# WORK PROGRAM
# &
# COST ESTIMATE

HIGHWAY PLANNING, RESEARCH,
DEVELOPMENT AND IMPLEMENTATION

**FISCAL YEAR**

**2001**

**KANSAS DEPARTMENT OF TRANSPORTATION**
**BUREAU OF TRANSPORTATION PLANNING**

# ACKNOWLEDGEMENTS


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**KANSAS DEPARTMENT OF TRANSPORTATION**

# REPORT OF THE CURRENT STATE PLANNING AND RESEARCH, DEVELOPMENT & IMPLEMENTATION PROGRAM

**PROJECT**

**HPR-0010(23) Statewide**

for the 2000 Fiscal Year
July 1, 1999 through June 30, 2000

**and**

# OF THE FUTURE STATE PLANNING AND RESEARCH, DEVELOPMENT & IMPLEMENTATION PROGRAM

**PROJECTS**

**SPR-P010(24) Statewide Planning**
**SPR-R010(24) Statewide Research**

for the 2001 Fiscal Year
July 1, 2000 through June 30, 2001

**and a**

# SUMMARY OF THE RELATED STATE PLANNING AND RESEARCH, DEVELOPMENT & IMPLEMENTATION ACTIVITIES WHICH ARE NOT FUNDED WITH SPR FUNDS

In cooperation with the
**U.S. DEPARTMENT OF TRANSPORTATION**
**FEDERAL HIGHWAY ADMINISTRATION**

June 2000

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**RESEARCH, DEVELOPMENT & IMPLEMENTATION**
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SPR-R010(24) Statewide Research

Fiscal Year 2001
July 1, 2000 through June 30, 2001


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## FOREWORD

This State Planning and Research, Development and Implementation Work Program and Cost Estimate has been prepared for submittal in compliance with subsection (c) of Section 307 of Title 23, United States Code.

This program describes the State Planning and Research, Development and Implementation activities of the Kansas Department of Transportation proposed for state fiscal year 2001 (July 1, 2000 through June 30, 2001) to meet the needs of the Kansas Department of Transportation and the Federal Highway Administration. In addition, this program provides a report of the State Planning and Research, Development and Implementation accomplishments of the Kansas Department of Transportation for state fiscal year 2000 (July 1, 1999 through June 30, 2000).

This program is divided into four parts. Part I describes the State Planning and Research (SPR) participating planning projects (SPR-P010 (24)). The SPR participating research, development and implementation projects are described in Part II (SPR-R010(24)). Related planning activities which are not funded with SPR funds are described in Part III. Additional research, development and implementation projects funded with state funds are described in Part IV.

## INTRODUCTION

The highway planning program was initiated by the Hayden-Cartwright Act of 1934. The planning activities were later expanded to include research, development and implementation activities. The Federal-Aid Highway Act of 1962 expanded the planning activities to include a continuing, comprehensive and cooperative (3C) planning process in each of the urbanized areas. The Federal-Aid Highway Act of 1973 provided special funding for the planning activities in the urbanized areas. The 1973 Act and other acts have expanded the State Planning and Research (SPR) activities to include safety activities and public transportation planning activities. The Intermodal Surface Transportation Act of 1991 (ISTEA) contained provisions for the SPR funding that are largely retained in the current legislation, the Transportation Equity Act for the 21st Century (TEA-21), passed in 1998.

The TEA-21 provides that two percent (2%) of each State's total apportionment of Interstate Maintenance, National Highway System, Surface Transportation Program, Bridge Replacement and Rehabilitation, Congestion Mitigation and Air Quality improvement funds must be used as SPR funds. In addition, a minimum of twenty-five percent of that amount must be used for research, development, and Technology Transfer activities. The balance of the funds for the planning and research activities come from the State Highway Fund, including the required matching funds.

The SPR funds have been earmarked to provide funding for conducting, on a continuing basis, the activities necessary to accomplish "engineering and economic surveys and investigations; for the planning of future highway programs and local public transportation systems and for planning for the financing thereof; for studies of the economy, safety, and convenience of highway usage and the desirable regulation and equitable taxation thereof; and for research and development, necessary in connection with the planning design, construction, and maintenance of transportation systems, and the regulation and taxation of their use."

This proposed work program has been prepared to provide for the continuation of the State Planning and Research activities in accordance with the transportation needs and goals of the State of Kansas, to provide for the fulfillment of State Statutory and Legislative requirements and needs, to provide for the fulfillment of the requirements of the United States Code and associated regulations, and to provide the necessary information for the continued development and maintenance of a safe, efficient and convenient transportation network for the State of Kansas. This proposed work program anticipates that Federal legislation will continue to be passed to provide funding at a level at or above TEA-21 levels.

## Bureau of Transportation Planning

The functions and responsibilities of the Bureau of Transportation Planning can be divided into seven functional areas which correspond to the seven units of the bureau. These seven functional areas and units consist of Traffic and Field Operations, Geometric and Accident Data, Cartography, Urban Planning, Public Transportation, Rail Affairs, and Statewide Planning. These seven units, along with an Intelligent Transportation Systems (ITS) Coordinator position, a Long Range Planning Engineer position, and the Research Unit of the Bureau of Materials and Research are responsible for accomplishing the majority of the activities in the SPR work program. Management of these activities is included in the administrative sections of the work program.

The activities of the Bureau include the performance of needs analysis; collection, maintenance and analysis of traffic, accident and inventory data; preparation of State, district, county and city maps, conducting local, State and national transportation studies, metropolitan planning studies, and sub-state planning studies that include all modes within the particular region; "Statewide" planning where the emphasis is on a particular mode or combination of all modes involved in the movement of persons and goods; monitoring and coordinating railroad activities; administration of public transit programs; coordination of ITS activities; and many other analytical aspects of transportation planning. The information developed through these transportation planning activities provides the basis for administrative and legislative decisions and actions concerning the development and management of the transportation system. Because of the important role of planning data in the decision-making process, it is essential that many types of accurate and reliable data be maintained on a current basis. In addition, it is essential that the capability exists, including having adequate personnel, to provide the planning data in a timely manner, especially when requested by the management, the administration or the legislature. The 1999 Kansas legislature enacted a new 10-year Comprehensive Transportation Program which provided a significant increase in state funds for all modes of transportation. The legislation authorized an additional seven positions for the Bureau of Transportation Planning. These new positions have been used in the areas of data collection, data analysis, traffic forecasting, and administration.

## Other Units and Offices

Other offices outside the Bureau of Transportation Planning that are involved in activities included in this program are the Bureau of Program Management (construction program development and monitoring) and the Bureau of Materials and Research (pavement management).

**Bureau of Materials and Research**
**Research Unit**

Research, Development, and Technology Transfer (RD&T) are service-oriented staff operations that include field and laboratory analytical and experimental activities, which primarily seek to increase the understanding and usefulness of fundamental phenomena. Basic research looks at phenomena whose use may not yet be known. KDOT primarily does applied research on specific needs of the State's road system. This can include development of experimental hardware, but usually the output is a report for management to decide whether or not to use the research results. To be cost effective, RD&T must do one or more of several things: Increase safety, lower costs, reduce waste, increase personnel efficiency or production, eliminate unneeded work, improve working conditions, methods or equipment, improve operations or extend service life. KDOT Research has been shown to be highly cost effective.

Much Research Unit effort goes toward implementation, demonstration, or evaluation of experimental construction features that take many weeks of before, during, and after construction activities. The monitoring often requires several years of field and lab evaluations of the experimental feature before it can be accepted for standard practice or rejected if found unsatisfactory. Kansas signed a basic agreement with FHWA on November 15, 1974 to expedite and coordinate the evaluation of implementable research under the Federally Coordinated Implementation Program (FCIP). This was updated on January 1, 1985 (9DTFH61-85-C-00020).

The National Experimental and Evaluation Program (NEEP) has been dropped by FHWA but existing studies must be continued and reported according to the original work plans. Technologies are now developed, promoted, and evaluated through the issuance of Work Orders under a Demonstration Projects Basic Cooperative Agreement executed between FHWA Demonstration Projects Division and KDOT on June 6, 1981. A new Experimental Projects Program has been established for a select category of experimental features. These features are new technologies that are identified as potentially very promising with high pay-off but with little or no proven performance record. The National Coordinated Program (NCP) of Highway Research, Development and Technology includes the SPR, NCHRP, and FHWA staff and contract research. Former Strategic Highway Research Program (SHRP) implementation activities and Long Term Pavement Performance (LTPP) activities have been transferred to the FHWA.

The University of Kansas Transportation Center operates an effective Technology Transfer Center for Local Transportation agencies under an agreement with KDOT and FHWA. The Research Technical Committee meets to consider new research proposals and to promote technology transfer. The Division FHWA Planning and Research Engineer is an ex officio member of the committee.

Since the Research Unit is also a service unit, researchers are asked by various organizations and individuals to participate in solving construction problems, prepare experimental feature statements, complete questionnaires, serve on state and national task forces, committees, councils, workshops, schools, etc. and make presentations about research findings at those and other group meetings. Researchers publish papers in national and state journals in addition to reports printed by KDOT. KDOT maintains membership in TRB, NCHRP, AASHTO, ASTM and ACI and researchers serve on various committees and panels associated with these organizations. One researcher serves as the SHRP Long Term Pavement Performance (LTPP) liaison. Another serves as the KDOT pilot for aerial surveys. Research Unit technicians work on pavement management field crews each spring.

A cooperative transportation research program between the Kansas Department of Transportation, Kansas State University (KSU), and the University of Kansas (KU) was created during 1990. The program, called the Kansas Transportation Research and New-Developments (K-TRAN) Program, is modeled after the successful Texas program. The annual K-TRAN Program budget was increased to $700,000 from $500,000 for the FY 2000 program. The K-TRAN Program has been highly successful showing an overall benefit to cost ratio of 15.5 to 1 in the July 1999 assessment of triennial benefits. A revision to the K-TRAN master agreement to include all university RD&T and guarantee a funding level of $350,000 per university per year was signed in January 2000.

In the interest of technology sharing, KDOT mails copies of all published reports to the FHWA, Research Directors in all other States and selected other research organizations. Copies are also mailed to several Canadian and European researchers. Internally copies are sent to all Bureaus, Offices, Districts and Areas. Others receiving copies in Kansas include the University of Kansas, Kansas State University, Kansas Turnpike Authority, State Historical Society and the State Library. KDOT also publishes a Technology Transfer Digest, a quarterly publication, which receives widespread distribution throughout the Division of Operations Construction and Maintenance staff. The Research Unit has created several internet and intranet web pages to provide customers with easy access to RD&T related information. KDOT inputs research in progress information directly into the Transportation Research Information System (TRIS) using the FHWA approved system. Electronic copies of most new full text reports are being provided to TRB for inclusion in TRIS Online.

KDOT certified that it is in compliance with all requirements of 23 U.S.C. 307 and its implementing regulations with respect to the RD&T program prior to June 30, 1995. A RD&T Procedures manual that documents the RD&T process was completed during May 1995. A peer exchange meeting was held October 29-31, 1996. During early 1998, changes to the research oversight committee structure and research assessment and implementation process were finalized and implemented. The RD&T Manual will be reviewed and updated early in the fiscal year. We also expect to conduct a second peer exchange meeting early in the fiscal year.

## TITLE VI/NONDISCRIMINATION PROVISIONS

Compliance with the requirements of Title VI of the Civil Rights Act of 1964 in conducting the Highway Planning and Research, Development and Implementation Activities is assured by the "Affirmative Action" program of the Kansas Department of Transportation. This program is administered in the following manner.

1. All internal EEO responsibilities within KDOT are assigned to the Bureau of Personnel Services. KDOT's internal EEO officer processes internal civil rights complaints and conducts Title VI/Nondiscrimination training as a part of other classes. The internal EEO officer also prepares the annual affirmative action plan for the agency.

2. The external EEO activities are managed by the Office of Engineering Support, external EEO section. The activities include processing Title VI complaints, services for minority and women owned businesses, contract compliance and the trainee program. Assistance is provided to contractors, consultants, local governments and KDOT bureaus of achieve Title VI/Nondiscrimination compliance.

3. The Prequalification procedure used in the selection of consultants includes Title VI assurance provisions.

In addition, the process described in the "Action Plan" includes procedures to obtain public involvement, including minority involvement, in the various aspects of the planning and project development activities.

**KANSAS STATE PLANNING and**
**RESEARCH, DEVELOPMENT & IMPLEMENTATION**
**WORK PROGRAM -- PROJECT**
**SPR-P010(24) Statewide Planning**
**SPR-R010(24) Statewide Research**
**Fiscal Year 2001**
**July 1, 2000 through June 30, 2001**

**FINANCIAL SUMMARY SHEET**

A. Total Estimated Costs

| | SPR |
|---|---|
| Part I Planning | $5,726,000 |
| Part II Research, Development & Implementation | $1,230,000 |
| Total | $6,956,000 |

B. Available Federal Funds as indicated:

| Fiscal Year | Type Funds | Federal Participation Ratio | Apportionment | Unobligated Amount |
|---|---|---|---|---|
| 2000 (As of 5-1-00) | SPR | 0.80 | $ 6,309,837 | $2,356,474 |
| 2001 Est. | SPR | 0.80 | $ 5,864,100 | $5,864,100 |
| Subtotal | SPR | | $12,173,937 | $8,220,574 |
| Less: | | | | |
| LTAP-HPR-NHI-000(001) | SPR | 0.80 | 135,000 | 135,000 |
| SPR-4(198) | Dedicated (5 1/2%) NCHRP | | | 322,526 |
| SPR-2(203) | Truck/Pavement/Economic Modeling and In-Situ Field Testing | | | 25,000 |
| SPR-2(207) | Traffic Management Center (TMC) Consortium | | | 30,000 |
| SPR-2(209) | Support of AASHTO Strategic Highway Safety Plan | | | 50,000 |
| SPR-2(212) | Non Nuclear Testing of Soils and Bases Using Geoguage | | | 35,000 |
| SPR-3(017) | Crash Testing of Highway Safety Appurtenances and Obstacles | | | 55,000 |
| SPR-3(020) | Enterprise (ITS) | | | 50,000 |
| SPR-3(044) | North Central Superpave Center | | | 25,000 |
| SPR-3(047) | Midwest States Accelerated Testing Program | | | 60,000 |
| SPR-3(075) | Midwest States Smart Work Zone Deployment Initiative | | | 62,500 |
| SPR-3( ) | Midwest States Fiber Reinforced Polymers Fund Program | | | 40,000 |
| SPR-3( ) | Update "A Guide to Standardized Highway Lighting Pole Hardware" Manual | | | 15,000 |
| | Subtotal | | | 905,026 |
| | Total Available Federal Funds | | | $7,315,549 |

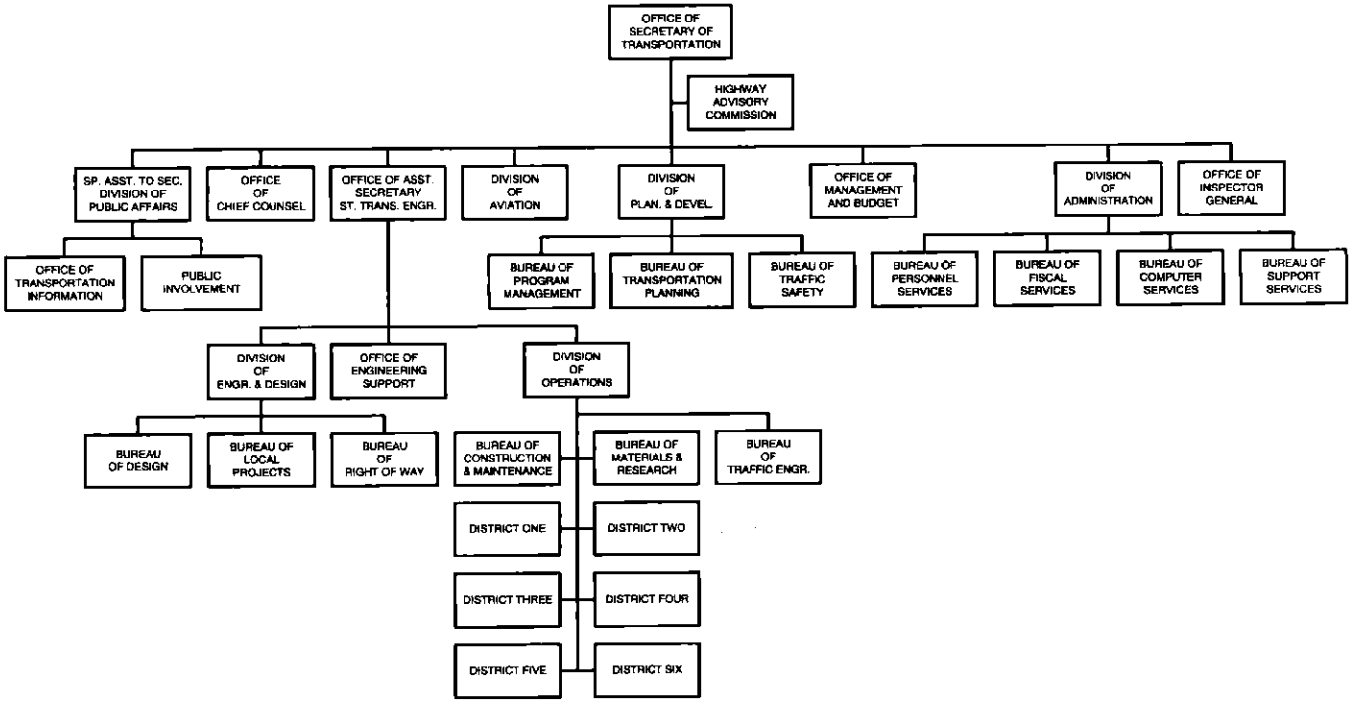
C. Proposed Financing

| Fiscal Year | Type Funds | Federal Share | Federal Funds | State Funds | Total Funds |
|---|---|---|---|---|---|
| 2000 | SPR | 0.80 | $ 2,356,474 | $ 589,119 | $2,945,593 |
| 2001 Est. | SPR | 0.80 | $ 3,208,326 | $ 802,082 | $4,010,408 |
| Subtotal | SPR | 0.80 | $ 5,564,800 | $ 1,391,200 | $6,956,000 |

UNPROGRAMMED BALANCES OF FEDERAL FUNDS

| Fiscal Year | Type Funds | Apportionment |
|---|---|---|
| 2001 | SPR | $1,750,749 |

# ORGANIZATIONAL CHART
# KANSAS DEPARTMENT OF TRANSPORTATION

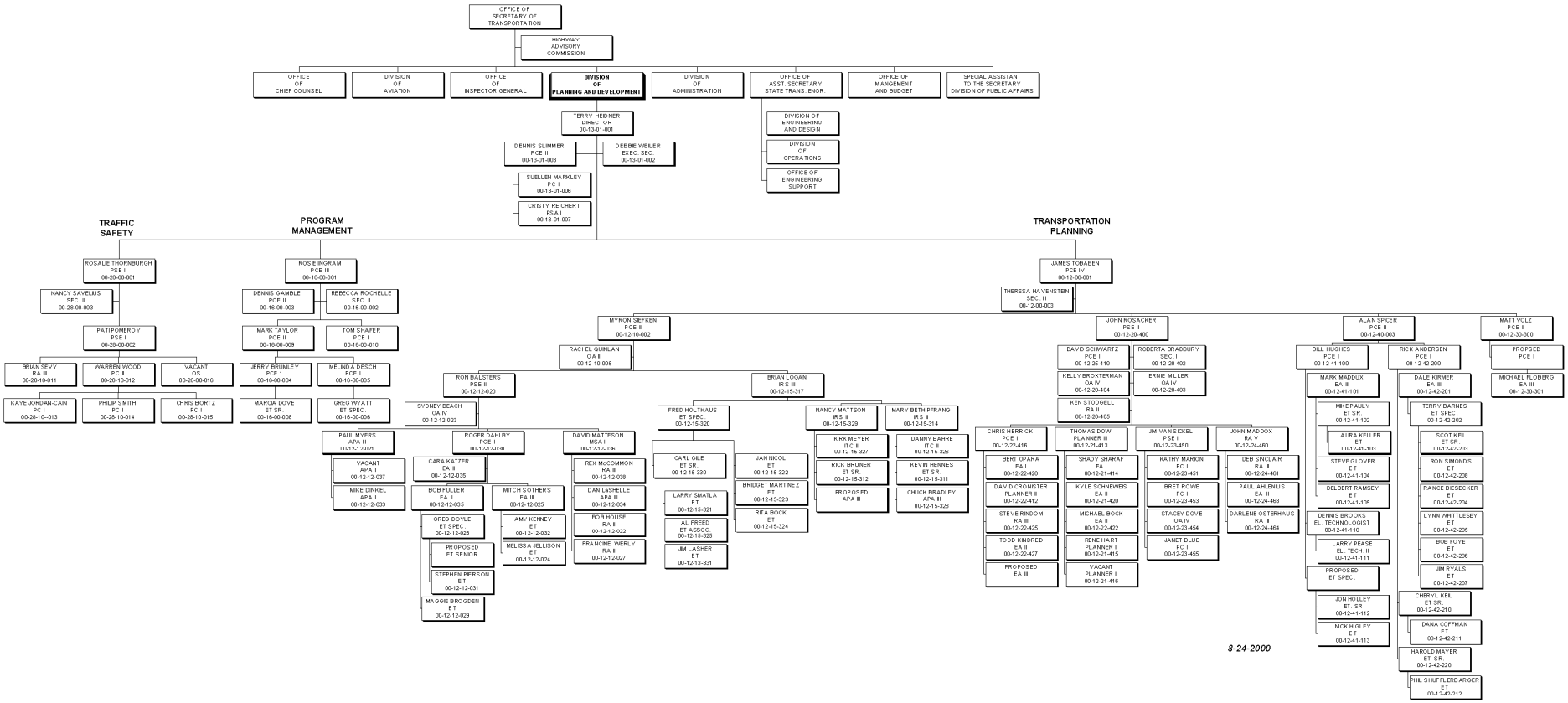



INTERNAL EEO IS LOCATED WITHIN THE BUREAU OF PERSONNEL SERVICES.
EXTERNAL EEO IS LOCATED WITHIN THE OFFICE OF ENGINEERING SUPPORT.

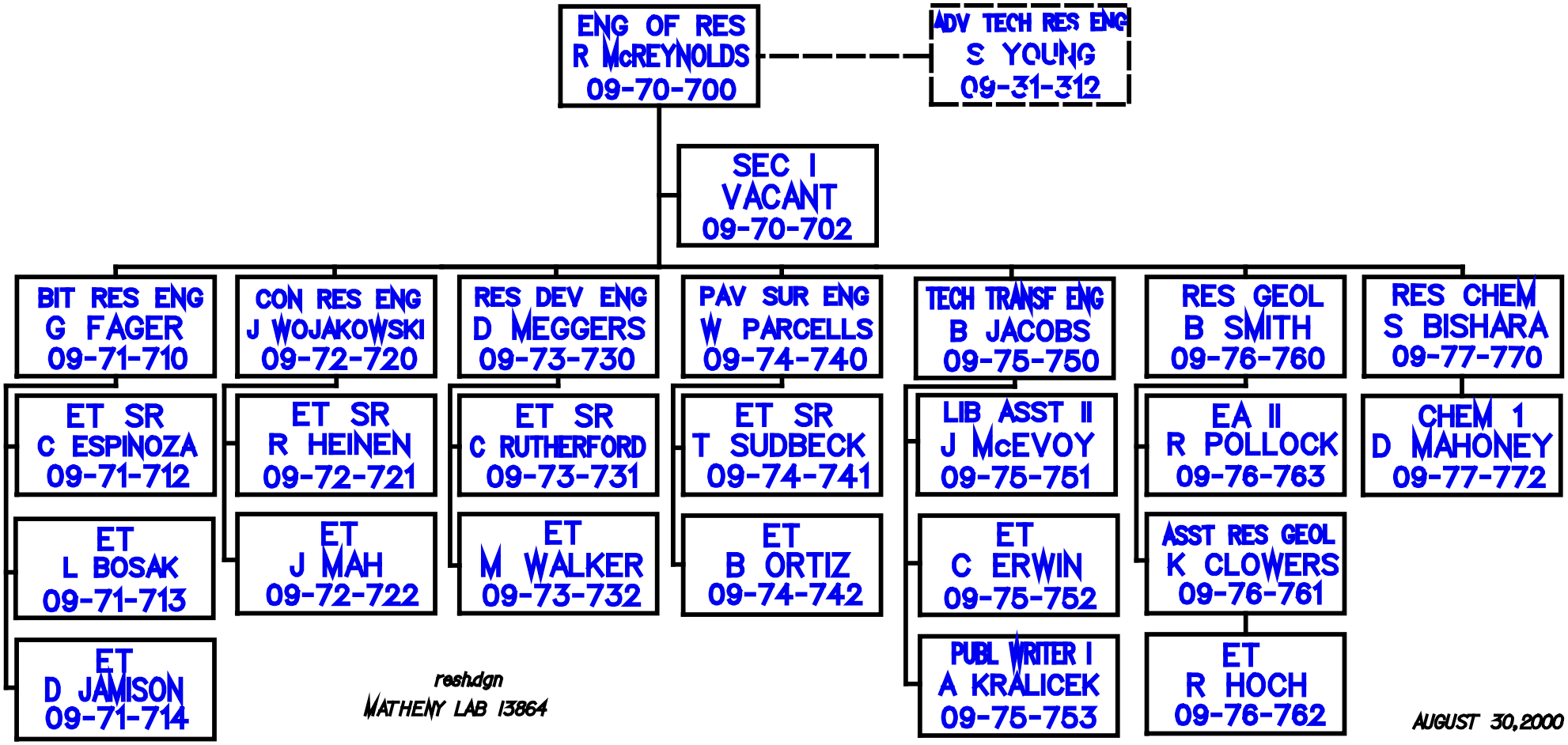
E Dean Carlson

SECRETARY OF TRANSPORTATION
JULY 1, 1999

# KANSAS DEPARTMENT OF TRANSPORTATION
## DIVISION OF PLANNING AND DEVELOPMENT



# RESEARCH UNIT



**DETAILED COST ESTIMATE AND OUTLINE**

**FOR**

**THE 2001 WORK PROGRAM**

# PART I

**PLANNING ACTIVITIES**

**PROJECT**
**SPR-P010(24) Statewide**

**KANSAS STATE PLANNING**
**DEVELOPMENT & IMPLEMENTATION**
**WORK PROGRAM -- PROJECT**

SPR-P010(24) Statewide
Fiscal Year 2001
July 1, 2000 through June 30, 2001

**SUMMARIES OF ESTIMATED COSTS**
**BY**
**SECTIONS AND SUBSECTIONS**

PART I

| | | AMOUNT | AMOUNT | AMOUNT |
|---|---|---|---|---|
| 1. | ADMINISTRATION AND CONTROL | | | 500,000 |
| | A. Salaries and Expenses | | 500,000 | |
| 2. | INVENTORY | | | 481,000 |
| | A. Mapping and Road Characteristics Inventory | | 120,000 | |
| | B. Railroad Crossing Hazard Rating | | 1,000 | |
| | C. Pavement Inventory Frictional Characteristics | | 250,000 | |
| | D. Videologging | | 110,000 | |
| 3. | MAPPING | | | 520,000 |
| | A. Mapping | | 310,000 | |
| | B. Official State Mapping | | 10,000 | |
| | C. Geographic Information Systems | | 200,000 | |
| 4. | TRAFFIC MONITORING | | | 1,065,000 |
| | A. Traffic Volume Counting | | 600,000 | |
| | B. Vehicle Classification | | 170,000 | |
| | C. Truck Weight and Characteristics | | 145,000 | |
| | D. Speed Studies | | 10,000 | |
| | E. Purchase of Traffic Monitoring Equipment | | 140,000 | |

| | | AMOUNT | AMOUNT | AMOUNT |
|---|---|---|---|---|
| 5. | HIGHWAY STATISTICS | | | 50,000 |
| 6. | ECONOMIC AND FISCAL | | | 110,000 |
| | A. Highway Construction Records | | 110,000 | |
| 7. | SYSTEMS AND PROGRAMMING | | | 1,750,000 |
| | A. Highway Classification and Systems | | 30,000 | |
| | B. Highway Needs and Performance | | 530,000 | |
| | (1) Planning Database Management | 380,000 | | |
| | (2) Database Conversion Analysis | 100,000 | | |
| | (3) Rural and Urban Highway Needs | 5,000 | | |
| | (4) Highway Performance Monitoring System | 35,000 | | |
| | (5) National Bridge Inventory Program | 10,000 | | |
| | C. Long-Range Program | | 490,000 | |
| | (1) Construction Program Development | 490,000 | | |
| | D. Accident Data Collection, Coding and Processing | | 230,000 | |
| | E. Pavement Management System | | 470,000 | |

| | | AMOUNT | AMOUNT | AMOUNT |
|---|---|---|---|---|
| 8. | URBAN TRANSPORTATION STUDIES | | | 400,000 |
| | A. Metropolitan Planning Support - General | | 140,000 | |
| | B. Metropolitan Planning Support - Wichita | | 50,000 | |
| | C. Metropolitan Planning Support - Kansas City | | 80,000 | |
| | D. Metropolitan Planning Support - Topeka | | 40,000 | |
| | E. Metropolitan Planning Support - Lawrence | | 40,000 | |
| | F. Areas Under 50,000 Population | | 50,000 | |
| | (1) Small Urban Area Support | 50,000 | | |
| 9. | STATEWIDE TRANSPORTATION STUDIES | | | 550,000 |
| | A. Statewide Planning | | 100,000 | |
| | B. Rural Traffic Studies And Forecasts | | 150,000 | |
| | C. State Rail And Intermodal Planning | | 200,000 | |
| | D. Corridor Studies | | 100,000 | |

| | | AMOUNT | AMOUNT | AMOUNT |
|---|---|---|---|---|
| 10. | SPECIAL STUDIES | | 200,000 | |
| | A. National | | 0 | |
| | (1) None | 0 | | |
| | B. State | | 200,000 | |
| | (1) Bicycle and Pedestrian Program | 60,000 | | |
| | (2) Intelligent Transportation Systems | 140,000 | | |
| 11. | RESERVED | | | 100,000 |
| | TOTAL PART I - PLANNING | | | 5,726,000 |

## 1. ADMINISTRATION AND CONTROL Total Estimated Cost $500,000

### A. Salaries and Expenses (P-0219-01)

Objective

The objective is to provide for the planning, organizing, direction, supervision, record keeping, auditing and general office work necessary for the administration of the planning work performed with participating State Planning and Research (SPR) funds.

Accomplishments 2000

The salaries and authorized expenses of the Chief of Transportation Planning, the three Assistant Chiefs of Transportation Planning, the secretaries, office assistants, and anyone else on administrative work were charged to administration when the activities involved were fully attributable to the administration of Part I of the work program. In addition, the salaries and authorized expenses for the auditors of the Bureau of Fiscal Services, when conducting audits of work performed with participating State Planning and Research and Metropolitan Planning funds, were charged to administration. Administrative activities not fully attributable to the administration of Part I of the work program, were charged to State funded activities.

Proposed 2001

The salaries and authorized expenses of the Chief of Transportation Planning, the three Assistant Chiefs of Transportation Planning, the secretaries, office assistants, and anyone else on administrative work will be charged to administration when the activities involved are fully attributable to the administration of Part I of the work program. Administrative activities, not fully attributable to the administration of Part I of the work program, will be charged to State funded activities.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $530,000 | $330,000 | $500,000 |

## 2. INVENTORY Total Estimated Cost $481,000

### A. Mapping and Road Characteristics Inventory (P-0002-01)

Objective

The purpose of field inventory is to obtain information required for the drafting of maps; for statistical tabulations of such roadway characteristics as mileage, dimensions, surface type and such structure characteristics as type, dimensions and load postings; for the evaluation of needs to upgrade to current standards for functional adequacy; for verification of State Highway geometrics contained in the State System Control Section Data Base; and for other pertinent analyses.

Accomplishments 2000

Inventory was completed in 12 counties. Refer to map on page I-8 which delineates these counties.

The inventory of the arterial and collector streets in 20 nonurban areas and 11 urban areas in District Five were updated. The updating includes any new mileage due to incorporation, system changes or construction and any changes or additions in the inventory of streets that existed at the time the previous inventory was obtained. Other inventory was accomplished statewide in urban and urbanized areas where there were changes in the functional classification or urban or urbanized area boundary changes.

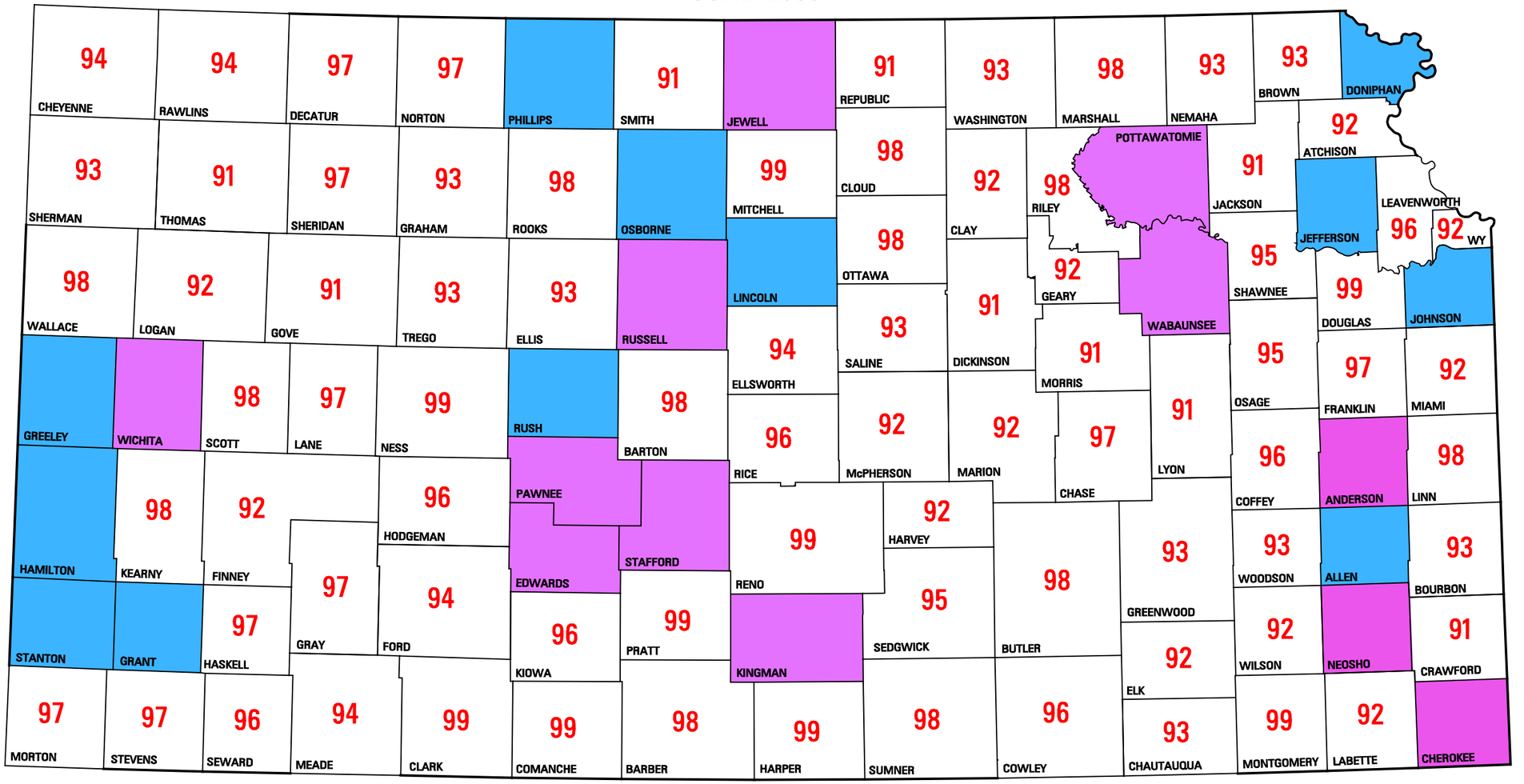
Proposed 2001

Inventory is scheduled this year for 12 additional counties. Refer to the map on page I-8 which delineates these counties.

The inventory of all arterial and collector streets and a sample of local streets in 22 nonurban areas and 8 urban areas in District Four will be updated. The updating will include any new mileage due to incorporation, system changes or construction and any changes or additions in the inventory of streets that existed at the time the previous inventory was obtained. Other inventory will be accomplished statewide in urban and urbanized areas where there are changes in the functional classification or urban or urbanized area boundary changes.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $110,000 | $115,000 | $120,000 |

# KANSAS DEPARTMENT OF TRANSPORTATION
# RURAL ROAD INVENTORY STATUS MAP
# JUNE 2000

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## B. **Railroad Crossing Hazard Rating** (P-0205-01)

Objective

The objective is to maintain a current inventory of data for each public at grade railroad crossing and to analyze this inventory data to determine if the need for improvement of protection type or approach sight distance exists at any of the railroad grade crossings, and if a need for improvement does exist, to further analyze the data to determine the relative priority ranking of the needed improvements.

Accomplishments 2000

A continuous update of the KDOT public at grade railroad crossing data file was performed from data obtained through the inventory activity (Subsection 2-A), from construction records, from railroad initiated U.S. DOT-AAR crossing inventory forms, from KDOT computer generated lists for railroad crossing evaluation and data correction, from KDOT's Coordinating Section's diagnostic team preinspection, and from the State Highway System Geometric Data Base. Railroad grade crossing index maps were updated as required to reflect any change in status of crossings; such as, rural to city or rail line abandonment. The Railroad Crossing index maps were updated to reflect the federal railroad serial numbers. Various computer listings of railroad crossing inventory data and ratings were produced as requested by KDOT users and various public agencies.

The railroad crossing inventory system (Section 7-B(2)) migration to a client server relational database environment is continuing. This involved many hours of data validation to ensure that the current functionality is maintained in the new system. The DB manager aided in migration of current data files to relational databases and enhancement to support data in a form closer to the Federal Railroad Administration’s Grade Crossing (GX) database. Some of this work was charged to Database Conversion Analysis - Section 7-B(2).

Proposed 2001

A continuous update of the public at grade railroad crossing data file will be performed from data obtained through the Rural and Urban inventory activity (Subsection 2-A), from construction records, from railroad initiated U.S. DOT-AAR crossing inventory forms, from KDOT computer generated lists for railroad crossing evaluation and data correction, from KDOT's Coordinating Section's diagnostic team preinspection, and from the State Highway System Geometric Data Base. Railroad grade crossing index maps will be updated as required to reflect any change in status of crossings; such as, rural to city or rail line abandonment. Various computer listings of railroad crossing inventory data and ratings will continue to be produced as requested by KDOT users and public agencies.

During Fiscal Year 2001 the railroad crossing inventory system will be completely migrated to a client server relational database environment. This will involve many hours of data validation and report editing to ensure that the current functionality is maintained in the new system. Current fortran programs will be rewritten by KDOT’s contractor as Structured Query Language based applications. They will be generated through a development facility that operates in and generates a WINDOWS-like environment. The rail crossing DB technician will be trained in the use of Oracle products and the KDOT application interface. The DB manager will aid in migration of current data files to relational databases and enhancement to support data in a form closer to the Federal Railroad Administration’s Grade Crossing (GX) database. The entire set of documentation will be rewritten in an interactive format. Some of this work will be charged to Database Conversion Analysis - Section 7-B(2).

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $1,000 | $1,000 | $1,000 |

## C. Pavement Inventory of Frictional Characteristics (P-0275-01)

Objective

The objective of skid inventory testing is to supply the frictional data necessary to determine and recommend pavement and material types that will provide adequate safety and reduce accidents. Inventory testing is a means of providing the necessary data for this function. It also provides a means of locating sections of pavement that may require immediate attention.

Accomplishments 2000

Inventory testing of approximately 7,000 miles of the State Highway System was accomplished. Special request testing conducted included the following: milled asphalt surfaces, latex slurry surfaces, asphalt surfacing using chat (chert) and limestone mix, and recycled Portland Cement Concrete pavement.

All costs including personnel salaries and subsistence, equipment operation, repair and replacement expenses, and data processing were funded with SPR funds.

Proposed 2001

Inventory testing of approximately 7,000 miles of the State Highway System will be continued. The inventory testing will be done according to normal skid testing procedure. Five tests will be conducted in a 2-mile section of pavement, spaced strategically to represent the entire section of pavement constructed under a contract and having a common surface type. Testing will be done at both 40 and 55 mph so a speed gradient can be calculated. The inventory testing will include Interstate routes on an annual basis and all other routes on a biennial basis. Highway sections that are resurfaced will be tested the following year. Other inventory testing will be conducted as necessary.

The existing truck and trailer test unit is approaching 10 years of age, will soon have over 100,000 miles, and is scheduled for replacement in FY 2001. The estimated cost for a rebuilt unit is $150,000. This would include a new tow vehicle, new wiring, new computer with monitor, new air/hydraulic brake system and new water delivery system. The existing trailer frame would be stripped and reconditioned and the transducers would be checked and reconditioned as needed.

All personnel costs including salaries and subsistence expenses plus equipment operation, repair and replacement expenses and data processing will be funded with SPR funds in FY 2001.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $100,000 | $100,000 | $250,000 |

## D. **Videologging** (P-0431-01)

Objective

The objective is to maintain and provide user accessibility to a pictorial record of numerous characteristics of the State Highway System which will reduce the need for time consuming, costly field trips and provide a historical record of these characteristics.

Accomplishments 2000

Videologging was completed in Districts 2 and 5. Digital videologging of Districts 1 and 4 was started. All videolog data for Districts 2 and 5 was edited, indexed and delivered to the appropriate Bureaus and Districts.

Digital videolog workstations were purchased for Districts 2 and 5. A file server to store and access all digital images and data recorded was upgraded. A new software application was purchased with state funds which will enable users to view videolog images from desktop PCs.

Proposed 2001

Digital videolog will continue in Districts 1 and 4 and should be completed in the fall. Videologging in District 3 and 6 will start in the spring of 2001.

Bureau and District personnel will be supported in the use of current analog videolog and in the use of digital videolog as they become available for use.

Technological advances will be monitored and new or updated hardware and software will be purchased if applicable.

Access and support for analog video, digital video and the 35mm film photolog will be provided. Editing and reproduction of digital videolog will be accomplished.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $100,000 | $110,000 | $110,000 |

## 3. MAPPING — Total Estimated Cost $520,000

Objective

The objective is to provide reliable, accurate, legible and reasonably current maps for all counties, cities and urban areas throughout the state; the state transportation map and other state and district maps for transportation planning activities and for general public use.

### A. **Mapping** (P-0003-01)

Accomplishments 2000

County maps are revised each year showing road surface types, road alignment, major structures, cultural features and route numbers. These county maps are printed in three scales; 1/4 inch, 1/2 inch, and 1 inch equals one mile. The following county maps were prepared during FY 2000:

13 - 1 inch per mile scale general highway county maps
13 - 1/2 inch per mile scale general highway county maps
13 - 1/4 inch per mile scale general highway county maps

The map on page I-15 delineates the counties for which new county maps at a scale of 1/2 inch per mile and 1 inch per mile were prepared using KDOT's Computer Aided Mapping (CAM) System.

Reproductions of city plats were maintained for the city plat file of 628 incorporated areas. Forty (40) city maps were created in digital format.

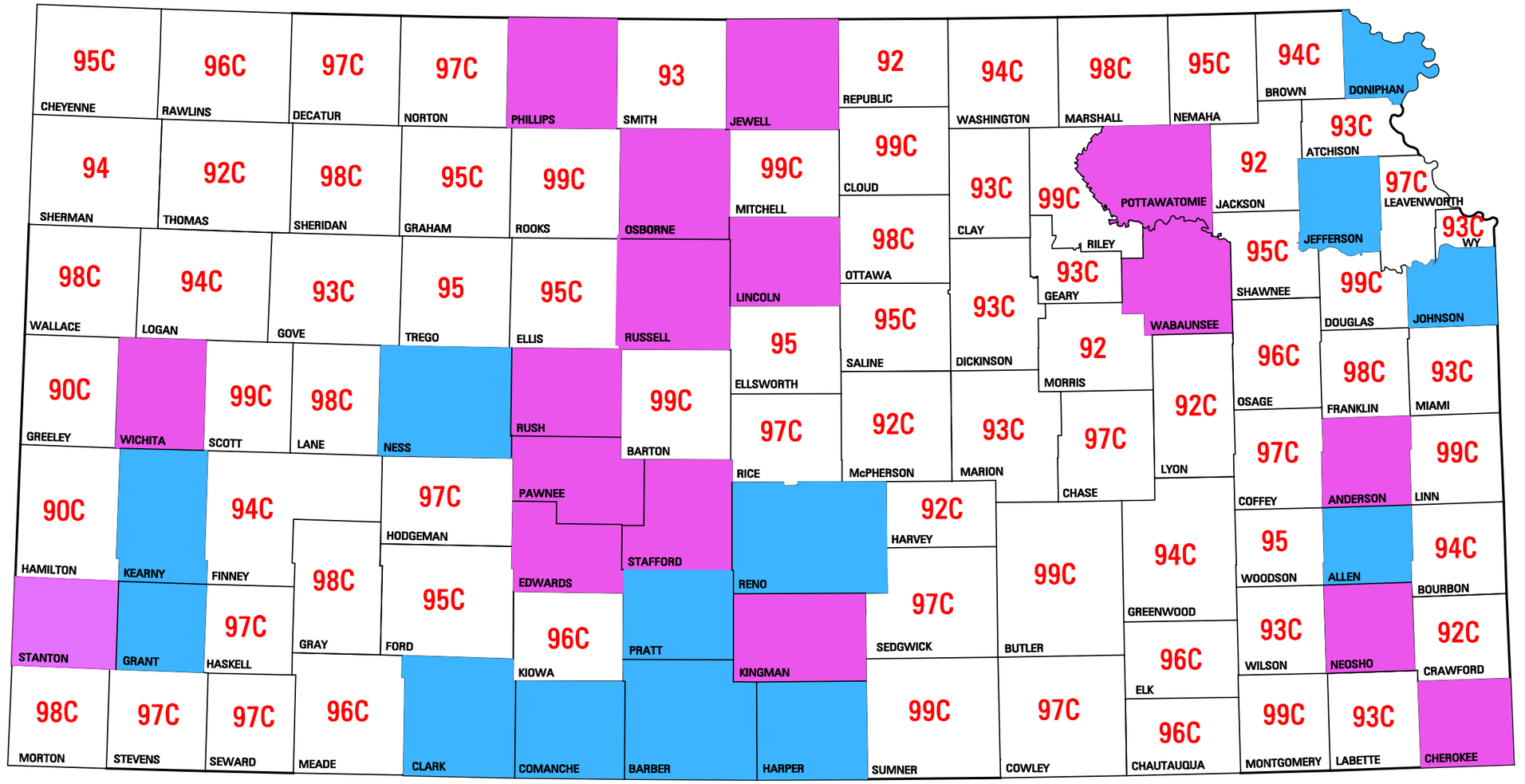
Proposed 2001

The county mapping program will be continued with map updating planned for 12 counties. The map on page I-16 delineates these counties.

The city plat file of 628 incorporated cities will be maintained. Urban area boundary maps will be revised as needed. Other city and urban mapping will continue to be converted to digital format. City limits will be updated on all city maps as needed.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $260,000 | $300,000 | $310,000 |

# COUNTY MAPPING STATUS MAP
# KANSAS DEPARTMENT OF TRANSPORTATION
## JUNE 2000

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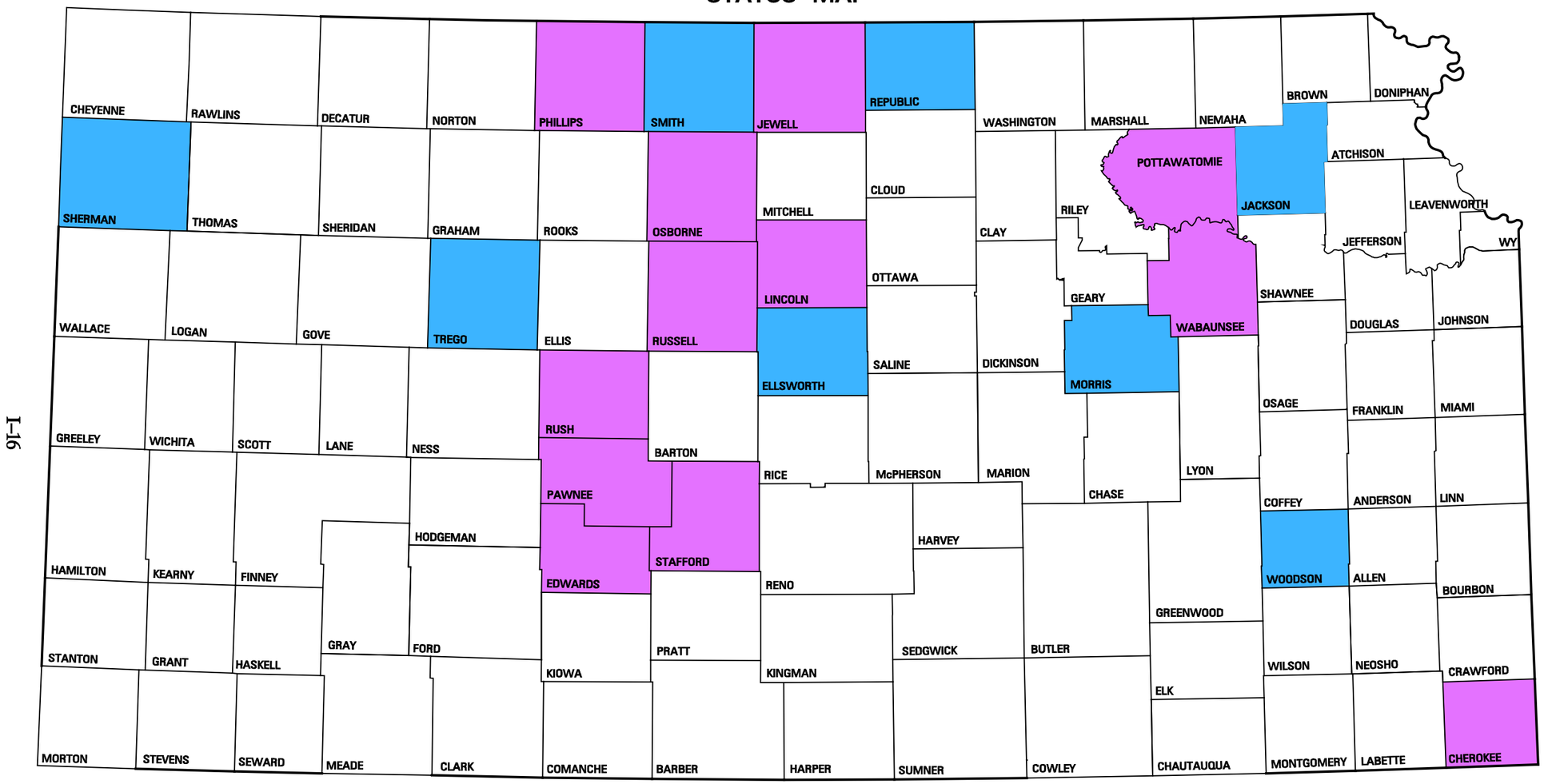
# KANSAS DEPARTMENT OF TRANSPORTATION
# DIGITAL COUNTY MAPPING
# STATUS MAP

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OR PROPOSED

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**B. Official State Mapping** (P-0084-01)

Accomplishments 2000

New software from Intergraph, Map Publisher, was used to produce the new map which increased our efficiency and reduced the set-up costs prior to printing.

Proposed 2001

1,200,000 copies of the 2001-2002 Official State Map will be printed and distributed in January 2001.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $10,000 | $10,000 | $10,000 |

**C. Geographic Information Systems** (P-0737-01)

Objective

The objective is to provide maps of the KDOT road and bridge network, that have been symbolized based upon attributes retrieved from a database, to KDOT and Kansas legislature decision makers and the public.

Accomplishments 2000

The Road Condition Reporting System (RCRS) was completed and is on KDOT's Intranet. A Risk Assessment was conducted by a private consultant and all points-of-failure were identified. Redundant servers are being ordered to compliment the new Storage Area Network Architecture that KDOT is adopting. The RCRS Microsoft Access database conversion to an Oracle database will be completed by September 2000 which is our goal to go public through KDOT's Internet.

Initial work on the Construction and Detour Reporting System (CDRS) and the Base Map Accuracy project has begun.

KDOT's GIS Strategic Management Plan is complete and awaiting presentation to our Executive IT Committee by the consultants, GeoDecisions.

Proposed 2001

Finish work on RCRS conversion to Oracle. Continue work on CDRS and the Base Map Accuracy project. The Base Map project will require us to add all local roads (app 124,000 additional centerline miles) and support this data layer at the Data Access and Support Center (DASC), a state GIS clearinghouse. To add centerline data, KDOT is exploring the acquisition and use of remote sensing data.

Begin work to convert our computer-aided mapping(CAM) generated State System Construction Strip Maps to a GIS format.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $130,000 | $160,000 | $200,000 |

## 4. TRAFFIC MONITORING Total Estimated Cost $1,065,000

### A. Traffic Volume Counting (P-0004-01)

Objective

The objective of the traffic counting program is to obtain, at a minimum cost, data for estimating traffic volumes which are within reasonable tolerances of accuracy. With the recurring patterns of traffic flow on an hourly, daily, weekly and seasonal basis, statistical techniques are utilized which provide volume data with the desired degree of accuracy for a minimum expenditure of manpower and money. The three basic types of traffic counts are: (1) continuous counts, (2) seasonal counts and (3) coverage counts.

Accomplishments 2000

Continuous traffic counters were operated at 102 locations. These locations are shown on the maps on pages I-21 and I-22. The 1999 annual continuous traffic counter report was printed and distributed. Accuracy checks were made a minimum of one time on all continuous traffic counters. Eighty-five (85) locations continue to transmit data by telemetry. The computer conversion application from a mainframe to a client-server environment for editing, storage and reporting of continuous data was completed.

The Interstate routes and other routes with full control of access were counted Statewide for a 24-hour duration. The other, non-Interstate, State System routes in Districts 4, 5, and 6 were counted.

Statistical coverage count sampling on local city streets and by county for the county portions of the Major and Minor Collector Systems and for the rural roads functionally classified as local was completed for Districts 5 and 6. All HPMS sections were counted for 48-hour periods. Machine counts were edited, checked, and entered into the CVRG database. Field count location maps were updated in MicroStation as city and county maps are digitized.

Special studies to collect peak hour traffic and turn movements were conducted on System Enhancement proposals, K-7 in Wyandotte County and I-135 in Sedgwick County conducted.

Proposed 2001

Coverage counts for local city streets and the county portions of the Major and Minor Collector Systems and for rural roads functionally classified as local will be completed for Districts 1 and 4. Continuous recording traffic counters will be operated at all existing locations. Short period (24-hour) machine counts necessary for the annual survey will be taken on all state highways and their city connecting links in Districts 1, 2, and 3. The TMS/H will be reviewed and updated as necessary. Special traffic studies will be conducted as necessary.

| 2000 Program | 2000 Est. Expenditures | 2001 Program |
|---|---|---|
| $540,000 | $580,000 | $600,000 |

**B. Vehicle Classification** (P-0346-01)

Objective

The objective is to update existing data, to supplement the data from continuous traffic count station, to determine the pattern of changes, if any, in vehicle usage from previous years, and to establish the vehicle type mix on sections of highways where such information was not previously available. Vehicle Classification data will be collected in accordance with requirements of the Traffic Monitoring Guide (TMG): Procedures for the Collection and Analysis of Traffic Volume Data, Vehicle Classification Data, and Truck Weight Data. Vehicle classification counts are made visually and by machine throughout the state.

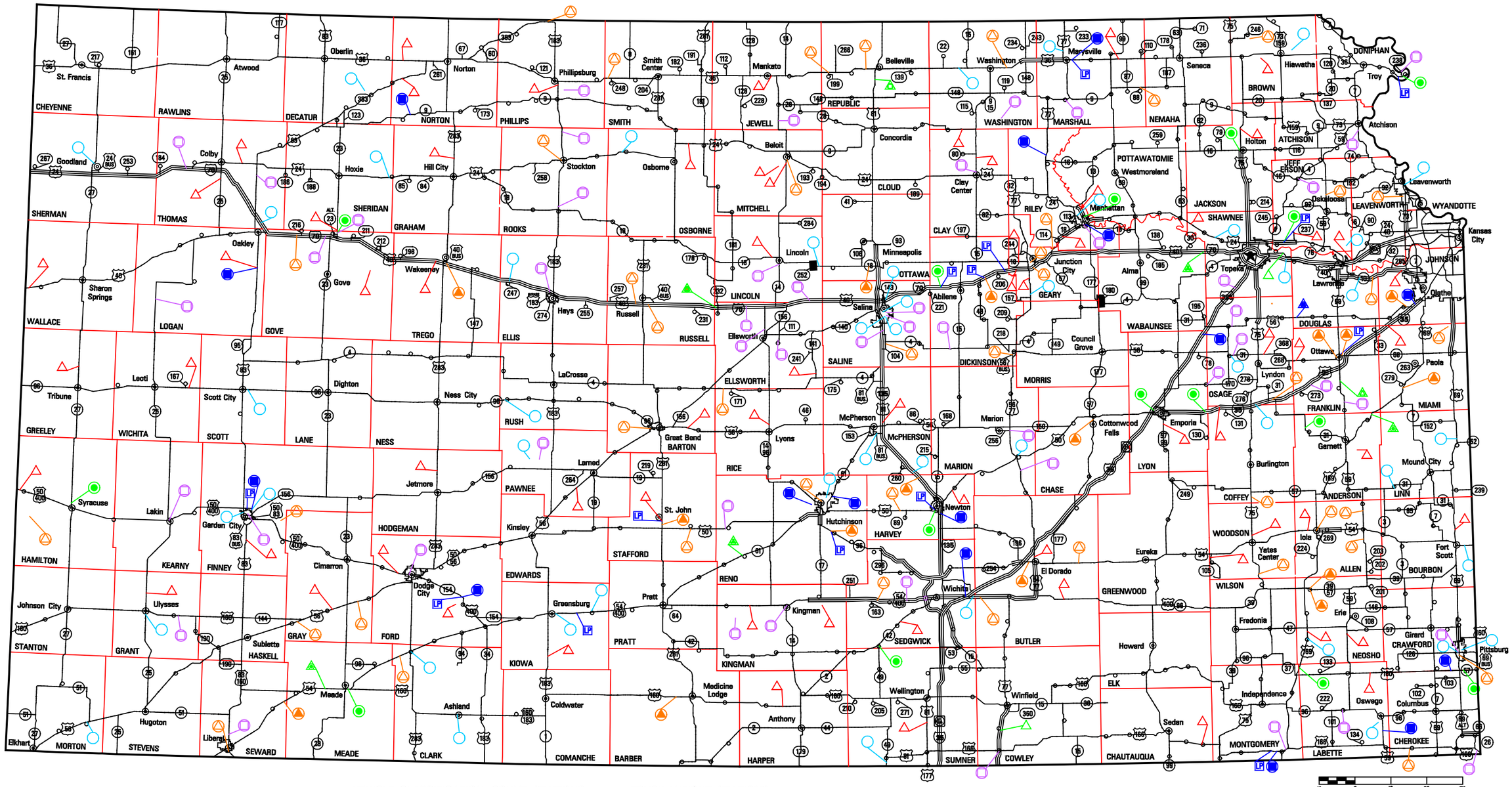
Accomplishments 2000

48-hour vehicle classification counts were collected for the one hundred (100) Traffic Monitoring Guide (TMG) locations for 1999. Collection of data for the one hundred (100) regular TMG locations commenced for 2000. Supplemental visual and machine classification counts were obtained. The 1999 data was compiled and a report published and the data was submitted to FHWA.

# KANSAS DEPARTMENT OF TRANSPORTATION
## BUREAU OF TRANSPORTATION PLANNING

**JULY 1997**

LOCATIONS OF AUTOMATIC RECORDERS, VEHICLE CLASSIFICATION COUNT STATIONS, TRUCK WEIGHT STATIONS, LONG TERM PAVEMENT PERFORMANCE (LTPP) STATIONS, AND STANDARD STATIONS ON THE STATE HIGHWAY AND RURAL SECONDARY SYSTEM




### VEHICLE CLASSIFICATION COUNT STATIONS – TRUCK WEIGHT STATIONS

- 1998 & 2001 VEHICLE CLASSIFICATION COUNT STATION
- 1998 & 2001 VEHICLE CLASSIFICATION COUNT AND TRUCK WEIGHT STATION
- 1997 & 2000 VEHICLE CLASSIFICATION COUNT STATION
- 1997 & 2000 VEHICLE CLASSIFICATION COUNT & TRUCK WEIGHT STATION
- 1999 & 2002 VEHICLE CLASSIFICATION COUNT STATION
- 1999 & 2002 VEHICLE CLASSIFICATION COUNT & TRUCK WEIGHT STATION
- AUTOMATIC TRAFFIC RECORDER LOCATION
- COMBINATION AUTOMATIC TRAFFIC RECORDER AND VEHICLE CLASSIFICATION COUNT STATION
- LP LONG TERM PAVEMENT PERFORMANCE (LTPP)


PREPARED BY THE
KANSAS DEPARTMENT OF TRANSPORTATION
BUREAU OF TRANSPORTATION PLANNING
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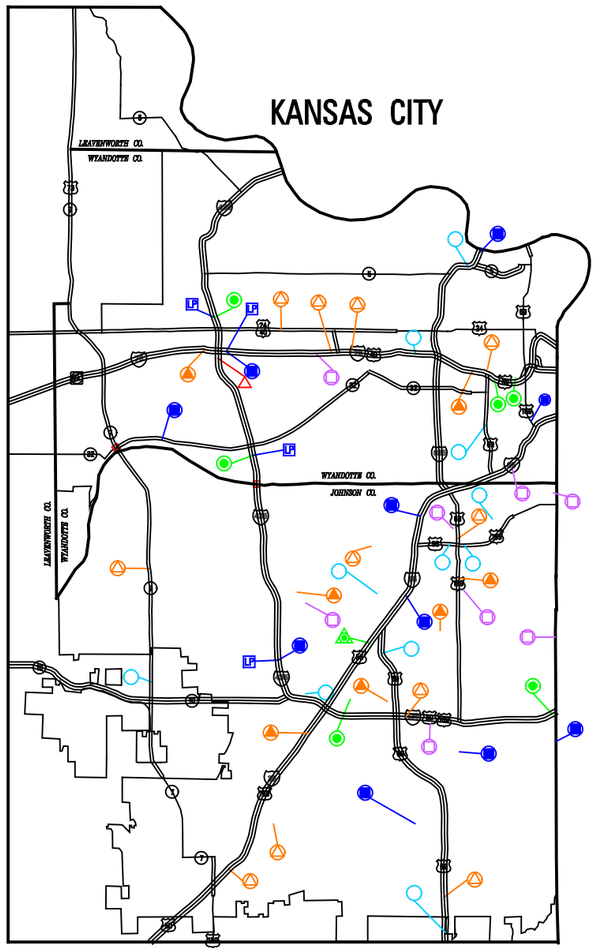
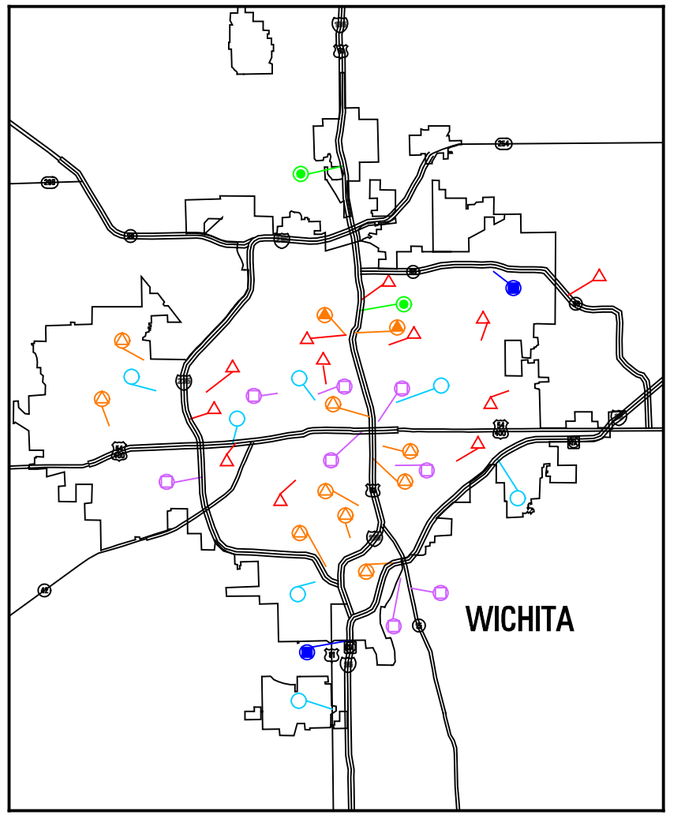
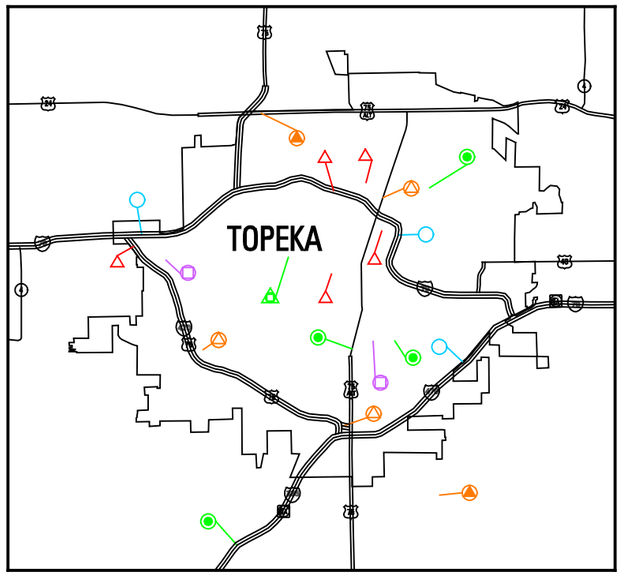
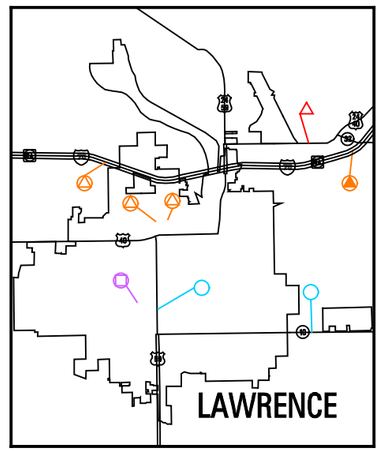
# VEHICLE CLASSIFICATION COUNT STATIONS

# TRUCK WEIGHT STATIONS




1998 & 2001 VEHICLE CLASSIFICATION COUNT STATION

1998 & 2001 VEHICLE CLASSIFICATION COUNT AND TRUCK WEIGHT STATION

1997 & 2000 VEHICLE CLASSIFICATION COUNT STATION

1997 & 2000 VEHICLE CLASSIFICATION COUNT AND TRUCK WEIGHT STATION

1999 & 2002 VEHICLE CLASSIFICATION COUNT STATION

1999 & 2002 VEHICLE CLASSIFICATION COUNT AND TRUCK WEIGHT STATION

COMBINATION AUTOMATIC TRAFFIC RECORDER AND VEHICLE CLASSIFICATION COUNT STATION

AUTOMATIC TRAFFIC RECORDER

LONG TERM PAVEMENT PERFORMANCE (LTPP)



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Proposed 2001

Collection of 48-hour vehicle classification data for the one hundred (100) regular stations scheduled for 2000 will be completed. Collection of 48-hour vehicle classification data for 2001 will commence. Weekday 24-hour supplemental vehicle classification counts with turning movements, if needed, will also be collected as requested for traffic forecasts or other studies. The 2000 data will be compiled and a report will published and data will be submitted to FHWA.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $170,000 | $150,000 | $170,000 |

**C. Truck Weight and Characteristics** (P-0094-01)

Objective

The objective of this study is to provide information on the weight, size, and load patterns of commercial vehicles. In conjunction with traffic volume and vehicle classification surveys, this data will provide measures of usage and demand upon the highway system. This data is obtained by sampling locations on Urban and Rural roads functionally classified higher than Local.

Accomplishments 2000

Weight data from the CY1998 sample sites was submitted. Weight and classification data at 28 of the 30 CY1999 sites selected for sampling was collected. A new portable weighing system with additional weight sensors to replace older equipment was purchased. Three permanent weighing sites were updated with new equipment. Weight surveys on the sites selected for the CY2000 sample began.

Proposed 2001

Weight surveys for the remaining sites in the CY2000 sample will be conducted. A report of the sites surveyed in CY2000 will be prepared and distributed. Equipment will be purchased to update six permanent weighing sites. Data collection for the CY2001 sample sites will begin.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $115,000 | $140,000 | $145,000 |

## D. **Speed Studies** (P-0195-01)

Objective

Speed studies are conducted to provide reliable data to determine and provide speed summaries for monitoring speeds on state highways.

Accomplishments 2000

Speed data was collected at each of the forty-one (41) monitoring sites for at least one day each quarter. The data was compared with previous data to monitor changes in speed on the state highway system.

Proposed 2001

Speed data will be collected at each of the monitoring sites for at least one day each quarter. The data will be compared with previous data to monitor changes in speeds on state highways.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $25,000 | $10,000 | $10,000 |

## E. Purchase of Traffic Monitoring Equipment (P-0008-01)

Objective

The objective is to replace, maintain, and update traffic monitoring equipment used to obtain traffic counts, vehicle classification, truck weight data through weigh-in-motion, and data at SHRP locations.

Accomplishments 2000

The following items were purchased during the year:

- One (1) portable weigh unit
- Three (2) weigh pad sensors
- Twenty-two (22) electronic vehicle classifiers
- One (1) equipment upgrade at a permanent weight site
- Four (4) electronic turning movement machines
- Ten (10) line powered modems

Miscellaneous items including transistors, relays, fuses, hoses, and other replacement parts for traffic monitoring equipment were purchased as needed.

Proposed 2001

It is planned to purchase the following equipment during the year:

- Five (5) electronic weighing units to replace existing vehicle detection and weighing sensor equipment at a cost of $65,000.
- Ten(10) automatic traffic recorders to replace existing equipment at a cost of $20,000.
- Two (2) non-intrusive vehicle detectors at a cost of $7,000.
- One (1) equipment upgrade at an existing permanent truck weigh location at a cost of $20,000.

Miscellaneous items including transistors, relays, fuses, hoses, and other replacement parts for traffic monitoring equipment will be purchased as needed.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $140,000 | $120,000 | $140,000 |

**5. HIGHWAY STATISTICS** (P-0006-01) Total Estimated Cost $50,000

Objective

To maintain and report mileage statistics on all roads and streets in Kansas. Data covered includes road types, surface widths, traffic volume and administrative systems. Included in this work is the maintenance of records of all city limits and the urban limits of the larger cities.

To maintain and report data on motor vehicle registrations, motor fuel usage, highway-user tax revenues and licensed drivers.

To maintain and report estimates of revenue and expenditures for highway construction, maintenance and operations for all units of government in Kansas.

Accomplishments 2000

Records were updated from inventories and construction records. The certification of public road mileage was prepared and submitted to the Federal Highway Administration. Summaries of mileage and vehicle-miles of travel by county were prepared for use by the State Treasurer's office. An annual series of mileage reports and travel summary tables were prepared for KDOT use. See Section 7 for activities relating to the Highway Performance Monitoring System, which includes the mileage reporting requirements. The State Highway System mileage network was updated to reflect highway system improvements.

The annual series of FHWA reports on motor vehicle registrations, motor fuel usage, highway-user tax revenues and licensed drivers were prepared and forwarded to the FHWA. Related analysis and reporting were performed for State use.

The annual series of FHWA reports on state highway income, expenditures, obligations issued, and status of transportation debt were prepared and forwarded to the FHWA.

The biennial report for the local highway finance report FHWA Form 536 was submitted for 1998 data.

Proposed 2001

Records will be updated from inventories and construction records. The certification of public road mileage will be prepared and submitted to the Federal Highway Administration. Summaries of mileage and vehicle-miles of travel by county will be prepared for use by the State Treasurer's office. Mileage and travel summary tables will be prepared from the 1999 data. An annual series of mileage reports and travel summary tables will be prepared for KDOT use. See Section 7 for activities relating to the Highway Performance Monitoring System, which includes the mileage reporting requirements. The State Highway System mileage network will be updated to reflect highway system improvements.

The annual series of FHWA reports on motor vehicle registrations, motor fuel usage, highway user tax revenues and licensed drivers will be prepared and forwarded to the FHWA. Related analysis and reporting will be performed for State use.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $50,000 | $25,000 | $50,000 |

## 6. ECONOMIC AND FISCAL Total Estimated Cost $110,000

### A. Highway Construction Records (P-0198-01)

Objective

The objective is to maintain an accurate record of all state highway construction on strip maps, sketches and logs for planning and other State use.

Accomplishments 2000

The construction strip maps and city connecting link sketches were maintained, published and distributed to most Bureaus of the Kansas Department of Transportation and to the FHWA. Revision of city connecting link resolutions was performed as needed.

Proposed 2001

The construction strip maps and city connecting link sketches will be maintained, published and distributed to most Bureaus of the Kansas Department of Transportation and to the FHWA. Revision of city connecting link resolutions will be maintained and converted to digital format as needed. Conversion of strip maps to a digital format using an automated process will be investigated.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $100,000 | $100,000 | $110,000 |

## 7. SYSTEMS AND PROGRAMMING Total Estimated Cost $1,750,000

### A. Highway Classification and Systems (P-0200-01)

Objective

The objective is the establishment of defined systems of roads, streets and highways, classified according to their functional usage, to provide guidelines for the rational assignment of jurisdictional responsibility and to provide a framework for the orderly and efficient development of a modern highway system. Within this established framework, the determination of needs and priorities may be realistically related to the present and anticipated future traffic and service demands. This will in turn provide a basis for the development of relatively stable long range financial and physical programs for orderly system development.

Accomplishments 2000

Functional classification designations and supporting documents were revised as necessary to reflect requested and approved modifications to the systems.

Proposed 2001

Statewide functional classification and urban area boundaries supporting documents will be revised as necessary. A review of urban area boundaries and functional classification for each county will begin in anticipation of 2000 U.S. Census results.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $30,000 | $25,000 | $30,000 |

## B. Highway Needs and Performance

Objective

The objective is to establish and maintain the necessary systems and procedures for conducting continuing and comprehensive Federal and statewide needs and performance studies. The total statewide needs determination would be arrived at by determining the needed improvement type. The needed improvement type for each control section of highway would be a function of the existing roadway geometrics, present and estimated future base, surface and shoulder conditions, maintenance costs, present and estimated future traffic volumes and service demands, social and environmental effects, and the appropriate minimum tolerable standards. The needs evaluation system should be developed so that the effects of new construction, roadway and bridge obsolescence, alternative minimum tolerable and design standards and changes in traffic flow could easily be determined. The accomplishments and proposed activities in this area are directed toward the continued development of the components of a continuing, comprehensive statewide needs determination and performance evaluation system in the following subareas:

**(1)Planning Data Base Management** (P-0007-01)

Accomplishments 2000

The library of computer programs necessary to maintain, access and query the databases continued to be maintained, refined and expanded. Procedure manuals for the databases were refined, updated and distributed as necessary. County and city maps necessary to locate roadway control sections, bridges and railroad crossings were refined, updated, and distributed as necessary. Field inventory of highways, city classified streets and bridges was completed. Data preparation, entry and editing continued. Existing data was updated where appropriate to reflect system changes, construction project changes, field inventory and inspection data. Computer programs necessary to produce state and FHWA needs/performance studies and reporting were created, tested, modified and maintained as necessary. A thorough study of Y2K compliance of the current system was conducted. The results of this study determined that the current system would require minimal changes to become Y2K compliant. Y2K system changes were completed as they came up during day to day operation. Design and implementation of the planning databases and business functions (Section 7-B(2)) continues to be converted to a client server relational database environment.

Proposed 2001

The library of computer programs necessary to maintain, access and query the databases will continue to be maintained, refined and expanded. Procedure manuals for the databases will be refined, updated and distributed as necessary. County and city maps necessary to locate roadway control sections, bridges and railroad crossings will be refined, updated and distributed as necessary. Field inventory of highways, city classified streets and bridges was completed. Data preparation, entry and editing will continue. Existing data will be updated where appropriate to reflect system changes, construction project changes, field inventory and inspection data. Computer programs necessary to produce state and FHWA needs/performance studies and reporting were created, tested, modified and maintained as necessary. Y2K system changes will be completed as they come up during day to day operation. Design and implementation of the planning databases and business functions (Section 7-B(2)) in a client server relational database environment will be completed.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $300,000 | $375,000 | $380,000 |

**(2) Database Conversion Analysis** (P-0001-01)

Accomplishments 2000

Design and implementation of the new data base system continued. The Oracle software package, Oracle Transportation Manager (OTM) was scrapped and replaced with a Commercial Off The Shelf (COTS) system called Highways by exor. This system was developed by exor Corporation of the United Kingdom. The system has been installed on site and initial training is being conducted. Testing of the system was completed.

Proposed 2001

Design and implementation of the new database system will be completed. Testing and verification of the new system will be completed.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $100,000 | $88,000 | $100,000 |

**(3) Rural and Urban Highway Needs** (P-0202-01)

Accomplishments 2000

Field sheets were prepared and the inventory of the classified and local streets in the sample cities in District Five was performed, as reported in Section 2-A, INVENTORY. The updating of the geometric, condition, traffic and bridge data necessary for needs analysis on the State Highway System was performed in the Control Section Data Base and Bridge Data System subareas. Needs analysis support was provided for the project identification phase of developing and updating the construction programs, which is reported in Section 7-C, Long-Range Program. An additional year's (1999) accident data was added to the Planning Accident Record (PAR) file. Processing of accident data for the five year period 1995 to 1999 to identify "sections" and "spots" with accident rates which exceed the expected critical accident rate was performed. The County Engineer's annual report for 1999 was reviewed for improvements. The Bureau of Local Projects currently reviews the entire annual report.

Proposed 2001

Field sheets will be prepared and inventory of the classified and local streets in the sample cities in District Four will be performed, as reported in Section 2-A, INVENTORY. The updating of the geometric, condition, traffic and bridge data necessary for needs analysis on the State Highway System will be performed in the Control Section Data Base and Bridge Data System subareas. Needs analysis support will be provided for the project identification phase of developing and updating the construction programs, which is reported in Section 7-C, Long-Range Program. An additional year's (2000) accident data will be added to the Planning Accident Record (PAR) file. Processing of accident data for the years 1996 through 2000 will be performed to identify "spots" with accident rates which exceed the expected critical accident rate. The County Engineer's annual reports for 2000 will be reviewed by the Bureau of Local Projects.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $5,000 | $5,000 | $5,000 |

**(4) Highway Performance Monitoring System (HPMS)**(P-0207-01)

Accomplishments 2000

HPMS computer software routines were modified to meet new FHWA software and submittal requirements. In accordance with the instructions, current and new data was collected, assembled and submitted to reflect the status of all Kansas roads as of December 31, 1999.

Proposed 2001

Alterations to processes and procedures will be accomplished as required. Sampling procedures will be validated with adjustments where necessary. In accordance with the instructions, current data will be collected, assembled and submitted to the FHWA to update the Kansas portion of the HPMS Study to reflect the status of all Kansas roads as of December 31, 2000.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $35,000 | $20,000 | $35,000 |

**(5) National Bridge Inventory Program (NBIP)** (P-0009-01)

Accomplishments 2000

Alterations to processes and procedures were accomplished as required. In accordance with the instructions, current bridge condition data was collected, assembled and submitted to the FHWA to update the Kansas portion of the NBIP Study to reflect the status of all Kansas bridges as of December 31, 1999.

Proposed 2001

NBIP computer software routines will be modified as needed. In accordance with the instructions, current bridge condition data will be collected, assembled and submitted to the FHWA to update the Kansas portion of the NBIP Study to reflect the status of all Kansas bridges as of December 31, 2000.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $10,000 | $10,000 | $10,000 |

## C. Long-Range Program

Objective

The long-range program is one of the major goals of a comprehensive transportation planning program and should fully utilize the data developed in the areas of "Highway Classification and Systems" and "Highway Needs and Performance."

Programming for transportation improvement projects can be defined as the process of stipulating the work to be performed on individual projects within a specified period of time to accomplish the goals and objectives set for that period, with due regard given to the relative urgency of the work. The end product is a carefully developed and documented plan whereby projects are arranged in a logical sequence to most effectively meet transportation goals and use anticipated funds as they are made available. The process of programming transportation improvement projects is a complex operation which considers the relative urgency of the needs for each transportation segment, the scheduling time (which varies from two to ten years) required to prepare for each major project, the funds available by fund classification, the estimate of revenues, the consideration of project distribution over an area to maintain a balanced work force, coordination with the programs of other governmental agencies, and the orderly and systematic development of the entire transportation system.

The Statewide Transportation Improvement Program (STIP) for FY 2001 will be developed utilizing existing plans and policies. This Program will be compiled and prepared by the Office of Engineering Support. It will represent all federally funded highway and transit projects under Title 23 and the Federal Transit Act.

The accomplishments and proposed activities in the area of Long-Range Programming are performed in the following subareas:

**(1) Construction Program Development** (P-0204-01)

Accomplishments 2000

The ten-year Comprehensive Transportation Program (CTP) as enacted by the 1999 Kansas Legislature was initiated. Cost estimates for all projects in the various construction programs were reviewed and updated as necessary to reflect changes in project scope, in the rate of inflation, and/or in the anticipated letting dates. Revenue, operating expense, and federal-aid fund projections were reviewed and updated to determine the availability of future construction funds on a fund class basis. The multi year construction program was reviewed and updated. Requests for program additions, deletions, and adjustments were reviewed and processed. Proposed and passed legislation was reviewed to determine the effect on a future highway construction program. Analysis was made to determine the effect of the program on the transportation system.

As a part of the CTP, the System Enhancement Program was established and the project selection process initiated. Project applications were solicited and reviewed. Final applications were reviewed and project selection criteria analyzed. Projects were selected and programmed.

Considerable effort was spent developing and enhancing computer files and procedures to aid the programming activities. Considerable effort was also expended in continued development, testing, training, and utilization of the agency's Comprehensive Program Management System (CPMS).

Review of the Priority Formulas was initiated. Extensive work was required in managing the consultant team conducting the evaluation and the Steering Committee providing input to the process. Phase I of the review was completed and Technical and Summary Reports issued along with a series of fact sheets.

Staff participated in the following work groups:

- The Corridor Management working group was created to develop and manage KDOT's Corridor Management Policy.
- The Records Work Flow Management working group was created to improve the agency's document processes.
- The Public Involvement Plan working group was created to improve public project awareness.

- The Comprehensive Transportation Program (CTP) Financial Reporting Steering Committee was created to oversee improvements to KDOT's information systems to insure that KDOT has uniform financial management and reporting capability with regard to the CTP.

Proposed 2001

Entering the second year of the ten-year Comprehensive Transportation Program (CTP), cost estimates for all of the projects in the various project categories will be reviewed and updated as necessary to reflect changes in project scope, in the rate of inflation, and an anticipated fiscal year of letting will be assigned. The multi year construction program will be reviewed, updated, and published.

The System Enhancement Program will be implemented and project start up activities and agreements initiated. Revenue, operating expense, and federal-aid fund projections will be reviewed and updated to determine the availability of future construction funds on a fund class basis. Efforts to efficiently utilize funds, provided as a result of new federal and state transportation legislation, will continue.

Requests for program additions, deletions and adjustments will be reviewed and processed. Proposed and passed legislation will be reviewed to determine the effect on a future highway construction program. Analysis will be made to determine the effect of the program on the highway system. Potential projects will be identified on the basis of need for possible addition to the construction program. Potential projects will be scoped, cost estimates prepared, priorities established, and the projects programmed consistent with available funds; or to be ready when funds become available. Identification of needs and determination of project priority will be established using the Priority System. All necessary data processing will be performed. Training and familiarization with CPMS will continue.

Work on Phase II of the Priority Formula Review project will continue including project management, work product review, and data/information input. Staff will also participate in Corridor Management, Records Work Flow Management, KDOT Public Involvement and CTP Financial Reporting work efforts.

| 2000 Work Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $450,000 | $450,000 | $470,000 |

**D. Accident Data Collection, Coding and Processing** (P-0364-01)

Objective

The objective is to collect, code and process data for all reportable motor vehicle accidents in Kansas and to provide accident data analysis and report generation. The analysis of these data is essential for use in planning highway construction and for implementing accident reduction measures. The maintenance of such data is vital to the promotion of highway safety and for fulfilling data needs at the Federal level.

Accomplishments 2000

Data developed in Section 7-B and this section, was utilized to provide input to the Highway Safety Improvement Program and to produce the Annual Evaluation Report as required by the Federal-Aid Highway Program Manual. All necessary data processing was performed.

The microfilming, coding and keying of all data for all reportable calendar year 1999 motor vehicle accidents in Kansas was performed by inmates at the Kansas State Correctional Facility under an agreement with the Kansas Department of Corrections. The agreement and activities directly related to administration of the contract were State funded. The remaining checking, editing and coordination necessary to accomplish the objectives was SPR funded. The reporting of all calendar year 1999 traffic accident data was completed. Studies into plotting accident locations and associated data using current Intergraph Geomedia equipment described in 3-E, Decision Mapping, continue. The analysis of 1999 traffic accident data was completed. All year 2000 traffic accidents will be scanned instead of microfilmed.

Exploration into electronic accident data submittal continued. KDOT has hired the consulting firm called Business Software and Equipment to assist in this endeavor.

Proposed 2001

Data developed in Section 7-B and this section, will be utilized to continue the development and updating of the Highway Safety Improvement Program and to produce the Annual Evaluation Report of the Safety Program as required by the Federal-Aid Highway Program Manual.

The coding, data entry and scanning for all reportable 2000 motor vehicle accidents in Kansas will be performed under agreement with Kansas Department of Corrections, by inmates at the Kansas State Correctional Facility. The agreement and activities directly related to administration of the contract will be State funded. The remaining checking, editing and coordination necessary to accomplish the objectives will be SPR funded. The analysis and reporting of all traffic accidents for calendar year 2000 will be completed. System testing and enhancements continue. Plotting accident locations and associated data using current Intergraph GeoMedia equipment described in 3-E, Decision Mapping, will continue. Accident location maps will be supplied to selected users. The Kansas Accident Records System (KARS), in the client server relational database environment, will continue to be tested and modified as necessary. Linking of accident data to the new CANSYS database (Section 7-B-2) will be accomplished. Selected accident and CANSYS elements will be incorporated using KDOT's Location Referencing System into a Geographic Information System.

Exploration into electronic data submittal continues.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $200,000 | $215,000 | $230,000 |

## E. **Pavement Management System** (P-0433-01)

Objective

The Pavement Management System (PMS) assists highway engineers and managers in making consistent and cost-effective decisions that maximize benefits achieved from expenditures for preservation and rehabilitation of State Highway System roadway surfaces. This is accomplished through the yearly production of the Substantial Maintenance mileage allotments by District and the Candidate Project List, which serves as the basis for developing the yearly Kansas highway rehabilitation program, and providing pavement condition data - both present and historical - in several formats for use in evaluating alternative pavement preservation actions.

Accomplishments 2000

The annual condition survey of the State Highway System and review and analysis of the condition survey data were accomplished. Oversampling continued for both the manual rating system and the laser profiling vans as a data quality assurance measure as well as for research purposes. The PMS was used successfully in the surface rehabilitation project selection process for the FY 2001 program. Development efforts continued in all areas of PMS. Enhancements to the Network Optimization System (NOS), including porting the system to a different operating system and converting the software to an Agency standard language, is underway. The ports and conversions align PMS and the associated subsystems with Agency standards. The functional enhancements to NOS are intended to both make the system easier to use and manage and to improve the ability of the system to incorporate policy and business practices more accurately for decision support. A full statewide run of the Project Optimization System (POS) was again completed. Problems in POS models continue to be addressed via research projects with the universities through techniques like neural networks. Because the AASHTO Provisional Standards for pavement management data collection are significantly inconsistent with our current practices, the demonstration project and additional testing of automated distress identification systems continues to be postponed. Again this year major strides were taken in integrating Geographic Information System (GIS) capabilities into the PMS. Additionally, Global Position System (GPS) data was collected in the data collection process to allow for future simplification of referencing procedures. Many of the existing Pavement Management reports have been transferred to electronic media and are currently available via KDOT's intranet.

Proposed 2001

The annual condition survey of the State Highway System will be accomplished. Quality control/quality assurance (QCQA) measures will again be used to insure the validity of the data collected. Global Positioning System (GPS) is being incorporated into the data collection process to simplify referencing procedures and provide a reference database of latitude and longitude that make additional GIS capability feasible. KDOT will also co-host with FHWA the biennial Midwest PMS conference in the fall. Modification and use of the Pavement Management System (PMS) will continue. The Enhanced Network Optimization System will be implemented. A study of a Laboratory Information Management System (LIMS) related to PMS will be initiated. Also a study to resynchronize POS with the Enhanced NOS may begin. If a methodology to productively evaluate the impacts of the AASHTO provisional standards for PMS data collection on our system can be developed, we will proceed. KDOT will continue to develop GIS capabilities with PMS to create user understandable maps and charts efficiently as well as electronic interfaces via the KDOT intranet and possibly the internet. The Pavement Management Section will also monitor activities associated with proposed state highway legislation and funding issues. The activities will consist primarily of using the optimization system to estimate appropriate funding levels for various levels of service.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $470,000 | $480,000 | $490,000 |

## 8. URBAN TRANSPORTATION STUDIES

Total Estimated Cost $400,000

Objective

Urban transportation planning is designed to develop and continuously evaluate short and long-range transportation plans, which are soundly conceived to meet the goals and standards of the State and of the urban and urbanized areas.

This year's major focus will be on working with the Metropolitan Planning Organizations (MPOs) to implement the requirements of Federal legislation and the new planning regulations for TEA-21 once they are issued.

In the metropolitan areas, effort will be directed at updating and refining previous plans to provide the best decision-making data possible. Traffic forecasting and special studies are included as a service function in this section for the urbanized areas. Work will continue for supporting and expanding the activities of the planning process in each of the metropolitan areas. In the small urban areas, the objective is similar, but at a lesser scale and on a periodic schedule, as determined by a specific need. Traffic forecasting activities are included as a service function in this section for the small urban areas.

### A. **Metropolitan Planning Support - General** (P-0218-01)

Accomplishments 2000

Some progress has been made on updating the Lawrence/Douglas County and the Topeka/Shawnee County travel demand models. The Wichita/Sedgwick County MPO updated its long-range transportation plan. Numerous traffic forecasts for the metropolitan regions were completed (including traffic forecasts for the system enhancement program). Maintenance of the data management system continued. Administrative and training activities were performed which pertain in general to the planning activities of all urbanized areas. Requirements of the 1990 Clean Air Act and associated regulations that pertained to transportation were monitored. Statewide Planning and Urban Planning staff have began preparing an update of the MPO Policy Handbook: Administration of the 3-C Planning Process. The new handbook will include changes relevant to TEA-21 and should give the MPOs more guidance in their administration of planning grant funds.

Beginning with the distribution of FY 2000 planning funds, KDOT and the MPOs will enter into a planning agreement on an annual basis for each year’s allocation of funds. This agreement has been prepared and will be executed soon.

Proposed 2001

The Lawrence/Douglas County and the Topeka/Shawnee County travel demand models will be completed. Urban Planning Unit staff will assist Lawrence and Topeka staff with maintaining the models once they are completed. The Topeka/Shawnee County and the Lawrence/Douglas County long-range transportation plans will be completed. Urban Planning Unit staff will assist with the updates.

The MPO manual will be completed. The manual will be presented to the MPOs at the first in a series of annual workshops.

Environmental Justice will become a more prominent issue in the coming years. Planning staff will be participating in training from FHWA and FTA to learn more about the issue. Planning staff will work with the MPOs to develop and assess a public involvement process that recognizes the provisions of Title VI and Environmental Justice provisions of the 1964 Civil Rights Act, the National Environmental Policy Act of 1969, the Federal-aid Highway Act of 1970, Executive Order 12898, as well as the related DOT and FHWA orders.

With the expectation that new Census data will lead to the creation of a new MPO, planning staff will be preparing for the inclusion of Manhattan as an MPO. This will involve working with FHWA, FTA, Manhattan and Riley County officials and other entities to set up the structure of the MPO as well as any preliminary planning efforts that might help the transition.

Maintenance of the data management system will continue. Administrative and training activities will be conducted which pertain to the planning processes of all urbanized areas. Planning requirements for the 1990 Clean Air Act Amendments will continue.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $100,000 | $135,000 | $140,000 |

**B. Metropolitan Planning Support - Wichita** (P-0214-01)

(See Wichita-Sedgwick County Unified Work Program)

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $60,000 | $20,000 | $50,000 |

**C. Metropolitan Planning Support - Kansas City** (P-0215-01)

(See Kansas City Unified Work Program)

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $100,000 | $40,000 | $80,000 |

**D. Metropolitan Planning Support - Topeka** (P-0216-01)

(See Topeka Unified Work Program)

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $50,000 | $10,000 | $40,000 |

**E. Metropolitan Planning Support - Lawrence** (P-0217-01)

(See Lawrence-Douglas County Unified Work Program)

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $40,000 | $30,000 | $40,000 |

**F. Small Urban Area Support** (P-0278-01)

Accomplishments 2000

Work in this area consisted of the review of planning studies, assistance in preparing corrections and additions to those studies, attendance at related meetings, preparation of requested traffic forecasts and development of travel models. Some of these studies include reviewing access break requests to insure that state and federal guidelines are followed and operational characteristics of the interstate system are not degraded. An access break request for the I-35/US-59 interchange in Miami County was completed and approved. A value engineering project continues for US-75 in Independence. 2000 Census preparations/review continues so the end transportation related products for small urban areas are finalized.

Proposed 2001

Work in this area will consist of the review of planning studies, assistance in preparing corrections and additions to those studies, attendance at related meetings, preparation of requested traffic forecasts and development of travel models. A travel demand model of McPherson will be built and calibrated in FY2001.

Continued emphasis will be placed on preparing data for several small urban areas in anticipation of them reaching metropolitan status after the 2000 Census (Manhattan). Work continues with the City of Manhattan in developing a travel demand model and laying the framework for a successful transition from a small urban area to metropolitan status by the year 2000. Access break applications will be reviewed as needed. A traffic forecast and origin-destination study will be completed for US-75 in Independence.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $50,000 | $12,000 | $50,000 |

**9. Statewide Transportation Studies** Total Estimated Cost $450,000

**A. Statewide Planning** (P-0760-01)

Objective

The objective is to support statewide transportation planning through the Statewide Long Range Transportation Plan, studies of freight movements around and through the state, studies of demographics and their relations to transportation, studies of economic development/impacts related to transportation, and provide traffic estimates for proposed projects.

Accomplishments 2000

Work began on the update of the Statewide Long Range Transportation Plan. Internal meetings were held to shape the course of the update. The Plan update will incorporate the successes of the original plan, new directives as discovered in the public outreach, and consider environmental justice wherever applicable.

Technical support and traffic projections were provided to several corridor studies, including the Topeka to Kansas City Major Corridor Study, the I-35 and US-69 Major Investment Studies in Johnson and Wyandotte Counties, the South Lawrence Trafficway Supplemental Environmental Impact Statement, and for the System Enhancement evaluation for the Comprehensive Transportation Program.

Activities related to freight and passenger movement, economic development, state and federal legislation, and transportation related demographics were compiled and monitored in support of a variety of statewide issues.

Proposed 2001

Work will continue on implementation of the broad-based policy recommendations made in the Statewide Long Range Transportation Plan. In addition, an update of the Long Range Plan will be prepared. This will include accomplishments of the first five years of the LRP as well as the findings of the Transportation 2000 committee and the external survey. Opportunities for the public to give and receive information regarding highway programs and public preferences for future programs will continue. Proposed federal legislation impacts on KDOT's long range planning efforts will be monitored. Demographic, freight, and economic development/impact studies will be emphasized.

General transportation planning support related to statewide issues will be provided.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $100,000 | $10,000 | $100,000 |

## B. **Rural Traffic Studies and Forecasts** (P-0005-01)

Objective

The objective of rural traffic studies is to satisfy requests for traffic analysis, traffic forecasts, and special studies. The majority of these requests are for location or design related activities. To fulfill these requests considerable effort is spent in gathering, tabulating, and analyzing data relating to traffic flow and travel patterns. These traffic studies are used to develop factors and assumptions for projecting future needs analysis.

Accomplishments 2000

137 traffic forecasts were prepared and additional traffic information was provided as requested. Over 80 system enhancement corridor projects were reviewed for future traffic and information was provided as requested. These duties were transferred within the Bureau of Transportation Planning from the Traffic and Field Operations Unit to the Statewide Planning Unit.

Proposed 2001

Approximately 100 traffic forecasts will be prepared and additional traffic information will be provided as requested. Special traffic studies will also be conducted as requested. Mechanisms to identify appropriate levels of forecasting effort will be developed to provide more responsive and appropriate forecasts.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $100,000 | $80,000 | $150,000 |

## C. State Rail and Intermodal Planning (RA-0318-01, RA-320-01)

Objective

The objectives are to gather, analyze and evaluate economic, financial and operational data on railroad and intermodal freight transportation carriers and facilities in Kansas and provide a framework for short and long range decision making, to disseminate relevant information to rail users and local governments faced with loss or changes in rail services, and administer the federal LRFA and state rail assistance loan programs.

Accomplishments 2000

The ongoing research and analysis of rail and intermodal freight issues by the Office of Rail Affairs continued. Rail lines faced with potential abandonment were identified and studied and their viability for continued operations was evaluated. Meetings were held with shippers, railroad company management, and local officials. Rail freight assistance was administered and documentation submitted to the Federal Railroad Administration. The administration of loans funded by the federal LRFA and state rail assistance programs was also done. Abandonments and sales of rail lines were monitored. Issues pertaining to the rail industry before the Kansas Legislature in the 2000 general session were monitored. The ongoing effects of the mergers of the Burlington Northern and Santa Fe and the Union Pacific and Southern Pacific railroads continued to be monitored, as well as the proposed merger between the Burlington Northern Santa Fe and Canadian National railroads. Input was provided to other Bureaus and Offices within KDOT on rail and intermodal issues, including those related to the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21), such as Transportation Enhancements, Management Systems, Long-Range Planning, Bicycle and Pedestrian Facilities and Rails-To-Trails Corridor Preservation. Written Testimony was provided to the Federal Railroad Administration pertaining to the implementation of the TEA-21 Railroad Rehabilitation and Improvement Financing (RRIF) Program.

The Office of Rail Affairs also monitored the completion of a study requested by the Legislature's Special Committee on Rail Transportation to determine the feasibility of passenger rail service between Kansas and Oklahoma. Regional and national high-speed passenger rail issues, projects and legislation were also monitored.

Proposed 2001

Analysis of potential rail abandonments, sales and mergers will continue. The Office of Rail Affairs will continue to monitor the Union Pacific purchase of the Northeast Kansas and Missouri line in Kansas and ongoing activities of the proposed merger between the Burlington Northern Santa Fe and Canadian National railroads, as well as Surface Transportation Board decisions regarding the proposed merger. Evaluation of the viability of continued rail operations would be provided to shippers, local governments, and potential shortline operators. Information on rail matters will be furnished to the Legislature, the Governor, and other state agencies and local governments as needed. Management of the federal and state loan programs will continue, including gathering and analysis of financial and operational data on proposed projects. Special economic studies of rail and intermodal freight issues will continue, including a study on the effects of large 286,000 pound rail cars on shortline railroads, the communities they serve and the state transportation network. Prior reports will be updated, and additional reports of ongoing research and analysis will be published. Assistance will be provided to the Division in implementing the rail, intermodal, transportation enhancement, long-range planning, and non-motorized programs under the Transportation Equity Act for the 21st Century (TEA-21). The Office of Rail Affairs will continue to monitor passenger rail service issues and legislation.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $200,000 | $160,000 | $200,000 |

## D. **Corridor Studies** (P-0320-01)

Objective

The objective is to identify and coordinate the scope and needs of potential projects with regional or statewide significance. This includes MIS-like studies between regional activity centers or longer corridors within the state and may or may not include a metropolitan area. Results of these studies will be used to help prioritize competing activities within the corridor to meet the anticipated transportation demand.

Accomplishments 2000

A Major Corridor Study (MCS) was undertaken and completed by KDOT and the Kansas Turnpike Authority to look at the transportation needs, both present and future, for vehicles traveling in the Topeka to Kansas City corridor. A travel demand model was calibrated and validated for the MCS. The final report for the MCS study was published in January of 2000. Work continues on converting the existing MCS TranPlan model to a TransCad Model. A K-7 Corridor study was undertaken by KDOT and MARC to look at access control issues and existing and future traffic operations. KDOT staff continues to attend meetings and work on traffic forecasts for the study.

Proposed 2001

KDOT and MARC will continue work on determining future needs for the K-7 Corridor. Work continues on completing the traffic forecasts for the K-7 corridor and all interchanges and intersections. Alternatives will be studied and recommendations for future improvements will be identified. Work on the US-54 corridor between Kingman and Mullinville continues. KDOT and HNTB are working on future traffic projections and operational characteristics along the corridor and for the bypasses around Kingman, Pratt, and Greensburg. Final traffic forecasts should be completed in FY2001.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $875,000 | $875,000 | $100,000 |

**10. SPECIAL STUDIES** Total Estimated Cost ($200,000)

**National**

**(1) None**

**State**

**(1) Bicycle and Pedestrian Program** (P-0758-01)

Objective

The objective is to continue the bicycle and pedestrian program at the state level as required by the Transportation Equity Act for the 21st Century (TEA-21). The program consists of participation in the implementation of the Transportation Enhancement Program, working with KDOT staff to meet bicycle/pedestrian accommodation needs on the Kansas State Highway System and disseminating information to the public about bicycle and pedestrian efforts at KDOT. The program also includes updating the Kansas Bicycle Guide map, distribution of the Kansas Bicycle Transportation Facilities Guide, and the development of a Kansas Pedestrian Transportation Facilities Guide and pedestrian safety brochures as discussed in the Kansas Bicycle and Pedestrian Transportation Plan completed and adopted in 1995.

Accomplishments 2000

Copies of the Kansas Bicycle Transportation Facilities Guide were distributed. The 1996 Kansas Bicycle Guide map was updated and printed for distribution. The Guide and safety brochures continue to be distributed upon request from the public. Presentations to community groups, bicycle clubs, trail groups, and other interested citizen and professional groups continued. Provided on-going assistance to bicyclists planning to travel across the state. The Bicycle Coordinator attended a conference for state bicycle and pedestrian coordinators.

Proposed 2001

The sixth solicitation for proposed Transportation Enhancement (TE) Program bicycle/pedestrian project applications will be reviewed and projects recommended for appropriate fiscal year TE funding.

Preparation of the Kansas Pedestrian Transportation Facilities Guide, and children pedestrian safety brochures will begin.

Development of reference material library of bicycle/pedestrian documents and photographing and logging pictures and slides of bicycle/pedestrian facilities in Kansas, including all bicycle/pedestrian TE projects, and such facilities of communities across the country visited through travel will continue.

Meetings with bicycle and pedestrian organizations and providing assistance will continue as requested.

A web site to be used to disseminate information externally and internally will be developed.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $60,000 | $55,000 | $60,000 |

**(2) INTELLIGENT TRANSPORTATION SYSTEMS** (P-0763-01)

Objective

The goal of Intelligent Transportation Systems (ITS) in the State of Kansas is to decrease congestion and increase driver safety through the use of a variety of available technologies, including information processing, integration, control, and communications. In metropolitan areas, this can be as complex as a fully staffed Traffic Operations Center (TOC) monitoring and controlling all aspects of transportation or it can be as simple as the timing of the traffic signals along a major arterial.

Rural ITS is an emerging field of the nationwide ITS movement. Of primary concern to rural motorists is safety and traveler information. Response times to accidents, animal-vehicle incidents, and roadway and weather condition information are all areas that ITS technologies can be applied to.

The objective of Planning's involvement in ITS activities is to assist KDOT and the State of Kansas in taking full advantage of ITS technologies as they become available and economically feasible. To accomplish this objective, Planning's role is to serve as the focal point and clearinghouse in the agency for all ITS activities and to promote, coordinate, and facilitate the development and use of ITS technologies throughout the state. The primary goal is to mainstream ITS into the planning and design process within KDOT.

Accomplishments 2000

In Kansas City, the Phase 1 design of the Scout project continued with the project consultant, Black & Veatch and their subconsultant NET, determining the locations of ITS field elements such as cameras, message boards, and vehicle detection stations. The traffic operations center (TOC) is nearing completion. The internal layout of the TOC was determined through a series of workshops in 2000. The steering committee participants have met regularly to direct the development of this project. MoDOT is the lead agency for this phase of the project and the contract was approved by the Missouri Highway Commission in March 1998. Design began in April 1998. The Early Deployment Plan for Kansas City was completed by HNTB in 1996. The plan detailed the available ITS technologies and how they should be implemented in the Kansas City Metropolitan Area. The plan recommended approximately 48 miles in Kansas City for deployment of ITS technologies in Phase 1 and the remainder to be deployed in phases as the cost-benefit ratios become more attractive.

The ITS Early Deployment Study was completed in December 1998 for the Wichita area. The study recommended what ITS user services would benefit Wichita, developed the system architecture, created an incident management plan for I-135, and established an action plan for the deployment of ITS technologies in Wichita. One of the primary recommendations of the study is the development of a traffic management system for Wichita with a joint transportation/emergency communications center at the heart of the system. The study was a joint effort between the City of Wichita, Sedgwick County, and KDOT with the City administering the contract. In August 1999, staff from KDOT and Wichita attended a scanning tour of San Antonio's traffic management system. In October 1999, an Incident Management workshop was held in Wichita. In May 2000, Steve Lackey of Wichita was provided funding to attend the ITS America Annual Meeting in Boston.

The Statewide ITS Plan development was completed in March 2000 by the ITS Unit and TranSystems Corporation. The plan combines urban ITS, rural ITS and commercial vehicle ITS applications into one strategic plan for the state. Prior to finalization of the plan, a series of six ITS awareness sessions were held across the state to allow review. Funding was approved in March 1998 for the development of a statewide ITS plan to be performed by the ITS Section with the assistance of a consulting firm. The initial contract was $350,000 with a contingent contract of $100,000 to allow the selected firm to perform an evaluation and upgrade of the plan two years after completion of the initial plan. An additional $35,000 has been budgeted to allow TranSystems Corporation to assist in the development of the CVISN Program Plan for Kansas.

The ITS Set-Aside fund was created in August 1999. Its purpose is to provide funds for transportation technology applications in Kansas. In FY 2000, the fund amount is $1 million, in FY 2001, the fund amount is $1.5 million; in FY 2001 and beyond, the fund amount will be $2 million. Twelve projects were selected in March 2000 for a total of $1 million.

The ITS Unit began work on the Commercial Vehicle Information System and Network (CVISN) project development planning. Three federally funded workshops were attended and a program plan was developed that outlines the Kansas plan for CVISN. Funding for the development of the program plan was provided through the ITS Set-Aside fund.

KDOT continued work in the pooled fund research program, called ENTERPRISE, with six other states, the FHWA, the Province of Ontario, the Dutch DOT and Transport Canada. The purpose of this pooled fund study is to collaborate on ITS research, development and deployment reflecting the interests of the member groups. In FY 1999, KDOT contributed $25,000; in FY 2000, KDOT contributed $30,000.

A survey of motorists on the usefulness of weather kiosks at rest areas and traveler information centers was performed November 1999 to March 2000. The purpose of the survey was to determine the benefits and public interest in having weather information available at public locations. A test installation of an Advanced Traveler Information System (ATIS) at selected rest areas and Tourist Information Centers in Kansas was completed in April of 1999. The ATIS involves the use of the DTN weather information system. The survey results were very positive with approximately 85% of respondents in favor of the system.

Funding for a rural transit technology demonstration was secured through the Office of Public Transit. $200,000 has been designated for the planning and design of technologies for two rural Kansas transit providers. In addition, $30,000 has been obtained from the ENTERPRISE group for independent project evaluation.

Work continued on the K-TRAN project researching the institutional issues associated with deployment of Mayday systems in Kansas. Dr. Eric Meyer at the University of Kansas is the proposer and Matthew Volz at KDOT is the project monitor.

Construction is continuing on the fiber optic infrastructure system throughout the state of Kansas. The ITS Unit is responsible for the coordination of these construction contracts.

The ITS Unit began participation in the Traffic Management Center (TMC) pooled fund study. The purpose of this study is to research new methodologies for the management of urban transportation systems. KDOT’s FY 2000 contribution was $30,000.

The ITS Unit participated in the Midwest Smart Work Zone Initiative along with Nebraska, Missouri and Iowa. This initiative is looking at how to improve the safety of work zones through the application of technology. KDOT’s FY 2000 contribution was $75,000.

Acted as Project Monitor for a K-TRAN study investigating cellular coverage areas in Kansas. Dr. Eric Meyer at KU performed this study.

The ITS Steering Committee continued regular meetings approximately every 3 months to monitor the development and review of ITS policies and issues.

The ITS Heartland Chapter of ITS America was officially formed. The first annual meeting was in St. Joseph, Missouri in April 2000 with over 150 people in attendance. KDOT’s annual dues to ITS America are $2,500. ITS Heartland annual dues will be $500.

Proposed 2001

Implement the recommendations of the Statewide ITS Plan. TranSystems Corporation will be evaluating the performance of the ITS Unit over the next two years.

Continue to work with the Missouri Department of Transportation in the administration of the design contract for Phase I of the Kansas City ITS. Production plans for letting will be complete in October 2000. Letting is expected in January 2001.

Continue to develop funding recommendations with the City of Wichita to advance the deployment of ITS. Serve on the project steering committees with the Wichita Metro Engineer as KDOT's representatives. Keep the KDOT Urban Planning Section and the District involved in the ITS process in Wichita.

The ITS Set-Aside Program will be administered by the ITS Unit. For FY 2001, $1.5 million is available to fund ITS projects for both state and local agencies.

Monitor the fiber optic installation in Kansas and coordinate these activities with the ongoing design of the Kansas City ITS project and development of ITS in Kansas.

Oversee the operational demonstration of ITS for rural transit providers. This demonstration will involve the application of Automated Vehicle Location (AVL), Computer Aided Dispatch (CAD), and Mobile Data Terminals (MDT) on a rural fleet to use as a showcase for other transit providers on the benefits of these technologies.

Continue participation in the ENTERPRISE Pooled Fund Study with research into quantifying benefits of maintenance and transit ITS applications. KDOT is proposing that $50,000 be contributed for FY 2001.

The ITS Unit will continue participating in a Traffic Management Center (TMC) pooled fund study through the US DOT. KDOT contributed $30,000 in FY 2000. KDOT will contribute $30,000 in FY 2001.

Continue to act as project monitor for the K-TRAN study looking at the deployment of Mayday systems in Kansas.

Continue to participate in the Midwest Smart Work Zone Initiative Pooled Fund Study. Kansas is contributing $62,500 in FY 2001 to the study.

The US DOT's Tier II architecture courses will be performed in Kansas City in September 2000. The purpose of the course is to develop a regional architecture for the Kansas City Metropolitan Area.

Scanning tours of the Maryland and Minneapolis ITS systems will be conducted for officials from Kansas City and Wichita.

Continue to act as chair of the ITS Steering Committee at KDOT. Participate in and sponsor workshops, conferences and committees as appropriate in the ITS area.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $140,000 | $120,000 | $140,000 |

**11. RESERVED** (P-0209-01) Total Estimated Cost $100,000

Objective

The objective is to provide for changes in the work program which may require additional funds and to allow for the possibility that anticipated expenditures may exceed estimated costs.

Accomplishments 2000

Funds were used to purchase Kansas' 2000 Census Transportation Planning Package (CTPP) and to fund transportation planning activities of the Heartland Freight Coalition.

Proposed 2001

It is proposed to provide an adequate reserve for possible program changes which may require additional funds.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $100,000 | $40,000 | $100,000 |

**DETAILED COST ESTIMATE AND OUTLINE**

**FOR**

**THE 2001 WORK PROGRAM**

# PART II

## RESEARCH, DEVELOPMENT AND IMPLEMENTATION ACTIVITIES

**PROJECT**
**SPR-R010 (024) Statewide**

# KANSAS PROJECT SPR-R010 (24)
# R&D Work Program - Part II
# Fiscal Year 2001
# 07/01/00 to 06/30/01

| State Study | Title | Budget FY 2001 (FY 2000) | Exp. To Date (Total Appr.) | Principal Inv. (Compl. Date) | FTC | W. H. Contact Code |
|---|---|---|---|---|---|---|
| | Administration | $165,000 (150,000) | | | | |
| 67-1 | R&D Administration ($78,215) | | | | | Wm. Zaccagnino HRD-10 |
| 64-10 | Transportation Research Correlation Ser. ($86,785) | | | | | |
| 73-1 | Implementation of Research and Development Findings | 740,000 (680,000) | | #R. McReynolds | W. Klassen | Wm. Zaccagnino HRD-10 |
| 93-1 | Technology Transfer and Training | 275,000 (270,000) | | #W. Jacobs | W. Klassen | Wm. Zaccagnino HRD-10 |
| 67-2 | Contingencies and Proposed Studies | 50,000 (50,000) | | *J. Tobaben | W. Klassen | Wm. Zaccagnino HRD-10 |
| | TOTAL | $1,230,000 (1,150,000) | | | | |

#Phone (785) 296-7410
*Phone (785) 296-3841

## NATIONAL POOLED FUND STUDIES

| FHWA NO. | KDOT NO. | TITLE | FY 2001 FUNDS PLEDGED |
|---|---|---|---|
| SPR-2(203) | RE-0264-01 | Truck/Pavement/Economic Modeling and In-Situ Field Testing (Andrew Gisi) | $ 25,000 |
| SPR-2(207) | RE-0228-01 | Traffic Management Center(TMC)Consortium (Mike Floberg) | $ 30,000 |
| SPR-2(209) | RE-0266-01 | Enhanced Guidance for Implementation of Safety Strategies (Rosalie Thornburgh) | $ 50,000 |
| SPR-2(212) | RE-0263-01 | Non Nuclear Testing of Soils and Bases Using Geogauge (Morris Hunt) | $ 35,000 |

The following are Active or Recently Completed With No Funds Committed by KDOT for FY 2001

| | | |
|---|---|---|
| HPR-2(174) | RE-0045-01 | Accelerated Pavement Testing of Crumb Rubber Modified Asphalt Pavements (T. LaTorella) |
| HPR-2(176) | RE-0046-01 | Validation of SHRP Asphalt and Asphalt Mixture Specifications Using Accelerated Testing (Glenn Fager) |
| HPR-2(178) | RE-0047-01 | Seasonal Changes in Pavement Materials Properties (A. J. Gisi) |
| HPR-2(179) | RE-0048-01 | Load Testing of Instrumented Pavement Sections (A. J. Gisi) |
| SPR-2(184) | RE-0117-01 | Long Term Monitoring of Mitigating Corrosion Measures(John Wojakowski) |
| SPR-2(189) | RE-0116-01 | Support, Maintenance and Refinement of the National Transportation Control/ITS Communications Protocol (NTCIP) (Edward M. Halter) |
| SPR-2(192) | RE-0160-01 | Durability of Geosynthetics II (James Brennan) |
| SPR-2(199) | RE-0168-01 | Optimal Acceptance Procedures for Statistical Construction Specifications (Richard Kreider) |
| SPR-2(202) | RE-0219-01 | HPMS Computer Based Training |
| SPR-2(204) | RE-0224-01 | HITEC FRP Bridge Decks and Sign Retroreflectometer Evaluations (Dave Meggers/Mike Crow) |
| SPR-2(208) | RE-0262-01 | Pavement Subgrade Performance Study(Andrew Gisi) |
| HPR-2(800) | RE-0757-01 | SHRP Implementation - Asphalt Test Equipment (Richard L. McReynolds) |

## REGIONAL POOLED FUND STUDIES

| FHWA NO. | KDOT NO. | TITLE | FY 2001 FUNDS PLEDGED |
|---|---|---|---|
| HPR-3(017) | RE-0020-01 | Crash Testing of Highway Safety Appurtenances and Obstacles (Ronald Seitz) | $ 55,000 |
| SPR-3(020) | RE-0215-01 | Enterprise (ITS) (Matt Volz) | $ 50,000 |
| SPR-3(044) | RE-0163-01 | North Central States Superpave Center Operation and Support (R. L. McReynolds) | $ 25,000 |
| SPR-3(047) | RE-0165-01 | Accelerated Testing Program (Andrew Gisi) Kansas is lead state on this study. Total study is estimated at $250,000.) | $ 60,000 |
| SPR-3(075) | RE-0214-01 | Midwest States Smart Work Zone Deployment Initiative (Mike Crow) | $ 62,500 |
| SPR-3(xxx) | RE-xxxx-01 | Midwest States Fiber Reinforced Polymers Fund Program (David Meggers) | $ 40,000 |
| SPR-3(xxx) | RE-xxxx-01 | Update "A Guide to Standardized Highway Lighting Pole Hardware Manual (David Church) | $ 15,000 |

The Following are Active or Recently Completed With No Funds Committed by KDOT for FY 2001

| | | |
|---|---|---|
| SPR-3(065) | RE-0188-01 | Design Model for Use of Geosynthetics to Reduce Granular Base Course Thickness (James Brennan) |
| SPR-3(071) | RE-0212-01 | A New Approach to Assessing Road User Charges (Robert Haley) |
| SPR-3(073) | RE-0211-01 | Micro-surface Mix Design Procedure (Kansas is lead state--$500,000 total cost) (R. L. McReynolds) |
| SPR-3(081) | RE-0250-01 | HERMES II (Dave Meggers) |
| SPR-3(083) | RE-0225-01 | Fabrication Error Indexed Examples and Solutions (FIXS)(Kansas is the lead state.) (Ken Hurst) |

## OTHER STUDIES

| | |
|---|---|
| RE-0257-01:<br>HPR-4(200) | |
| National Coordinated Highway Research Program (NCHRP) | $339,616 |
| RE-0255-01:<br>LTAP-HPR-NHI-010(001)SPR | |
| Local Transportation Assistance Program (LTAP) | $135,000 |
| RE-0223-01: | |
| Accelerated Testing for Concrete Reinforcing Bar Corrosion Protection Systems, Dr. David Darwin, KU, (Matching funds on National Science Foundation Project) Total KDOT cost $160,000 for three-year study to be paid over 4 fiscal years. Ken Hurst)(Year 3 of 4) | $40,000 |

**WORK PROGRAM FOR KANSAS PROJECT SPR-R010(24)**
**Part II Research and Development**
**July 1, 2000 to June 30, 2001**

**KSDOT 67-1**
**RE-0274-01**

**TITLE:** Research and Development Administration

**PROPOSER:** Kansas Department of Transportation
Topeka, Kansas

**MAJOR SUBDIVISION:** Bureau of Materials and Research

**PRINCIPAL:** Mr. Richard L. McReynolds, P. E.,
Engineer of Research
Materials and Research Center
2300 Van Buren Street
Topeka, Kansas 66611

**MONEY REQUESTED:**

| | |
|---|---|
| Salaries | $70,000 |
| Travel, Misc. | 8,215 |
| Total | $78,215 |

These funds are to be used for salaries and travel expense for time expended in general administrative control of SPR activities; in preparation of the annual work program and cost estimate, in preparation of research problem statements, proposals, and work plans for proposed studies; for attending administrative or technical meetings and schools or workshops associated with research, development, implementation, and technology transfer, and for salaries and reproduction costs for the preparation of progress reports or other special reports associated with the research, development, implementation and technology transfer administration. Funds are also for salaries and expenses associated with administering and auditing contract research or cooperative research conducted by persons other than personnel of the research unit. Funds will also be used for attendee travel and related costs associated with conducting an in-state peer exchange meeting every three years.

**WORK PROGRAM FOR KANSAS PROJECT SPR-R010(24)**
**Part II Research and Development**
**July 1, 2000 to June 30, 2001**

**KSDOT 64-10**
**RE-0260-01**

**TITLE:** Transportation Research Correlation Service

**PROPOSER:** Kansas Department of Transportation
Topeka, Kansas

**MAJOR SUBDIVISION:** Bureau of Materials and Research

**PRINCIPAL:** Mr. Richard L. McReynolds, P. E.,
Engineer of Research
Materials and Research Center
2300 Van Buren Street
Topeka, Kansas 66611

**MONEY REQUESTED:** $86,785

These funds are for the annual subscription payment to the Transportation Research Board's Research Correlation Service. The payment is reviewed every three years and adjustments made as required. The current rate begins in FY 2001 and will remain unchanged for three years.

**WORK PROGRAM FOR KANSAS PROJECT SPR-R010(24)**
**Part II Research and Development**
**July 1, 2000 to June 30, 2001**

**KSDOT 73-1**
**RE-0259-01**

**TITLE:** Implementation of Research and Development Findings (Approved May 1972)

**PROPOSER:** Kansas Department of Transportation
Topeka, Kansas

**MAJOR SUBDIVISION:** Bureau of Materials and Research

**PRINCIPAL:** Mr. Richard L. McReynolds, P.E.,
Engineer of Research
Materials and Research Center
2300 Van Buren Street
Topeka, Kansas 66611

**CO-PRINCIPAL:** David A. Meggers, P.E.,
Research Development Engineer
Materials and Research Center
2300 Van Buren Street
Topeka, Kansas 66611

**MONEY REQUESTED:**

| | |
|---|---|
| Salaries | $720,000 |
| Supplies, Travel, Reproduction, Misc. | 15,000 |
| Equipment | 5,000 |
| Total | $740,000 |

**Objective:** To use special efforts to bring the results of various research and development projects into operating practice.

**Accomplishments:** Since being originated, numerous innovative research ideas, product evaluations, implementation reports and related activities have been accomplished under this line item which gives the flexibility necessary for stimulating new ideas. The most productive research under this line item was the rebar insertion for concrete girder repair project that saved the KsDOT about $25,000,000. Numerous other innovative ideas have become successful research results because of the flexibility allowed to quickly pursue ideas while they are fresh. Implementation of SHRP test equipment was enhanced by purchases made under this line item.

**Staffing Plan:** Civil engineers, engineering technicians, publications writer, library assistant, secretaries, photographers, chemists, geologists, laborers, and other employees from the Bureau of Materials and Research and from recipient departments or districts will be utilized as needed and available.

**Plan for 2001:** This work will involve several levels of implementation, development, and technology transfer efforts such as: Preparation of implementation reports which translate research and development findings into usable format for engineering practice, helping prepare engineering specifications, reviewing research and development reports for implementable materials, publishing K-TRAN Program and other research reports, attending workshops, seminars, demonstrations, schools and technical meetings associated with highway research, development, and implementation, distribution of research and development reports from various sources, evaluating new or special products under the experimental construction feature studies, task order studies, or other related programs, aiding other groups such as FHWA implementation and demonstration teams, Research contractors, NCHRP, or NCTRP, etc., and any other mechanisms needed in the development, implementation and technology transfer process. A listing follows:

**KSDOT RESEARCH AND DEVELOPMENT**
**EXPERIMENTAL FEATURE, DEMONSTRATION, POOLED FUND,**
**TECHNOLOGY TRANSFER,**
**AND IMPLEMENTATION PROJECTS**

NOTE: NEPT = National Experimental Project Tabulation

**CRACK REDUCTION STUDIES:** Glenn Fager

**Crumb Rubber Modified (CRM) Asphalt Cement Concrete:**

Dry Process, GF-80 Ultra Fine:

K-16 Jackson Co. (Constructed 1992)

Reacted Crumb Rubber, Wet Process:

US-56 Johnson Co. (Constructed 1993)
I-135 McPherson Co. (Constructed 1994) NEPT KS 9401

**Aggregate Base (AB-1)/Geogrid:**

US-54 Kiowa Co. (Constructed 1993) NEPT KS 8903
(SHRP SPS-1 and SPS-9)

**PAVEMENT RECYCLING PROJECTS:** Glenn Fager

**Cold Recycling:**

US-83 Scott Co. (Constructed 1988)
K-96 Greeley Co. (Constructed 1990)
US-56 Haskell Co. (Constructed 1990)

**Hot Recycling:**

US-54 Butler Co. (Constructed 1988)
I-70 Thomas Co. (Constructed 1991) NEPT KS 9002

**Fly Ash in Cold Recycled Bituminous Pavements:** Glenn Fager

US-56 Haskell Co. (Constructed 1990)
I-70 Thomas Co. (Constructed 1991) NEPT KS 9002
K-27 Sherman and Wallace Cos. (Constructed 1992)
US-24 Riley Co. (Constructed 1994)
US-283 Ford Co. (Constructed 1997) NEPT KS 9701

**Emulsion and Lime Slurry in Cold Recycled Bituminous Pavements:** Glenn Fager

US-283 Ford Co. (Constructed 1997) NEPT KS 9701

**LABORATORY EVALUATION OF NEW BITUMINOUS PAVEMENT MIXES AND EQUIPMENT:** Glenn Fager

Evaluation of Superpave Equipment, Mixes and Procedures
Evaluation of Bituminous Mixes

**BRIDGE CAMBER STUDIES:** John Wojakowski

US-50 near Elmdale (Constructed 1975)
K-4 Valley Falls (Constructed 1976)
K-177 at Cottonwood Falls (Constructed 1976)

**BRIDGE DECK PROTECTIVE SYSTEMS:** John Wojakowski(Former NEEP 12)

**Cost Effective Bridge Deck Reconstruction:**

**Iowa System Deck Overlays (on old decks):**

Industrial Avenue over I-35 NEPT KS 7802A (Installed 1978)
E.B I-470 over Shunganunga Creek NEPT KS 7802B
(Installed 1979) (Replaced 1994)
W.B. I-470 over Shunganunga Creek NEPT KS 7802B
(Installed 1977) (Replaced 1990)
Milford Lake Road (FAS 270) over I-70 NEPT KS 7802C
(Installed 1979)

**Kansas System Deck Overlays (on old decks):**

FAS 511 over Marias des Cygnes R., S of Quenemo
(Installed 1987)

**Interlayer Membrane with Asphaltic Concrete Wearing Surface:**

S.B. I-235 over Zoo Blvd., Wichita, NEPT KS 8501
(Installed 1986)
S.B. I-235 over Floodway, Wichita, NEPT KS 8501
(Installed 1986)

**Silica Fume Concrete Deck Overlays (on new decks):**

W.B. I-470 over Fairlawn Ave. in Topeka (Constructed 1990)
NEPT KS 9003
E.B. I-470 over 29th Street in Topeka (Constructed 1990)
NEPT KS 9003

**Thin Membrane or Seals (on old decks):** David A. Meggers

K-16 (Randolph Bridge), Riley and Pottawatomie Cos.
Etanplast System (Constructed 1993 TS, 1995)

**Evaluation of Thin (1 1/4") Concrete Bridge Deck Overlays with Silica Fume, Steel Fibers, Polypropylene Fibers and LightWeight Aggregates:** David A. Meggers

I-70(024)WB over Snokomo Creek, Wabaunsee Co.
- 1 1/4" silica fume (Constructed 1993) NEPT KS 9201

**Evaluation of Type K Cement Bridge Deck Overlays:** David A. Meggers

**EXPERIMENTAL FEATURES FOR NEW BRIDGE DECKS:** John Wojakowski

**Dow Latex System Deck Overlays (on new decks):**
Second St. over Ark River, Wichita NEPT KS 7501
(Installed 1976)
Twin Bridges over Floodway, Wichita NEPT KS 7601A
(Installed 1976, 77)
Twin Bridges over Big Slough, Wichita NEPT KS 7601A
(Installed 1977)
Rock Road over Gypsum Creek, Wichita NEPT KS 7601B
(Installed 1977)

**Epoxy Coated Rebars:**

N.B. US-75 over Lower Silver Lake Road in Topeka
(Constructed 1978)
S.B. US-75 over Lower Silver Lake Road in Topeka
(Constructed 1978)

**Concrete Consolidation Studies:**

Automated Vibration Systems:

N.B. US-75 over 25th Street in Topeka (Constructed 1977)
S.B. US-75 over 25th Street in Topeka (Constructed 1977)
K-96 over Arkansas River in Hutchinson (Constructed 1977-78)
K-31 over Elm Creek, south of Harris (Constructed 1978)
E.B. US-36 over FAS-69 north of Robinson (Constructed 1978)
E.B. US-36 over outfall from Brown Co. Lake (Constructed 1978)
N.B. US-75 over Lower Silver Lake Rd. In Topeka (Constructed 1978)
S.B. US-75 over Lower Silver Lake Rd. In Topeka (Constructed 1978)
N.B. US-75 over US-24 in Topeka (Constructed 1978)
S.B. US-75 over US-24 in Topeka (Constructed 1978)
E.B. US-36 over Co. road, NW of Robinson (Constructed 1979)

Manual Vibration Systems:

US-75 over Wakarusa River, South of Topeka (Constructed 1973)
US-50 over Diamond Creek, South of Strong City (Constructed 1975)

**PORTLAND CEMENT CONCRETE PAVEMENT STUDIES:** John Wojakowski

**Thin Bonded PCCP Inlay:**

I-435 Midland Dr. N to Kansas River, NB, Johnson Co. (Constructed 1989)

**PCCP Overlay:**

US-24 Topeka - Unbonded (Constructed 1978)
US-56 Great Bend - Bonded (Constructed 1986)

**Crushed Limestone Coarse Aggregate in PCCP:**

US-169 Johnson and Miami Co. NEPT KS 8505 (Constructed 1986) John B. Wojakowski

I-35, US-50 Lyon Co. NEPT KS 9601 (Constructed 1993, 1994) Karen A. Clowers

**Prediction of Pavement Blowups:** David A. Meggers

**PROFILOGRAPH EVALUATION OF PAVEMENTS:** Wm. Parcells, Jr.

**Comparison of Ride Using 0.0" and 0.2" Blanking Bands on**

**PCCP and ACP.** (Interim Report June 2000)

**USE OF CHEMISTRY TO EVALUATE ASPHALT CEMENT AND OTHER HIGHWAY MATERIALS:** S. W. Bishara and Donna Mahoney

**Application of Microwave Energy for Aging of SHRP and Polymerized Asphalt Cements.** (Interim Report, FHWA-KS-99-5, August 1999)

**Study of Field Effects of Acid Modification of Binders on their Physical and Chemical Properties and Pavement Performance.**

**High Performance Size Exclusion Chromatography.**

**SPECIAL PRODUCT EVALUATION STUDIES:**

**Concrete Pavement Joint Sealants:** John Wojakowski

US-36 Doniphan Co. NEPT KS 8904 (Installed 1990)(Replaced with low modulus hot pour sealant, 1999)

| | |
|---|---|
| W. R. Meadows Sof-Seal (Cold applied) | W. R. Meadows Hi Spec |
| Dow 888 | Crafco 231 (Modified) |
| Dow 888 SL | Koch 9030 (Modified) |
| Dow 890 SL | W. R. Meadows Sof-Seal (hot applied) |
| Crafco Roadsaver Silicone | Sikaflex 15 LM |
| Mobay Baysilone 960 | Koch UV Cure E88 |
| D.S. Brown Neoprene Preformed | Koch UV Cure E77 |
| Crafco 221 | Koch UV Cure |
| Koch 9005 | Koch Polysulfide |

**Analysis of Aggregates for AC and PCC Pavement:** Barbara Smith

**Elastomeric Concrete Evaluation (Delcrete and Wabocrete):** John Wojakowski

I-135, SB Bridge over Arkansas River, Sedgwick County, NEPT KS 9102

**Repair of Corroded Corrugated Metal Pipe Culverts:** David A. Meggers

**Evaluation of Metal, PCC and Plastic Pipe Culverts:** David A. Meggers

**Monitor Progress on University (K-TRAN and other stated funded) Research Projects:** Barbara Smith, Karen Clowers, Glenn Fager, David A. Meggers, W. H. Parcells, Jr. and John Wojakowski

**Coordination of Strategic Highway Research Program (SHRP) Long Term Pavement Performance (LTPP) Activities:** Wm. Parcells, Jr.

**Evaluation of SHRP Equipment and Test Methods:** Barbara Smith, Karen Clowers, Glenn Fager, David A. Meggers, John Wojakowski, S. W. Bishara and Donna Mahoney

**Use of Asphalt Shingle Waste in Asphalt Cement Concrete Pavements:** Glenn Fager

**Chip Seal, Present ADT Limits and Cost Effectiveness:** Glenn Fager

**Textural and Mineralogical Characterization of Kansas Limestone Aggregates in Relation to Physical Test Results** Barbara Smith and Ralph Pollock (Interim Report No. FHWA-KS-00-1, March 2000)

**Evaluation of Consolidation Problems in Thicker PCCP Slabs--SPR 91-2** (Preparation and Printing of Final Report) John Wojakowski

**Taking the Bang Out of Transverse Cracks--SPR 91-3** (Preparation and Printing of Final Report) W. H. Parcells, Jr.

**Crack Sealing and Repair on Older Serviceable Bridges Using High Molecular Weight Methacrylate--SPR 91-4** David A. Meggers (Final Report No. FHWA-KS-98-4, January 1998, printed May 2000)

**Special Investigations and Studies of PCC and AC Pavements and Materials** (formerly state funded charged to RE-0251 and RE-0252) John Wojakowski, David A. Meggers, Glenn A. Fager and W. H. Parcells, Jr.

**Koch Sand Anti-Fracture Stress Absorbing Interlayer:** Glenn A. Fager

US-75, Osage Co. (Installed 2000)

**Low Temperature Cracking of PG Binder Study:** Glenn A. Fager(for WRI)

US-77, Marion Co. (Installed 2000)

**Evaluation of US-50 PCCP Emporia to Newton:** Karen Clowers, Barbara Smith and John Wojakowski

**Evaluation of Standard vs. Optimized PCCP Mixes for Cracking Potential (Topeka Area):** John Wojakowsi and Barbara Smith

**Evaluation of Air Distribution of PCCP Produced in High Speed (30 Second) Mixers:** Barbara Smith and John Wojakowski

**Energetically Modified Cement (EMC) Evaluation:** John Wojakowski

**Cathodic Protection of Bridges:** David A. Meggers

Active System: US-75 over 101st St., Shawnee Co.
Passive System: I-470 over I-70, Shawnee Co.

**PROJECTS BEING DONE BY OTHERS WITH RESEARCH ADVICE OR INPUT:**

**Fly Ash Treated Base Study:** Andrew Gisi

**Evaluation of Daylighted Bound Drainable Base:** W. H. Parcells, Jr., Andrew Gisi, James Brennan

US-50, Marion Co. NEPT KS 9702

**WORK PROGRAM FOR KANSAS PROJECT SPR-R010(24)**
**Part II Research and Development**
**July 1, 2000 to June 30, 2001**

**KSDOT 93-1**
**RE-0001-01**
**RE-0265-01**

**TITLE:** Technology Transfer and Training

**PROPOSER:** Kansas Department of Transportation
Topeka, Kansas

**MAJOR SUBDIVISION:** Bureau of Materials and Research

**PRINCIPAL:** Mr. William L. Jacobs, P.E.,
Technology Transfer Engineer
Kansas Department of Transportation
2300 Van Buren Street
Topeka, Kansas 66611

**MONEY REQUESTED:**

| | |
|---|---|
| Salaries | $ 220,000 |
| Travel Expense | 2,500 |
| Reproduction Postage and Misc. Expense | 2,500 |
| Training Course Fees (RE-0265) | 50,000 |
| Total | $ 275,000 |

**Objectives:** These funds are to be used for salaries and travel expense for time expended in administration of technology transfer activities including the library and training activities. Funds will be used to operate the KDOT Library; assist with coordination of research efforts; assess current research and review publications to identify areas of specific interest to KDOT; develop implementation plans to transfer technological advances into field operations; provide training courses that lead to the adoption of new techniques or products; assist with assessment of new products and their implementation if warranted by preparation of new specifications and procedures; serve as liaison to organizations such as the Midwest Transportation Consortium, University of Kansas Transportation Center, etc.; monitor the LTAP Program, schedule and administer training courses; participate in administration and review of National Pooled Fund Studies solicitations; and edit and publish Technology Transfer Digest on a quarterly basis.

**Accomplishments:** Technology transfer materials were distributed, the LTAP administered, the library operated, a number of seminars, training activities and conferences arranged and technical assistance provided for a variety of RD&T activities. KDOT hosted the AASHTO Region 3 Research Advisory Committee Annual Meeting during September 1999. Technical training on Superpave QC/QA and Profilograph Operation procedures was provided to KDOT and Contractor staff. Twelve major training courses were provided during the last 12 months. Training course expenditures and receipts were tracked using a separate project number (RE-0067). The Technology Transfer Digest was published four times during the fiscal year. A number of K-TRAN and in house final reports were edited and published. Leadership at the national level to develop an ACI aggregate certification-testing program was completed.

**Staffing Plan:** Civil engineers, publications writer, engineering technicians, library assistant, secretaries, and other employees from the Bureau of Materials and Research and from recipient bureaus and districts will be utilized as required.

**Plan for 2001:** Administration of KDOT technology transfer activities and operation of the KDOT library will be accomplished. Ten major training courses covering a variety of subjects will be provided to KDOT staff. Superpave and other testing certification training will be funded to the extent Research staff time is utilized. Other training courses will be arranged or presented on an as needed basis. Four issues of the Technology Transfer Digest will be published. A RD&T Annual Report and technical brochures will be published. Most of the remaining recommendations of the library role quality team will be completed when the new moveable shelving is installed.

**WORK PROGRAM FOR KANSAS PROJECT SPR-R010(24)**
**Part II Research and Development**
**July 1, 2000 to June 30, 2001**

**KSDOT 67-2**
**RE-0453-01**

**TITLE:** Research and Development Contingencies and Proposed Studies

**PROPOSER:** Kansas Department of Transportation
Topeka, Kansas

**MAJOR SUBDIVISION:** Division of Planning and Development

**PRINCIPAL:** Mr. James Tobaben, P.E., and Chief
Bureau of Transportation Planning
Kansas Department of Transportation
Docking State Office Building
Topeka, Kansas 66612

**CO-PRINCIPAL:** Mr. Richard L. McReynolds, P.E.,
Engineer of Research
Kansas Department of Transportation
Materials and Research Center
2300 Van Buren Street
Topeka, Kansas 666111

**MONEY REQUESTED:** $50,000

**Objectives:** These funds are to be used to provide for change of scope of projects in the program and for funding of new projects introduced during the fiscal year.

**DETAILED COST ESTIMATE AND OUTLINE**

**FOR**

**THE 2001 WORK PROGRAM**

# PART III

**PLANNING ACTIVITIES**
**NOT FUNDED WITH**
**SPR FUNDS**

**KANSAS STATE PLANNING and**
**RESEARCH, DEVELOPMENT & IMPLEMENTATION**
**WORK PROGRAM**

Fiscal Year 2001
July 1, 2000 through June 30, 2001

SUMMARY OF ESTIMATED COSTS
BY
SECTION AND SUBSECTION

**PART III**
**PLANNING ACTIVITIES**

| | | AMOUNT | AMOUNT |
|---|---|---|---|
| 1. | GENERAL NON-PARTICIPATING PLANNING ACTIVITIES - STATE FUNDED | 220,000 | |
| | A. Administration | 220,000 | |
| 2. | OTHER PLANNING ACTIVITIES FUNDED WITH STATE FUNDS | | 560,000 |
| | A. Official State Map | 240,000 | |
| | B. Accident Microfilming, Data Coding and Keying | 90,000 | |
| | C. Public Transportation | 230,000 | |
| | Total Part III | | 780,000 |

**1. GENERAL NON-PARTICIPATING PLANNING ACTIVITIES-STATE FUNDED** Total Estimated Cost $220,000

**A. Administration** (P-0245-01)

Objective

Selected highway planning activities and expenditures are not eligible for funding with SPR funds. In addition, there are a few activities which occur during the year which would be eligible for funding from one of these categories, but due to the limited scale of the effort for these activities, modification of the affected portion of the work program to obtain the funding is not warranted. These non-participating planning activities are grouped into an "Administration" category. The "Administration" category consists of the general administrative activities related to the general operation of the Bureau of Transportation Planning and not specifically related to the administration or accomplishment of the Annual SPR Work Program. Included are the expenditures for general communication services, microfilming, general office supplies and related items, acquisition and maintenance of office and shop tools and equipment, and organizational training and conferences. Miscellaneous service function activities involved in accomplishing non-SPR related activities for the KDOT Secretary of Transportation, the KDOT Division Directors and for other KDOT bureaus and offices are also included in the "Administration" category.

Accomplishments 2000

Non-participating planning activities, as described above, resulted in the estimated expenditures as shown below.

Proposed 2001

Non-participating planning activities, as described above, are expected to result in the following estimated costs.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $220,000 | $220,000 | $220,000 |

## 2. OTHER PLANNING ACTIVITIES FUNDED WITH STATE FUNDS

Total Estimated Cost $560,000

### A. Official State Map (P-0084-01)

Objective

The objective is to provide a reliable, accurate, legible and reasonably current general state transportation map.

Accomplishments 2000

Refer to Section 3, MAPPING, of Part I for a report of the drafting activities (SPR participating).

Proposed 2001

Refer to Section 3, MAPPING, of Part I for the proposed drafting activities (SPR participating).

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $10,000 | $10,000 | $240,000 |

## B. **Accident Data Microfilming, Coding and Keying** (P-0364-01)

Objective

The objective is to collect, code and process data for all reportable motor vehicle accidents in Kansas and to provide accident data analysis and report generation. The analysis of these data is essential for use in planning highway construction and for implementing accident reduction measures. The maintenance of such data is vital to the promotion of highway safety and for fulfilling data needs at the Federal level.

Accomplished 2000

Selection and training of microfilming, coding, and keying personnel continued at KDOC as turnover occurred. The target date for closing calendar year 1999 data was met. KDOT personnel continued to perform batch processing, editing, spot checking and coordination functions including preparation and updating of location coding materials and aids.

Investigation into changing storing data on microfilm to using scanned images was completed. All 2000 accident reports will be scanned. Electronic submission of motor vehicle accident reports continues to be investigated.

Proposed 2001

A new agreement will be negotiated between the Kansas Department of Corrections (KDOC) and the Kansas Department of Transportation for the aforementioned services. KDOT will continue aforementioned tasks.

Electronic submission of motor vehicle accident reports will continue to be investigated.

| 2000 Program | 2000 Estimated Expenditures | 2001 Program |
|---|---|---|
| $90,000 | $80,000 | $90,000 |

## C. Public Transportation

State Funds for Coordinated Transportation Services to elderly persons and persons with disabilities.

Objective

The objective of this program is to provide funds for coordinated transportation services to elderly persons and persons with disabilities through established transportation providers who already participate in the Federal 49 U.S.C. #5307, #5310 or #5311 program. All grants awarded are based upon an 80% state and 20% local matching formula.

Accomplishments 2000

Transit Authority Grant

A $495,600 grant was awarded to Topeka Metropolitan Transit Authority to assist with operating expenses.

A $680,000 grant was awarded to Johnson County Transit to assist in the purchase of eight (8) vehicles and match for two (2) other vehicles.

A $515,000 grant was awarded to the Wichita Transit Authority to assist in the purchase of nine (9) vehicles, passenger shelters, bus repairs, ITS and miscellaneous administrative expenses.

A $495,600 grant was awarded to assist the Unified Government of Wyandotte County/Kansas City, Kansas with the redesign of transit system, purchase of support vehicles and for Fleet Operations Maintenance Facility.

Vehicle Awards

A total of $555,300 was set aside for the purchase of nineteen (19)vehicles and communications equipment for one agency. Vehicles were distributed to eighteen (18) transportation provider agencies across the state.

The following were awarded vehicles:

1. Leavenworth County
2. Doniphan County Services and Workskills
3. Independent Living Center of NE Kansas
4. Twin Valley Developmental Services
5. Morris Co.Sr. Citizens (Communications Equip)
6. McPherson County COA
7. OCCK, Inc.
8. City of Wakeeney
9. COF Training Services
10. Anderson County COA
11. Senior Services of SE Kansas
12. Allen County
13. Cowley Co. Dev. Services
14. Northview Dev. Services (2 vehicles)
15. KETCH, Inc.
16. TECH, Inc.
17. City of Anthony
18. Minneola Dist. Hospital
19. Finney County Comm on Aging

Operating Expenses

A total of $1,000,000 was set aside to provide financial assistance for operating expenses to 49 U.S.C. #5311 grantees and to the active 49 U.S.C. #5310 providers who were not receiving 49 U.S.C. #5311 operating grants.

Twenty four (24) 49 U.S.C. #5310 providers received assistance.

Thirteen (13) Coordinated Transit Districts (CTDs) received 49 U.S.C. #5311 assistance.

Proposed 2001

Continue the state program as established.

The Office of Public Transportation administers two federal programs.

Objective

The 49 U.S.C. #5310 grant program provides capital assistance (vehicles) to private non-profit organizations specifically for the purpose of assisting them in providing transportation services for elderly persons and persons with disabilities. All grants awarded are based upon an 80% federal and 20% local matching formula.

Accomplishments 2000

Allocation of $792,000(federal funds) for the purchase of twenty-three (25) vehicles which will be delivered in early 2001.

Proposed 2001

Continue the federal 49 U.S.C. #5310 program.

The 49 U.S.C. #5311 grant program provides funding to rural and small urban areas (under 50,000 population) transportation providers for capital and operating assistance. Kansas has the largest number of Section 5311 providers in the nation.

Accomplishments 2000

Twenty-one (26) vehicles were purchased in 2000.

Provide approximately $1.9 million (federal funds) of operating assistance to 13 CTDs. (Thirteen (13) CTDs is the number of districts receiving funding. There are a number of individual transportation providers making up a CTD, each receiving assistance for operating expenses.)

Proposed 2001

Continue the federal 49 U.S.C. #5310 program. Federal funds will be used for operating and capital assistance.

| 2000 Program* | 2000 Estimated Expenditures* | 2001 Program* |
|---|---|---|
| $230,000 | $190,000 | $230,000 |

*Costs to administer the Public Transportation Programs.

**DETAILED COST ESTIMATE AND OUTLINE**

**FOR**

**THE FY 2001 WORK PROGRAM**

# PART IV

**RESEARCH ACTIVITIES**
**NOT FUNDED WITH**
**SPR FUNDS**

**KANSAS DEPARTMENT OF TRANSPORTATION**
**BUREAU OF MATERIALS AND RESEARCH**
**WORK PROGRAM**
**RESEARCH, DEVELOPMENT AND IMPLEMENTATION ACTIVITIES**

**DETAILED COST ESTIMATE AND OUTLINE**

**PART IV**

Fiscal Year 2001
July 1, 2000 through June 30, 2001

KDOT RESEARCH POLICY

MISSION OF THE RESEARCH UNIT

RESEARCH, DEVELOPMENT AND IMPLEMENTATION ACTIVITIES FUNDED WITH:

1. STATE FUNDS - UNIVERSITY RESEARCH

   a. K-TRAN Program

   b. Undesignated University Research Program

2. STATE FUNDS - INTERNAL RESEARCH PROGRAM

3. FHWA EXPERIMENTAL, DEMONSTRATION, IMPLEMENTATION AND TASK ORDERS FUNDS

KANSAS DEPARTMENT OF TRANSPORTATION

RESEARCH POLICY

The Department has a strong commitment to support research, development and technology transfer activities (RD&T) in the Bureau of Materials and Research. While the focal points of RD&T activities are in the Bureau of Materials and Research and the K-TRAN Research Program in conjunction with KU and KSU, the Department advocates an interest and involvement in these activities by all KDOT staff members. Activities such as submitting research ideas, implementing research results, providing or monitoring test sections, and administering a K-TRAN or other research projects are all important RD&T functions and examples of the involvement and commitment desired from staff.

Management support of RD&T activities will be provided through advocacy, funding and a willingness to promote implementation of research findings.

MISSION OF THE RESEARCH UNIT

The mission of the Research Unit is:

1. To support and encourage innovation throughout the Department by promoting research, development and implementation (RD&T) activities.

2. To evaluate problems as they arise during standard construction and maintenance field operations and provide timely responses.

3. To serve as an information resource for agency management.

While in-house RD&T activities of the Research Unit are primarily focused on highway construction and maintenance materials, products and procedures, the Unit supports all functional areas through general administration of the K-TRAN Research Program and providing technical information to management.

A goal of the Unit is to be service oriented and provide timely responses to the wide array of questions and requests received.

**KANSAS DEPARTMENT OF TRANSPORTATION**

**BUREAU OF MATERIALS AND RESEARCH**

**WORK PROGRAM**

**RESEARCH, DEVELOPMENT AND IMPLEMENTATION ACTIVITIES**

**SUMMARY OF ESTIMATED COSTS**

Fiscal Year 2001
July 1, 2000 through June 30, 2001

Summary of Estimated Costs

| | | |
|---|---|---|
| 1. | State Funds - University Research Program | |
| | a. K-TRAN Program | $740,000 |
| | b. Undesignated University Research Program | $40,000 |
| 2. | State Funds - Internal Research Program | $175,000 |
| 3. | FHWA Experimental, Demonstration Implementation and Task Order Funds | $452,000 |
| | Total Part IV | $1,407,000 |

**1a. GENERAL NONPARTICIPATING RESEARCH, DEVELOPMENT AND IMPLEMENTATION ACTIVITIES-STATE FUNDED UNIVERSITY RESEARCH K-TRAN PROGRAM**

Total Estimated Cost $740,000

**Objective:**

The Kansas Transportation Research and New-Developments (K-TRAN) Research Program is an on-going, cooperative and comprehensive research program addressing transportation needs of the State of Kansas utilizing academic and research resources from the Kansas Department of Transportation, Kansas State University and the University of Kansas, The projects included in the research program are jointly developed by transportation professionals in KDOT and the universities.

The K-TRAN Program was initiated on August 21, 1990 and is currently governed by an agreement signed January 25, 2000. The minimum funding level (all research expenditures) is $700,000 annually ($350,000 per university). Available funds, research needs and the availability of researchers will govern the number of projects that can be included in the research program.

The K-TRAN Research Program is governed by the theme of the organization -- addressing transportation needs of the State of Kansas for the 21st Century so that its people will enjoy better transportation provided in a more efficient and effective manner.

To develop a program to achieve K-TRAN objectives, eight major categories have been established for the review and development of research ideas:

- planning (including administration)
- pavements & materials (construction & maintenance)
- traffic operations and geometric design
- structural
- computing
- drainage
- rail, aviation and public transit
- local governments

The K-TRAN effort is timely and a critical need for Kansas in view of the opportunity it represents to maintain and rebuild the aging and transitional Kansas transportation system, the opportunity at a time of the post-Interstate environment, and the opportunities created by National and Kansas transportation legislation passed during the last 10 years. Major benefits of the program include development of a flow of high quality transportation research targeted to Kansas transportation needs; financial support to engineering students contributing to the pool of transportation professionals in Kansas; continuing education opportunities for KDOT personnel; enhanced quality of faculty, staff and graduates in the transportation area; attracted federal research resources for use in Kansas; and a much expanded but efficiently organized transportation research resource in Kansas. A benefit cost ratio of 15.5 :1 has been reported for the overall program.

The Program Council approved a FY 2001 K-TRAN Program consisting of 17 projects. Most of the Agreements will be under contract by August 2000. The FY 2001 K-TRAN Program listing is included for reference.

Future Research Programs will be developed using the following schedule:

**K-TRAN SCHEDULE**

| | |
|---|---|
| Solicit Research Ideas from KDOT staff | June 15 |
| Deadline for Ideas | August 15 |
| Program Council Review | September 1 |
| Request for K-TRAN Research Project Statements | November 1 |
| Deadline for Research Project Statements | December 1 |
| Categorize and Assign RPS to Area Panels | December 15 |
| Area Panel Evaluations Completed | February 1 |
| Technical Committee Formulates Recommended Research Program | February 15 |
| Program Council Approves K-TRAN Program and Budget | March 1 |
| Detailed Proposals and Agreements Prepared and Signed for Projects Beginning Prior to July 1 | May 1 |

**FY 2001 K-TRAN Program**
**July 1, 2000**

| K-TRAN PROJECT NO. | KDOT PROJECT NO. | PI | APL | PM | KDOT TOTAL EST COST | PROJECT ACCUM COST | PRE-PROPOSAL |
|---|---|---|---|---|---|---|---|
| Admin | RE-0231-01 | Russell | | McReynolds | $17,500 | $17,500 | |
| KSU-01-1 | RE-0232-01 | Hossain | LSI | Montney | $36,000 | $53,500 | 19 |
| KSU-01-2 | RE-0233-01 | Peterman | KFH | Burnett | $60,000 | $113,500 | 2 |
| KSU-01-3 | RE-0234-01 | Russell/Landman | JET | Opara | $42,500 | $156,000 | 4 |
| KSU-01-4 | RE-0235-01 | Stokes/Russell/Rys | MLC | Gower | $15,000 | $171,000 | 11 |
| KSU-01-5 | RE-0236-01 | Babcock | JJR | Maddox | $42,000 | $213,000 | 14 |
| KSU-01-6 | RE-0237-01 | Russell | LWE | Breakstone | $40,000 | $253,000 | 6 |
| KSU-01-7 | RE-0238-01 | Hossain/Devore | LSI | Parcells | $68,000 | $321,000 | 23 |
| KSU-01-8 | RE-0239-01 | Babcock | JET | Clements | $43,000 | $364,000 | 15 |
| SUBTOTALS | | | | | $364,000 | | |
| Admin | RE-0240-01 | Mulinazzi | | McReynolds | $17,500 | $17,500 | |
| KU-01-1 | RE-0241-01 | Kurt | JET | D. Schwartz | $37,700 | $55,200 | 8 |
| KU-01-2 | RE-0242-01 | Roddis | KFH | J. Jones | $45,000 | $100,200 | 18 |
| KU-01-3 | RE-0243-01 | Cross | LSI | Fager | $16,000 | $116,200 | 32 |
| KU-01-4 | RE-0244-01 | Meyer/Mulinazzi | MLC | McKenna | $40,000 | $156,200 | 24 |
| KU-01-5 | RE-0245-01 | Meyer | LSI | J. Vogel | $30,000 | $186,200 | 23 |
| KU-01-6 | RE-0246-01 | Weaver | JJR | Van Sickle | $25,000 | $211,200 | 31 |
| KU-01-7 | RE-0247-01 | Roddis | KFH | Filippi | $30,000 | $241,200 | 17 |
| KU-01-8 | RE-0248-01 | Parsons/Cross | LSI | Hunt | $78,000 | $319,200 | 26 |
| KU-01-9 | RE-0249-01 | Darwin | KFH | Scherschligt | $57,000 | $376,200 | 9 |
| SUBTOTALS | | | | | $376,200 | | |
| GRAND TOTAL | | | | | $740,200 | | |

## K-TRAN PROJECT TITLES

### KANSAS STATE UNIVERSITY

| | |
|---|---|
| KSU-01-1 | Investigation and Quantification of Factors Affecting Aggregate Specific Gravities as Determined by KDOT Test Method KT-6 |
| KSU-01-2 | Evaluating FRP Repair Method for Cracked Prestressed Concrete Bridge Members Subjected to Repeated Loadings (Phase 1) |
| KSU-01-3 | Development of Multiple Growth Strategies for use in Developing Traffic Forecasts |
| KSU-01-4 | Effectiveness of Automated Traffic Signal Violation Enforcement Systems |
| KSU-01-5 | Impact of Kansas Grain Transportation on Kansas Highway Damage Costs |
| KSU-01-6 | Update the Kansas Low-Volume Roads Handbook and the Handbook of Traffic Engineering Practices for Small Cities |
| KSU-01-7 | Investigation of Effect of Curling on As-Constructed Smoothness and Ride Quality of KDOT PCC Pavements |
| KSU-01-8 | Land Value Appraisal Methods for Highway Right-Of-Way Acquisition |

### UNIVERSITY OF KANSAS

| | |
|---|---|
| KU-01-1 | GIS-Based Dynamic Traffic Simulation System-Phase 2 |
| KU-01-2 | Steel Girder Lateral Stability |
| KU-01-3 | Evaluation of Test Methods for Stiffness Properties of HMA |
| KU-01-4 | Comprehensive Assessment of Needs and Practices Related to Traffic Control for Older Drivers |
| KU-01-5 | Development Plan for Automatic Vehicle Location (AVL) in Maintenance Vehicles |
| KU-01-6 | A Feasibility Study of Web-Based Transit Support and Technical Assistance Enhancement Program |
| KU-01-7 | Simple Cost Effective Bridge Plans |
| KU-01-8 | Evaluation of Performance-Based Admixture Criteria for Soil Modification and Stabilization |
| KU-01-9 | Performance of Silica Fume Overlays on Bridge Decks |

**1b. GENERAL NONPARTICIPATING RESEARCH, DEVELOPMENT AND IMPLEMENTATION ACTIVITIES-STATE FUNDED UNIVERSITY RESEARCH-UNDESIGNATED UNIVERSITY RESEARCH PROGRAM**

Total Estimated Cost $40,000

**Objective:**

Funds were included in the requested FY 2001 budget for undesignated university research. These funds will be used to fund emergency projects or to perform ad hoc research determined to be needed by the Department. An amount of $40,200 has been committed for the FY 2001 K-TRAN program overrun leaving about $40,000 available. The FY 2000 funds were used for the following projects:

RE-0132-01: Testing K-126 FRP Panels (KSU-98-8), Dr. Hugh Walker, KSU, $7,994 (increase for deck stiffness study by Dr. Baker, UMC)

RE-0187-01: Factors Influencing the Density, VMA, and Air Voids of Kansas Superpave Mixtures, Dr. Mustaque Hossain, KSU, $3,464 (extension and increase)

RE-0227-01: Evaluate Silica Fume Concrete Permeability, Phase II Dr. Mohammed Abou-Zeid and Dr. Steven L. McCabe, KU, $5,000

RE-0230-01: Determination of N Design for CIR Mixture Design, Dr. Steve Cross, KU $3,500 (matching funds for RMRC grant)

RE-0261-01: Development of a Prototype Model for Estimating the Benefits of K-TRAN Research Projects, Dr. Stokes, Babcock, Rys and Russell, KSU, $35,489

## 2. GENERAL NONPARTICIPATING RESEARCH, DEVELOPMENT AND IMPLEMENTATION ACTIVITIES-STATE FUNDED INTERNAL KDOT RESEARCH

Estimated Cost $175,000

**Objective:**

Certain highway research, development and implementation activities and expenditures are not eligible for SPR participation or do not warrant modification of the program to include them.

The General Research Administration and Support Category (RE-0641) includes administrative, budgetary, clerical, drafting, training, and other support activities related to the general operation of the bureau or unit and not specifically related to the administration or accomplishments of the annual SPR Work Program. Included are research laboratory operation expenses such as inventory, telephone, freight, equipment repair, new equipment, chemicals, laboratory glassware, supplies, repair or replacement parts, computer charges, field expenses, contractual services, etc. that spread over all research projects and are not fully chargeable to any particular one.

**3. NON SPR RESEARCH, DEVELOPMENT AND IMPLEMENTATION EVALUATIONS - FEDERALLY FUNDED**

**A. FHWA Special Experimental, Demonstration and Implementation Project Funds**

| | FHWA Funds Max. Amount | Total Exp. on 4/7/00 | 2000 Prog. Amount | 2000 Est. Exp. | 2001 Prog. Amount |
|---|---|---|---|---|---|
| RE-0221-01: Concrete Pavement Smoothness Video and Workshop | $26,000 | $3,292 | $26,000 | $10,000 | $10,000 |
| RE-0220-01: Test, Evaluate Lightweight Profiling Equipment | $6,000 | $3,500 | $6,000 | $3,500 | $0 |
| RE-0213-01: Design, Test FRP Bridge Rail | $405,000 | $77,121 | $300,000 | $100,000 | $300,000 |
| RE-0187-01: Test Impl. Of Distress Ident. Protocols | $40,000 | $0 | $32,000 | $0 | $40,000 |
| RE-0132-01: Redesign and Testing of FRP Bridge Deck Panels | $247,000 | $159,029 | $134,000 | $70,000 | $88,000 |
| RE-0121-01: High Performance Rigid Pavements | $346,000 ($100K Eval.) | $24,247 | $10,000 | $1,000 | $5,000 |
| RE-0073-01: Thin Bonded Overlay and Laminates Study (Br) | $80,000 | $49,845 | $10,000 | $0 | $5,000 |
| RE-0049-01: Thin Bonded Overlay and Laminates Study (Pvt) | $40,000 | $29,117 | $4,000 | $1,000 | $4,000 |
| TOTAL: | $1,190,000 | $346,141 | $522,000 | $185,500 | $452,000 |

**TITLE:** Concrete Pavement Smoothness Video and Workshop (RE-0221-01)

**Objective; Previous and Planned Activities:**

This study will plan, develop and create two videos that demonstrate the best practices for constructing smooth PCCP and host a national workshop. Work order No. DTFH71-99-TE027-KS-10 was assigned and provides a maximum of $26,000. William Jacobs and William Parcells, Jr. are the KDOT contacts. The scheduled completion date is July 31, 2001. Scripting, collection of raw video collection and assemblage into final form (except for Madden introduction) has been completed. A workshop was held during March 2000 in conjunction with the annual MO/KS Concrete Paving Conference in Kansas City, MO. Final editing to include introduction will be completed and original copy submitted to FHWA for distribution early in the fiscal year.

**TITLE:** Field Test and Evaluate Lightweight Profiling Equipment (RE-0220-01)

**Objective; Previous and Planned Activities:**

This study will field test and evaluate four non-contact profilometers to determine if they operate correctly and correlate with the California type profilograph. Work order No. DTFH71-99-TE027-KS-29 was assigned and provides a maximum of $6,000. William Parcells, Jr. is the principal investigator. The scheduled completion date is September 31, 2001. Three non-contact profilometers have been evaluated on our test track. The final report will be completed this year.

**TITLE:** Design and Test Fiber Reinforced Plastic Bridge Rail (RE-0213-01)

**Objective; Previous and Planned Activities:**

This study will design and crash test a FRP bridge rail connection for expected use on FRP bridge decks. Federal Project No. SPR-R021(301) was assigned and provides a maximum of $405,000 from the Innovative Bridge Research Program. A portion ($98,000) of the funds was transferred to the Midwest States Crash Testing Program being conducted at UNL. Kansas Structural Composites, Inc has constructed the FRP test sections. KSU and B&G Consultants are also involved in the study. Dave Meggers is the principal investigator. Designs of the rail connections have been completed and test samples constructed. Static and crash tests will be performed during the fiscal year.

**TITLE:** Test Implementation of Distress Identification Protocols (RE-0187-01)

**Objective; Previous and Planned Activities:**

This study will evaluate the performance of automated pavement distress equipment to collect pavement condition data according to the AASHTO provisional standards. Work order No. DTFH71-98-TE021-KS-28 was assigned and provides a maximum of $40,000. G. N. Clark and Andrew Gisi are the state contacts. The project will be reevaluated to determine how to proceed during the fiscal year.

**TITLE:** Redesign and Testing of Composite Bridge Deck Panels (RE-0132-01)

**Objective; Previous and Planned Activities:** This study will further evaluate the findings of the Russell Co. FRP bridge and apply them to a deck replacement design for two K-126 bridges in Cherokee County. Dr. Walker and associates at KSU will also perform additional testing of the new designs and perform evaluations after construction is completed. Funding for work order DTFH-71-97-PTP-KS-26 totals $247,000. It was signed August 18, 1997 and ends December 31, 1999. Funds ($107,300) are also included for construction delta costs. KDOT, KSU, MATC and industry are also providing additional funding for this project. Dave Meggers is the KDOT contact. The design and construction of the bridge panels has been completed but construction was delayed due to the need to obtain right of way and move utilities. The project was completed during October 1999. Data collection and analysis is underway.

**TITLE:** High Performance Rigid Pavements (RE-0121-01)

**Objective; Planned and Previous Activities:**

This study will construct 10 test sections and compare results against a standard PCCP control section. The test sections include:

1. Single saw cut
2. FiberCon dowels
3. Stainless steel dowels
4. Oval/Oblong fiberglass dowels
5. Special pavement markings/longitudinal tining
6. Lower water cement ratio by 0.05 from standard mix
7. ASTM C1315 curing/random tining
8. Two-lift with 30% replacement of coarse aggregate with recycled asphalt in bottom lift
9. Two-lift with 30% replacement of coarse aggregate with high absorption durable aggregate in bottom lift
10. Two-lift with 30% replacement of coarse aggregate with high absorption durable aggregate in bottom lift and rhyolite aggregate in the top lift

Funds from FHWA Technical and Evaluation Project No. 30: High Performance Rigid Pavement are being provided in the amount of $100,000 for evaluation. A request has been made for $300,444 for delta construction costs and $6,000 to host a national showcase meeting. The work order for phase I evaluation is DTFH 71-96-TE30-KS-22 which was signed August 29, 1996.

Annual progress reports will be prepared and a final report submitted after 5 years of service. John Wojakowski, KDOT, is the principal investigator. Construction was completed during Fall 1997 and an Open House was held on September 23, 1997. A construction report (FHWA-KS-98/2, April 1998) was completed and distributed. Performance data was collected and an annual report prepared and distributed. An annual progress report will be completed during the fiscal year.

**TITLE:** Thin Bonded Overlay and Laminates Study (RE-0073-01)

**Objective; Previous and Planned Activities:**

This project is being evaluated to determine the performance of 4 bridge deck overlays located as follows:

K-254 over Oliver Street, Sedgwick Co., Silica Fume Concrete with Polypropylene Fibers.

K-96 over Cedar Hollow Creek, Greenwood Co., Silica Fume Concrete with Steel Fibers.

K-96 over Fall River, Greenwood Co., Type IP Cement with Silica Fume Concrete.

K-96 over Shawnee Creek, Greenwood Co., Type IP Cement Concrete.

Each bridge deck will be evaluated to determine constructability and performance relative to chloride penetration and cracking over a minimum of 5 years. The work order for this evaluation is DTFH71-95-TBO-KS-20 that was signed on May 11, 1995 and modified on June 30, 1997 and July 3, 1997. It now provides a maximum of $80,000 for evaluation. The project has been extended until July 2001. Dave Meggers is the principal investigator. The bridges were constructed during May and June 1997. Evaluations of the permeability of cores, cylinders, etc. are being conducted at various time intervals. An annual report was prepared. A construction report documenting preconstruction, construction and initial performance data will be completed.

**TITLE:** Thin Bonded Overlay and Laminates Study (RE-0049-01)

**Objective; Previous and Planned Activities:**

This project is being evaluated to determine the performance of a 2-inch Portland cement concrete (PCC) overlay placed over an existing asphalt concrete pavement (ACP) 119th Street from Roe Avenue to Mission Road in Lenexa, Kansas. The existing ACP was cold milled prior to placement of the PCC Overlay. Six test sections to evaluate panel size, use of fibrillated fibers and joint sealant importance were constructed during April-May 1995. The work order for evaluation is DTFH71-94-TBO-KS-16 and was signed on April 25, 1994. It provides a maximum of $40,000 for evaluation. Field observations and measurements were made before and during construction. A construction report was written to document these activities. The project will be evaluated during the fiscal year. An annual report documenting performance data will be completed.