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LEWISTON

Bridge Report

Prepared for the
95TH LEGISLATURE

by the
MAINE
STATE HIGHWAY COMMISSION
in cooperation with the
U.S. BUREAU OF PUBLIC ROADS

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LEWISTON - AUBURN

Bridge Report

Prepared by the

MAINE STATE HIGHWAY COMMISSION

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U. S. BUREAU OF PUBLIC ROADS

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State Highway Commission
State of Maine
Augusta

February 19, 1951

To the Honorable Senate and House of Representatives
of the Ninety-fifth Legislature:

This bridge report is prepared in response to a directive from the Ninety-fourth Legislature and is presented for your consideration.

The construction of a third bridge between Lewiston and Auburn is recommended. Previous to its construction, we urge that the municipal authorities of the two places give consideration to the recommendations contained herein relative to means of improving traffic movements on the approaches to the present North Bridge.

Respectfully,

Lloyd B. Morton
C. J. Russell
Harley D. Welch
State Highway Commission

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LEWISTON-AUBURN BRIDGE REPORT

INTRODUCTION

This report is written in compliance with a directive by the Ninety-fourth Legislature that the State Highway Commission make a study of the need and costs of a highway bridge across the Androscoggin River between Lewiston and Auburn and report its findings to the Ninety-fifth Legislature.* This report satisfies the legislative directive, providing an evaluation of need, a determination of location, and an estimate of cost.

In order to define the existing conditions upon which need is predicated, to determine a feasible location for a new bridge and to make a rational estimate of cost, basic data were secured throughout the urban area. The information secured for these purposes included an origin and destination survey, a parking survey limited to the business areas of the two cities, density and classification determinations, inventory, speed checks and turning movements and a reconnaissance survey at the bridge location. These surveys were completed in 1949 and 1950.

HISTORY OF THE AREA

Lewiston and Auburn, situated on facing banks of the Androscoggin River some 20 miles above tidewater, were originally settled just prior to the Revolutionary War. The growth of the two cities has been uninterrupted since that time, with a present combined population of 64,220 according to the 1950 census. The terrain in the area is generally level with the exception of about a six per cent grade from the river plain for an approximate 600 feet in Lewiston and for slightly less distance in Auburn. The street pattern in the business and industrial area is rectangular with a fan-like development of streets and highways extending from the limits of this business area.

There are three numbered routes entering Lewiston, the most important of which is U. S. Route 202 extending through the central part of the State to Bangor; Route 126 and Route 196 extend through the adjacent communities of Sabattus and Lisbon Falls. In Auburn there are four routes—U. S. Route 202 connecting this area with the southern part of the State; Routes 11 and 121 extending toward the New Hampshire line and Route 4 extending toward northern Oxford and Franklin Counties.

Lewiston and Auburn are primarily manufacturing centers with cotton textiles the most important activity in Lewiston and shoe manufacturing in Auburn.

EVALUATION OF NEED

Need for improved facilities for the number of vehicles crossing the Androscoggin River between Lewiston and Auburn derives from traffic volumes generally in excess of 20,000 vehicles daily on the North Bridge and its approaches. The off-center location of the South Bridge with respect to the core of the business area makes its utilization for the further relief of North Bridge traffic unpracticable; therefore, the problem resolves itself into providing relief for the large volume of traffic on the North Bridge and its approaches. Incontrovertible evidence of the deficiencies causing congestion on the North Bridge and its approaches, at least between Lisbon Street in Lewiston and Turner Street in Auburn, is provided in the speed and delay studies (See Map 1) which reveal average speeds of 8 miles an hour or less during the peak hours of traffic during which bumper to bumper operation of vehicles prevails. The existing parallel curb parking occurring on both sides of Main Street in Lewiston from Lisbon Street to the North Bridge and on Court

* See appendix

Street in Auburn from the North Bridge to Minot Avenue utilizes such areas of these streets for parking occupancy and maneuvering as to reduce their vehicular capacity 49%.

EVALUATION OF LOCATION

The results from the analysis of the origin and destination studies made in Lewiston and Auburn were the principal factors in determination of location of a proposed bridge connecting Lewiston and Auburn. As has already been indicated, congestion exists on the approaches to the North Bridge. The location of a new crossing of the Androscoggin River should be such as to serve at least that volume of traffic in excess of the capacity of the existing bridge and its approaches. The location should also be such as to provide the most direct connection for traffic which is not otherwise efficiently accommodated. The location, as determined from the analysis of origin and destination studies, should be parallel with and north of the existing North Bridge and immediately south of the Maine Central Railroad Bridge. The analysis of origin and destination data correlated with existing volumes indicates that the proposed new bridge over the Androscoggin will accommodate 8,480 vehicles and that 11,575 vehicles will continue to use the existing North Bridge at the 1949 annual average daily traffic level.

The Lewiston approaches to this structure should run easterly from the bridge to a connection with Sabattus and Main streets on an entirely new location. It should be observed that the latter intersection is a pivotal point for traffic serving State Routes 11 and 100, U. S. Route 202 and Route 126. This intersection is a distribution point for traffic having origin or destination at Winthrop, Augusta and points north, and Gardiner and points east.

The approach, by use of existing streets, is accessible to the high volumes of traffic generated in the business district in Lewiston, thus affording maximum relief on the present North Bridge and approaches thereof.

The approach on the Auburn side will run generally west, overpassing Turner Street to a junction with Pleasant and Hampshire streets. At the Turner Street overpass, adequate on and off ramps will be constructed to provide for traffic to Route 4, serving northern Oxford and Franklin Counties and to provide for that traffic which has its origin and destination in those sections adjacent to Turner Street.

From the junction of Hampshire Street with Pleasant Street, the improvement will continue south on Pleasant Street to a junction with Court Street.

At the proposed location, the structure across the Androscoggin River will carry a volume of 9,760 vehicles during the four summer months (1949 level). Estimated usage of the new bridge on an annual average daily basis for 1949 is 8,480 vehicles. Expansion of this annual average to the 1970 level indicates a probable volume at that time of 10,430. Since origin and destination* was taken during the summer, the following distribution table** was set up on the basis of the volumes of traffic which occurred at that time:

LEWISTON APPROACH

Main Street, East, Rt. U. S. 202, 11, 100 and adjacent areas	4,110
Sabattus Street, Route 126 and adjacent areas	2,790
Area north of High Street	320
South of High Street between Hammond and Chapel and including both streets	2,540
	9,760

* A tabulation and a section map showing the origins and destinations of vehicles using the existing North Bridge are on file at the State Highway Commission office.

** A map showing distribution of traffic using the proposed bridge, as well as residual traffic on the existing bridge, is available at the State Highway Commission office.

AUBURN APPROACH

Turner Street, Ramp	3,700
Area up Hampshire Street	710
Goff Street and Gamage Avenue area	760
Utilizing Court Street and adjacent streets off Goff Hill	760
Minot Avenue and South Goff Street, north of Elm	300
Minot Avenue in vicinity of Elm and High streets	50
Mechanic Falls Road and Auburn area served by Minot Avenue west of junction with Washington Street	1,340
Portland Road and Auburn area served by Washington Street	2,140
	9,760

APPRAISAL OF EXISTING CONDITIONS

In view of the locations of the South Bridge and the North Bridge, it is obvious that consideration must be given to the improvement of the approaches to the North Bridge or to furnishing an additional facility if relief to the traffic is to be afforded. In Auburn, all numbered routes and streets feed into Court Street on the approaches to the North Bridge and, in Lewiston, Main Street performs the same function as Court Street in Auburn in that all major highways entering the urban area terminate thereon. Street widths and volumes on Court Street in Auburn and Main Street in Lewiston are shown in the following tabulation:

	Surface Width	1949 24-Hr. Ave. Four Summer Months Traffic
COURT STREET IN AUBURN		
Minot Avenue to Railroad Crossing	48'	11,600
Railroad Crossing to Spring Street	46'	11,600
Spring Street to Pleasant Street	46'	11,600
Pleasant Street to High Street	46'	15,400
High Street to Turner Street	48'	15,400
Turner Street to Main Street	48'	20,000
Main Street to Bridge	40'	23,080
On North Bridge	38'	23,080
MAIN STREET IN LEWISTON		
North Bridge to Lincoln Street	46'	23,080
Lincoln Street to Island Avenue	46'	22,980
Island Avenue to Canal Street	54'	22,980
Canal Street to Lisbon Street	52'	22,380

* The above widths are curb-to-curb sections, hence, actual width also represents potential width.

CAPACITY DIFFERENTIAL ON EXISTING FACILITIES

In order to properly evaluate the capacity of Main Street in Lewiston from Lisbon Street to the bridge and Court Street in Auburn from the bridge to Minot Avenue, it is necessary to deal with the westbound movement and the eastbound movement separately.

Generally speaking, the surface widths are about 46-48 feet on these facilities with the exception of the North Bridge where a 38 foot width is available.

Westbound traffic moves at a rate of approximately 1,100 vehicles per hour between Lisbon Street and the bridge when Main Street is operating at or near the saturation point. Parking is prohibited on the north side of Main Street from Lincoln Street to the bridge. Storage of vehicles waiting to make a left turn into Lincoln Street compresses through traffic for the most part into the curb lane but, from this point on across the bridge to Main Street in Auburn, two lanes operate especially during the peak hour.

In Auburn, the street capacity is regulated to a considerable degree by the green signal time at the Court-Main Street and the Court-Turner Street intersections. Signals at these points operate on a 65/35 per cent split of time, this division of time remaining constant as the signal control system operates at present. The actual length of the green time may be altered from the central control by changes in the length of the light cycle. The subdivision of a 60 second cycle should permit clearance of 960 vehicles per lane or 1,920 vehicles in the two lanes per hour. In actual practice, however, the high percentage of left and right turns at the Main Street intersection cuts the capacity of the westbound lanes back to a maximum possible volume of about 1,100 vehicles per hour. Despite the fact that the junction of Turner and Court streets does not appear to present the problems of the Main Street intersection, the utilization of street width for parking between Main and Turner streets restricts moving vehicles to a single-lane operation and prevents the clearance of more than 1,000 vehicles per hour.

The capacity of the eastbound lanes is slightly less than the westbound facilities despite the fact that two-lane operation prevails generally from Main Street in Auburn to Lisbon Street in Lewiston. This decreased capacity derives from the additional junctions on the south side of Main Street which render the lane adjacent to the parking lane usable in a large measure for vehicles turning into and from the intersecting streets.

With parking permitted and with existing left turns, present actual maximum capacity between Lisbon Street in Lewiston and Main Street in Auburn is in the vicinity of 2,100 vehicles per hour. With the prohibition of parking, an additional lane for the movement of vehicles will be made available and lane widths will be increased from an approximate 10 feet to 11 feet. Capacities per lane will increase with the elimination of delay caused by parking maneuvers. For example, the average travel time, westbound, between Lisbon and Lincoln streets, based upon several speed and delay trials during peak hours of travel was 81.25 seconds. Average delay due to parking maneuvers per trip was 15.25 seconds. The elimination of this delay by the prohibition of parking makes possible the increase in speed from 8.8 MPH to 10.4 MPH and a gain in capacity of 275 vehicles per hour. The factors of increased width and increased speeds therefore, indicate lane capacity of about 1,475. Curb lane capacity, on the basis of findings by the Institute of Traffic Engineers, may be computed at approximately half that of the centerline lane. This yields a capacity of 2,210 vehicles. For eastbound movements, similar computations indicate capacity of 1,960 vehicles in two available lanes or a total street capacity of 4,170 as compared with 2,100 vehicles per hour under existing conditions.

In Auburn, traffic congestion is most acute at the intersections of Court with Main and Turner streets and on Court Street between these intersections. Since the rates of clearance of the intersections may be altered by the revision of signalization, increases in capacity which may be obtained between intersections will be considered. Speed trials indicate identical rates of 7.8 MPH in each direction between Main and Turner streets with lane capacity of 975 vehicles on the basis of existing intersection controls. Removal of parallel curb parking will increase speeds to 9.02 MPH for the eastbound movement and to 8.8 MPH for the westbound movement, with respective increases in capacity to 1,214 and 1,187 vehicles per hour. The above capacity figures represent single-lane operation. The removal of parking creates two additional lanes and provides for a 50% increase in street capacity, thus, total street capacity is fixed at 3,600 vehicles per hour which, because corrections are parallel, will automatically approximate the 4,100 which is determined as the maximum on the Lewiston approach and the bridge.

Increase in the midblock capacities to the above noted levels would require the alteration of signalization if intersection clearances are to be adequate. There are several proposals under consideration at present, especially in Auburn, for the elimination of congestive turning movements in intersections. The elimination of parking and retiming of

signals would permit a capacity of 3,400 vehicles per hour between Lisbon Street in Lewiston and Minot Avenue in Auburn, with comfortable, convenient and safe operation of vehicles and no delays at intersections longer than a single light cycle.

ACCOMMODATION OF DIVERTED PARKING

Considerable additional street capacity can be obtained on Main Street in Lewiston between Lisbon Street and the North Bridge and on Court Street in Auburn from the North Bridge to Minot Avenue if curb parking is removed from these streets. If parking is to be removed from these streets, it is obvious that some provision must be made for its accommodation. Subsequent discussions indicate the procedures followed in determining to what extent streets and lots immediately adjacent to Main and Court streets can provide accommodations for these vehicles diverted from these streets. In order to determine the parking capacity of a street or lot, each legal parking space is rated as available space for eight 60-minute periods or 480 space minutes per day. The term "space minutes" as used subsequently applies to the number of minutes available in all spaces per eight hour day.

During the parking survey it was found that unrestricted curb spaces on Lincoln Street between Main Street and Cross Street, on Canal Street between Main Street and Ash Street and on Mill Street accommodated vehicles in excess of 34,000 space minutes per day out of a total available time of 47,000 space minutes.

Consideration of the fact that the above-mentioned parking facilities were available in an unrestricted area, it is believed that the installation of meters with a one hour limit will cause those vehicles parked in excess of one hour to seek parking in another area. However, in supporting computations, a space use of two hours was assigned in order to be on the conservative side in making an estimate.

Thus, an additional 27,000 space minutes were estimated available in addition to the previously computed surplus of 13,000 space minutes, making a total of 40,000 surplus space minutes available.

In computing the actual time which a parking facility may be used, it has been found that 80% usage is about the maximum usage obtainable. That is due to two factors, one of which is that considerable time is not usable because of parking maneuvers and, in addition, that there are brief intervals of time during which a space may be available but not in demand by any of the cars which are passing. Another factor must be considered in the diversion of parking from one street to another and that is the additional walking time necessary between the parking space and the place of destination. Assuming that the additional parking time required by walking to destination in the Lewiston-Auburn area will average 5 minutes, this provides an approximate 13% increase in space minutes used by diverted vehicles. Application of the combined percentages derived from time lag and additional walking time to the total surplus of 40,000 space minutes yields an actual surplus of 27,000 space minutes which is considerably more than ample time to provide for the accommodation of vehicles using 6,700 space minutes to be diverted from Main Street between Lisbon Street and the North Bridge to the new location on Lincoln, Mill and Canal streets.

Motorists parked on Main Street from Lisbon Street to the bridge, on Canal Street from Main to Ash Street, on Lincoln Street from Main Street to Cross Street, on Mill Street and all public lots and garages served by those streets, had destinations totaling 9,000 space minutes in other areas. Parkers in other areas with destinations on Main Street between Lisbon Street and the bridge utilized 1,000 space minutes. This shows further evidence of the adequacy of the area to which parking may be diverted.

Analysis of parking survey interviews in Auburn indicates that parked cars diverted from Court Street between Main Street and Turner Street may be accommodated at the

public parking lot located at the corner of North Main and Franklin streets. This lot has a capacity of 175 cars or a space minute capacity per eight hour day of 84,000 space minutes. Presently accommodated by this parking lot are cars which use 11,400 space minutes, leaving a surplus of 72,500 available space minutes. The reduction of this revised surplus by 33 per cent yields a usable surplus of 48,575 space minutes.

Vehicles currently parked on Court Street between Main and Turner streets utilize 4,800 space minutes. An additional demand for service in this general vicinity was 8,500 space minutes, providing a total requirement of 13,300 space minutes for vehicles which would be diverted to the parking lot. The surplus time available is considerably more than sufficient to accommodate the diverted vehicles.

Between Turner Street and Minot Avenue, parking time requirements are currently 9,000 space minutes which would be adequately satisfied by a surplus of time available on existing metered areas on Pleasant Street north of Court Street, in addition to newly metered areas on Pleasant Street south of Court Street; Spring Street, both north and south of Court Street and School Street west of Spring Street. The surplus time available on these three streets is 19,100 space minutes.

From the preceding analysis, it is concluded that all parking presently permitted on Main Street in Lewiston, and Court Street in Auburn between Lisbon Street and Minot Avenue can be accommodated on adjacent streets or by parking lots within 5 minutes walking distance of the destinations of the occupants of the vehicles currently parked on these streets.

DESIGN FEATURES

Beginning along the centerline of Pleasant Street in Auburn, the proposed project centerline will extend on about an 8 degree curve toward the northeast; then along a tangent and a 5 degree curve to a point about opposite, and 140 feet south and downstream from the westerly abutment of the present railroad bridge. The line then extends across the Androscoggin River to the Lewiston shore, to a point about 80 feet south of the existing railroad. From here on about a 9 degree curve and along a tangent, the centerline, as previously noted, will extend to Main Street in Lewiston about opposite Sabattus Street. The length of the above project is approximately 4,000 feet.

Access to the structure from Turner Street in Auburn will be provided. This necessitates an underpass under the existing railroad track and the construction of two ramps to the bridge; one for traffic entering the bridge and traveling to the Lewiston side and the other for traffic leaving the structure and entering Turner and Center streets in Auburn.

The project will deny access from Hampshire Street between Turner and Pleasant streets, permit access to Hampshire Street west of Pleasant Street, overpass both Turner and Knight streets on the Auburn approach, and will meet all intersecting streets at grade in the city of Lewiston. Further study may indicate that improvement may be necessary on the approach connections, possibly involving the use of Spring and Pleasant and Middle and Bates as pairs of one-way streets.

The bridge structure will begin at about the westerly side of Turner Street in Auburn and will consist of a series of structural steel I-beam spans supported upon reinforced concrete column piers. The above type of structure will extend to the high point of land on the Auburn approach. From this point, the bridge will consist of a series of steel deck truss spans extending over the main river channel to the Lewiston shore. The length of the bridge project is about 2,150 feet. Ramps to the structure from the Turner Street approach will also be carried on a trestle wherever necessary.

The bridge roadway width will be 28 feet with a sidewalk 6 feet wide along each side. The bridge floor, sidewalks, piers and abutments will be of reinforced concrete and the roadway will carry a bituminous concrete wearing surface.

Beginning at Pleasant Street in Auburn, the grade will extend up at about 1½ per cent to the main river crossing. The main structure will have about the same roadway elevation as the top of the present railroad bridge.

From the bridge to Court Street in Auburn and from Middle Street to Sabattus Street in Lewiston, the approaches will have surface widths of 64 feet, 6 inch granite curbs and 6-8 foot sidewalks will be provided on both sides. Road surface will be 3 inch bituminous concrete over a base comprising 18 inches of gravel and 5 inches of bituminous treated crushed rock.

RECOMMENDATIONS AND COSTS

The State Highway Commission recommends construction of a new bridge between Lewiston and Auburn adjacent to and downstream from the existing Maine Central Railroad crossing. The cost of the new structure and its approaches is estimated at \$3,000,000. In view of the fact that delays in construction may occur, it is recommended that the municipal authorities of Lewiston and Auburn give consideration to the removal of parking at all times on the north side of Main Street from Chapel Street to the North Bridge and on the south side of Main Street from Lisbon Street to the bridge; in Auburn, on both sides of Court Street from the bridge to Minot Avenue.

APPENDIX

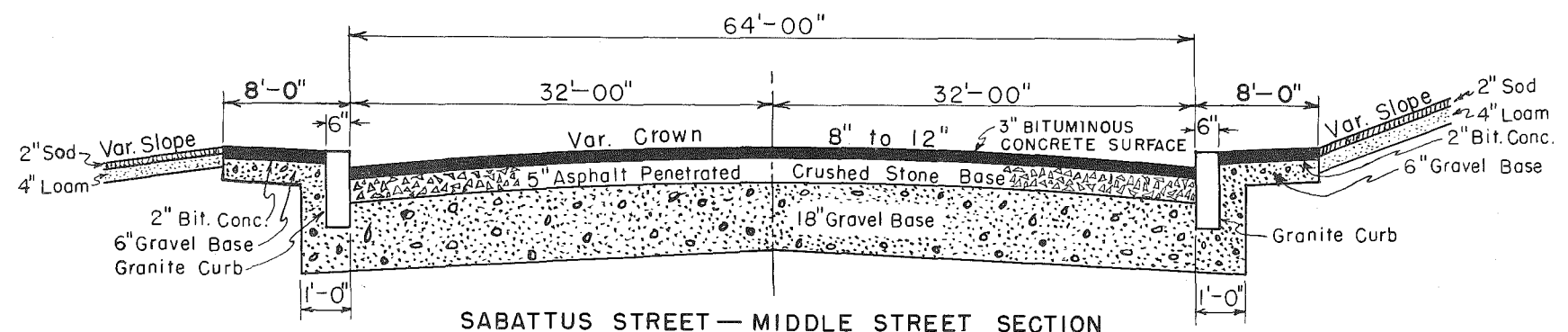
Resolve - 182

**RESOLVE, Authorizing State Highway Commission to Study Desirability of a Bridge
Across the Androscoggin River.**

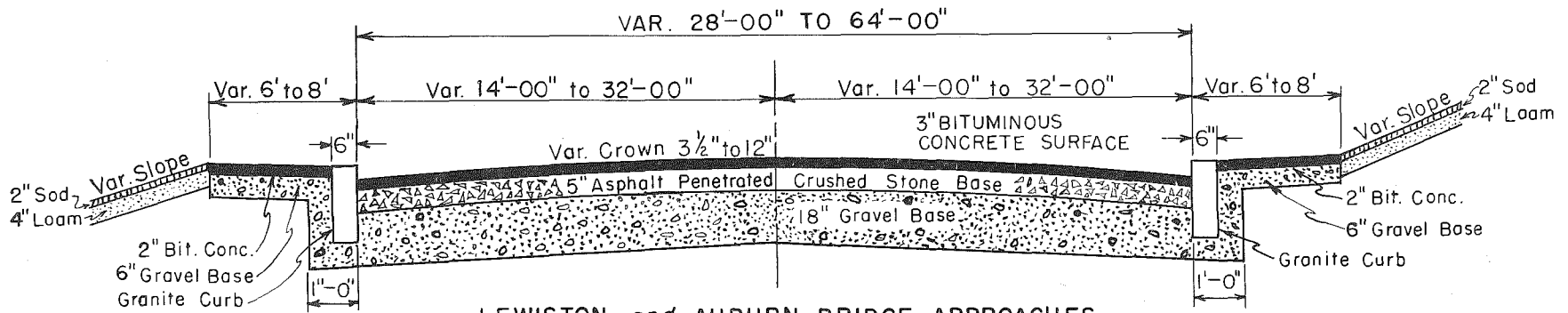
Bridge across Androscoggin river; study authorized. Resolved: That the state highway commission be, and hereby is, authorized and directed to make a study of the need and cost of a highway bridge across the Androscoggin river between the cities of Lewiston and Auburn, in the county of Androscoggin, with necessary highway approaches thereto; and be it further

Resolved: That the commission shall report the results of their study at the next regular session of the legislature.

TYPICAL CROSS-SECTIONS



SABATTUS STREET — MIDDLE STREET SECTION
and
PLEASANT STREET SECTION

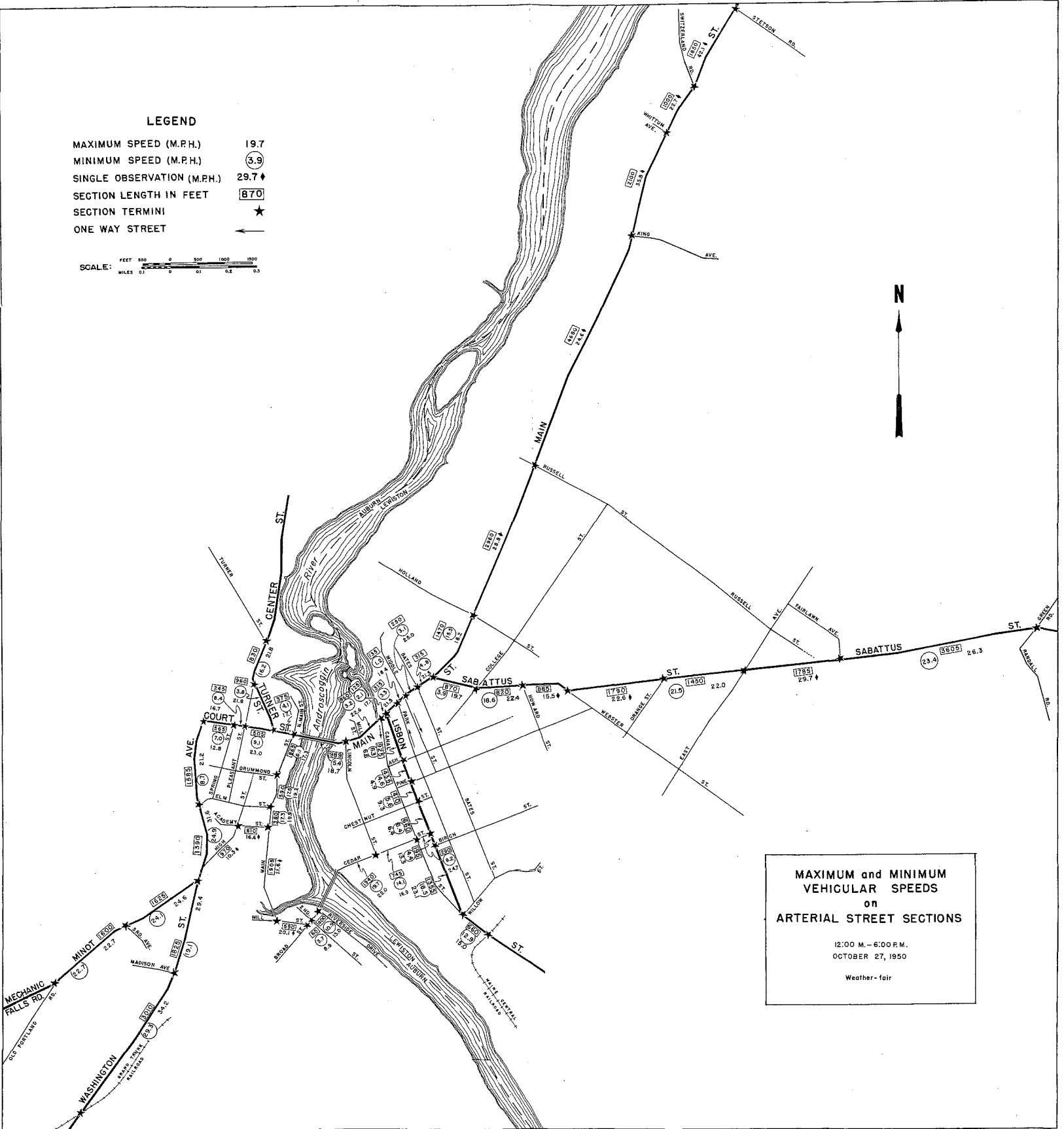


LEWISTON and AUBURN BRIDGE APPROACHES

CHART NO. 1

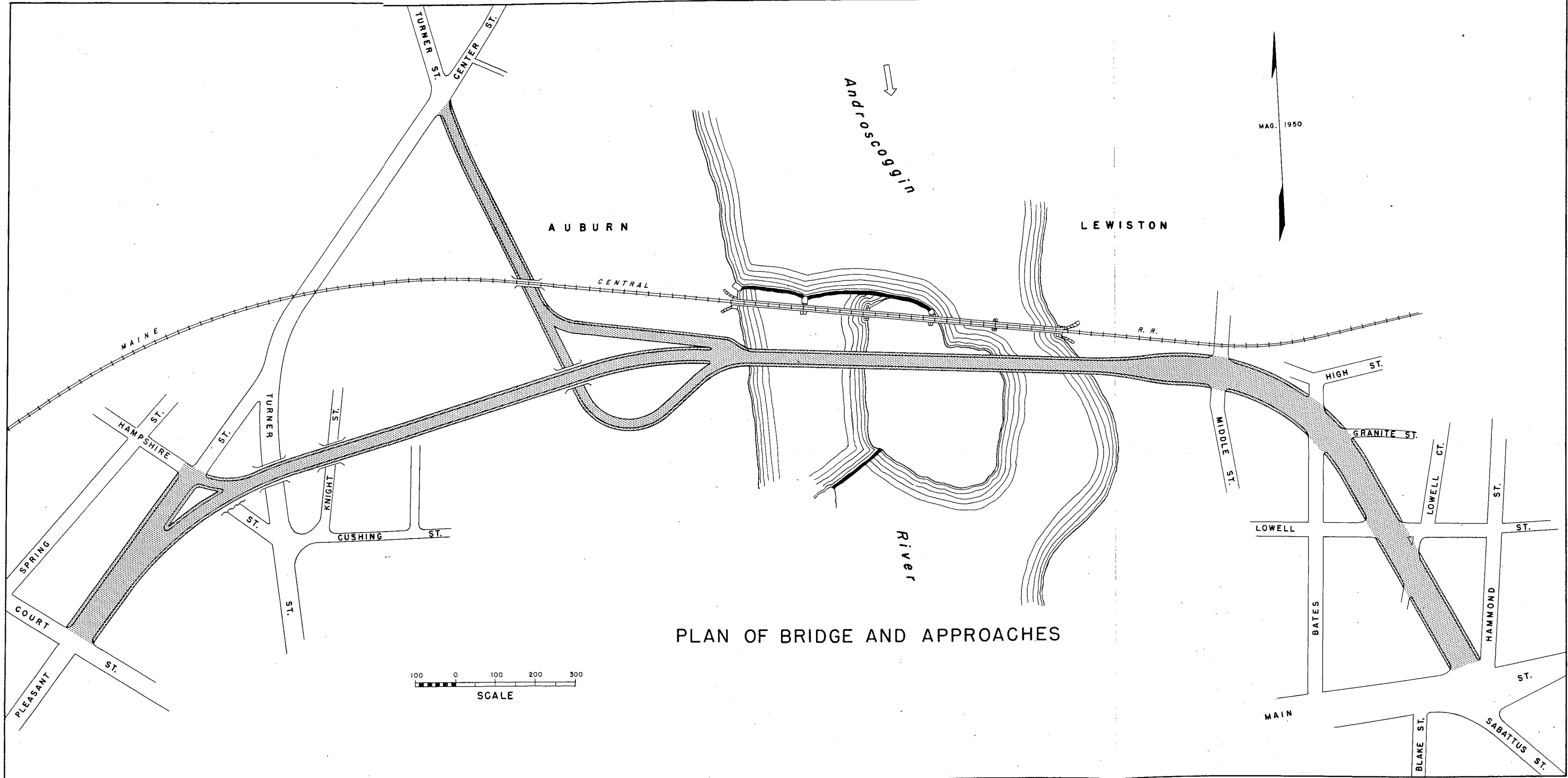
LEGEND

- MAXIMUM SPEED (M.P.H.) 19.7
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- SINGLE OBSERVATION (M.P.H.) 29.7 †
- SECTION LENGTH IN FEET [870]
- SECTION TERMINI ★
- ONE WAY STREET ←



**MAXIMUM and MINIMUM
VEHICULAR SPEEDS
on
ARTERIAL STREET SECTIONS**

12:00 M. - 6:00 P.M.
OCTOBER 27, 1950
Weather - fair



PLAN OF BRIDGE AND APPROACHES