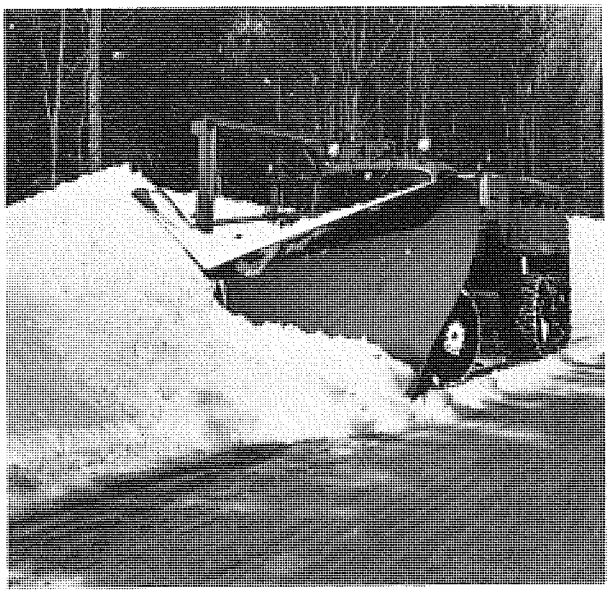
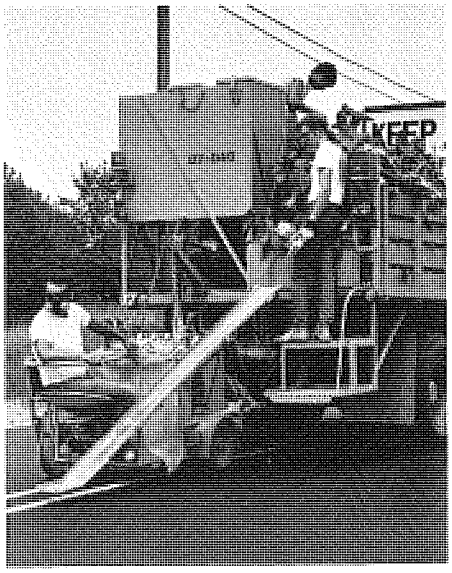
HIGHWAY REPORT

To The

106th Legislature





Prepared by

Maine Department of Transportation

In response to

Report on the
State Highway Commission

by the

Highway Study Committee

of the

105th Legislature

HIGHWAY REPORT

TO THE

106TH LEGISLATURE

PREPARED BY

MAINE DEPARTMENT OF TRANSPORTATION

IN RESPONSE TO

REPORT ON THE

STATE HIGHWAY COMMISSION

BY THE

HIGHWAY STUDY COMMITTEE

OF THE

105TH LEGISLATURE

STATE OF MAINE

In Senate February 4, 1971

Ordered, the House concurring, that a copy of the Highway Study Committee Report on the State Highway Commission, dated January 27, 1971, accompanied by this Order, be transmitted forthwith by the Secretary of the Senate to the Chairman of the State Highway Commission and that he be directed to report in detail at the next regular session of the Legislature as to the progress the Commission has made pursuant to the recommendations contained therein.

SP 196

IN SENATE CHAMBER

FEB 4 1971

READ AND PASSED

FAILED PASSAGE FOR CONSIDERATION

HOUSE OF REPRESENTATIVES

READ AND PASSED

FEB 5 1971

CLERK

(Greeley)

Name: Greeley

County: Waldo

DAVID H. STEVENS
Commissioner

State of Maine
Department of Transportation

AUGUSTA, MAINE
04330

February 21, 1973

TO THE MEMBERS OF THE 106th. LEGISLATURE

OF THE STATE OF MAINE:

Pursuant to Joint Order SP 196 of the 105th Legislature, I have the honor to present the Department of Transportation's Report regarding recommendations made in the Highway Study Committee's report to the 105th Legislature, dated January 27, 1971 and entitled "Report on State Highway Commission".

Respectfully submitted,

David H. Stevens, Commissioner
Maine Department of Transportation

TABLE OF CONTENTS

SUMMARY

In developing the Department of Transportation's response to the Legislative Highway Study Committee's Report, a broad cross section of the Department's people, both as regards administrative level and geographical location, has been involved and has been stimulated to reexamine critically existing programs and procedures. Some activities have been curtailed, others modified and many innovative approaches to old problems have been developed. These are fully detailed in the body of this Report, but perhaps a few deserve special mention:

1. Supervisors and foremen have received formal training in effective supervision and communication.

2. Training of equipment operators has been intensified and new procedures have been established to insure notice of promotional opportunities.

3. Management training has been broadened to increase the potential of present administrators and to develop a new generation of administrators.

4. Public relations and informational programs have been expanded to improve relations with those affected by construction projects. Citizen involvement in planning activities has been increased and a major additional effort is well underway.

5. Use of privately owned equipment continues to increase and new highway and bridge rehabilitation programs promise further involvement and encouragement of new contractors from the private sector.

6. Designs and specifications for contract work are being revised to reduce costs wherever national standards and prudent judgment permit.

7. Techniques of snow and ice control have been refined to improve service, hold down costs and lessen adverse environmental effects.

8. The hot and cold mix resurfacing programs are being expanded as rapidly as funds and resource availability permit.

9. State Aid and T.R.I. standards have been reduced to correspond more realistically with current funds and immediate needs.

10. The advantages of performing maintenance work with state equipment have been reaffirmed but efforts continue on a broad front to improve performance and efficiency and to control costs.

The Department recognizes the critically important role that highways play in the economic life of the State of Maine. It also recognizes its obligation to provide the greatest possible service for each dollar expended and that social and environmental considerations are an inseparable part of present day cost-benefit analysis. In all its diverse activities, the Maine Department of Transportation endeavors to maintain a climate favorable to continued improvement and change.

INTRODUCTION

Subsequent to the issuance of the 105th Legislature's Joint Order directing the Chairman of the State Highway Commission to report to the 106th Legislature, that body, in Special Session, reorganized portions of state government--dissolving the State Highway Commission and placing its responsibilities in a newly-formed Maine Department of Transportation. Accordingly, this Report is presented by the Commissioner of Transportation as executive head of the Department of Transportation and its Bureau of Highways.

METHODOLOGY - ACKNOWLEDGEMENTS

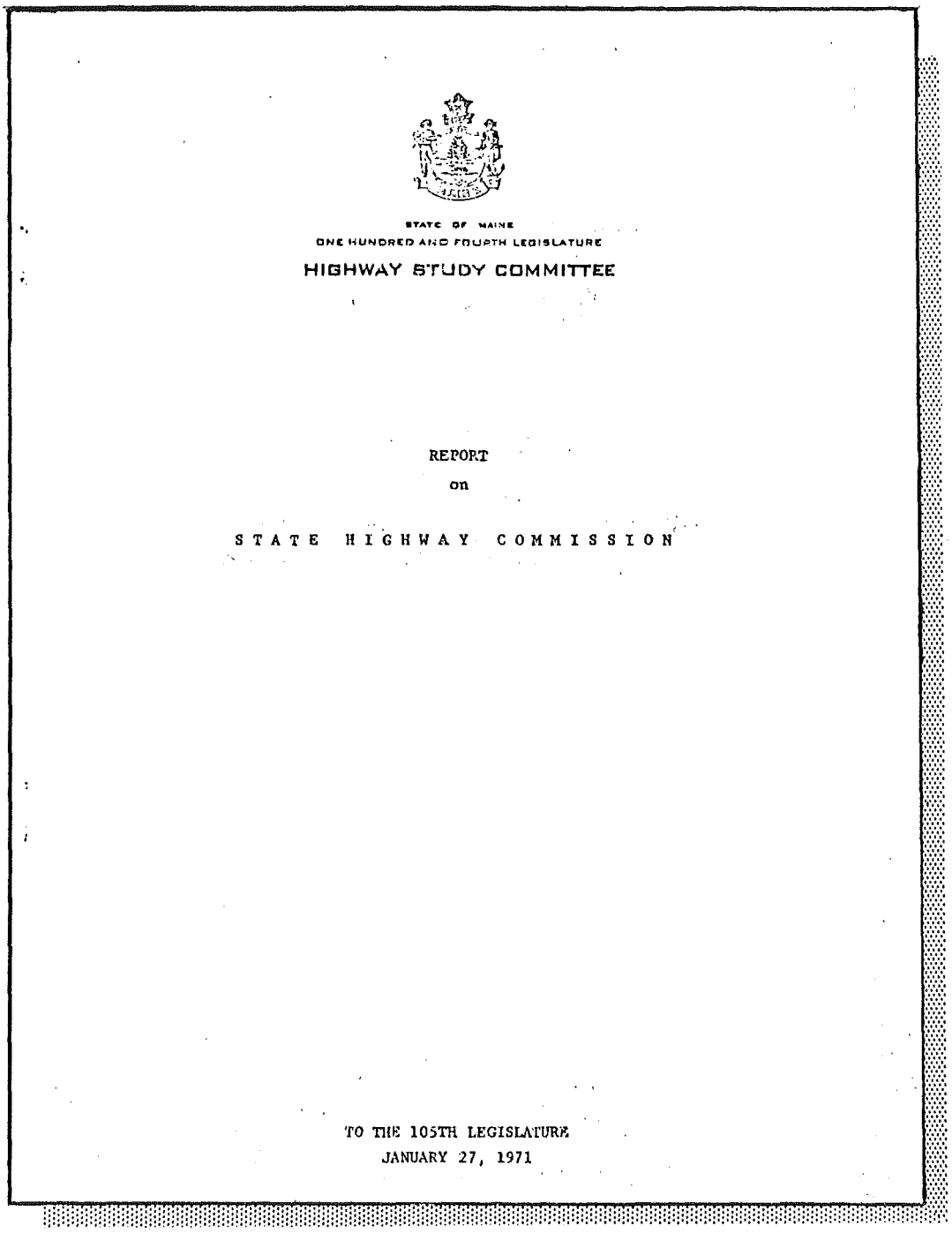
The Special Highway Study Committee, created by the 104th Legislature, studied the general operations of the State Highway Commission in considerable depth and made numerous comments and suggestions with the purpose of "determining necessary and possible improvements or economies in its operations". Because the recommendations made were quite specific, the Department of Transportation has attempted to respond in considerable detail. Selected departmental personnel prepared comments on legislative recommendations affecting their fields of expertise and the entire Report was reviewed by a committee of the whole. It is believed that the result fairly represents the Department's situation as viewed from all levels of the organization.

MDOT RESPONSE REPORT COMMITTEE:

Richard A. Luettich, Deputy Commissioner--Operations
Roger L. Mallar, Deputy Commissioner--Planning and Administration
Martin C. Rissel, Engineer of Maintenance and State Aid Highways
Guy E. Nicholas, Director--Division of Special Services
Ralph M. Dunbar, Division Engineer-Division 3, Bangor
Merton F. Brackett, Division Engineer-Division 6, Scarborough
Fred Campbell, Employee Representative
Merle Lancaster, Division Highway Maintenance Supervisor Division 4, Fairfield
Kenneth White, State Aid Foreman-Division 7, Dixfield
Charles C. Wright, Engineer of Policy and Procedures Review

FORMAT

It has been some time since the Highway Study Committee of the 104th Legislature issued its "Report on the State Highway Commission" to the 105th Legislature. Some members of the 106th Legislature may be unfamiliar with the Report and others may not have ready access to a copy. Accordingly, the entire Report is reproduced herein. To keep the Department's Response Report as brief as possible, the recommendations portion of the Highway Study Committee Report has been separated by paragraphs - each used to introduce the related Department of Transportation comments.



STATE OF MAINE
ONE HUNDRED AND FOURTH LEGISLATURE
HIGHWAY STUDY COMMITTEE

REPORT
on

STATE HIGHWAY COMMISSION

TO THE 105TH LEGISLATURE
JANUARY 27, 1971

SENATE
SEN. EDWIN H. GREELEY, CHAIRMAN
SEN. CARL E. DIANDRETTE
SEN. WAKINE G. TANOUS

HOUSE
REP. ROOSEVELT BUSI, VICE-CHAIRMAN
REP. PARIS J. SNOW
REP. HAROLD C. BARNES, SR.
REP. CHESTER L. BURNHAM

STATE OF MAINE
ONE HUNDRED AND FOURTH LEGISLATURE

HIGHWAY STUDY COMMITTEE

January 27, 1971

TO THE MEMBERS OF THE 105TH LEGISLATURE:

This Committee was established by Joint Senate Order No. 545 of the 104th Legislature. It was directed by the Legislature to inquire into questions of improvement and economy concerning revenues, expenditures, policies, functions and the general operation of the State Highway Commission and its several divisions. The Committee has inquired at great length into those matters referred to it and has the honor to submit herewith its report to the 105th Legislature as charged.

The Committee wishes to acknowledge its appreciation of the cooperation and service rendered by the State Highway Commission in connection with the study. The Committee sincerely hopes that the findings and recommendations herein contained will be of benefit to Members of the Legislature and the public at large.

Respectfully submitted,

Edwin H. Greeley

Edwin H. Greeley, Chairman
Highway Study Committee

OPERATION OF THE STATE HIGHWAY COMMISSION

ORDERED, the House concurring, that there is created a special committee to consist of 3 Senators to be appointed by the President of the Senate and 4 Representatives to be appointed by the Speaker of the House, to study, under the supervision of the Legislative Research Committee, revenues, expenditures, policies, functions and general operation of the State Highway Commission and its several divisions for the purpose of determining necessary and possible improvements or economies in its operations; and be it further

ORDERED, that the special committee, with the advice and consent of the Legislative Research Committee, shall report the results of its study at the regular session of the 105th Legislature; and be it further

ORDERED, that the members of the special committee shall serve without compensation, but shall be reimbursed for their actual expenses incurred in the performance of their duties under this Order; such sums to be paid out of the Legislative Appropriation; and be it further

ORDERED, that the special committee shall have the authority to employ professional and clerical assistance within the limits of funds provided; and be it further

ORDERED, that there is appropriated to this special committee from the Legislative Appropriation the sum of $25,000 to carry our the purposes of this Order.

SP 545	In Senate Chamber	House of Representatives
Beliveau	Read and Passed	Read and Passed
Oxford	Sent down for concurrence	July 1, 1969
	June 26, 1969	In concurrence

The Highway Study Committee was created by the foregoing order of the 104th Legislature and charged with the responsibility of studying the revenues, expenditures, policies, functions and general operation of the State Highway Commission and its several divisions for the purpose of determining necessary and possible improvements or economies in its operations.

The Committee held a series of sixteen meetings following the initial organizational meeting held August 13, 1969.

Most of the members of the Committee had some familiarity with the individual aspects of the operations of the Highway Commission. Because of this, the Committee voted unanimously not to employ outside consultants to aid in the study.

In order to gain an in-depth understanding of the functions and programs of the State Highway Commission, the Committee met with many organizations and extensively reviewed the commission's operations in the field. Committee members visited all of the division offices within the State and also inspected a wide range of projects under construction throughout the State.

Assistance and suggestions were obtained from various individuals of the Highway Department and groups such as Maine Municipal Association, Maine Good Roads Association, Maine Equipment Dealers Association and the Bureau of Public Administration, University of Maine. The Maine Municipal Association prepared a questionnaire for distribution to all municipalities and the results were tabulated by the Committee. Overall, the majority of complaints against the Highway Commission, as reported by the municipalities, are as follows:

(1) Department should improve efficiency of its labor.

(2) Excessive amount of supervision.

(3) Improper utilization of equipment.

(4) Return to the old "patrolman" system where possible.

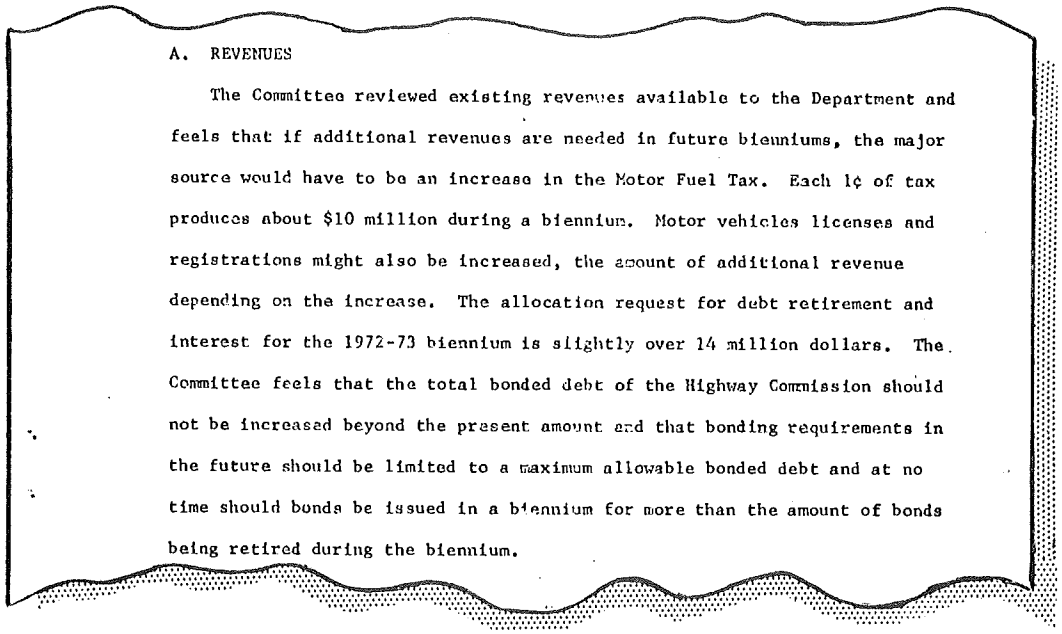
(5) Department has a tendency to be "bureaucratic".

(6) Overemphasis on interstate expenditure.

(7) Revaluation effect on allocation of state funds to smaller communities.

As a result of all this activity, the Committee makes the following recommendations pursuant to its legislative directive.

A. REVENUES



A. REVENUES

The Committee reviewed existing revenues available to the Department and feels that if additional revenues are needed in future bienniums, the major source would have to be an increase in the Motor Fuel Tax. Each 1¢ of tax produces about $10 million during a biennium. Motor vehicles licenses and registrations might also be increased, the amount of additional revenue depending on the increase. The allocation request for debt retirement and interest for the 1972-73 biennium is slightly over 14 million dollars. The Committee feels that the total bonded debt of the Highway Commission should not be increased beyond the present amount and that bonding requirements in the future should be limited to a maximum allowable bonded debt and at no time should bonds be issued in a biennium for more than the amount of bonds being retired during the biennium.

Consideration and determination of revenue sources for the highway program, as in General Fund programs, is a legislative matter. In an effort to provide some factual background on this subject, the following is offered. There are four basic sources of revenues which have been considered, from time to time, for possible utilization in highway financing:

I. Fuel Taxes
II. Licenses and Registration Fees
III. New and/or General Fund Sources
IV. Bonds

I. FUEL TAXES

Fuel taxes are the major source of revenue in the General Highway Fund. These taxes are estimated to approximate $50,000,000 during the first year of the next biennium--nearly 75% of available revenue. Historically, fuel taxes have been authorized as follows:

7/7/23	1¢
7/11/25	3¢
10/29/27	4¢
6/1/47	6¢
6/1/55	7¢
7/1/69	8¢
7/1/71	9¢

The last two Maine Legislatures have each approved increases in this revenue source. Maine's nine-cent State tax is less than that in Connecticut (ten cents) and equal to that in New Hampshire and Vermont, as well as Kentucky, Maryland, North Carolina, Virginia and Washington.

Various aspects of the gas tax will likely support its continuation as a major source of support for the highway program:

1. The user pays in proportion to his use of the highway system.

2. Those from out-of-state provide income in relation to their use of the highway system.

3. The modest percent of change in cost to the consumer for normal changes in the tax.

4. Its existence as a currently major revenue source and therefore the relative administrative ease of implementation of any change.

A one-cent increase in fuel taxes produces approximately $5.5 million per year or about $11,000,000 for a biennium. Seasonal adjustments in this revenue and other innovative techniques have been considered in past years.

II. LICENSES AND REGISTRATION FEES

Driver license and vehicle registration fees are expected to provide $16,500,000 in fiscal 1974, or almost 25 percent of available funds. Unlike fuel taxes, this revenue source has not been increased in recent years, despite the increased costs of the program itself and the inflationary aspects of the economy. One reason expressed for not increasing these fees is that those less able to pay are taxed the same amount as those more able, although others have questioned whether a modest increase in the fees would create any particular hardship on motor vehicle owners or operators, since the current rates are modest ($5, two-year operator license; $15, passenger vehicle registration fee).

A twenty-five percent across-the-board increase in these fees would produce approximately $8,000,000 for a biennium.

III. NEW AND/OR GENERAL FUND SOURCES

Several different taxes have been discussed from time to time, most of which do, or could also involve General Fund revenues. Some of those mentioned most frequently are the following:

1. Absorbing the entire cost of the State Police operation in the General Fund (75% now included in the highway program).

2. Taxes on the trade-in value of motor vehicles.

3. Taxes on motor vehicle parts, accessories, etc.

The available funds from Item 1, above, would amount to approximately $9,500,000 for the next biennium. The amounts related to the remaining items are dependent, of course, on the level of tax imposed. All of these sources depend on the ability of the General Fund to absorb any costs or loss of revenue, now or in the future, and the willingness of those most closely associated with the taxing effort to accept the concepts.

IV. BONDS

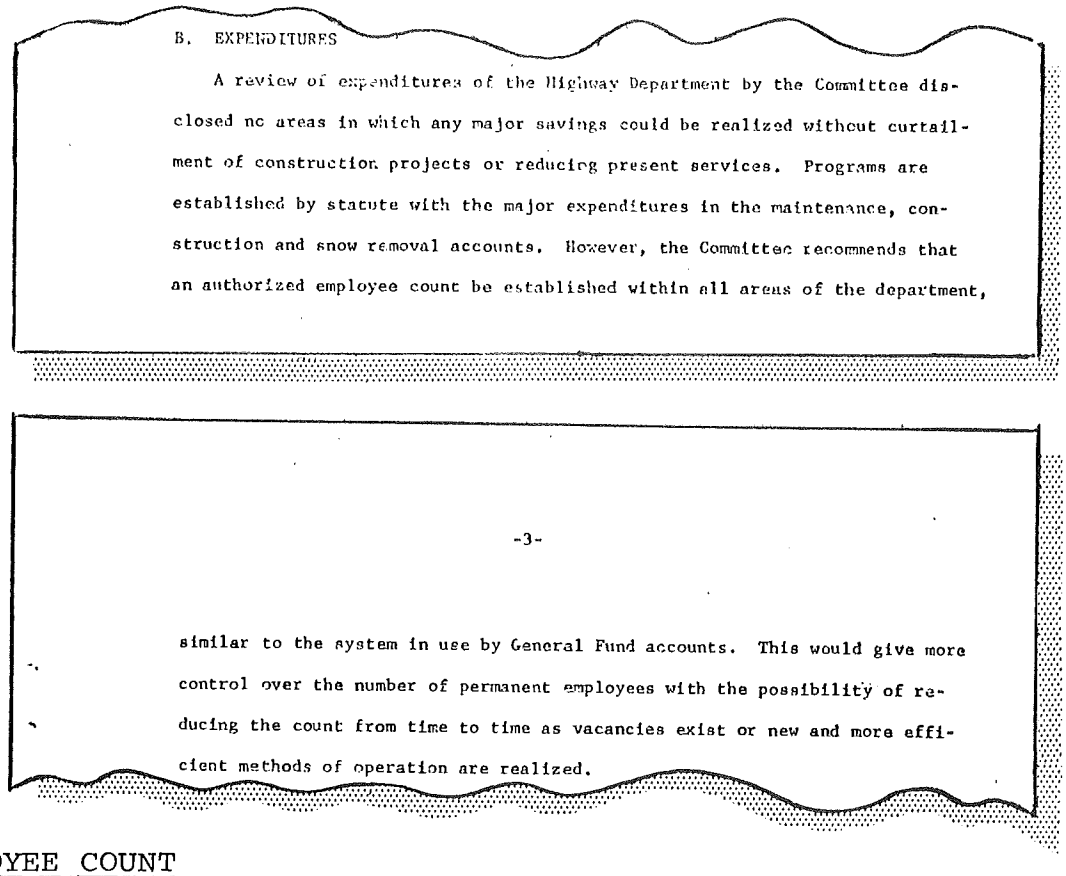
Bond financing has been used with considerable regularity to support highway construction activities since 1952. The following summarizes bond issue authorizations since that time:

Fiscal Year	Amount
1952	$34,000,000
1958	24,000,000
1960	16,900,000
1962	6,000,000
1964	7,000,000
1966	9,600,000
1968	17,300,000
1970	19,500,000
1972	10,300,000

The bonded indebtedness in the highway program is expected to be $69,945,000 as of June 30, 1973, with an additional $10.3 million authorized but not anticipated to be sold by that time. The level of debt is about average when compared to those states which have used bond financing as a part of their highway programs. The highway program for the biennium starting July 1, 1973 will require $10,665,000 for bond retirement and $6,813,236 for interest payments or a total of $17,478,236 for debt service requirements.

A continuation of bond financing will depend upon the size of the highway construction effort, the consideration of the Legislature regarding additional revenues, and the willingness of the Legislature and the people of the State of Maine to approve additional or replacement bonding.

B. EXPENDITURES



B. EXPENDITURES

A review of expenditures of the Highway Department by the Committee disclosed no areas in which any major savings could be realized without curtailment of construction projects or reducing present services. Programs are established by statute with the major expenditures in the maintenance, construction and snow removal accounts. However, the Committee recommends that an authorized employee count be established within all areas of the department,

-3-

similar to the system in use by General Fund accounts. This would give more control over the number of permanent employees with the possibility of reducing the count from time to time as vacancies exist or new and more efficient methods of operation are realized.

EMPLOYEE COUNT

The Department of Transportation does prepare employee count information for certain elements in the highway program, similar to that of General Fund agencies, and it is submitted to the Governor through the Budget Office.

This data is prepared for those accounts that are not construction or maintenance oriented and therefore have relative stability. These activities include planning, traffic services, accounting and radio operations. The number of employees in these programmed activities is currently controlled by the Department to remain within budgeted amounts.

The Department has been able to control, and even reduce, the number of employees in its other programs commensurate with the level of activity required. The number of employees engaged over the years in maintenance and state-aid activities may be considered an example. In 1960, there were 1466 employees active in this area. In 1972, the employee count had been reduced to 1325 persons, a reduction of 141 employees. This was accomplished despite the fact that the Department assumed the responsibility for 300 more miles of winter maintenance and 500 more miles of summer maintenance. In both instances, 150 miles were four-lane divided Interstate-type construction.

Engineering employees engaged in the location, design and construction of Maine highways have increased over the past several years. This has resulted from increased requirements for inspection and testing, particularly on federal aid projects, and an increased number of projects including many specialty-type activities, such as traffic signals, signing, street lighting, bridges, rest areas, etc.

More recent experience, however, has shown a reduction in engineering classes. From July, 1971 to July, 1972 the number of engineering employees dropped from 867 to 850 and, similarly, from December, 1971 to December, 1972 a drop from 739 to 726 was recorded.

As a result of the uncertainty of federal funding and a shift in the type of construction projects, the Department currently has a policy of not hiring additional engineering employees, except in unusual circumstances. Furthermore, the Department is screening replacement requests very carefully in order to assure further reductions in its engineering staff.

The goal of the Department is to reduce its engineering complement to 700 employees during the off season and 800 employees during the peak construction season--through attrition and non-hiring practices.

The construction and maintenance activities of the Department undergo wide variations in activities as a result of seasonal and other variable weather conditions; significant fluctuations in the availability of funds at the Federal, State and local levels; and major changes in the emphasis in programs or types of projects. As a result of these changes, the level of employees must fluctuate to respond to the program effectively and efficiently. Therefore, it would appear desirable to continue to allow the Department to control the level of employees at the minimum amount required as it has in the past.

C. POLICIES, FUNCTIONS, and GENERAL OPERATIONS

C. POLICIES, FUNCTIONS AND GENERAL OPERATIONS

The Committee feels that overall, the State Highway Commission programs are adequately performed. The following committee recommendations should not be construed as providing large cost savings to the department but are designed to (1) get more results for the dollars invested through more efficient programs and (2) to provide a more effective program of public education and understanding of the State Highway Commission operations.

The Committee recognizes that, in the maze of such a vast department with a great number of employees, projects, programs and expenditures, efficiency and production suffers and waste creeps in unless the Department adopts certain objectives and carries them through. The Committee therefore offers the following recommendations:

C.1. SUPERVISION

1. The Committee feels that one of the biggest problems in the maintenance program is "supervision". There should be better communication from the supervisors down to the foremen and more authority given to foremen to enable them to take care of small emergencies in the absence of the supervisors. Regular meetings should be held to talk over problems and explain duties.

TRAINING IN COMMUNICATION

In any organization, effective and economic utilization of physical and human resources is directly related to the quality of supervision exercised at all levels. In an effort to insure that maintenance and State Aid operations are carried out in a satisfactory and efficient manner, the Department has a number of programs to improve supervisory practices of foremen and supervisors.

In the summer of 1972, a twelve session course in supervisory practices was given to Maintenance, State Aid, Pavement, Pavement Striping, Electrical Maintenance, and Sign Shop and Sign Erection Supervisors. Course outlines and workbooks by professional management educators were combined with in-house instruction to cover such diverse subjects as planning, organizing, directing, coordinating, controlling, delegating, motivating, communicating, training, discipline and public relations.

Early in 1970 the Department initiated the training program for foremen which is described in the response to Legislative Committee Recommendation No. 2.

These programs stressed the great importance of effective communications--both up and down the organizational chain.

While the results of training programs have been generally gratifying, it is recognized that such training must be continuous if all hands are to be reached, convinced, and their skills sharpened.

AUTHORITY OF FOREMEN

In recent years, public awareness of departmental programs and insistence on expanded and improved services has greatly increased. At the same time, rapidly changing technologies and increasingly complex economic, social, legal and environmental considerations require ever more complicated solutions. Many seemingly simple situations now require the application of specialized knowledge if all ramifications are to be properly considered. The public doesn't always recognize this and questions involving subtle policy interpretations are often directed to patrolmen and crew leaders. It is to their credit that they often wisely resist the temptation to appear all-knowing and authoritative by presuming to provide instant answers and simplistic solutions.

Under these circumstances, it may appear that Department personnel are lacking in authority to do their jobs when actually they are just too well trained to pretend to knowledge and authority they do not, in fact, possess. This situation is common in all large organizations and probably can't be entirely eliminated. The Department feels that the vast majority of its foremen, on their own initiative, do promptly respond to real emergencies and do endeavor to resolve less pressing problems as rapidly as reasonably authoritative solutions can be found. It is hoped they will continue to refer matters beyond their scope to other authority.

It is anticipated that improvements in internal Department communications, and technical and supervisory training programs will enable foremen to handle routine, as well as emergency matters, more promptly and confidently.

REGULAR MEETINGS

At the start of each winter maintenance "season", drivers, foremen and supervisors attend joint meetings at which appropriate Department supervisors discuss subjects such as: driving practices, preventive maintenance, safety, public relations, aid to motorists, plowing and deicing techniques and methods of controlling salt use. Recurring problems and the lessons of experience are considered and general discussion of all matters is invited. Similar programs are conducted in the spring for supervisors and foremen.

Division Engineers conduct formal sessions with their foremen several times a year; some meet with their supervisors as often as once a week; and supervisors are in almost daily contact with their foremen. Foremen conduct safety meetings with their men on a monthly schedule. All of the group meetings and innumerable individual day-to-day contacts are used to discuss problems, evaluate present practices, and to disseminate information.

C.2. TRAINING - FOREMAN and OPERATORS

2. More effort should be made to provide training for foremen and equipment operators. This would improve the morale of the employees and be a benefit to the department. There should be a uniform system of seniority throughout the State to insure that all jobs are open to all qualified personnel.

TRAINING OF FOREMEN

Early in 1970, the Department initiated a training program for foremen. Under the direction of the department's Employee Representative, instructional manuals were prepared and meetings were conducted in the seven Maintenance Divisions. The course consisted of down-to-earth instruction in the responsibilities of the first line supervisor and techniques for effective accomplishment of his job. As in the case of the supervisors' course, the importance of effective communications--with superiors, subordinates and the public--was emphasized. A training film was utilized to show actual work situations and effective methods used by foremen and supervisors in solving on-the-job problems. Pertinent State Personnel Laws and Rules were discussed and Department Administrative Bulletins and memoranda relating to the maintenance and State Aid function were studied. All foremen were supplied with loose leaf books containing the course outline and copies of Personnel and Department publications for future reference. Revisions and additions are periodically issued so that foremen will always have an up-to-date, authoritative reference. The training was intended to provide foremen with both the knowledge of what to do and the self-assurance to go and do it. It is felt that morale of foremen has been improved by training in effective supervisory practices and the knowledge that the Department encourages their application.

TRAINING OF EQUIPMENT OPERATORS

In 1963 the Department inaugurated a formal program for the selection and training of equipment operators. The goals of the program were broadly: to decrease accident frequency, increase production, improve performance, increase equipment availability, prolong equipment life and reduce operating costs. Techniques used to achieve these goals are: careful selection of personnel, thorough training, periodic refresher sessions and formal recognition of accomplishments.

Applicants for employment or promotion are thoroughly screened:

1. Written applications provide personal and experience data.

2. Applicants are individually interviewed and references are checked.

3. Court and accident records are investigated.

4. Applicant's knowledge of traffic laws and vehicle operation is determined by written, oral, and road tests.

Because of the large number of operators to be processed, the program concentrated on driver selection and screening during the first few years. It was recognized that more emphasis on training was needed. To intensify the training effort, in 1971 the Commission authorized an increase in the Driver Trainer staff from two to four, making a trainer available for Divisions I and II; one for Divisions III and V; one for Divisions VI and VII; and one for Division IV plus the Augusta area agencies. By augmenting the training staff, not only was the operator screening and training program strengthened, but also the staff now has the capability of training foremen in the proper selection, utilization, operation and maintenance of assigned equipment.

Once a man is selected, the Division Engineer or Supervisor requests any necessary training. Training is conducted by Driver Trainers chosen on the basis of their experience as drivers, their mechanical skill and their ability to communicate with trainees. Prospective operators may receive training in the operation of multi-speed trucks and attachments such as hoists, plows, wings, slushers (high speed blades), and sand and salt spreaders of various types. Some may learn to operate more specialized equipment such as bituminous distributors, cranes, shovels, loaders, graders, hydraulic seeders, sprayers, or paint stripers. All are thoroughly indoctrinated in preventive maintenance procedures.

Operators, as well as foremen and supervisors, participate in the meetings conducted prior to the winter maintenance season. Experience has shown the effectiveness of these refresher sessions and they are now being scheduled on a regular basis.

MORALE

Men who operate ten years without an accident earn Safe Driver Pins; crews that go a year without a lost-time accident attend recognition banquets; and each year, the Division with the lowest lost-time accident

rate receives an award plaque. These recognitions are publicized in the "Transportation News" to stimulate interest and competition.

The overall program has achieved encouraging results. Improvements in efficiency and the reduction of operating costs directly benefit the State. Reduction of accidents and breakdowns and the enhancement of worker pride due to sharpened skills boost morale and this, too, is of benefit to the State as well as to the individuals involved.

SENIORITY

Under State of Maine Personnel Laws and rules, employment and promotion in the classified service must be based on merit and fitness. In judging merit and fitness an employing agency may consider such qualities as: education, experience, accomplishments, knowledge, skill, capacity, intelligence, aptitude and character. The laws and rules provide that seniority be considered only in matters of lay-off and subsequent reemployment. While seniority, per se, is not a criterion for promotion in a merit system, it can be and is considered to the extent that it has a bearing on other qualities, such as experience, which do have to be evaluated. Seniority might even be a deciding factor in choosing between two candidates of otherwise equal qualifications.

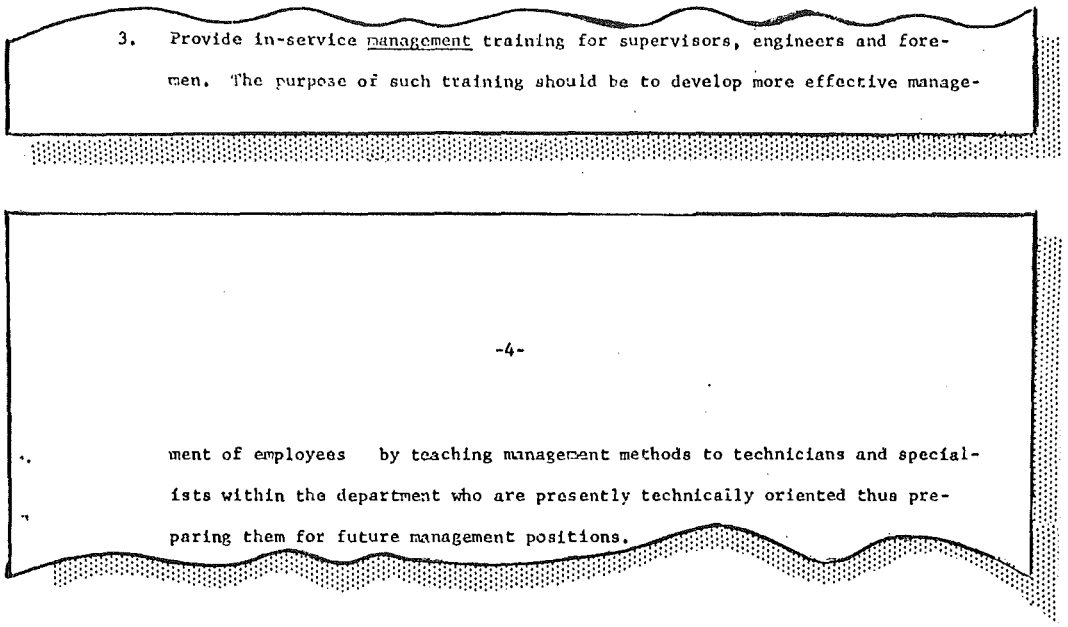
In addition to giving appropriate weight to seniority, the Department makes a real effort to insure that all qualified personnel are made aware of promotional opportunities.

In 1967, the Commission established a state-wide procedure for the announcement of vacancies in the Highway Maintenanceman III and IV and Foreman I and II classifications. Notices fully describing positions to be filled and detailing application procedure are posted for two weeks at all maintenance crew assembly-point buildings. Where crews do not meet at a building, supervisors or foremen are delegated to inform employees.

In 1971, procedures were set up for the notification of Highway Maintenanceman II and Bridgeman vacancies. Announcements are posted for one week at the assembly point of the crew where the vacancy exists and at the assembly points of all other adjacent crew areas in the Division. Openings for positions of all classes which require state-wide travel are announced state-wide.

In a few cases, employees have questioned the selections made by supervisory boards--often because of a lack of understanding of the relatively secondary importance of seniority in the State Merit System. However, since the present announcement procedures were instituted, there have been no grievances alleging lack of notification of promotional opportunities.

C.3. MANAGEMENT TRAINING



3. Provide in-service management training for supervisors, engineers and foremen. The purpose of such training should be to develop more effective manage-

-4-

ment of employees by teaching management methods to technicians and specialists within the department who are presently technically oriented thus preparing them for future management positions.

TRAINING OF SUPERVISORS AND FOREMEN

The Department's in-service management training programs for foremen and supervisors are described in preceding sections of this Report. Management training for engineers and other specialists takes many forms.

TRAINING OF ENGINEERS AND ADMINISTRATORS

About fifteen years ago, at a time when its programs were rapidly expanding, the Department recognized that the crowded college schedules of engineering students often did not include many courses in psychology, management, or the study of administrative skills. Fortunately, the art or science of management has now come into its own under the impetus of industry, government and educational institutions.

The Department launched its management training efforts in the summer of 1958 when 20 of the Department's then junior executives received an intensive one-week Management Training Course. The students later participated in an eight-week orientation period during which they became acquainted with the various operations of the Department and the people who made it run. They were involved in the day-to-day activities of Department leaders to enable them to gain practical experience in the application of the managerial techniques they had studied.

In 1960, an Advanced Highway Management Training Seminar lasting four days was conducted for heads of operating divisions and Maintenance Division Engineers.

A program similar to that held in 1958 was presented for 25 engineers with managerial potential in the summer of 1960 and winter of 1960 and 1961.

In 1971 an intensive one-week Administrative Management Seminar was held for 30 engineers in lower management positions.

The formal portion of all of these programs was conducted by outstanding men from the faculties of leading universities, management institutes, management consulting firms, and from within the Department.

Most of those in the initial program now constitute the backbone of the management team. Those in the 1960 group of Division Heads have almost all retired or passed away. The Department must, therefore, look to the latter two groups to fill future executive vacancies. Obviously, management training has to be conducted at reasonably regular intervals if the Department is to maintain a cadre of trained personnel.

In-house orientation programs were held for 24 of the Department's newer engineers in 1958 and for 49 others in 1972. Conducted by Department personnel, the programs were designed to acquaint the newer employees with the overall organization of the Department and the functions and responsibilities of the various divisions within it. It is thought that by showing employees how their work, as individuals, relates to the accomplishment of the objectives of the Department, internal communications and operations are significantly improved. Also, new people are enabled to find the field of their greatest interest where they can make the best contribution to the Department while at the same time achieving personal fulfillment in their chosen professions.

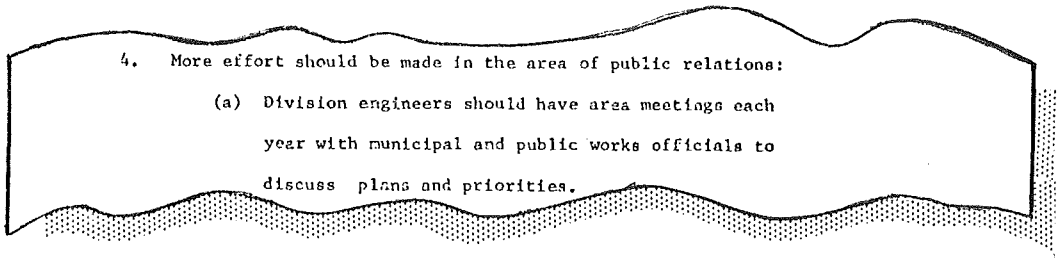
In addition to the preceding group programs, the Department also sponsors the attendance of selected top-level administrators at advanced management schools. Each year the Department sends one or two administrative people to the Highway Management Institute at the University of Mississippi. Sponsored by The American Association of State Highway Officials in cooperation with The Highway Users Federation for Safety and Mobility, the schools consist of an intensive six-week program at the graduate level aimed directly at management procedures for highway administrators. Eight of the Department's Bureau Directors and Division heads have benefited from this program.

A number of middle management personnel have attended similar but briefer one-week courses under the same sponsorship at New England universities. Other employees have been assisted so they could attend management-related courses at branches of the University of Maine. Seminars in such subjects as Critical Path Scheduling, Maintenance Management and the Role of Computers as a Management Tool have been held.

Personnel in both technician and professional grades receive indirect instruction in managerial practices through material embodied in the procedural manuals of the Construction, Location and Survey, Right of Way and other Divisions.

Transportation, like all endeavor, gets ever more complex and the need for management skills constantly increases. The Department recognizes this and plans to continue having a variety of programs to insure the maintenance of an adequate pool of trained personnel at all levels of the organization.

PUBLIC RELATIONS
C.4(a) AREA MEETINGS



The Department recognizes the importance of working closely with municipal and public works officials and several approaches have been used--with varying degrees of success.

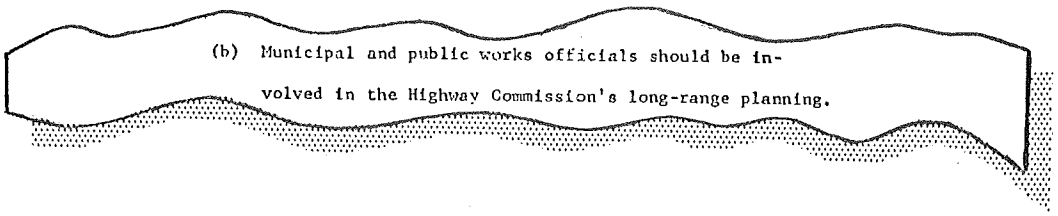
One Division Engineer scheduled area meetings in two successive years. The first year, invitations to officials of the fifty-two towns in the Division resulted in the attendance of representatives from fewer than half the towns. Because of the need for full-time supervision of State Aid and TRIF projects, the practice of having town road commissioners serve as project foreman was on the wane. For this and other reasons, the second year's meeting was more poorly attended than the first and the program was abandoned. It was thought that officials were reluctant to ask questions and discuss problems in a group atmosphere and that such meetings inhibited rather than enhanced communications.

Department personnel do attend the annual meetings of the Maine Municipal Association and participate in various MMA committee activities upon invitation. MDOT informational booths at MMA annual meetings do not generally enjoy much interest. It is, however, felt that some mutual benefits have derived from the committee meetings.

Because the area or group approach to municipal officials has been relatively unproductive, the Department relies on personal contacts to achieve necessary liaison. Division Engineers, Assistant Division Engineers, State Aid Construction Supervisors and others meet regularly with municipal officials to discuss State Aid, Town Road Improvement and maintenance problems and programs. Between meetings, Department personnel make themselves readily available to town officials on an "as needed" basis.

Municipal officials' lack of interest in group meetings with the Department may be an indication that town needs are being satisfied by more personal contacts which permit greater attention to individual problems.

C.4.(b) LONG RANGE PLANNING



The Department makes a real effort to involve local officials in the Department's long range planning activities. Everyone benefits when unanimity of thought is progressively reached as plans are developed.

LARGE URBAN AREAS

Several of the State's larger urban areas have both policy committees and technical committees to consider area transportation problems. The Department has worked with such committees in the Portland area for years. The Department has provided technical expertise and funds for the development of the Portland Area Comprehensive Transportation Study (PACTS). This is an ongoing study, updated about every five years, involving highway construction, reconstruction and TOPICS (Traffic Operations Program to Improve Capacity and Safety) studies. The Department also participated in a recent study to pinpoint operational problems in bus transportation. Similar ongoing studies are conducted in the Lewiston-Auburn area, the Lewiston Area Comprehensive Transportation Study (LACTS).

SMALL URBAN AREAS

In smaller urban areas throughout the State, local officials are often asked to establish ad hoc committees to work with the Department when transportation studies are underway. These committees provide a communication link between the Department and the local community to insure development of the best possible long range plan. In Wiscasset, for example, where efforts are being made to forge a better link in the Route 1 corridor and to relieve congestion in the village, many meetings have been held not only with local officials but also with others interested in the preservation of an historic district. Hundreds of such meetings are held throughout the State every year.

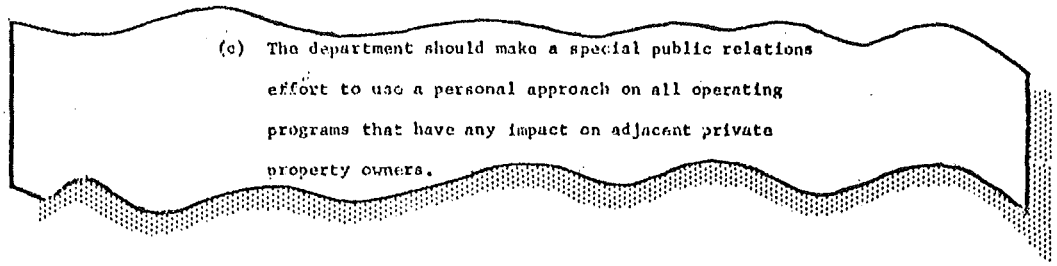
STATE-WIDE STUDIES

Local officials are involved to a lesser degree in state-wide studies because of their vary nature. The Department, however, is represented in such activities as the New England Regional Planning Commission's East-West Corridor Study and the Department, in turn, maintains communications with the Maine Municipal Association. The Department also maintains liaison with almost all State and regional agencies with interests in planning.

RECENT INCREASED EFFORTS

Nothwithstanding these diverse activities, the Department recognizes that local officials occasionally feel they have not been provided sufficient opportunity to be involved in the Department's long range planning. MDOT is presently exploring ways to increase the involvement of local officials and other interested groups. Methods of communicating long range planning intentions to interested groups are being analyzed. Once a mechanism has been devised to insure that interested groups will reveal their interests in the Department's studies, their positive involvement can certainly be arranged. The Department's Project Scheduling Group is presently developing an action plan, "Process Guidelines", which provides for an optimum amount of public participation and input into the entire project development process to insure full evaluation of all social, economic and environmental considerations. This plan is well underway and should be fully operational in the spring.

C.4(c). PROPERTY OWNERS



It is the policy of the Maine Department of Transportation to make a real effort to keep adjacent property owners informed about highway construction projects from the planning stage through to completion.

FEDERAL AID AND STATE CONTRACT PROJECTS

On State and Federal Aid contract construction projects, when a significant impact upon abutting properties is anticipated, owners are frequently contacted during early planning stages--either directly by departmental personnel or by or through municipal officers or planning boards with whom the Department is working. Additional contacts are made before the start of field surveys for location studies. Each property owner is advised, by letter (Appendix-Exhibit I) of the approximate limits of the proposed project and the nature of the survey to be conducted. Owners are advised that it may be necessary for crews to enter upon their property to run lines and to gather necessary information. They are given a name, address and telephone number so they may make contact for additional information. Quite a number of people do have questions and the Department responds by letter or often by personal contact.

The notification letters are accompanied by questionnaires (Exhibit II) soliciting information on local features which might have bearing on the highway location. Comments are invited and the Department's willingness to make personal contacts is restated. Response to the Department's initiatives has been excellent. Valuable information is obtained and property owners are involved at an early stage in project development.

After survey lines have been run, Right-of-Way Agents contact property owners to check property lines and markers, the location of water supply and sewage disposal facilities, and to get data on deeds, property use and other features having bearing on possible construction in the area. Although the effects, if any, of the proposed project are not known at this time, agents do endeavor to advise owners of procedures which will be followed as plans develop.

Before final locations are established or construction is authorized, notices are published advising that the Department has scheduled a public hearing or will do so upon request. When hearings are held, Department personnel describe the proposed project giving the pros and cons of the various alignments and designs under consideration. The procedures which will be followed in acquiring land and rights in land, should the project be authorized, are fully described. Following the Department's presentation, all interested parties, including abutting land owners, are invited to ask questions or make statements. It has been found that some people are reluctant to discuss their individual problems during the official, recorded portion of the hearing so the Department makes it a practice to have its representatives remain for individual consultation following the formal hearing. In addition, the records are held open for at least ten days following a hearing to accommodate those who wish to file written statements for consideration.

After a decision to construct on a given location, final construction plans are developed and right-of-way needs are determined. Qualified appraisers contact property owners to gather data bearing on the determination of land "damages". After appraisals are completed and reviewed and authorization to acquire has been given, Right-of-Way negotiators personally contact property owners. Right-of-way plans, construction plans, moving and dislocation allowance programs, the basis of the State's offer, and rights of appeal are all explained in detail.

When the value of damages is in dispute, negotiators and engineers specially trained in right-of-way matters contact owners, often repeatedly, in an effort to effect a settlement which will spare owners and the State the expense and inconvenience of appeal proceedings. Property owners receive every consideration allowable by statute or other operating guidelines. Approximately 85% of land damage cases on contract projects are settled without appeal.

As the time for award of the contract approaches, survey crews are dispatched to establish the controls which will be used for reference in constructing the work. Survey party chiefs distribute letters to abutting land owners explaining what is being done and why and requesting land owners' cooperation in the preservation of stakes (Exhibit III). Abuttors are advised who to contact for additional information and requests are promptly responded to.

After the construction contract is awarded, a Resident Engineer is assigned to represent the State on the project site. One of his first duties is to introduce himself to abutting land owners, each of whom is provided with a letter advising him to contact the Resident to register complaints or to obtain information. The letter gives the Resident's name and field office telephone number. The Department's Construction

Manual instructs the Resident and his staff to listen sympathetically to individual problems; to make every effort not to let questions, suggestions or criticisms go unheeded; and to follow through on such matters until the person has a satisfactory answer.

STATE AID PROJECTS

State Aid projects are initiated at the local level; often by the abutting land owners themselves; and proposed work is discussed at Town Meetings prior to authorization of local funds. Because of this, the Department is usually not involved with land owners during the advanced planning stage of these projects. Recognizing that most municipalities have no set procedures for advising abuttors of upcoming projects, in 1972 the Department initiated the procedure of distributing notification letters to abutting land owners. When a State Aid project has been advanced to the point where a field survey is to be done, the state survey crew passes out letters to property owners (Exhibit IV) advising of the possibility of construction and giving a name, address, and telephone number where additional information may be obtained. Most State Aid work is done within existing rights-of-way and design standards are lower than used on State and Federal Aid routes. Accordingly, there are fewer land takings and damages than on contract projects and less need for repeated contacts with land owners. When additional land or rights in land are required, owners are contact and payments are negotiated. More than 95% of necessary acquisitions for State Aid work are obtained without resort to condemnation.

TRIF PROJECTS

The Department feels that relations with land owners along Town Road Improvement Fund projects are, due to the very nature of the projects and the statutes governing the program, entirely the responsibility of local officials.

MAINTENANCE OPERATIONS

Maintenance personnel meet prior to the start of the winter maintenance season to discuss the latest techniques in snow and ice control and to have a "refresher" on operating procedures and policies, including relations with abuttors and the traveling public. At these meetings it is emphasized that, to many people, the "Department" is "the man in the orange truck" and that personnel should do everything possible to maintain good relations with abuttors and the traveling public.

Vehicles are washed regularly--to improve visibility and safety, to minimize corrosion, and to demonstrate a proper concern for the care of public property. Operators are instructed to shut off sanders when passing cars and they are taught how to adjust equipment to minimize the scatter of salt and sand on abutting frontages.

Heavy or prolonged snow storms present unique problems to maintenance forces. In order to keep the traveled way in the best possible condition throughout the duration of a storm and to minimize damage to mailboxes or other roadside installations which are difficult to see at the height of a storm, "winging-back" or widening is usually deferred until daylight hours after the weather has cleared. When storms are of long duration or occur in rapid succession, winging-back may not be done until after crews have been given time for a much needed rest. Inevitably, someone's driveway will be plowed in after he has just cleared it. The Department accepts a certain amount of criticism in such cases because the alternatives--duplicate crews or nighttime operation of large equipment by exhausted personnel--are unacceptable.

As earlier mentioned, abutting land owners frequently approach "the man in the orange truck" with problems or questions which are beyond his knowledge or authority and the response is not always what the Department might wish for. Administrative personnel are aware of this problem and efforts are being made to provide better service to the public by improving communications within the Department and by the establishment of guidelines for employee contacts with property owners.

INFORMATIONAL PROGRAMS

Not only does the Department recognize the need for "a personal approach to...operating programs that have (an) impact on adjacent private property owners", it also recognizes that all its programs have some effect on nearly every citizen of Maine and upon thousands, even millions, of others outside the State who travel and do business here. A number of informational programs are conducted to keep the general public informed and to gain the public acceptance so necessary for effectively carrying out highway programs.

A continuous flow of news releases, feature stories and articles about Department operations goes out to the news media and to periodicals throughout the State. An employee news letter is prepared and distributed monthly to keep employees informed of Department operations so they, in turn, may accurately inform the public.

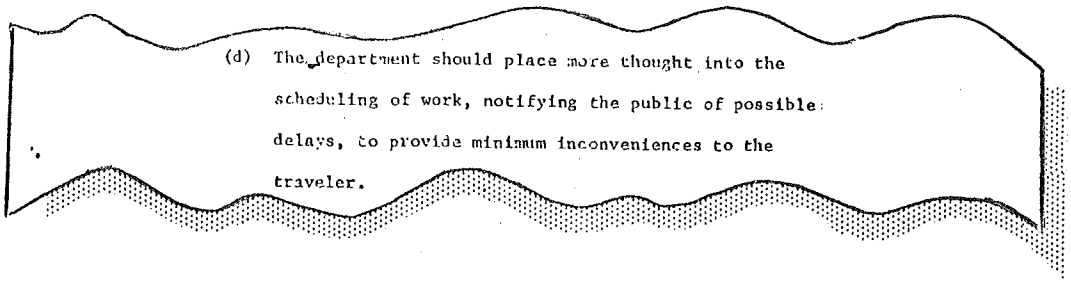
Department employees participate in an active speaking program, traveling throughout the state and appearing before all kinds of clubs, groups and associations. Over 100 speaking engagements were kept last year.

The Department carries on an almost continuous educational program within its own ranks. At informal meetings, MDOT personnel are informed of and discuss Department policies and procedures in depth. At more formal seminars, personnel learn of new developments or brush up on traditional procedures. Articles in the Department's publication, "Transportation News", familiarize employees with operations other than their own. A new column has just been initiated to answer employee questions and explain policies. All these efforts should help employees to respond knowledgeably to public queries about Department operations.

The Department now has a standard procedure of expeditiously replying, in person or in writing, to all questions or complaints concerning transportation matters.

Administrative and supervisory people consciously seek to impress upon all employees an awareness that each represents the Department in everything that he does and to, therefore, act accordingly.

C.4(d). SCHEDULING



HIGHWAY CONSTRUCTION

Many areas of the State of Maine are strongly oriented toward summer tourism. In some, tourist businesses constitute the principal if not the only significant commercial activity and are major beneficiaries of improved highways. Ironically, the same tourists and tourist "industry" people who often demand new construction are among those least tolerant of inconvenience resulting from construction activity. The Department recognizes this and does make a real effort to schedule projects in vacation areas so that heavy grading can be accomplished at times other than during the peak of the summer season. Often, this type of scheduling results in paving activities the following summer. While tourists may be delayed by one-way traffic operations during paving, the delays are local and the entire surfaced roadway is available nights and weekends. Our State's visitors, many of whom have little experience in operating off paved surfaces, are spared the inconvenience of driving or towing camp and boat trailers over unpaved construction.

On urban sections of primary routes, traffic volumes usually require multi-lane construction. In almost all cases, construction specifications require the contractor to schedule operations in such a manner that at least one full lane of either old or new paving is provided for traffic in each direction throughout the duration of the work.

When feasible, rural highway projects are placed under contract in the late summer or fall with provisions requiring that existing pavement be left intact through the winter, thus sparing motorists the inconvenience of traveling over subgrades or gravel bases which can become muddy or corrugated under wintertime freeze-thaw conditions.

BRIDGE CONSTRUCTION

When grade separations are required on existing routes and the alignment cannot be changed so as to locate the new work away from the existing highway, it is now usual practice to provide a short paved detour to accommodate traffic during the construction of the new structure and approaches. Similar detours have been provided at bridge sites and at locations where extensive muck excavation was required. Detours are now given a temporary paved surface wherever traffic warrants and, increasingly, the Department has determined that paving can be justified as a necessary traffic service.

Because it is recognized that long detours sometimes cause loss of business to tourist-oriented establishments, they are authorized only under very special circumstances. When they have to be used, the Department places paid notices, describing the route to be taken and the duration of the project, in newspapers serving the area where the work is located. News releases are also sent out, describing the route and the project in detail.

MAINTENANCE OPERATIONS

The "Hot Mix Mulch Program", more fully described in the Department's comments on Committee Recommendation No. 5, greatly reduces inconveniences to the traveler. Aggregates and bitumen are pre-mixed in bituminous concrete plants and laid on the roadway with paving machines. While it is necessary to operate one-way traffic through the paving operation; as is also the case with the traditional road mixing procedure; the traveling public is spared the ordeal of driving through wet tar or over windrows of material being mixed. Traffic flow is better in that only one lane is occupied by paving equipment rather than the whole roadway as is the case with road mixes. Once the material is rolled out and set, the public has a completed surface to ride on rather than a loose sand-blotter which is sometimes rather dusty and prone to "bleeding" and pick-up in hot weather or spatter in rainy weather. The bitumen used in hot mixes cures out more rapidly than the grades required for road mixes, thus permitting more rapid restoration of lane markings. Since the public has little knowledge of the economic or structural reasons behind the inauguration and expansion of this program, it is reasonable to assume that the excellent public acceptance of this program is due, at least in part, to favorable reaction to the decrease in motorist inconvenience.

BRIDGE REPAIR

Last year and again this year, bridge deck replacement work has been conducted lane-at-a-time at night so as to permit full width traffic during daytime peak traffic periods. In a number of cases where lane-at-a-time construction was not feasible and traffic volumes or limitations on Bridge Act monies did not warrant construction of temporary detour structures, pre-cast concrete deck panels have been prepared in advance so that replacements could be rapidly made with a minimum of traffic interruption. News releases are sent out prior to these projects, informing residents in the area that a certain bridge is about to be repaired, how the work will be performed, times when the bridge will be closed to traffic, and how long the work will take.

NOTIFICATION OF PUBLIC

In emergency situations, press releases are sent to the news media to inform the public of any interruption or restriction ocurring on highways of the State. In the winter of 1972, the Deer Isle-Sedgwick suspension bridge sustained damage from gale winds. The public was notified by press releases that the bridge was temporarily closed to heavily-loaded trailer trucks. Later releases described the extent of the damage and measures being taken to restore the structural soundness of the span.

During the winter season, the Department operates a night patrol covering 2,000 miles of the most heavily traveled highways in the State. Besides calling out plow, sand or emergency repair crews when needed, patrols are prepared to assist motorists in distress. Last winter over 1,200 motorists, 935 from Maine, received direct assistance of one sort or another. Patrolmen contact their Division Offices by radio at least once each hour to report weather and road conditions. Every two hours, Division Offices relay information to the Department's Augusta headquarters. The Augusta headquarters prepares state-wide reports at 10:00 a.m. and at 5:00 p.m. and 10:00 p.m. and these are relayed to the Division Offices. All of this information--late reports on local conditions and state-wide summary reports--is made available to news services and to the general public at all Departmental offices any time of the day or night.

PROJECT SCHEDULING GROUP

Early in 1969, a functional realignment of the Department's operating divisions provided for the establishment of a Project Scheduling Group. A real effort is made to schedule construction projects in a manner which will minimize inconvenience to abuttors and the traveling public, but project advertising dates are often dictated by deadlines on the obligation of funds rather than by other considerations. Federal matching funds are increased, decreased, impounded or released in a rather

unpredictable manner. In order to insure that Maine benefits from its full share of all funds available, the Department has to let contracts whenever plans are ready and funds are available. When project starts are governed by federal deadlines or special overriding engineering considerations, an effort is made to include special contract provisions to lessen the impact on motorists. News releases are extensively employed to advise travelers of special situations and of routes to follow to avoid delays.

TRAFFIC CONTROL

Years ago there was a tendency in the highway construction industry to erect a "Construction-Pass At Your Own Risk" sign at the beginning of a project and then to concentrate attention on the work at hand with too little regard for motorists negotiating the project. Today, it is recognized that smooth traffic flow through construction and maintenance operations is necessary for the safety of both motorists and workmen and that inefficient traffic control is not only aggravating to the public and damaging to public relations--it can also cause costly delays to construction forces.

The Department and the construction industry recognize these things and have been attacking the problem in several ways. American Association of Highway Officials' and MDOT signing manuals and guidelines have been distributed to state and contractor personnel, specification requirements have been tightened and contractors are now required to maintain larger inventories of signs and traffic control devices. Instructional programs have been expanded.

While much has been accomplished, it is recognized that construction of ever increasing complexity must be accomplished while handling larger and larger traffic volumes traveling at higher and higher average speeds and that the Department must, consequently, expand its training efforts even more and it must divert an increasing share of the construction dollar from permanent improvements to traffic services.

Use of the new "hot" paint system for pavement striping (see Discussion No. 10), not only improves efficiency; it also minimizes the need for protective "flags" and mid-road pickup, thus lessening motorist confusion and inconvenience.

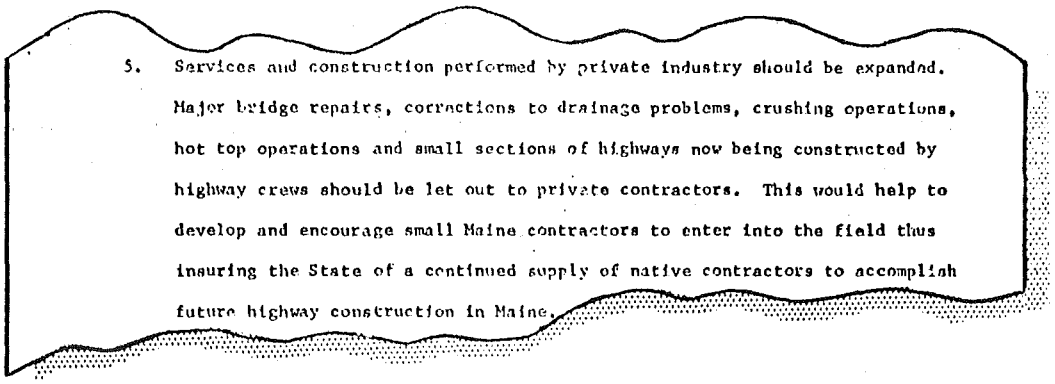
ENGINEERING OPERATIONS

The Department's Location and Survey Division makes an effort to schedule preliminary survey operations on heavily traveled tourist routes either before or after the summer season, both to minimize traffic

interference and to improve the efficiency, accuracy and safety aspects of the survey work itself.

Survey operations in urban areas with high traffic volumes often start in early morning hours so they may be suspended during times of peak traffic. Police officers are engaged when necessary to protect the surveyors and to expedite smooth traffic flow.

C.5. PRIVATE INDUSTRY



Legislative Committee recommendations 5 and 7 cover most of the major operations of the Department's Maintenance and State Aid Division. Before discussing the specific recommendations, it would perhaps be helpful to define some of the terms used and to discuss the Cost-Benefit approach used by the Department in evaluating the effectiveness of its programs.

MAINTENANCE AND STATE AID OPERATIONS

Major activities of the Department's Maintenance and State Aid Division can be classified into five broad groups:

1. "Summer" highway maintenance.
2. "Winter" highway maintenance.
3. Bridge maintenance.
4. Force account construction.
5. Motor Transport Service.

MAINTENANCE TYPES

Summer maintenance is that which deals with the repair and upkeep of the highway structure. Some so-called "summer" maintenance is, therefore, performed at other seasons of the year. Winter maintenance (snow and ice control) is not really maintenance at all in the strict sense of the word in that it does nothing to preserve the road structure--it is a traffic service.

Each type of maintenance may be broken down into planned maintenance and emergency maintenance. Planned maintenance is that over which the Department exercises control of the timing--at least on a short range basis; whereas emergency maintenance may be thought of as that work which must be performed at a time dictated by conditions outside the control of the Department and where action is actually reaction to outside influences.

A tank truck collision covering the highway with burning oil would call for an emergency operation by maintenance crews whereas the replacement of the damaged pavement could be scheduled

later as a planned maintenance activity. Snow plowing during a storm would be classed as emergency maintenance, but winging back during regular working hours the following day would be planned maintenance. Repair of a hole in a bridge deck because of a sudden failure would be considered emergency maintenance, whereas a scheduled deck replacement would be called planned maintenance.

STATE AID-FORCE ACCOUNT

In the early days, all road construction in Maine was under the jurisdiction of cities and towns which showed scant interest in connections to neighboring towns and none whatever in the concept of a statewide, interconnected system. In 1913 the Legislature established a State Highway Commission to designate and construct a system of State roads. It was during this early period that the Commission began the practice of building roads on a "Force Account" basis. Crews (Forces) were set up with a foreman, laborers, and all the then available equipment to construct these new roads. This method of construction was phased out in favor of contract work--first on the Federal System and later on most of the larger State Highway projects--but, in a modified form, it continues to be used in constructing State Aid, Town Road Improvement, and for small State Highway stop-gap improvements. Towns designate projects and appropriate matching funds at town meetings in the spring and want the projects constructed that same summer. They seldom want to wait for the complete survey, design, specifications and other preliminaries necessary for a contract project.

Although the term "Force Account" continues to be used in connection with non-contract work, it no longer means the same thing it originally did. In the early 1960's the Department began phasing out the use of State-owned equipment and state employee operators and made greater use of privately owned and operated machinery, then becoming increasingly more available. Today, a typical State Aid, Special State Aid, T.R.I. or small improvement project is in the charge of a State foreman who has two or three seasonal employees as laborers, but the equipment used is hired from private owners on a "Contractual Basis".

COST-BENEFIT ANALYSIS

The Department makes extensive use of "Cost-Benefit Analysis" in making management decisions regarding its maintenance functions, this being, in the words of the Joint Economic Committee of the Congress: "...a powerful tool in analyzing and evaluating the economic worth of public policies, both prior to decisions to undertake new projects and programs and as a basis for revising, enlarging, or abandoning existing programs." It indicates a need for economy studies, including studies of social and environmental consequences, as a major basis for the best allocation of resources among competing demands.

In the final decision stage the decision maker has every need to know what the consequences of his decision will be. Who will be helped; who will be harmed; how much and in what way? What are the trade-offs in costs and benefits, and who is affected? What are the long term effects? What adverse effects are temporary? What adverse factors arise from purely personal situations? What effects are of general public concern?

Because so many Maine people are utterly dependent on the highway system, the Department feels it must maintain a high capability to cope with emergency conditions whenever and wherever they arise. This means sufficient personnel--well dispersed. For this to be economic, personnel kept available for emergency operations must be productively employed in planned activities at other times. The fact that the men are dispersed to handle emergency work promptly, incidentally and fortunately means that routine planned maintenance can be accomplished with minimal time loss and transportation cost. Thus it is that benefits and costs are weighed.

Benefits and costs are similarly considered when locating crew headquarters and equipment storage facilities; when spotting salt sheds and sand stockpiles; when determining what equipment to buy and where to locate preventive maintenance garages.

"MAJOR BRIDGE REPAIRS"

Bridge maintenance forces are maintained at a level necessary to attend promptly to emergency work and to take care of routine planned maintenance operations. Contract maintenance is used to do those projects which are large enough to warrant the development of plans and specifications and which would otherwise require a large seasonal increase in the strength of regular forces.

Major deck replacements are often contracted. Recently, in Biddeford and Saco, three bridges were rehabilitated at a contract price of $403,000. The deck of the Brunswick-Topsham bridge was replaced at a contract price of $214,000. The Department's crews could not have handled this work without hiring many additional personnel or by unacceptable deferral of other necessary operations. A number of major deck replacements are presently being considered for contract because they are beyond the scope of regularly assigned forces.

The contract method is also employed in the painting of large structures. The Deer Isle-Sedgwick suspension bridge was painted by contract a short while ago as was the Waldo-Hancock Bridge. Generally, it is planned to paint at least one major structure per year by the contract method.

"CORRECTIONS TO DRAINAGE PROBLEMS"

It has been said that the three most important features of a highway are: Drainage, drainage and drainage. Yearly, the Department installs or replaces some 20 miles of culvert. The quantity varies somewhat from year to year because replacements are not made according to any schedule or planned program. Life expectancy is highly variable depending on such factors as flow volume, percent of grade, erosion of stream bed and abrasiveness of bed load, acidity or alkalinity of the water and durability of the culvert type. Because of the sheer number, small size and, frequently, submerged flow line of most culverts, it is impractical to have a regular inspection program. In most cases culverts are replaced after failure--usually when the bottoms rust out and the sides begin to collapse. At this stage, replacement can be characterized as "emergency" work because it must be quickly done to avoid backup of runoff and damage or closure of the highway or properties which might be affected. Time does not permit the conduct of surveys, preparation of plans, writing of specifications, advertising, or any of the other time-consuming steps associated with the type of contract required for the administration of State funds.

The work is performed with State forces, using the same small backhoe-equipped tractors used for salt and sand loading and other routine maintenance operations.

It is, however, feasible to inspect large diameter culverts regularly, anticipate the need for replacement and to program the work. The Department often hires privately-owned equipment for this work because it is beyond the capabilities of standard maintenance equipment. Many large culverts are installed by contract under the Bridge Act.

"CRUSHING OPERATIONS"

Large, efficient, commercial crushing plants are stationary and are seldom within economic haul distance of where materials are needed. Because of the seasonal nature of both heavy construction and "summer" maintenance work, it has been the Department's experience that smaller, contractor-owned, portable crushing plants are seldom available when the State needs material. Accordingly, contract crushing only occasionally fits into the guidelines established for sound maintenance management.

When circumstances do favor purchase of commercially produced materials, the Department does obtain them by that method so comparative costs are available. All records indicate that it is generally more economical for the Department to produce maintenance

materials with its own portable plants. The Department's crushers were specially designed and manufactured to meet a performance specification incorporating such elements as the natural gradation of materials normally processed, the gradation of products desired, and required production rates. They are extremely efficient producers of the maintenance materials they were designed to make.

"HOT TOP OPERATIONS"

"Hot Top" is a common term, usually used to denote what is more technically called "Bituminous Concrete". It is a controlled mixture of fine and coarse mineral aggregates, filler and asphalt which is heated and pre-mixed in a plant, applied to the roadway with pavers while still hot, consolidated by rolling and which solidifies upon cooling. It differs from many somewhat similar mixtures of aggregate and asphalt in that all aggregates are completely dried and preheated in a rotary furnace and the asphalt cement used solidifies at normal temperatures. "Cold mixes," while they may be made with asphalt which has been heated somewhat to facilitate handling, are usually composed of cold, air-dried aggregates and asphalts which have been "cut back" with naptha, kerosene, or water and emulsifiers to make them liquid at relatively low temperatures. Though occasionally somewhat warm when placed, they do not harden until the asphalt solvents evaporate--often days, weeks, or months after they are placed.

The Department uses both types of material. Programs for "cold mix" and "hot mix mulch" are described in the Department's comments on Legislative Committee Recommendation No. 8.

The Department manufactures cold mixes in so-called "stabilization plants". It manufactures no hot mix whatever and does not even own a plant capable of doing so. It has but one bituminous paving machine, primarily used for laying cold mixes. All "hot top" manufacture and all but an insignificant amount of emergency placement work is performed by some sort of contractual arrangement with private industry.

Heavy overlays on primary highways are performed entirely by contract. This work amounted to $257,856.22 in 1971 and $221,483.28 in 1972.

Bituminous concrete work on urban and some rural State Aid projects is also done by contract--usually advertised by either the Division Office or the Bureau of Purchases with award approved by the Commissioner. Payments to private contractors amounted to about $290,000 in 1972.

The Hot Mix Mulch surface treatment program is a cooperative venture--contractors provide materials, plants, pavers, rollers and crews and the Department provides trucking, traffic control and shoulder work. Contractors furnish specialized high production plants, modern paving machines and skilled workmen--their forte, and the Department makes efficient summertime use of the equipment and manpower reserves maintained for winter and other emergency work. This program accounted for payments to contractors of $1,775,539.51 in 1971 and $2,379,571.28 in 1972. The program meets the criteria for sound maintenance management because both the Department and the private sector contribute toward the end result the work they can best, most economically, do.

"SMALL SECTIONS OF HIGHWAYS NOW BEING CONSTRUCTED BY HIGHWAY CREWS"

As previously mentioned, Force account State Aid construction is now performed almost entirely with privately owned and operated equipment hired on a contractual basis. Rock drilling and blasting is done at an hourly rate for small amounts or, for larger quantities, by quotations per cubic yard on a project or seasonal basis. Department personnel do no blasting except in one Division where private operators are unavailable. Excavation is now done with privately owned, rented front end loaders, skid shovels and swing shovels. The Department now owns thirty-three fewer swing shovels than it did in 1964. Those remaining are used only where private equipment is unavailable or prohibitively priced. Privately-owned bulldozers are used exclusively. The Department has not owned one since 1964. Over 99 percent of the trucking is done with privately owned and operated vehicles--State trucks being used only to supplement in emergencies. Most borrow and base materials are obtained from private pits. State graders are used for final surface work on State-financed projects--primarily due to a shortage of machines available for hire, but the Department is slowly reducing its inventory of motor graders.

It is expected that the term "Force Account" will continue to be used to designate projects not let out to contract but it should be noted that, today, the "Force" is almost entirely from the private sector. In 1971, the Department paid out $4,250,000 to 1,247 individual equipment owners employed in maintenance and State Aid work. A significant portion of this found its way to equipment dealers and suppliers, many of whom are not regularly patronized by large general contractors. Sixty-six percent of the total cost of the "Force Account" construction program was for the rental of privately owned equipment, the remaining 34 percent being divided among pit owners, suppliers of culverts and other materials and State labor and equipment charges. The latter accounted for only 10 to 15 percent of project costs--considered by some a reasonable figure for supervision alone.

There is little room to expand private industry's role in the State Aid program short of constructing the projects by contract. Because of the added lead time involved, most municipalities without established engineering departments to do their own survey and design work, do not favor the contract method. Some of the equipment owners presently employed on Force Account projects lack the resources necessary to handle contract projects so the present method of operating Force Account projects appears to be a practical approach to providing them a share of the Department's work.

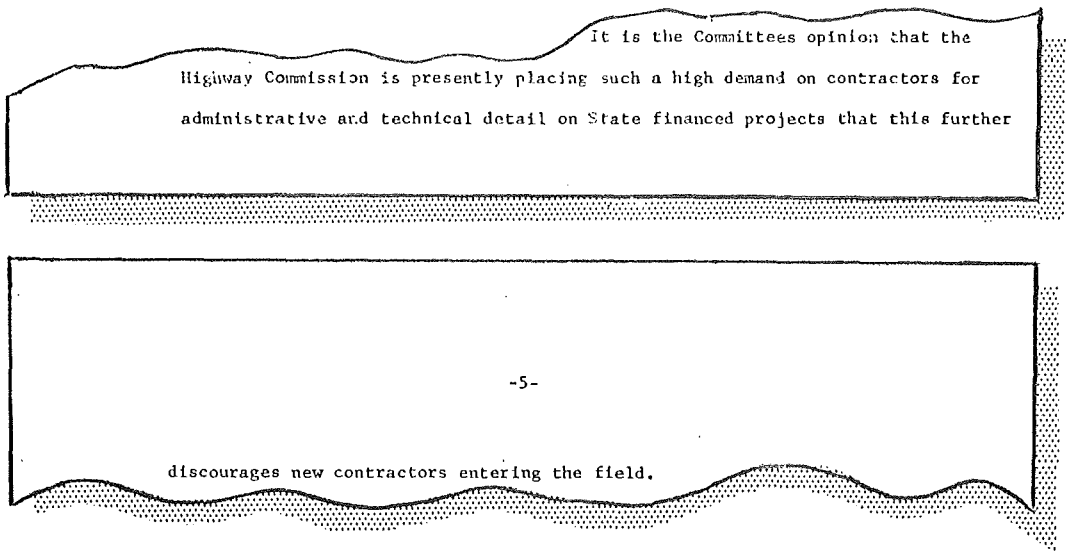
TRAFFIC SERVICES

In the preceding discussion of Cost-Benefit Analysis, it was noted that the technique was useful "as a basis for revising enlarging, or abandoning existing programs". The Department's Traffic Engineering Division has conducted reviews of two of its activities to determine whether or not services by private industry should be expanded.

It was found that pavement striping was being done by State forces and equipment at a cost one-half the price charged by private contractors and that no advantage would accrue by changing the present procedure.

The Department's involvement in street lighting has greatly increased as more and more urban expressways and freeway interchanges are placed in service. A street light maintenance cost study resulted in the Department equipping itself to do the work for 50% less than the cost under contracts with private power companies.

C.5.(cont'd.) NEW CONTRACTORS



When the Department's 1974-75 Construction Program was announced, it was stated that:

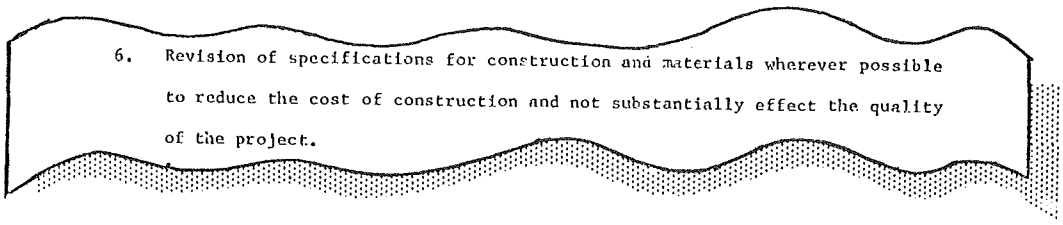
> "Continued inflationary trends in the highway construction industry have again limited the number of miles of improvements that can be accomplished within established budgetary resources. Therefore, the Department has included 'Stop-Gap Improvement' projects in the program consisting of less expensive, lower standard improvements at selected locations along given sections of roadway."

All of the twenty-four stop-gap improvement projects in the program are in a price range such that, if let to contract, they can be considered suitable for small contractors. Also in the 1974-75 program are some 40 hazard correction projects, two-thirds of which may be considered as within the capabilities of small contractors. A number of truck lane and bridge replacement projects are also of a size such that they could be handled by some of the smaller, newer contractors.

The Department is presently exploring ways to set up simplified contracts for some of this work. Drawing on experience gained on similar work done on a Force account basis on Route 201, Topsham-Richmond, and on Route 133 in Wayne, Department poeple and industry representatives will be working to develop new approaches to accomplish reduced standard projects with a minimum of plans, specifications and "administrative and technical detail".

Of course, there is no way of assuring that the smaller contractors will bid successfully on this work, but it is anticipated that there will be enough such projects let to give them ample opportunity to compete.

C.6. SPECIFICATIONS



HISTORY

The building of the Interstate Highway System is the largest construction undertaking ever conceived by man, whether measured in dollars or in sheer quantities of construction materials involved. In the early 1960's the Congress determined that the then usual construction practices were not good enough for such a monumental work. Great pressure was exerted on Federal Highway administrators to upgrade design and construction standards and to better document the expenditure of funds. The volume, weight and speed of traffic was increasing at unprecedented rates at the same time and this added impetus to the drive for higher standards.

Under constant pressure from the federal government all states, Maine included, repeatedly revised specifications to meet ever more stringent federal requirements. For some time now, some of the Department's people have felt that this trend had been carried to the point of diminishing returns and have shared the Legislative Committee's feeling that some specification requirements should be relaxed to reduce costs.

TRIAL PROJECTS

Last year Department administrators were successful in persuading federal highway officials that there should be some relaxation of requirements on secondary road projects. To implement this, a committee of some of the Department's most experienced engineers representing both the Design and the Construction Divisions was formed. Each committee member was charged to study particular construction contract items. Bare-bones performance requirements were determined and compared with current specification requirements. Engineers considered such things as the capabilities of modern equipment, adaptability of standard equipment to required operations, reduction of

contractor capital investment and the availability and cost of skilled and unskilled labor. Whenever possible, an attempt was made to minimize contractor and State engineering and documentation expense. Individual recommendations were reviewed by the committee as a whole and contractors and material suppliers were invited to contribute suggestions through the Association of General Contractors.

Contract Special Provisions, modifying Standard Specifications, were developed in an effort to reduce costs on a number of construction items. Among these are the following:

1. More options were provided for the disposal of "Clearing" and "Tree Removal" debris, including burial under sideslopes of highways unlikely ever to be widened; and burning, provided air pollutants were not used to start or maintain fires.

2. Finish tolerances on slopes and ditches were increased to virtually eliminate the need for hand labor or special finegrading machines.

3. Embankment compaction requirements were relaxed and subgrade grading tolerances were widened.

4. Lower class bedding was specified for small "flexible" culvert pipes and trench excavation was made incidental to the price of the pipes to minimize engineering measurements and quantity calculations.

5. Gradation requirements of underdrain filter material were reduced to eliminate screening where reasonably good natural sand was available and compaction requirements were relaxed for underdrains in areas where settlements could be tolerated.

6. Gravel base gradation specifications were opened up so that good bank-run material would pass without screening or crushing and compaction requirements were relaxed.

7. Procedures for the "tare" weighing of trucks hauling paving mix were simplified and a number of inspection checks were eliminated.

8. Uncrushed gravel base was used to reduce equipment requirements and the items: "Hand Laid Riprap", and "Reflectorization of Bituminous Curb" were eliminated to reduce labor expense.

9. The frequency of materials testing was reduced on nearly all items to eliminate the need for a project testing building and full time testing personnel.

Approved recommendations were incorporated in the Special Provisions governing a 1.16 mile project on Route 6 in the town of Lee. A special pre-bid conference was held to acquaint prospective bidders with the changed specifications.

On December 22, 1971 bids were opened with the following results:

1.	$166,231.00	Low Bid - Awarded
2.	212,230.00	
3.	213,685.00	
4.	216,853.00	
5.	222,043.00	

The low bid was possibly not too conclusive as the contractor had never before been awarded a contract under the usual Standard Specifications, but the other bids from experienced contractors were quite revealing. The relatively narrow "spread" was indicative of real competition and all bids were well below the Engineer's Estimate of what the cost would have been had the designs and specifications followed previous practice ($258,362.00).

Encouraged by the apparent success of this first effort, about two months later on March 1, 1972, the Commission let another project, 2.75 miles in Township 1, Range 9 and Township 2, Range 9, using similar specifications. Bids were received as follows:

1.	$129,710.00	Low Bid - Awarded
2.	146,251.00	
3.	146,604.00	
4.	153,559.00	
5.	165,645.00	

Again, the "spread" indicated quite competitive bidding. The Department's engineers estimated the cost of this project, if constructed according to usual requirements, at $176,868.00.

The Resident Inspector on the Lee project has filed a report detailing his views on the cost effectiveness and quality of work obtained under the revised specifications. On this particular project, it appears that the greatest economies were achieved on those items where aggregate gradation requirements were tailored to permit use of the relatively good local materials with a minimum of processing. The Resident was of the opinion that both the contractor and the State could effect some cost savings by allowing the Resident more latitude in determining the need for and frequency of compaction and gradation testing. These observations were perhaps somewhat predictable as the federal government has been strongly emphasizing rigid testing controls and, no doubt, this has affected the cost of aggregate materials.

The Resident on the T1-R2, T2-R9 project will also soon be reporting on his experiences and observations of work performed under modified specifications.

APPLICABILITY OF RESULTS

While preliminary indications are that economies can be effected on secondary highways by specifying cheaper materials, a lower class of workmanship, and greater tolerances on finishing; great care must be exercised to insure that savings in the cost of new construction are not wiped out by the need for premature and costly maintenance or repair work. It has to be constantly borne in mind that Federal Aid funds cannot be spent on maintenance work.

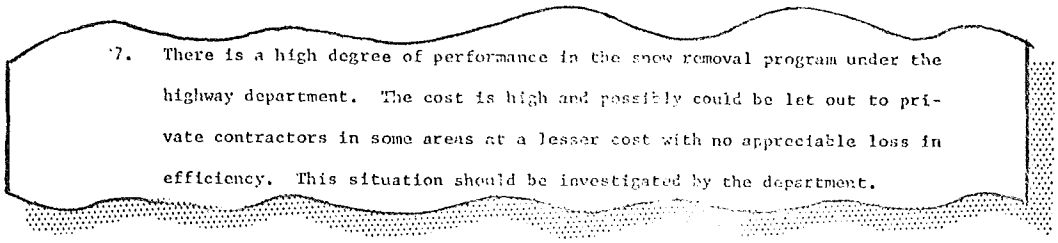
It should also be recognized that many cost reduction techniques applicable to low volume highways with light grading in areas with good natural materials are not appropriate or desirable for high volume facilities, in areas of difficult soil conditions, or where natural materials absolutely must be upgraded to obtain satisfactory performance. Obviously, the Department would not want to construct a dangerously weak pavement-base structure in an area where a later overlay would be difficult due to curbs and drainage structures and where such work would be extremely hazardous or excessively disruptive of traffic service.

Each project must be separately analyzed and design and specification revisions must be custom-tailored to fit local conditions. This is the approach the Department has taken to date and as State engineers and contractor's forces gain more experience with the idea of varying specifications from job to job, it is expected that some costs can be held down without substantial ill effect on the quality of construction projects.

DESIGN MODIFICATIONS

In addition to working with construction people in the development of cost-reducing specifications, the Department's Design Division is critically reexamining geometric standards. The use of flat 6 on 1 sideslopes and rounded ditches, inaugurated under recent programs emphasizing safety even for off-the road, runaway vehicles has been drastically cut back. Plans for ten projects were reworked to show conventional sideslopes. Alignment, grade, and cross-section standards have been reduced, particularly for projects on dead-end coastal highways where modern standards require land takings unacceptable to local interests. Proposed projects are fully evaluated from all angles. For example, after some preliminary design work was done on two projects, it was determined that the improvement which could be realized under the restraints imposed did not warrant the expenditure and they were dropped from the program.

C.7 SNOW REMOVAL



THE NEED

An efficient internal transportation system is the very life-blood of a nation or a state. Primitive cultures are noted for their lack of transport just as advanced ones excel in this regard. This is no less true in Maine in 1973 than it was in the ancient Roman empire.

In Maine, we have experienced the demise of canals and the decline of coastal shipping; the end of rail passenger service and problems with freight service; the demise of street railways and the decline of bus service; the abandonment of some trunk airline routes and the struggles of secondary carriers. Today, in Maine, automobiles, trucks, and the highway network they use constitute the principle transportation system for the movement of most of the State's people and goods. A state as totally dependent on highways as Maine is can ill-afford an undependable winter maintenance program.

Motorists fully expect to be able to travel anywhere, anytime, day or night, regardless of the weather. Even at the height of raging blizzards, most people expect but little difficulty once they leave their driveways--they expect almost clear pavements once they get to "the state road."

Undeniably, the cost of providing this service is high. The cost may not, however, be too high considering the social and economic costs of a lesser service.

MEETING THE NEED

Winter maintenance of State Highways as carried on by the Department of Transportation is an integrated, state-wide effort involving many operations--some of which go on in the heat of the summer. Specifications are prepared, contracts are advertised and awarded and supplies of salt, sand, cutting edges, and other stores are stockpiled. Trucks, graders, plows, loaders, sanders and communication systems are made ready. Snow fences are erected and obstructions are marked. Actual operations involve radio-equipped Night Patrol, Supervisor, and Foreman vehicles and a state-wide system of radio base stations operating 24 hours a day; storage buildings for equipment and salt; sand stockpiles and loaders; repair garages manned night and day; over 500 plow trucks equipped with sanders, about 60 motor graders, and 15 heavy duty vee plows and 6 rotaries; and, last but certainly not least, crews of trained, experienced men with a real dedication to the job. In short, snow removal is a major logistic effort which, like all efficient operations, appears far easier than it actually is.

CONTRACT PLOWING - EXPERIENCE

Years ago, a rather significant percentage of State Highway snow removal was done by private contractors and the service provided was considered adequate at the time. In recent years, the Department and, incidentally, many towns have tended to rely less and less on contract work--for a number of reasons:

1. Contractors are not now equipped with the class of warning lights or the specialized equipment such as left-hand plows which would be needed on high speed expressways.

2. Contractor-owned equipment seldom meets the level of capability, dependability or availability presently maintained in the Department's fleet.

3. Contractor personnel often lack training in safety procedures and the protection of roadside installations.

4. Supervision is difficult and, at times, impossible due to the impracticality of tie-in with the Department's communication system and the problems inherent in the fact that contractor personnel are not directly accountable to State supervisory people.

5. Although some contractors do express interest in plowing work, few want to assume the responsibility for ice control. As noted elsewhere in this report, the Department's salt conservation program involves careful calibration of specialized equipment,

extensive operator training and close supervision. It would be difficult to have similar controls over private equipment and personnel. Contract plowing provides rather doubtful economic advantage if the State must provide redundant crews and equipment to handle ice control.

6. The Department's experience has been that plowing contractors have a tendency to delay the start of plowing. This results in poor traffic service during storms and in many cases causes a build-up of hard-packed snow. There is also a tendency to adjust plow blades to minimize cutting edge wear and vehicle stress with the result that the"pack" doesn't get removed. State forces then have to use motor graders and heavy applications of sand and salt to get highways back in proper condition. The duration of slippery or sloppy conditions is prolonged and excessive use of salt is both costly and environmentally damaging.

7. Some contractors slight post-storm widening or winging-back. This can result in loss of shoulder use; drainage problems and icing or puddling with resultant pavement deterioration; drifting; and other problems which cause hazards, decrease traffic service and may require expensive emergency work by State forces.

8. In many areas, no bids are received. The Department has never terminated a plowing contract although many contractors have stopped doing the work.

CONTRACT PLOWING - COST

The cost of winter maintenance by private contractors vs State forces cannot be readily compared for a number of reasons:

1. For many of the reasons previously cited, contract plowing is used only on State Highways with very low traffic volumes. Contractors plow roads--which are narrower than average; which have very little traffic interference; usually on low traffic roads where drivers and vehicles are well equipped for winter travel and where abrupt weather changes and icing have less effect than on high traffic volume highways.

2. Plowing contractors do not plow multi-lane expressways, channelized intersections, ramps, or interchanges requiring specialized equipment--where costs per mile are relatively high.

3. Contractors are not generally required to furnish or stockpile sand and salt and in many instances do not even apply it.

4. Contractors' bids do not reflect the costs of supervision, communications systems, Night Patrol, many incidental operations and, very importantly, they do not include the cost of reserve capability necessary to meet emergency situations, some of which arise when contractors suffer equipment breakdowns or when prolonged storms overtax their manpower reserves.

CONTRACT PLOWING - INCREASE ?

The Department sees other problems arising from a too heavy reliance on contract plowing:

1. Coordination of a large number of private contractors would be difficult in extreme storm emergencies.

2. Little would be gained by an increase in contract work unless State forces could be correspondingly reduced. Reductions in heavy equipment reserves might make it very difficult for State forces to promptly and effectively respond to the emergencies which arise when the resources of contractors or municipalities prove inadequate. The Department presently does maintain such a capability--supported by widely-based garage and stockpile facilities.

3. If Departmental manpower or equipment were cut by decreasing wintertime operations, great difficulty would be had in obtaining necessary equipment and trained personnel to perform summer work as the Department would be competing for resources during the peak construction season. A considerable upward adjustment of pay scales and equipment rental rates would probably be required.

4. Although a number of contractors have expressed interest in contract plowing, there has been very little real competition in bidding on sections placed under contract. Often, only one bid is received. Without the close grouping of truly competitive bids, it is difficult to consider performance ratings in making awards. When no bids are received or they are unreasonably high, the Department has no alternative but to do the work itself. Such unscheduled mobilization can be difficult and costly.

5. The State would be competing with towns for the use of a rather limited amount of private equipment. Of 74 towns with a valuation of $1,000,000 or less which solicited bids during the 1971-72 season, 50 received only one bid.

COSTS - BENEFITS

Most of the approximately 21,000 miles of public ways in Maine are kept open throughout the winter. In 1971, a year of unusually heavy snowfall and greater than average number of storms, the State and its municipalities expended approximately $20. million for winter maintenance.

The State Department of Transportation maintained 3,570 miles of Federal Aid and State Highways at a cost of about $8.2 million.

Municipalities maintained the remaining mileage consisting of Town Ways, State Aid Highways, and portions of State Highways within the compact or built-up sections of towns of more than 2,500 population -- receiving $1.8 million in reimbursements from the Department of Transportation. (The Department participates in the cost of winter maintenance on that portion of State Aid and Town Ways, excluding "compact" sections, which are "accepted" as "winter routes"--some 12,800 miles.)

Highways would survive the rigors of winter with much less frost damage if they could be allowed to spend the winter under an insulating blanket of snow. Thus "winter maintenance" is not really maintenance at all in the strictest sense of the word--it is a traffic service. As such, its worth can best be measured in terms of the cost per vehicle served. While the cost on State maintained roads seems high--41% of the total statewide expenditure being used on 17% of the total mileage--traffic studies show that these highways account for 42% of the total vehicle-miles of travel and an even greater percentage of the commercial traffic. Considering that these highways are maintained to a standard commensurate with their social and economic importance and the fact that costs are in almost direct relation to traffic served, the cost is not considered to be excessively high.

The Department presently lets out the plowing of 115 miles to private contractors. Neither past experience nor future projections support any significant increase in this activity.

Of the 561 towns with MDOT "accepted" winter routes, 214 perform winter maintenance with town forces and 347 use privately-owned equipment. The number of towns gearing up to do their own winter maintenance increases yearly as towns experience greater difficulty in obtaining competitive bids from responsible contractors. It does not appear in the public interest for the Department of Transportation to compete for or become heavily dependent on a decreasing availability of private equipment.

C.8. RESURFACING

8. Apparently the new program of resurfacing with cold and hot mix is an excellent one and if results affirm present indications, the program should be expanded.

A BIG PROBLEM

The Department of Transportation is responsible for summer maintenance of some 10,500 miles of State and State Aid Highways. Fewer than 1,700 miles of this have what is known as a "high type surface" and many of those miles were built years ago with pavement and base thickness inadequate for today's traffic loads. Thus the Department has some 9,000 or more miles which are constantly overstressed and which must be regularly resurfaced to seal cracks and true up deformations to prevent disintegration and loss of previous investment.

TRADITIONAL METHODS, LIMITATIONS

The traditional methods of doing this were by sprayed-on bituminous seal coats with sand cover and, where heavier coatings were required, by blending bitumens ("tar") and fine aggregates on the roadway using graders ("mulching"). Some years ago, it became evident that something better was needed. Mulch treatments had reached their limitations as to durability and improvement of riding quality. Road tar became unavailable or prohibitively expensive when the advent of natural gas shut down coal gas plants and economic conditions dictated that steel mills use coke oven byproducts for fuel or chemical production. To conserve limited quantities of tar for such work as initial "penetration" on new State Aid construction, the Department used asphalt cutbacks and emulsions for mulch work. These materials caused some problems, particularly during adverse weather. It was becoming increasingly difficult to perform the work under heavy traffic conditions. The public was becoming less tolerant of the inconvenience and nuisance of wet "tar", traffic delays, and dust from cover materials and, because heavy traffic tended to pre-compact the mix before it was fully laid out, ridges and rough surfaces often resulted.

COLD PRE-MIX--A BETTER ANSWER

In its search for a better procedure, the Department purchased a cold mix "stabilization plant" in 1967. By use of this plant, selected grades of aggregates could be premixed with various grades

of liquid bitumen and the prepared mixture could be placed on the roadway with a minimum of traffic disruption. The composition of the mix could be controlled and mixes could be designed for specific conditions.

Later, another stabilization plant was purchased and now the two plants are programmed to travel throughout the Maintenance Divisions during the resurfacing season. Mixes from these plants can be used to reshape, economically, highways with excessive crowns, inadequate curve, super elevations, and other irregularities requiring extensive shimming preparatory to the placement of a hot mix surface.

HOT MIXES, EARLY TRIALS

The hot mix program has a somewhat longer history than does the cold pre-mix program. As early as 1962, some divisions used graders to lay hot mix obtained from commercial plants. Although some excellent resurfacing work was done by this method and the life of the surface was quite long, the procedure did not lend itself to expansion into a large program. Truck drivers, dump men, and grader operators with an uncommon amount of finesse were required to achieve a thin but uniform thickness, else the material cost was excessive. The procedure could not be sufficiently controlled.

In 1967, two miles of what is now called "hot mix mulch" (thin, plant-mixed overlay) were placed in the Fairfield Division using a regular bituminous paver rented on a per ton of mix laid basis. The same procedure was used to pave 14 miles in the Fairfield Division in 1968; 38 miles in the Fairfield Division; and 25 miles in the Bangor Division in 1969. In 1970 nearly 140 miles were placed. Most of this work was done in built-up or compact areas where pedestrian and vehicular traffic considerations made the "wet tar" mulching process impractical. Public acceptance of these early jobs was very high and, to date, maintenance requirements have been negligible.

For safety reasons, the Department has always had serious reservations about placing what, to the average motorist, appears a high type surface on highways unsuited to the speeds normally permissible on completely new projects having similar appearing pavements. However, in recent years it has become increasingly evident that the construction dollar can probably never be stretched to permit major reconstruction of all our roads and that, for many of them, whatever improvements are made must take the form of periodic resurfacing and spot correction of serious problems of line and grade. Thin, hot-mixed mulch surface treatments appear to have a definite place in a program of this sort.

HOT MIX MULCH PROGRAM, THE SOLUTION?

In 1971, the Department inaugurated a program of placing hot mix mulch by contract. Mix was made in fixed commercial plants or contractor-owned portable plants, trucked in State vehicles, and laid by contractor crews with State personnel providing traffic control services. Each Maintenance Division was allotted 25,000 tons (about 63 miles). This was increased to 30,000 tons (about 75 miles) in 1972 and present plans call for 40,000 tons (about 100 miles) per Division in 1973 and 50,000 tons (about 125 miles) in 1974. Savings due to strong competitive bidding and some reductions in other surfacing programs enabled the Department to do more of this work than originally scheduled so that, state-wide, 535 miles were completed in 1971 and 662 miles were resurfaced in 1972.

The contract hot mix mulch paving program has been very successful to date for the following reasons:

1. Minor delays to traffic.
2. Very high public acceptance.
3. Good control over materials and thicknesses.
4. No adverse effects from rain following placement.
5. Very little repair required to date.
6. Better surface for snow removal and more effective results from plowing and salt and sand applications.

To achieve optimum results from this program, the areas to be treated must be carefully planned:

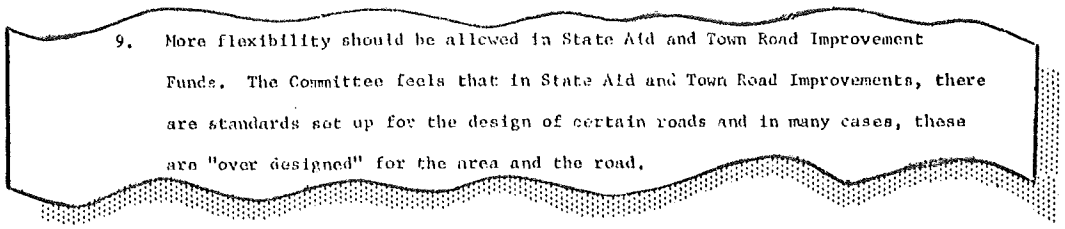
1. Ditching, culvert replacement and other preparatory work must be accomplished in advance of paving.
2. Where needed, cold mix shimming must be scheduled, completed, and be given time to cure before paving.
3. Materials for building up shoulders must be processed and stockpiled and crews and equipment must be available to do the work within a reasonable time after paving.
4. Roads to be paved must be concentrated in fairly close proximity to plants, often by taking advantage of the temporary location of portable plants, so that costs can be held down by allowing plants to operate at full capacity and by minimizing the number of trucks hauling and the number and length of equipment moves.
5. While the work can be accomplished quite economically by utilizing surplus capacity of present plants, trucks, and crews, too rapid an expansion of the program, necessitating new investment in plants with relatively low utilization rates could result in very appreciable cost increases.

GOOD, BUT...

The Department is pleased with the unusually high degree of public acceptance of these programs but they have created a few problems in the field of public understanding. Some areas of the State are vigorously requesting this type of work even though conventionally treated roads are in quite good condition. There are areas where it is not possible to meet the criteria necessary for economic use of the hot mix system and, in others, low traffic volumes and considerations such as efficient utilization of present equipment investment, suggested there is still a place for traditional procedures.

Despite their appearance when new, these "pavements" are merely thin surface treatments and they do not greatly strengthen the roads they are placed on. It is a little too early to predict just how long they will last. While an average useful life of five years is hoped for, some weak road beds can be expected to fail before that time. A year or two of unusually severe frost problems might well force the Department to resurface existing pavements and to curtail the treatment of new sections. The Department sees a real need for public understanding of these things because, while the program is indeed a good one, it is not "reconstruction" and it is not a panacea which will take care of all the State's many highway needs.

C.9 SA,TRI STANDARDS



DEPARTMENT REVIEW

As a result of review of State Aid and Town Road Improvement Fund operations, the Department has concluded that there has indeed been some lack of flexibility in the application of standards in some areas. Where there has been a problem, it appears that the lack of flexibility on the part of Department personnel resulted not so much from indifference to the views of others as, apparently, from an excess of zeal on the part of employees eager to obtain designs with maximum useful life and incorporating recent concepts of safety and aesthetics.

A Maintenance and State Aid Division meeting held on February 29, 1972 and attended by Division Engineers and Assistant Division Engineers was devoted almost entirely to the subject of State Aid design. The physical elements having the greatest effect on costs were considered as were methods of achieving minimum satisfactory designs. It was reaffirmed that while line, grade and cross-section configuration could and would be areas for compromise, structural and drainage features would not, because to construct a facility with known structural or drainage deficiencies would be to invite perpetual excessive maintenance costs.

COSTS, BENEFITS EVALUATED, NEW STATE AID STANDARDS

The conferees noted the difficulties inherent in the adoption of minimum design standards: While some might laud efforts to stretch the construction dollar over a maximum length of project by the adoption of curving alignments and rolling grades, others would surely condemn the work from the safety standpoint should a serious accident occur on a new section, whether or not the highway itself was a contributing factor. A decision was made to cut expenses by assuming lower design speeds on projects where such assumptions would measurably reduce right-of-way and grading or other costs.

Having accepted the concept of reduced standards for line and grade, it then became feasible to consider more or less superimposing appreciable sections of new highway on top of the old, thereby making possible some reduction in gravel requirements by using varible depth base to make optimum use of whatever support value remained in the old road structure.

While some view loam, seed and sod work as a wasteful frill, others clamor for restoration of the landscape for ecological and environmental reasons. It was concluded that, as a public agency, the Department did have an obligation to show a proper regard for the environment by taking necessary steps to prevent erosion and siltation of materials into brooks and streams and that the expense was economically justified by the fact that stabilization of slopes and ditches reduced maintenance costs and prevented structural damage.

IMPLEMENTATION

As a direct result of the conference, "Guidelines for the Design of State Aid Highways" were adopted--incorporating new reduced standards designed to effect cost reductions.

The Department will continually review State Aid designs to be assured that guidelines are followed and to explore new methods of reducing costs.

TRIF STANDARDS, NOT CHANGED

The Department's policy on Town Road Improvement Fund construction is quite simple. The completed section must have adequate drainage, at least one foot of gravel base, and it must be at least fourteen feet in width, the statutory minimum for acceptance for snow removal reimbursement. These few standards do not seem excessive for roads which municipalities must maintain for many years. Many towns, in fact, request additional width to meet traffic demands.

C.10. MAINTENANCE

10. There is a question whether the maintenance of highways by the department with state-owned equipment and employees is any improvement over the old system of patrolmen with their own trucks. Now that this system is in operation however, and in view of the fact that maintenance garages have been constructed throughout the State, the committee feels that the system should be continued. Improved supervision and management plus more planning for efficient use of equipment and personnel should be implemented by the department.

STATE-OWNED AND PATROLMAN-OWNED TRUCKS COMPARED

State-owned trucks have been found to be more satisfactory than patrolman-owned vehicles primarily because of improved capacity, dependability, uniformity and safety.

When patrolmen owned their own trucks, there was a large variation in the capacity, condition and availability of individual trucks. Some were capable of hauling reasonable loads while others were barely capable of doing routine patrol work and some were actually suitable only for personal transportation. Not only was capacity highly variable, there was no uniformity in the state of repair of different trucks. It was never known whether or not some of the older and weaker trucks would be available for a given assignment. To compound the problem, trucks used for hauling full loads commanded a higher hourly rate that that paid for routine patrol duty. Often, owners of dilapidated trucks wanted them used on long-haul, capacity work because of the higher rate, but the trucks were not always capable. When so used, they broke down and were sometimes unavailable for several days thereafter. Effective work planning and supervision was extremely difficult due to the necessity of trying to apportion premium rate work equally, make allowances for variable capacities and juggle vehicles to maintain loader-truck balance, constantly upset by breakdowns. Private trucks were based at patrolmen's homes often miles from the nearest repair facilities, and they were seldom housed in garages. Repair work was uncertain at best, virtually impossible under nighttime storm conditions.

State-owned patrol trucks can be assigned where most needed without consideration of adversely affecting the driver's income and, though there may be some variation in mechanical condition due to age, differences are minor because all are kept up under a formal preventive maintenance program. They are housed in

heated garages, usually near preventive maintenance or repair garages with proper facilities for speedy repair.

Differences in makes, models, ages and types of patrolman-owned trucks caused many problems in the mounting of snow plows by Department garages. Hardly any two trucks had the same front axle rating or frame type and power take-off types and locations came in infinite varieties. Initial plow mounting was a slow, time consuming and costly procedure. Interchange of plow frame parts, especially frame plates, was virtually impossible as was the stocking of spare parts. When breakdowns occurred during storm emergencies, repairs often took too long to get the unit back to work until after the storm was over. Some patrolmen were frequent traders in the used truck market and plow mounting costs were very high.

State-owned trucks are usually purchased in groups with identical specifications, as are the plows to equip them. Replacement parts can be stocked at Department garages and repairs can be promptly made at any time, day or night.

Mounting plows on an infinite variety of patrolman-owned trucks overtaxed the Department's garage facilities--installation of hydraulic motors and tailgate sanders could not be considered. Patrolmen's trucks were accordingly equipped with towed, spinner-type sanders and salt was applied through tailgate cutouts. Spinner sanders required a man to stand in the dump body to feed the sand through the gate--an inherently dangerous and, under storm conditions, man-killing operation. Private trucks came in all colors of the rainbow but seldom the high visibility orange which would aid identification and safety. They were usually equipped with only the minimum legal requirement for lights and often had confusing white lights at the rear for the man in the body.

Because of a predictably long usage, State-owned trucks can be economically equipped with hydraulic gear to operate tail-gate or hopper sanders. No men are required to stand in the body to tend them and they can be calibrated to conserve sand and salt. They are uniformly painted with high visibility orange which is kept visible by hot water washing. They are equipped with the latest in warning light systems and are provided with signs to aid passing motorists.

By keeping accurate records of performance and operating costs, the Department has been able to pinpoint weaknesses in earlier models and to develop very detailed specifications for vehicles specially adapted to the State's needs. The recent loss of fleet discounts and the effects of inflation created real financial problems when reserves proved inadequate to replace retired vehicles. Specifications were further refined, and by cooperative efforts with manufacturers, very durable and highly efficient trucks have been developed. Recently purchased 26,000 GVW trucks are not only more economical in purchase price and operating costs, they also have practically the same capabilities as the earlier 34,000 GVW class.

The change from gasoline to diesel power has resulted in much longer engine life and increased power to carry maximum payloads at reasonable road speeds. Sheet metal protection has been improved to insure that cab and fender assemblies will last as long as engines and running gear.

SUPERVISION AND MANAGEMENT, SCOPE OF THE JOB

The Department's efforts to improve supervision and management through training programs have been detailed in statements made in response to Legislative Committee Recommendations 1, 2, and 3. All maintenance operations are constantly reviewed with the thought of increasing efficiency in the use of equipment and personnel. Because of the miles and miles of roads maintained by the Department, the aggregate total of relatively small, individual operations results in quite considerable quantities of work and materials. Yearly accomplishments of maintenance forces include:

1. Issue permits for 1,750 entrances and construct where necessary.
2. Issue permits and inspect 20,000 square yards of utility openings.
3. Pick up and dispose of 11,000 cubic yards of litter.
4. Mow 17,000 acres of roadside.
5. Replace 2,000 delineator posts.
6. Replace or repair 40,000 road signs.
7. Install or replace 1,000 steel guard rail posts.
8. Apply 2,000 gallons of guard rail paint.
9. Install or replace 20,000 guard rail components, all types.
10. Install or replace 21,000 treated wood guard rail posts.
11. Install or replace 110,000 linear feet of culverts.
12. Haul aggregates and construct 1,000 miles of shoulders on new work.
13. Haul and apply 15,000 cubic yards of aggregate for miscellaneous surfaces.
14. Haul and apply 26,000 cubic yards of aggregate for sealing.
15. Haul and apply 40,900 cubic yards of cold mix mulch for State Aid construction.
16. Haul and apply 150,000 cubic yards of cold mix mulch for maintenance.
17. Haul 311,000 tons of hot mix to resurface 640 miles of roadway.
18. Process 320,000 cubic yards of crushed gravel.
19. Haul and apply or use 4,900,000 gallons of asphalt and tar for crack sealing, surface treatments and cold mix manufacture.

20. Place 9,720,000 shovels-full (60,000 cubic yards) of cold patch in potholes.
21. Maintain 177 picnic areas; 27 scenic turnouts and 6 roadside springs--involving care of 1,092 picnic tables; 358 shelters; 377 fireplaces; 818 rubbish barrels; 9,180 feet of rustic fence and 187 public toilets.
22. Periodically drag and grade shoulders on 10,500 centerline miles of roadway.
23. Apply 14,000 gallons of paint to maintenance buildings.
24. Erect and remove 115 miles of snow fence.
25. Haul and apply 80,000 tons of rock salt for ice control.
26. Screen, haul, mix, stockpile, load and apply 390,000 cubic yards of winter sand.
27. Remove 176,000,000 cubic yards of snow from highways and highway shoulders.

PLANNING FOR EFFICIENT USE OF MEN AND MACHINES

When dealing with such volumes of work, small savings in unit costs can pyramid into very significant savings in the overall cost of maintenance. Some of the more recent developments designed to increase the efficiency of equipment and personnel are:

Plastic Bags for Litter

Use of plastic bags for litter patrol enables a worker, equipped with a pocketful of bags, to pick more or less continuously--leaving his collection along the roadside in neat bags from which it cannot be redistributed by wind eddys--for later collection by a fast-moving truck operation. This system has greatly increased efficiency and has received much favorable comment. Plastic bags are now also being used to line picnic area trash cans, improving the efficiency of collection and eliminating nuisances, particularly in coastal areas where garbage from fish-type picnics is a problem.

Low Center of Gravity Tractors with Flail Mowers

The low center of gravity tractors are safer to operate than former types and have been well received by both operators and supervisors. The flail mowers do a good job without tending to throw debris, which would endanger passing traffic. It has been found that three units of this type can accomplish the work formerly assigned to four old style units.

Treated Guard Rail Posts

The Maintenance Division has converted entirely to the use of pressure treated posts with reflectors for nighttime visibility. It was found that untreated posts were expensive to maintain due to their relatively short life and the need for continual painting to avoid an unsightly appearance.

Augers for Placing Guard Rail Posts

Each Maintenance Division is now equipped with a power auger to dig guard rail post holes. Time for setting a post has been reduced from one-half hour to about five minutes.

Guard Rail Windrow Eliminator

When guard-railed shoulders are graded, the blade leaves a windrow of material along the face of the guard rail because it cannot grade out over the shoulder edge. These windrows tend to concentrate runoff and can result in costly washouts. The Maintenance Division, in cooperation with the Motor Transport Service, has developed a grader attachment to remove these windrows--eliminating a great deal of hand labor which, somehow, never seemed available in sufficient numbers to keep up with the work.

Hot Mix Mulch Program

(See discussion of Legislative Committee Recommendation No. 8)

Accumulative Inventory of Surface Treatment Operations

The Department now has a total record of all surface treatments on all State and State Aid Highways it maintains. Maintenance technicians update it yearly--permitting a rational programming of resurfacing operations. Although the Department cannot do all the resurfacing it should because of lack of funds, this inventory system insures that work is done where most urgently required.

Road Salt Reduction Program

In order to minimize the use of salt, both because of its cost and its potential for environmental damage, salt reduction has been approached in four ways. Equipment has been modified by use of the now rather well known "salt restrictor" (an attachment to the auger of sand spreaders to reduce flow to a rate appropriate for the spreading of salt). Equipment modifications have been combined with educational programs for operators, administrative checkup procedures, and

increasingly more restrictive salt specifications to insure dry, free-flowing and controllable salt. The overall program has achieved a reduction of between 20,000 and 25,000 tons of salt per year without adverse effect on the standards of ice control. With rock salt costing approximately $15.50 per ton delivered to storage buildings, to say nothing of handling and spreading costs, this is a very substantial savings. The Department has ordered ten automatic devices for controlling salt flow. These will be studied by the Materials and Research Division. It is expected that further reductions in salt use will be achieved by use of this equipment.

Maintenance and Salt Storage Buildings

Standard designs have been developed and are being used for these types of buildings. The maintenance building design is adaptable for any desired size from four to eight bays. Because of uniformity and detail of design, these buildings are easily erected by relatively unskilled workers and the completed structures are uniformly attractive. Recent figures show that the hourly cost of a truck kept in warm storage is about $1.00 less than the hourly cost of a twin vehicle stored outdoors. It appears that savings in operating costs will amortize the cost of these buildings within five years. The construction of salt storage buildings has greatly facilitated the road salt reduction program because dry salt can be so much more accurately controlled. These new storage facilities should also materially reduce leaching with savings in material and reduction of pollution claims and adverse environmental effects.

Dieselization of Patrol Trucks

The improvements in power and engine life resulting from this program were previously mentioned. In addition, cost records indicate that fuel savings alone will offset the cost of diesel engines in slightly over three years so bonus savings will accumulate after that. Records also show incidental savings in that more miles of travel are realized per hour of use because diesel engines are better suited to the work than were the former gasoline types. It has also been possible to eliminate gasoline pumps in some remote areas with considerable reduction in vandalism and fuel theft.

Rustproofing

All trucks purchased in the last two years have been rustproofed. An experimental program launched some years ago established that rustproofing, at an initial cost of $100, eliminated body work averaging $200 per vehicle. It appears that the extra life of diesel engines combined with preservation of sheet metal work may make an additional year of economic use feasible as well as adding to resale value.

Hot Water Heaters in Buildings

The addition of hot water heaters in maintenance buildings has permitted the use of high pressure washing of vehicles. This improves safety through greater visibility and greatly increases the efficiency of the preventive maintenance program while appreciably extending vehicle life through corrosion reduction.

Tungsten Carbide Insert Plow Blades

Several years ago a few tungsten carbide cutting edges were purchased for evaluation. The evaluation was done by the combined efforts of the Divisions of Materials and Research, Motor Transport, and Maintenance and State Aid. It was demonstrated that, while it cost about twelve times as much for the carbide blades, they lasted twenty to twenty-five times longer than the conventional blades, indicating a savings of approximately fifty percent on the cutting edges alone. Further economies are realized by reductions in the labor cost of changing edges, and by greatly reducing deadhead trips or the need of calling servicemen out into storms to change blades under sometimes dangerous and always unfavorable conditions.

Radio Operations

Base and repeater stations have been insulated and provided with automatic summer ventilation and winter heating. This has greatly improved reliability and reduced service calls. All new mobile units have one hundred percent solid state components. This has measurably reduced down time on mobile radios even though only one third of the units presently in use are of this modern type.

Pavement Striping

One of the Department's three pavement stripers is now equipped to apply so-called "hot paint". This system produces lane markings which dry almost instantaneously, eliminating the need for protective flags and their subsequent pickup, exept under very poor drying conditions. The new rig is also equipped to pump paint directly from 55 gallon drums, obviating the mess, labor and expense of handling thousands of 5 gallon pails.

When the new system is fully tested (present indications are most favorable) and older equipment is converted to the new system, it is expected that productivity increases will permit the Department to field four crews with the same complement now required for three at the same or slightly less total cost. This will permit much more timely coverage of stripes which become worn or covered by pavement overlays. Safety and motorist service will both be improved.

RESULTS TO DATE

The efficacy of the various programs of improved supervision, and management and planning for efficient use of equipment and manpower is indicated by the fact that while the number of lane miles maintained has increased nearly five percent since 1962, the number of trucks in use has increased only three percent and personnel requirements have actually been reduced by nearly ten percent from what they were twelve years ago. Continued improvement is looked for as many successful programs are not yet fully implemented and, of course, records of the recent past include many non-recurring "start-up" costs.

The Legislative Highway Study Committee Report closed:

The Committee would like to thank the many individuals and groups who cooperated wholeheartedly during this study. The department is fortunate to have dedicated, knowledgeable employees within the ranks and changes are being made to improve public relations, supervision and general program improvements. Construction and maintenance of the many miles of highways within the State is a large operation re-

quiring special skills, adequate funding and public understanding in order to accomplish the goals of the department.

In order to determine the effectiveness of the Committee's recommendations, it is recommended that a Joint Order be considered by the 105th Legislature, directing the Commission to report to the next regular session of the legislature in regard to the progress made on the above mentioned items.

APPENDIX

DAVID H. STEVENS
Commissioner

State of Maine
Department of Transportation

AUGUSTA, MAINE
04330

Project:

Dear

Sometime in the near future a Department of Transportation, Bureau of Highways, survey crew will begin survey operations by or near your property collecting information for planned improvements to this section of roadway. Generally, the proposed project limits are as follows:

Our survey procedure consists of:

1. Laying out a survey baseline. This will appear as a series of stakes or markers placed on a line the length of the project. Many times the stakes will be driven at one side or the other of the proposed line of the highway because it may not be practical to affix them exactly on the line.

2. Collecting and listing of various physical features - such as houses, barns, trees, lawns, walls, fences, driveways, etc., so a map can be drawn

3. The establishment of a series of elevation points along the project. These are known distances above sea level.

4. Using the elevation points to determine the high points and low points along the line of the road, and further to determine the lay of the land near the road.

5. A survey review is conducted to detect possible changes in previous information collected prior to the building of the project.

As the survey team performs the different operations listed, they may pass back and forth in front of your property several times. Also, the team may be called away from time to time to carry out survey work at a distant construction project and then return to pick up where they left off. Many times their actions may appear to be repetitious when actually they are simply carrying out one more phase of the surveying operation.

APPENDIX I

This letter is to advise you of the forthcoming survey, to help you better understand preliminary survey procedures, to inform you that it will probably be necessary to enter onto your land for the purpose of collecting the information referred to above, and further to ask you to comment on the questions that appear on the attached sheet. Any information at all that you can supply us at this time will be helpful.

If you have questions regarding the field survey phase of this project, please contact Mr. Randall Foster, Survey Engineer, Department of Transportation, Bureau of Highways, Augusta, Maine, Tel. No. 289-3321, and he will be pleased to meet with you.

At the present time it is not known when the improvements to this section of the road will start. It may be quite some time in the future; but prior to any construction, a public hearing will be held or an opportunity will be afforded for a public hearing in the vicinity of the proposed project to discuss the various details of proposed improvements and their effect on your property.

Very truly yours,

DEPARTMENT OF TRANSPORTATION

Richard A. Luettich

Richard A. Luettich
Deputy Commissioner

DAVID H. STEVENS
Commissioner

State of Maine
Department of Transportation

AUGUSTA, MAINE
04330

Questionnaire to Aid in Evaluating Highway Locations

1. Are you aware of any old cemeteries in the immediate area of this project?

2. Are you aware of any buildings or monuments of a cultural or historical significance?

3. To your knowledge, are there any public or private bird or wildlife refuges within the limits of this project?

4. Is there any land adjacent to this project that might contain artifacts of archeological significance?

5. Do you know of any private or public park lands on or near this project?

6. Are there any unique features about this area not listed above that you feel may have a bearing on the location of this highway project and are worthy of comment?

If you have any comments relating to the above, it would be appreciated if this information could be sent to me at your earliest convenience in the enclosed prestamped envelope. If you feel any information that you have to offer would require personal contact at this time, I or one of my staff would be pleased to meet with you at your convenience.

Thank you for taking an active interest in this project.

Very truly yours,

R. A. Coleman

Richard A. Coleman, Engineer
of Location & Survey
Bureau of Highways

APPENDIX II

DAVID H. STEVENS
Commissioner

State of Maine

Department of Transportation

AUGUSTA, MAINE
04330

Dear

Sometime in the near future a Department of Transportation, Bureau of Highways, crew will do the layout phase of surveying on or near your property. This crew will place the survey stakes that are to be used during the construction of the project in your area.

This phase of surveying consists of:

1. Re-establishing the survey centerline, which may have been surveyed several years ago, and making any changes in the line brought about by progressive changes in design. This updated survey line will be the "construction centerline".

2. Placing survey stakes at a known distance on both sides of the centerline where they will not be disturbed by construction operations. The stakes will be at 50-foot intervals (opposite each "station") and also at crucial points where they mark the location of other installations.

3. Obtaining the elevations on top of the stakes. The survey stakes are extremely important to the construction project because they are the key reference points used by engineers and inspectors to re-establish the centerline as construction progresses, to locate drainage facilities and other installations, to give the men a known elevation to refer to so they will know how much work is required at each station.

Because of the importance of the survey stakes we ask that they not be removed or disturbed in any way. When stakes are disturbed they must be reset at an added expense to the State.

To make the most efficient use of our crews, it is necessary to carry out this second phase of the survey some time before the construction is scheduled to begin.

APPENDIX III

As soon as the contract is awarded, a Project Resident will be assigned to represent the State during the course of the construction. The Project Resident will contact and advise you of his field office location and phone number. Until the Project Resident has been assigned, if you have any questions regarding this project, please contact Mr. Ralph Stevens, Engineer of Construction, Department of Transportation, Bureau of Highways, Augusta, Maine. Telephone 289-2171.

Very truly yours,

DEPARTMENT OF TRANSPORTATION

Richard A. Luettich
Deputy Commissioner

Maine State Highway Commission

AUGUSTA, MAINE 04330

STATE HIGHWAY COMM.
P. O. BOX 1940
PORTLAND, MAINE

To Whom It May Concern

This letter is to bring to your attention the possibility of road construction adjacent to your property in the Town of _____ on the so-called _____ Ro

This road is to be constructed with town funds raised during your Town Meeting, with matching funds allocated by the State Highway Commission establishing the State Aid Joint Fund. This section of road was chosen by your Town Officials to be constructed due to excessive maintenance costs, general poor condition or perhaps hazardous location.

We attempt to construct a road to reasonable design standards promoting a safer facility along with long term savings in cost of summer and winter maintenance. It is probable that many years will elapse before your town can afford to perform any further up-grading of this section in question inasmuch as other areas of your town will be requiring the use of this limited fund.

In most areas of Maine the old right-of-way widths were laid out for wagon traff and may not necessarily be wide enough to accomodate the more modern two way roadway. If additional right-of-way is required for this road, you will be contacted by the appropriate personnel.

It will be necessary for a survey crew to run the proposed centerline and take necessary measurements. In conjunction with this, side stakes which may appear on lawns, in fields or woods will more than likely be reference stakes and are purposely placed where they will not be disturbed by equipment and construction personnel.

Fully realizing that in this short letter we may not have answered all your questions, please feel free to contact the _____ Division Office by telephone at _____ or by letter.

Thank you for your cooperation.

Very truly yours,

MAINE STATE HIGHWAY COMMISSION

APPENDIX IV