T764
1972

CITY OF SUMMIT

TRAFFIC OPERATIONS PROGRAM TO INCREASE CAPACITY AND SAFETY

TOPICS

MAY 1972

SUMMIT ENGINEERING DEPARTMENT
David B. Coward, City Engineer
Martin J. Egan, Assistant City Engineer
J. Henry Negus, Retired City Engineer

PROJECT ENGINEER
Walter W. Gardiner, Traffic Engineer
Union County Planning Board

MAYOR
Elmer J. Bennett

COMMON COUNCIL:
Frank H. Lehr, President
Dr. Alexander D. Crosett
Naomi B. Faison
Dr. Murray M. Ross
Luther S. Roehm
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CITY OF SUMMIT

TRAFFIC OPERATIONS PROGRAM TO INCREASE CAPACITY AND SAFETY

Preparation of this report was financially aided through the Federal Highway Administration and the Department of Transportation under TOPICS funds. Program authorized by section 10 of the Federal-Aid Highway Act of 1968 and the New Jersey Department of Transportation through TOPICS Assistance Funds made available by the Commissioner of Transportation.

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FOREWORD

The City of Summit TOPICS Study was prepared as a team effort utilizing both the City of Summit's Engineering Department and the Union County Planning Board Staff.

The inventory of existing physical conditions and accident data was substantially aided by the Summit Police Department. The Summit Fire Department contributed its analysis of the proposed one-way system's impact on fire protection.

Upon completion of all inventories, the City's Engineering Staff and the Union County Traffic Engineering Division combined forces to analyze the existing road system.

The evaluations, conclusions and recommended improvements herein contained are a result of this combined effort.

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TOPICS PROGRAM

Systems Analysis

The City of Summit's street and highway network can be regarded as four inter-related sub-systems. These sub-systems are as follows:

1. The Morris and Essex Turnpike (N.J. 24) from Chatham along the north border of Summit into the Springfield-Millburn area.
2. The potential Morris Avenue--Broad Street one-way couplet between the Morris and Essex Turnpike (N. J. 24) and the intersection of Morris Avenue and Kent Place Boulevard.
3. The Summit Central Business District street grid bounded by the railroad on the south, Summit Avenue on the east, DeForest Avenue on the north, Morris Avenue on the west.
4. The Morris Avenue--River Road complex which consists of the intersections listed below and the road sections interconnecting them.
    a. Morris Avenue and River Road
    b. Passaic Avenue and River Road
    c. Lafayette Avenue and Morris Avenue
    d. Chatham Road and River Road
    e. Lincoln Avenue and Morris Avenue

Sub-System 1

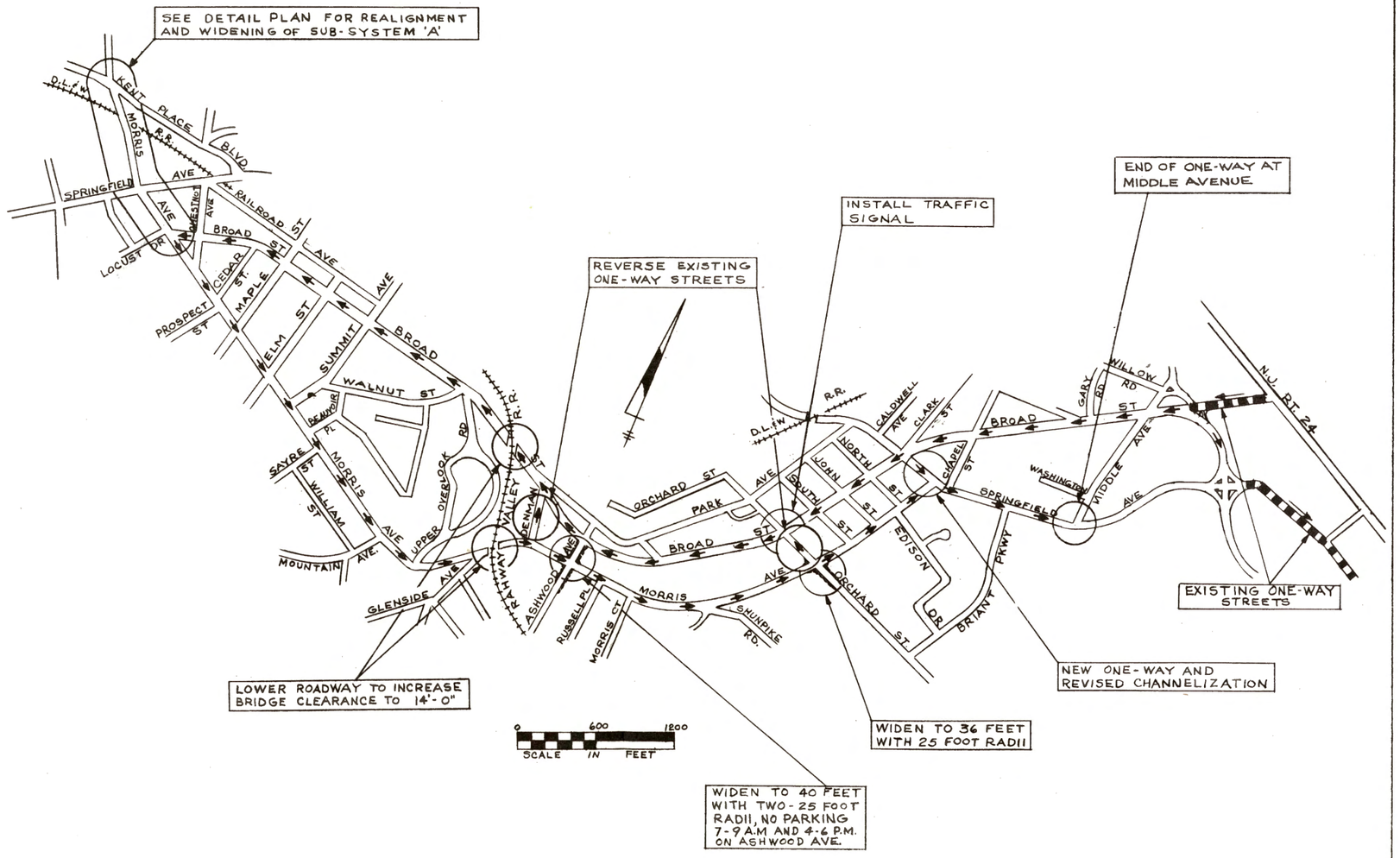
The New Jersey Department of Transportation has planned and construction is in progress on the New Jersey Route 24 Freeway. The target completion date is November, 1974. This freeway will greatly help traffic conditions through its corridor and relieve traffic congestion and accidents at the intersection of River Road and Morris--Essex Turnpike (N. J. 24). Accordingly, this study will be dealing with the remaining three inter-related sub-systems.

Sub-System 2

The Morris--Avenue Broad Street one-way couplet is the proposed conversion of two approximately parallel two-way streets to two separate one-way roadways. Broad Street would be one-way westbound from the Morris-Essex Turnpike (N.J.24) to its natural terminus at Morris Avenue. Morris Avenue would be one-way eastbound from its intersection with Broad Street to Springfield Avenue, and Springfield Avenue would then continue one-way eastbound from this point to Middle Avenue. A plan of Sub-System 2 following this page indicates travel directions and required improvements. Upon examination of this plan three conditions are apparent: one--natural terminal destination points; two--proximity of one block with the exception of the Overlook Road area; three--obvious free flowing roadway concept.

Specific Benefits

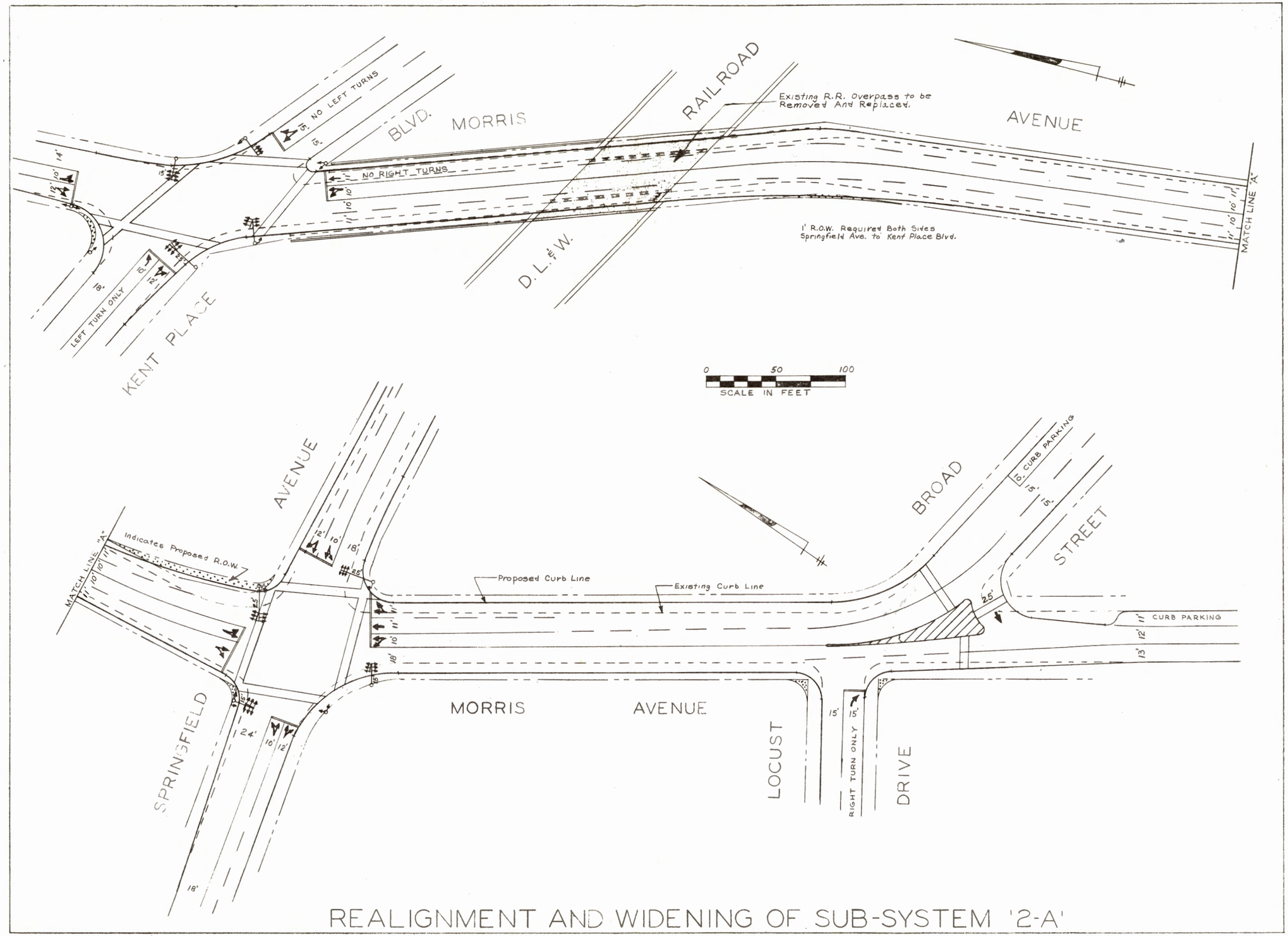
1. Conflicts in flow pattern are reduced.
2. Intersection turning conflicts are reduced.
3. Head-on collision hazard reduced.
4. Night time headlight glare problem reduced.
5. Pedestrians can cross more easily because of fewer directions of oncoming traffic.
6. Accidents decreased.
7. Total trip times often reduced.
8. Traffic delay reduced.
9. Bus running time reduced.
10. Collect and distribute traffic more efficiently.
11. Signal timing is simplified. Smooth, controlled traffic movement can be provided from signal to signal.



SUB-SYSTEM '2'

BROAD STREET – MORRIS AVENUE ONE-WAY SYSTEM

REVISED: 10-29-71



REALIGNMENT AND WIDENING OF SUB-SYSTEM '2-A'

Systems Analysis - continued

12. Roadway capacity increased.
13. More efficient use of street width.
14. Minimum disruption of parking for a major improvement toward safety and efficiency.

Anticipated General Objections and Concerns

1. Residents along routes may call this a proposed "speed way".
2. Residents living between Broad Street and Morris Avenue may voice concern as to the increase in traffic on their streets due to U-turns between Morris Avenue and Broad Street.
3. Residents living north of Broad Street and residents living south of Morris Avenue may feel this system makes it difficult to get to and from their homes as well as increasing travel distance to and from shopping areas and schools.
4. Businessmen along route may be concerned about loss of business due to difficult access, confusion, reduced exposure.
5. Central Business District retailers will have interest in the impact on traffic flow patterns through their area.

These concerns can be appreciated. However, statistics on one-way systems indicate that usually substantial gains in safety and efficiency result in positive public acceptance once motorists have become accustomed to the change. Regarding speed, the present speed limits would remain in effect and significantly greater speeds of the free flowing traffic are not expected. Some travel distances will increase and minor inconveniences will exist; however, the increase in travel distance will generally be offset by the reduction in travel time and reduction of congestion. The minor inconveniences will generally be accepted as familiarity with the system is achieved and the outlined benefits are fully appreciated.

Systems Analysis - continued

South Street, John Street, North Street and Chapel Street between Broad Street and Morris Avenue will have an increase in traffic due to U-turns and cross connection traffic with their segments to the north of Broad Street. However, it is not felt this increase will be significant enough to change the residential side street character of these streets.

Statistics on business attitudes toward one-way systems are reported by the Highway Research Board in a recent publication and are as follows:

> "Many businessmen in the past haven't favored one-ways; some still don't. But, disfavor has diminished with the growing and successful use of one-ways as access routes.
>
> "A publication by the U. S. Chamber of Commerce showed that businessmen in 103 of 134 cities favored one-ways after a fair trial. In Fresno, California, 90 percent of businessmen felt that one-ways were not harmful; 85 percent said they would recommend them. In Baltimore, some businessmen continue opposition to one-ways despite data showing retail improvements. In New Haven, Connecticut, a choice between one-way and no-parking was developed. Generally, businessmen preferred the one-way."

In summary, to achieve the necessary additional capacity and a safer operational experience along these arterials, one of two courses may be chosen. "Creeping widening", with the initial step being a reduction of curb parking, and then a 5 feet widening one year and a 5 feet widening 5 years later. Needless to say, this widening results in loss of street trees, the placing of moving traffic very close to residences, and narrow sidewalks. The proposed one-way couplet, on the other hand, can avoid these consequences. And, a key point: once widening is accomplished, it cannot be undone. A one-way system can be changed, and the trees remain.

Sub-System 3

Inadequate parking facilities in the Central Business District is the primary cause of congestion and delay. Curb parking is at present essential; however, it is preventing the Central Business District street grid from developing its potential capacity and free flow. As is often the case with curb parking, the short-stop shopper may be block circling in search of a vacant parking stall. Furthermore, entering and exiting of curb stalls causes traffic blockage problems. The Central Business District has lost 40 parking stalls at the Glenwood Place parking lot now the site of the Glenwood Place Housing Development.

To achieve a more attractive character and efficient street grid in the Central Business District, 450 additional offstreet parking stalls should be provided by 1980. As the 450 additional parking stalls are made available, curb parking should be phased out at the following locations:

1. Springfield Avenue--south side, from Woodland Ave. to Summit Ave.
2. Summit Avenue--west side from Springfield Ave. to Union Place.

The elimination of curb parking at these locations should supply the desired additional traffic capacity and enhance the already pleasant qualities of this area.

Sub-System 4

The Morris Avenue--River Road complex is the scene of severe traffic-delays during commuter hours. Much of the traffic involved in these delays is produced by the Ciba Pharmaceutical Company, the largest industry in Summit. Numerous other nearby commercial and manufacturing operations contribute further to the traffic load. Construction plans for the widening and channelization of the intersection of Passaic Avenue and River Road and the widening, channelization and signalization of the intersection of Morris Avenue and River Road have been completed. It is anticipated that these improvements will be completed in 1972.

Lincoln Avenue, Lafayette Avenue, Madison Avenue are used for ingress and egress to the CIBA parking lot located directly opposite the intersection of Lafayette Avenue and Madison Avenue. During A.M. and P.M. peak traffic hours when this parking lot is filling up with or discharging employees, delays are encountered on Morris Avenue, Lincoln Avenue and Lafayette Avenue due to left turn conflicts at their joint intersections. To properly control the ingress and egress to this parking lot, reduce delays, and increase safety in this area, the conversion of the flashing signal at the intersection of Lafayette Avenue and Morris Avenue to a full time, semi-actuated traffic signal is recommended. To maximize the traffic flow potential, roadway capacity and traffic signal efficiency, a minor widening is necessary at this intersection and the creation of a one-way loop--Lincoln Avenue being one-way westbound from Morris Avenue to Lafayette Avenue, and Lafayette Avenue being one-way eastbound from Lincoln Avenue to Morris Avenue is recommended.

Systems Analysis - continued

This Sub-System has one remaining glaring traffic problem and that is the curb parking on Morris Avenue between Lafayette Avenue and Lincoln Avenue. Retail businesses along this one-block segment of Morris Avenue require close, short stop parking facilities. The vacant lot on the northwesterly corner of Morris Avenue and Lafayette Avenue could be acquired by the City for a parking lot. Curb parking could be eliminated on the westerly side of Morris Avenue from Lafayette Avenue to Lincoln Avenue when this parking lot is completed.

Since the initial writing of this report, the City has entered into a lease agreement with the owner of the said vacant lot and construction of this parking lot was completed in 1971.

Sub-System 2 - Morris Avenue - Broad Street One-Way Couplet

The implementation of this one-way system will bring a dynamic change in traffic flow with reduced congestion and reduction of accidents, especially at the Morris Avenue--Glenside Avenue intersection. This sub-system has been divided into two parts for implementation purposes: Sub-System 2A, the widening and realignment of Morris Avenue from Broad Street to Kent Place Boulevard, which is to be considered a major construction project consisting of Right-of-Way acquisition, bridge construction, retaining walls, paving, curbing, sidewalk and traffic signal installation, Sub-System 2B is the remainder of the one-way system, Broad Street from Route 24 to Morris Avenue, and Morris Avenue from Broad Street to Middle Avenue which consists of Right-of-Way acquisition, minor widening of Ashwood Avenue and Orchard Street, lowering of roadway to increase bridge clearance, extensive traffic signing changes and traffic signal installation at Broad Street and Orchard Street. This Sub-System should be implemented in accordance with the following schedule:

Morris Avenue--Broad Street One-Way - Sub-System 2A

1. R.O.W. to be acquired
2. Bridge construction
3. Traffic signal installation (2)
4. Widening

Morris Avenue--Broad Street One-Way - Sub System 2B

1. Reverse one-way Denman Place
2. Make Springfield Avenue one-way easterly from Broad Street to Morris Avenue
3. Acquire R.O.W. east side of Ashwood Avenue for widening. Acquire R.O.W. Orchard Street.
4. Widen Ashwood Avenue to 40' and Orchard Street to 36'
5. Install traffic signal at Broad Street and Orchard Street
6. Reverse one-way Orchard Street
7. Lower roadway to increase bridge clearance to 14' -0" at Morris Avenue and Rahway Valley Railroad
8. Publicize plan of one-way system for 2 to 3 weeks prior to implementation

9. Install all required signs needed for one-way operation (hooded)
10. Upon completion of all steps of Sub-Systems 2A and 2B, implement Broad Street and Morris Avenue one-way system.

Sub-System 2 - ESTIMATED COST

Sub-System 2A	
Right-of-Way Acquisition	$ 26,000.00
Bridge Construction	250,000.00
Replace Traffic Signals	65,000.00
Widen and Channelize County Roads	134,000.00
Widen Springfield Ave.--Morris Ave. to R.R.	17,000.00
Total Construction Cost	$492,000.00
Federal Government - TOPICS Share	
Bridge Construction - 50%	125,000.00
Replace Traffic Signals - 50%	32,500.00
Widen and Channelize County Roads - 50%	67,000.00
Widen Springfield Ave.--Morris Ave. to R.R.- 50%	8,500.00
Total TOPICS Funds	$233,000.00
Union County Share	
Bridge Construction - 50%	125,000.00
Widen and Channelize County Roads - 50%	67,000.00
Total County Funds	$192,000.00
City of Summit Share	
Right-of-Way Acquisition - 100%	26,000.00
Replace Traffic Signals - 50%	32,500.00
Widen Springfield Ave.--Morris Ave. to R.R.- 50%	8,500.00
Total City Funds	$67,000.00

Sub-System 2B		
Right-of-Way Acquisition		$18,000.00
Install new Traffic Signal and Relocate Signals		25,000.00
Widen Orchard Street (County road)		10,000.00
Widen Ashwood Avenue		10,000.00
Increase Bridge clearance		12,000.00
Marking, Signing and Miscellaneous		5,000.00
Total Construction Cost		$80,000.00
Federal Government - TOPICS Share		
Install new Traffic Signal and Relocate Signals	- 50%	12,500.00
Widen Orchard Street (County road)	- 50%	5,000.00
Widen Ashwood Avenue	- 50%	5,000.00
Increase Bridge Clearance	- 50%	6,000.00
Marking, Signing and Miscellaneous	- 50%	2,500.00
Total TOPICS Funds		$31,000.00
Union County Share		
Widen Orchard Street (County road)	- 50%	5,000.00
Increase Bridge Clearance	- 50%	6,000.00
Marking, Signing and Miscellaneous	- 50%	2,500.00
Total County Funds		$13,500.00
City of Summit Share		
Right-of-Way Acquisition	- 100%	18,000.00
Install new Traffic Signal and Relocate Signals	- 50%	12,500.00
Widen Ashwood Avenue	- 50%	5,000.00
Total City Funds		$35,500.00

Economic considerations will pose the question as to whether Sub-System 2B can be implemented without going through the major expense of Sub-System 2A. Yes, it can. However, to do so would reduce the desired system efficiency and postpone the inevitable widening of Sub-System 2A to the not so distant future and inflate the cost accordingly.

Sub-System 3 - Central Business District

It is essential that the Central Business District street grid be free flowing with minimal traffic delays and ample off-street parking if Summit is to remain competitive with the outlying shopping malls. To alleviate congestion and delays on Springfield Avenue, curb parking should be eliminated and traffic conflicts reduced. The addition of 450 off-street parking stalls are needed prior to elimination of curb parking so as not to adversely affect retail sales. Off-street parking facilities are not eligible for TOPICS funds; however, a brief discussion and recommendations are essential to develop a full picture of the Central Business District.

A shopper generally is willing to park and walk a maximum of 1,000 feet through the Central Business District to a given store if along the route there are other shops of interest. If any portion of the route, particularly the first portion, is void of shops, the shopper will seek parking within 700 feet of her destination. Holding these conditions as the criterion for additional parking facilities, the following sites would service the Central Business District to best advantage (see map of Central Business District).

Cullis & Lewis Parking Lot
Expand existing parking lot at grade to accommodate 70 additional cars. Construction scheduled for 1972.

Franklin Place & Summit Avenue
Acquisition of lots 14 through 18, Block 161, would accommodate 85 cars at grade within 700 feet of center of Central Business District.

Springfield Avenue & Chestnut Avenue
Acquisition of Lots 2 through 7, Block 52, would accommodate 100 cars at grade within 1,000 feet of the center of Central Business District.

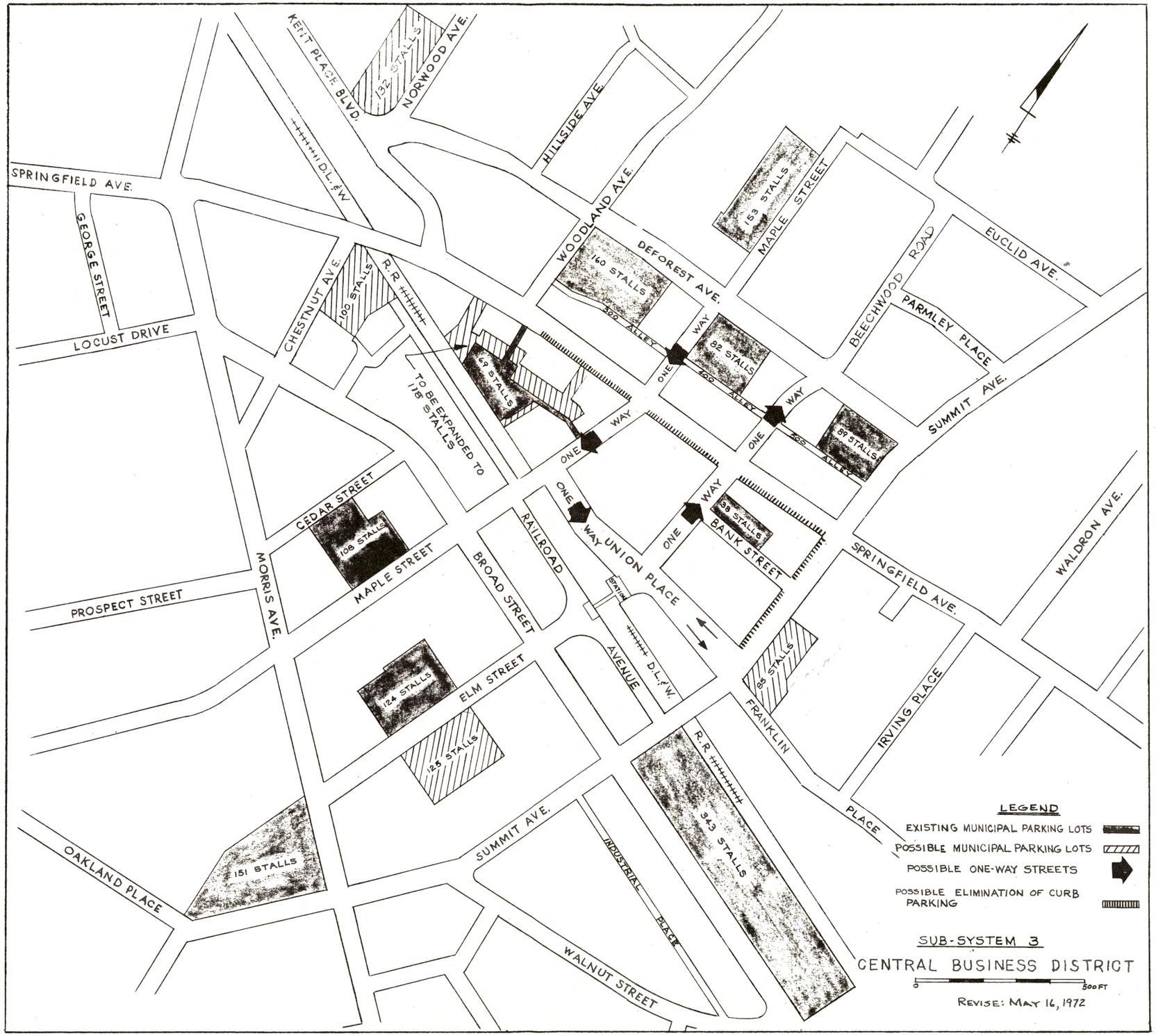
Elm Street between Broad Street & Morris Avenue
Acquisition of Lot 15, Block 47 and utilization of existing City lots 14 and part of lot 13 would accommodate 125 cars at grade within 1,000 feet of the center of the Central Business District. This lot would be used by commuters and office personnel as well as shoppers.

Kent Place Boulevard & Norwood Avenue
Acquisition of part of Lots 4, 5 and 6, Block 130, would accommodate 132 cars at grade within 1,000 feet of the center of the Central Business District.

Traffic conflicts on Springfield Avenue can be reduced substantially and the traffic flow made more efficient with the implementation of a one-way system as shown on the Map of the Central Business District. Maple Street would become one-way South from DeForest Avenue to Union Place, and Beechwood Road would become one-way North from Union Place to DeForest Avenue. This would reduce left turn conflicts at the intersections of Maple Street and Springfield Avenue, and at Beechwood Road and Springfield Avenue. A circular traffic pattern is also created with easy access to off-street parking along the route.

Total Estimated Cost of One-Way System

(Signing, Marking, Signal Adjoustments)			$5,000.00
TOPICS Share	- 50%	$2,500.00	
City Share	- 50%	2,500.00	


KENT PLACE BLVD.
132 STALLS
NORWOOD AVE.
HILLSIDE AVE.
SPRINGFIELD AVE.
GEORGE STREET
LOCUST DRIVE
CHESTNUT AVE.
105 STALLS
R.R.
WOODLAND AVE.
DEFOREST AVE.
160 STALLS
320 ALLEY
153 STALLS
MAPLE STREET
BEECHWOOD ROAD
EUCLID AVE.
PARMLEY PLACE
SUMMIT AVE.
TO BE EXPANDED TO 118 STALLS
69 STALLS
ONE WAY
82 STALLS
320 ALLEY
89 STALLS
365 ALLEY
CEDAR STREET
108 STALLS
MAPLE STREET
RAILROAD
UNION PLACE
58 STALLS
BANK STREET
WALDRON AVE.
PROSPECT STREET
MORRIS AVE.
BROAD STREET
STATION
AVENUE
D.L.&W.
124 STALLS
ELM STREET
135 STALLS
88 STALLS
FRANKLIN
IRVING PLACE
PLACE
OAKLAND PLACE
151 STALLS
SUMMIT AVE.
INDUSTRIAL PLACE
343 STALLS
WALNUT STREET
LEGEND
EXISTING MUNICIPAL PARKING LOTS
POSSIBLE MUNICIPAL PARKING LOTS
POSSIBLE ONE-WAY STREETS
POSSIBLE ELIMINATION OF CURB PARKING
SUB-SYSTEM 3
CENTRAL BUSINESS DISTRICT
0
500 FT
REVISE: MAY 16, 1972

TOPICS Improvement Program - continued

Sub-System 4 - Morris Avenue--River Road Complex

Construction plans for the improvements to the intersections of Morris Avenue and River Road, and River Road and Passaic Avenue have been completed and construction to be completed in 1972. The map of Sub-System 4 outlines the proposed improvements and follows page 14.

Estimated Cost - Union County will be letting the construction contract and paying for said improvements with its Extra-Ordinary State Aid allocation--with the exception of the traffic signal, sidewalks and curb where presently non-existing, and Right-of-Way acquisition. The City is responsible for the cost of said exceptions. Applications have been filed for TOPICS funds to implement this Sub-System.

Right-of-Way Acquisition	$ 64,000.00
Traffic Signal Installation	22,000.00
Curb and Sidewalk Construction	19,000.00
Total City Cost Responsibility	$105,000.00
Federal Government--TOPICS Share	
Traffic Signal Installation - 50%	$ 11,000.00
Extra-Ordinary State Aid	
Right-of-Way Acquisition - 53%	34,110.00
Curb and Sidewalk Construction - 65%	12,344.00
	$ 46,454.00
City of Summit Share	
Right-of-Way Acquisition - 47%	$ 29,990.00
Traffic Signal Installation - 50%	11,000.00
Curb and Sidewalk Construction - 35%	6,656.00
	$ 47,546.00

Lafayette Avenue and Morris Avenue

The proposed traffic signal at the intersection of Lafayette Avenue and Morris Avenue was approved by the New Jersey Bureau of Traffic Safety on September 27, 1962. It was recommended as part of this approval the creation of a one-way system, Lafayette Avenue one-way eastbound, and Lincoln Avenue one-way westbound. This study concurs with this approval since it

TOPICS Improvement Program - continued

creates a controlled traffic pattern for ingress and egress to the CIBA parking lot, increases traffic signal efficiency and storage capacity. On March 7, 1968 a second approval was granted for this signal eliminating this one-way system recommendation. This second approval drastically increases the cost since the northwesterly corner of Lafayette Avenue at Morris Avenue would have to be cut back substantially which would necessitate a large property acquisition and considerable reconstruction.

Estimated Cost - One-Way System (Lafayette and Lincoln Aves.)	
Right-of-Way Acquisition	$1,000.00
Traffic Signal Installation	20,000.00
Curb, Sidewalk and Pavement Construction	1,500.00
Total Construction Cost	$22,500.00
Federal Government - TOPICS Share	
Traffic Signal Installation - 50%	$10,000.00
Union County Share	
Curb, Sidewalk and Pavement Construction	$1,500.00
City of Summit Share	
Right-of-Way Acquisition - 100%	1,000.00
Traffic Signal Installation - 50%	10,000.00
Total City Funds	$11,000.00

As pointed out in Sub-System 3, off-street parking facilities are not eligible for TOPICS funds. However, it is strongly recommended that the City acquire part of Lot 13, Block 126, on the northwesterly corner of Morris Avenue and Lafayette Avenue. A parking lot which would accommodate 15 cars at grade could be constructed on this site, allowing curb parking to be eliminated on the westerly side of Morris Avenue from Lafayette Avenue to Lincoln Avenue. The elimination of curb parking would make this road segment safer and increase the roadway capacity.

Estimated Cost of Parking Lot	
Property Acquisition	$16,600.00
Construction Cost	3,700.00
Total Cost	$20,300.00

Program Priorities

The priorities as herein set forth are simply a recommended guide line which is intended to maximize the benefit for the funds invested. It is fully appreciated that the availability of funds and public acceptance of a given project often dictate priority; the recommended priorities are in no way fixed or binding upon the City of Summit. The suggested timing is also fluid and at the discretion of the governing body.

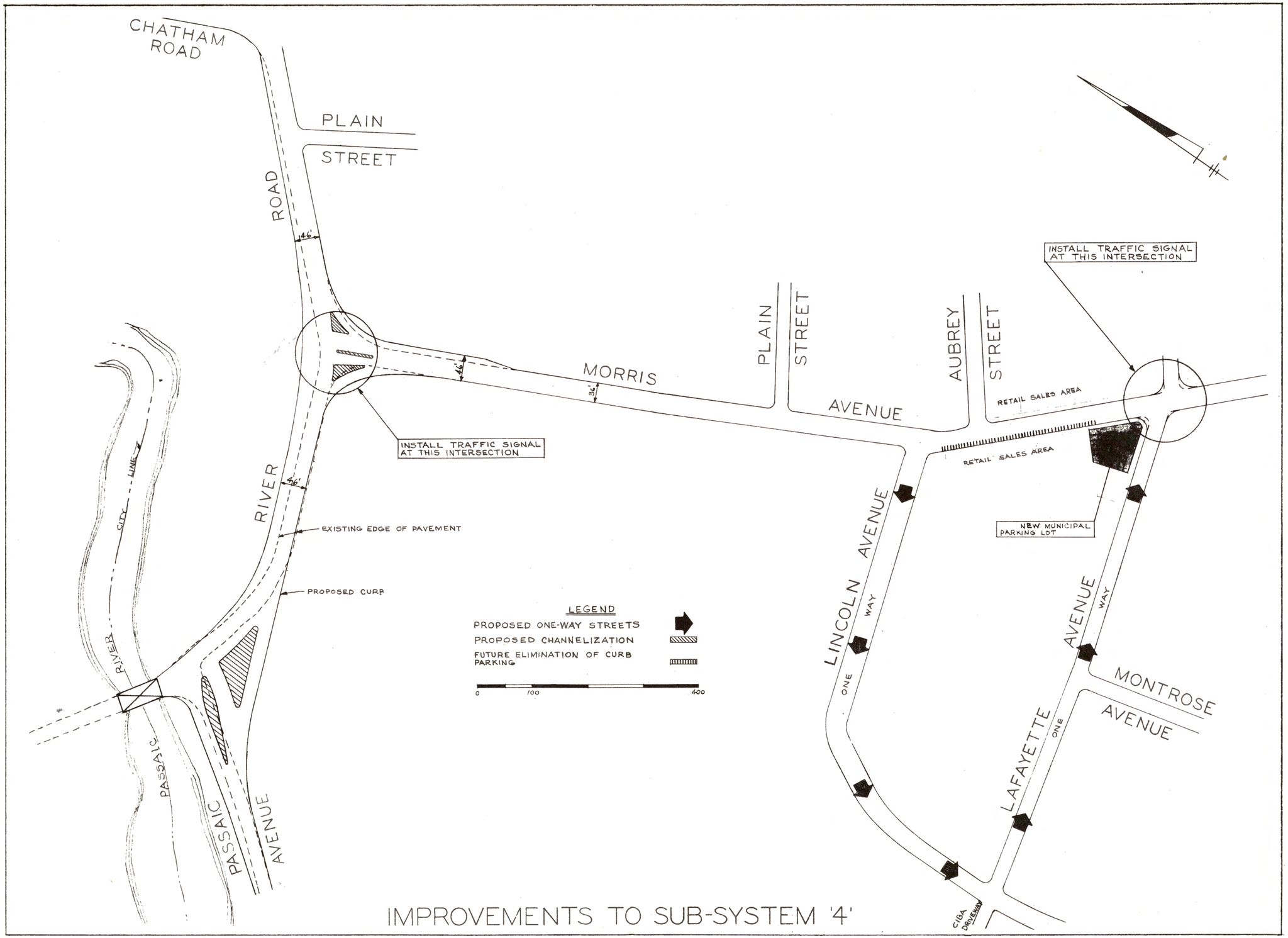
The criteria used in establishing system priority for recommended TOPICS improvement projects are as follows:

1. Severity of the deficiency
2. Importance of affected artery
3. Relationship and impact of affected artery to entire road system
4. Benefit derived for funds invested

Priority 1 - Sub-System 4, Morris Avenue--River Road Complex

This complex is overloaded and functioning at a "level of service E" (forced flow) during peak traffic hours. Our overall speed study disclosed an average speed through the intersection of Morris Avenue and River Road of 10.1 m.p.h. with the slowest leg (River Road west of Morris Avenue) having an average speed of 6.0 m.p.h. and backing up approximately 1/4 mile. The average speed through the intersection of Morris Avenue and Lafayette Avenue is 13.8 m.p.h. with Lafayette Avenue having the lowest average speed of 5.1 m.p.h. This low average speed can be attributed to a merging problem which is caused by the back-up of traffic from the intersection of Morris Avenue and River Road as well as the impact of a local retail business area on Morris Avenue between Lincoln Avenue and Butler Parkway. Accident data indicates these intersections are functioning within an acceptable accident range; however, the road segment of Morris Avenue between Lafayette Avenue and Lincoln Avenue has an accident rate of 7.2.*

*Number of accidents per 10,000,000 vehicles passing through the intersection.



IMPROVEMENTS TO SUB-SYSTEM '4'

The proposed improvement of this Sub-System would reduce the severe traffic delays during commuter hours and increase safety by reducing the said 7.2* accident rate.

Priority 2 - Sub-Sytem 2, Morris Avenue--Broad Street One-Way Couplet

Morris Avenue and Broad Street have a calculated uninterrupted road capacity of 1100 to 1400 v.p.h. The present peak hour volume is approximately 1650 v.p.h.; therefore, these routes are functioning at a level of service E (forced flow). This is apparent at the intersection of Morris Avenue and Springfield Avenue which is the scene of severe congestion and delay due to poor intersection alignment and a funnelling of traffic to a one lane operation across a 26-foot wide railroad bridge. Along these routes there are six intersections with accident rates exceeding 7.5*, the majority of which are right angle collisions.

The widening and realignment of Sub-System 2A will substantially increase the capacity and reduce the 7.9* accident rate in this area. The implementation of Sub-System 2B (one-way system) will reduce the traffic conflicts at the intersections along these routes and thereby reduce right angle collisions.

Priority 3 - Sub-System 3, Central Business District

The Central Business District street grid has overall speeds ranging from 3.4 m.p.h. to 14.4 m.p.h. Maple Street from Broad Street to DeForest Avenue has an average overall speed of 3.9 m.p.h.; Beechwood Road from DeForest Avenue to Union Place has an average overall speed of 6.0 m.p.h. Springfield Avenue from Summit Avenue to Woodland Avenue has an average overall speed of 5.6 m.p.h. The intersection of Maple Street and Springfield Avenue has an accident rate of 11.7.*

* Number of accidents per 10,000,000 vehicles passing through the intersection.

These low overall speeds can be directly attributed to cars entering and exiting of curb parking stalls and delays at traffic signals.

The proposed off-street parking would permit elimination of curb parking as outlined in the program. This would reduce delays and increase capacity in these areas. The implementation of the one-way system would reduce the said 11.7* accident rate and would reduce delays and congestion.

* Number of accidents per 10,000,000 vehicles passing through the intersection.

PRIMARY TYPE II SYSTEM

Upon completion and analysis of all data obtained through the classification and inventory of the City's road system, a Primary Type II Road System was selected. These roads are not on the Federal-aid Primary TypeI, Federal-aid Secondary, or Federal-aid Urban Systems. This system is a connected network of routes which carry the major portion of traffic in the City. A map of this system follows this page. Upon approval by the State and Federal officials, this system would become eligible for Federal-aid participation for the following types of improvements:

1. Channelization of intersections.
2. Widening of traffic lanes.
3. Providing additional traffic lanes on approaches. to signalize intersections.
4. Construction of grade separations.
5. Installation of traffic control systems.
6. Short reconstruction or construction of road sections to eliminate a jog.

SYSTEM	MILES	PERCENTAGE
Interstate	1.30	1.50
Fed. Aid Urban	11.35	13.20
A-Fed. Aid Primary, TypeI	2.60	
B-Fed. Aid Secondary	4.90	
Fed. Aid Primary, TypeII	23.75	27.71

JANUARY 3, 1972

THE CITY OF

SUMMIT N.J.

0 500 1000

CITY ENGINEER

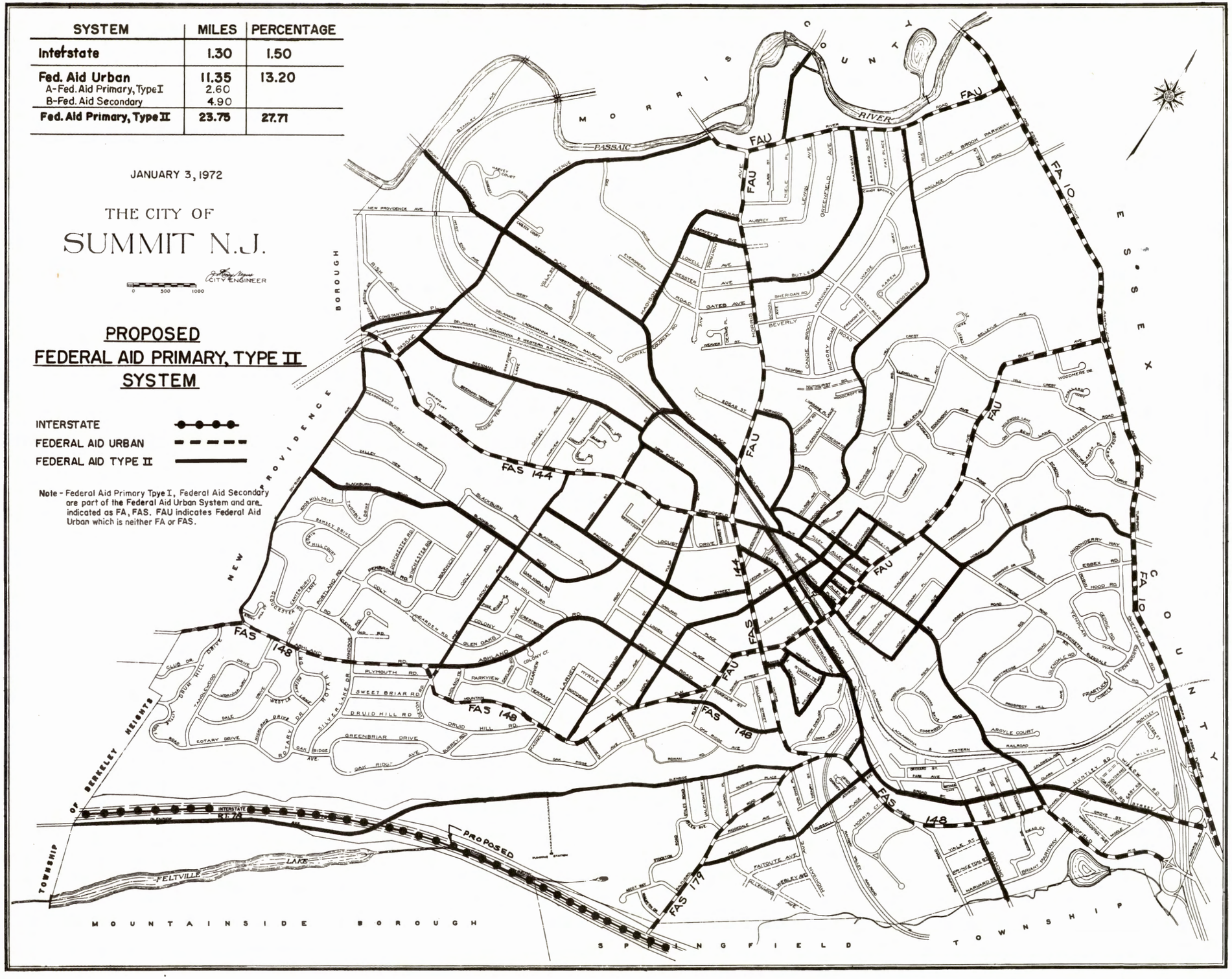
PROPOSED FEDERAL AID PRIMARY, TYPE II SYSTEM

INTERSTATE

FEDERAL AID URBAN

FEDERAL AID TYPE II

Note - Federal Aid Primary Tpye I, Federal Aid Secondary are part of the Federal Aid Urban System and are indicated as FA, FAS. FAU indicates Federal Aid Urban which is neither FA or FAS.



CLASSIFICATION

AND

INVENTORY

FUNCTIONAL CLASSIFICATION OF ROADS IN THE CITY OF SUMMIT STUDY SYSTEM

Definition of Functional Classification

Functional classification is the grouping of roads, streets and highways into an integrated system, each road ranked by its importance to the general public welfare, motorists' needs, and the land use structure. The study process for developing functional classification of an urban area's road system such as the City of Summit's is to relate the road network to the various travel corridors between travel origins and destinations of varying importance and select individual roads to serve these corridors.

Purpose of Functional Classification

In general, the development of an integrated functional classification of a road system provides a foundation for: establishing administrative road systems, designating appropriate design standards for these road systems, evaluating present and future road needs, apportioning fiscal resources for improvements, and establishing priorities for needed projects.

Concept

Every aspect of road planning and improvement rests on system selection, that is, the assignment of each road in the City to a functional category. For example, a limited access freeway would be of the highest functional classification since it serves mainly through traffic of a long distance trip length. This high classification of road would certainly be suitable for administration at the state government level.

An example of the other extreme would be a residential side street that served no through traffic but was exclusively for access to abutting property. This residential side street is assigned to the lowest functional

classification of roads. In between the limited access freeway and the residential side street are other functional classifications of roads and it is the purpose of this report to define these functional classifications and assign the roads in the City of Summit.

Since Functional Classifications represent the degree of importance of groups of roads, it follows that the more important groups of roads, that is, those roads serving principally longer distance through traffic should be administrated as part of a higher governmental level.

Functional Classifications in the City of Summit

In general, there are three governmental levels available for administrating roads and highways in the City of Summit: the State level, the County level, and the Municipal level.

In the study, to arrive at functional classifications for assignment of the City's roads, six functional classification categories were used. These functional classifications were as presented in the publication "Functional Highway Classification in Urban Areas", Automotive Safety Foundation, c. July 1967. These six functional classifications are Principal Arterial, Primary Arterial, Secondary Arterial, Tertiary Arterial, Collector Streets and Residential Side Streets.

Principal Arterials are the highest functional classification with no local traffic and in most cases no access to abutting land. This classification includes the Turnpikes, Parkways, Interstate Highways and other high type limited access roads which are intended to serve mostly inter-regional traffic movements.

Primary Arterials are generally high type roads, usually multi-lane, which serve major travel between large urban centers and other relatively long distance traffic movements. Primary Arterials are not necessarily limited access, however access to abutting properties should definitely be a very minor function as compared to service to through traffic.

Secondary Arterials function mainly for inter-county and major inter-municipal traffic movement and serve to complement and connect the Principal and Primary Arterial systems to form a continuous Urban arterial network throughout a metropolitan region. Access to property abutting Secondary highways is a relatively more important function than on higher type roads, however, this property access is still the minor purpose of a Secondary Arterial.

Tertiary Arterials serve minor inter-municipal and major intra-municipal traffic movements and do not necessarily need to be part of continuous routes through an urban area, as are the three higher functional classifications. Access to abutting lands can be almost the prime purpose for a Tertiary highway.

The fifth classification used in this report on roads in the City of Summit is Collector Streets. Collector Streets serve mainly to gather and distribute traffic in local neighborhoods and access to abutting lands is the major purpose while through traffic to residential side streets constitutes a somewhat smaller portion of the street usage.

Residential side streets service no through traffic but are exclusively for access to abutting property.

Determination of Each Road's Function

In determining the predominant function of each street and highway in the City, several factors were considered simultaneously. First, estimates

of the predominance of through over local traffic were made. An examination of available data on land uses, roadway characteristics and traffic volumes were used to estimate the predominance of through traffic.

In addition to the road's importance to through traffic, its relationship in the road system to major traffic generators and other routes feeding into it, were taken into account. In doing this, aerial photographs, land use inventories and other available information were used to study the importance and traffic effects of various traffic generators.

Assignment of Functional Classifications to the Roads in the City of Summit

The map entitled "Road Study System: Functional Classification" on the following page shows the functional classifications of roads in the City of Summit. All six classifications, principal arterials through residential side streets, are shown. A discussion of the six different classifications follows:

The Principal Arterial classification, which includes the highest type roads intended to serve major inter-regional traffic movements was assigned to: Interstate Route 78 and the New Jersey 24 Freeway. It may be noted that both Principal Arterials designated are presently in the planning or construction stage; these uncompleted Principal Arterials were included in this functional classification study to provide the initial framework for the remaining lower classifications. Again, these state highways were assigned the principal arterial classification since, in addition to being freeway type facilities with no access to abutting properties and accordingly serving only through traffic, they serve mainly inter-regional traffic movements.

The next functional classification below Principal Arterials is Primary Arterials. In the City of Summit, the roads assigned Primary Arterial classifications are the state highways. Note that when Route 24 Freeway construction

is completed it will be classified Principal Arterial.

Roads assigned the classification of Secondary Arterial complement the Principal and Primary Arterials to form a continuous inter-connected network to serve all major inter-county and inter-municipal through traffic movement. In all cases, these Secondary Arterials are existing county roads.

The fourth level of functional classification is the Tertiary Arterials. These roads serve minor inter-municipal traffic movements and while they are not necessarily continuous routes as part of the network made up of the three higher arterials, they still are traveled by a high proportion of through traffic. On the functional classification map all of the Tertiary Arterials are municipal streets.

Collector Streets, shown on the functional classification map, serve to gather and distribute traffic inside the municipality; they do not participate to any great extent in inter-municipal or inter-county traffic movement.

The final functional classification is the residential side street which serves a feeding function to a higher level of functional classification. These residential side streets service no through traffic but are exclusively for access to abutting property.

INVENTORY OF PHYSICAL CHARACTERISTICS

The inventory of the City Road System was started in 1969 when the Engineering Department's staff acquired data on its physical characteristics. Information was assembled on the extent and condition of the physical road system, including roadway widths, rights-of-way, pavement roughness, and road crown conditions. This inventory will provide for a comprehensive listing of the City's present assets in streets and is indispensable in determining the capacity of the road system.

Road Widths Study

As part of the inventory of physical characteristics, the widths of all City road pavements were measured in 1969-1970. In making these measurements, each different width section of City road was measured in the field regardless of how long or short it was, and recorded. The record of these pavements widths, in addition to providing an up-to-date inventory, is also necessary in computing traffic capacity of the roads and intersections.

The road widths are plotted on a map entitled "City of Summit Road System: Road Widths", following page number 26.

As can be seen from the map and tabulation, 4.7% of the City road system mileage has pavement less than 24 feet in width which can generally be regarded as unsafe for two-lane operation, especially when there are hills and curves. Roads in this classification which are possible future widening projects are Tulip St. from Locust Dr. to Springfield Ave., Madison Ave. from Kent Place Blvd. to Evergreen Rd. 38.1% of the City road system mileage falls within the 24-28 feet width classification which is substandard for the traffic volumes placed upon them. Hobart Ave., which is 24 feet wide, is a priority widening project due to the anticipated traffic volume increase upon completion of New Jersey 24 Freeway. Division Avenue interconnects Ashland Rd. with Passaic Ave. via Springfield Ave. and is only 25 feet wide. Widening and reconstruction is needed in the near future. The remaining 57% of the City road system is 29-50 feet in width and function as two-lane roads.

TABULATION OF ROAD WIDTHS

(SECONDARY & TERTIARY ARTERIALS ONLY)

STREET	Less than 24 ft	24-28 ft	29-32 ft	33-36 ft	37-40 ft	Over 40 ft	Mileage Totals
*Ashland Rd.		0.095	1.533		0.133		1.761
Ashwood Ave.		0.208	0.322				0.530
*Baltusrol Rd.			0.322	0.303			0.625
Bank St.		0.057					0.057
Beauvoir Ave.			0.187				0.187
Beauvoir Pl.			0.038				0.038
Beechwood Rd.			0.161		0.076		0.237
Beekman Rd.	0.720						0.720
Blackburn Rd.		0.379		0.227			0.606
*Broad St.					1.326	0.341	1.667
Butler Pkwy.					0.644		0.644
*Chatham Rd.					0.284		0.284
*Constantine Pl.	0.038		0.047		0.180		0.265
DeForest Ave.						0.341	0.341
Division Ave.		0.909					0.909
Elm St.			0.152				0.152
Elm Pl.	0.114						0.114
Euclid Ave.		0.170					0.170
Franklin Pl.		0.227					0.227
*Glenside Ave.	2.235						2.235
High St.		0.290	0.170				0.460
Hobart Ave.		0.695	0.208				0.903
Kent Pl. Blvd.			0.227	1.099			1.326
Lafayette Ave.		0.156					0.156
Lincoln Ave.					0.095		0.095
Madison Ave.	0.076		0.302				0.378
Maple St.		0.133	0.540		0.227		0.900
*Morris Ave.				2.270	0.379		2.649
*Mountain Ave.	1.174						1.174
Mount Vernon Ave.	0.246						0.246
New England Ave.				0.284			0.284
Norwood Ave.		0.379					0.379
*Orchard St.			0.237				0.237
Parmley Pl.	0.040	0.045					0.085
*Passaic Ave.	1.032	0.180					1.212
Pine Grove Ave.		0.663					0.663
Prospect St.			0.520	0.133			0.653
Railroad Ave.			0.133	0.161			0.294
*River Rd.		0.133		0.114	0.704		0.951
*Springfield Ave.			0.663	0.246	1.638	0.379	2.926
*Summit Ave.				1.522	0.076		1.598
Sylvan Rd.			0.133				0.133
Tulip St.	0.038	0.322	0.398				0.758
Union Pl.						0.142	0.142
Valley View Ave.	0.398						0.398

STREET	Less than 24 ft	24-28 ft	29-32 ft	33-36 ft	37-40 ft	Over 40 ft	Mileage Totals
Walnut St.			0.189				0.189
Whittredge Rd.		0.359	0.153				0.512
Woodland Ave.		1.112	0.085	0.226			1.433
TOTALS MUNICIPAL & COUNTY ROADS	5.391	7.242	6.720	6.585	5.762	1.203	32.903
COUNTY ROADS	4.520	0.135	1.150	4.242	3.838	0.344	14.229
CITY OF SUMMIT ROADS	0.871	7.107	5.570	2.343	1.924	0.859	18.674
Percentage	4.7%	38.1%	29.8%	12.5%	10.3%	4.6%	100%

* INDICATES UNION COUNTY ROADS (ALL OR IN PART)

THE CITY OF

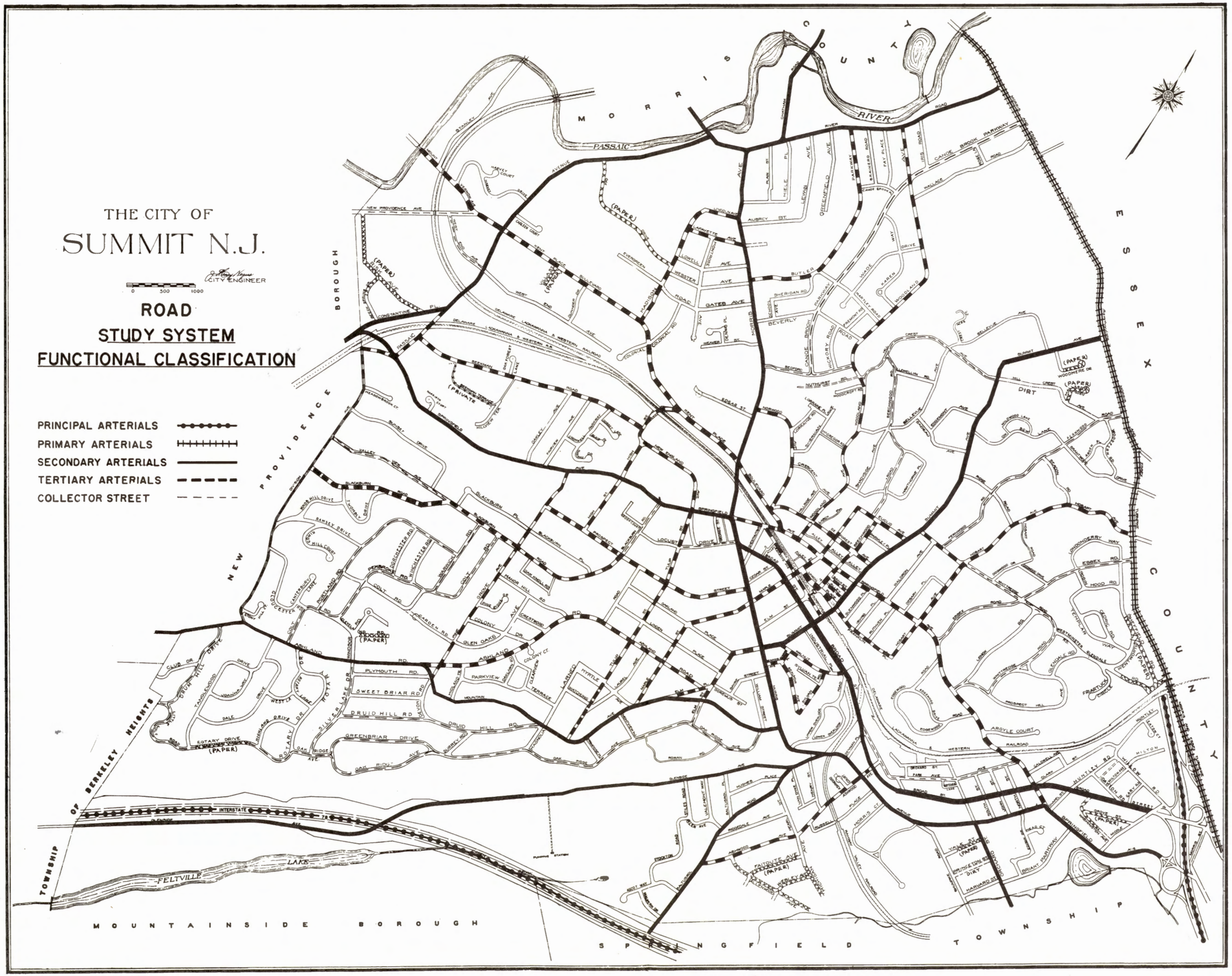
SUMMIT N.J.

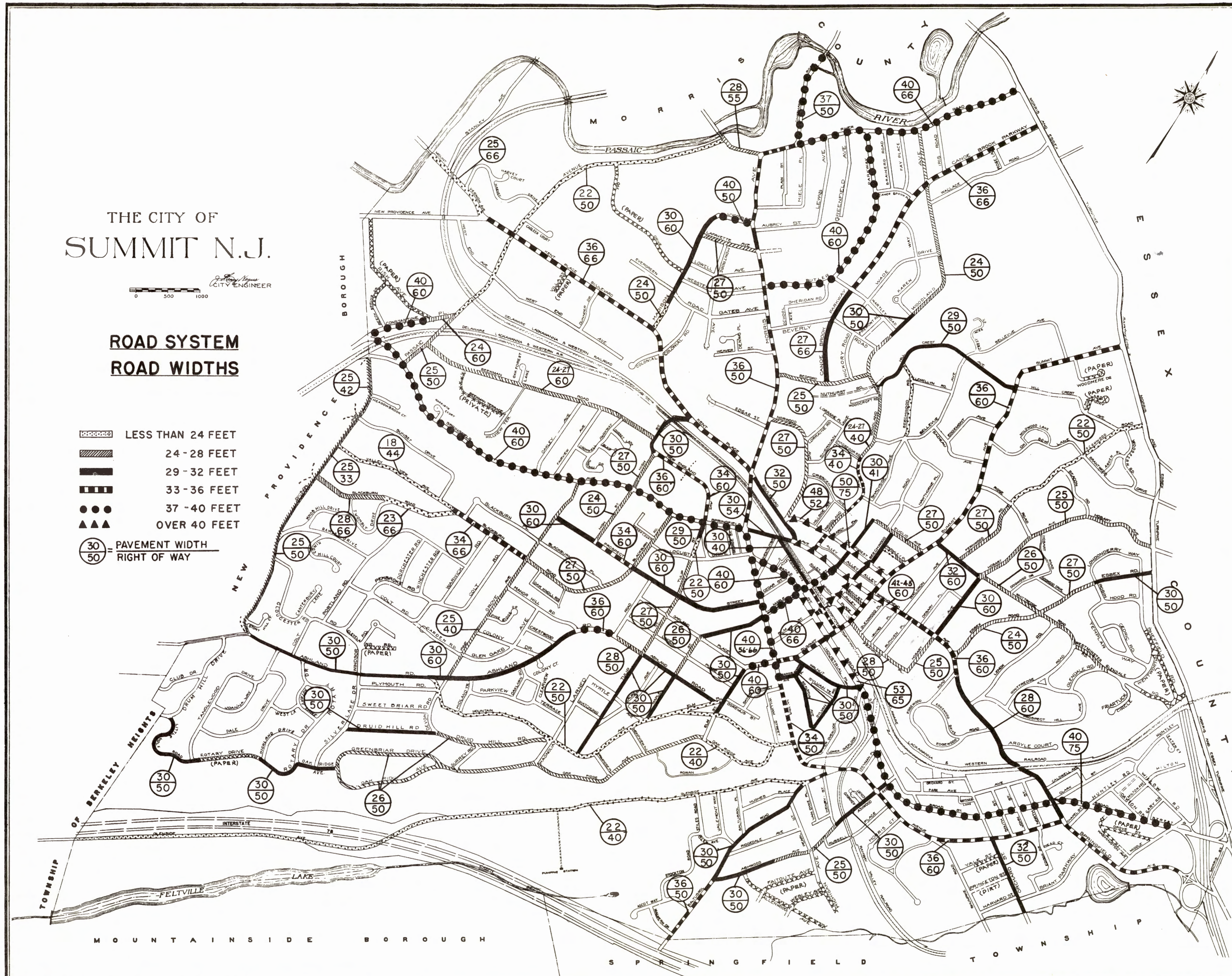
0 500 1000

Gerald Wayne
CITY ENGINEER

ROAD
STUDY SYSTEM
FUNCTIONAL CLASSIFICATION

PRINCIPAL ARTERIALS
PRIMARY ARTERIALS
SECONDARY ARTERIALS
TERTIARY ARTERIALS
COLLECTOR STREET




THE CITY OF
SUMMIT N.J.
CITY ENGINEER
0 500 1000
ROAD SYSTEM
ROAD WIDTHS
LESS THAN 24 FEET
24-28 FEET
29-32 FEET
33-36 FEET
37-40 FEET
OVER 40 FEET
30/50 = PAVEMENT WIDTH / RIGHT OF WAY
MORRIS COUNTY
PASSAIC RIVER
ESSEX COUNTY
NEW PROVIDENCE BOROUGH
TOWNSHIP OF BERKELEY HEIGHTS
MOUNTAINSIDE BOROUGH
SPRINGFIELD TOWNSHIP
FELTVILLE LAKE
INTERSTATE 78
ASHLAND RD.
PLYMOUTH RD.
SWEET BRIAR RD
DRUID HILL RD
GREENBRIAR DRIVE
ROTARY DRIVE
COLONY RD
GLEN OAKS
PARKVIEW
AUBREY ST
ARGYLE COURT
ESSEX
(PAPER)
(PRIVATE)
(DIRT)

Pavement Roughness

Another inventory of physical characteristics was of pavement roughness. In this inventory all secondary and tertiary arterial roads were driven and evaluated by the City Engineer as to degree of pavement unevenness, wear and poor crown conditions. This inventory was made in October, 1969.

The pavement roughness inventory is plotted on a map entitled "Road System: Pavement Roughness" following page number 29.

The map and tabulation pinpoint the pavement conditions of 32.90 miles of the City's most heavily traveled roads. 14.23 miles are maintained by Union County. 54% of the 18.67 miles maintained by the City is either smooth or worn and generally provides a reasonably safe and pleasant riding surface. 46% of this road surface was classified as rough or very rough which is generally unpleasant to drive on. Roads which are very rough are Division Avenue from Blackburn Road to Ashland Road, and Hobart Avenue from Beacon Road to Morris & Essex Turnpike. The improvement of Hobart Avenue will be deferred until New Jersey 24 Freeway is completed. Division Avenue will have to be improved as a joint project with the Borough of New Providence since the municipal boundary is coincident with the center line of the road. Poor crown conditions were observed on 2.14 miles of municipal roadway; 86% of this mileage was found on roads classified rough or very rough; therefore, when road reconstruction takes place, this condition will be corrected. The remaining 14% will be corrected by inclusion in the City's annual maintenance program.

CITY OF SUMMIT ROAD SYSTEM
PAVEMENT ROUGHNESS

STREET	SMOOTH	WORN	ROUGH	VERY ROUGH	TOTAL	POOR CROWN
*Ashland Rd.	1.761				1.761	
Ashwood Ave.		0.170	0.360		0.530	
*Baltusrol Rd.	0.625				0.625	
Bank St.		0.057			0.057	
Beauvoir Ave.	0.025	0.043	0.119		0.187	
Beauvoir Pl.		0.038			0.038	
Beechwood Road		0.237			0.237	
Beekman Rd.			0.720		0.720	0.170
Blackburn Rd.			0.606		0.606	0.114
*Broad St.	1.667				1.667	
Butler Pkwy.		0.644			0.644	
*Chatham Rd.	0.284				0.284	
*Constantine Pl.		0.265			0.265	
DeForest Ave.	0.133	0.208			0.341	
Division Ave.				0.909	0.909	0.095
Elm St.		0.057	0.095		0.152	0.114
Elm Pl.		0.114			0.114	0.057
Euclid Ave.		0.170			0.170	
Franklin Pl.		0.227			0.227	
*Glenside Ave.		0.095	2.140		2.235	
High St.		0.170	0.290		0.460	0.057
Hobart Ave.		0.657	0.057	0.189	0.903	0.170
Kent Pl. Blvd.	0.189		1.136		1.326	
Lafayette Ave.		0.156			0.156	
Lincoln Ave.		0.095			0.095	
Madison Ave.		0.170	0.208		0.378	
Maple St.	0.398	0.294	0.208		0.900	0.057
*Morris Ave.	1.640	1.009			2.649	
*Mountain Ave.	1.174				1.174	
Mount Vernon Ave.			0.246		0.246	
New England Ave.		0.284			0.284	0.057
Norwood Ave.	0.379				0.379	
*Orchard St.	0.237				0.237	
Parmley Pl.			0.085		0.085	
*Passaic Ave.	1.032		0.180		1.212	0.180
Pine Grove Ave.		0.398	0.265		0.663	0.133
Prospect St.	0.246	0.142	0.265		0.653	0.170
Railroad Ave.		0.142	0.152		0.294	0.152
*River Road	0.818	0.133			0.951	
*Springfield Ave.	2.337	0.133	0.456		2.926	
*Summit Ave.	1.598				1.598	
Sylvan Rd.	0.057		0.076		0.133	
Tulip St.		0.341	0.417		0.758	0.170
Union Pl.			0.142		0.142	
Valley View Ave.			0.398		0.398	0.341

STREET	SMOOTH	WORN	ROUGH	VERY ROUGH	TOTAL	POOR CROWN
Walnut St.			0.189		0.189	
Whittredge Rd.		0.417	0.095		0.512	
Woodland Ave.		0.549	0.884		1.433	0.114
TOTALS MUNICIPAL & COUNTY ROADS	14.600	7.415	9.790	1.098	32.903	2.150
COUNTY ROADS	10.096	1.834	2.299		14.229	
SUMMIT ROADS	4.504	5.581	7.491	1.098	18.674	2.150
Percentage	24.1%	29.9%	40.1%	5.9%	100%	11.7%

* INDICATES UNION COUNTY ROADS (ALL OR IN PART)

THE CITY OF

SUMMIT N.J.

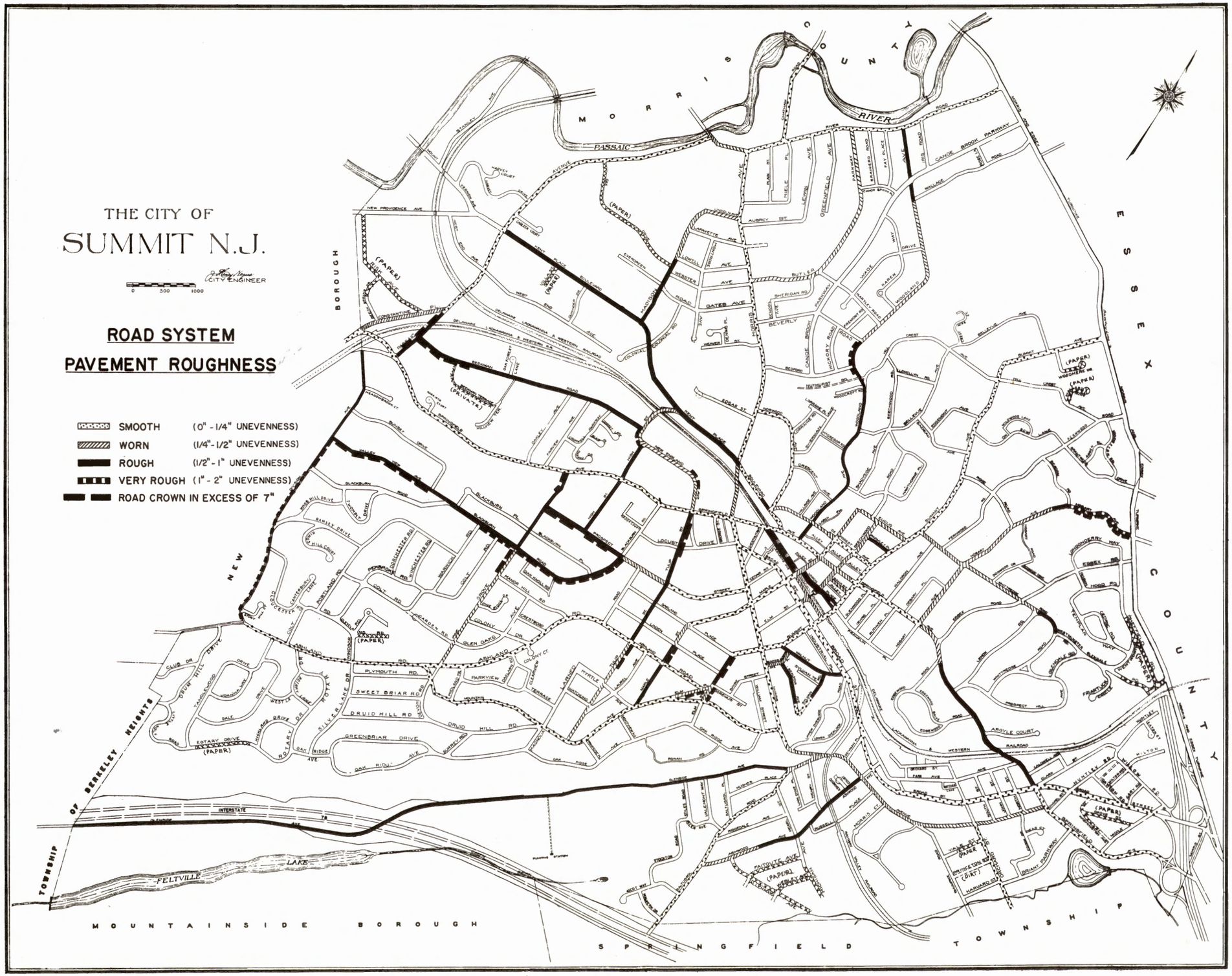
0 500 1000

CITY ENGINEER

ROAD SYSTEM

PAVEMENT ROUGHNESS

- SMOOTH (0" - 1/4" UNEVENNESS)
- WORN (1/4" - 1/2" UNEVENNESS)
- ROUGH (1/2" - 1" UNEVENNESS)
- VERY ROUGH (1" - 2" UNEVENNESS)
- ROAD CROWN IN EXCESS OF 7"



INVENTORY OF SIGNING, SIGNALIZATION, PARKING, PUBLIC TRANSPORTATION AND TRAFFIC GENERATORS

This inventory of the City road system was compiled in 1969-1970 when the Engineering Department staff inspected every length and intersection on its 86 miles of roadway. Data was acquired as to the existence of all authorized and unauthorized traffic control devices and parking regulations. Furthering this inventory, traffic generators were analyzed including retail business areas, office complexes, light industrial concentrations, shopping centers, county and state highway interconnections, commuter parking lots, schools and hospitals. All bus routes were inspected for bus stop markings and passenger facilities. The information herein contained will prove invaluable in evaluating the need for additional traffic control devices and determining future road improvements, as well as determining municipal liability for improper signing.

Traffic Controls

A field survey was conducted by the Engineering Department to ascertain the existence of all traffic control devices, including flashers, traffic signals, one-way streets and through streets. Upon completion of this field survey, the City traffic ordinances were reviewed and checked against field data.

A through street for the purposes of this inventory shall be defined as a route of vehicular travel interrupted only by traffic signals and controlled along its entire length by STOP or YIELD signs. A through street will not always interconnect arterials and in some cases will be a short portion of a continuing road.

Existing traffic control devices are plotted on a map entitled "Road System: Traffic Controls" following page number 31.

As a result of this up-to-date inventory, 23 STOP intersections and 3 one-way streets which were unauthorized were discovered; an authorizing revision to the City Traffic Ordinance was prepared to conform to State Statutes.

28STOP signs which were authorized had not been installed and immediate steps were taken to install these signs. 50% of the missing signs occurred at short cul-de-sac roads or very minor intersections; however, regardless of traffic volume the signs were installed. Recent court judgments as well as public safety prompted these installations.

THE CITY OF

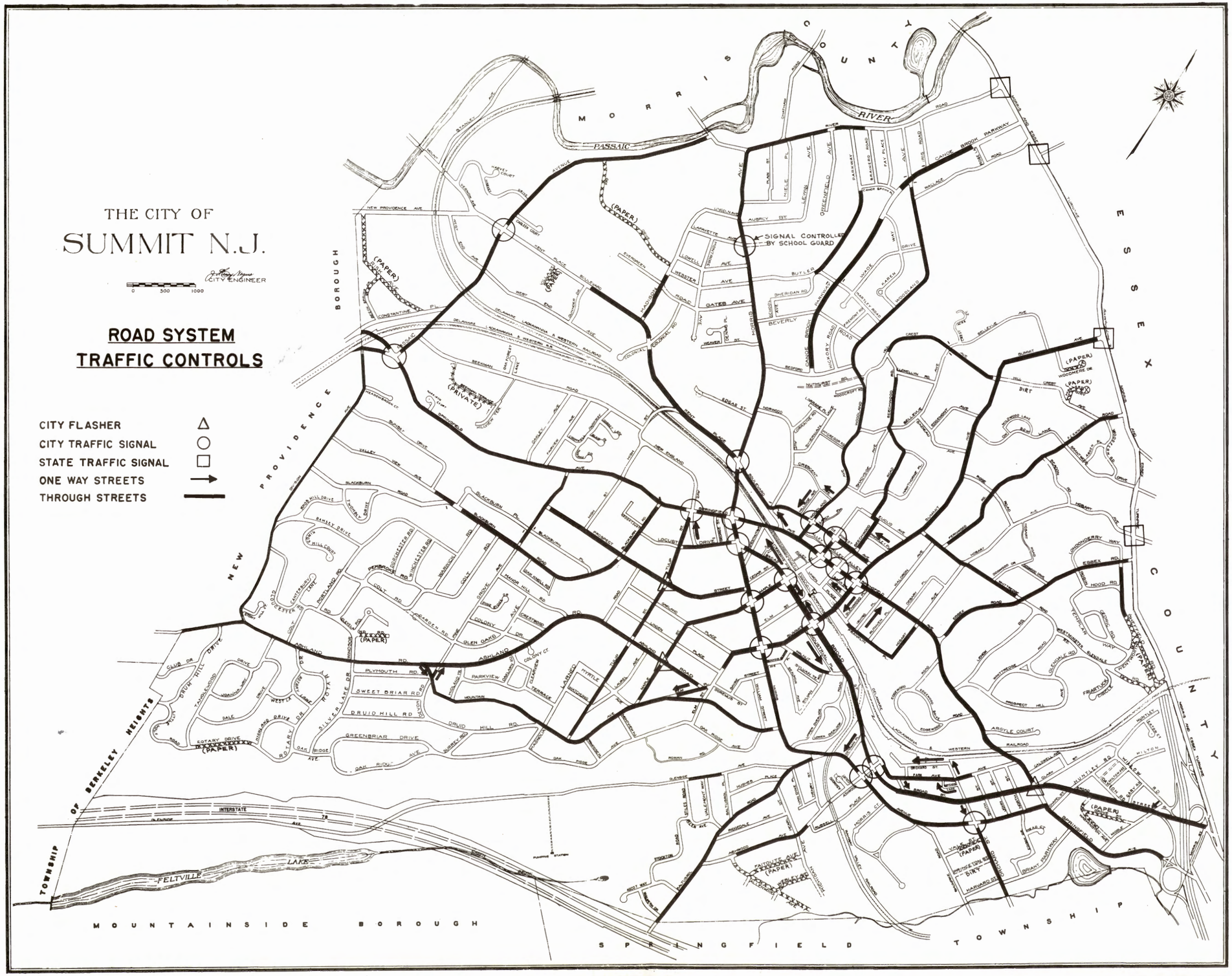
SUMMIT N.J.

J. Henry Mayne
CITY ENGINEER

0 500 1000

ROAD SYSTEM
TRAFFIC CONTROLS

CITY FLASHER △
CITY TRAFFIC SIGNAL ○
STATE TRAFFIC SIGNAL □
ONE WAY STREETS →
THROUGH STREETS ——



Parking Regulations

The initial step in analyzing existing parking conditions was to plot the parking zones authorized by the City Traffic Ordinance; to verify this information a field survey was necessary. Existing parking regulations as well as municipal parking lots are plotted on the map entitled "Road System: Parking Regulations" following this page.

The municipal parking lots shown on this map have a total capacity of 1,355 parking stalls. This capacity is allocated as follows: 445 shopper stalls, 225 office stalls, 685 commuter stalls. Shopper parking lots are at capacity daily with overflow using private parking and on-street metered parking. Office parking is used to 90% of its capacity and additional construction is recommended by 1980. Commuter parking is discussed under Public Transportation and Traffic Generators.

It is recommended that the maps entitled "Road System: Traffic Controls" and "Road System: Parking Regulations" be incorporated into the City Traffic Ordinance since they are a composite of all existing traffic ordinances and will be valuable in determining future revisions.

The data gained by this study was used in calculating road capacity.

THE CITY OF

SUMMIT N.J.

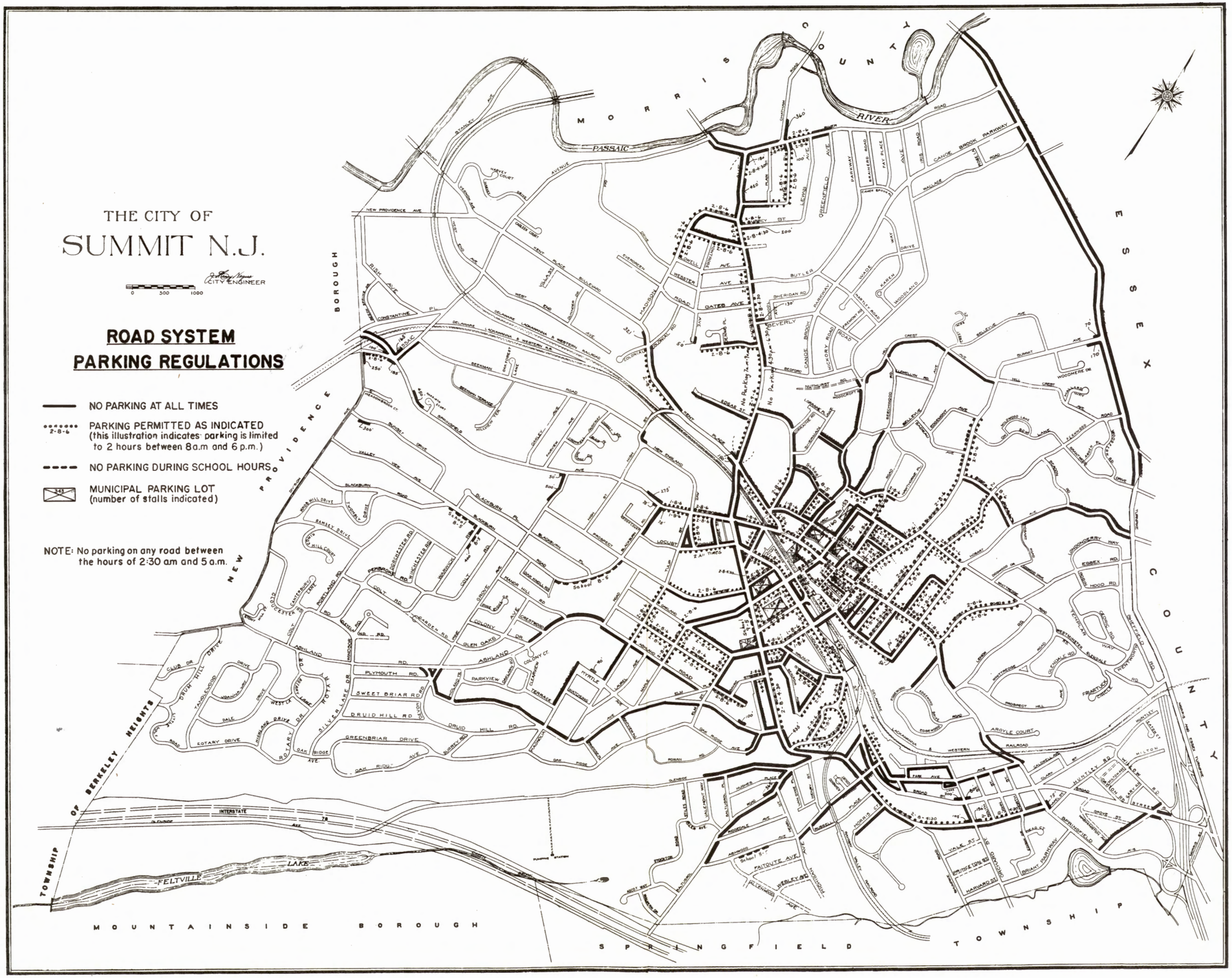
0 500 1000

CITY ENGINEER

ROAD SYSTEM
PARKING REGULATIONS

- NO PARKING AT ALL TIMES
- 2-8-4 PARKING PERMITTED AS INDICATED (this illustration indicates parking is limited to 2 hours between 8a.m and 6 p.m.)
- NO PARKING DURING SCHOOL HOURS
- 180 MUNICIPAL PARKING LOT (number of stalls indicated)

NOTE: No parking on any road between the hours of 2:30 am and 5 a.m.



Public Transporation and Traffic Generators

The City of Summit has 5 bus routes offering service to commuters. 3 Public Service routes connect the western suburban communities with the City of Newark. These Public Service routes have prescribed, marked bus stops but will stop anywhere enroute on demand. The 2 DeCorso Bus Company routes offer transportation between Summit and Berkeley Heights, and Summit and New Providence. Bus stops are not designated; passengers are picked up on demand. Passenger facilities are not available on any of the routes.

The Delaware-Lackawanna Railroad, which offers direct connection to New York City via the Hoboken-to-New York City tubes, has two (2) passenger stations. The main station is located in the heart of the retail business district, and the second station is located on the Summit-New Providence boundary line on Old Springfield Avenue. These stations have waiting rooms and toilet facilities.

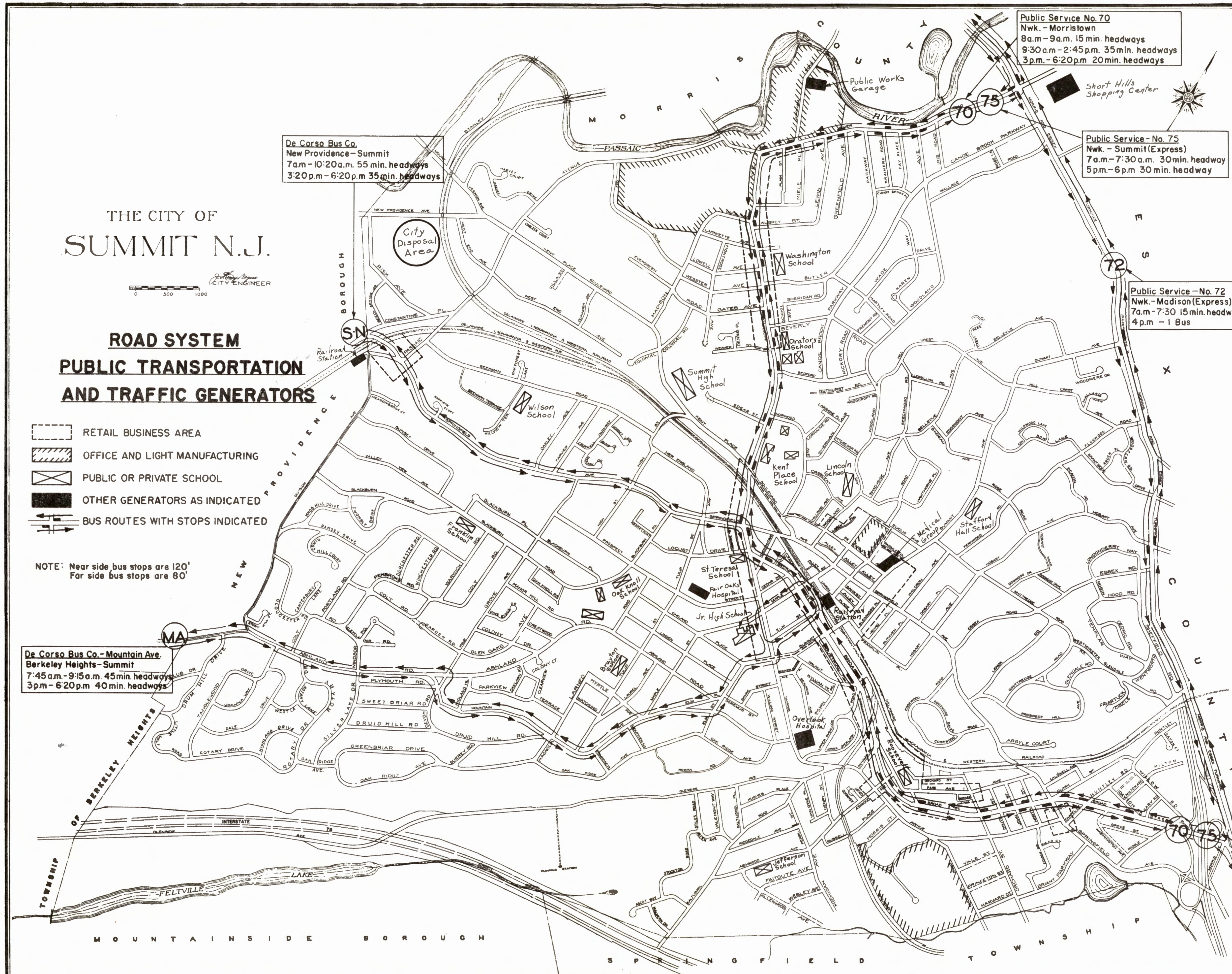
Public transportation routes, stops and headways are plotted on the map entitled "Road System: Public Transportation and Traffic Generators" following page number 34.

In reviewing this map you will note the main railroad station is the nucleus of four (4) bus routes and in this area the City has constructed four (4) parking lots primarily for commuter use. These parking lots have a total of 685 commuter parking stalls. The largest parking lot has a capacity of 343 cars; 70% of this capacity is occupied daily. The 3 smaller lots are filled to capacity daily. Since only 15% of the available commuter parking is now vacant, additional commuter parking is recommended by 1980.

Traffic generators are also plotted on the above mentioned map. These generators fall into peak-hour generators and off-peak-hour generators, the peak traffic hours being 8 AM to 9AM and 4:30 PM to 5:30 PM.

Peak-hour generators indicated on the following map are: office and light manufacturing areas, public and private schools, railroad stations and the county road system itself. The county road system is considered a peak-hour generator since they form corridors to the metropolitan business area which is the major external generator.

Off-peak-hour generators are: retail business areas, Overlook Hospital, Short Hills Mall shopping center. These off-peak-hour generators have very little impact on the AM peak hour; however, during the PM peak-hour they are still in full operation and add volume as well as traffic interruption.


THE CITY OF
SUMMIT N.J.
CITY ENGINEER
ROAD SYSTEM
PUBLIC TRANSPORTATION
AND TRAFFIC GENERATORS
RETAIL BUSINESS AREA
OFFICE AND LIGHT MANUFACTURING
PUBLIC OR PRIVATE SCHOOL
OTHER GENERATORS AS INDICATED
BUS ROUTES WITH STOPS INDICATED
NOTE: Near side bus stops are 120'
Far side bus stops are 80'
De Corso Bus Co.
New Providence - Summit
7a.m - 10:20a.m. 55 min. headways
3:20 p.m - 6:20 p.m 35 min. headways
Public Service No. 70
Nwk. - Morristown
8a.m - 9a.m. 15 min. headways
9:30 a.m - 2:45 p.m. 35 min. headways
3p.m. - 6:20 p.m 20 min. headways
Public Service - No. 75
Nwk. - Summit (Express)
7a.m - 7:30 a.m. 30 min. headway
5p.m. - 6p.m 30 min. headway
Public Service - No. 72
Nwk. - Madison (Express)
7a.m - 7:30 15 min. headways
4 p.m - 1 Bus
De Corso Bus Co. - Mountain Ave.
Berkeley Heights - Summit
7:45 a.m. - 9:15 a.m. 45 min. headways
3p.m - 6:20 p.m 40 min. headways
City Disposal Area
Public Works Garage
Short Hills Shopping Center
Railroad Station
Washington School
Oratory School
Summit High School
Wilson School
Kent Place School
Lincoln School
Franklin School
Oak Knoll School
St. Teresa School
Fair Oaks Hospital
Jr. High School
Medical Group
Stafford Hall School
Overlook Hospital
Jefferson School
MORRIS COUNTY
ESSEX COUNTY
BOROUGH OF NEW PROVIDENCE
TOWNSHIP OF BERKELEY HEIGHTS
MOUNTAINSIDE BOROUGH
SPRINGFIELD TOWNSHIP
PASSAIC RIVER
FELTVILLE LAKE
INTERSTATE 78

ACCIDENT STUDY

The purpose of the City Road System Accident Study is to identify locations having excessive traffic accidents so they may be given priority for further study and improvements. The City Police Department made available its accident records for the period January 1, 1966 through December 31, 1969. These records consisted of accidents reported by a police officer responding to a duty call and would normally indicate a more severe condition than minor property damage. Personal injury, property damage, pedestrian injury and fatal accidents were given equal treatment so as not to sensationalize any particular area.

Plotted on a map entitled "City of Summit Road System: Traffic Accidents" following page number 36 are intersections and road sections having either four or more accidents in a year, or eight or more in three years.

ACCIDENT RATE STUDY

It is generally accepted that the number of accidents at an intersection or on length of roadway having high traffic volumes will likely be higher, all other conditions being equal, than intersections or lengths of roadway with lower traffic volumes. This being the case, it would not seem fair to judge the level of safety of an intersection or length of roadway on just the number of accidents alone. Rather, an accident rate based on a measure of exposure, such as traffic volume, would seem more truly indicative of traffic safety. The rating system used in the study of the City of Summit Road System was the number of accidents per 10,000,000 vehicles. To compute this rate at each intersection or length of roadway, the number of accidents in the 1966-1968 three-year period was divided by the 1970 24-hour volume, multiplied by 1096, then divided by 10,000,000. An example of rate calculation would be as

follows at Springfield Avenue and Morris Avenue. Here there were 31 accidents in the three-year period and according to our counts, 33,221 vehicles per day pass through the intersection. 33,221 vehicles, multiplied by 1096 days (3 years) equals 36,410,216 vehicles. Thus, 31 accidents, divided by 36,410,216 vehicles, divided by 10,000,000 vehicles equals 7.9 accidents per 10,000,000 vehicles.

Altogether, 17 intersections had a rate of 7 or more and these are plotted on the map entitled "Road System: Accident Rates" preceding page number 37.

The value of the accident rate is that a motorist's chance of having an accident at an intersection should be directly proportional to the accident rate at that intersection. As a result, it could be said that a corner with a rate of 20 is only half as safe as a corner with a rate of 10. Accordingly, a high accident rate is often an indication of some intersection engineering deficiencies or other shortcoming and pinpoints the need for study.

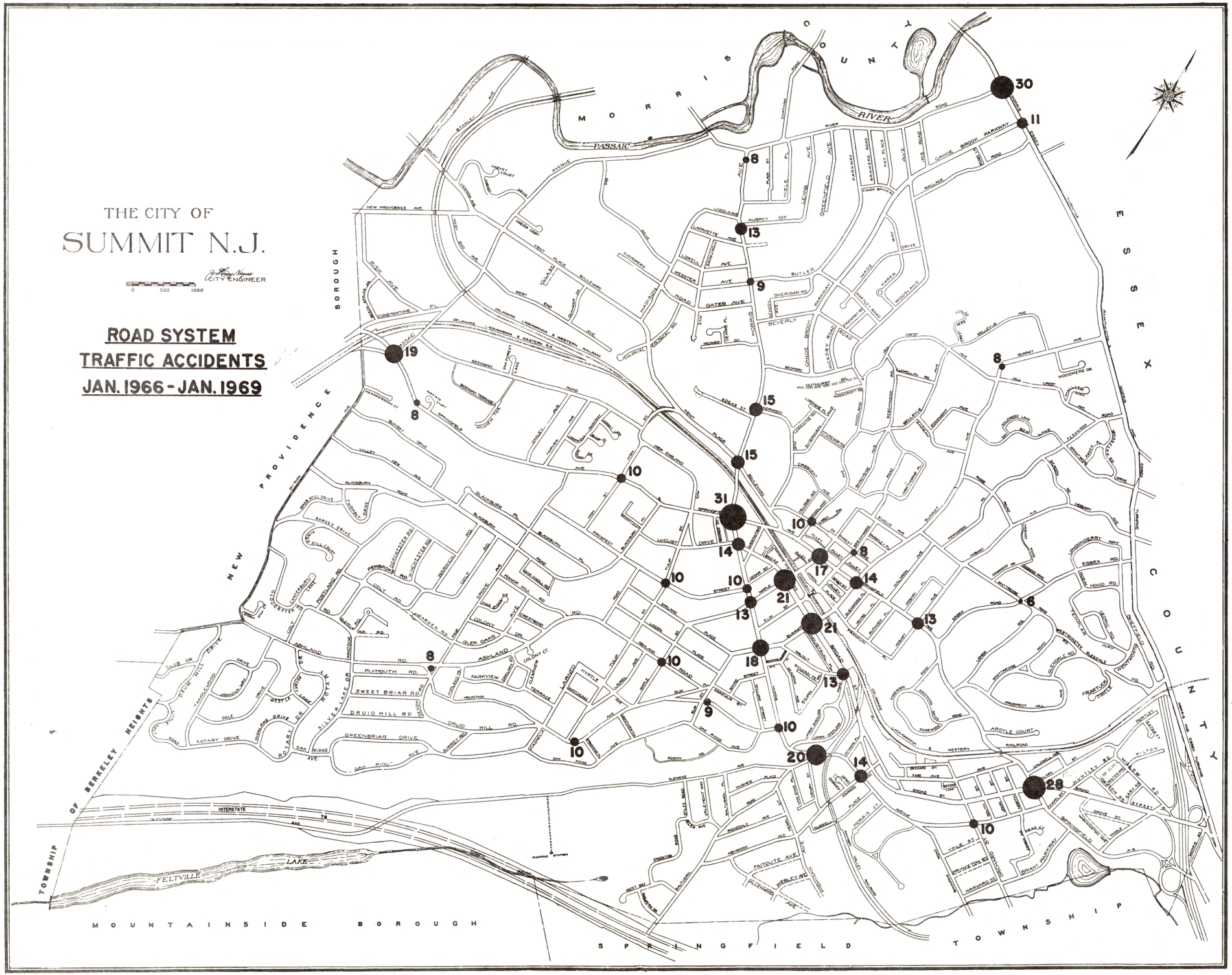
THE CITY OF

SUMMIT N.J.

J. Henry Vreeland
CITY ENGINEER

0 500 1000

ROAD SYSTEM
TRAFFIC ACCIDENTS
JAN. 1966 - JAN. 1969



THE CITY OF

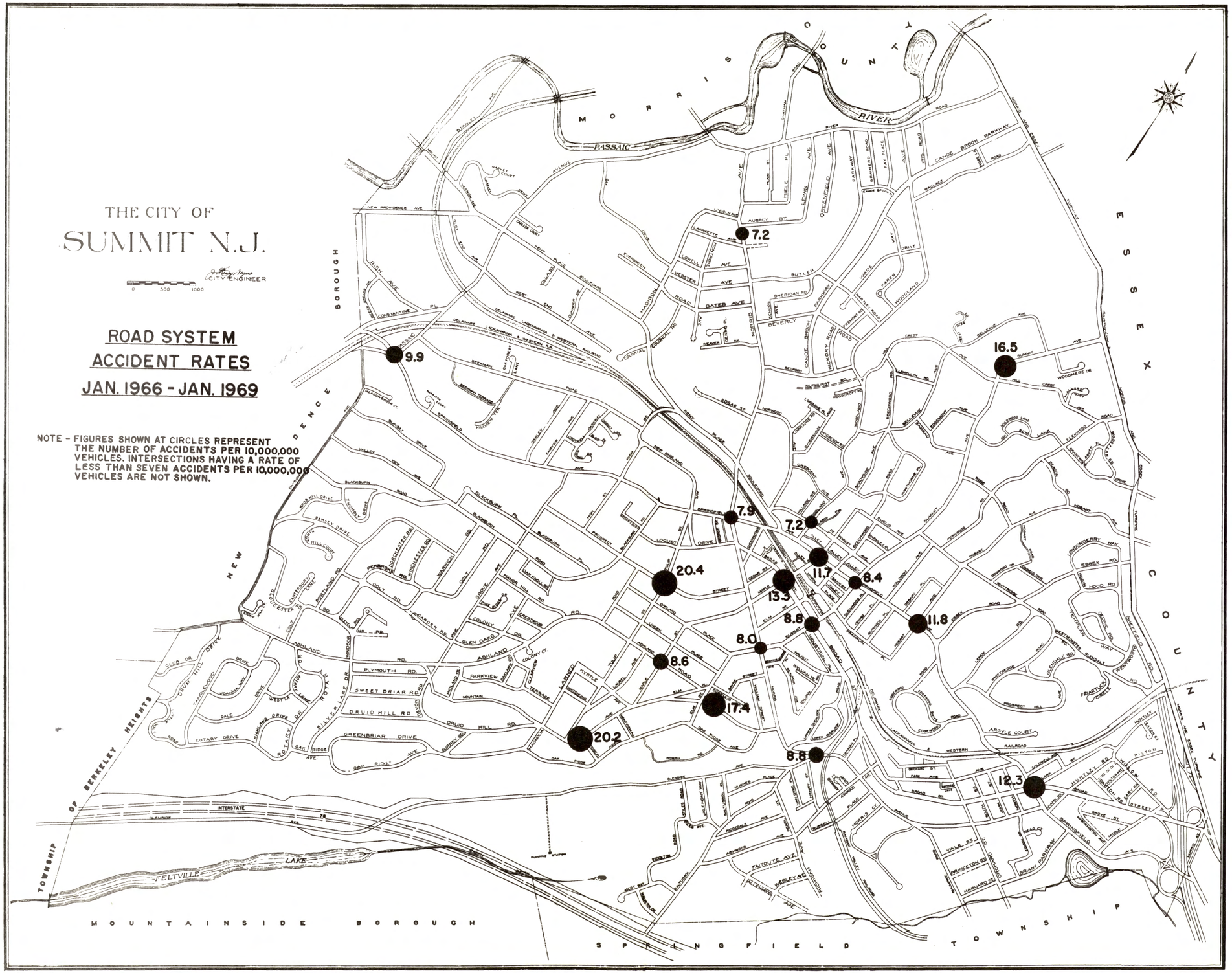
SUMMIT N.J.

J. Henry Hynes
CITY ENGINEER

0 500 1000

ROAD SYSTEM
ACCIDENT RATES
JAN. 1966 - JAN. 1969

NOTE - FIGURES SHOWN AT CIRCLES REPRESENT THE NUMBER OF ACCIDENTS PER 10,000,000 VEHICLES. INTERSECTIONS HAVING A RATE OF LESS THAN SEVEN ACCIDENTS PER 10,000,000 VEHICLES ARE NOT SHOWN.



OVERALL SPEED STUDY

In making an overall speed study, speed delay runs were first made to gather data on the City road system. These runs were made using the "floating car" method during A.M. and P.M. peak rush hour traffic conditions. The "floating car" method involves driving a vehicle in the traffic stream at the same pace that other traffic is moving and keeping track of the time it takes to travel between major intersections, and the time spent being delayed by traffic congestion and other causes of stoppages. At least two runs were made in each direction during both A.M. and P.M. peak traffic hours on each section of Secondary and Tertiary Arterial road system.

Once the speed delay data was collected from the runs, the Overall Speed Study was undertaken. Overall speeds are the average travel rates on the various sections of roads taking into account both moving time and delay time. When average overall speeds were computed for each direction on a given section of road, that direction having the lowest overall speed was selected to represent that road section.

The Overall Speed of a section of road is a valuable indicator of the quality of traffic movement in that it gives the actual average speed of traffic when traveling through the area during peak traffic conditions. Heavy peak-hour traffic is the true test of a road; this is when the largest number of motorists are using it. Low Overall Speeds can often be considered as indications of poor quality operation and show the need for further studies to pinpoint the problem conditions. Overall Speeds during peak-hour traffic volumes on the City road system have been plotted on the map entitled "City of Summit Road System: Overall Speeds at A.M.--P.M. Peak Hours" following page number 38.

It can be seen by examining the map that in nearly all cases the delays were experienced at high demand signalized intersections and retail business areas. The major exceptions to this are the intersections of Morris Avenue and River Road, and the intersection of Morris Avenue and Glenside Avenue, where the volumes and road characteristics are the delay factors.

THE CITY OF

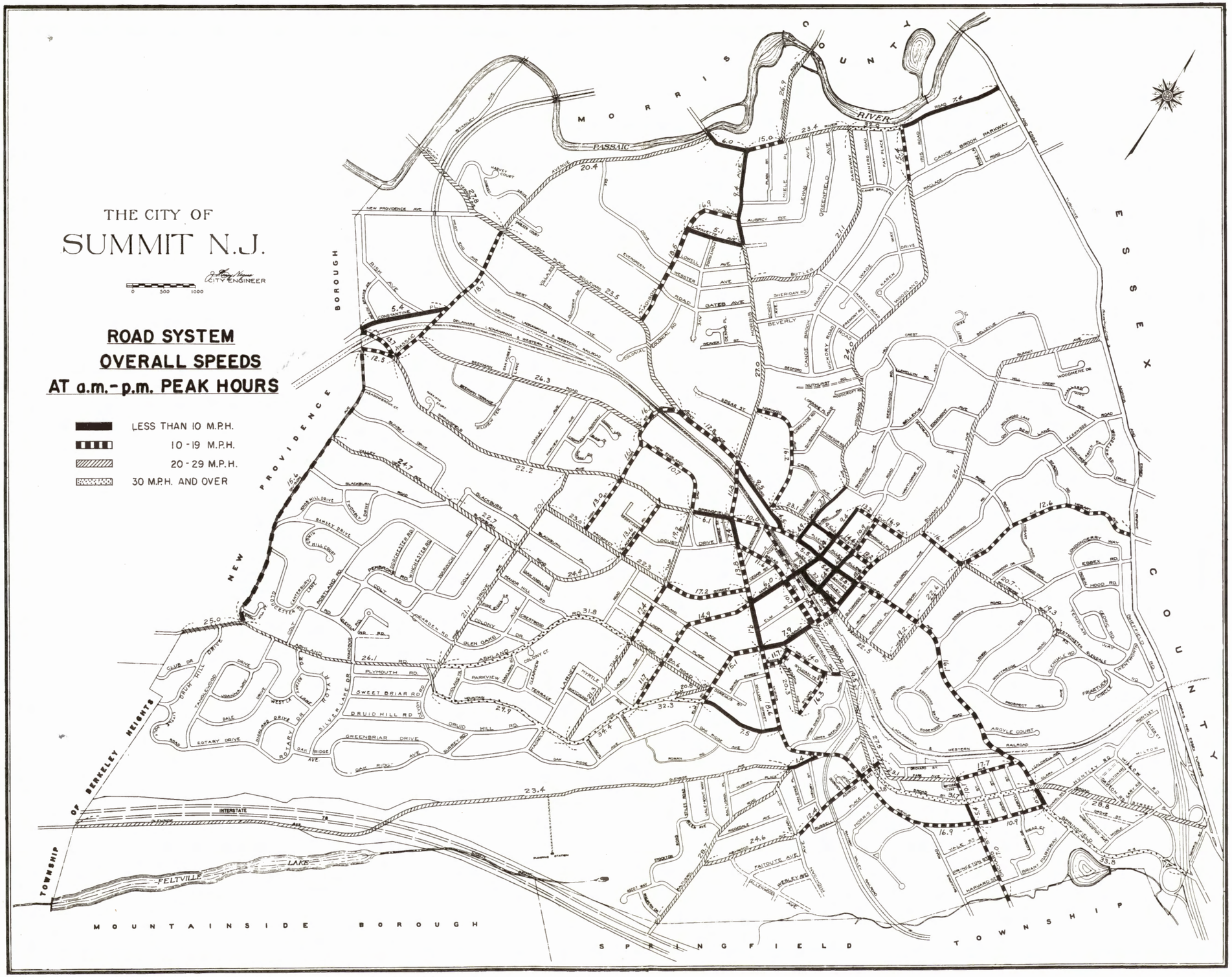
SUMMIT N.J.

0 500 1000

CITY ENGINEER

ROAD SYSTEM
OVERALL SPEEDS
AT a.m.-p.m. PEAK HOURS

- LESS THAN 10 M.P.H.
- 10 - 19 M.P.H.
- 20 - 29 M.P.H.
- 30 M.P.H. AND OVER



TRAFFIC VOLUMES

A determination of traffic volume is basic to the evaluation of traffic movement. By counting the number of vehicles passing a given point during a given period of time, the rate of traffic use of a road may be obtained. Because it furnishes a basic scale of comparison, the measure of traffic volume shows the relative importance of a highway or street and can also be used in planning and designing improvements and establishing priorities for projects.

Machine Traffic Counts

In 1970, 135 traffic counts were made using one recording traffic counting machine. These counts were 24-hour, two-way traffic counts, 5 counting stations being on county roads and 130 stations on municipal roads. The counting stations were placed at locations which would provide a good indication of traffic conditions in a controlled area traffic study.

Counts were made Monday through Friday for 24-hour periods and the counter recorded each hour of traffic in both directions. Care was taken to insure that there were no unusual temporary influences such as a construction detour or National holiday which might prevent the count from being typical of year round conditions.

These traffic counts are quite helpful in determining both hourly traffic fluctuations and traffic growth from year to year. They can also help establish priorities for road widenings and other road improvement projects.

Traffic volumes were plotted on the map following this page. In reviewing this map you will note that the wider the shaded band, the more heavily traveled the road. Butler Parkway and Ashwood Avenue which are included in the Type II System are not presently heavily traveled, however, it is anticipated that the future will bring heavier traffic in these areas.

THE CITY OF

SUMMIT N.J.

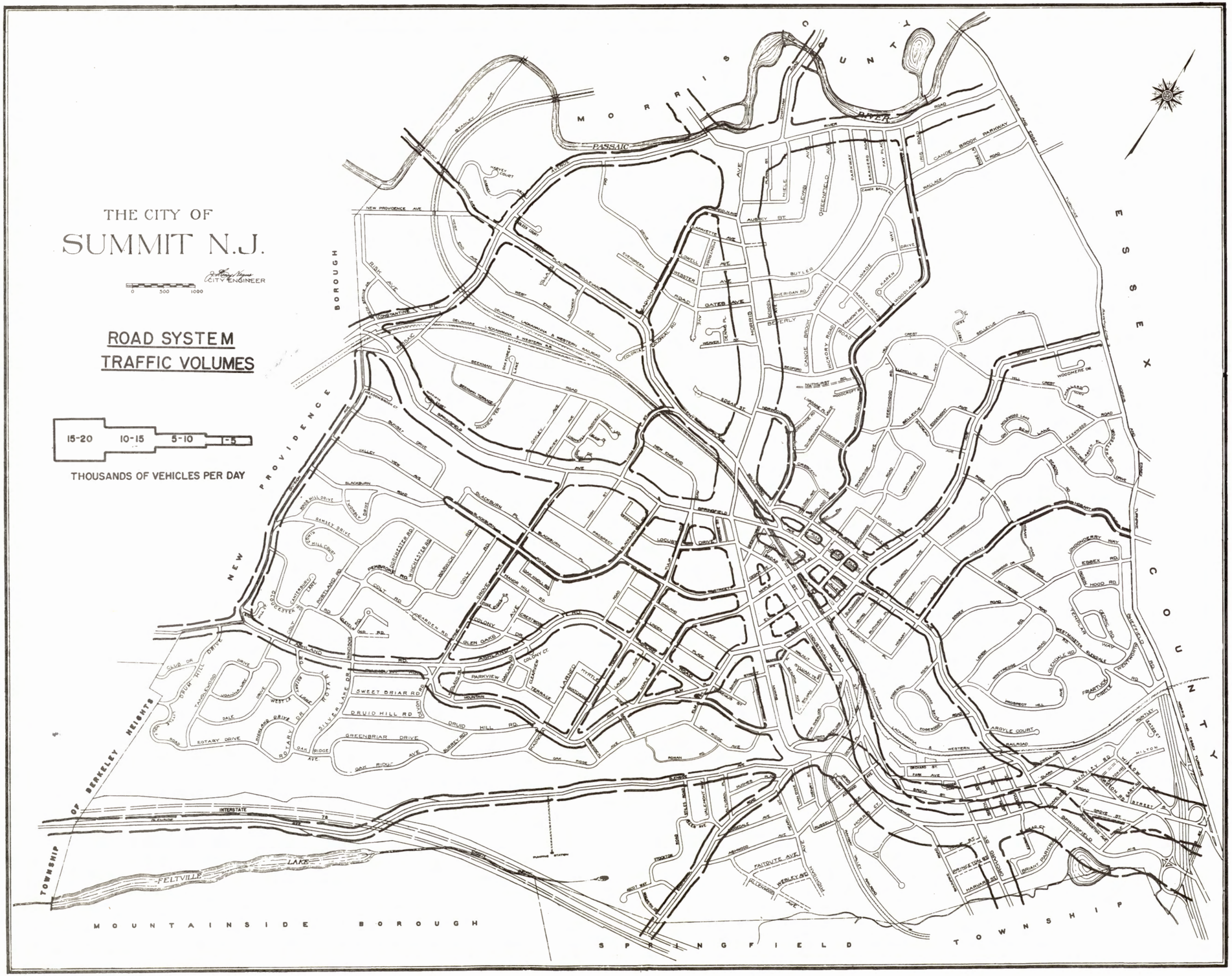
Richard Wayne
CITY ENGINEER

0 500 1000

ROAD SYSTEM
TRAFFIC VOLUMES

15-20	10-15	5-10	1-5

THOUSANDS OF VEHICLES PER DAY



ROADWAY CAPACITY ANALYSIS

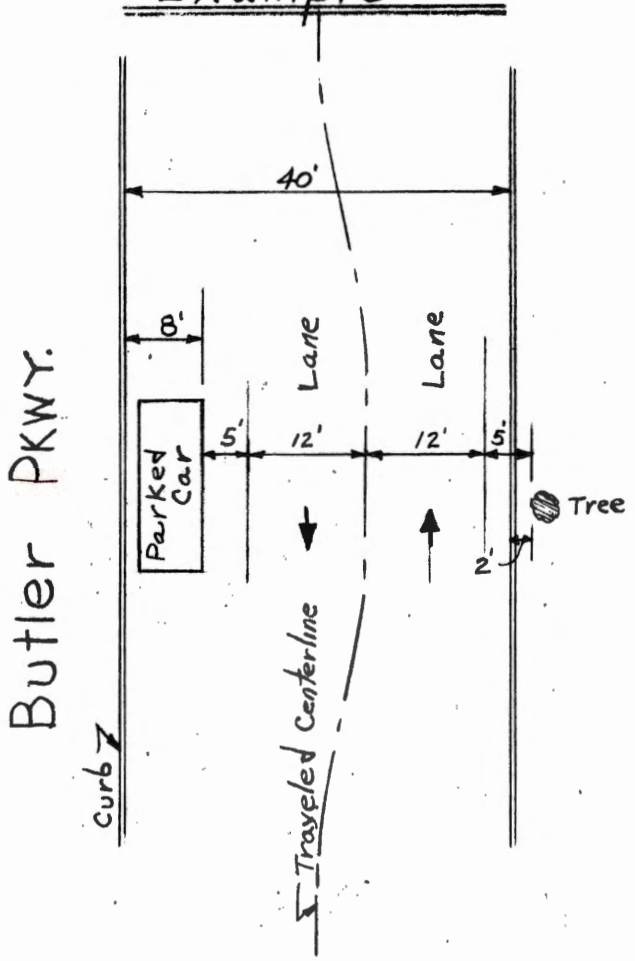
Uninterrupted Capacities

The uninterrupted capacity of a roadway is the number of vehicles per hour it can carry at locations where traffic is not interrupted by traffic signals, STOP signs or other such hindrances. In the uninterrupted capacity study of the City of Summit Road System, all capacities were computed in accordance with procedures given in the 1965 Highway Capacity Manual published by the Highway Research Board. The capacities computed were those at the "level of service C". Level of service C is in the zone of stable flow, but speeds and maneuverability are closely controlled by the high volumes. Most of the drivers are restricted in their freedom to select their own speed, or pass. A relatively satisfactory operating speed is obtained.

Uninterrupted capacity is computed from information about width of pavement, steepness of grade, percentage of trucks in the traffic, and the proximity of obstructions adjacent to the traffic lanes. For purposes of capacity analysis, lateral clearance and lane width of the City's secondary and tertiary arterials and collector streets were considered to have parking on one side unless otherwise regulated. The following examples illustrate clearance and width determination.

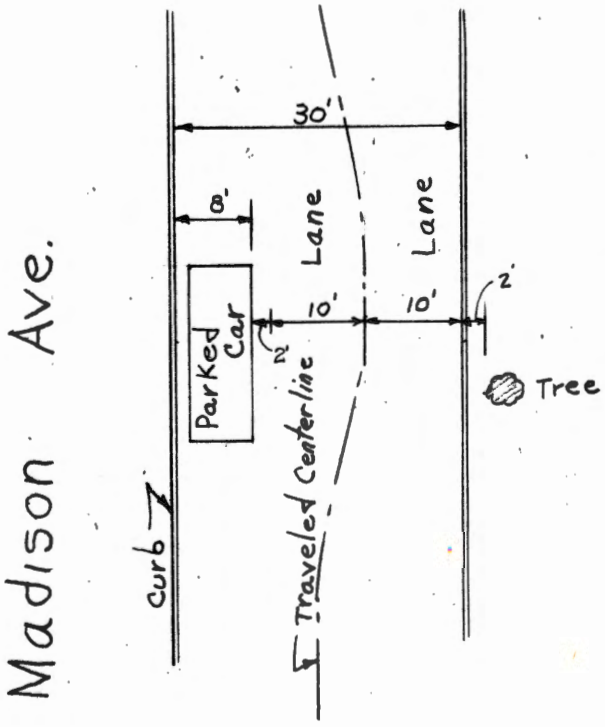
Uninterrupted Road Capacities are plotted on the map following page 41.

Example 1



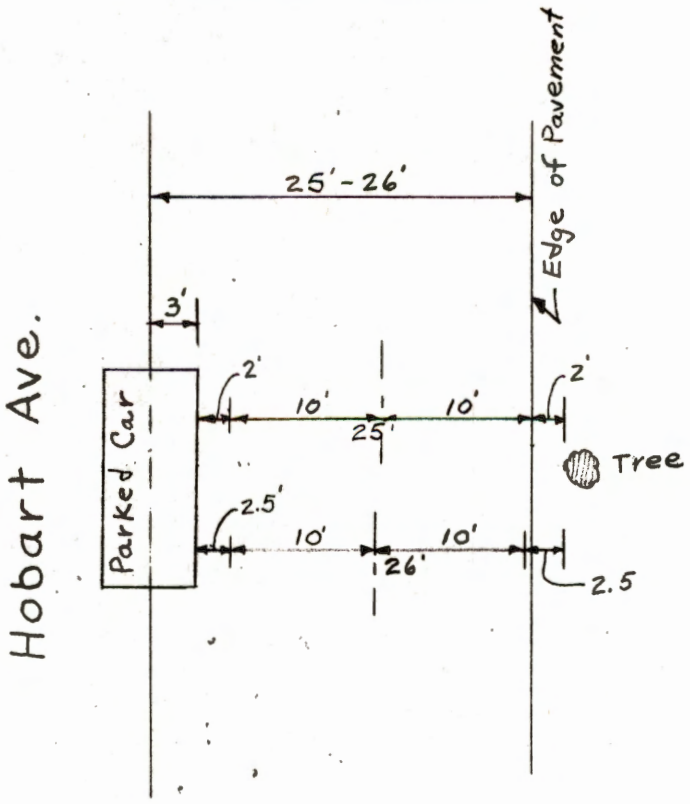
40' Road Width
8' Parking Lane
32'
24' = 2-12' Lanes
8' Remaining Pavement
2' Clearance to Trees
10' Total Clearance
∴ 5' Clearance both Sides

Example 2



30' Road Width
8' Parking Lane
22'
20' = 2-10' Lanes
2' Remaining Pavement
2' Clearance To Trees
4' Total Clearance
∴ 2' Clearance Both sides

Example 3



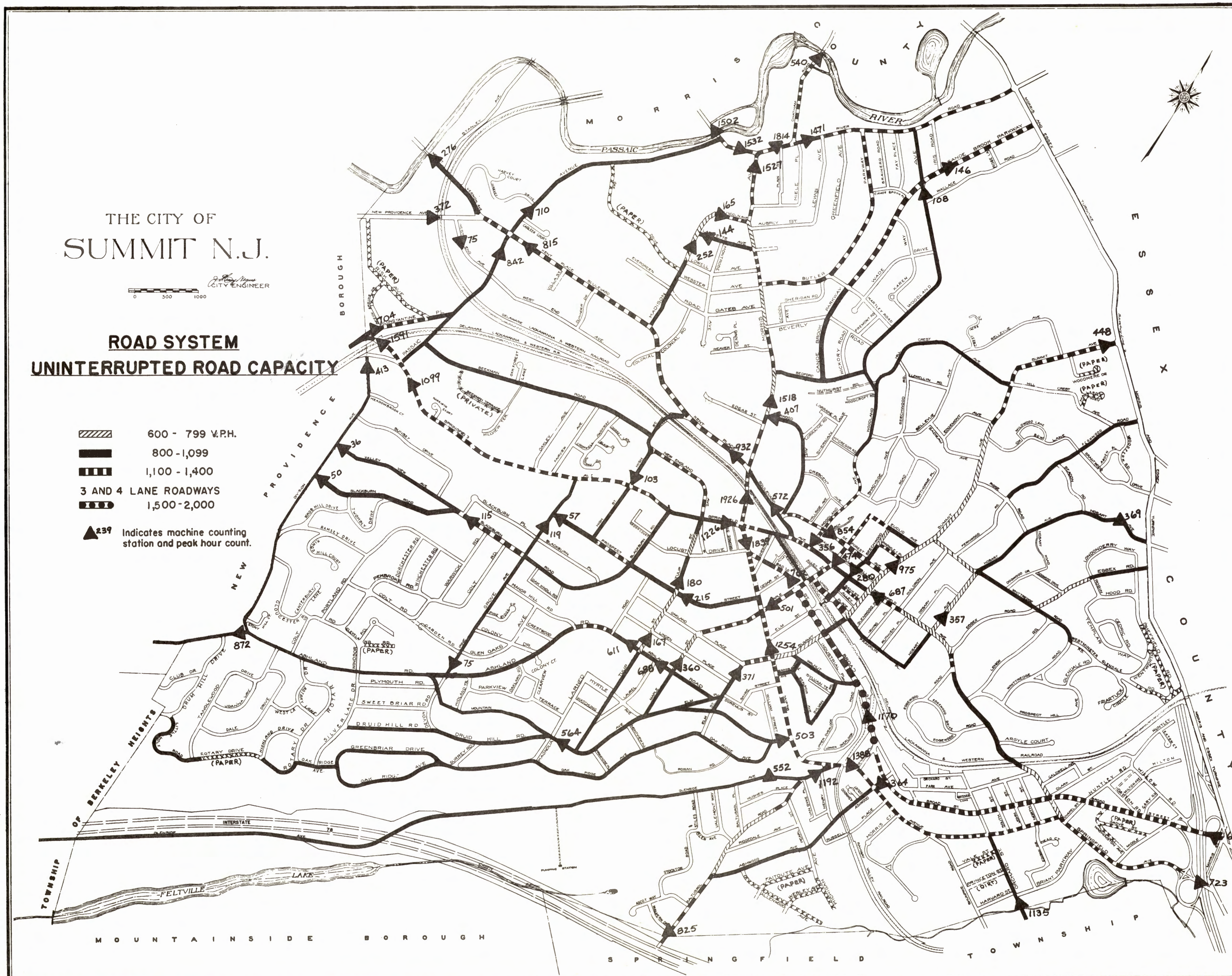
Note
All Roads Having Widths 22' TO 24' Were Considered To Be Too Narrow For Parking And Function As A Two-11' Lane Roadway And A Two-12' Lane Roadway Respectively; Clearance Varied.

CITY OF SUMMIT ROAD SYSTEM
UNINTERRUPTED CAPACITIES (VEHICLES PER HOUR)

STREET	2 Lane 600--799	2 Lane 800--1099	2 Lane 1100--1400	3-4 Lane 1500--2000	MILEAGE TOTAL
*Ashland Rd.		1.628	0.133		1.761
Ashwood Ave.	0.530				0.530
*Baltusrol Rd.	0.265		0.360		0.625
Bank St.			0.057		0.057
Beauvoir Ave.	0.187				0.187
Beauvoir Pl.	0.038				0.038
Beechwood Rd.	0.057	0.180			0.237
Beekman Rd.		0.720			0.720
Blackburn Rd.	0.379		0.227		0.606
*Broad St.		0.047	1.260	0.360	1.667
Butler Pkwy.			0.644		0.644
*Chatham Rd.			0.284		0.284
*Constantine Pl.	0.038		0.227		0.265
DeForest Ave.			0.341		0.341
Division Ave.		0.909			0.909
Elm Pl.		0.114			0.114
Elm St.		0.152			0.152
Euclid Ave.		0.113	0.057		0.170
Franklin Pl.		0.227			0.227
*Glenside Ave.		2.235			2.235
High St.		0.460			0.460
Hobart Ave.	0.695	0.208			0.903
Kent Pl. Blvd.		0.227	1.099		1.326
Lafayette Ave.		0.156			0.156
Lincoln Ave.			0.095		0.095
Madison Ave.	0.170	0.208			0.378
Maple St.	0.133	0.166	0.601		0.900
*Morris Ave.	0.331		2.318		2.649
*Mountain Ave.		1.174			1.174
Mount Vernon Ave.		0.246			0.246
New England Ave.			0.284		0.284
Norwood Ave.			0.379		0.379
*Orchard St.		0.237			0.237
Parmley Pl.			0.085		0.085
*Passaic Ave.		1.212			1.212
Pine Grove Ave.		0.663			0.663
Prospect St.		0.520	0.133		0.653
Railroad Ave.		0.294			0.294
*River Rd.		0.076	0.875		0.951
*Springfield Ave.	0.379	0.881	1.666		2.926
*Summit Ave.	0.973	0.057	0.568		1.598
Sylvan Rd.		0.133			0.133
Tulip St.		0.474	0.284		0.758
Union Pl.			0.142		0.142
Valley View Ave.		0.398			0.398

STREET	2 Lane 600--799	2 Lane 800--1099	2 Lane 1100--1400	3-4 Lane 1500--2000	MILEAGE TOTAL
Walnut St.		0.189			0.189
Whittredge Rd.	0.152	0.360			0.512
Woodland Ave.		1.130	0.303		1.433
TOTALS MUNICIPAL & COUNTY ROADS	4.327	15.794	12.422	0.360	32.903
COUNTY ROADS	1.607	5.721	6.541	0.360	14.229
SUMMIT ROADS	2.720	10.073	5.881		18.674
Percentage	14.6%	53.4%	32.0%		100%

* INDICATES UNION COUNTY ROADS (ALL OR IN PART)


THE CITY OF
SUMMIT N.J.
CITY ENGINEER
0 300 1000
ROAD SYSTEM
UNINTERRUPTED ROAD CAPACITY
600 - 799 V.P.H.
800 - 1,099
1,100 - 1,400
3 AND 4 LANE ROADWAYS
1,500 - 2,000
▲239 Indicates machine counting station and peak hour count.
MORRIS COUNTY
PASSAIC RIVER
ESSEX COUNTY
NEW PROVIDENCE BOROUGH
TOWNSHIP OF BERKELEY HEIGHTS
MOUNTAINSIDE BOROUGH
SPRINGFIELD TOWNSHIP
FELTVILLE LAKE
INTERSTATE 78
DELAWARE LACKAWANNA & WESTERN RAILROAD
(PAPER)
(PRIVATE)