

Bicycle Facilities

THE TIME IS NOW



1981 ROANOKE VALLEY BIKEWAY PLAN

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<u>NAME</u>	<u>ORGANIZATION</u>
Richard Burrow	Roanoke City
Denish Tiwari	Roanoke City
Gary Burton	City of Salem
Ronald Miller	Town of Vinton
Darryl Shell	Roanoke County
Scott Leweke	Bicycle Club
Bill Izzel	Bicycle Club, Blacksburg
Gene Dixon	Dixon's Bicycle Shop
Jeanette Fitzwilliams	Virginia Trail's Association
Robert Bush	Virginia Trail's Association
Dan Kier	U.S. Corps of Engineers
Leon M. Clancy	Virginia Bicycle Federation
Susan Duncan	Commission of Outdoor Recreation
Marshall Moore	WVWR Radio Station
Hollins College	
Virginia Western Community College	
U.S. Department of Transportation (FHWA)	
Virginia Department of Highways and Transportation	

FOREWORD

This report is designed to serve as an update of the Roanoke Valley 1975 Bikeway Plan prepared by the Fifth Planning District Commission in cooperation with the Virginia Department of Highways and Transportation and the U.S. Department of Transportation. It attempts to deal with the planning and location of bikeways incorporating the cities of Roanoke and Salem, Roanoke County, and the Town of Vinton.

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INTRODUCTION

When Karl von Drais introduced a prototype of what is known today as a bicycle, and J.K. Starley later equipped that idea with the first successful chain drive, little did they realize they had invented the "most efficient form of power for land transportation ever devised by man."¹

In 1977, bicycling ranked one among the most popular recreational pursuits in Virginia, a trend which is projected to continue. Only recently have the numerous advantages of the bicycle been realized. The substitution of the bicycle for the car may never come, but the time of the bicycle as a supplemental means of transportation is here.

Bicycle use can provide enjoyment, improve health, and reduce air pollution, traffic congestion, energy consumption and the cost of personal transportation. It also allows you to reach your destination easier than by car in some instances. As people seek the most direct routes from where they are to where they want to go, they begin to use bicycles for more than casual recreation.

During the last five years, two groups of adult bicyclists, utilitarian, and recreationists, have become recognizable. Commuters are turning to bicycles because of the exercise, their concern about pollution and traffic congestion, and because the bicycle is more economical to operate than the automobile. Recreation seekers are bicycling in their ever increasing leisure hours. "The opportunity for improved physical fitness requiring only a nominal expenditure on equipment has lured many people into the sport."²

The "bicycle boom" is occurring at an ideal time. We are in a period in which we are seeking answers to our environmental problems, and bicycling should be recognized as a legitimate form of transportation.

It should be made clear that bicycling in urban areas where no specific provision is made for the cyclist, can be hazardous. Owing to the limited protection of the bicyclist and the low mass of the bicycle, the cyclist tends to sustain injuries in such collisions far greater and more frequently than does his motor vehicle counterpart.

The type of facilities that should be provided for bicyclists has been a major concern of bicyclists and transportation officials for several years.

Rising construction costs and limited funds have made it more important than ever to place emphasis on the efficient management of transportation facilities rather than expansion of the facilities.

Goals

The primary goal of this report is to improve bicycling transportation in the Roanoke Valley area by coordinating the development of bicycling facilities in order to facilitate the movement of bicycles, and by raising the level of bicycle awareness among Roanoke Valley citizens.

If this goal is fulfilled, the realization of a second will develop; to encourage the increased use of bicycles in Roanoke and nearby areas.

Bicycle Classification

"Bikeway" means all facilities that provide primarily for bicycle travel. The following classifications are defined in Section 2373 of the California Vehicle Code:

- (a) Class I Bikeway (Bike Path or Bike Trail) - Provides a completely separated right-of-way designated for the exclusive use of bicycles and pedestrians with crossflows by motorists minimized.

(Note: Mopeds are prohibited from bike paths and trails unless specifically authorized by the agency having jurisdiction over the facility).

- (b) Class II Bikeway (Bike Lane) - Provides a restricted right-of-way designated for the exclusive or semi-exclusive use of bicycles with through travel by motor vehicles or pedestrians prohibited, but with vehicle parking and crossflows by pedestrians and motorists permitted.

- (c) Class III Bikeway (Bike Route) - Provides a right-of-way designated by signs or permanent markings and shared with pedestrians or motorists. Any bikeway which shares its through traffic right-of-way with either or both moving (not parking) motor vehicles and pedestrians is considered a Class III Bikeway.

The designation of bikeways as Class I, II, and III should not be construed as a hierarchy of bikeways. The class of bikeway to select in meeting the bicyclist's needs is dependent on many factors. According to the Planning and Design Criteria for Bikeways in California manual, the following applications are the most common for each type.

Class I Bikeway (Bike Path) - Generally, bike paths should be used to serve corridors not served by streets and highways or where wide right-of-way exist, permitting such facilities to be constructed away from the influence of parallel streets. Bike paths should offer opportunities not provided by the road system. They can either provide a recreational opportunity or, in some instances, can serve as direct high speed commuter routes, if crossflow by motor vehicles can be minimized. The most common applications are along rivers, ocean fronts, canals, utility right-of-ways, abandoned railroad right-of-ways, within college campuses, or within and between parks. There may also be situations where such facilities can be provided as part of planned developments. Another common application of Class I facilities is to close gaps to bicycle travel caused by construction of freeways, or because of the existence of natural barriers (rivers, mountains, etc.).

Class II Bikeway (Bike Lane) - Bike lanes are established along streets in corridors where there is significant bicycle demand, and where there are distinct needs that can be served by them. The purpose should be to improve conditions for bicyclists in the corridors. Bike lanes are intended to delineate the right-of-ways assigned to bicyclists and motorists and to provide for more predictable movements by each. A more important reason for

constructing bike lanes is to better accommodate bicyclists through corridors where insufficient room exists for safe bicycling on existing streets. This can be accomplished by reducing the number of lanes, or prohibiting parking on given streets in order to delineate bike lanes. In addition, other things can be done on bike lane streets to improve the situation for bicyclists that might not be possible on all streets (e.g., improvements to the surface; augmented sweeping programs, special signal facilities, etc.). Generally, stripes alone will not measurably enhance bicycling. If bicycle travel is to be controlled by delineation, special efforts should be made to assure that high levels of service are provided with these lanes.

Class III Bikeway (Bike Route) - Bike routes are shared facilities which serve either to: (1) provide continuity to other bicycle facilities (usually Class II bikeways); or (2) to designate preferred routes through high-demand corridors. As with bike lanes, designation of bike routes should indicate to bicyclists that there are particular advantages to using these routes as compared with alternative routes. This means that responsible agencies have taken actions to assure that these routes are suitable as shared routes and will be maintained in a manner consistent with needs of bicyclists. Normally, bike routes are shared with motor vehicles. The use of sidewalks as Class III bikeways is strongly discouraged.

Shared Roadway (no bikeway designation) - Streets and highways without bikeway designations. In some instances, entire street systems may be fully

adequate for safe and efficient bicycle travel and signing and striping for bicycle use may be unnecessary, but in other cases, routes may be inherently unsafe for bicycle travel and it would be inappropriate to encourage additional bicycle travel by designating the routes as bikeways. Also, routes may not be along high bicycle-demand corridors and it would be inappropriate to designate bikeways regardless of roadway conditions. It is important to remember that shared roadways and Class III bikeways are not necessarily poor bikeways. They are alternative choices and have their place in a bikeway network.

Data from a survey taken in Palo Alto, California, indicated that bicycle accidents increased when sidewalk riding was permitted and when the first generation of bike signs were installed. Car/bike accidents showed a decrease with the use of shared roadways, although bicycle/car door accidents increased. Both total and serious accidents were relatively less common for riders using bike lanes.

Bikeway Design Criteria

Every alternative should be explored before implementing a bikeway system. Roads designated as bikeways with bicycle lanes should be marked as such by providing lane stripping, pavement markings, and proper signing. Where roadways do not meet the minimal required widths for bicycle lanes, the bikeways should temporarily be marked as shared roadways with proper signing and pavement markings. Lighting, bicycle parking facilities, and traffic control devices should be added to complete the bikeway system. There are several publications available for more detailed information on other bikeway design and location criteria. Two such publications are Caltrans - Planning and Design Criteria for Bikeways in California and the ABCD's of Bikeways published by the U.S. Department of Transportation. Also, the proposed standards drafted by the FHWA applies to all federally funded projects. These standards can be found in the Federal Register, August 4, 1980.

Lengths

The lengths of the bikeway must be one that will attract users to major destinations (shopping areas, educational institutions, job sites, high density residential areas, recreational areas). Therefore, the length will vary, but generally a bikeway 3 to 5 miles in length is considered desirable for a recreational bike path within a park or an open space area. Shared road recreational tours can be 20 to 50 miles in length. Commuter/utilitarian trips are under 5 miles long usually, however, this does not mean that the bikeway for these type trips should be only 3 to 5 miles long.

Clearance to Obstructions

A minimum 2-foot horizontal clearance to obstructions shall be provided adjacent to the pavement, however, a 3-foot clearance is recommended. The vertical clearance to obstructions across the clear width of the path shall be a minimum of 8 feet. These provisions allow the bicyclists to feel safe and operate his bicycle in comfortable riding conditions.

Bikeway Lighting

Bikeways must be illuminated from fixed luminaries which serve to light the path and reveal the presence of the bicyclist. These luminaries must be mounted at least 10 feet in height so as to shed light on the bicyclist and provide security. Also, bikeway crossings need to be regarded when considering bikeway lighting.

Bicycle Parking Facilities

Bicycle parking facilities are highly recommended when planning a bikeway. Signs informing the bicyclist of the parking facilities location will encourage greater usage of these facilities. Secure bicycle parking facilities should be located at major activity centers, such as public and private employment locations, transit stations, schools, shopping centers, recreation areas, and municipal facilities. A bike rack provides some protection against theft when used with a well constructed, theft resistant padlock. There are many different types of locks and racks available, and they will provide more of an incentive to new riders if the racks are located close to the entrance of work places or in a central location for shopping. Storage facilities should also be considered when planning bus stop locations. To help deter crime, racks or lockers should be readily visible to the public, and, if used at night, lighting should be provided.

Maintenance

Poor maintenance is a major deterrent to increased bicycle riding. Measures must be undertaken to ensure the surface of bikeways are maintained in a smooth condition, free of broken glass, gravel, potholes and other debris which can cause accidents and make riding generally unpleasant. A comprehensive bicycle strategy should contain clear assignment of responsibility for regular inspection, street sweeping, bikeway sweeping, and tree trimming by local governments and an adequate budget. This responsibility should be worked out between the city or county highway department or the park and recreation department. Local bicycle clubs can be asked to patrol the route on a regular basis and report missing signs or other damage to the proper governmental authority.

FIGURE I

CLASS I	CLASS II	SHARED ROADWAYS CLASS III
<p>Minimum paved width for a two-way bike path shall be 8 ft. Minimum paved width for a one-way bike path shall be 5 ft. A minimum 2-foot wide graded area shall be provided adjacent to the pavement.</p>	<p>Bike lanes shall be one-way facilities. Where parking stripes are marked, the minimum width is 5 ft. Where parking is permitted without parking stripe or stall, 11 feet or 12 feet is the minimum width. A minimum 4 foot wide bike lane but with at least 3 feet between the traffic lane and the longitudinal joint at the concrete gutter, is required on streets where parking is prohibited. Bike lanes on a highway without curbs and gutters require a minimum width of 4 feet.</p>	<p>The acceptable width for Class III bikeways is dependent on many factors, including the volume and character of vehicular traffic on the road, typical speeds, vertical and horizontal alignment, sight distance and parking conditions.</p>
<p>A 4-inch yellow centerline stripe may be used to separate opposing directions of travel. A 3-foot stripe with a 9 foot space is the recommended striping pattern, but may be revised, depending on the situation. Standard regulatory and warning signs for bike paths are required.</p>	<p>Bike route signs may be used along bike lanes, but its primary purpose should be to provide directional signing and destination signing where necessary. Bike lane stripes should be placed a constant distance from the outside motor vehicle lane.</p>	<p>Bike routes are shared routes and do not require pavement markings. A 4-inch white edge stripe separating the traffic lanes from the shoulder can be helpful in providing for safer shared use. Bike route signs should be placed at all points where the route changes direction and periodically as necessary.</p>

SOURCE: Caltrans Planning and Design Criteria for Bikeways in California.

REFERENCE: Manual on Uniform Traffic Control Duties, Chapter IX (official striping and signing criteria)

Safety Education

If people perceive the bicycling environment is safe, they will be more likely to use a bike more often. Safety campaigns utilizing television, radio, newspaper, and posters and relating messages of hazard recognition, emergency maneuvers, and bicyclist vulnerability may prove effective. Public school safety education programs including bicycle inspection, classroom instruction through movies or a lecture and road training have been developed in some school districts. Film strips are more likely to be most effective. Enforcement programs when combined with policy education in schools, have shown to be about as effective in reducing accidents as well-designed bikeways.

The State of Wisconsin has taken several steps concerning bicycle safety. Some of these programs which may prove effective for the Roanoke Valley are:

A) A comprehensive bicycle safety manual for bicyclists developed to be used in grades 4-6 as part of an elementary school bicycle safety program, which can also be well suited for parents and adults as it shows the state laws, proper maneuvers, signs, signals, as well as how to choose, fit and maintain a bicycle.

B) A guidelines to teaching driver education as it relates to the safety of pedestrians and bicyclists could encourage driver education students to look at the problem situations a bicyclist faces while sharing the roadway with motorists.

C) A leaflet addressing pedestrian and bicycle safety from the motorist's point of view titled, "Points of Law Every Driver Must Know", which would be sent with each driver license renewal form to every area driver.

D) Bicycle safety television public service announcements could be distributed to all television stations in the Roanoke Valley. The announcements would be directed at the motorist and address bicycle/motor vehicle conflicts and the need to share the roadway.

Cost of Biking Facilities

Many factors are involved in the cost of establishing biking facilities. Localities are well advised to install bicycle-proof grates on routes traveled by bicyclists before an accident occurs. Intersections should be carefully designed and consideration given to installation of bicycle actuated traffic signals at difficult intersections. The use of these signals by bicyclists depends on how conveniently the buttons are located.

Due to extensive work and the scarcity of funds, the implementation of biking facilities may have to be done in various stages. A bikeway project should not be implemented without necessary funding for all improvements associated with the chosen bikeway design and for an appropriate operations and maintenance program. In many cases, it may be better to design a less sophisticated bikeway, providing the less sophisticated design still meets the bicyclists' needs, than to have to cut corners later.

A few cost effective measures which serve to enhance safe cycling include replacement of drainage grates to those safe for cycling, bringing manhole covers or minor road surface repairs level with existing road surface, stabilization of road shoulder, and improvements such as street widening and curb repair made during highway improvement projects.

POTENTIAL FUNDING SOURCES FOR BICYCLE
PROGRAMS AND FACILITIES⁴

The Federal Highway Administration (FHWA)

A wide variety of bicycle projects are eligible for funding under the Bicycle Grant Program established by the regulation developed by FHWA. The regulation provides federal funds to State and local governments for bikeway construction and for non-construction projects that can be expected to enhance the safety and use of bicycles, as authorized by Section 141(c) of the Surface Transportation Assistance Act of 1978 (STAA). This regulation was developed to be responsive to the bicycling needs of State and local governments and the public.

Project Selection Criteria

(A) Emphasis will be on those projects which will promote the use of bicycles for transportation and enhance access, mobility or safety for bicyclists and will most benefit the community.

(B) The following general selection criteria will be applied by the FHWA for all types of projects:

- (1) A demonstrated need for the project.
- (2) Probability of successful implementation and completion of the project.
- (3) Evidence of support and participation by bicyclists and other citizens in the project.
- (4) The estimated cost of the project and the Federal share of that cost.

(5) A determination that the project can reasonably be expected to enhance the safety of bicyclists or the use of bicycles for saving energy.

(C) In addition to the general criteria, the following selection criteria will be applied to bikeway construction projects:

(1) Compliance with the current FHWA design and construction criteria for bicycle facilities contained in "A Guide for Bicycle Routes" or equivalent criteria approved by the FHWA Division Administrator.

(2) For projects in urbanized areas, evidence that the project is part of the planning process specified in 23 U.S.C. 134 and is endorsed by the Metropolitan Planning Organization.

Non-Construction

1. Eligible projects which would result in public information and encouragement programs could include:

- a. Mapping of bicycle routes, or
- b. Bicycle use promotion and encouragement campaigns.

2. Eligible projects which educate and train the public could include:

- a. Bicycle safety education and training courses, or
- b. Education programs which teach motorists how to safely share the road with bicyclists.

Construction

1. Eligible projects which would result in support facilities for bicycling could include:

- a. Bicycle parking facilities or,
- b. Bicycle racks on buses and other facilities to interface bicycles with transit.

2. Eligible projects which would result in the modification or spot improvement of existing highways could include:

- a. Widening of an existing roadway, shoulder or structure for the purpose of accommodating bicycle travel.
- b. Replacing existing unsafe drainage grates with "bicycle safe" grate inlets.
- c. Restriping pavement to provide bicycle lanes or wider curb lanes.
- d. Curb-cut ramps on new or existing bikeways.
- e. Grade separations where necessary.
- f. Treatment of railroad crossings to make them bicycle safe.
- g. Traffic control devices, or
- h. Lighting.

3. Eligible projects which would result in new facilities could include construction of a bike path adjacent to or independent of an existing highway or Federal-aid route (grading, drainage, paving, barriers, landscaping, signs, structures, right-of-way, etc.).

Virginia Department of Highways and Transportation (VDH&T)

The State Highway and Transportation Commission and the Commission of Outdoor Recreation adopted a policy to govern the use of recreational access funds pursuant to Section 33.1-223 as amended of the Code of Virginia. It is the intent of the Commission that the concept of access be applicable to facilities for motor vehicles and bicycles whether in separate physical facilities or combined in a single facility. Bikeway construction for recreational purposes will be considered by the Department only when jointly developed by the Department and the Commission of Outdoor Recreation as a recreational access facility. Furthermore, highway construction projects may include recreational bikeways if jointly developed in accordance with policy adopted by the Department and the Commission of Outdoor Recreation.

The following is a brief summary of other programs which deal either directly or indirectly with recreation and related issues:

National Highway Traffic Safety Administration - Seed money for states to develop programs to meet highway safety needs---education enforcement and knowledge of rules of the road must be a part of annual work program of highway safety plan in which bicycle safety programs are eligible.

U.S. Army Corps of Engineers - Non-federal agency must agree to assume half of separable costs and all maintenance, operation, replacement and administration costs for recreation facility.

EPA Clean Water Act - For sewage treatment projects which clean up land, but bikeways can be constructed along the interceptor sewer lines.

Department of Housing and Urban Development (HUD) - Bikeways are eligible through the Community Development Block Grant, and several other assistance programs that may be of help in planning, acquiring, and developing trails and related recreational facilities.

Department of Interior (DOI) - For conversion of abandoned railroad right-of-ways to recreation and conservation use and for outdoor recreation facilities in which bike facilities are eligible. Bike facilities must be a part of the State Comprehensive Outdoor Recreation Plans.

Department of Health, Education and Welfare (HEW) - Grant-in-Aid programs which must be in association with educational improvement or research depending on which grant applied for.

Department of Labor (DOL) - Projects which contribute to conservation, development, management of natural resource or recreation area.

Appalachian Regional Commission (ARC) - For improving the Appalachian region. Bikeways may be part of authorized highways and access roads or a mining land reclamation project.

Department of Transportation (DOT), Federal Highway Administration (FHWA), Urban Mass Transportation Administration-Transportation Improvement Program (UMTA-TIP), Metropolitan Planning Organization (MPO), and Unified Transportation Work Program (UTWP) - Bicycle facilities are eligible items for the use of highway trust funds when they are incidental features of a highway project. Section 217 was added to the Federal-Aid Highway Act of 1973 to allow the use of federal-aid highway funds for construction of bicycle facilities. However, bicycle facilities must compete with other highway programs for use of funds. Bicycle studies and facilities, as well as bicycle parking facilities, are also eligible.

General Services Administration - Bike parking facilities are eligible, currently bike racks provided at federal buildings are free upon request.

This quickly summarizes what appears to be some of the major Federal programs that can assist in developing trails and related recreational facilities. Localities may wish to consider less costly projects. Three such projects include:

- (1) Suitability Mapping - an analysis of the suitability of the existing street network for cycling. Color-coded maps are produced, depicting restricted routes, hazardous routes, and safe routes.
- (2) Identification of Gaps to Bike Travel - this strategy concentrates on the identification and elimination of obstacles to through bicycle travel, such as narrow bridges, dead end streets, narrow roads, etc. Once the obstacles have been identified, they should be listed in order of priority for the purpose of funding corrective measures.
- (3) Elimination of Local Deterrents to Cycling - through a handlebar survey, such problems as unsafe drainage inlets, bumpy shoulders, pavement cracks, etc. are identifiable for subsequent correction.

SURVEY OF BICYCLE ACTIVITY IN THE ROANOKE VALLEY

A survey was taken during the month of September 1980, in the Roanoke Valley, to determine preferences of bicycle users with respect to the roadways they use, the types of trips they take, their reasons for using their bicycles, and their propensities for using bikeways if such were provided.

The survey was publicized by the newspaper and radio stations, and the public had the options of calling in to have surveys mailed to their homes, or because it was a brief survey, they could answer the questions over the phone. Surveys were also distributed to local bicycle shops and the County Parks and Recreation building so that they would be more accessible to the public.

Reports from local bicycle shops showed an increase in bicycle sales. Cardinal Bicycle Shop, which has been open 4 years, showed a 20 percent increase in sales in 1979 over the year 1978. In 1980, the sales increased 25 percent over 1979. The Peddler Shop showed an increase in sales of 19.3 percent for 1978. For the year 1979, sales were constant, but 1980 showed a 21.5 percent increase over 1979. Already, 1981 is showing an increase in sales. Dixon's Bicycle Shop has also showed an increase in recent years ranging from 25 percent to 30 percent.

Of the people responding to the survey, 31 percent were aged under 18, 9 percent aged 18-24, 12 percent aged 25-29, 18 percent aged 30-34, 8 percent aged 35-39, 7 percent aged 40-44, 7 percent aged 45-49, 2 percent aged 50-54, and 6 percent aged 55 and over.

The majority of the respondents ride their bicycle either daily or weekly, although there were some who ride only several times a month or year. The survey indicated that the level of bicycle use is influenced by bad weather; however, many bicyclists continue to ride during the cold weather.

The absence of biking facilities was indicated as a deterrent to bicycle riding. Concern about accidents was expressed in 90 percent of the surveys. The extent of risk of death or injury to bicyclists compared with other modes of transportation is difficult to determine because of the lack of data on accidents by type and location compared to bicycle miles traveled. However, some sources have quoted that the risk of a fatal accident while cycling ranges from 3-10 times as much risk while driving.

Seventy-one percent of the respondents ride their bicycles for recreational purposes; however, many of these persons ride for exercise also. Although only 35 percent of the respondents use their bicycle as a means of transportation, 75 percent of the respondents stated they would use their bicycle as a means of transportation if safe routes were provided. Statistics show that a high percentage of all auto trips are under five miles in length, which indicates more trips would probably be taken by bicycle rather than car if people are motivated to do so. One cost effective way of providing more bicycle facilities is through institution of a policy of automatically providing a wide curb or outside lane, and/or a wide shoulder when road improvements or new construction takes place. However, this should only be done after each project has been evaluated individually for its potential bicycle use.

EXISTING BIKEWAYS

There are currently two bike routes existing in the Roanoke Valley. One is located in Salem and the other runs along Wiley Drive. They are designated as such only by the use of bike route signs, and the Parks and Recreation Department in Salem publishes a map of its bike route. The majority of the respondents to the survey are aware of one or both of these routes; however, there are a considerable number of people who were not aware of one or both routes until the survey was taken. This suggests that the routes are not well publicized, and in future planning, extensive efforts should be made to publicize biking facilities.

Although such bike routes exist, only 32 percent of the respondents to the survey said they use them. At first glance, this might suggest that future biking facilities would serve little purpose; however, the reasons these bike routes are not used extensively bare some close examination for future planning of biking facilities. Surveys throughout the states show that bike signs on streets are the last preference of bicyclists. Bicyclists oppose such signs because they give the illusion of providing adequate facilities while they serve only as temporary solutions for officials not willing to fully support bicycle measures. According to the "Bicycling and Air Quality Information Document", "the only real advantage of bike route signs are a possible increase in motorist awareness of bicycle traffic, provision of directional information (if included on the sign), and information that the signed route may be safer in some way"

(e.g., have been selected because of a low traffic volume or wide street width). Another point to consider in planning biking facilities is that bicyclists will rarely travel more than a block or two out of their way for bike routes except for recreational purposes, and sometimes not even then. It is a common complaint from bicyclists in the Roanoke Valley that they have to travel out of their way to get a bike route, and usually that travel involves driving an automobile, which actually defeats the purpose of having bike facilities.

ONGOING AND FUTURE STUDIES RELATING TO BICYCLING

Every new trip taken by bicycle instead of car will result in direct gasoline savings, emission reduction, and air pollution improvement. Carbon monoxide, which is a polluting emission produced by the operation of automobiles, tends to be localized. It reaches its peak during rush hours when heavy traffic is encountered. This lends support to the fact that bicycle strategies to reduce this pollutant should concentrate on commuter travel and travel in areas of heavy traffic such as to popular recreation facilities, shopping centers, and schools.

"Bicycle strategies to reduce air pollution can be more effective if intermodal links are provided."⁵ Dual use facilities include provision for parking bicycles at transit stations and for transporting bicycles on cars and buses. This would permit bicycle travel to be used as part of long trips.

The bikeway system should serve the needs of cyclists who are going places such as homes, schools, shopping centers and places of work as well as provide a leisure ride for the recreational rider.

Several projects are now underway or will begin in the near future which will coordinate with efforts to develop biking facilities. The city-wide park study being prepared by the Roanoke City Department of Parks and Recreation shows strong support for a biking/jogging trail. A route connecting points of interest such as schools, parks, and shopping centers is one of several being proposed by this bikeway plan. Parks can serve as a destination point or point of interest along a bikeway as well as the recreational benefit they offer. In designing any bikeway system, it should be connected with existing bike routes in the area if at all possible.

The Fifth Planning District Commission (on behalf of the Roanoke Area Metropolitan Planning Organization) will be conducting a park-and-ride study within the year. The purpose of this study is to determine the feasibility of establishing lots where people can park their cars and ride the bus or carpool with other drivers. Four major corridors are being considered:

- 1) the U.S. 11, 220 corridor in the Troutville area
- 2) the U.S. 460 corridor in West Roanoke County
- 3) the U.S. 221 corridor in West Roanoke County
- 4) the U.S. 460 corridor in East Roanoke County

This bikeway plan proposes to have bicycle racks or lockers located in these lots so that people desiring to ride their bicycles may do so. A bicycle rack supports bicycles by their frames while at the same time securing the wheels. There are various economical models to choose from. An alternative to bicycle racks is a bicycle locker. This theft-proof innovation offers total enclosure for bicycles. A single auto parking space provides enough space for up to 8 bicycle locker units back-to-back.

PROPOSED BIKEWAY PLANS

A flood control study of the Roanoke River is being prepared by the Corps of Engineers. They are considering a bikeway trail that would parallel the Roanoke River for approximately 16 miles, extending from approximately Diquids Lane, near the southwest Salem City limits to approximately Tinker Creek in Roanoke City. The bikeway could be constructed on a 50-50 cost share basis, i.e., the City of Salem and the City of Roanoke would contribute 50 percent of the bikeway trail construction costs with the remaining 50 percent provided by the Corps if the study results are acceptable and funding approved. The bikeway trail is conceptual at this time and has not been coordinated with either the City of Salem or the City of Roanoke in its ongoing city-wide recreation study. This is a long-term project and will involve several years before completion. However, if such a plan is approved, it is recommended that the localities involved coordinate their efforts and give their full support to the project.

The Roanoke Valley Bikeway proposed in 1975 once again bears consideration. The proposed route utilizes roadways parallel to Williamson Road where traffic is less of a problem and links Crossroads Mall and the northern part of Roanoke City to the downtown area. Tanglewood Mall, Virginia Western Community College, and Towers Shopping Center in southwest Roanoke are linked to downtown Roanoke via Ogden Road, Winding Way Road, Colonial Avenue, Brandon Avenue and Jefferson Street. This area could be linked to the Riverjack area of Salem by providing a bike trail

along State Route 419. The Oak Grove Shopping Center on Route 419 may be served by a route utilizing Bower Road, Grandin Road Extension, Grandin Road, Memorial Avenue, and Wiley Drive which is now designated a bikeway by the City of Roanoke.

The recreational route proposed in 1975 follows the Roanoke River, and in the survey taken by the Commission, there was strong support for a route along the Roanoke River. If the study being done by the Corps of Engineers is not implemented, the following route should once again be considered. Salem's existing bikeway can be linked to this route. The route follows the Roanoke River east along the Riverside Drive until it crosses the Route 419-Route 11 intersection where the trail may be constructed on a levee along side the river. After crossing Route 11 again the trail is planned to pass behind Blue Ridge Industrial Park. This trail follows the river until it reaches Lick Run where the route may make use of existing streets, eventually joining Wiley Drive. From Wiley Drive the route follows Piedmont Street to Riverland Road. Here a bridge for bicycles and pedestrians may be constructed across the river to take the cyclists away from the heavy traffic on Riverland Road. There is a flood control levee upon which the trail may be constructed. The trail would then cross the river at the Underhill Avenue bridge in southeast Roanoke where it would branch north to Wise Avenue and south on Bennington Street. From Wise Avenue the proposed route goes into Vinton where it may utilize several side streets to avoid traffic and finally go into Mountain View Road.

RECOMMENDATIONS

The following are recommendations proposed by this bikeway study:

- (1) Localities coordinate efforts for the implementation of biking facilities.
- (2) Adopt this plan and locate bikeways where feasible.
- (3) Adopt a provision that for all future construction or repair on roads, consideration be given to bicycles and bikeways added into the design where feasible.
- (4) Direct that bikeways be constructed with high quality to reduce maintenance costs, and appropriate adequate funds for the maintenance of bikeways.
- (5) Establish programs for educating pedestrians, bike riders, and motorists of the rules and regulations governing each in relationship to bikeways.
- (6) Provide an adequate supply of maps of the bike route.

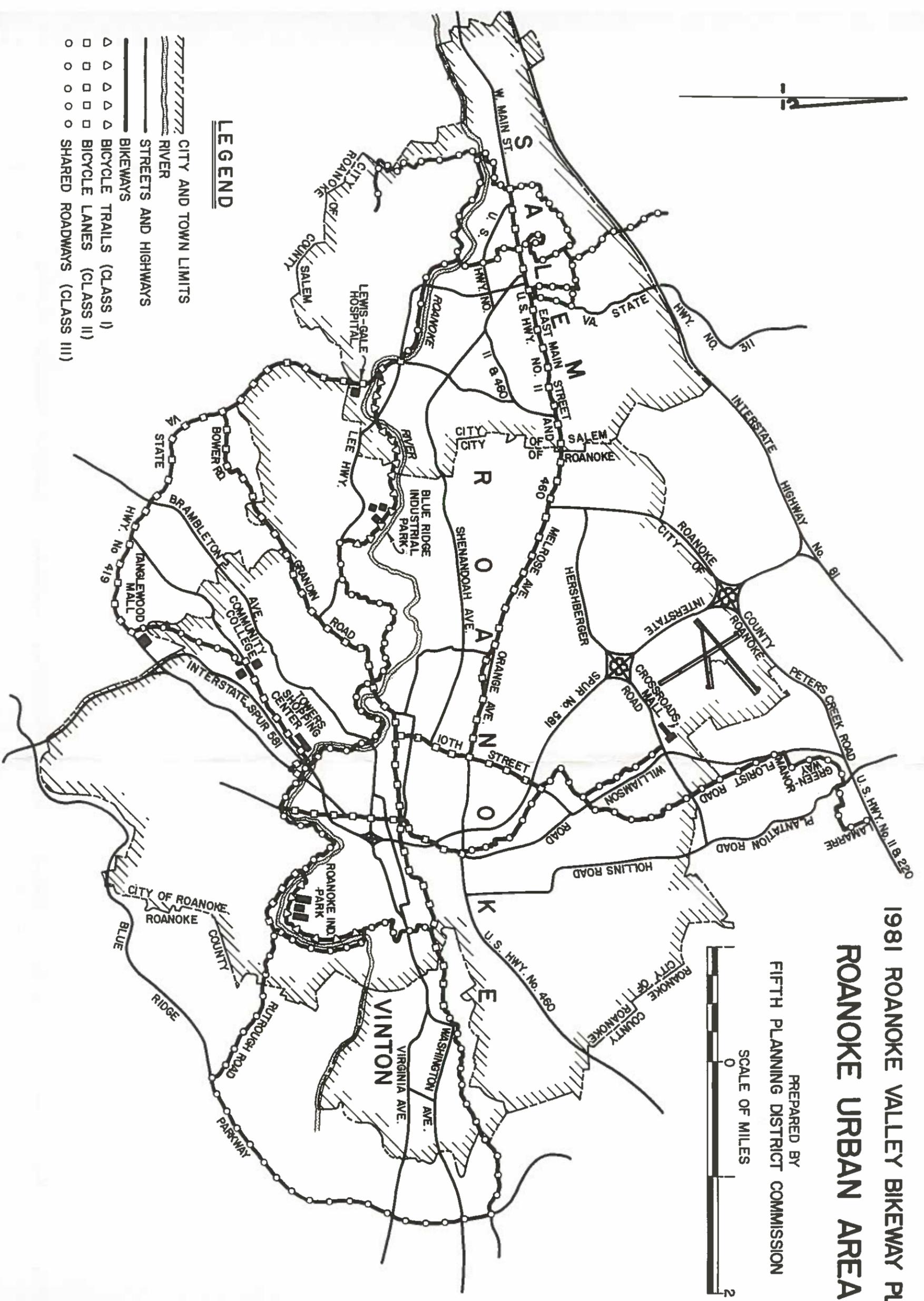
BIBLIOGRAPHY

References contributing to the publication of this study are as follows:

1. Fifth Planning District Commission, Roanoke Valley 1975 Bikeway Plan.
2. Alderson, Frederick, Praeger Publishers, Bicycling - A History, 1972.
3. Institute of Transportation and Traffic Engineering, UCLA, Bikeway Planning Criteria and Guidelines, prepared for the State of California, April 1972.
4. Environmental Protection Agency, Bicycling and Air Quality Information Documents, September 1979.
5. Miami Valley Regional Planning Commission, 'Guide to Starting a Community Bikeway -- Miami Valley Regional Bikeway Plan,' 1973.
6. Blacksburg, Virginia, 'Blacksburg Bicycle Trail Study -- Prepared for the Blacksburg Planning Department,' May 1974.
7. Forester, John, Effective Cycling, 1978.
8. Mountain Bicyclist Association, Basic Bicycling, 1980.
9. Smith, Daniel T., Jr., Safety and Location Criteria for Bicycle Facilities, prepared for Federal Highway Administration - Department of Transportation, February 1977.
10. State of California, Department of Transportation, Caltrans, Planning and Design Criteria for Bikeways in California.
11. Williams, John, 'Bicycle Forum,' Number 4, Fall 1979.

1981 ROANOKE VALLEY BIKEWAY PLAN ROANOKE URBAN AREA

PREPARED BY
FIFTH PLANNING DISTRICT COMMISSION



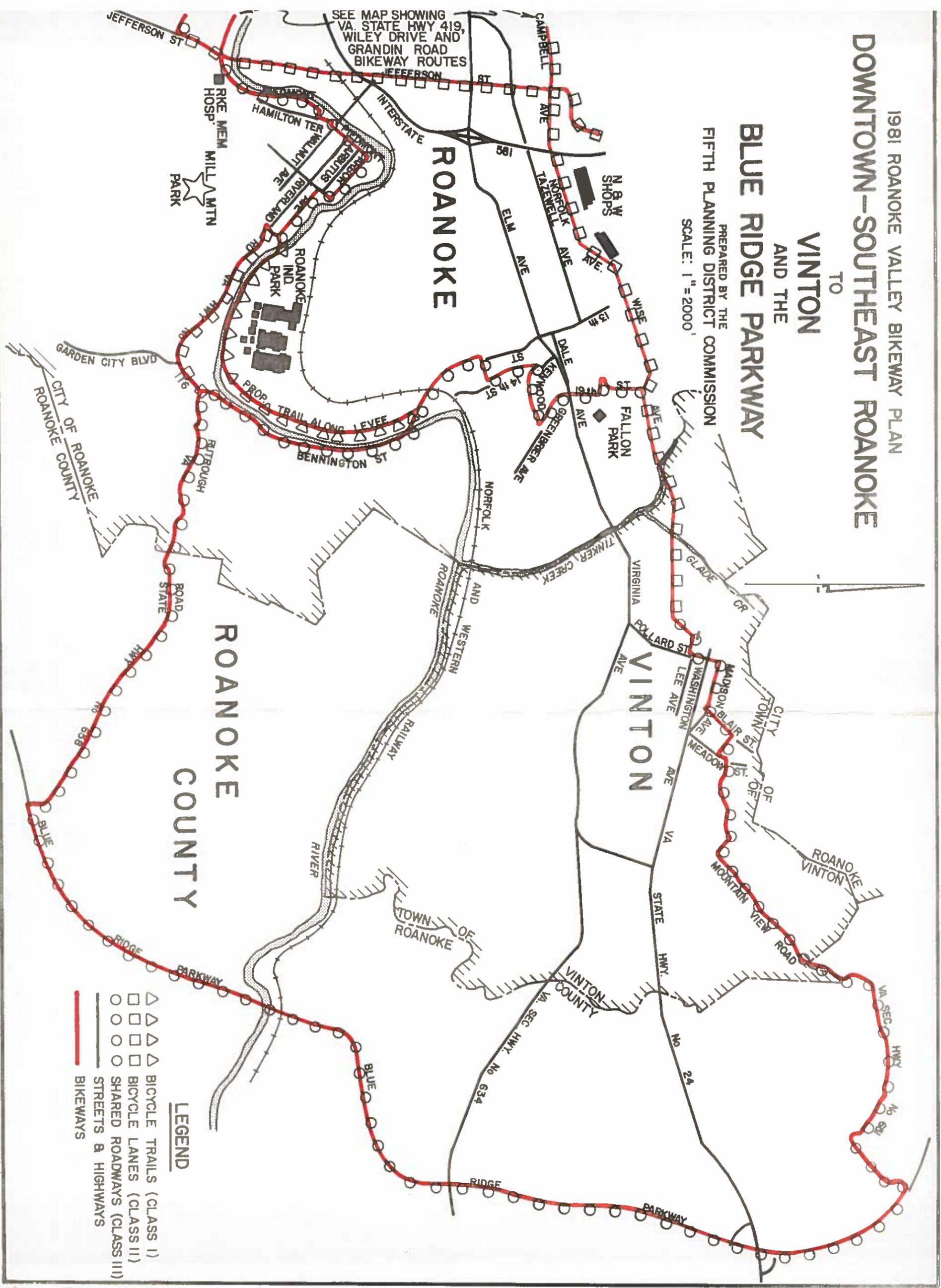
LEGEND

- TTTTTTTTT CITY AND TOWN LIMITS
- ~~~~~ RIVER
- ==== STREETS AND HIGHWAYS
- BIKEWAYS
- △ △ △ △ △ BIKEWAY TRAILS (CLASS I)
- □ □ □ □ BIKEWAY LANES (CLASS II)
- ○ ○ ○ ○ SHARED ROADWAYS (CLASS III)

1981 ROANOKE VALLEY BIKEWAY PLAN DOWNTOWN-SOUTHEAST ROANOKE

VINTON TO AND THE BLUE RIDGE PARKWAY

PREPARED BY THE
FIFTH PLANNING DISTRICT COMMISSION
SCALE: 1" = 2000'



- LEGEND**
- △ △ △ △ BICYCLE TRAILS (CLASS I)
 - □ □ □ BICYCLE LANES (CLASS II)
 - ○ ○ ○ SHARED ROADWAYS (CLASS III)
 - STREETS & HIGHWAYS
 - BIKEWAYS

SEE MAP SHOWING
VA. STATE HWY 419,
WILEY DRIVE AND
GRANDIN ROAD
BIKEWAY ROUTES

RKE MEN
HOSP. MTN
PARK

N & W
SHOPS

FALLON
PARK

ROANOKE
COUNTY

VINTON

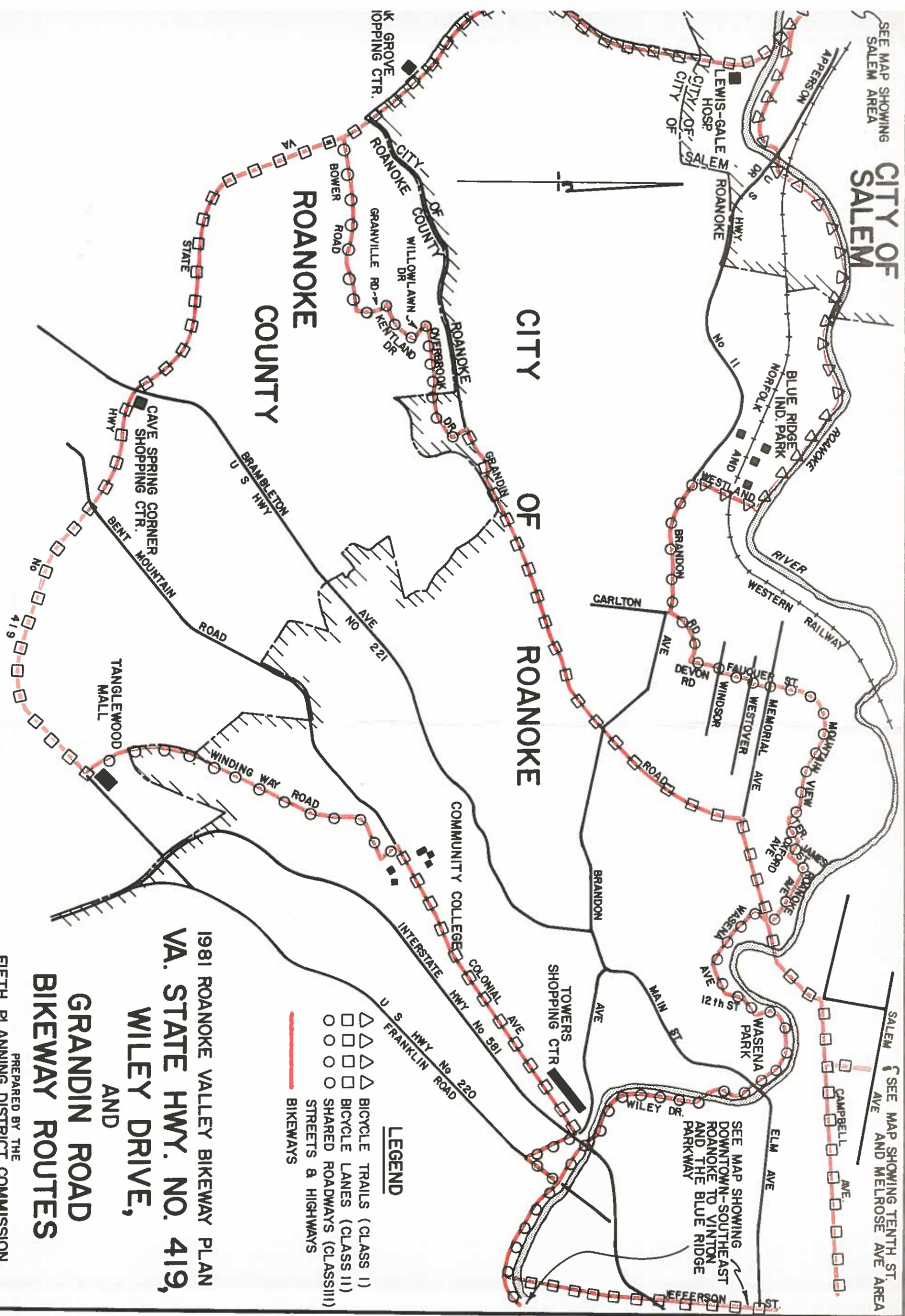
TOWN OF
ROANOKE

VINTON
COUNTY

ROANOKE
VINTON

SEE MAP SHOWING SALEM AREA

CITY OF SALEM



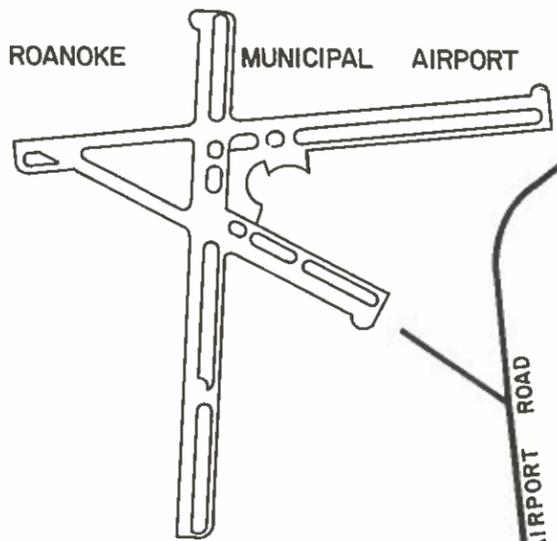
SEE MAP SHOWING TENTH ST. AVE AND MELROSE AVE AREA

SEE MAP SHOWING DOWNTOWN-SOUTHEAST ROANOKE TO VINTON AND THE BLUE RIDGE PARKWAY

- LEGEND**
- △ △ △ △ BICYCLE TRAILS (CLASS I)
 - □ □ □ BICYCLE LANES (CLASS II)
 - ○ ○ ○ SHARED ROADWAYS (CLASS III)
 - STREETS & HIGHWAYS
 - BIKEWAYS

1981 ROANOKE VALLEY BIKEWAY PLAN
VA. STATE HWY. NO. 419,
WILEY DRIVE,
AND
GRANDIN ROAD
BIKEWAY ROUTES

PREPARED BY THE
 FIFTH PLANNING DISTRICT COMMISSION
 SCALE: 1" = 2000'



ROANOKE

MUNICIPAL AIRPORT

CROSSROADS MALL SHOPPING CENTER

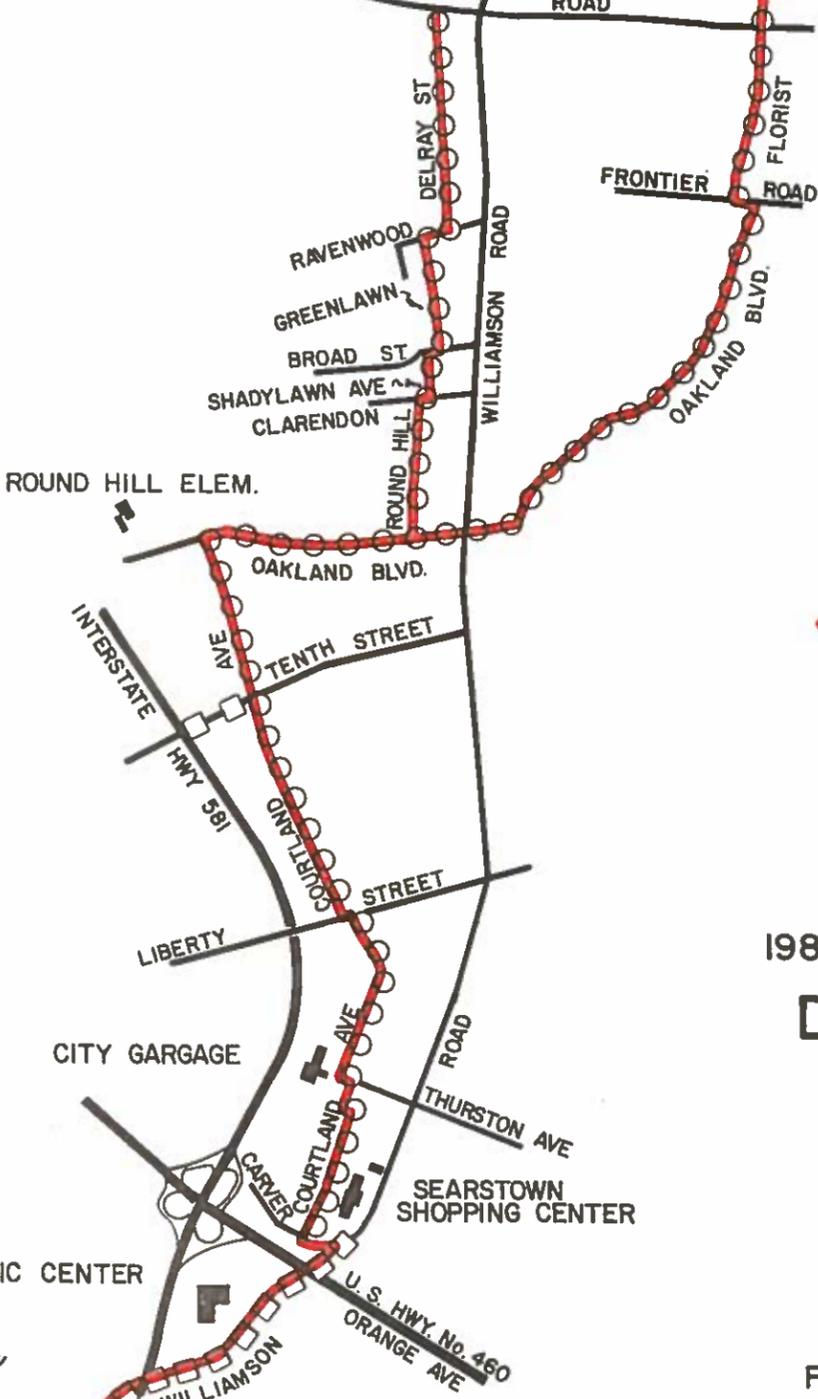
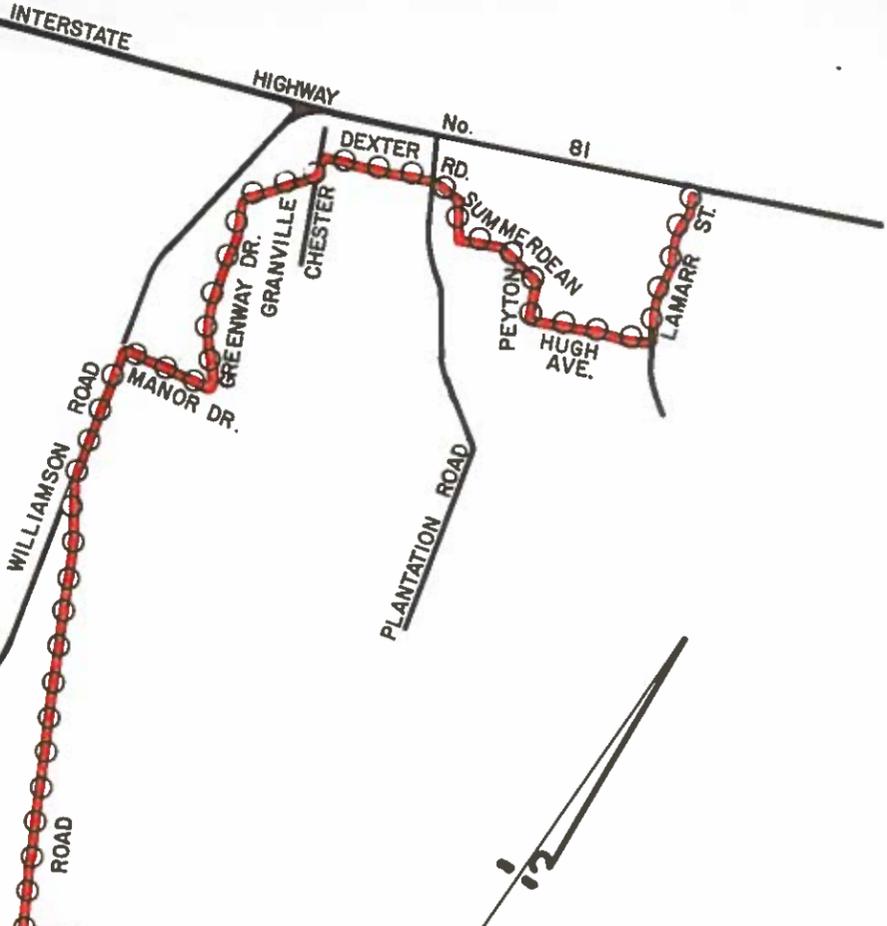
HERSHBERGER

ROUND HILL ELEM.

CITY GARGAGE

CIVIC CENTER

SEE MAP SHOWING S. JEFFERSON ST. ROUTE



LEGEND

- ○ ○ ○ ○ BICYCLE LANES (CLASS II)
- □ □ □ □ SHARED ROADWAYS (CLASS III)
- STREETS AND HIGHWAYS
- BIKEWAYS

**1981 ROANOKE VALLEY BIKEWAY PLAN
DOWNTOWN ROANOKE
TO
CROSSROADS MALL
AND
HOLLINS AREA**

PREPARED BY
FIFTH PLANNING DISTRICT COMMISSION

SCALE: 1" = 2000'

CITY OF SALEM



- LEGEND**
- △ △ △ △ BICYCLE TRAILS (CLASS I)
 - □ □ □ BICYCLE LANES (CLASS II)
 - ○ ○ ○ SHARED ROADWAYS (CLASS III)
 - — — — STREETS & HIGHWAYS
 - — — — BIKEWAYS

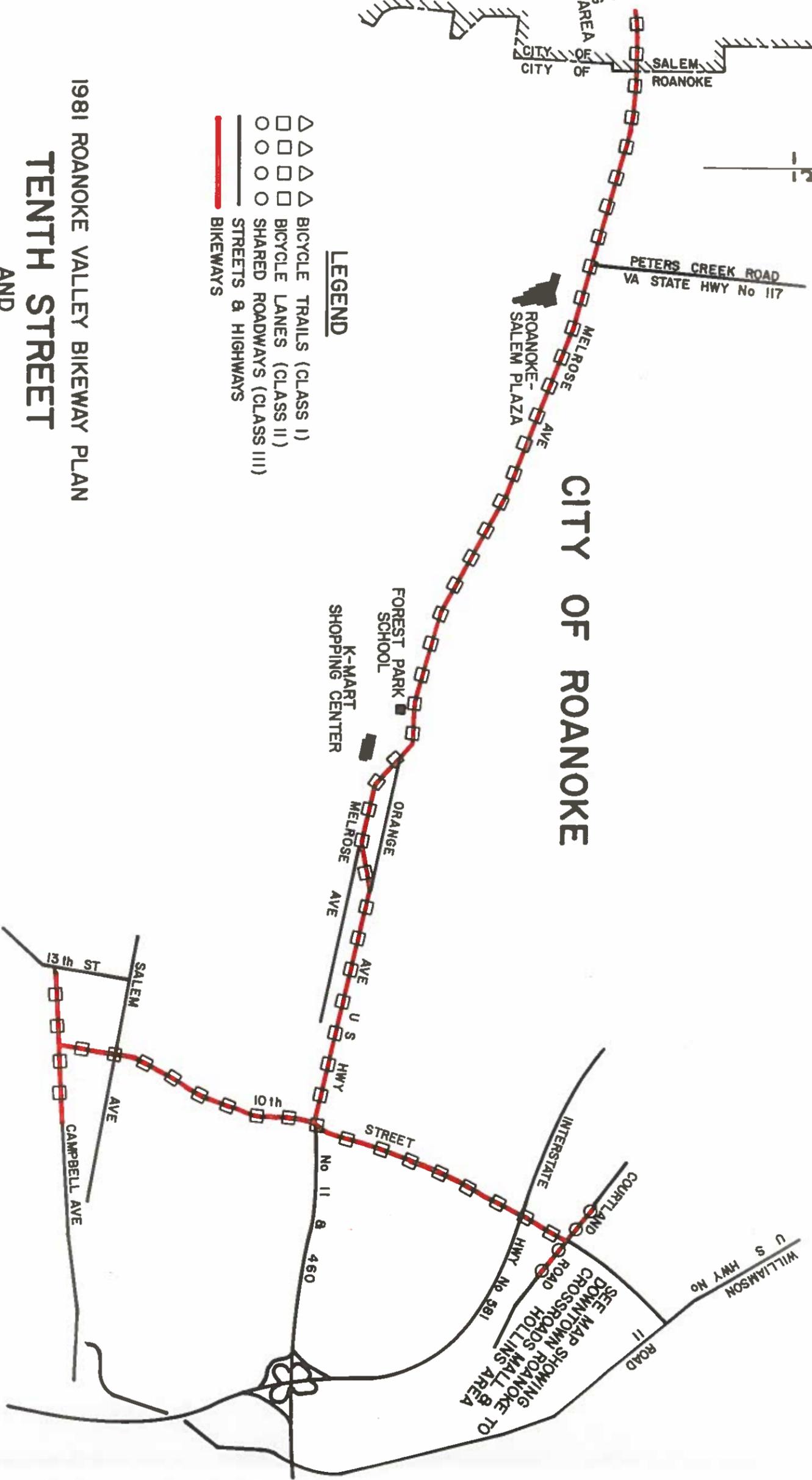
CITY OF ROANOKE

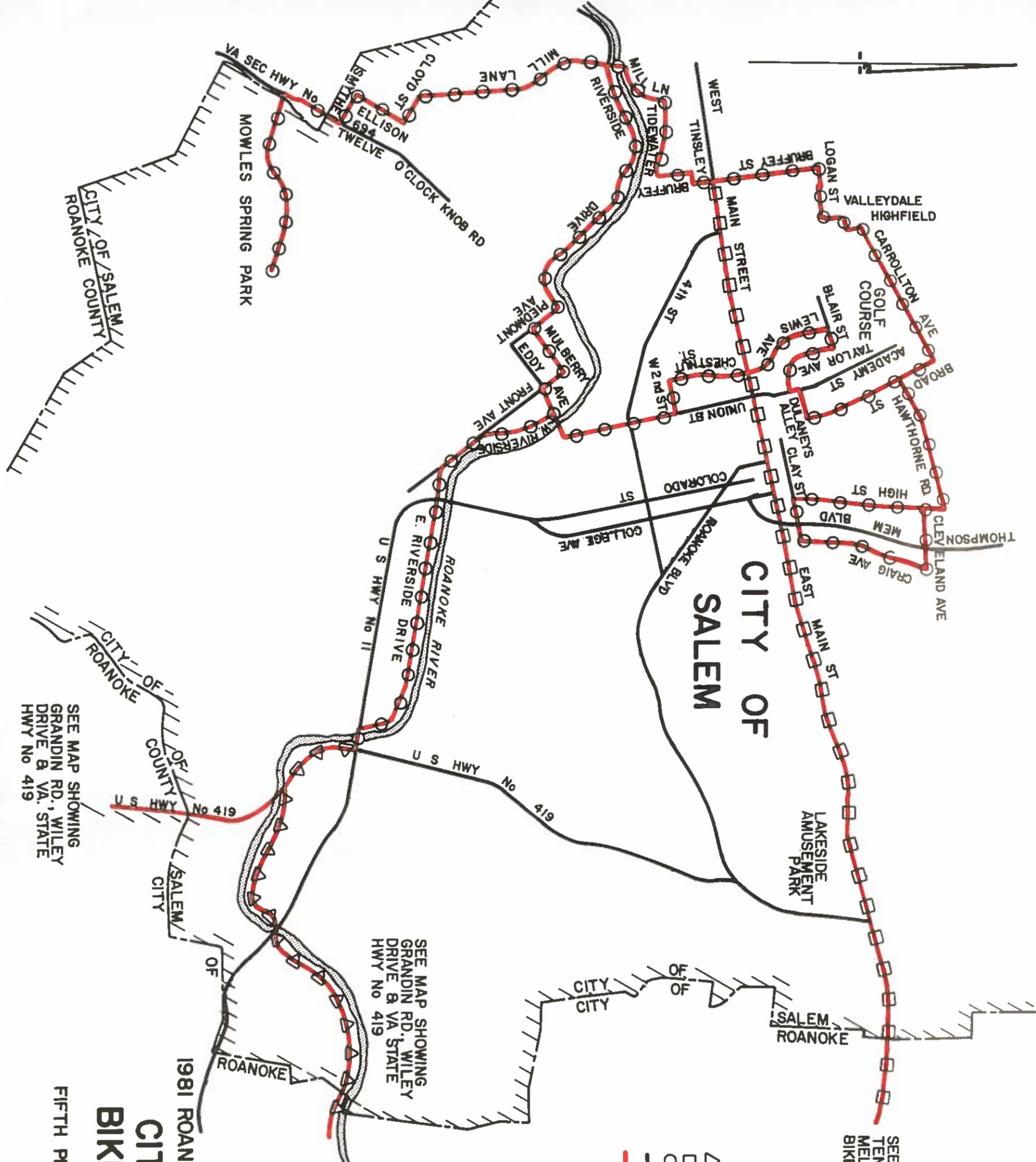
1981 ROANOKE VALLEY BIKEWAY PLAN TENTH STREET AND MELROSE AVENUE BIKEWAYS

PREPARED BY THE
FIFTH PLANNING DISTRICT COMMISSION

SCALE: 1" = 2000'

SEE MAP SHOWING DOWNTOWN ROANOKE
TO SALEM BY THE WILEY DRIVE GRANDIN
ROAD AND U S HWY NO 419 BIKEWAYS





SEE MAP SHOWING TENTH STREET & MELROSE AVE. BIKEWAYS

LEGEND

- △ △ △ △ BICYCLE TRAILS (CLASS I)
- □ □ □ BICYCLE LANES (CLASS II)
- ○ ○ ○ SHARED ROADWAYS (CLASS II)
- — — — STREETS & HIGHWAYS
- — — — BIKEWAYS

**1981 ROANOKE VALLEY BIKEWAY PLAN
CITY OF SALEM
BIKEWAY ROUTES**

PREPARED BY THE
FIFTH PLANNING DISTRICT COMMISSION
SCALE: 1" = 2000'

SEE MAP SHOWING GRANDIN RD., WILEY DRIVE & VA. STATE HWY No 419

SEE MAP SHOWING GRANDIN RD., WILEY DRIVE & VA. STATE HWY No 419