzing the necessary inventory data. (2) Establishing and maintaining the liaison contacts between cities, villages, towns and counties and the participants in the inventory. (3) Coordinating potential park site selections. (4) The preparation and adoption of park and open space planning standards. (5) The over-all direction of the inventory. (6) Providing office space for Conservation Department personnel assigned to the inventory.

Contributions of DRD include: (1) Preparation of maps delineating the unique natural or man-made resource locations within the seven-county Region which have potential as environmental corridors and sites for park and open space reservation. (2) Providing data on current and possible future demand for park and related open space areas within the Region, giving consideration to the effect of the existing and probable future levels of population and composition in northeastern Illinois as well as southeastern Wisconsin.

Contributions of the WCD to the inventory include: (1) Locating, delineating and classifying all those areas within the Region which should be preserved as park sites. (2) The identification, delineation, classification and quantification on an importance rating basis all forest, fish, wildlife and scientific open space areas within the Region. This study, however, concerns only these related open space areas when they directly contribute to a site's park potential, as previously explained.

SOURCES FOR THE IDENTIFICATION OF SITES

Approximately 500 sites having potential park and related open space value were identified using information from five primary sources:

1. Files of the DRD.
2. An inventory of all forest and significant fish and game habitat areas within the Region made by WCD foresters and fish and game technicians respectively as a part of the park and related open space inventory.

3. Files of local park officials and other interested citizens within the Region.

4. A potential park and related open space site inspection conducted by an experienced landscape architect.

Additional sources of information for the identification of potential park and related open space sites included the existing park and open space facility inventory, the operational soil survey and the surface water quality studies currently being conducted by the SEWRPC, and the recreation demand and environmental corridor pattern studies currently being conducted by the DRD. The soils survey includes special analyses of the recreational site capabilities of each soil type within the Region. Since some types of recreational development are best suited to certain soil types, these analyses will be the basis for recommending specific uses for specific potential park and related open space sites.

The regional surface water quality survey and interpretation provides definitive knowledge on water quality as a basis for planning land and water development and management on a regional scale. Recreational use recommendations for surface waters will be of prime importance to such planning.

Recreation demand data and environmental corridor patterns are currently being developed by the Department of Resource Development.[2] Environmental corridors are defined as geographic patterns formed by high environmental quality land and water resources in extensive corridor-like patterns. Some parts of the corridors are best preserved in their natural state and others best developed for active recreation use. Sites lying within the corridor patterns warrant special consideration during field investigation.

The detailed inventory of all existing park and other related open space facilities being conducted by SEWRPC is in another article in this issue and provides an important input to the consideration of potential sites. Significant historical data is also being collected from the various historical societies in the Region, and this data will add to the basic information of the park and open space inventory.

INVENTORY CRITERIA

The criteria used in determining the park and related open space potential of sites within the Region are indicated by the data requirements listed on the inventory form shown in Figure 1. Each potential park and related open space site was field inspected and the necessary basic information recorded on the inventory form. The form was designed so that the recorded information could be transferred to punch cards for high-speed electronic data processing. A brief description of each criterion follows.

Location

Data was collected to establish the relationship of the location of potential sites to nearby communities and to other existing recreation facilities. Each potential site

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2 Recreation in Wisconsin; Wisconsin Department of Resource Development, 1963.

Figure 1

EXAMPLE OF A COMPLETED INVENTORY OF POTENTIAL PARKS, RECREATION AREAS, AND OPEN SPACE

FORM T4-3 5/63

SOUTHEASTERN WISCONSIN REGIONAL PLANNING COMMISSION

SOUTHEASTERN WISCONSIN REGIONAL LAND USE – TRANSPORTATION STUDY

INVENTORY OF POTENTIAL PARKS RECREATION AREAS AND OPEN SPACES

CARD NO. 021

INTERPRETER: K HOLZWARTH | DATE: 10/28/63 | OFFICE | FIELD: ✓ | SITE NO.: 5

LOCATION: CIVIL DIVISION 316 | TOWN & RANGE 0419 | SECTION 23 | 1/4 SEC. 2

CHECKED BY ____ INITIALS ____ DATE

PUNCHED BY ____ INITIALS ____ DATE

VERIFIED BY ____ INITIALS ____ DATE

LOCATION REMARKS:

2 MILES TO WATERFORD	2 MILES TO HEG. MEM. PARK
8 " " BURLINGTON	8 " " MUSKEGO C. P.
14 " " WAUKESHA	19 " " BIG FOOT BEACH S.P.
20 " " RACINE	20 " " PETRIFYING SPRINGS C.P.

CON'T. ON PAGE 4 ( )

I LAND USE

0. Residential
1. Retail & Services
2. Wholesale
3. Manufacturing (Non-Durable)
4. Manufacturing (Durable)
5. Transportation Communications & Utilities
6. Institution & Government Services
7. Recreation
8. Agriculture & Related
9. Other Open lands, swamps & Water areas

9 1ST
– 2ND

REMARKS ____

CON'T. ON PAGE 4 ( )

II NO. OF ACRES

1. Less than 150
2. 150 - 300
3. 300 - 500
4. 500 - 750
5. 750 - 1,000
6. More than 1,000

2

REMARKS APRX. 250 ACRES

CON'T. ON PAGE 4 ( )

III KEY ATTRACTION TO AREA

1. Lake
2. Forest
3. River
4. Creek
5. Flowage
6. Topography
7. Other ____

3 1ST
6 2ND
– 3RD

REMARKS FOX RIVER

CON'T. ON PAGE 4 ( )

IV ACCESS

A. Convenience & Control

1. Excellent
2. Good
3. Fair
4. Poor

3

REMARKS ____

CON'T. ON PAGE 4 ( )

B. Road Description

1. Interstate
2. U.S. Highway
3. State Highway
4. County Trunk
5. Town Road
6. Private
7. Developed
8. Undeveloped

5
7

REMARKS BUENA PARK ROAD

CON'T. ON PAGE 4 ( )

V GENERAL SOIL TYPES

1. Clay
2. Loam
3. Sand
4. Gravel

2

REMARKS SILT LOAM

CON'T. ON PAGE 4 ( )

VI WATER-USE POSSIBILITIES

1. Swimming
2. Fast Boating & Skiing
3. Fishing - Slow-Boating
4. Sailing
5. Winter - Use
6. Other ____

3 1ST
6 2ND
1 3RD
– 4TH

REMARKS GOOD AESTHETIC SETTING
WILDLIFE OBSERVATION

CON'T. ON PAGE 4 ( )

VII BEACH DEVELOPMENT

1. Good Water Quality
2. Sand Beach
3. Drop Offs
4. Some Shade
5. Parking Available
6. Good Sun Bathing Area
7. Other ____

6 1ST
5 2ND
– 3RD
– 4TH

REMARKS POOR BEACH AREA

CON'T. ON PAGE 4 ( )

VIII TYPE OF FOREST COVER

A. Trees

1. Yes
2. No

1

B. Size - Diameter - in order of dominance

1. 1 - 2"
2. 3 - 6"
3. 7 - 12"
4. 12 - 24"
5. More than 24"

4 1ST
3 2ND
5 3RD
1 4TH
2 5TH

REMARKS VERY FEW TREES ON THIS SITE — OAK, LINDEN, HICKORY, POPLAR NEAR WATERS EDGE

REMARKS ____

REMARKS VERY FEW RED & GRAY DOGWOOD, SUMAC, HAWTHORNE

CON'T. ON PAGE 4 ( )

C. Shrubs

1. Yes
2. No

1

D. Grass

1. Good Stand
2. Weeds

1

IX TOPOGRAPHY & DRAINAGE

40 2	1ST
41 3	2ND
42 1	3RD

1. 0 - 2%
2. 3 - 6%
3. 7 - 12%
4. More than 12%

REMARKS

CON'T ON PAGE 4 ( )

X GENERAL DEVELOPMENT POSSIBILITIES

43 6	1ST
44 2	2ND
45 7	3RD
46 1	4TH
47 5	5TH
48 4	6TH

1. Swimming
2. Picnicking
3. Nature Study
4. Campground
5. Hiking Trails
6. Golf
7. Fishing
8. Hunting
9. Boating
0. Other_____

REMARKS
Possible wildlife observation along river bank

CONT. ON PAGE 4 ( )

XI EXPANSION POSSIBILITIES

49 2

1. Yes
2. No

REMARKS

CON'T. ON PAGE 4 ( )

XII HISTORICAL - ARCHEOLOGICAL - GEOLOGICAL SIGNIFICANCE

50 2

1. Yes
2. No

REMARKS

CON'T. ON PAGE 4 ( )

XIII UNFAVORABLE EXPOSURE

51 -	1ST
52 -	2ND
53 -	3RD

1. Lack of Natural Interest
2. Noise
3. Foul Oders
4. Water Quality - Poor
5. Other_____

REMARKS Residential development is both north and south of the site

CON'T. ON PAGE 4 ( )

XIV RECOMMENDATION

A. State

54 5

1. State Recreation Area
2. Scenic State Park
3. State Roadside Park
4. Historical Memorial Park
5. Does not qualify

REMARKS

B. County

55 2

1. Picnic & Recreation Area
2. Golf Courses
3. Swimming Areas
4. Fairgrounds
5. Waysides or Roadsides
6. Does not qualify
7. Other_____

REMARKS

56 -

C Other_____

CON'T. ON PAGE 4 ( )

GENERAL REMARKS

This is a large open area north of Buena Park and east of the Tichigan Wildlife Area. The site has an interesting topography with gentle to steep grades which overlook the Fox River. The site has very good golf course potential. Water use potential is limited to passive use because of its marshy banks. Picnicking is also a very good potential use because of its good setting. Good wildlife habitat in this area offers wildlife observation potential along with related activities (trails and nature study).

Related open space values are both high (waterfowl and muskrat) and low (squirrel) for game. Its water rating is low.

The site is rated high for its potential as a park site.

OFFICE REMARKS

1/2 original size

was assigned a code which established its geographic location within the Region by U. S. Public Land Survey quarter section, the basic areal unit used for data collection and land use analyses by the SEWRPC.

The utilization value of potential park and related open space sites will vary with their proximity to other existing and similar porposed sites and to the centers of population within the Region. Sites near high population centers have a higher potential because of their location, while close proximity to other existing recreation sites can either limit or expand the potential value of a proposed site depending upon the relationship of the values found in the site to those found in the existing sites.

Existing Land Use

The existing land use at each site was established from field inspection utilizing ten basic land use categories (see Figure 1). This information provides an insight into possible compatible uses for the area and warns of the detriments of any encroachment into single-use areas. Certain potential recreational land uses may be competitive or incompatible with existing uses and destroy the values of a certain area, while other potential recreational land uses may compliment existing uses and enhance their values.

Size of Site

The varying sizes of different parcels of land are an important factor in the determination of potential recreational uses. Since land is a three dimensional entity and definite two dimensional size requirements for the many different potential park and recreation uses possible are difficult to establish, it was determined undesirable to set strict acreage requirements on potential park and open space sites for initial inventory purposes.

Standards presently being developed indicate the following desirable acreage ranges: county parks, 100 to 300 acres; scenic state park areas, at least 1000 acres and state roadside parks, from 200 to 300 acres when adjacent to or associated with important routes of travel. If smaller sites have values so unique as to create sufficient interest and provide adequate facilities, they can and should be considered for preservation and development accordingly.

Key Attraction to the Area

A site may offer a wide variety of possible recreational values to the public, but generally each site will possess just one or two main attractions. The main attraction of the site provides an indication of significance and general interest. It also determines some of the facilities required for proper development.

Accessibility

The accessibility of each site was rated on the basis of such factors as safety, convenience, site access control, existing highway improvements and cost of new improvements. Site access control is very important to the safety and proper management of an area as a state or county park. When admission fees are charged, site access control takes on added importance.

Soil Types

General soil texture was established and noted during the field inspection of each site. The detailed operational soil survey currently being conducted by the Soil Conservation Service for the SEWRPC will be used to supplement the field inspection data. The detailed soil survey data will provide the following quantitative information on each site: the drainage characteristics, the degree of recreational development, the types of facilities for which an area is best suited and other soil-recreation associated factors.

Water Use

With the increasing popularity of such water related recreation activities as swimming, boating, water skiing and fishing, access to high quality streams and lakes becomes an important factor in establishing the potential park and recreation value of an area. The following water use possibilities were checked for each site: swimming, fast boating and water skiing, fishing and slow boating, winter use and "other" related possibilities.

For inventory purposes boating was divided into four classes: fishing, sailing, speed and sight seeing or aesthetic boating. Speed boating and its companion use, water skiing, generally employ speeds in excess of 15 miles per hour. Space becomes a prime requisite for speed boating since the minimum turning radius required by speed boats is often in excess of 150 feet. A water skiing unit, comprised of boat and skier, will generally be 50 feet or more in length and will require a much larger minimum turning radius. Since prolonged speeds of 20 to 30 miles per hour are desired by many boat owners, a lake circular in shape would have to be over 100 acres in size in order to allow for more than a minute to cross. Use of surface waters for fishing is dependent upon accessibility, water conditions and fish populations. As a whole, the Region's waters are fertile and provide productive fisheries.

Winter use possibilities are added primarily for ice skating potential. The aesthetic setting of areas with wind protection and a good ice formation are prerequisites of a good ice skating area.

Beach Development

Beaches today must provide numerous facilities for those using them. Actual water frontage is generally the least space consuming of all of the facilities required. Sun bathing areas, game areas, picnic grounds and parking facilities are also required if optimum use is to be achieved.

Other requirements for swimming are good quality water, unpolluted and preferably clear, and a firm sandy bottom. Heavy weed growth and turbid waters are barriers to good swimming areas. An area of some shaded cover should be provided for those bathers wishing some protection from the sun.

A water depth survey should be made before any development to protect against the problems of drop offs and to assure that a large enough area for safe swimming can be provided. A minimum of 25-30 square feet of surface water area must be provided for each potential swimmer.

Type of Forest Cover

High quality tree growth, shrubs and prairie areas are all desirable characteristics of a natural park area. Areas of heavy cover provide excellent potential for nature study, trail layout and hunting facilities. Open areas and pastured woodlands provide a degree of immediate useability and development possibilities.

Information on the amount, kind and diameter of trees, together with shrub types and quality of the grass, provides a good measure of the state of vegetative cover. Sites with a degree of balance between wooded areas and open areas provide good potential for quick and economic park development.

Topography and Drainage

Field data on topography and drainage provides a good measure of the potential development capabilities and for evaluating drainage problems which may be encountered during development. Areas having: (1) Less than 2 percent slopes may have drainage problems and a relatively poor development potential. (2) Three to 6 percent are well drained and have many excellent development possibilities. (3) Seven to 12 percent become too steep for development for most active recreation areas. However, golf and hiking areas and some winter sport facilities can be developed on such slope ranges, but will have attendant grading and drainage problems. These slopes do add interest to a site and provide a good park setting.

Slopes in excess of 12 percent create a great deal of interest and excite the eye of the potential user. Potential development in such steeply sloped areas, however, become somewhat limited. Good road and parking lot areas are difficult and expensive to develop and many other facilities have limited development potential in such areas. If both steep slopes and gentle slopes exist on the same site, the site's development potential is greatly enhanced as a greater variety of facilities can be offered and more interest can be created within reasonable development costs.

General Development Possibilities

A list of development possibilities are field checked for each site. The possibilities are recorded and ranked in order of best potential for each site. An important question here is whether or not the site can be economically developed for given facilities and uses.

Expansion Possibilities

Expansion possibilities for future development is also an important item to be considered. Possibilities are recorded along with the direction of the possible expansion. Expansion possibilities become an asset when the demand for use of a site increases.

Historical, Archeological, Geological Significance

This information is being collected in close cooperation with the local historical societies operating within the Region.

Unfavorable Exposure

Data listed under this criterion is intended to point out any drawbacks and hazards to development potential. Some of these drawbacks may be readily overcome by proper planning. Others may be expensive to overcome.

Recommendations

Finally, a summary recommendation is made for each inventoried site based upon the specified criteria for each type of park.

SUMMARY

The park and related open space inventory will make it possible for regional planners to guide land use and transportation development in such a way as to limit the encroachment of urban land uses and transportation routes into the best park and related open space reservation sites within the Region. The inventory will also be used as a guide to acquiring park and related open space lands and in development programs of the state, county park and conservation agencies operating within the Region. The inventory represents an important step toward the preservation, improvement and proper utilization of the Region's limited amount of good park and related open space areas.

* * * * * * *

(Backward Glance continued from page 38)

1927, another eight were purchased from the Indianapolis and Cincinatti Traction Company in 1929 and converted to unique articulated coach units. In addition, two all steel articulated diner-coach units were built in the company shops in 1928. (See Figure 1.)

Photo courtesy of Kurt W. Bauer

Figure 1

Pictured above is a two-car TMER&T interurban train just west of 35th Street on the double-track route to Waukesha. A portion of the interstate highway (I-94) is now located on this right-of-way.

Continued on page 48

(Backward Glance continued from page 47)

Electric power, supplied by overhead wires, was generated at plants located in Milwaukee, St. Francis, and Port Washington. At first, the lines carried 2,300 volt AC current. Later, when this type of power supply proved uneconomical, it was converted to 1,200 volt DC; and finally in 1927 the line was standardized at 600 volt DC.

THE SERVICE

In the 1920's and early 1930's, the Milwaukee Electric was a profit-making operation. By 1931, it was recognized as the third fastest electric interurban railway in the country, with an average speed on its Oconomowoc run of 59.95 miles per hour. High speed multiple unit trains carried daily commuters into Milwaukee from the western suburbs. Special excursion trains carried thousands of vacationers and amusement seekers to Big Bend, Waukesha Beach and Muskego Beach. Duck hunters and fishermen crowded weekend trains to resorts and preserves that grew up around the many lakes along the right-of-way.

The frequency of service varied considerably, the outer portions of the lines receiving less frequent service than the inner portions. For example, on the double-track route to Waukesha, trains ran every 30 minutes, but cars went on to Watertown only on one hour (and later two-hour) schedules. The Kenosha line service was usually hourly. All lines carried freight including coal and mail as well as passengers; however, freight hauling was never developed into a profitable business by the road. Operating revenues totaling $5 million in 1917 grew to $10 million in 1920 and fluctuated at about that level through 1931.

The TMER&L was also in the bus business with route extensions as far as Fond du Lac, Madison and Beloit, necessary because Wisconsin did not legislate to protect interurbans against bus competition. The result was a highly coordinated rail-bus system rarely duplicated elsewhere in the United States.

THE DECLINE

Many theories have been advanced concerning the reasons for the decline of the electric interurban network in southeastern Wisconsin. Some held that the interurbans were ahead of their times. Others contended that conservative management and failure to modernize and improve service after the depression to compete with other means of transportation should be blamed. More likely, it was a combination of these plus the depression and the beginning of mass automotive transportation.

Continued on next page

Although the automobile had already had some effect on traffic, especially on the outer limits of the line, no cutbacks were made until 1938. Abandonments then followed rapidly:

1938 - Burlington branch abandoned to Hales Corners.

1939 - East Troy branch abandoned to Hales Corners.

1940 - Watertown line beyond Oconomowoc abandoned, and the Sheboygan line beyond Port Washington abandoned.

1941 - The Oconomowoc line abandoned west of Waukesha.

During the war years the inner segments of three routes--to Waukesha and Hales Corners, Port Washington and Racine-Kenosha together with the North Shore Railway to Racine, Kenosha and Chicago--carried the heaviest volumes in their history. However, after the war, the line went through a series of changes. The Port Washington line was sold in 1942 (although it continued to be operated by the TMER&L) and the Waukesha line was sold in 1946. Henry P. Bruner, president of the Kenosha Motor Coach Lines, bought the interurban lines at very low prices from TMER&L and resold them later to Greyhound.

Late in 1946 the line to Racine and Kenosha was abandoned. The Milwaukee to Port Washington line was abandoned on March 28, 1948. After the Spring of 1948, this left the Waukesha and Hales Corners lines, which had been resold by Bruner to Greyhound, the only operating portion of the original system.

TRY AT REVIVAL

In 1949, the newly formed Milwaukee Rapid Transit and Speedrail Company purchased the line from Greyhound. Lightweight one-man cars acquired from various abandoned interurban lines replaced the heavy two-man equipment in an effort to reduce operating costs with the hope that the new company might succeed. But, on Labor Day, 1950, two special trains collided head-on, killing ten and injuring 47. The new president of the line, Jay Maeder, was at the controls of one of the trains.

As a result of the ensuing investigation, insurance difficulties and a loss of traffic, the road was placed in trusteeship. The remaining two lines were finally abandoned on June 30, 1951. The company did, however, retain one 5-mile section of track, a freight belt line on the south side of the city between the Lakeside Power Plant at St. Francis and Powerton, to haul coal to the Lakeside Power Plant and a similar segment at the Port Washington Power Plant. These sections, together with a small 6-mile segment between the Soo inter-

Continued on next page

change at Mukwonago and East Troy, are still in operation today hauling freight and coal. (See Figure 2.)

On the evening of June 30, 1951, car 66 made the last run to Hales Corners. Shortly before midnight, train 37-38 completed the final run to Waukesha. The line was dismantled in the spring of 1952 by a Chicago firm, and cars were scrapped at a Waukesha gravel pit. The Chicago, North Shore and Milwaukee Electric Railway, operated until January 21, 1963 when all efforts of citizen groups, including court orders and credit extensions failed. By June of 1962, only a handful of electric busses in Milwaukee were left to remind many southeastern Wisconsin residents of the days when a ride on "The TM" was as much a part of their daily life as getting up in the morning.

Figure 2

One of the three remaining operational sections of the former TMER&T is a 6-mile segment from Mukwonago to East Troy. This freight motor shuttles freight cars from an interchange with the Soo Line in Mukwonago to industries in East Troy which has no other rail service. The line is owned and operated by the Village of East Troy and is presently for sale. SEWRPC Photo.

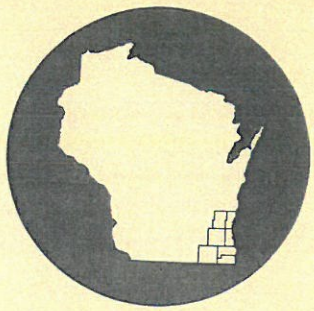
* * * * * * *

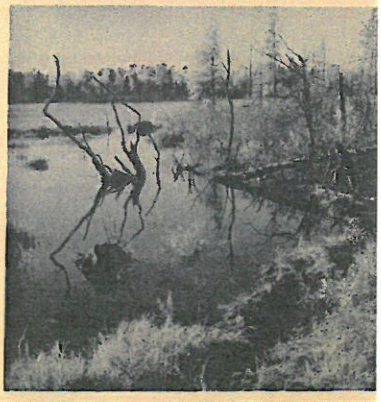
(Sources: Milwaukee Electric Lines, Willard V. Anderson, TRAINS Magazines, copyright August, 1947. The Electric Interurban Railways in America, George W. Hilton and John F. Due, Stanford University Press, 1960. Let There Be Light, Forrest McDonald, American History Research Center, 1957. The Wisconsin State Historical Society.)

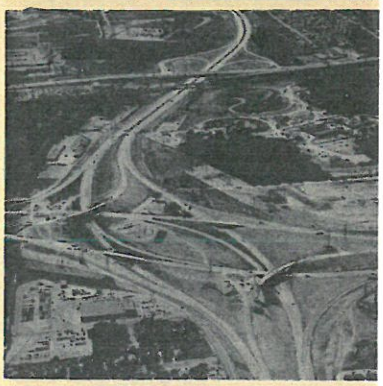
THIS IS SOUTHEASTERN WISCONSIN

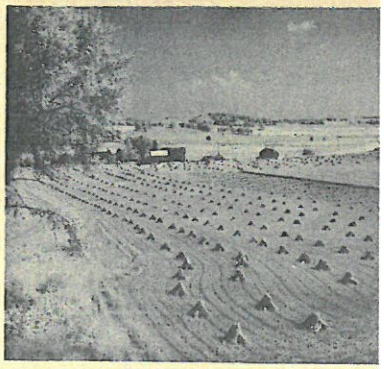
Important vital statistics on the Region and percent of totals for the State of Wisconsin.

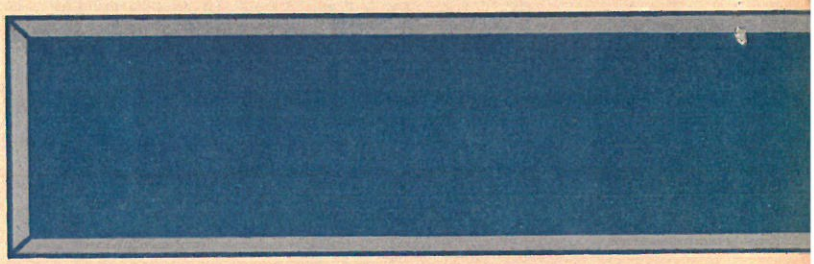
Land and Water Area (sq. mi.)	2,688	5%
Population (1960)	1,573,620	40%
Resident Employment (1960)	612,723	42%
Resident Unemployment (1960)	24,174	41%
Resident Labor Force (1960)	636,897	42%
Resident Man'f. Employment (1960)	253,292	52%
Resident Non-Man'f. Employment (1960)	359,431	37%
Disposable Personal Income (1960)	$3,572,000,000	46%
Retail Establishments (1958)	15,780	33%
Retail Sales (1960)	$2,045,000,000	42%
Property Value (1960)	$8,726,000,000	46%
Total Shared Tax (1960)	$62,777,000	54%
Total State Aids (1960)	$35,474,000	26%
Total Property Tax Levy	$239,380,000	50%
Total Long Term Public Debt	$378,592,000	55%
Total Highway (miles) (1960)	8,740.45	8.9%
Value of Mineral & Non-Metal Production (1961)	$15,494,487	20.08%
Total Vehicle Registration (1962-1963)	633,540	36.8%
Auto Vehicle Registration (1962-1963)	551,188	40%
Truck Registration (1962-1963)	55,950	23%
State Parks & Forest Areas (acres) (1963)	12,546	3.02%












KENOSHA · MILWAUKEE · OZAUKEE
WAUKESHA · WASHINGTON · WALWORTH · RACINE
SOUTHEASTERN
WISCONSIN
REGIONAL
PLANNING
COMMISSION