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1986

Annual Report

1987

Colorado Department of Highways



Executive Director's Message

Fiscal Year 1987 brought new leadership to the state of Colorado, with the election of a new governor, and to the Department of Highways with the appointment of seven new Highway Commissioners, including two Commissioners from newly established Front Range highway districts.

The Highway Department is working closely with the State Legislature, local communities, businesses and citizens to ensure that transportation priorities are established to prepare Colorado for the 21st Century.

Since 1970, Colorado has experienced explosive growth in population, the number of vehicles driving our highways and the number of miles driven by those vehicles. However, the dollars spent on our highways to move people and goods have not kept pace with this growth.

As Colorado prepares to meet these challenges, the Department must continue to search for innovative and efficient ways to provide for our highway needs as part of the foundation for economic growth and safe travel.

With inadequate resources to meet the vast needs, a cooperative spirit of understanding must be fostered to prioritize our state's transportation problems. Only by working together, with common goals of preserving our reputation as the hub of commerce and tourism in the western states and improving our quality of life, can we lead our state into the future and close the gap between highway needs and available revenue.

I, along with the members of the Highway Commission and each employee of the Department, am committed to the safest and most effective highway system that can be provided with the available resources. The following report illustrates this commitment.

A. Ray Chamberlain

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1/ THE HIGHWAY COMMISSION



Thomas L. Strickland
Chairman

"The overall commitment of the Commission is to maintain the integrity of the state highway system."

Colorado's 9,198-mile state highway system is managed by the Colorado Department of Highways under the guidance of the Colorado Highway Commission. The Commission is composed of eleven 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

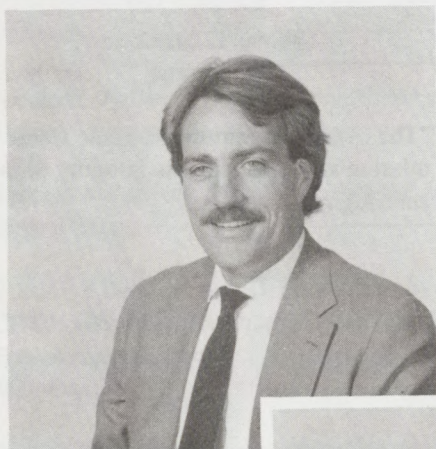
The powers and duties of the Highway Commission as determined by State Law include:

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; and

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

District 1
Thomas L. Strickland
Denver
Attorney



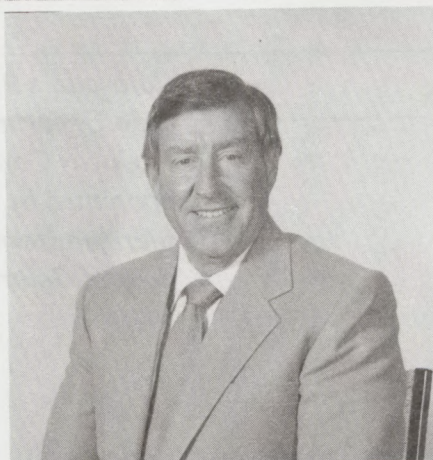
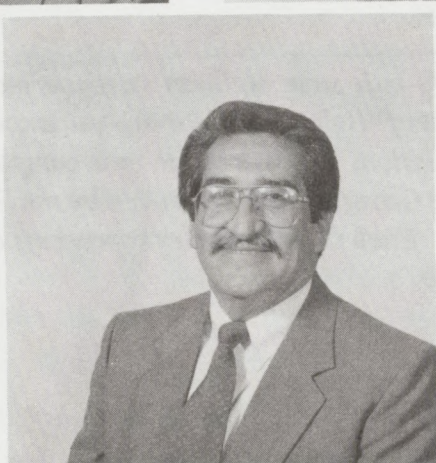
District 2
Flodie Anderson
Golden
Public Affairs



District 3
Fred L. Pundsack
Englewood
Business Executive



District 4
Pete M. Mirelez
Northglenn
Consultant



District 5
George W. Hall
Greeley
Contractor

District 6
Karl P. Mattlage
Steamboat Springs
Attorney



District 7
James Golden
Grand Junction
Attorney



District 8
Russell E. Yates
Durango
Attorney



District 9
Peter J. King, Jr.
Colorado Springs
Retired



District 10
Kirk P. Brown
Pueblo
Attorney

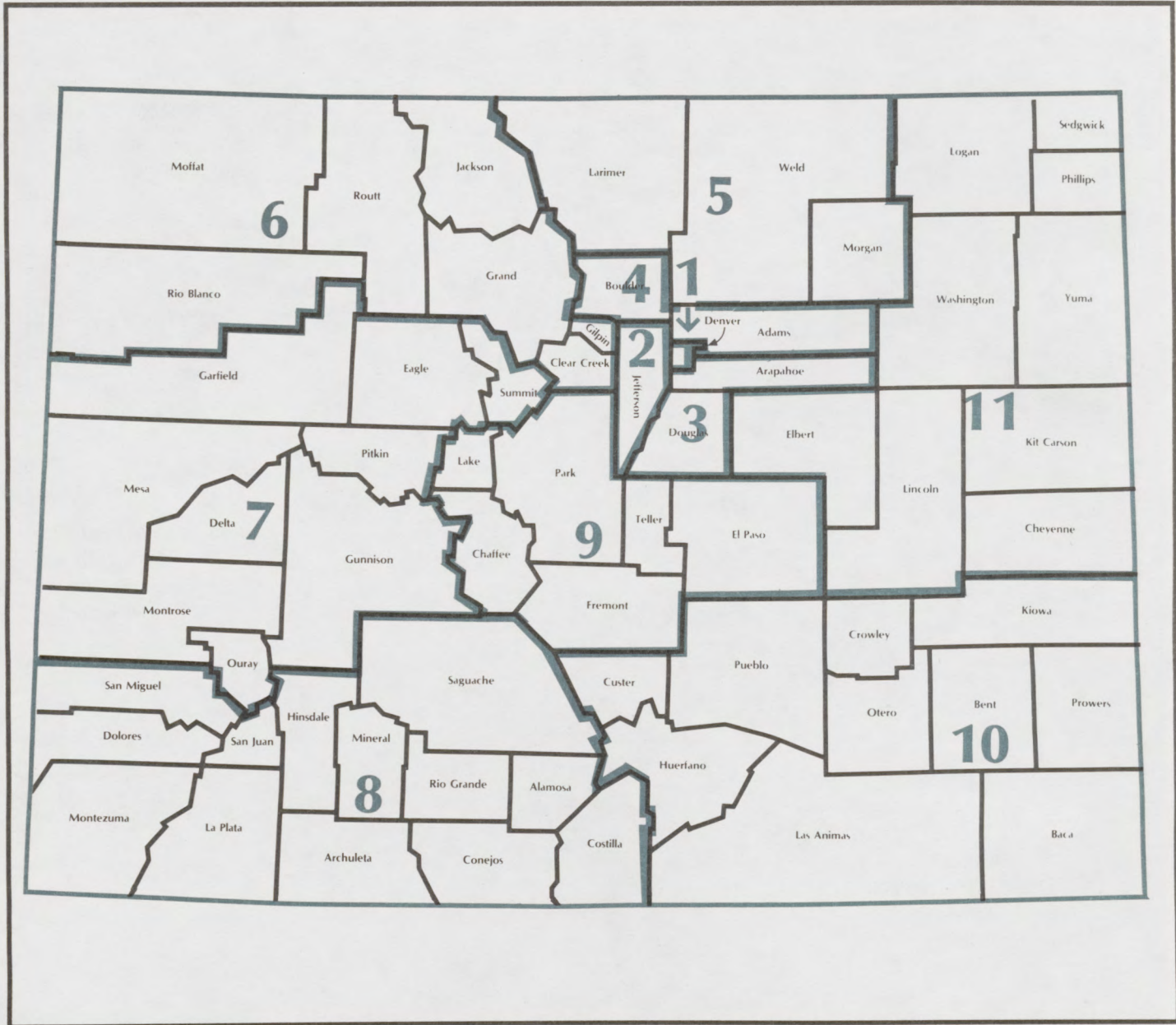


District 11
Donald G. Morrison
Limon
Rancher/Oil Distributor



Commission Districts

The Colorado Highway Commission districts were reapportioned during this 1987 legislative session by HB 1085, which established eleven geographic areas of representation. Formerly, the Highway Commission consisted of nine members.



2/ MAJOR EVENTS

During the past fiscal year, the Department made significant progress in completing the Interstate system through Colorado. Construction on major highways across the state has helped address congestion and safety problems. This section highlights the Department's major events of the 1987 fiscal year.

INTERSTATE NEARS COMPLETION

Colorado's Interstate system has 951 designated miles. As of December 1987, 934 miles (or 98.2 percent) are complete and open to traffic. Nearly half of the state's Interstate roadway was built before 1965 and about 75 percent was built prior to 1970. The three remaining gaps in the Interstate are on I-70 through Glenwood Canyon, I-70 through DeBeque Canyon, and on I-76 north of Denver.

I-70 At the Shoshone Power Plant in Glenwood Canyon

Traffic control in Glenwood Canyon continues to receive public praise and support, in spite of complex construction in very tight quarters. Since August 1986, work on the \$15 million eastbound structures at the Shoshone Power Plant has required four separate detours to complete pier and caisson work. These detours were accomplished in conjunction with the ongoing pilot car operation and despite record traffic volumes. The new roadway at the Shoshone Power Plant was opened to traffic in November 1987. The entire Glenwood Canyon project is scheduled for completion in 1993.



I-76 Extension

Construction is underway on Interstate 76 from I-25 to I-70 at Wadsworth Boulevard in Denver. This project is expected to reduce congestion and safety problems on I-25 between I-76 and I-70, on I-70 between I-25 and Wadsworth Boulevard, and at the "Mousetrap" interchange of I-25 at I-70.

The segment from Wadsworth to Federal is open. Work east of Federal is ongoing, including an \$8 million project to build structures over the railroad tracks and 60th Avenue, with associated modifications to 60th Avenue. This segment should be completed in the Fall of 1988.

It will take an additional \$95 million to complete the extension of I-76 and build an interchange with I-25.



I-70 Beavertail Tunnels

On September 24, 1986, the Interstate 70 Beavertail tunnels and adjacent bridges costing \$29 million were opened to traffic.

The completion of this Interstate segment has not only eliminated three miles of hazardous, curving, two-lane highway, but also has reduced the driving distance through DeBeque Canyon by 1.1 miles.

NOTABLE PROJECTS STATEWIDE

C-470 Segment Opened

Another 3.7 miles of the Centennial Parkway opened on September 4, 1987, serving motorists from Wadsworth Boulevard to Ken Caryl in Jefferson County. C-470 is a 26.1 mile beltway in the southwest Denver metropolitan area.

This new section of C-470 cost \$20.9 million. Overall, C-470 construction costs are estimated to reach \$243.6 million upon completion in 1989. The new segment connects with 12.2 miles of C-470 already open to traffic between I-25 and Wadsworth. The addition of the section between Wadsworth and Ken Caryl means approximately 60 percent of this highway is completed.

Environmental considerations along the new route, such as buff-colored bridges and the "rolling" look of earthen berms, make the drive a pleasant one. There also is a recreational trail along the full length of the route. Special fencing along the Dakota Hogback protects a resident deer population. Near Massey Draw, special lakes and wetlands provide water flow for wildlife in the area.

Between May 1 and July 1, 1987, the Department of Highways awarded \$8.5 million in construction projects for C-470 south of I-70 toward Hampden Avenue (U.S. 285). By the end of 1987, another \$23 million was awarded for various phases of C-470.



Fort Collins Expressway - Laporte Bypass

Construction of the first usable segment of the Fort Collins Expressway began in October 1986. This long-awaited project initially will provide a two-lane bypass of Laporte, a community northwest of Fort Collins. The Laporte Bypass portion of the expressway is over five miles long. Earthwork and structures on a three-mile portion of the bypass were completed during the Summer of 1987. Earthwork on the remaining two-mile segment began in late 1987. The entire five miles is expected to carry traffic by late 1988.

When the Laporte Bypass is open to traffic, it will be designated as U.S. 287. The Highway Commission will remove the old U.S. 287 route from the state system, turning it over to Larimer County.

Long term plans call for extending the expressway roughly seven miles to either Interstate 25 or U.S. 14 east of Fort Collins, making the entire expressway over 12 miles long. This will attract traffic away from congested highway routes in downtown Fort Collins (College Avenue/ U.S. 287 and Riverside Avenue/ S.H. 14). The additional seven miles will cost an additional \$64 million.

Additional Lanes on Wolf Creek Pass

Construction began in Spring 1986 on two lanes plus a climbing lane on the east side of Wolf Creek Pass. This 1.9-mile section of U.S. 160 begins at the top of the pass and extends to the Alberta Snowshed. The project was completed on August 7, 1987 at a total cost of \$2.8 million.

This project is the first of the planned improvements of the entire 19.5-mile corridor from the top of Wolf Creek Pass to South Fork. When completed, this corridor will meet modern standards and have climbing lanes at selected locations. Completion of the first segment represents a significant improvement to this vital transportation corridor for southern Colorado.

Work Begins on "The Mousetrap"

A significant milestone for the Department during FY 1987 was the beginning of reconstruction of the "Mousetrap," the interchange at I-25 and I-70. Reconstruction of Colorado's busiest junction was recommended in a 1984 study addressing congestion and safety problems. Ramps will be widened for greater capacity and higher operating speeds. Due to limited funding, this \$60-65 million project requires a phased approach. When all phases have been completed, the new interchange will carry I-70 over I-25.

Discretionary funds will be requested next year from the Federal Highway Administration to accelerate construction.

The first in a series of projects is the replacement of the 44th Avenue Bridge over I-25. Estimated to cost \$2.6 million, the demolition and replacement of this bridge will provide room for the widening of I-25, as well as ramps and HOV lanes in future phases of the reconstruction. Project completion is set for May 1988. The second project just underway is the widening of the existing I-25 bridge over I-70 westbound at an estimated cost of \$5.5 million. This should be completed in Fall 1988.



I-25/6th Avenue Interchange

The opening of the eastbound 6th Avenue to southbound I-25 ramp in June 1987 marked the completion of the first usable segment of the new I-25/6th Avenue interchange.

Reconstruction of this complex interchange was recommended in a 1984 study addressing access, congestion and safety problems. The new interchange will help alleviate congestion and reduce accidents.

Due to limited funding, this \$28 million project also requires a phased approach. Construction on the \$6 million first phase included replacement of the existing ramp from eastbound 6th Avenue to southbound I-25. Work is proceeding under three separate contracts totaling \$11.4 million to construct a "flyover" ramp from eastbound 6th Avenue to northbound I-25 and a new ramp from westbound 6th Avenue to northbound I-25. This project is expected to be completed by Spring 1989.



Widening Berthoud Pass

In October 1986, the Department of Highways completed the first phase of improvements to the east side of Berthoud Pass. This 4.4 - mile segment, located about 1.5 miles east of Berthoud Pass, was funded with revenues generated by the motor fuel tax increase (S.B.36) enacted in 1986. The cost of this segment was \$650,000.

The addition of an uphill passing lane at selected locations allows motorists to safely pass slower moving vehicles, reducing traffic delays.

Environmental damage was kept to a minimum by revegetating the slopes with

native grasses and by transplanting trees. Old scars actually were eliminated.

Earth moving was done at night to minimize delays to the public and to increase productivity.

Design of the second segment is complete and the Department has begun construction of a stretch of highway starting at the summit of Berthoud Pass and extending east 1.4 miles.

The Department is gathering data for the design of the third phase and anticipates construction beginning during the Summer of 1988. All three phases will provide extra width and passing lanes for uphill traffic.



56TH COLORADO GENERAL ASSEMBLY

Each General Assembly consists of two years (two sessions). The 56th General Assembly convened on January 7, 1987.

The odd numbered year sessions are not limited in length and usually average 168 days (even-numbered sessions are limited to 140 calendar days). This year, the Legislature adjourned Sine die on August 13, 1987.

Some of the highway-related concerns of the legislature this past session are described below.

Financing

For the past several years, the General Assembly has addressed shortfalls in the General Fund through a variety of adjustments, tax changes, and restrictions on the portion of the sales and uses tax dedicated to the Highway Users Tax Fund (HUTF). This dedication, known as the Noble Bill, was passed in 1979 and provided needed funding for highway construction and maintenance.

In 1987, the General Assembly again faced General Fund shortfalls and voted to permanently repeal this law. A reduced four-year substitution was adopted to provide General Fund support to the Department of Highways for state roads for two years and to local entities for local roads for four years. The FY 1988 substitution is predicated on surplus funds being available at the end of the fiscal year, which now appears unlikely. The Noble Bill has provided approximately \$50 million annually to the HUTF in recent years.

E-470 Authority

Senate Bill 247 creates a public/private authority to construct a portion of a beltway around the Denver metropolitan area. The law allows the authority or involved local governments to impose taxes, which would be used to repay bonds until tolls on the beltway are sufficient for this purpose. Prior to the imposition of such taxes, the law requires an election to approve the tax levy. An authority has been created to construct E-470, connecting with C-470 on the south and I-25 on the north.

Public/Private Authority

House Bill 1266 was passed allowing creation of authorities to construct toll tunnels, a concept supported by proponents of the Berthoud Pass tunnel. In addition, Senate Bill 1249 authorized a Transit Construction Authority to plan and build a mass transit line in the southeast corridor of metro Denver and mandated that the Regional Transportation District finalize plans for similar transit in other metro Denver corridors.

Regional Needs

The changing demographics of Colorado and the tremendous growth along the Front Range have created increasing pressure to address highway capacity needs in the metropolitan counties. Several innovative concepts were reviewed by the General Assembly in 1987 to respond to highway needs on a regional basis.



Logo Signs

In response to rural economic hardship, House Bill 1039 was passed to permit the placing of logo signs on rural stretches of the Interstate system. The signs are designed to encourage travelers to pull off the Interstate and patronize local businesses in economically depressed areas.

Financing Road Improvements

Two important highway financing measures failed. The Regional Mobility Program would have allowed the Highway Commission to issue bonds to finance specific capacity improvements in the Front Range counties, financed with a \$25 increase in the vehicle registration fee in those counties. The Metropolitan Roadway Fund, contained in another bill, would have allowed a metropolitan region to impose a five-cent per gallon motor fuel tax increase to finance local road improvements in that region.

Right-of-Way

At the request of the Department, the General Assembly adopted Senate Bill 27 allowing the appraised value of a piece of property to be reduced by an amount equal to the special benefits that will accrue to the property being retained by an owner. Such benefits must be a direct result of construction (e.g., increased ability to develop land due to its proximity to an interchange) and in no case may the Department pay less than 50% of the value of the land taken. The law also applies to counties and cities and is limited to land acquired for highway purposes.

The effect of this legislation could be significant when purchasing right-of-way for highways on new alignment.

65 MPH/ Seatbelts/ Drinking Age

Colorado adopted legislation at the beginning of the session, anticipating a change in federal law to allow states to increase speed limits on rural interstate highways. Colorado was the first state to finish posting new 65 mph signs. House Bill 1320 was adopted by the Legislature to bring Colorado into conformance with the federal 21-year-old drinking age mandate. Also adopted was legislation requiring the use of seat belts.



Nuclear Materials Transportation

Legislation passed allowing the Department of Public Safety to promulgate rules and regulations for the transportation of hazardous materials and to develop a routing system for the transportation of such materials.

In November 1986, the Executive Director of the Department of Highways adopted rules and regulations designating routes for the transportation of nuclear materials, effective December 30, 1986. Motor vehicles transporting nuclear materials are only permitted to travel on designated state highway segments.

The routes were designated primarily for transportation of nuclear materials to the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico, and the transportation of spent nuclear fuel rods to a permanent repository yet to be determined. These routes also must be used for transportation of any highway route-controlled quantities of radioactive materials.

3/ PROGRAM HIGHLIGHTS

The state highway system has become increasingly vital to Colorado's economy. The Department of Highways is working to accommodate the dramatic increase in highway use while addressing the challenges to safety, air quality and the environment. This section summarizes some of the accomplishments in these areas, as well as in research and safety, during the 1987 Fiscal Year.

AIR QUALITY IMPROVEMENT

The Department is working with other state offices and local governments to improve Colorado's air quality.

U.S. 36 Bus Lane

In a joint project between the Department and the Regional Transportation District (RTD), an exclusive bus lane was constructed on eastbound U.S. 36 from Zuni to southbound I-25. Buses save as much as ten minutes in the morning peak. The bus lane is a success and may be extended to Sheridan Boulevard for additional time savings.



Santa Fe HOV Lane

In October 1986, the Department opened a three-mile, High Occupancy Vehicle (HOV) lane on Santa Fe Drive from Harvard to I-25. These lanes are reserved for transit and ridesharing vehicles. The universally accepted diamond symbol marks these lanes that allow buses, carpools (two or more people), and vanpools to bypass congested general traffic lanes during rush hours.

Vehicles eligible to use the Santa Fe diamond lane have an exclusive ramp to northbound I-25. In addition, ramp meter bypasses are available to buses and carpools.

Rideshare Incentives

Through the cooperative efforts of the Department of Highways, the Regional Transportation District (RTD), and the Denver Regional Council of Governments (DRCOG), commuters are offered significant incentives to carpool.

The Department of Highways' contribution is a program allowing commuters to use metered entrance ramps via a special lane if they are in vehicles with three or more people. Currently there are six ramps set aside for carpools, vanpoolers and buses.

ENGINEERING/CONSTRUCTION ACTIVITIES

Walnut Street Viaduct

The westbound lanes of the Walnut viaduct opened in June 1987, while the eastbound lanes are scheduled to open in the Spring of 1988. The Walnut viaducts replace the structurally deficient Larimer and Lawrence viaducts. Demolition of the Larimer viaduct is underway. The Walnut viaducts will tie into the new Auraria Parkway, removing most through-traffic from the Auraria campus.

The final phase of the viaduct projects will be the construction of ramps at I-25 and Colfax for a full interchange. The Department expects the remaining two ramps to be completed in 1988. The total cost for the viaduct replacement and interchange improvement is \$36 million.

Phillips Curves

In November 1986, the Phillips Curves project on S.H. 82 in Pitkin County was completed. This \$1.2 million project widened and realigned 0.9 miles of S.H. 82 in an area with high accident rates. The crew worked an accelerated schedule to complete the project prior to ski season. The project greatly enhances safety and has resulted in many letters of thanks for a job well done.



Wiley Junction Interchange

Construction began in the Fall of 1987 on the first phase of a project to upgrade the existing T-intersection of S.H. 50 and U.S. 287 to a grade-separated interchange. This project also provides for widening SH 50 from two to four lanes.

Wiley Junction is located approximately 7.5 miles northwest of Lamar. Both S.H. 50 and U.S. 287 carry high numbers of semitrailer trucks and farm vehicles. The interchange will provide a free flow for vehicles, reducing accidents.

The first phase of this project is construction of a bridge over the relocated S.H. 50. Approximately \$700,000 has been budgeted for this first phase. The second phase, to complete the interchange, is scheduled for the Summer of 1988. The cost of this phase is estimated at \$3.2 million and the north channel of the river bridge was involved. Embankment material was placed next to the bridge, allowing traffic to bypass the construction zone.

Platte River Bridges

In 1987, the Department replaced three bridges over the South Platte River in eastern Colorado. These projects replace old, structurally deficient bridges.

The small farming communities of Crook, Sedgwick, and Ovid depend heavily on access to I-76 over the South Platte River. Therefore, the bridge projects at Crook and Sedgwick utilized a slightly new alignment, detouring traffic on the existing bridges and avoiding any economic hardships to these communities. At Ovid, only the north channel of the river bridge was involved. Embankment material was placed next to the bridge, allowing traffic to bypass the construction zone.

The total cost of the bridge replacement project at Crook was \$3.5 million. The project started in October 1986 and was completed a year later.

The total cost of the bridge replacement project south of Sedgwick was \$3 million. The Department began construction in November 1985 and completed the work by July 1987.

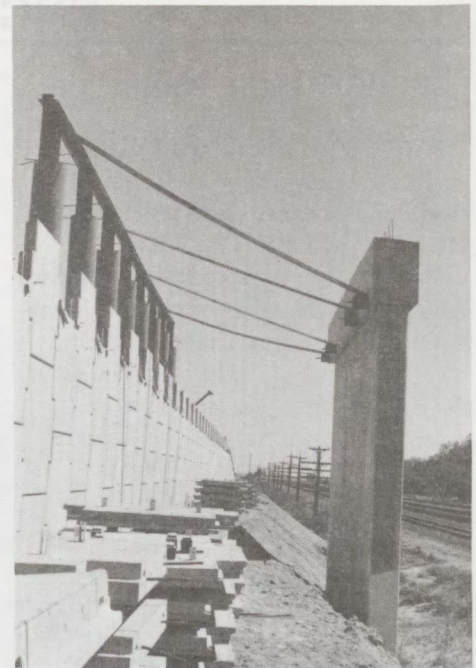
The bridge replacement project south of Ovid was not on the state highway system but was federally funded and administered by the Department. This project cost \$591,000. Construction began in December 1986 and was completed in May 1987.

Railroad Grade Separation in Julesburg

The Department has begun constructing a grade separation over the railroad tracks on S.H. 385 in Julesburg. Included in the project is the easterly realignment of S.H. 385 and the construction of an interchange with S.H. 138.

The project will eliminate highway/train conflicts at the existing at-grade railroad crossing on S.H. 385. The 42 high-speed trains that pass daily through the crossing and additional train switching operations make this the highest volume train crossing in Colorado.

Construction of this \$5 million project is scheduled to be completed in November 1988. Unique aspects of this project include use of reinforced earth retaining walls for the interchange structure and a 26-foot clearance to allow for future needs of the railroad.



Landslide Retaining Wall

A unique tieback wall was constructed along U.S. 160, repairing a large landslide on the west side of Mancos Hill near Durango. Construction started in April and was completed in the Fall of 1987. Total project cost was \$820,000.

Metal rods grounded into solid rock provide the support for this steel and timber vertical retaining wall. This support design is new and promises to be more cost effective than previous methods of retaining wall construction.

This project marks the first time that the design-build concept was used in the bidding process in Colorado. Under the design-build concept, the Department sets criteria for the design of the project, but the contractor is required to submit the final design plans with his bid. The decision to use this concept was based on the unique aspect of the wall construction and the fact that state of the art technical knowledge for the design existed in private industry.



I-25 Resurfacing Larimer County

A five-mile section of I-25 between Loveland and Fort Collins received a concrete overlay this year. This is the first major renovation of this portion of I-25 since it was built in 1964. Included in the project were a number of safety-related improvements, including new guardrail, improved lighting, extensions of culverts, and wider bridges. A parking lot for ridesharers was built at the S.H. 392 interchange.

Prior to placing a new 8-inch layer of concrete on the roadway, over 1,400 square yards of cracked or badly deteriorated slabs of existing concrete were removed. Rumble strips were added to the shoulders to alert drivers when they stray. In addition, bridge decks were rehabilitated.

The \$7.6 million project began in May 1986 and was completed in June 1987. This was one of a series of projects to renovate I-25 north of Denver. These projects are following a northward progression, similar to the sequence followed when the highway was originally built.

PLANNING AND INFORMATION

Long Range Strategic Planning

Each year, the Department develops a Five-Year Program of Projects. This program is a schedule of highway improvements proposed for the next five years on the state highway system given anticipated revenues.

To identify long-range highway construction and maintenance needs, the Department of Highways developed what is known as the "2001 Forecast." The original forecast was developed in 1985 and identified needs in nine specific categories, including the surface condition of our highways, volume capacity and safety.

The most recent update includes an estimate of how much it will cost to correct the deficiencies on the state highway system. Total needs on the existing state highway system were estimated at \$11.64 billion over the next 13 years (1989-2001).

Needs on local jurisdiction roads (roads not on the state system) were more difficult to estimate because of a lack of data, inconsistent design standards, and no agreement on desired performance levels. However, the methodology used generated a preliminary estimate of \$14.98 billion on local jurisdiction roadways. In addition, toll and regional authority roadways are projected to cost \$2.50 billion, yielding a total roadway need in the state of \$29.12 billion

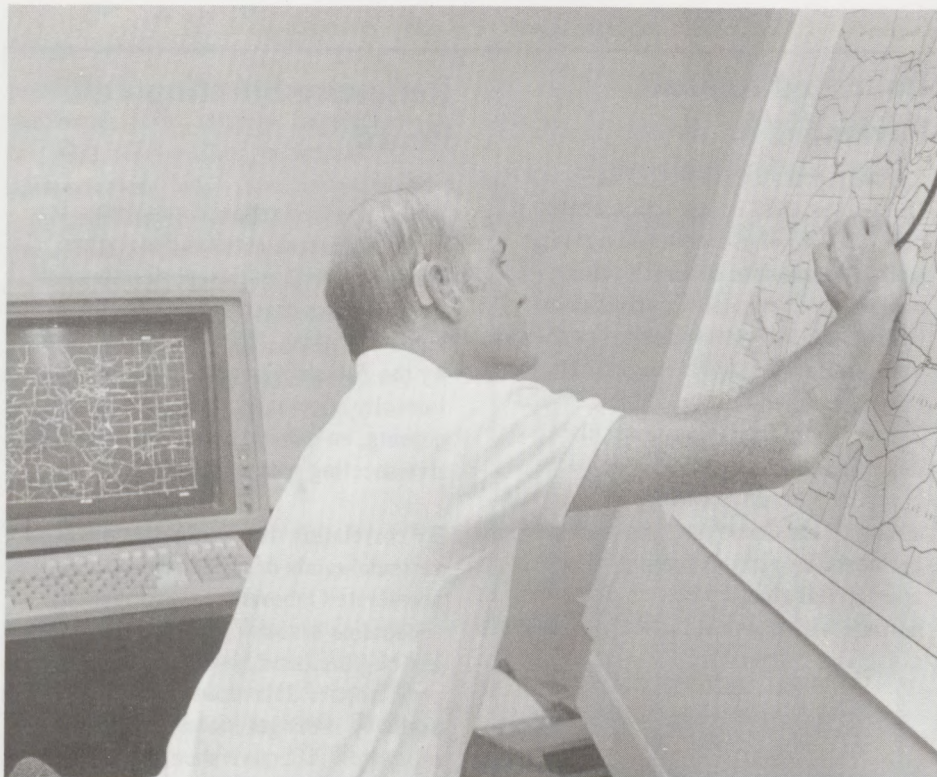
between 1989 and 2001.

The difference between what is needed and the revenue anticipated under current law is the potential funding shortfall. For state highways, the shortfall was estimated to be about \$8.8 billion.

The Highway Commission and the Highway Legislation Review Committee were involved throughout the development of this analysis and have been

briefed on the results. A series of public meetings around the state are planned to present the findings and explain the results. Through such an effort some consensus can be developed on constructive courses of action to close the gap between revenue and need and avoid a major deterioration to our statewide road system. This effort is the first step in the development of a long-range strategic transportation plan.





I-70 West Corridor Study

The Department has recently completed a study of I-70 through Clear Creek, Summit and Eagle counties to project growth in the corridor and the impact on the highway. The Department is working with a task force composed of representatives from local governments, the regional planning agency and the private sector in finalizing recommendations and developing a regional transportation plan for the corridor. Proposed improvements and associated costs are being reviewed and will be presented to the Highway Commission and interested parties in the near future.



Interactive Graphics System (IGS)

The Interactive Graphics Computer-Aided Drafting System (IGS) has been instrumental in automating the Department's highway design activities. With the IGS, drawings can be layered, allowing selected portions to be pulled out and changed, or recalled for reuse in another project, avoiding the need for redrafting.

In addition, the system now plots approximately 1,000 drawings per month, up from 600 per month in 1985. These numbers include both proofing and final sheets.

Geographic Information System (GIS)

In September, the Department began using its Geographic Information System, which allows the Department to link statistical information contained in Departmental data bases to a geographic format.

The Department now is able to portray information contained in numerous data bases graphically. Over twenty different products have been completed, including maps relating to surface condition, traffic volume, deficient bridges and recommended pavement strategies. Because of GIS, the Department has realized a substantial savings in production time and cost from these projects. In addition, the GIS allows the Department to identify errors within the various data bases.

RESEARCH

Pavement Marking

Pavement markings encounter a severe environment in Colorado. Heavy traffic volumes, sanding operations, hard plowing and the ultraviolet rays from the summer sun contribute to the rapid deterioration of pavement markings.

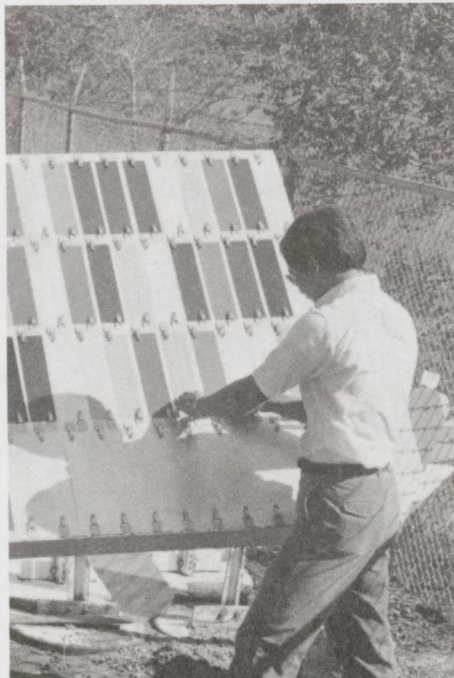
Since the most durable pavement marking material costs about thirty times more than standard traffic paint, research and performance monitoring is determining where the more costly pavement marking should be used.

Epoxy paint, applied on both concrete and asphalt, is being evaluated. One application has lasted for three years on a highway where standard traffic paint had to be applied every six months. Also, since this formula is 100% solids, there is no solvent to evaporate into the air to contribute to air pollution.

On eastbound I-70 just east of Bennett, the Department established a test site for pavement marking materials. Seven brands of preformed marking tape, two formulas of extruded thermoplastic, epoxy paint and standard traffic paint were placed across the roadway to accelerate wear. Test results will determine which brands are acceptable and what is the most cost-effective marking for each highway.

Improved Asphalt Pavement

During the 1987 construction season it became normal procedure to use high stability asphalt to diminish rutting of pavement, which causes vehicles to hydroplane on wet surfaces. For many years, rutting of asphalt pavements has been a problem throughout the United States. To reduce this rutting, the department developed a rut resistant composite pavement which utilizes stiff, strong lower layers and a special low permeability asphalt coating. This special seal coat produces a driving surface with high skid resistance, low tire noise and longer life.



Reflective Sheeting Test Board

With increased reliance on signing for complex interchanges and nighttime construction activities, performance of the reflective sheeting used for these signs is critical. With the recent mandate by the Federal Government to use high-intensity sheeting for all construction signing, an outside test board for reflective sheeting was established.

By correlating the field performance of various brands of reflective sheeting with accelerated laboratory performance, acceptable brands of reflective sheeting can be purchased based on laboratory performance data alone. This insures that highway users get the most for their money on reflective sheeting.

HIGHWAY SAFETY

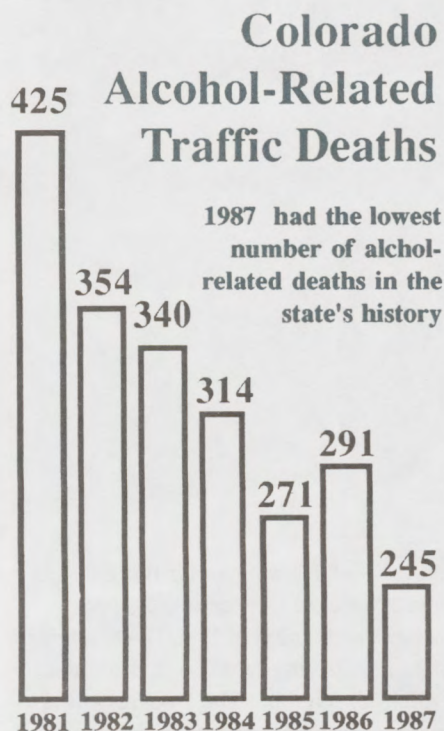
During the past federal fiscal year (October 1, 1986, through September 30, 1987), \$2.6 million in federal highway safety funds were administered by the Department of Highways with 40 grants directly benefiting highway safety activities throughout the state. These included alcohol countermeasures, occupant protection, police traffic services, emergency medical services, traffic records and roadway improvements.

Traffic Deaths

In 1986, there were 603 traffic fatalities in Colorado. The fatality rate (deaths per 100 million miles of travel) dropped to 2.27, compared to 5.91 in 1966. This means that approximately 7,000 lives have been saved over the past 20 years.

Traffic Records

Data is the foundation for highway safety problem identification, evaluation and research. Along these lines, the Department has developed an accident and violation information system for use by police officers and traffic engineers. The Department also has developed, with the assistance of the Colorado District Attorneys' Council, a statewide "DUI Tracking System." According to data from the system, 90 percent of those arrested for driving under the influence (DUI) in 1986 were convicted of an alcohol-related offense.



Occupant Restraints

Increased safety belt use is an important factor in the declining number of traffic fatalities. Even greater use is anticipated, as Colorado became the 29th state to pass legislation requiring motorists to buckle up. The law took effect on July 1, 1987. The Department has many programs to increase the use of safety belts, including citywide model community programs and educational programs for employers and employees. The importance of child safety seats also is emphasized, with loan-a-seat programs in all Colorado counties.



Truck Safety

The Department received the Federal Highway Administration's 1986 Safety Award for producing an innovative video dealing with truck safety. The video warns truckers of a deceptive downgrade on eastbound I-70 in Mount Vernon Canyon approaching Denver. The video is shown to drivers at the Downieville Port of Entry. In the years before the film was shown, there were an average of seven runaway truck crashes annually in the canyon. With the video in place, there was only one runaway truck crash in the canyon during all of 1986.



The Drinking Driver

The drinking driver continues to be the most serious highway safety problem. In 1987, 41.5 percent of all fatal crashes in Colorado involved drunken drivers, down from 48 percent in 1986. There were 245 people killed in alcohol-related traffic crashes in Colorado in 1986. Approximately 34,500 people were arrested for driving under the influence (DUI) in 1987.

To help in the fight against drunken drivers, the Department annually provides DUI detection training to more than 1,000 police officers. The Department also sponsors educational programs for deputy district attorneys and judges covering prosecution and adjudication of drunken driving cases.

The Department is heavily involved in alcohol education programs, especially for young drivers. To emphasize the

dangers of drinking and driving to this age group, the Department helped establish chapters of SADD—Students Against Driving Drunk—at more than 160 high schools. The Department also co-sponsors such events as the annual SADD Rally.

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. As an independent agency not directly involved in law enforcement activities, the Department of Highways was assigned the responsibility of administering the LEAF grants.

In calendar year 1987, there were 35 LEAF projects active in the state, with grants totaling approximately \$1 million.

Statewide, 16 new LEAF projects were implemented in 1987.

Over the years, the LEAF program consistently has increased drunken driving arrests while decreasing alcohol-related fatal crashes. For example, prior to receiving a LEAF grant, 73 percent of the fatal crashes in the city of Pueblo involved drunken drivers. The year following a LEAF grant, arrests for drunken driving increased 110 percent in Pueblo and only 40 percent of the fatal crashes in that city were alcohol-related.

There is no taxpayer investment in LEAF. Drunken drivers fund the projects through a fee assessed upon conviction of an alcohol-related traffic offense.

TRANSIT PROGRAM

The Department administers three Urban Mass Transportation Administration (UMTA) programs.

One program provides federal funding to rural transit operators to assist with the purchase of replacement vehicles and with operating and administrative expenses. During 1987, 17 awards totaling \$1,191,824 in federal funds were made in 27 counties. Agencies receiving these funds used them in combination with other funds to provide 7.6 million passenger trips.

Another program furnishes capital funds to private non-profit transportation providers who serve the elderly and handicapped. During 1987, \$353,865 in federal funds purchased 19 vehicles and 12 mobile radios for 15 agencies. In addition, a Technical Studies grant program provides a funding incentive to encourage coordinated regional transit services in rural areas.



AWARDS

Colorado received two of the 24 "Excellence in Design" awards made biennially by the Federal Highway Administration. The East Riverside Snow Shed south of Ouray on Route 550, constructed to protect travelers from snowslides, placed second in the Highway Support Facilities Category.

Judges also awarded an Honorable Mention in the category of Major Highway Structures to the Department and Figg and Muller Engineers, Inc. for the bridges built on Interstate 70 through Glenwood Canyon. The exceptional design preserved the scenic beauty of the canyon.

4/ MOTOR FUEL TAX INCREASE OF 1986

Colorado motorists have a vested interest in knowing how the Department of Highways has utilized revenues from the 1986 motor fuel tax increase.

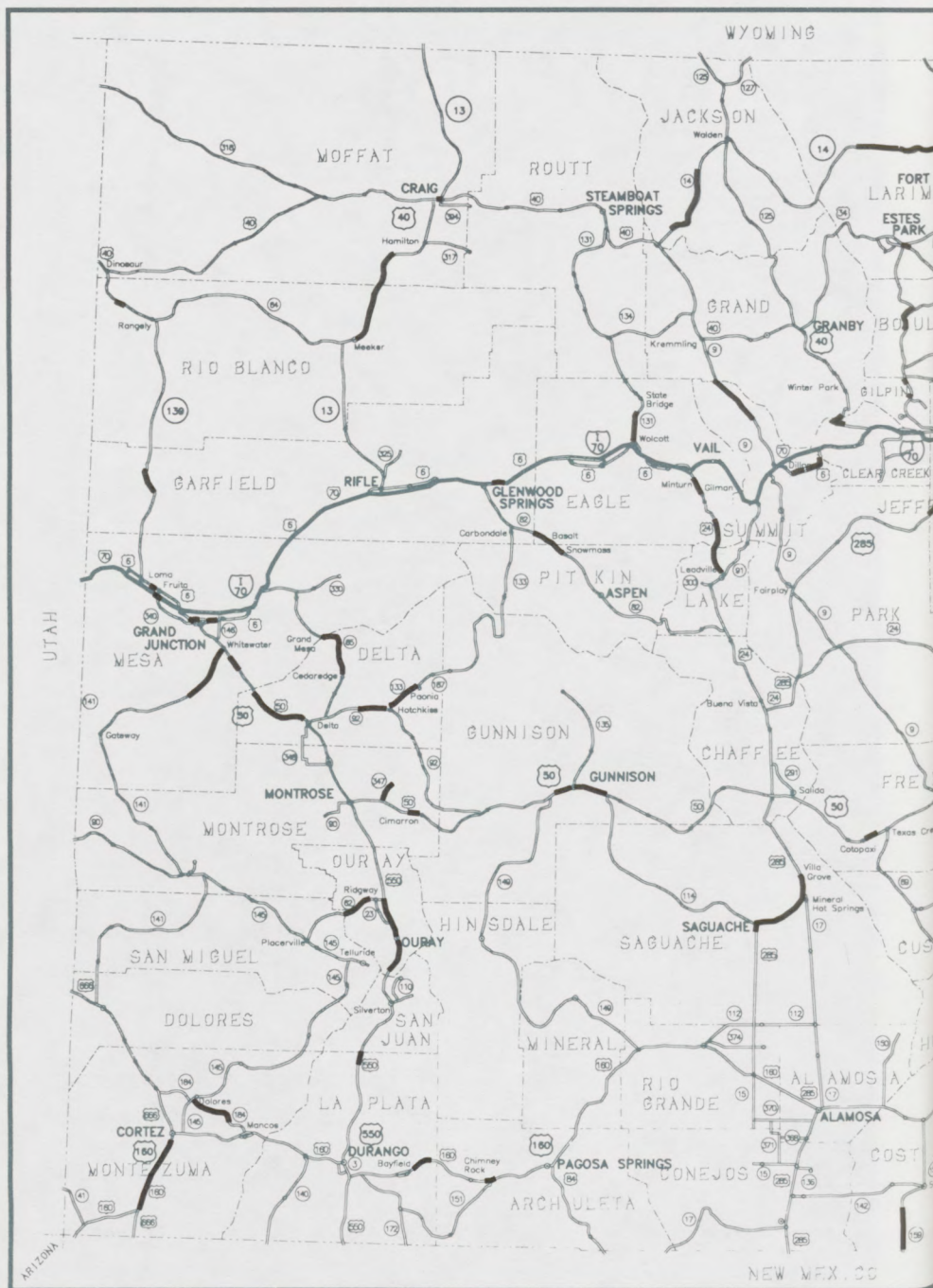
This section provides a summary of how the state has spent its share of the revenues from Senate Bill 36.

SENATE BILL 36

In 1986, the Colorado General Assembly passed Senate Bill 36, increasing the state motor fuel tax by 6 cents a gallon for gasoline and 7.5 cents a gallon for diesel fuel. This additional tax will expire June 30, 1989 unless the tax is extended by the Colorado General Assembly.

The state share of S.B. 36 revenue for FY 1987 and FY 1988 is expected to total \$105.4 million, and is budgeted exclusively for "CX" resurfacing and reconstruction projects on the state highway system.

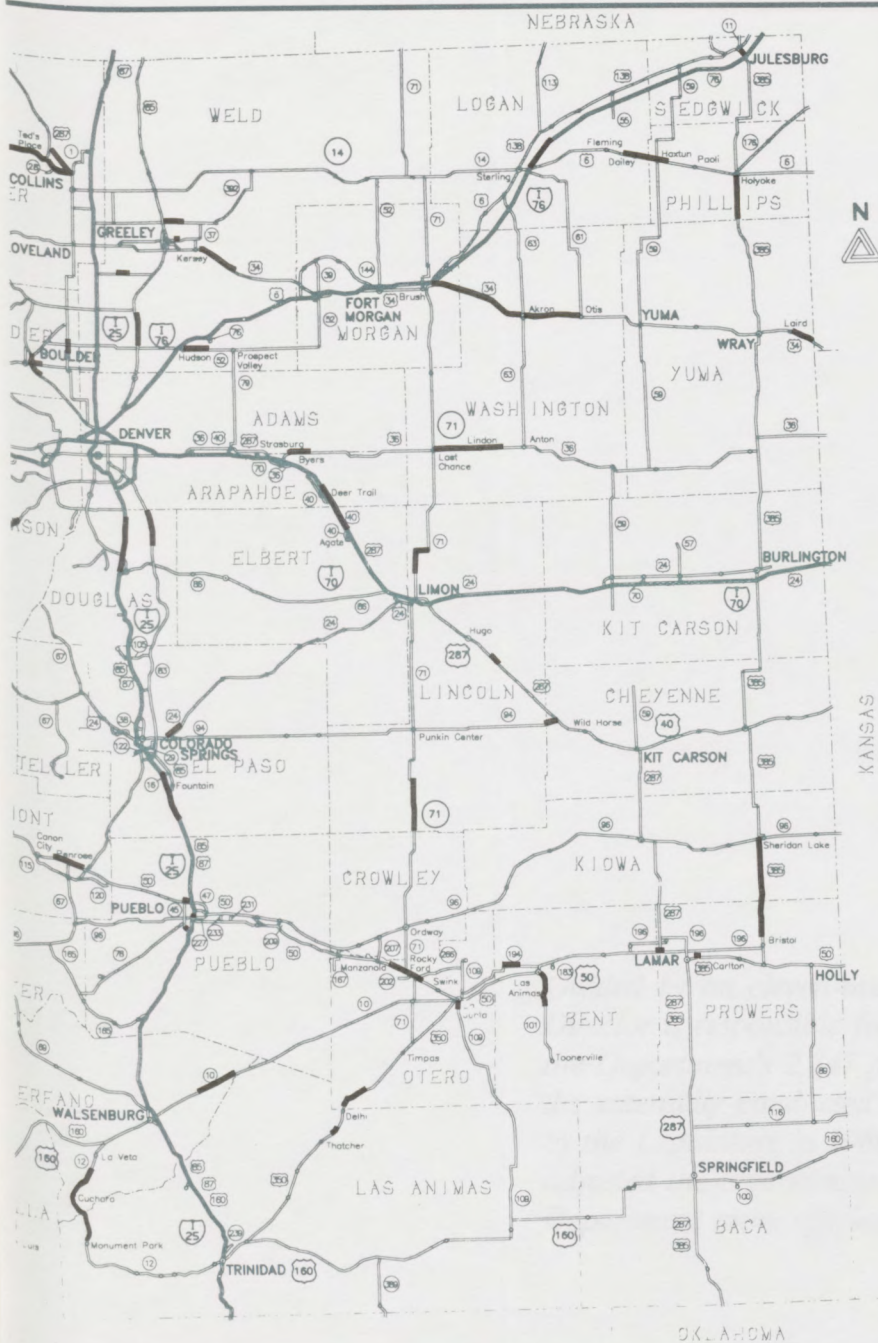
Unfortunately, many of these "CX" projects may have to be postponed indefinitely. This has resulted because \$30 million of General Fund revenue earmarked for state highways in FY 1988 was contingent on state income tax collections, which are now projected to be considerably lower than first estimated. The Highway Department has been informed by both the Legislative Council and the Office of State Planning and Budgeting that the \$30 million from the General Fund will not be available. As a result, 19 "CX" projects totalling \$26.4 million and seven other state highway projects totalling \$3.5 million are endangered and most likely will be delayed.



STATE OF COLORADO CX PROJECTS

FUNDED FROM SENATE BILL 36
FISCAL 1987 AND FISCAL 1988

NOTE - AN ADDITIONAL \$5,379,709 OF SB-36 FUNDS
BUDGETED FOR PRELIMINARY ENGINEERING
AND R.O.W. ARE NOT SHOWN.



DENVER AREA

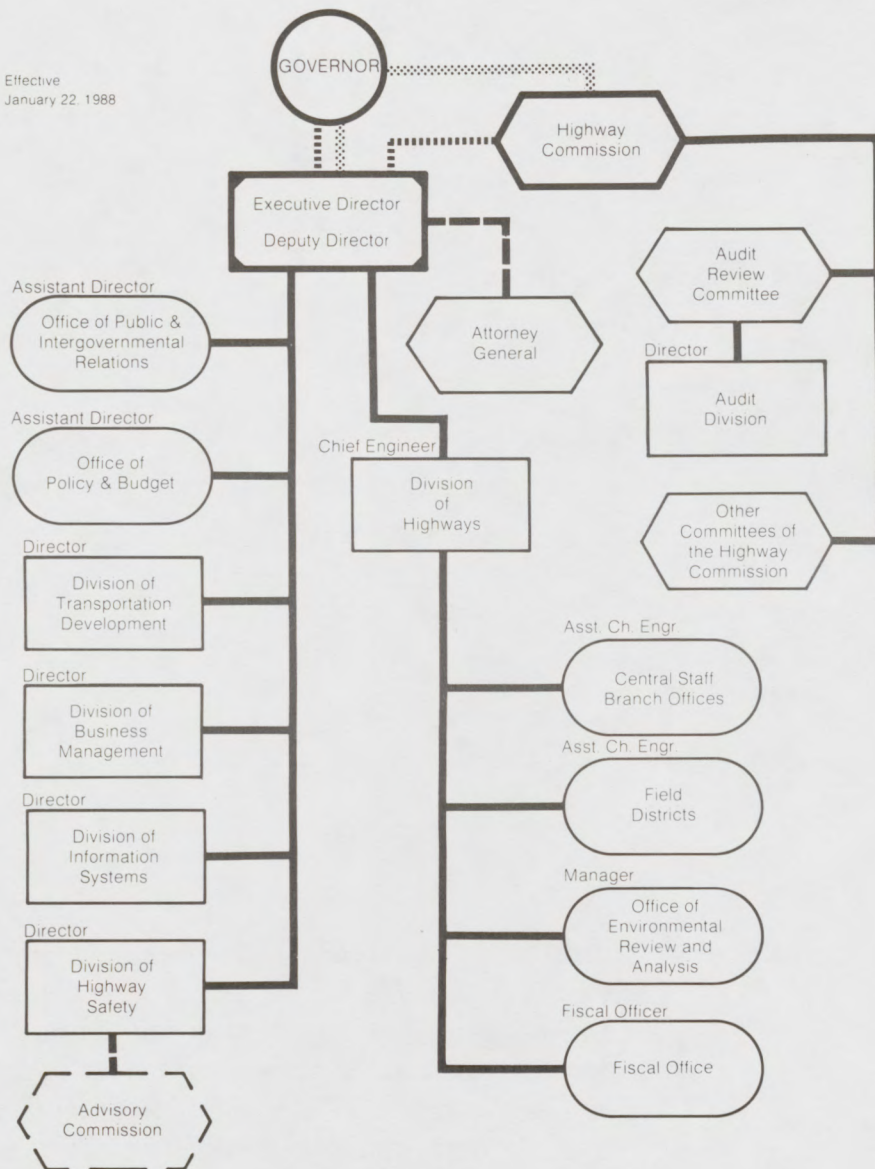
SCALE OF MILES
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5/ DEPARTMENT ORGANIZATION

Guided by an eleven-member Highway Commission, the Executive Director is responsible for the overall direction and management of the Department's 2,847 permanent, full-time employees. As a result of the externally conducted management and efficiency study requested by the Legislature in 1986 as part of Senate Bill 36, the Director has adjusted the organization to consolidate activities, thus making the Department more efficient.

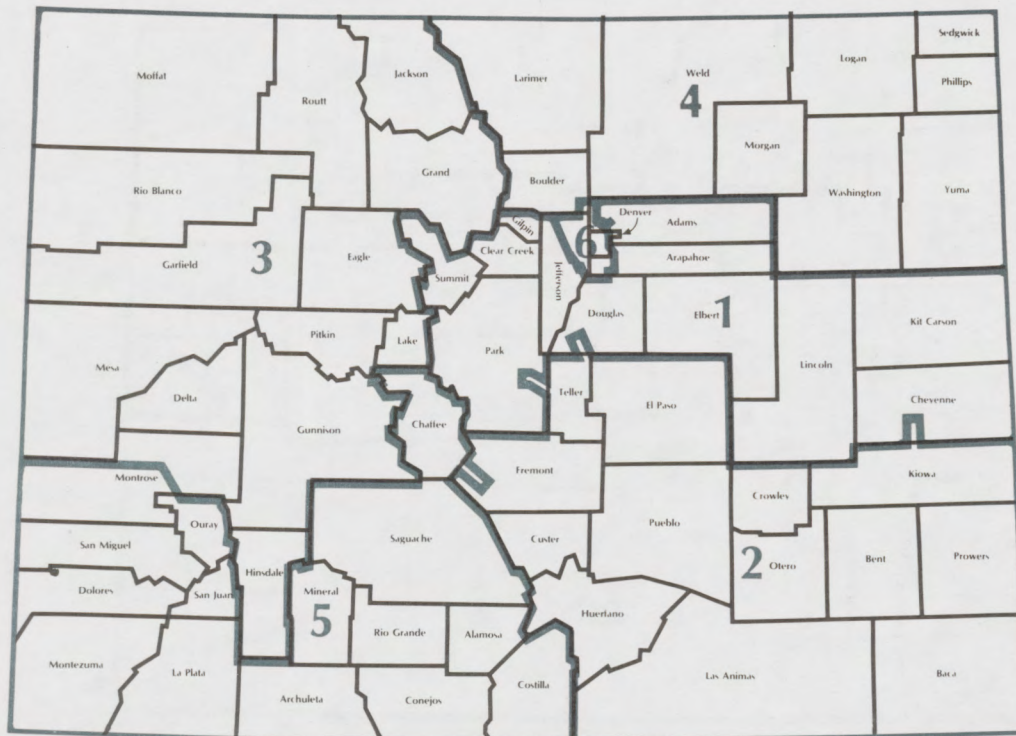
ORGANIZATION OF THE DEPARTMENT OF HIGHWAYS

Effective
January 22, 1988



-.-.- Appointed by the Governor
 - - - Advisory
 - - - Policy & Budget Direction
 - - - Operational Direction

ENGINEERING DISTRICTS



DISTRICT 1

PHILLIP R. McOLLOUGH
18500 E. COLFAX AVE.
AURORA, CO. 80011
(303) 757-9371

DISTRICT 3

ROBERT P. MOSTON
P.O. BOX 2107
222 S. 6TH ST. #317
GRAND JUNCTION, CO. 81502
(303) 248-7210

DISTRICT 5

ALFRED A. SHABLO
214 W 6TH ST.
HIGHWAY BUILDING
DURANGO, CO. 81301
(303) 259-1241

DISTRICT 2

KEN CONYERS
P.O. BOX 536
905 ERIE AVE.
PUELBLO, CO. 81002
(719) 544-6286

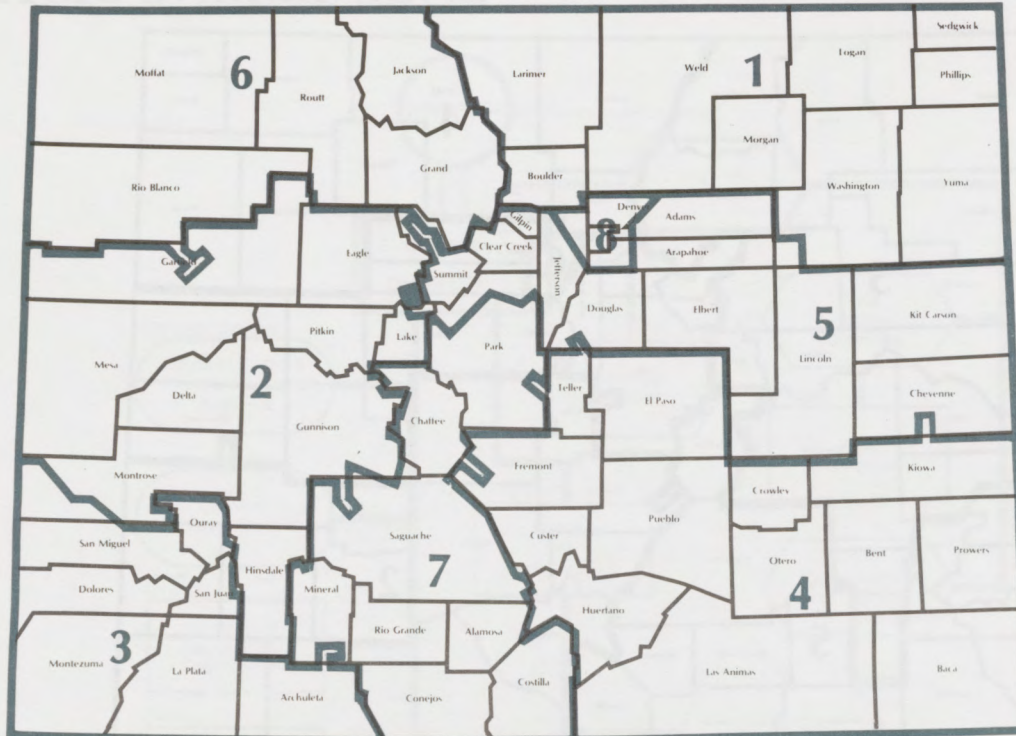
DISTRICT 4

DOUGLAS RAMES
P.O. BOX 850
1420 2ND ST.
GREELEY, CO. 80632
(303) 353-1232

DISTRICT 6

GUILLERMO VIDAL
2000 S HOLLY ST.
DENVER, CO. 80222
(303) 757-9251

MAINTENANCE SECTIONS



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

SECTION 1

DAVE FRASER
1420 20TH ST.
GREELEY, CO. 80632
(303) 353-1232

SECTION 2

BRYCE SANBURG
222 S 6TH ST.
GRAND JUNCTION, CO. 81501
(303) 248-7363

SECTION 3

TED VICKERS
214 W 6TH ST.
DURANGO, CO. 81301
(303) 259-0021

SECTION 4

JERRY WATSON
905 ERIE AVE.
PUEBLO, CO. 81002
(719) 544-6286

SECTION 5

ED FINK
18500 E. COLFAX AVE.
DENVER, CO. 80011
(303) 757-9100

SECTION 6

JOHN SMITH
260 RANNEY ST.
CRAIG, CO. 81625
(303) 824-5104

SECTION 7

TUFFY FOSTER
1205 WEST AVE.
ALAMOSA, CO. 81101
(719) 589-4311

SECTION 8

ORVILLE RHOADES
5640 E. ATLANTIC PL.
DENVER, CO. 80224
(303) 757-9514

SECTION 9

(EISENHOWER/JOHNSON TUNNEL)
ED FINK - MIKE SALAMON
18500 E. COLFAX AVE.
DENVER, CO. 80011
(303) 757-9100

6/ PERFORMANCE INDICATORS

The overall surface condition of the state highway system has continued to improve since 1985. This is only an indication of the smoothness of the ride and the amount of cracking in the roadway surface and does not take into account needed capacity or safety improvements. To stretch the available dollars, the Department has recently done less costly surface repairs rather than the more expensive substantial reconstruction.

EMPLOYEE STATISTICS

	1982-83	1983-84	1984-85	1985-86	1986-87
Number of permanent, full time employees -----	2,888	2,907	2,924	2,940	2,847
Number of protected-class employees (minorities and women) --	581	629	670	744	769
Number of minority employees -----	325	361	385	434	448
Percentage of protected-class employees -----	20.1%	21.6%	22.9%	25.3%	26.3%
Percent of minority employees -----	11.3%	12.4%	13.2%	14.8%	15.3%

ROADWAY SURFACE ACCOMPLISHMENT STATISTICS₁

(Federal Fiscal Year-October 1, 1986 thru September 30, 1987)

Miles treated -----	N.A.	796	1,365	1,573	2,580
Lane- miles treated -----	N.A.	1,894	3,031	3,519	5,001
Surface treatment costs (in millions of dollars) -----	N.A.	\$66.2	\$77.1	\$95.6	\$74.9
Surface treatment cost per lane- mile -----	N.A.	\$34,930	\$25,431	\$27,273	\$14,977

HIGHWAY AND BRIDGE PROGRAMS STATISTICS

Prime contract awards ----- (number of contracts)	197	213	187	187	212
Prime contract awards ----- (in millions of dollars)	\$123.2	\$181.1	\$178.4	\$193.9	\$194.7
Minority Business Enterprise ----- prime contract (number of contracts)	30	36	24	29	30
Minority Business Enterprise ----- prime contracts (in millions of dollars)	\$10.5	\$13.1	\$9.3	\$10.4	\$11.6
Average number of bids received for each project -----	5	5	4	5	5

TRUCK WEIGHT AND SAFETY

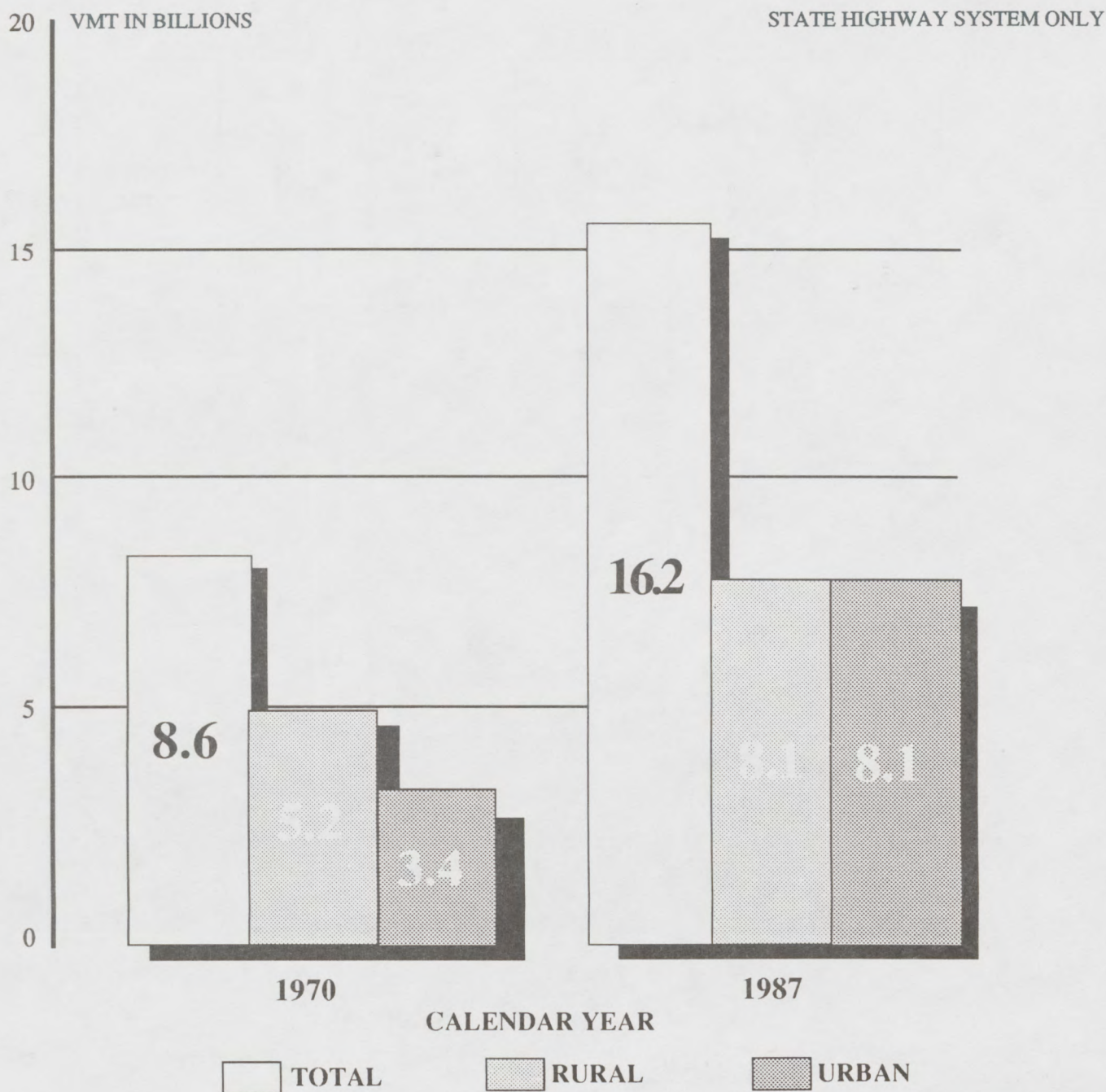
Trucks cleared ₂ -----	2,577,746	3,563,910	3,794,299	3,853,744	3,900,904
Trucks weighed -----	1,824,112	2,329,701	2,848,893	2,757,351	3,213,253
Overweight violations ₃ -----	15,637	24,858	18,633	24,384	28,848
Percentage of weight violations -----	.857	1.07	.654	.884	.898

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.

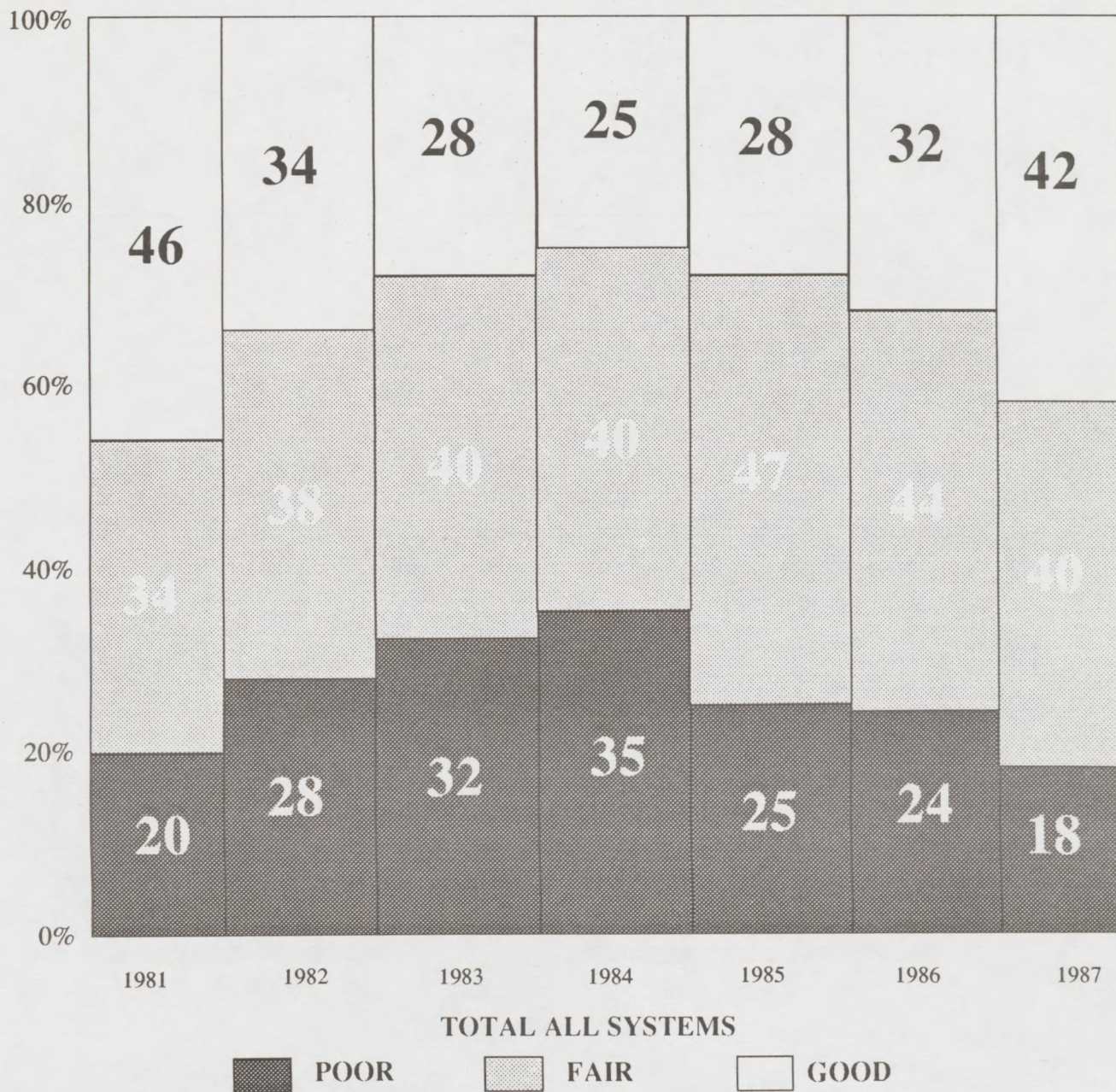
3 Overweight violations include the total number of violations where enforcement represented the number of summonses and number of penalty assessments collected and credited.

ANNUAL VEHICLE MILES TRAVELED (VMT)



SURFACE CONDITION

STATE HIGHWAY SYSTEM 1981-1987



DEFICIENT BRIDGES ON THE STATE SYSTEM, BY COUNTY, 1987

	total bridges by county			total bridges found structurally deficient			total bridges found functionally obsolete		
Adams -----	189	20	0	Lake -----	14	3	2		
Alamosa -----	4	0	0	La Plata -----	24	0	0		
Arapahoe -----	147	5	0	Larimer -----	175	7	7		
Archuleta -----	17	0	0	Las Animas ----	106	6	4		
Baca -----	32	4	1	Lincoln-----	85	8	3		
Bent -----	28	1	0	Logan -----	73	7	0		
Boulder -----	92	4	2	Mesa -----	157	4	0		
Chaffee -----	31	3	2	Mineral -----	10	1	0		
Cheyenne -----	36	0	3	Moffat -----	30	3	0		
Clear Creek ----	65	2	0	Montezuma ----	19	0	0		
Conejos -----	16	0	0	Montrose -----	39	2	2		
Costilla -----	4	0	0	Morgan -----	74	8	1		
Crowley -----	15	1	0	Otero-----	85	6	2		
Custer -----	14	2	0	Ouray -----	17	3	1		
Delta -----	25	5	5	Park -----	37	6	5		
Denver -----	151	5	1	Phillips-----	12	0	0		
Dolores -----	10	0	0	Pitkin-----	10	2	1		
Douglas -----	80	2	0	Prowers -----	47	8	1		
Eagle -----	96	2	1	Pueblo -----	171	8	2		
Elbert -----	61	0	1	Rio Blanco ----	30	4	1		
El Paso -----	228	8	2	Rio Grande ----	17	1	0		
Fremont -----	68	5	7	Routt -----	24	6	0		
Garfield -----	114	5	1	Saguache -----	23	2	0		
Gilpin -----	7	1	0	San Juan -----	5	0	0		
Grand -----	35	12	1	San Miguel ----	6	0	0		
Gunnison -----	28	3	1	Sedgwick -----	31	0	0		
Hinsdale -----	3	0	0	Summit -----	30	0	0		
Huerfano -----	69	3	2	Teller-----	12	1	0		
Jackson -----	11	2	0	Washington ----	32	2	2		
Jefferson -----	178	11	0	Weld -----	228	10	0		
Kiowa -----	17	5	1	Yuma -----	17	1	0		
Kit Carson -----	71	2	0						

	1984	1985	1986	1987
Total bridges -----	3,351	3,547	3,560	3,582
Total structurally deficient -----	194	192	213	219
Percent structurally deficient -----	5.49%	5.41%	5.98%	6.15%
Total functionally obsolete -----	70	67	64	65
Percent functionally obsolete -----	1.98%	1.89%	1.80%	1.76%

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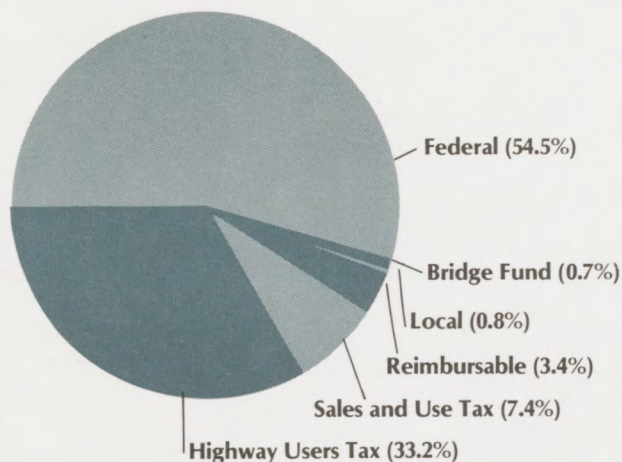
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7/ FINANCIAL DATA

The federal government's Highway Trust Fund is the largest source of revenue for Colorado's Highways. The next largest source of revenue is the Colorado Highway User's Tax Fund (HUTF). In Fiscal Year 1987, the Department budgeted over \$468 million. The majority of these funds were allocated to construction and maintenance activities.

FUNDING SOURCES

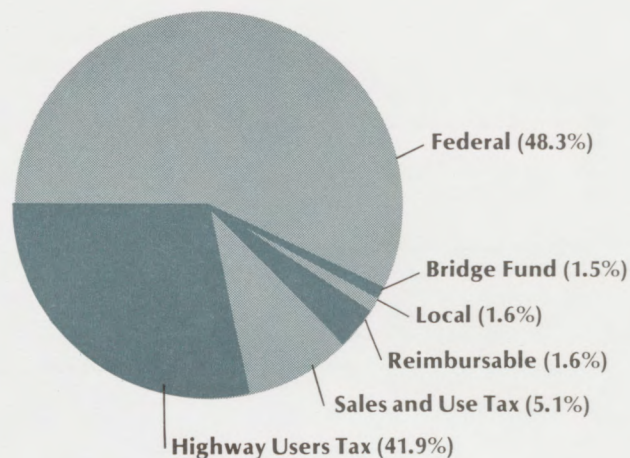
FY 1985-86 - \$420.4 MILLION



State share only of bridge fund
Local share of project costs

FUNDING SOURCES

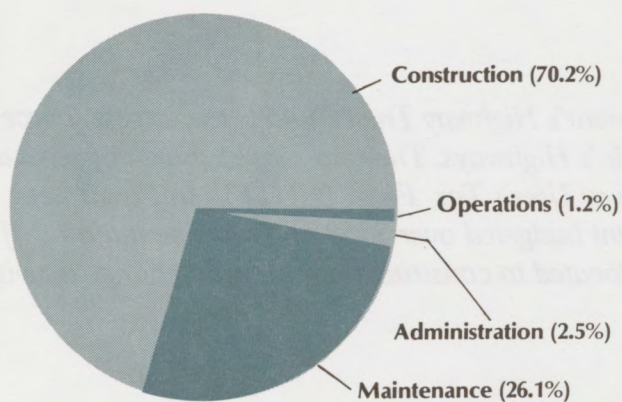
FY 1986-87 - \$468.2 MILLION



State share only of bridge fund
Local share of project costs

BUDGETED ALLOCATIONS

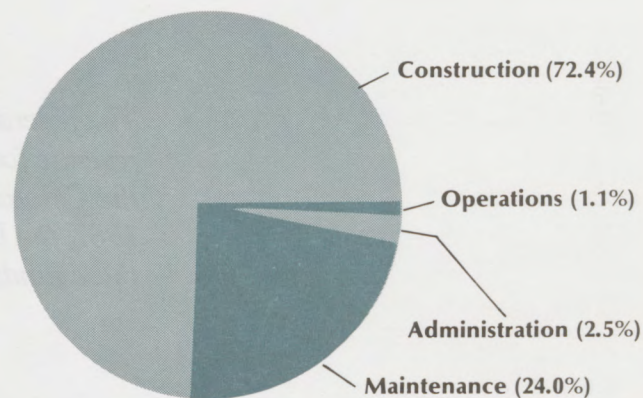
FY 1985-86 - \$420.4 MILLION



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

BUDGETED ALLOCATIONS

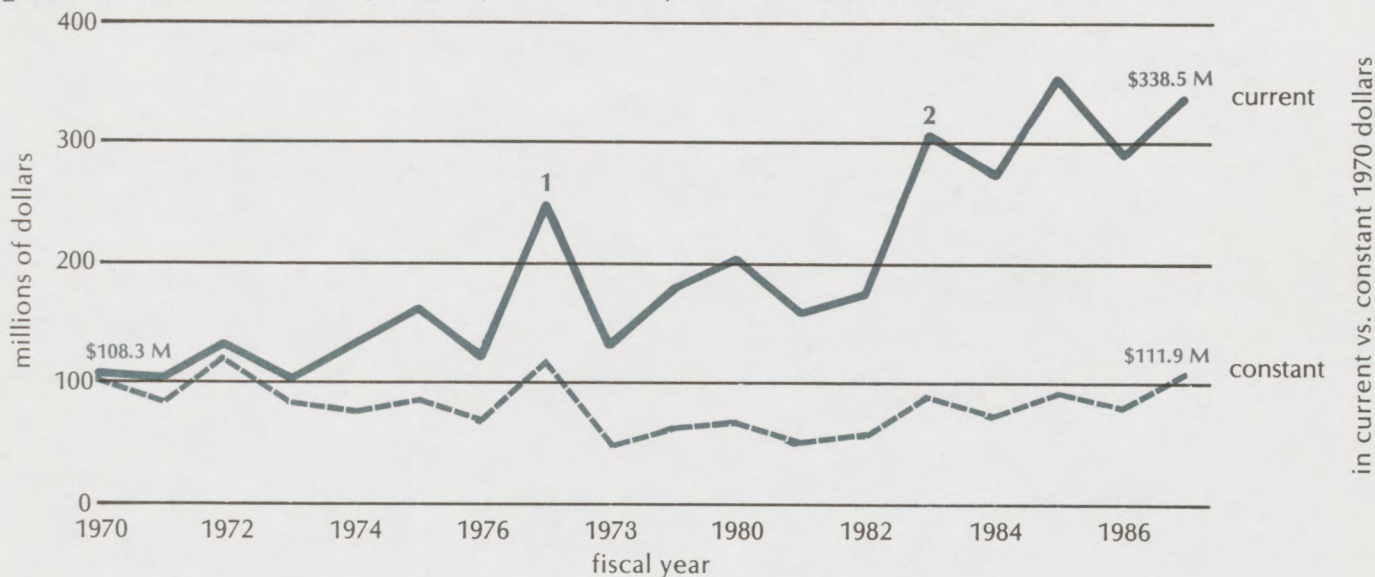
FY 1986-87 - \$468.2 MILLION



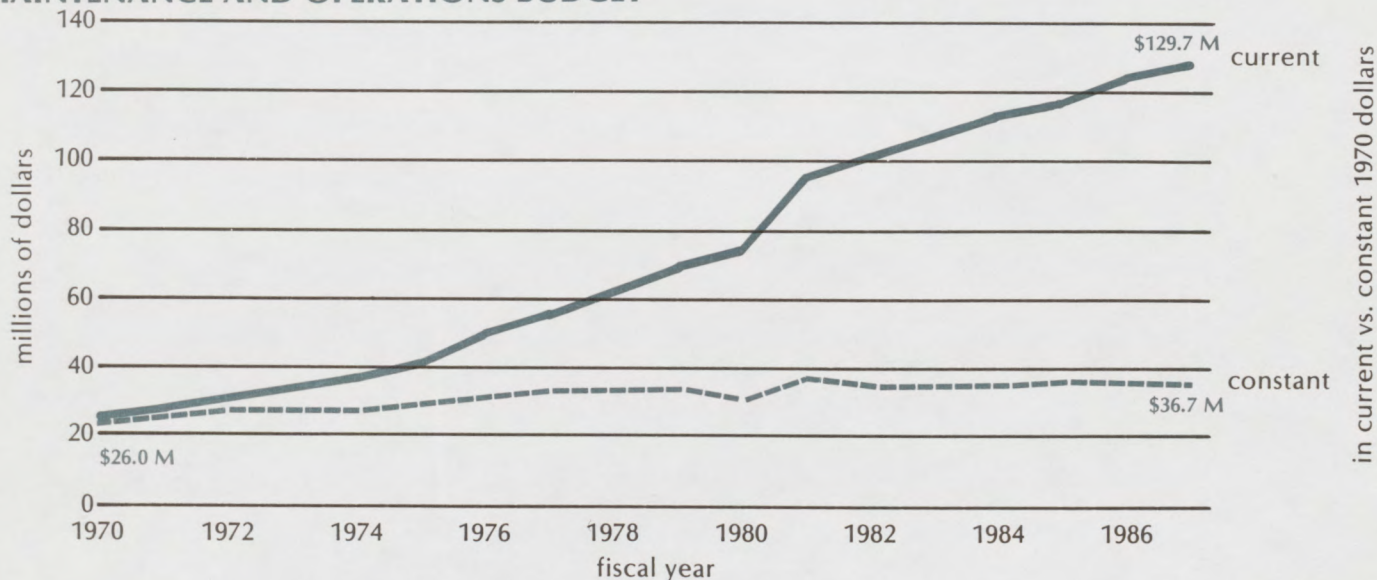
Construction includes new projects, resurfacing, and restoration of existing highways. This figure also includes projects budgeted.

CONSTRUCTION BUDGET

- 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.



MAINTENANCE AND OPERATIONS BUDGET



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