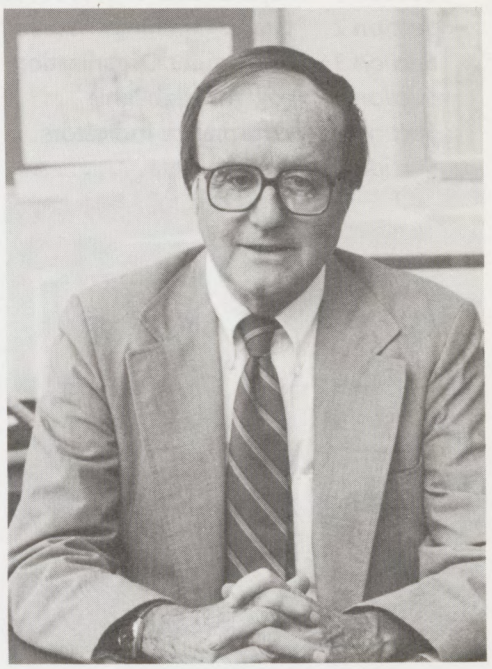
Colorado Department of Highways

Annual Report

1985-1986

A MESSAGE FROM THE EXECUTIVE DIRECTOR

The 1986 Fiscal Year was a "complete" success for the Colorado Department of Highways, for a number of reasons:



- On December 3, 1985, for the first time in ten years, a new segment of Interstate highway was completed in metropolitan Denver. The completed section, 1.2 miles of I-76, is part of a 5.6-mile route that by 1992 will connect I- 70 with I-25 in north Denver.

- Four days later, on December 7, 1985, nearly half of the C-470 Parkway was completed and opened to traffic. All 26 miles of the southwest Denver beltway should be completed by 1988.

- The Department also completed its *Forecast of the Year 2001 Highway System.* This study projected a $5.3 billion shortage in state highway funding over the next 15 years, and recommended the adoption of eight specific funding measures to overcome the massive shortfalls we anticipate.

- A complete turnabout on the condition rating of the state highway system occurred after more than a decade of steady decline. For the first time since the mid-1970s, the percent of state highways rated "good" increased while the percent of roadways rated "poor" dropped by 10%.

- Finally, the fiscal year was made complete in May 1985 when the Colorado General Assembly faced up to the difficult task of increasing the state's motor fuel tax in an election year. The new tax increase, to take effect July 1, 1986, will generate just over $100 million in revenue for the Highway Users Tax Fund, and will be shared by state, county and municipal road systems.

In short, 1986 has been a momentous year for us. We are proud of our accomplishments, and are pleased to report on our success in meeting the challenges facing the Colorado Department of Highways.

Joseph Dolan

Contents

Colorado Department of Highways
Division of Transportation Planning
Program Support Branch

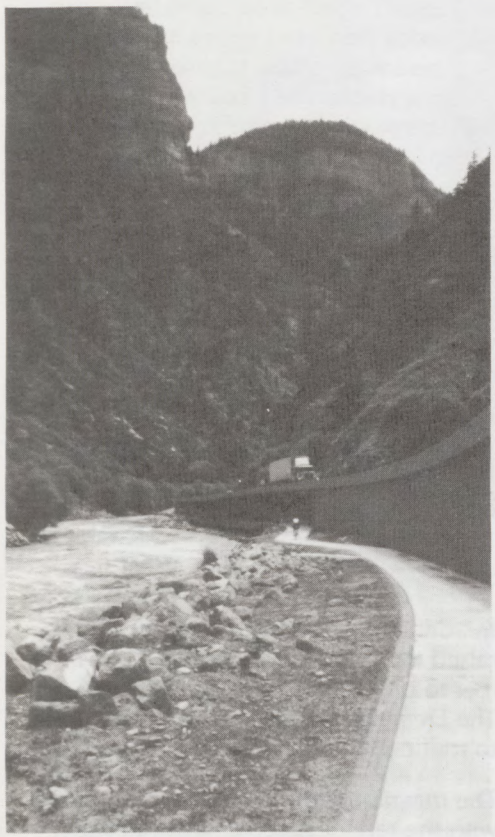
Major Events

Progress on Interstate completion, new projects, crucial legislation, and expeditious response to dangerous situations all contributed to an active year for the Department. This section highlights the Department's major events of the 1986 fiscal year.

GLENWOOD CANYON CONSTRUCTION

Glenwood Canyon is a 12.5-mile scenic gorge of the Colorado River located about 144 miles west of Denver. I-70 stops at each end of the canyon, creating an unsafe, two-lane "gap" in the Interstate system. The Glenwood Canyon I-70 project will close this "gap" with a safe four-lane highway.

The construction of I-70 through Glenwood Canyon began in 1981. Actual construction was preceded by nearly 20 years of study to evaluate route options, highway designs, and environmental impacts.



Completion of I-70 through Glenwood Canyon is projected for 1994 (based on the continuation of federal funding for Interstate Completion). The project will be substantially completed in 1991, but a difficult 2.5-mile segment in the center of the canyon will not open until 1994.

Currently, in terms of project length, Glenwood Canyon I-70 is over 50% complete or under construction. The total project cost, in 1984 dollars, is about $320 million.

Glenwood Canyon I-70 has many unique engineering features. Great care is being taken both to protect the environment during construction and to blend the completed highway with the natural environment. For example, rock cuts are stained with a special material to blend the color of the newly exposed rock with the ancient, weathered rock.

Also unique to the project are the Hanging Lake tunnels. These 4,000-foot tunnels, besides allowing a safe alignment through one of the tightest curves in the canyon, will create an "auto-free" zone at the Hanging Lake trailhead, a popular hiking trail in Colorado. Final design of these tunnels will begin in early 1987.

In late 1986, the first of the four-lane section, complete with bikepath, will be open to the traveling public. This two-mile section, from No Name to Grizzly Creek, will offer a safe highway that preserves the scenic beauty of the Colorado River and Glenwood Canyon, and provides pedestrians and bicyclists with a unique canyon experience.

LARIMER/LAWRENCE STREET VIADUCT

Despite a tragic construction accident October 3, 1985, work continued on the three-phase replacement of the Larimer and Lawrence Street viaducts in Denver.

Phase one, the reconstruction of the Colfax Avenue Viaduct, was completed August 7, 1984. Phase two, the construction of three outbound (westbound) lanes of the new Walnut Street Viaduct, should be open to traffic by April, 1987. These new lanes will connect with the Colfax Avenue structure and Denver's Valley Highway (I-25).

Phase three, now underway, will provide three inbound (eastbound) lanes and should be open to traffic in mid-1987. In addition, a new Auraria Parkway will connect viaduct lanes to Lawrence and Larimer streets in downtown Denver.

MUDDY CREEK SLIDE - McCLURE PASS

State Highway 133 south of McClure Pass near Paonia was closed May 6 by a massive mudslide one-half mile wide and approximately two miles long. The slide was activated by high water saturation from heavy rains and snowfall.

In its initial stages, the slide moved approximately one foot per hour, dumping 300-400 million cubic yards of material into Muddy Creek, which runs along S.H. 133. Department of Highways maintenance crews worked 24 hours a day with seven backhoes to prevent the mudslide from damming Muddy Creek. If the creek had dammed and then burst, serious problems would have resulted downstream at Paonia Reservoir.

In addition, maintenance crews raised the road approximately 40 feet to provide a buffer against flooding. The Department opened a gravel road to traffic on June 20.

The magnitude of this slide, coupled with the rate of speed at which it was flowing, created an unrelenting challenge to maintenance crews. Fortunately, their laborious efforts paid off; they were able to maintain the creek flow and preserve the roadbed.

U.S. 24 BYPASS

The Department has budgeted $43.4 million to open a new segment of roadway connecting I-25 with Circle Drive in Colorado Springs.

The bypass, which is designed to carry 2,700 vehicles per hour, begins with a new interchange on I-25 south of Fountain Boulevard just beyond a proposed overpass at Circle Drive. This provides an expressway with access permitted only at grade-separated interchanges and a few widely spaced intersections at selected city streets. This will help reduce congestion on U.S. 24, improve access to Colorado Springs Municipal Airport, and better serve long-distance travel through Colorado Springs.

TRINIDAD BYPASS

Construction is expected to begin in May 1987 of a one-mile stretch of roadway north of Trinidad from I-25 to U.S. 160. The Trinidad Bypass will alleviate the problem of hazardous material being transported through town by providing direct access to U.S. 160. In addition, the bypass will allow traffic, especially emergency vehicles, to travel across town without delay at railroad crossings.

The project will begin with the construction of a bridge over the Purgatory River. Total cost of the Trinidad Bypass is estimated at $13.64 million, and completion is anticipated within the next five years.

MOUNTAIN VISTA DRIVE INTERCHANGE

After investigating several sites in Colorado, Anheuser-Busch selected Fort Collins as the location for a new brewery. To accommodate the additional traffic to be generated by the new brewery, public officials and Anheuser-Busch representatives felt it was necessary to construct an interchange to provide direct access to I-25 from County Road 50 (Mountain Vista Drive).

This project also called for the relocation of an existing frontage road and the construction of a new frontage road intersecting at County Road 50 west of the interchange.

The construction of the interchange and the accompanying frontage roads began in September 1984 and was completed in September 1985. The total cost of the interchange and frontage roads was approximately 4.5 million. The Department paid one-third of the cost with federal Interstate 4R funds, and the local governments and Anheuser-Busch provided the balance.

EAST RIVERSIDE SLIDE SNOWSHED

The East Riverside Slide Snowshed south of Ouray on U.S. 550 was completed in November 1985 with a dedication attended by local and state officials and the families of victims of the notorious East Riverside snow slide. The completion of the snowshed represented the first step in a long effort by Western Slope residents to tame avalanches, which have claimed five lives in this area since 1963.

The 180-foot long snowshed was completed at a cost of $2.5 million and is designed to be a segment of an eventual 1,300-foot snowshed that will protect U.S. 550 from both the East Riverside Slide and the West Riverside Slide.

"MIRACLE MILE" ON U.S. 36 UPDATE

Traveling along U.S. 36 between Denver and Boulder, it is difficult to imagine the catastrophic events of August 2, 1985. On that Friday evening, two Burlington Northern freight trains collided head-on, killing five railroad employees and igniting a fireball that literally melted two highway bridges that crossed over the railroad tracks. Auto traffic was quickly rerouted onto nearby highways while the Department began the massive task of reconstructing the roadway and bridges. To address the immediate problem, Department crews and private contractors worked 57 straight hours to construct a one-mile, four-lane detour that was ready for rush hour traffic on Monday morning, August 5. The main line of U.S. 36 was reopened to traffic on December 2, 1985, when a new $2 million concrete bridge was dedicated. The "miracle mile" detour was removed in the Spring of 1986, and the land was restored to its prior state. The speed and efficiency with which this project was completed brought accolades from both the public and private sectors.

WIDENING OF S.H. 83

In August 1986, the Department began construction of the first segment of a major improvement proposed for S.H. 83 (Parker Road) in the southeast Denver metropolitan area. Environmental studies completed in 1980 cleared the way for a project to widen Parker Road from two to four lanes between S.H. 88 (Arapahoe Road) and Hilltop Road in Parker and for a two-lane improvement from Hilltop Road south to S.H. 86 at Franktown.

The proposed improvement to S.H. 83 has had broad support from both Douglas and Arapahoe counties since the early 1970s. The extensive growth in Douglas County in the past few years has intensified the need for this work. As a result of increased funds made available by the Surface Transportation Assistance Act (STAA) of 1982, the Highway Commission was able to authorize funding for construction of the first segment that begins at S.H. 88 and extends south approximately 1.4 miles to Longs Avenue. It is expected to be completed by the Spring of 1987.

Right-of-way and construction costs for this first 1.4-mile segment of the project are estimated at $3.7 million. The estimated cost of the overall project is $19 million.

55TH COLORADO GENERAL ASSEMBLY

Highway issues were of major concern during the second regular session of the General Assembly, and the deliberations resulted in a substantial increase in the state's motor fuel and other highway-related taxes.

SENATE BILL 36—FUEL TAX INCREASE

S.B. 36 was developed by a 1985 interim legislative study committee that reviewed the condition of state and local highways. To assist the study committee, the Department accelerated development of the Year 2001 Highway Forecast, which identified needed highway improvements and related costs in Colorado during the next 15 years.

The new law increased Colorado's gasoline tax to 18 cents a gallon and the diesel tax to 20.5 cents a gallon on July 1, 1986, and initiated a minimum gross ton-mile (GTM) tax of $150 per account. These revenue measures are expected to raise an additional $103.3 million in Fiscal Year 1987 to be shared by the Department and local governments. One major issue raised during legislative discussions was the appropriate share of taxes that should be paid by the trucking industry. To resolve this issue, the General Assembly appropriated $250,000 to the Legislative Council to conduct a cost allocation study and placed a three-year limit on the new taxes in order to force consideration of the results of that study.

The bill also strengthened legislative oversight of the Department and mandated that the Department fund a management and efficiency study out of cost savings. Until completion of that study in two years, Department staffing levels are frozen at present authorized levels. The Department supported these provisions.

OTHER REVENUE MEASURES

Several other bills also affected highway revenue. The General Assembly instituted a "laden weight" registration fee for trucks that have not paid appropriate registration fees. In addition, members voted to increase traffic fines and penalties substantially, reduce the amount of funds dedicated from the sales and use tax to the Highway Users Tax Fund (HUTF) for Fiscal Year 1987, increase funding for the Port-of-Entry Division to produce greater GTM compliance and discontinue the state's five-cent gasohol tax exemption which expires July 1, 1986. The Legislature considered legislation to allow the Department to issue bonds for highway projects and to increase other revenue sources, but these failed to pass. A bill to allow the Denver metropolitan area to impose a local motor fuel tax was vetoed.

HAZARDOUS MATERIALS

The General Assembly held extensive hearings on the transportation of hazardous materials, but the bill that was passed was vetoed by Governor Lamm because it did not provide as much protection as he desired. This issue is expected to be reconsidered in 1987. A bill to regulate the transportation of high-level nuclear materials did pass in 1986 and mandated that the Department designate transportation routes.

HIGHWAY SAFETY

Several highway safety measures were considered by the Legislature but failed to pass, including a 21-year-old drinking age bill, mandatory seat belt legislation, and reenactment of a mandatory motorcycle helmet law. The General Assembly increased funding to the state Law Enforcement Assistance Fund to help drunk driving programs. State lawmakers also passed legislation limiting liability of persons licensed to sell and serve alcoholic beverages and limiting liability of social hosts. In cases in which they are liable, lawmakers capped recovery at $150,000. Since Colorado does not have a 21-year-old drinking age, the state will lose approximately $9 million in federal highway funds in October 1986. An attempt will be made to raise the drinking age next year. If passed, this law will return withheld funds to Colorado.

IN MEMORIAM

CON SHEA

Con Shea, who was Acting Executive Director of the Department of Highways in 1975 and had been Assistant to the Director since 1976, passed away in December 1985. Con was was a specialist in state finances and also the director of the Department't Office of Management and Budget.

Con held the distinction of being Colorado's first State Budget Director. During his long and distinguished career, he also served as the State Controller, the Executive Director of the Department of Social Services, and the Executive Director of the Office of State Planning and Budgeting.

Given his extensive knowledge of the budget process and the practical workings of the state system, he was of invaluable assistance throughout his career to governors, legislators and state agency executives.

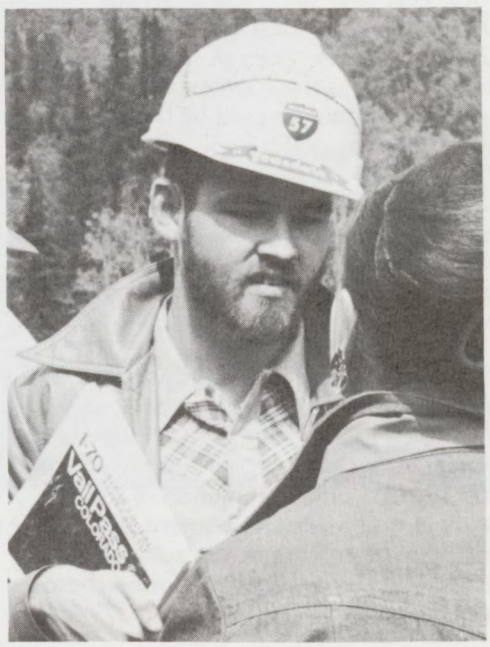
In addition to his exceptional experience with budget practices and procedures, Con had a keen understanding of the need for cooperation and agreement in order to accomplish any goal. He had the special ability to unify large government organizations because people working with him respected his integrity, leadership, and knowledge of the functions of state government.

Through all of the high-level government positions that Con held, he never lost sight of the individual needs of his employees. All staff members, regardless of their positions, had access to Con. He was always willing to share his knowledge and offer his assistance.

In a *Denver Post* tribute written shortly after his death, Con was described as "the ideal of dedicated public service...an indispensable and consummate public official for four governors...Shea handled it all with a patient doggedness that served his state and his fellow workers well...as an individual, Con Shea had no equal." We agree. Con has been sorely missed by his friends and co-workers.

MIKE BOSWELL

Mike Boswell, an employee of the Department from 1982 to 1986, was an extraordinary person. He was recognized nationwide for his expertise on the U.S. highway system, having memorized every route of America's Interstate system, and was instrumental in ensuring the accuracy of maps developed by the Department.



Mike's achievements were in spite of his lifetime battle with cerebral palsy, severe hearing loss, and diabetes. With an enormous amount of encouragement and confidence from his mother, Phyllis Boswell, he was able to overcome the limitations of his body and pursue his lifelong interest in the highway system. He corresponded regularly with highway and transportation departments across the nation and was often invited to openings of new highway sections, bridges and tunnels.

On June 12, 1986, at the age of 31, Mike's life was cut short by a massive heart attack. He will be remembered by his many friends for his determination to succeed, and for his significant contributions to interstate transportation.

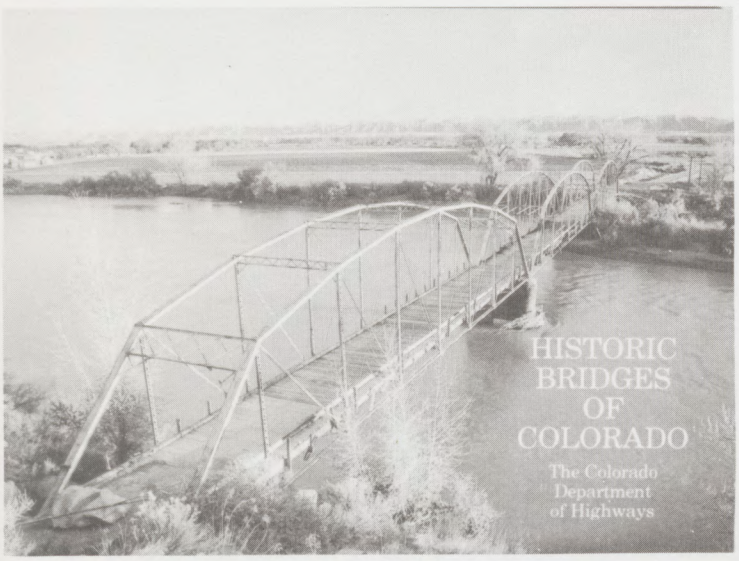
DEPARTMENT RECEIVES BRIDGE PRESERVATION AWARD

The U.S. Department of Transportation and the Advisory Council on Historic Preservation presented an award to the Department of Highways in May 1986 recognizing the Department's historic bridge survey and bridge preservation efforts.

Although 16 awards were presented for transportation-related preservation projects, only Colorado's Department of Highways surveyed and evaluated bridges for historical significance and developed a successful marketing plan for bridge preservation.

In the study, 550 bridges were evaluated for their historical and engineering significance. Of these bridges, 64 were deemed eligible for the National Register of Historic Places. Information collected from the survey has also been instrumental in the planning of bridge rehabilitation and replacement projects.

Results of the survey have been compiled by the Department in a 115-page publication entitled Historic Bridges of Colorado.



58TH ANNUAL COLORADO TRANSPORTATION CONFERENCE

The 58th Annual Colorado Transportation Conference met October 22 and 23, 1985, under the joint sponsorship of the University of Colorado at Denver and the Department of Highways.

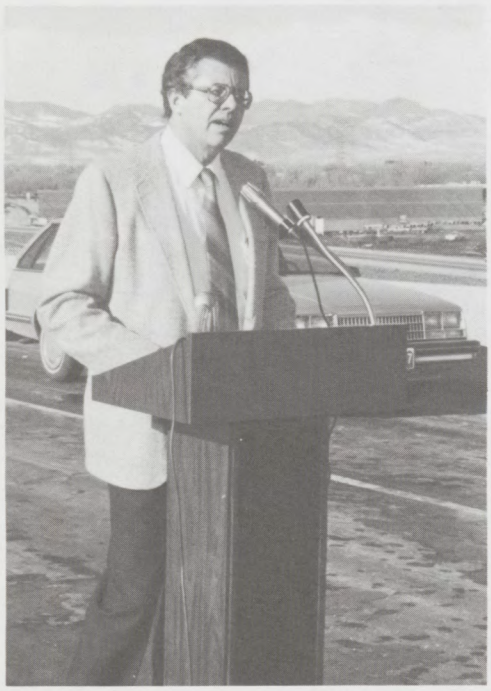
Since 1928, the conference has provided an annual forum where people in education, industry and government meet to trade information.

The theme that governed this year's Colorado Transportation Conference was "Stretching Limited Resources." Sessions focused on the technical, financial and managerial cooperation needed to accomplish public works transportation projects in the mid-1980s. The seventh annual Roderick L. Downing Award was presented to John A. (Jack) Bruce, City Engineer for Denver. This award recognizes outstanding service and significant contributions to transportation development in Colorado.

The Downing award is in honor of the late University of Colorado engineering professor Roderick L. Downing who co-founded the Transportation Conference and was one of the prime movers in the development of Colorado's transportation network.

"Grand Openings"

Over the last several years, the construction of new highways in Colorado has been limited. This has been due to a number of factors, including the escalating costs of construction and right-of-way, the diversion of scarce construction funds to maintain the existing highway system, and the widening of existing highways to accommodate greater traffic volumes. In spite of these factors, the Department was able to complete two new highway segments. The first is a 1.2-mile extension of I-76 along Clear Creek. The other project is the completion of the first phase of the C-470 Parkway.



Mr. Dwight M. Bower, Deputy Director of the Department, at the ribbon-cutting ceremony to open I-76.

A 1.2-mile segment of I-76 opened December 1985 along the Clear Creek corridor north of Denver. This $42 million segment consists of 14 separate road and bridge construction projects, and includes a recreational trail along most of the route.

The segment is part of a 5.6-mile route that will eventually link I-76 at its I-70 terminus near Wadsworth Boulevard to its I-25 connection at a modernized interchange north of 64th Avenue.

The opening of this Interstate segment marked Denver's first new Interstate highway in almost ten years. The last Interstate section to open was I-225 around the southeast Denver metropolitan area in May 1976.

Based on the expected availability of federal funds, the full I-76 route could be open to traffic as early as 1992.

On December 7, 1985, the Department opened nearly half of the C-470 "Centennial Parkway." A total of 12.2 miles from I-25 to Santa Fe Drive (U.S. 85) is now helping ease congestion in the southwest quadrant of the Denver metropolitan area.

The first phase of the new C-470 route was opened with a 10-kilometer (6.2-mile) footrace. Nearly 800 runners were the first travelers on the new stretch of roadway. After the race, Department officials and several Colorado dignitaries boarded a bus that broke through a ribbon of design blueprints to officially open the road.

Colorado's Congressional delegation has worked diligently to obtain funding for this much needed project. Because of these efforts, all of the remaining portions of C-470 should be under construction in 1987. All 26 miles of this four-lane parkway could be open to traffic late in 1988. Total cost of the project is estimated at $236 million.

C-470 was built with a magnificent view of the mountains and mesas in mind. The opening provided a chance for interested people to take a close look at the special features of this new route. The C-470 route carefully incorporates a landscaped parkway design with the concrete-paved roadway. Included in the design is a trail adjacent to the route to be used by bicyclists, hikers and joggers.

Department Organization

Governed by a nine-member Highway Commission, the Colorado Department of Highways has a workforce of more than 2,900 permanent employees. In order to reduce overall costs and streamline the organization, the Highway Commission abolished the Office of Management and Budget, including the positions of the Division Director and the associated clerical assistant. The Commission transferred some of this division's activities to other divisions and reorganized the remaining personnel into an Office of Management Support directly responsible to the Executive Director. This move left the Department with six divisions: Highways, Administration, Transportation Planning, Highway Safety, Information Systems, and Audit.

ABOUT THE COMMISSION

Colorado's 9,199-mile state highway system is managed by the State Department of Highways under the guidance of the Colorado Highway Commission. The Commission is composed of nine citizens appointed by the Governor and approved by the State Senate to serve four-year terms. Each Commissioner represents a different geographic area of Colorado.

DUTIES OF THE COMMISSION

Under State law, the powers and duties of the Highway Commission include the following:

Formulating general policy with respect to the management, construction and maintenance of public highways in the State.

Advising and making recommendations to the Governor and the General Assembly relative to highway policy.

Promulgating and adopting all State highway budgets and programs, including construction priorities and the approval of extensions or abandonments of the state highway system.

COLORADO DEPARTMENT OF HIGHWAYS GOALS

It is the policy of the Colorado Department of Highways to direct its efforts toward the accomplishment of the following goals for the Colorado highway transportation system to help ensure the health, safety, and welfare of its users:

- To improve its structural integrity.
- To improve its usefulness.
- To improve travel efficiency.
- To reduce the number and severity of accidents.
- To improve its energy efficiency.
- To vigorously support compliance with the 55 mph speed limit.
- To make it a positive influence toward achieving state and local priorities for economic development.
- To promote desirable environmental and social effects.
- To increase the minority population's participation in its economic benefits through direct employment and contracting policies.
- To provide assistance to public entities in highway transportation matters.

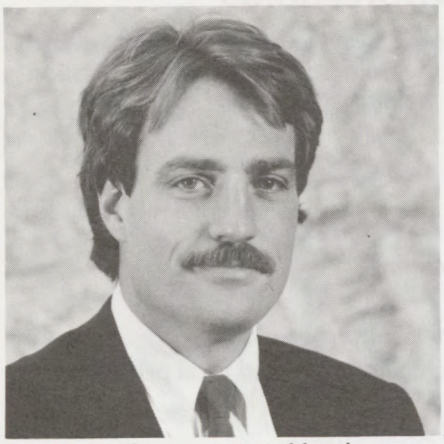
Richard J. Albrecht

Just prior to publication of this Annual Report, Mr. Richard Albrecht, Highway Commissioner from District 9 and vice chairman of the Colorado Highway Commission, died at age 47 after a yearlong illness.

Mr. Albrecht served the State in many different roles. Executive Vice President and General Manager of the Fort Collins Area Chamber of Commerce since April 1976, and was a member of many civic and community organizations.

Mr. Albrecht was an inspiration to many people and a highly respected representative of his area of the State.

HIGHWAY COMMISSIONERS



District 1, Thomas L. Strickland

District 2, Grant Wilkins

District 3, Charles L. Hanavan, Jr.

District 4, George G. Alderman

District 5, Kirk P. Brown

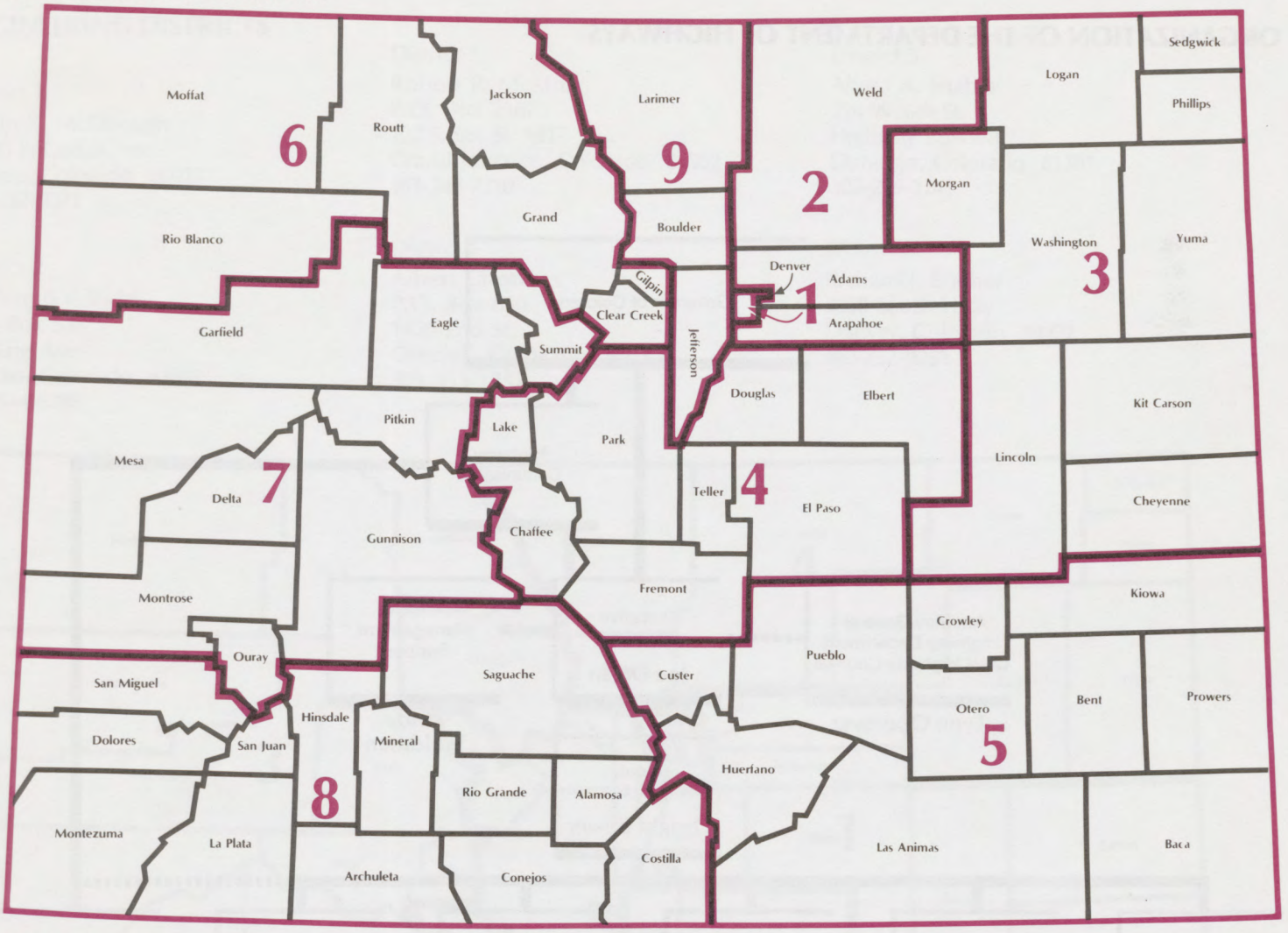
District 6, C.W. "Bill" Brennan

District 7, James Golden

District 8, Russell E. Yates

District 9, Richard J. Albrecht

COMMISSION DISTRICTS



District 1
Thomas L. Strickland
from Denver
Attorney

District 2
Grant Wilkins
from Littleton
Businessman, Marketing

District 3
Charles Hanavan, Jr.
from Cheyenne Wells
Farmer, Rancher

District 4
George G. Alderman
from Colorado Springs
Truck/Equipment Dealer

District 5
Kirk P. Brown
from Pueblo
Attorney

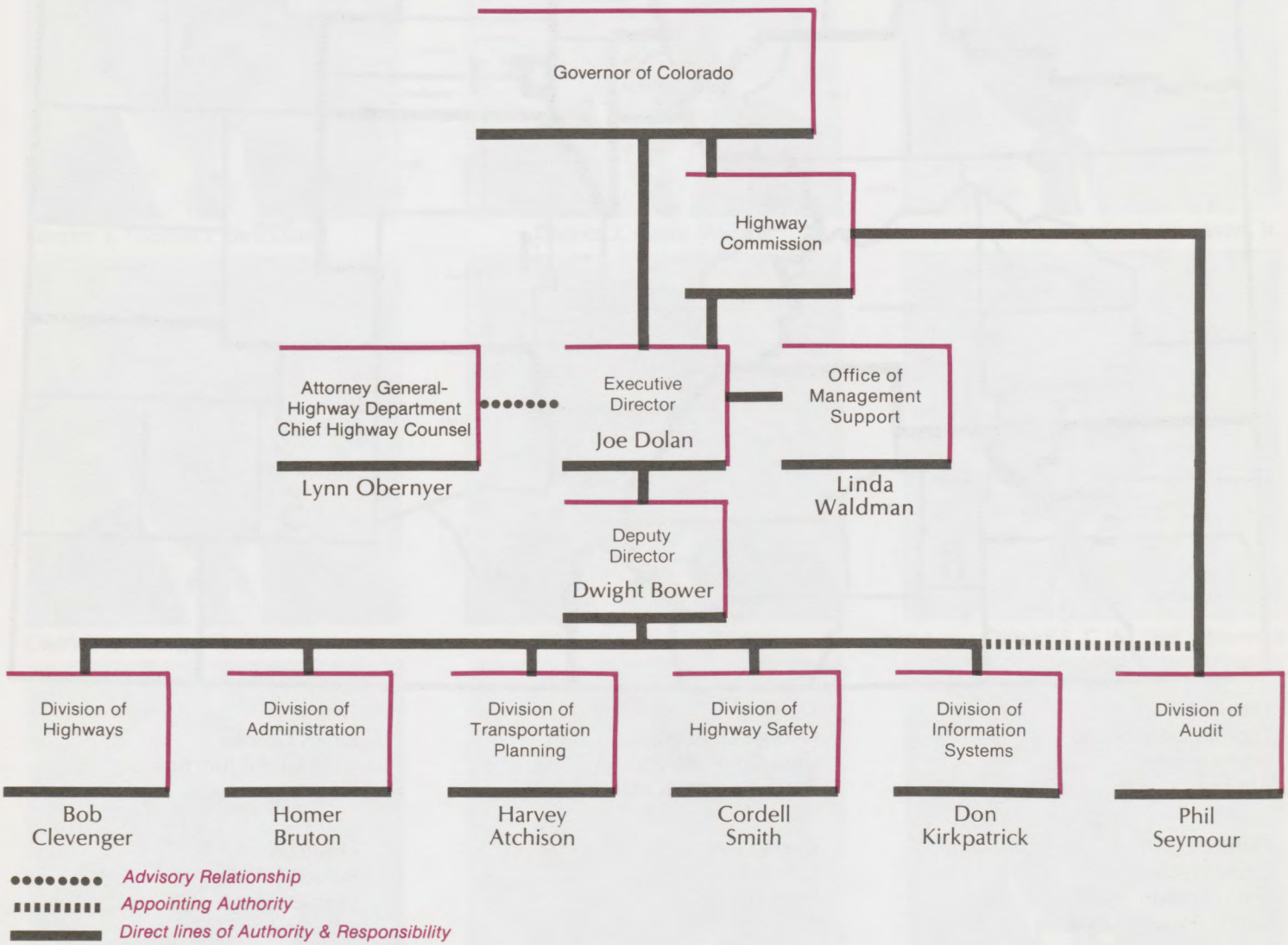
District 6
C.W. "Bill" Brennan
from Meeker
Rancher

District 7
James Golden
from Grand Junction
Attorney

District 8
Russell E. Yates
from Durango
Attorney

District 9
Richard J. Albrecht
from Fort Collins
General Manager,
Chamber of Commerce

ORGANIZATION OF THE DEPARTMENT OF HIGHWAYS



As of October 1, 1986

ENGINEERING DISTRICTS

District 1
Phillip R. McOllough
18500 E. Colfax Ave.
Aurora, Colorado 80011
303-757-9371

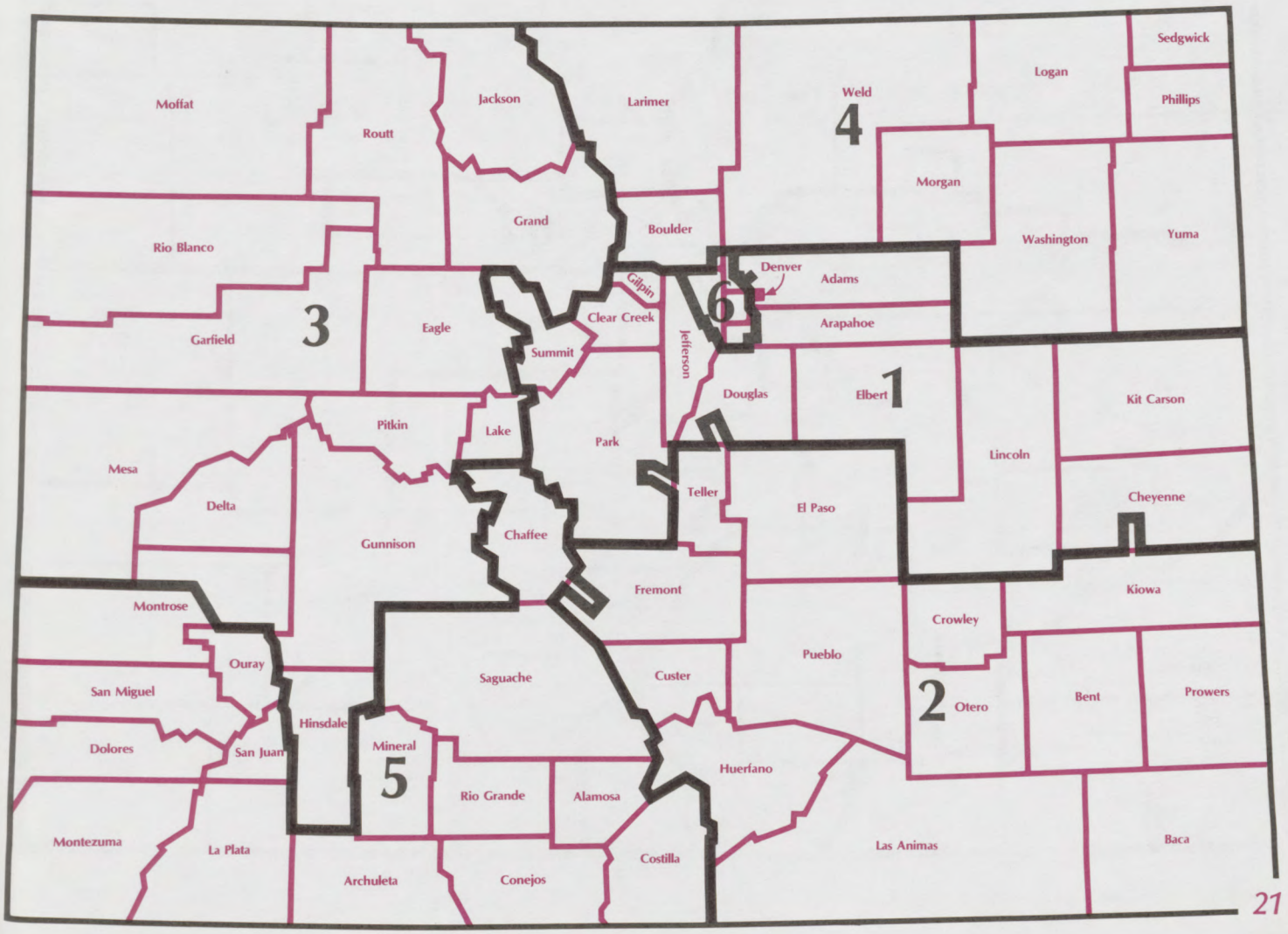
District 2
Guillermo V. Vidal
P.O. Box 536
905 Erie Ave.
Pueblo, Colorado 81002
303-544-6286

District 3
Robert P. Moston
P.O. Box 2107
222 S. 6th St. #317
Grand Junction, Colorado 81502
303-248-7210

District 4
Albert Chotvacs
P.O. Box 850
1420 2nd St.
Greeley, Colorado 80632
303-353-1232

District 5
Alfred A. Shablo
214 W. 6th St.
Highway Building
Durango, Colorado 81301
303-259-1241

District 6
Richard J. Brasher
2000 South Holly
Denver, Colorado 80222
303-757-9251



MAINTENANCE SECTIONS

Section 1
Dave Fraser 353-1232
1420 2nd St., Greeley, 80632

Section 2
Bryce Sanburg 248-7363
222 S. 6th, Grand Junction, 81501

Section 3
Ted Vickers 259-0021
214 W. 6th, Durango, 81301

Section 4
Ron Richards 544-6286
905 Erie Ave., Pueblo, 81002

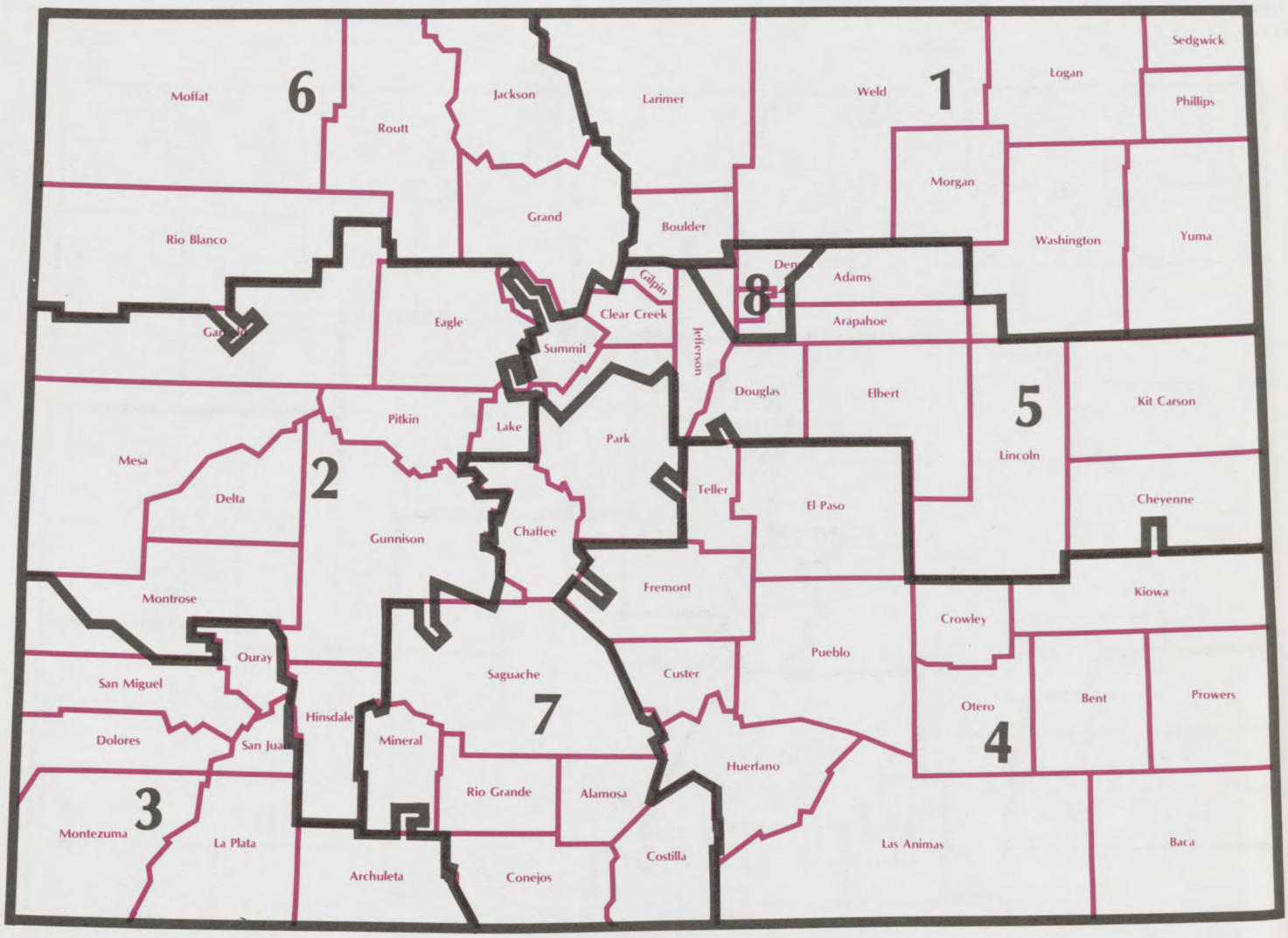
Section 5
Ed Fink 757-9100
18500 E. Colfax, Denver, 80011

Section 6
Lou Hahn 824-5104
260 Ranney St., Craig, 81625

Section 7
Tuffy Foster 589-4311
1205 West Ave., Alamosa, 81101

Section 8
Orville Rhoades 757-9514
5640 E. Atlantic Pl., Denver, 80224

Section 9*
Ed Fink - Mike Salamon 757-9100
18500 E. Colfax, Denver, 80011



* *Section 9 is the Eisenhower/Johnson tunnels at the Summit of Loveland Pass on I-70*

Program Highlights

Through the conscientious efforts of its employees, the Department achieved its objectives in the past year. This section summarizes accomplishments during the 1986 Fiscal Year.

ENGINEERING/CONSTRUCTION ACTIVITIES

FOOTHILLS PARKWAY (S.H. 157)

A half-mile long segment of the Foothills Parkway (S.H. 157) between Pearl Street and Valmont Road in Boulder was opened to traffic in May 1986. Also known as the 47th Street Bypass, the parkway will eventually connect the Denver-Boulder Turnpike (U.S. 36) to the Longmont-Boulder Diagonal (S.H. 119). Even though 1.3 miles at the northern end of the parkway remain to be built, the highway is already carrying substantial volumes of traffic. A temporary two-way connection between the parkway and existing 47th Street enables traffic to reach the parkway from S.H. 119.

The entire length of S.H. 157 is expected to be opened to traffic in 1988. When completed, S.H. 157 will allow motorists to bypass central Boulder.

Bike paths, two pedestrian/bike overpasses, noise barriers and landscaping are special features that improve the parkway's compatibility with its urban setting.

Approximately $40 million has been budgeted for the project. To date, $28 million has been spent on the project with an additional $12 million slated for the segments yet to be constructed.

During the last few years, the City of Boulder and Boulder County have committed right-of-way, engineering services, and over $3 million toward the construction of Foothills Parkway in an effort to accelerate its completion.

RAMP METERING

The Department has expanded the Denver Ramp Metering system with the installation of ramp metering on northbound I-225. The new metered ramps are located at Parker Road, Iliff Avenue, Mississippi Avenue, 6th Avenue and Colfax Avenue. The Department currently has 17 ramp metering locations in operation with four more under construction. The benefit derived from the installation of these metered ramps includes an increase in average travel speed during the morning peak period as well as a reduction in the number of rear end accidents.

SANTA FE DRIVE/EVANS AVENUE "URBAN INTERCHANGE"

Colorado's first "urban interchange," under construction where Evans Avenue passes over Santa Fe Drive in Denver, is scheduled to be opened in the Fall of 1986. This project involves the complete rebuilding of Santa Fe Drive in this area. An "urban interchange" requires less right-of-way than other interchange designs, is less disruptive to the neighborhood, and handles a higher volume of traffic than the standard diamond interchange.

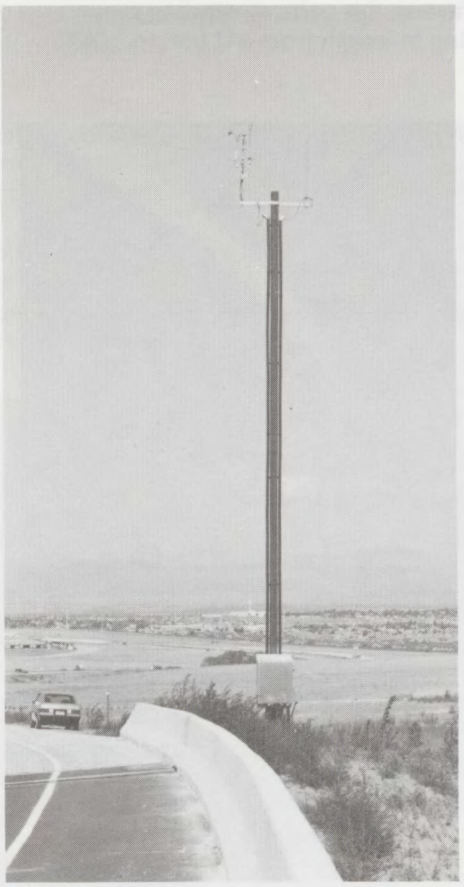
NOISE BARRIERS

In the Denver metropolitan area, the Department has built noise barriers at 15 locations along state highways over the past five years. There are two programs for barrier construction. Type I noise barriers are erected to protect residences near major highway improvements or widenings. The Type II Noise Barrier Program provides barriers along existing highways for neighborhoods exposed to noise levels in excess of 67 decibels. The Type II Program is a voluntary one that is not mandated by federal law. To underline the Department's commitment to noise reduction along the Interstate system, the Highway Commission has allocated approximately $1 million a year to Type II noise barrier projects.

ROADWAY/WEATHER MONITORING SYSTEM

The Department has installed a Roadway/Weather Monitoring System in two highway projects for early detection of the frost and ice conditions that generally occur first on elevated structures. The first project selected was on the elevated structures of the interchange at C-470 and I-25. The second project was on the elevated structure of I-70 between Washington Street and Colorado Boulevard in Denver.

The roadway portion of this system will detect moisture, frost and ice on the bridge decks and relay this information by radio to a central computer at the Department's engineering district office in Denver. The specific information gathered includes wind speed, wind direction, air temperature, humidity, ground temperature, and salt or chemical content on the road surface. In addition, a precipitation monitor indicates the presence of rain or snow in the area. The data is used to evaluate road conditions and to project when frost or icing will occur or when additional sanding is needed on these elevated structures.



The weather monitoring part of the system consists of color weather radar and weather forecast data. The color weather radar system scans and tracks weather conditions as they occur during the winter season. The system is capable of detecting weather conditions between a 10-mile and 200-mile radius. This radar information will be used in conjunction with weather forecast data (obtained locally to provide advanced warning to help the Department mobilize maintenance forces as needed.

The Roadway/Weather Monitoring System will insure that sanding of elevated structures occurs at the proper time. In addition to the obvious safety benefit to the public, the sytem will assist the Department in better utilizing its manpower.

WOLF CREEK PASS

Construction of a third lane of U.S. 160 on the east side of Wolf Creek Pass in southwest Colorado began this spring. The first phase of the project starts at the top of the pass and extends 1.5 miles to the Alberta Snowshed. This phase represents the first segment of an overall project to upgrade 19.5 miles from the top of Wolf Creek Pass to South Fork in order to bring it up to current design standards. Upon completion, the project will provide a safer roadway and be able to accommodate greater traffic volumes. The first phase of this project, which is expected to cost $2.7 million, will be completed by the Spring of 1987.

CLEAR CREEK CANYON TUNNEL LIGHTING

In the early 1940s, U.S. 6, a two-lane roadway, was completed through Clear Creek Canyon west of Golden. In order to traverse this narrow, winding canyon, it was necessary to construct six tunnels ranging in length from 411 feet to 1,068 feet.

In June 1986, a tunnel lighting and safety project was completed for Tunnels 2 and 6. Tunnel 2 is located approximately five miles west of Golden and Tunnel 6 is approximately 11 miles west of Golden. Tunnel 2 had no previous lighting while the lighting in Tunnel 6 was installed in the 1950s and was considered inadequate and obsolete. Need for the project was determined by the Department's Hazard Elimination Program, which identified these sites as having high accident rates. The "black-hole" effect of drivers entering these poorly lighted tunnels appeared to contribute to the high accident rate. The tunnel darkness made it difficult for motorists' eyes to adjust quickly when driving into them from the bright sunlight or the brightness of snow-covered ground. This resulted in drivers crowding to the center of the tunnel roadway, as they were unsure of the location of the roadway edge, leading to head-on collisions; or drivers braking hard when finding themselves in complete darkness, leading to rear end collisions.

The project consisted of installing lights in both tunnels as well as realigning a bad curve at the east entrance to Tunnel 2. Raised pavement markers were also installed in the remaining four tunnels for better lane delineation.

Total cost of the project was $816,000, which was funded with Hazard Elimination Funds. This project was complicated by the lack of a power source nearby, which necessitated the installation of 1.5 miles of utility lines to reach the site.

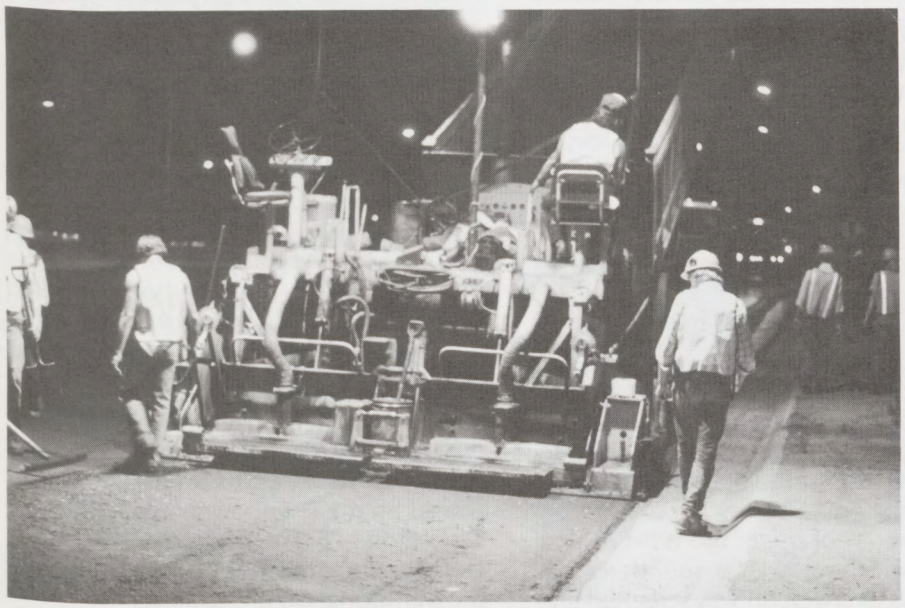
Installation of lighting in Tunnel 1 is scheduled for the Spring of 1987. The Department will continue to monitor accidents in the canyon in order to evaluate the safety improvements resulting from this project as well as to identify other needed safety improvements.

SAND/SALT DOMES

The Department has adopted a five-year, $3.2 million plan to control contamination from its sand/salt piles. The plan includes approximately $500,000 for asphalt pads and $2.7 million for specially constructed domes to cover the piles of sand and salt. The domes will be built on a priority basis according to environmental impact.

The domes, built on top of impervious asphalt or concrete pads, completely cover the piles, keeping the sand/salt mixture dry and eliminating any possibility of runoff or leaching into nearby streams or drinking water.

In areas where there are no nearby water sources, the Department will construct impervious asphalt pads, keeping the salt from seeping into the ground. The pads generally will be 80 feet square and four inches thick. After snow or rain, the resulting runoff will be channeled into evaporation ponds.



MINORITY BUSINESS ENTERPRISE

During Fiscal Year 1986, $34.7 million was awarded to Minority Business Enterprise (MBEs) and Women's Business Enterprises (WBEs) for prime contracts, subcontracts and construction materials.

The Surface Transportation Assistance Act of 1982 requires that not less than 10% of all federal-aid highway dollars be awarded to Disadvantaged Business Enterprise (DBE) firms. As of June 30, 1986, the Department had 11.5% DBE participation in federal-aid contracts during federal Fiscal Year 1986.

MAINTENANCE

To emphasize the Department's commitment to preserving the structural integrity of the existing transportation system, the Department is now devoting a larger portion (40%) of its maintenance budget to work directly related to maintaining the roadway surface, as compared to an average expenditure of 33% on these activities over the past five years. This includes such activities as filling potholes, sealing joints, filling cracks, patching, and seal coating.

Snow and ice control is now the second largest overall maintenance expenditure. It cost approximately $15 million to plow more than 4.7 million lane miles in Fiscal Year 1986.

A year ago, Department maintenance crews in the Denver area began nighttime paving. This activity was shown to increase productivity approximately 20% and cause less inconvenience to the traveling public.

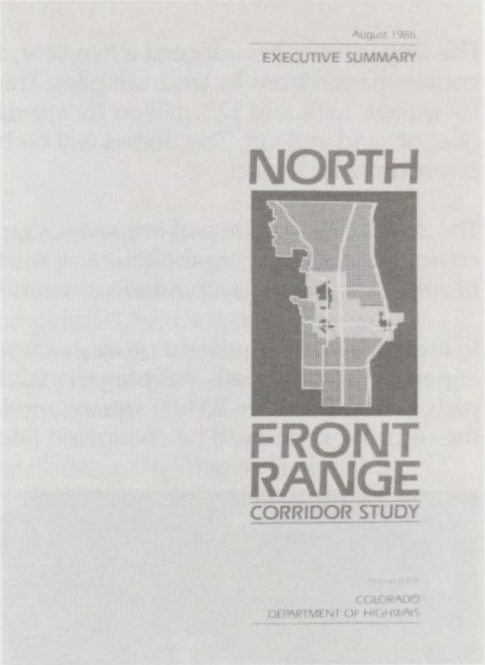
The fact that only 47% of the maintenance budget is directed toward salaries is a positive indicator of the efficiency of the Department's maintenance forces. This is low compared to the national average of 57% among the other state highway/transportation agencies.

PLANNING

Special Programs and Studies

NORTH FRONT RANGE CORRIDOR STUDY

The North Front Range Corridor Study, conducted by the Department in conjunction with local governments and the Federal Highway Administration (FHWA), was completed in the Summer of 1986. This study considered the impacts of growth and development in the transportation corridor along I-25 in Larimer and Weld counties. The study identified necessary state highway improvements for the 1995 and 2010 planning horizons, as well as a cost/revenue analysis for funding the recommended improvements. In addition, the study found that passenger rail service connecting Denver with the cities of Fort Collins, Loveland, Greeley and Boulder is not feasible at this time.



I-70 WEST CORRIDOR STUDY

In the Spring of 1986, the Department began a study of the I-70 West Corridor. The study will examine the transportation impacts of recreational traffic on I-70 through Eagle, Summit and Clear Creek counties. Various modes of transportation will be analyzed to determine the most cost-effective way of moving people to and from the recreational areas in the corridor. Specific highway improvements will be identified for the short- and long-term. The Department, the private sector, and local governments are cooperatively undertaking this study that is expected to be completed in June 1987.

TRUCK WEIGH-IN-MOTION (WIM)

The Department of Highways purchased two Weigh-In-Motion (WIM) mats during Fiscal Year 1986. In cooperation with the Port of Entry (POE) Division of the Department of Revenue, the Department of Highways hopes to collect more truck-related data that can be used for design and overweight enforcement.

Once installed, the WIM mats can be left unattended and gather specific vehicle weight and classification data. This will significantly reduce the cost of data collection, while increasing the amount of data available for roadway design purposes.

The WIM mats also offer an excellent way for the POE to screen vehicle weights, thus improving the effectiveness of the mobile weight enforcement program. For example, on the first day of use of the WIM mats, a truck weighing 134,000 pounds (54,000 pounds overweight) was screened and stopped. This resulted in a substantial fine for the offender. This truck may have gone unnoticed had the Department not had the WIM mat in operation.

HAZARDOUS MATERIALS

An in-depth review of existing rules and regulations regarding transportation of hazardous materials through tunnels on the state highway system was conducted in the past year. Particular emphasis was placed on the Eisenhower/Johnson Tunnel on I-70. The Highway Department's new rules do not address the transportation of high level radioactive materials; however, Senate Bill 19, passed during the 1986 legislative session, does regulate the transport of these radioactive materials.

The Department is currently developing rules that will designate state highways on which high level radioactive materials may be transported. These rules should be completed by January 1, 1987.

RESEARCH AND DEVELOPMENT ACTIVITIES

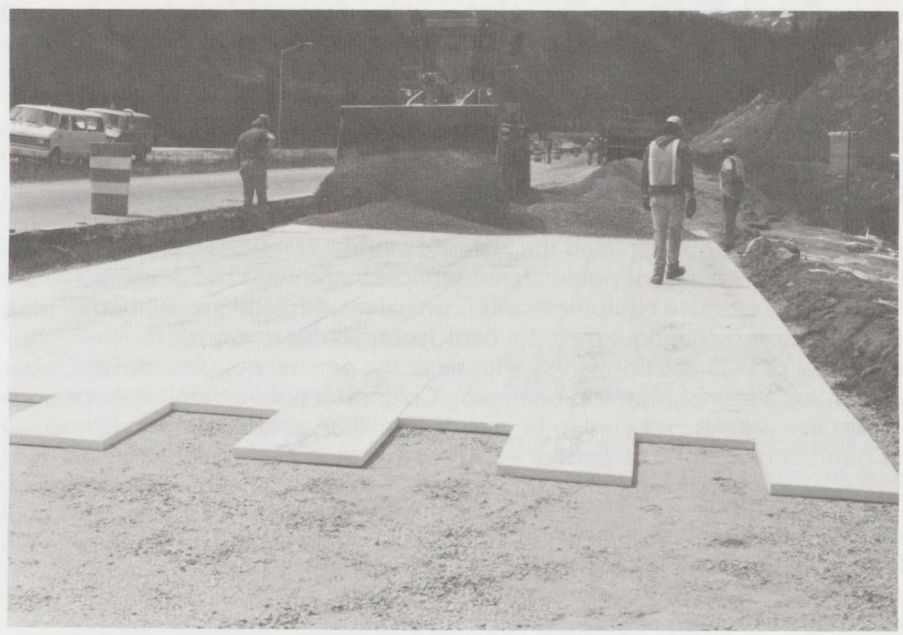
Fifteen research reports were published during the past year. These studies covered a wide range of subjects including construction management, soil modification for retaining walls or structures, asphalt and concrete components, structures, highway safety, and maintenance operations.

Two studies provide examples of the beneficial research currently underway. A project to recycle asphalt cold and in-place was constructed adjacent to I-70 near the DeBeque interchange. Four test sites were set up to evaluate different cold asphalt recycling techniques. Tests were designed to evaluate various types and amounts of rejuvenating agents as well as methods for mixing and placing the reworked cold asphalt pavement. This research project has shown cold recycling on a low volume road to be a highly effective technology. An additional project has since been implemented to demonstrate and promote the use of cold recycling in Colorado.

The prevention of frost swells during freezing winter conditions using styrofoam insulation is currently being studied in Colorado. The top of Rabbit Ears Pass was selected as a site to evaluate the use of a special type of insulation within the roadway structure. Two-inch thick insulation panels, placed beneath the roadway surface, were designed to reduce the number of freeze/thaw cycles and maintain constant temperatures in the subgrade. Temperature and moisture probes located in the pavement are used to monitor the performance for use in design of future sites. During 1986, results from this test were used in the design of an insulated roadway section on I-70 east of the Eisenhower Tunnel.

To assist local cities and counties, the Department has implemented a Rural Technical Assistance Program (RTAP). The program, administered in conjunction with Colorado State University, is patterned after the agricultural extension program. It will provide practical training and information to local officials on transportation issues.

An electronic bulletin board was established to provide an instant exchange of research information throughout the nation. The "RABBIT" (Research Activities Bulletin Board in Transportation) permits users with a personal computer and telephone modem to obtain report abstracts, updates of ongoing studies, schedules of current meetings, seminars, and other transportation-related information.



BICYCLING PROGRAM

The Colorado Bicycling Advisory Board was created by Executive Order of the Governor in 1986, and operates under the auspices of the Department of Highways. This board identifies the needs of bicyclists and recommends ways of addressing these needs.

In the past year, the Department published a set of two maps developed specifically for bicyclists. The maps provide information on traffic volume, shoulder width, emergency medical facilities, bicycle safety, routes along the Interstate corridors, and elevation profiles.

TRANSIT PROGRAM

The Department administers three Urban Mass Transportation Administration (UMTA) programs: Section 18, Section 16(b)2 and Section 8.

The Section 18 program provides federal funding to rural transit operators to assist with the purchase of replacement vehicles and with operating and administrative expenses. During 1985, 12 awards totaling $705,545 in federal funds were made to assist with transit service in 24 counties. Agencies receiving these funds used them in combination with local and other federal funds to furnish 3.2 million passenger trips.

The Section 16(b)2 program furnishes capital funds to private non-profit transportation providers who serve the elderly and handicapped. Vehicles acquired under this program provided approximately 380,000 trips in the past year.

The Section 8 Technical Studies grant program provides a funding incentive to encourage coordinated regional transit services in rural areas. In 1985, five transit development plans were completed.

The Department recently completed the Statewide Public Transit Assessment, which provided an overview of public transit services in the state and developed a data base to help estimate equipment and financial needs. Local governments and transit operators throughout the state participated in this study, which identified a total of 143 transit providers who serve the general population. The cost of operating, administering and equipping Colorado's public transit systems over the next five years is expected to be over $900 million, and this does not include a number of needed services or expenses that most likely will not be provided because of insufficient funds.

SAFETY

During the past federal fiscal year (October 1, 1985, through September 30, 1986), approximately $2.4 million in safety funds from the U.S. Department of Transportation was administered by the Department of Highways with 44 grants directly benefiting highway safety activities and projects throughout the state. These included alcohol countermeasures, police traffic services, emergency medical services, traffic records, roadway improvements, occupant protection, and motorcycle safety.

TRAFFIC DEATHS

In calendar year 1985, Colorado recorded the lowest number of traffic deaths in 20 years. There were 579 fatalities, compared to 609 in 1984. This accomplishment is even more impressive considering the dramatic increase in the number of miles traveled on Colorado's highways over the past two decades. In 1965, the fatality rate (number of deaths per 100 million miles of travel) was 5.43. By 1985, the fatality rate had dropped to 2.58. Over the 20-year period, the declining fatality rate means that 6,000 lives have been saved.

OCCUPANT RESTRAINTS

There is little doubt that increased safety belt usage has been a factor in the declining fatalities on Colorado's highways. The Department has many programs designed to increase voluntary use of safety belts. A corporate safety belt education program was successfully started in Grand Junction and has been expanded into Pueblo and Greeley. A model community safety belt program is underway in Fort Collins.

Loan-a-seat programs are in place in all Colorado counties, with over 5,000 child safety seats on loan. With the implementation of Colorado's child safety seat law, traffic deaths of children under age four declined 33% in 1984 and 1985, compared to previous years.

TRAFFIC RECORDS

Data is the foundation for highway safety problem identification, evaluation and research. In addition to the DUI Tracking System, the Department has developed an accident and violation information system for use by police departments and traffic engineers.

A major project has been initiated with the Division of Motor Vehicles to substantially upgrade the driver improvement and statewide accident records information system. In cooperation with the Judicial Department, the Department of Highways is developing a comprehensive traffic violator file. The long-term goal is an integrated, cost-effective traffic records system.

HAZARDOUS MATERIALS TRAINING

The Colorado Training Institute (CTI), established in 1980, was the first hazardous materials training school in the country. In 1986, CTI moved to a much-needed larger facility. The move allows for increased enrollments and expanded hands-on training. CTI has trained more than 4,000 students in the handling of hazardous materials spills, receiving national recognition for its training programs. After a recent nitric acid spill in Denver, a representative of the National Transportation Safety Board noted that most of the respondents received their training at CTI and "...this greatly assisted them in carrying out their emergency responsibilities."

HAZARDOUS LOCATIONS STUDIES

The Department looks beyond the state highway system and is anxious to assist local governments with their traffic engineering problems. Noteworthy is a 1986 city-wide traffic engineering study conducted for Pueblo, as well as evaluations in progress in Routt and Boulder counties.

THE DRINKING DRIVER

Alcohol-related fatal crashes, as a percentage of all fatal crashes, decreased in Colorado for a fourth consecutive year. In calendar year 1985, 46% of Colorado's fatal crashes involved drunken drivers, down from 48.5% in 1984.

Drunken driving arrests topped 40,000 for the first time in 1985. There were 42,330 arrests for drunken driving in Colorado, up from 39,436 in 1984. The Department annually provides training in the detection of drinking drivers to more than 1,000 police officers.

The Department sponsors educational programs for deputy district attorneys and judges in all aspects of prosecution and adjudication of drunken driving cases. According to data from the state's DUI Tracking System (a joint project of the Department and the Colorado District Attorneys' Office), 89.3% of those arrested for drunken driving in 1985 were convicted of an alcohol-related offense.

Although enforcement of drunken driving laws is crucial, the Department also is heavily involved in alcohol education programs, especially those focusing on young drivers. The Department cosponsors such events as the annual rally of Students Against Driving Drunk (SADD) and Celebrate Sober, a springtime symposium emphasizing positive peer pressure and refusal skills. The results have been gratifying. While alcohol-related fatal crashes for all age groups have declined by one-third over the past five years, those involving drivers age 16 to 20 have gone down by one-half. Drivers in that age group represent 9.4% of the licensed drivers, but are involved in 13% of the alcohol-related fatal crashes.

The top police agency in the enforcement of drunken driving laws in Colorado in 1985 was the Sheridan Police Department, where 18 officers made 400 arrests for driving under the influence (DUI), and average of 22.2 arrests per officer.

LAW ENFORCEMENT ASSISTANCE FUND

The Law Enforcement Assistance Fund (LEAF) was created by the Legislature in 1982 to help cities and counties enforce drunken driving laws. The Department was assigned the responsibility of administering LEAF grants to law enforcement agencies.

Today there are 40 LEAF projects in the state, with $1 million dollars in LEAF funds allocated for the 1986 calendar year. Five new LEAF projects were originated in 1986.

LEAF agencies represent 23% of the city and county police departments, but are responsible for 52% of the drunken driving arrests made by police departments statewide.

There is no taxpayer investment in LEAF. Drunken drivers fund the projects through a fee assessed upon conviction of an alcohol-related traffic offense. Recognizing the impact of LEAF, the 1986 General Assembly voted to increase the fee from $50 to $65. Accordingly, an additional $200,000 will be available for LEAF grants in 1987.

Performance Indicators

The overall surface condition of the state highway system declined from the mid-1970s to 1984. The Department witnessed its first turnaround in this trend in 1985.

The Department accomplished this in spite of increasing demands for highway funds, an aging highway system and increasing population.

This section presents key indicators that demonstrate the Department's success in upgrading the surface condition of Colorado's state highways.

EMPLOYEE STATISTICS

	1981-82	1982-83	1983-84	1984-85	1985-86
Number of employees	2886	2888	2907	2924	2940
Number of protected-class employees (minorities and women)	555	581	629	670	744
Number of minority employees	297	325	361	385	434
Percentage of protected-class employees	19.2%	20.1%	21.6%	22.9%	25.3%
Percentage of minority employees	10.3%	11.3%	12.4%	13.2%	14.8%

ROADWAY SURFACE ACCOMPLISHMENT STATISTICS [1]

(Federal Fiscal Year - October 1, 1985 through September 30, 1986)

Miles treated	N.A.	N.A.	796	1,365	1,450 *
Lane miles treated	N.A.	N.A.	1,894	3,031	3,300 *
Surface treatment costs	N.A.	N.A.	$66,154,000	$77,095,000	$90,000,000 *
Surface treatment cost per lane mile	N.A.	N.A.	$34,930	$25,431	$27,273 *

HIGHWAY AND BRIDGE PROGRAM STATISTICS

Prime contract awards *(number of projects)*	181	197	213	187	187
Prime contract awards *(in millions of dollars)*	$96.8	$123.2	$181.1	$178.4	$193.9
Minority business enterprise prime contracts *(number of projects)*	14	30	36	24	29
Minority business enterprise prime contracts *(in millions of dollars)*	$5.7	$10.5	$13.1	$9.3	$10.4
Average number of bids received for each project	6	5	5	4	5

TRUCK WEIGHT AND SAFETY

Trucks cleared [2]	2,517,210	2,577,746	3,563,910	3,794,299	3,853,744
Trucks weighed	1,639,057	1,824,112	2,329,701	2,848,893	2,757,351
Overweight violations [3]	16,861	15,637	24,858	18,633	24,384
Percentage of weight violations	1.029	.857	1.07	.654	.884

[1] Includes construction resurfacing, new construction, asphalt and seal coat.

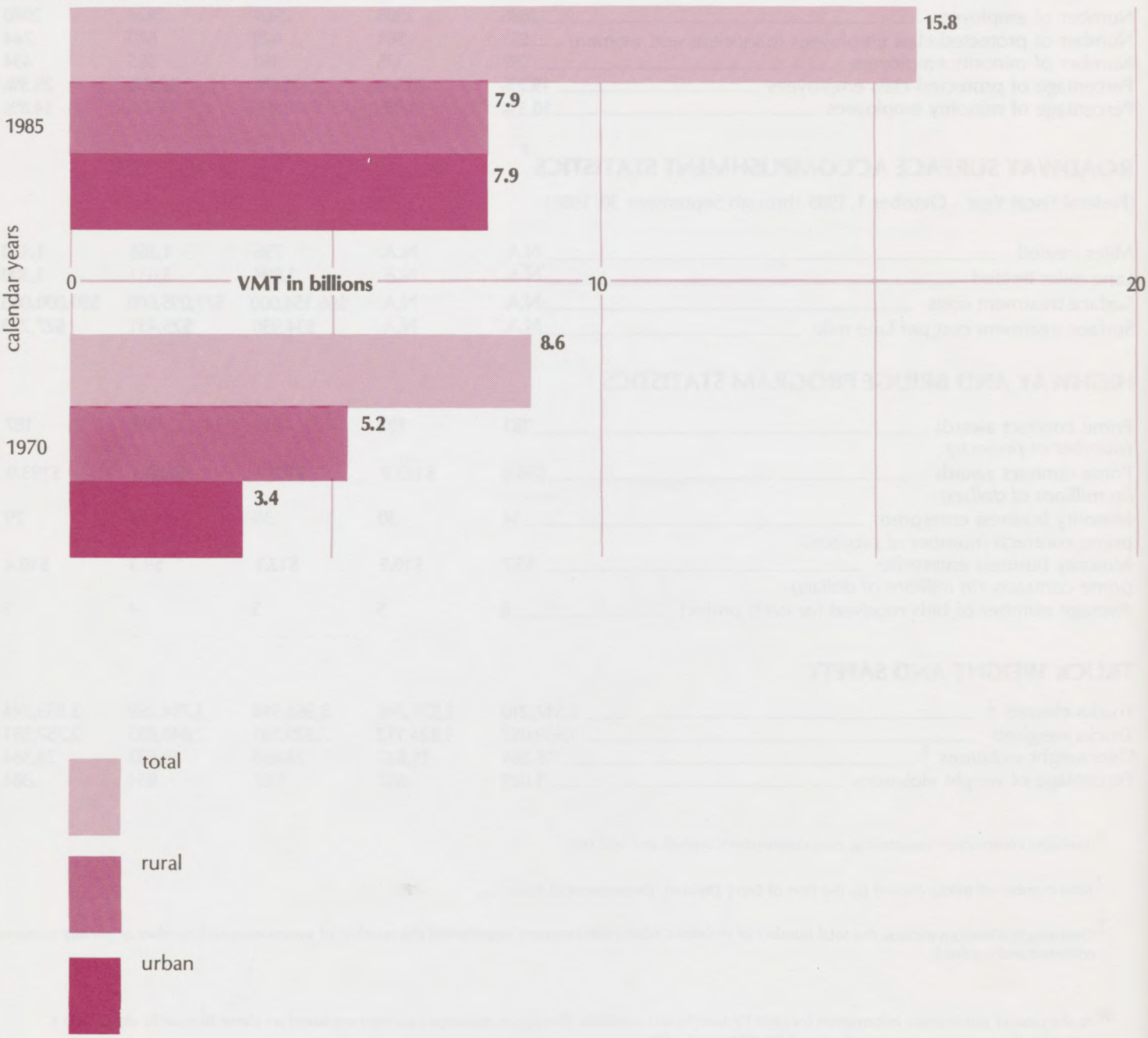
[2] Total number of trucks cleared by the Port of Entry Division, Department of Revenue.

[3] Overweight violations include the total number of violations where enforcement represented the number of summonses and number of penalty assessments collected and credited.

* *At the time of publication, information for only 10 months was available. This figure represents an estimate based on those 10 months along with a factor for the remaining two months based on prior years, data.*

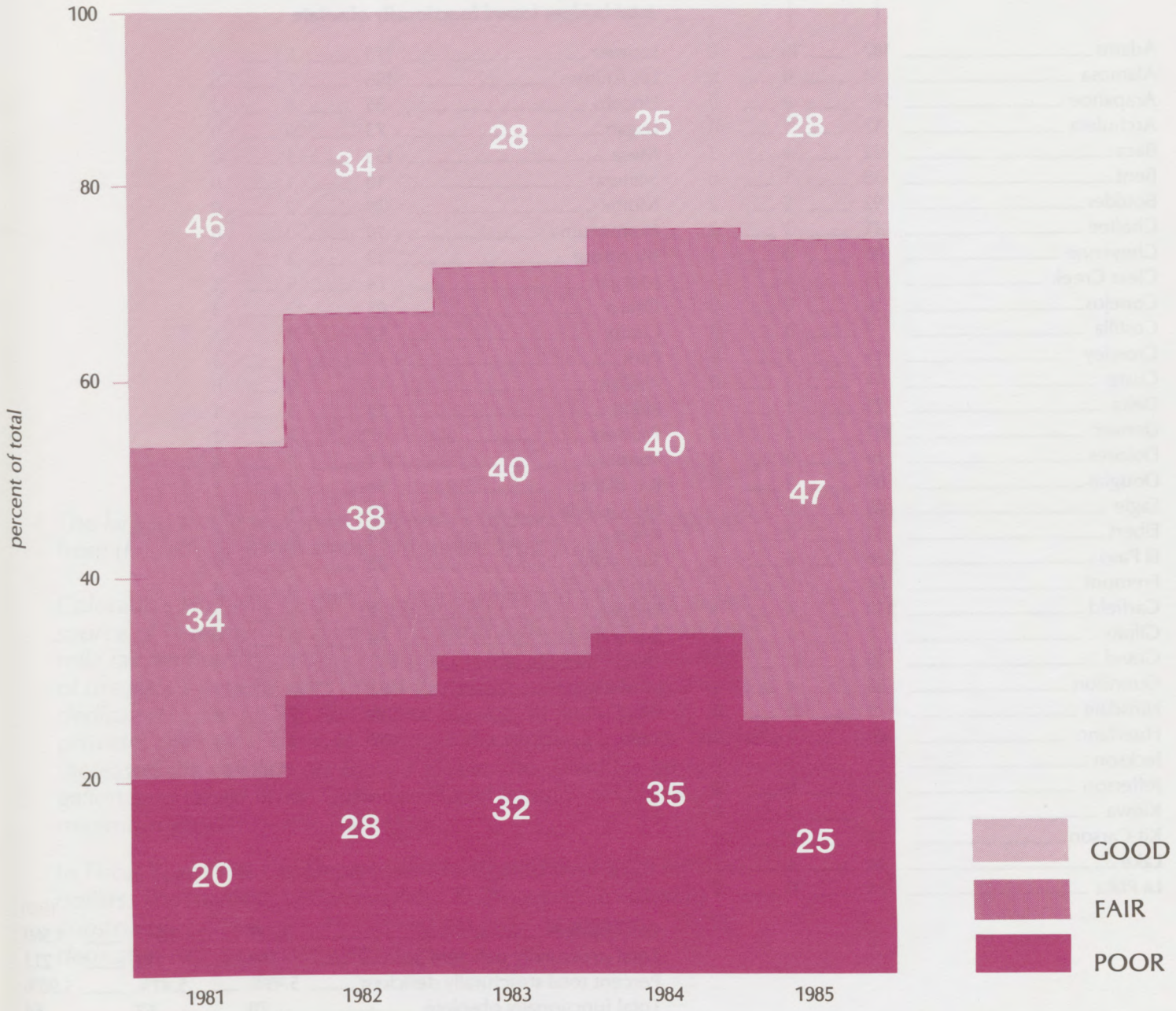
ANNUAL VEHICLE MILES OF TRAVEL (VMT)

state highway system only



CONDITION OF THE STATE HIGHWAY SYSTEM* 1981-1985

Total all systems



* Condition information based on roadway roughness and cracking as defined by the Colorado Pavement Management System.

DEFICIENT BRIDGES ON THE STATE SYSTEM, BY COUNTY, F.Y. 1986

total bridges by county
total bridges found structurally deficient
total bridges found functionally obsolete

Adams	187	16	0
Alamosa	4	0	0
Arapahoe	147	4	0
Archuleta	17	1	0
Baca	32	4	1
Bent	28	1	0
Boulder	92	5	2
Chaffee	31	3	2
Cheyenne	36	0	3
Clear Creek	65	5	0
Conejos	16	0	0
Costilla	4	0	0
Crowley	15	1	0
Custer	14	3	0
Delta	25	1	2
Denver	151	3	2
Dolores	10	0	0
Douglas	80	1	0
Eagle	96	2	1
Elbert	61	0	1
El Paso	228	7	3
Fremont	68	5	7
Garfield	110	4	1
Gilpin	7	1	0
Grand	35	11	1
Gunnison	28	4	1
Hinsdale	3	0	0
Huerfano	69	3	2
Jackson	11	3	0
Jefferson	171	8	0
Kiowa	17	5	0
Kit Carson	71	2	0
Lake	14	3	2
La Plata	24	0	0
Larimer	175	8	7
Las Animas	106	7	5
Lincoln	85	8	3
Logan	73	10	0
Mesa	153	5	0
Mineral	10	1	0
Moffat	30	2	0
Montezuma	19	0	0
Montrose	39	2	1
Morgan	74	6	1
Otero	85	2	3
Ouray	17	3	1
Park	37	6	5
Phillips	12	0	0
Pitkin	10	3	1
Prowers	47	7	1
Pueblo	171	7	2
Rio Blanco	30	2	1
Rio Grande	17	1	0
Routt	24	6	0
Saguache	23	2	0
San Miguel	6	0	0
Sedgwick	31	1	0
Summit	30	0	0
Teller	12	1	0
Washington	32	2	2
Weld	228	12	0
Yuma	17	3	0

	1984	1985	1986
Total bridges	3,531	3,547	3,560
Total structurally deficient	194	192	213
Percent total structurally deficient	5.49%	5.41%	5.98%
Total functionally obsolete	70	67	64
Percent total functionally obsolete	1.98%	1.89%	1.80%

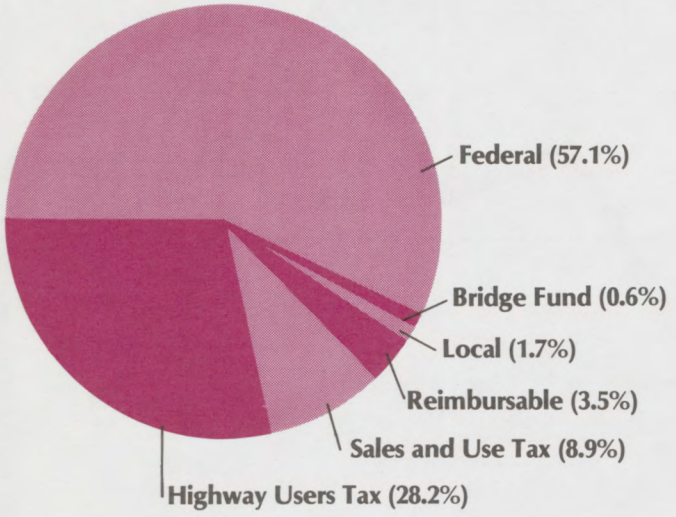
Financial Data

The largest single source of Colorado's highway revenue comes from the federal government's Highway Trust Fund.

Colorado's Highway Users Tax Fund (HUTF) is the second largest source of revenue. The base of this fund is the fuel tax, gross ton-mile tax, and motor vehicle registration fee. In addition, a portion of the state's general sales tax attributed to auto-related products is dedicated to the HUTF. The recent passage of Senate Bill 36 provides additional funds to improve the highway system. This bill increased the gasoline tax by 6¢ a gallon, the diesel tax by 7.5¢ a gallon, and raised other highway-related taxes, including a minimum gross ton-mile (GTM) tax.

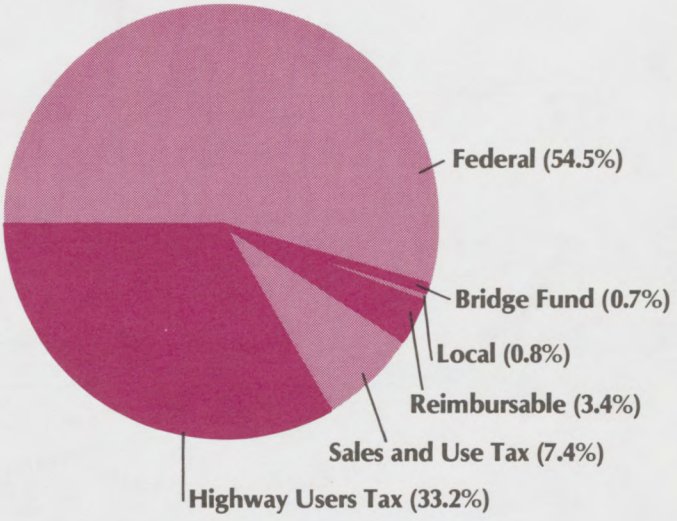
In Fiscal Year 1986, the Department budgeted over $420 million dollars. The majority of these funds, 70.2%, were allocated to construction activities, with the second greatest amount, 26.1%, dedicated to maintenance activities.

FUNDING SOURCES
FY 1984-85 - $470.7 MILLION



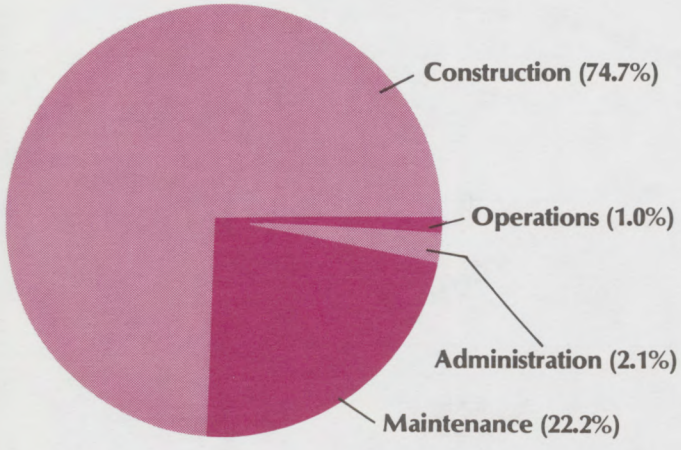
State share only of bridge fund
Local share of project costs

FUNDING SOURCES
FY 1985-86 - $420.4 MILLION



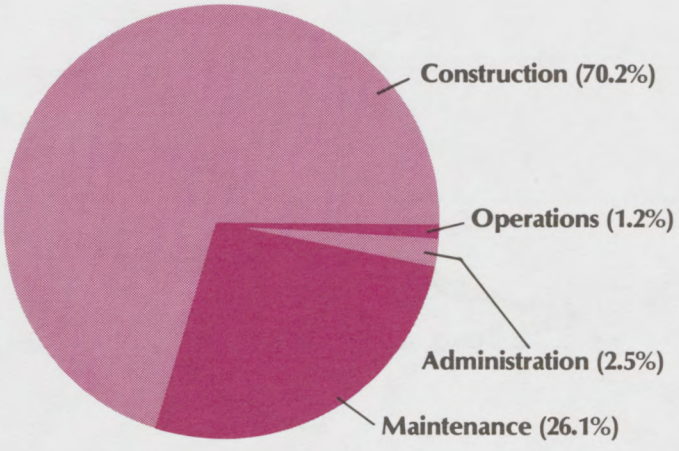
State share only of bridge fund
Local share of project costs

BUDGETED ALLOCATIONS
FY 1984-85 - $470.7 MILLION



Construction includes new projects, resurfacing, and restoration of existing highways. This figure also includes projects budgeted.

BUDGETED ALLOCATIONS
FY 1985-86 - $420.4 MILLION

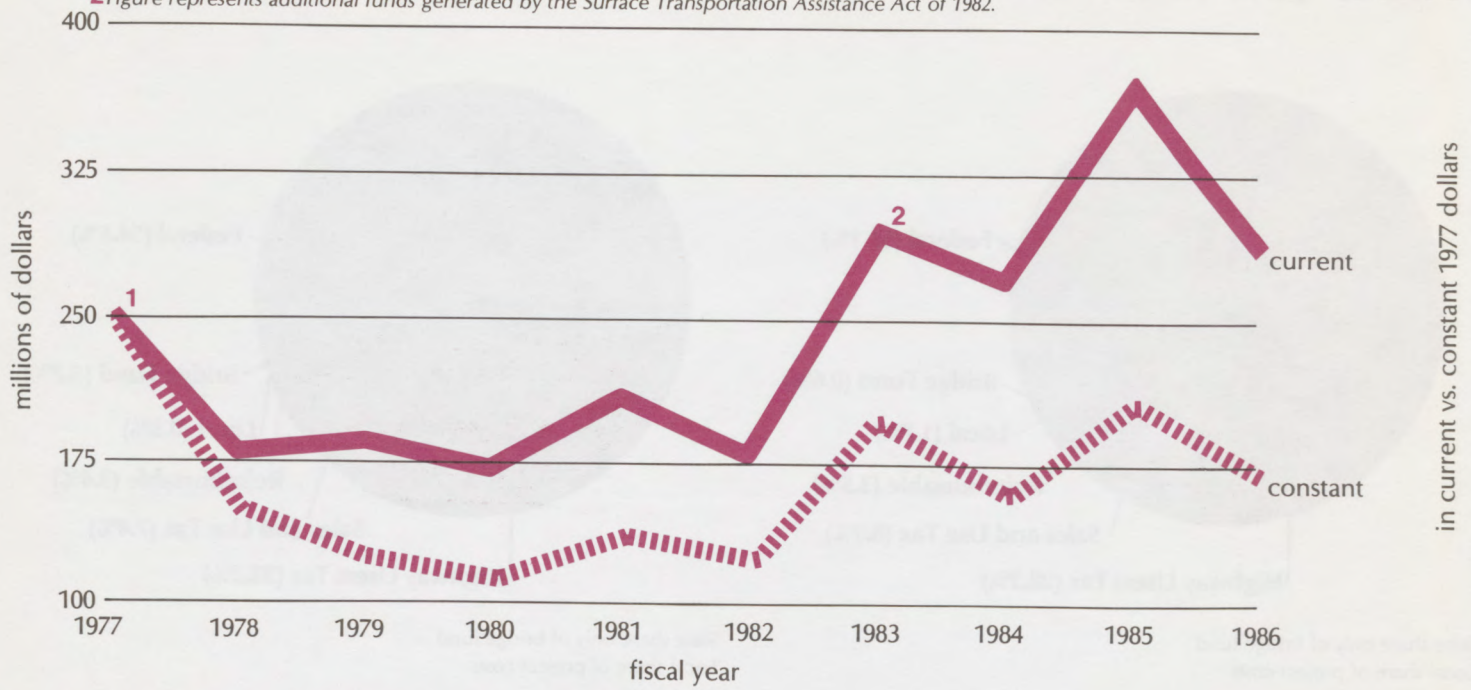


Construction includes new projects, resurfacing, and restoration of existing highways. This figure also includes projects budgeted.

BUDGETED CONSTRUCTION EXPENDITURES

1 *Figure includes costs associated with construction of Eisenhower Tunnel, emergency relief funds for reconstruction of roadways destroyed by the Big Thompson flood and a changeover in the Federal Fiscal Year, adding 3 additional months of funding*

2 *Figure represents additional funds generated by the Surface Transportation Assistance Act of 1982.*



BUDGETED MAINTENANCE EXPENDITURES