

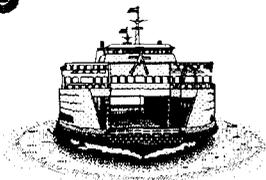
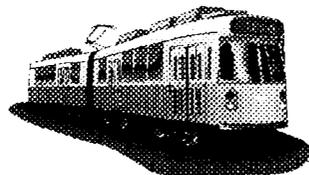
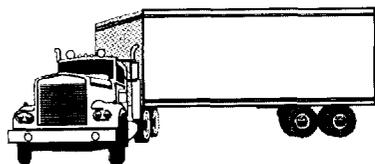
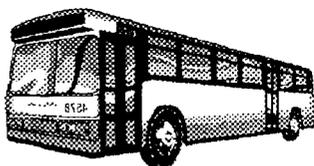
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REVIEW OF THE TRANSPORTATION PLANNING PROCESS IN THE DENVER METROPOLITAN AREA

NOVEMBER 1994

prepared for:
U.S. Department of Transportation
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and
Federal Highway Administration
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prepared by:
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**REVIEW OF THE URBAN TRANSPORTATION PLANNING
PROCESS IN THE DENVER METROPOLITAN AREA**

November 1994

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The federal review team, consisting of staff from FTA Headquarters and Region VIII, FHWA, Colorado Division, and the Volpe Center, participated in the site visit in the Denver area and reviewed drafts of the report. A draft report was provided for comment to the Denver Regional Council of Governments. The assistance of staff from the Denver Regional Council of Governments, the Colorado Department of Transportation, the Regional Transportation District, Colorado Department of Health, Air Pollution Control Division, Regional Air Quality Council, and the U.S. Environmental Protection Agency, Region 8, throughout the review is also gratefully acknowledged. Participating state, regional, and local staff are listed in Appendix 1.

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Glossary of Acronyms

ADA	Americans With Disabilities Act
APCD	(Colorado Department of Health's) Air Pollution Control Division
CAAA	Clean Air Act Amendments of 1990
CBD	Central Business District
CDOT	Colorado Department of Transportation
CMS	Congestion Management System
CMAQ	Congestion Management and Air Quality (Funds)
CNG	Compressed Natural Gas
CO	Carbon Monoxide
CPI	Consumer Price Index
DIA	Denver International Airport
DBE	Disadvantaged Business Enterprise
DRCOG	Denver Regional Council of Governments
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration, US Department of Transportation
FTA	Federal Transit Administration, US Department of Transportation
GIS	Geographical Information Software
HC	Hydrocarbons
HOV	High Occupancy Vehicle
HPMS	Highway Performance Monitoring System
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
LRT	Light Rail Transit
MAC	Metro Area Connection
MOBILE	US Environmental Protection Agency's Mobile Emissions Model
MPO	Metropolitan Planning Organization
O & M	Operating and Maintenance
PDP	Professional Development Program
PM	Preventive Maintenance
PM ₁₀	Fine Particulate Matter
PPACG	Pikes Peak Area Council of Governments
RAQC	Regional Air Quality Council
RDF	Regional Development Framework
RDP	Regional Development Plan
RMP	Regional Monitoring Program
RRT	Regional Review Team
RSA	Regional Statistical Area
RTD	Regional Transportation District
RTP	Regional Transportation Plan
SIC	Standard Industrial Classification
SIP	State Implementation Plan
3-C	Continuing, Cooperative, and Comprehensive (Planning Process)
TAC	Transportation Advisory Committee
TAZ	Traffic Analysis Zone
TCM	Transportation Control Measure
TDM	Transportation Demand Management

Glossary of Acronyms (cont.)

TDP	Transit Development Program
TIP	Transportation Improvement Program
TMA	Transportation Management Area
TSM	Transportation System Management
UPWP	Unified Planning Work Program
US DOT	United States Department of Transportation
US EPA	United States Environmental Protection Agency
UTPP	Urban Transportation Planning Process
UZA	Urbanized Area
VMT	Vehicles Miles Traveled
Volpe Center	John A. Volpe National Transportation Systems Center, Research and Special Projects Administration, US Department of Transportation

I. Summary of Findings and Suggestions

This formal, comprehensive review of the planning process in the Denver metropolitan area was conducted by Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) headquarters and regional staff, with the assistance of the U.S. Department of Transportation's John A. Volpe National Transportation Systems Center (Volpe Center). The federal review team met with representatives of: the Denver Regional Council of Governments (DRCOG), the metropolitan planning organization (MPO) for the Denver metropolitan area; the Colorado Department of Transportation (CDOT); the Denver Regional Transportation District (RTD), the regional transit operator; and the Colorado Department of Health's Air Pollution Control Division (APCD) and the Regional Air Quality Council (RAQC), the agencies responsible for air quality planning in the area; and other agencies.

The federal team concluded that DRCOG's activities were being carried out in accordance with FHWA and FTA regulations, policies, and procedures in place prior to passage of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA), and the MPO is addressing requirements of the ISTEA Interim Guidance. DRCOG and other area agencies performing transportation planning conduct a competently managed and organized continuing, cooperative, and comprehensive (3-C) planning process, produce adequate planning products, and use acceptable planning tools. Efforts are being made to implement a multi-modal planning approach, and the transit operator is involved in the process.

In view of the changing requirements and policies of new law, particularly those of ISTEA and the Clean Air Act Amendments of 1990 (CAAA), the federal team developed a series of observations and suggestions to strengthen each aspect of the transportation planning process. ISTEA includes a requirement for Federal certification of the planning process in metropolitan areas with a population over 200,000. This review will assist the Denver metropolitan area to prepare for future formal certification.

The findings of the federal team are summarized in this section. These observations and suggestions are intended to improve a competent process and reinforce changes that have already been initiated by the region to respond to the requirements of the new laws. Sections of the report where each summary point is discussed in greater detail are noted in parentheses.

A. Organization and Management of the Denver Area Planning Process

1. DRCOG is commended for including RTD and CDOT as major participants on the Transportation Committee. **The inclusion of RTD on the Transportation Policy Committee and the DRCOG Board of Directors is also encouraged. ISTEA regulations encourage the inclusion of representation from agencies that operate or administer major modes or systems of transportation as voting members of MPOs' policy bodies. (III.A.)**
2. DRCOG's Transportation Planning Prospectus, which was prepared in 1981, **effectively demystifies the planning process and provides sufficient information** to any citizen on how to participate and influence decision-making;

however, the document needs to be updated. (III.A.)

3. **The priorities or criteria used by DRCOG's transportation advisory team (known as the Regional Review Team) for selecting tasks to be undertaken for each of the work elements could be documented within the Unified Planning Work Program (UPWP). By doing this, the document would be more responsive to the requirements of ISTEA and the CAAA. (III.B.)**
4. **The UPWP should include all regionally significant transportation planning and management activities in the Denver region, regardless of funding source. The UPWP should present a single integrated picture of regional transportation planning. (III.B.)**

B. Products of the Planning Process

1. **Future Regional Transportation Plans (RTPs) should be comprehensive in that they incorporate detailed information about the region's short-term travel management strategies, elderly and handicapped plan, and pedestrian and bikeway plan. (IV.A.)**
2. **The development of a short to medium range plan (2015) with financial constraints along with a longer range "vision" plan (2020 and beyond) to guide future regional development and project selection is a realistic approach to meeting ISTEA requirements. (IV.A.)**
3. **DRCOG is commended for developing an objective, quantifiable method for evaluating the Transportation Improvement Program (TIP) project submittals and selecting which projects should be included in the program. (IV.B.)**
4. **DRCOG is commended for its efforts to include all significant projects that are funded by local units of government in the TIP. This anticipates the requirement in the Final Rule that air quality non-attainment areas include all regionally significant projects to be funded with non-federal funds in their TIPs. (IV.B.)**
5. **To maximize the flexible funding provision under ISTEA, CDOT needs to adequately indicate the state's regional distribution of federal funds by funding category. Since at least 65% of the ISTEA authorization is flexible, DRCOG needs this information to identify projects, test scenarios in its development of a long-range transportation plan, and select projects for inclusion in the TIP. (IV.B.)**

C. Elements of the 3-C Transportation Planning Process and Related Activities

1. **DRCOG, RTD, and CDOT could develop a formal process to evaluate implemented major transportation investments against planning forecasts and**

the objectives of the region's long-range transportation plan. Investment assessments are becoming increasingly important given ISTEA's efficiency mandate and the scarcity of national and regional financial resources. (V.A.)

2. DRCOG is commended for monitoring land development trends, travel patterns, and levels of traffic and transit service in the region (as documented in the recent Mobility Report). **Data useful in identifying the location and intensity of congestion could be necessary to develop effective congestion management strategies.** (V.B.)
3. DRCOG could **enhance its MPO functions by further developing a Geographical Information Software (GIS) capability.** With this capability, DRCOG would be able to manage the extensive data that are collected, and conduct analyses which combine demographic data, travel and congestion information, and air quality pollutant information. (V.B.)
4. DRCOG and RTD are commended for **conducting corridor and sub-area studies that examine a range of transit solutions.** By considering a range of alternatives, the region demonstrates a commitment to identifying cost effective solutions that will reduce congestion and air emissions. (V.C.)
5. **The planning agencies are commended for initial efforts to develop a congestion management system.** The agencies should also move forward with the development of intermodal and public transportation management systems. These management systems, which are required by ISTEA, will ensure the effective management of both existing and new transportation facilities. (V.C.)
6. **The region is commended for its cooperative and inclusive air quality and transportation planning relationships.** The air quality problems of the region, as well as the action needed to overcome them, seem to be well understood by the planning process participants. (V.D.)
7. DRCOG and RTD work hard at communicating with the public and providing an open planning process; however, **outreach efforts could be expanded to include large employers, employer associations, labor organizations, financial, real estate, and development associations.** This will encourage continued development of a consensus among groups on regional strategies and alternative transportation solutions. (V.E.)

D. Tools, Skills, and Data Bases for Transportation Planning

1. **DRCOG is to be commended for maintaining a well-documented, state-of-the-practice multimodal travel demand modeling process.** Continued use and refinement of the process by participating agencies should prove cost-effective. (VI.A.)

2. Many, if not most, MPOs now use micro-computer techniques exclusively for all aspects of transportation planning. As experience and time and budget permit, **DRCOG could shift away from the mainframe and utilize a micro-computer package** for travel demand forecasting. This would eliminate duplication of the travel demand estimation efforts that are ongoing at RTD, as well as enhance coordination with RTD. (VI.A.)
3. Because the last region-wide home interview survey was conducted over 20 years ago, it appears advisable for **DRCOG to undertake a new survey as soon as possible**. This is necessary to better understand the impact of dramatic population growth and increases in multi-vehicle and two worker households on travel patterns. The updated travel survey will also prepare the region to address ISTEA and CAAA concerns. (VI.A.)

E. Ongoing Transit Planning

1. RTD and DRCOG should define for the public and the region's politicians what **the roles of the different plans and programs that address transit development are**. This would establish the inter-relationships of the Transit Development Program, the strategic transit plan, and the regional transportation plan. (VII.A.)
2. **RTD's strategic plan should include the rationale, as well as the market demand estimates, for rapid transit development in certain corridors, and the financial or cost effectiveness measures that are necessary to justify the investment.** (VII.A.)
3. RTD could expand its performance evaluations to indicate areas where efficiency improvements can be made. **Both the effectiveness and efficiency of transit service should be measured to plan future activities.** (VII.B.)
4. RTD is commended for its special efforts to include minorities when considering new transit services or changes. It is also commended for its **Equal Opportunity and Disadvantaged Business Enterprise (DBE) Program**, which sets goals for securing the participation of DBEs in providing contractual services. (VII.G.)

F. ISTEA Planning

1. DRCOG is **commended for incorporating many of the fifteen factors into its planning process**. DRCOG, RTD, and CDOT are encouraged to incorporate additional factors, such as the rights-of-way preservation, efficient freight movement, and transit security, in their planning. (VIII)
2. **Further integration of the region's transit, congestion, and air quality planning as part of the RTP development process could allow the region's**

planning agencies to maximize the use of the flexible funding feature. (VIII)

3. **DRCOG and RTD are commended for their effective outreach efforts; however, they need to formalize their citizen participation activities to further respond to ISTEA requirements. (VIII)**

II. Introduction

A. Background

On July 13-15, 1993, a team of representatives from the Federal Highway Administration (FHWA) headquarters, division, and regional offices; the Federal Transit Administration (FTA) headquarters and regional offices; and the U.S. Department of Transportation's John A. Volpe National Transportation Systems Center (Volpe Center) met with representatives of: the Denver Regional Council of Governments (DRCOG), the metropolitan planning organization (MPO) for the Denver metropolitan area; the Colorado Department of Transportation (CDOT); the Denver Regional Transportation District (RTD), the regional transit operator; and the Colorado Department of Health's Air Pollution Control Division (APCD) and the Regional Air Quality Council (RAQC), the agencies responsible for air quality planning in the area; and other agencies.

Prior to the site visit, the team reviewed extensive documentation on the planning process in the area. The site visit consisted of structured meetings with staff from regional, local and state agencies responsible for transportation and air quality planning, and the major public transit providers. Participants in the review are listed in Appendix 1. The agenda for the meetings is presented in Appendix 2.

This report evaluates transportation planning in the Denver metropolitan area and summarizes the results of the review in a series of findings and suggestions on planning practices.

Under the regulations in place prior to passage of the Intermodal Surface Transportation and Efficiency Act of 1991 (ISTEA) and the Interim Guidance on the ISTEA metropolitan planning requirements (issued by FHWA and FTA on April 6, 1992), the State of Colorado and the MPO must self-certify that the urban transportation planning process (UTPP) conforms to joint regulations set forth in 23 CFR 450 and the Interim Guidance, which encompass transit, highway, and air quality planning. The federal regulations were designed to ensure that urban areas apply a continuing, cooperative, and comprehensive (3-C) transportation planning process to develop plans and programs which address identified transportation needs in the area, and which are consistent with the overall planned development of the metropolitan area.

Self-certification is intended to grant responsibility for transportation planning to states and MPOs, but does not relieve FHWA and FTA of oversight responsibilities and the obligation to review and evaluate the planning process. One means of satisfying these responsibilities is through periodic independent reviews.

The federal team evaluated whether transportation planning activities of DRCOG and other metropolitan area agencies are being carried out in accordance with FHWA and FTA regulations, policies, and procedures in place prior to passage of ISTEA, and whether the MPO is addressing requirements of the Interim Guidance on ISTEA metropolitan planning requirements. In view of the changing requirements and policies of new law, particularly those of the Clean Air Act Amendments of 1990 (CAAA) and ISTEA, the review was undertaken to develop observations and suggestions to strengthen major aspects of the transportation planning process. ISTEA includes a requirement for federal certification of the planning process in metropolitan areas with

a population over 200,000. This review is intended to assist the Denver metropolitan area to prepare for future formal certification.

B. Scope of the Planning Review

A purpose of this review is to allow FHWA and FTA to determine how successfully the UTPP addresses broadly defined regional transportation needs, and whether the planning process meets the requirements of the joint planning regulations and the Interim Guidance. Another purpose of the review is to assess the ability of the planning process to address broader responsibilities described under the guidelines implementing the Clean Air Act Amendments of 1990 (CAAA) and ISTEA. ISTEA includes a requirement for federal certification of the planning process in metropolitan areas containing urbanized areas (UZAs) with a population over 200,000. This review will assist the Denver metropolitan area prepare for future formal certification.

The team reviewed support documentation that included the TIP; the Regional Transportation Plan, the region's long range transportation plan; the UPWP; and other technical materials related to the UTPP. (Documents reviewed are listed in Appendix 3.)

The review also focused on the transportation and air quality planning activities of DRCOG, CDOT, RTD, and the APCD.

C. Objectives of the Planning Review

In conducting the planning review, the objectives of FHWA and FTA are to determine if:

- planning activities of the MPO and DRCOG are conducted in accordance with FHWA and FTA pre-ISTEA UTPP regulations, policies, and procedures, and the Interim Guidance on ISTEA metropolitan planning requirements;
- regional transportation planning is a 3-C process that results in the development and support of transportation improvements for the Denver metropolitan area;
- the transportation planning process involves representation and input on transportation needs from all levels of government, transit operators, other interest groups, and the public;
- the UPWP adequately reflects all aspects of the UTPP and all transportation planning in the area;
- the transportation planning products, including the TIP and long range transportation plan, reflect identified transportation needs, priorities, and funding resources;
- products of the transportation planning process are multi-modal in perspective, complete, based on current information, and interrelated; and
- requirements and objectives of the CAAA, ISTEA, and the Americans With Disabilities

Act (ADA) are incorporated into the planning process and supported by transportation development activities.

D. Local Transportation Issues

To understand the regional context in which transportation planning is performed in the Denver metropolitan area, the following major transportation issues were identified through discussion with staff from DRCOG and other agencies:

- Issue 1 Population and Employment Growth.** Due to extreme economic cycles, the development of "accurate" population and economic forecasts to be used for regional planning has been difficult. Towards the end of the region's economic boom, which ended in the early 1980s, DRCOG prepared regional socioeconomic forecasts that did not anticipate the duration of the economic downturn that occurred in the mid to late 1980s. DRCOG has recently revised its regional forecasts to account for the downturn. The latest forecasts indicate that the level of population and employment projected in the mid-1980s for the year 2010 will not occur until 2017.
- Issue 2 Regional Population and Employment Shift.** Between 1980 and 1991, population in the Denver region grew by 16 percent from approximately 1.6 million persons to 1.9 million, and employment grew by 23 percent from about 757,000 employed workers to 984,000. The growth occurred primarily in the suburbs. The City and County of Denver's share of the regional population fell from 30 percent to 25 percent, and its employment share dropped from 49 percent to 41 percent. As a result of this shift, suburban interests will exert an increasing influence on regional planning and demand future commitments to capital investments.
- Issue 3 Air Quality.** The non-attainment area is currently classified moderate for carbon monoxide and fine particulate matter (PM₁₀), and transitional for ozone. Denver, which is known for its brown cloud, has been actively fighting its air quality problem since the 1970s, focusing primarily on the reduction of carbon monoxide and ozone precursors. The region's transportation and air quality planners currently believe that the development and implementation of an effective PM₁₀ strategy will be the region's greatest air quality hurdle.
- Issue 4 Financing of Transportation Projects.** The 2010 long-range plan adopted in 1987 identifies \$11 billion in transportation needs; however, only \$4.0 billion in revenues will be available from current sources. As part of its recent efforts to revise its transportation plan to 2015, DRCOG is developing six different financially constrained scenarios. Nevertheless, even with slower growth than anticipated in the 2010 plan, DRCOG believes resources are inadequate to finance transportation improvements and maintenance of the existing infrastructure. (Also, with the passage of Amendment 1, which is Colorado's equivalent to California's Proposition 13, the complexion of the public financing environment and the ability to develop new revenue sources for transportation and capital

needs have become more difficult.) Attempts to secure additional funding through new taxes and fees have been either rejected by the state legislature or vetoed by the governor. Currently, the MPO is developing a proposal for additional financing.

Issue 5 **Light Rail Transit (LRT) Development.** The development of a regional LRT system has been under study since the 1970s; however, the political and public interests have not been able to unite to support its development. The region recently began construction of a 5.3 mile light rail segment to serve the central business district (CBD), which could eventually be extended to serve commuters originating in the region's southwest corridor. Further development of a regional light rail system with a CBD focus could be hampered by the shift in population and employment patterns, and the growth in suburb-to-suburb trip-making.

Issue 6 **Real Estate and Economic Development.** The City and County of Denver has been pursuing the development of the Central Platte Valley, which rings Denver's downtown. Its development could strengthen the economic vitality of the city center and generate new sources of tax revenue. Recent investment in lower downtown's infrastructure, such as the redevelopment of the Denver Union Terminal Building as a multi-modal terminus, construction of the new baseball stadium, and reconstruction of the bridges and access roads that cross the Valley (and connect to the region's north-south interstate), could spur this development.

Issue 7 **Airport Access.** Denver International Airport (DIA) is scheduled to open in early 1995. Despite recognition in preliminary planning studies of the need for a greatly expanded ground transportation network to serve the remote location, regional and city planners are concerned that the roadway and transit systems are inadequate to meet short-term peak hour demand for the airport. Even though the local roadway system was improved in anticipation of the airport's opening, planners are concerned that the roadway and transit networks (including the possible construction of a light rail connection) still need to be expanded to satisfy the peak hour demand and provide continuous connections to the region's population centers.

III. Organization and Management of the Planning Process

A. Metropolitan Planning Organization

DRCOG is a voluntary association of city and county governments serving eight counties - Denver, Arapahoe, Adams, Boulder, Douglas, Jefferson, Clear Creek and Gilpin - and over forty municipalities. The region, which has approximately 1.88 million people, is comprised of three urbanized areas - Denver, Boulder, and Longmont. The organization provides planning and technical support to its members, and acts as a forum for transportation, air quality, growth and development, water quality, and aging issues.

The Governor of Colorado designated DRCOG as the MPO for the Denver/Boulder urbanized area in 1977. A Memorandum of Agreement was entered into by DRCOG, Colorado Department of Highways (predecessor to CDOT), and RTD to cooperatively conduct the planning process in the Denver area. DRCOG, as the MPO, is responsible for operation and maintenance of the urban transportation planning process. Although DRCOG serves eight counties, the MPO's area or boundaries approximate six of the eight counties (Denver, Arapahoe, Adams, Boulder, Douglas and Jefferson). DRCOG, CDOT, and RTD are responsible for carrying out selective portions of the process in a fashion that complements the region-wide planning process.

Policy and management direction for DRCOG is governed by a Board of Directors. The Board has forty-seven members representing the different local governments participating in the organization. The Board is also the policy body for the MPO. It is supported by a number of committees that provide advice on technical and policy issues.

The key committee advising the Board is the Transportation Committee. Its ten members represent DRCOG, the State of Colorado, and RTD and they are charged with the management of the urban transportation planning process. The Board can either accept or reject a recommendation of the Transportation Committee; however, it can take no action as the MPO without the concurrence of the Transportation Committee.

The Transportation Committee has ten voting members. Four of the members represent DRCOG and the remaining six positions are evenly split between CDOT and RTD. Three of DRCOG's positions are assigned to its Chairman, Vice Chairman, and a Board member, all of whom are elected officials. The fourth DRCOG member is its Executive Director. The state's positions are assigned to the Chairman of Colorado's Transportation Commission, a member of the Commission designated by the governor, and CDOT's Executive Director. RTD's representatives include its Chairman of the Board, another Board member, and its Executive Director. All of RTD's Board members are publicly elected.

In addition, the Transportation Committee has two non-voting members representing the Colorado Air Quality Control Commission and the Regional Air Quality Council (RAQC). The Air Quality Control Commission is the state's statutory organization responsible for implementing the CAAA and approving state implementation plans (SIPs). The RAQC is the lead agency for preparing SIPs and identifying different transportation control measures (TCMs) for the Denver region. The organization was formed by mandate by the governor but has no statutory authority.

The Transportation Committee is supported by the Regional Review Team (RRT) which is comprised of technical managers from DRCOG, CDOT, RTD, the state divisions of Planning and Air Pollution Control, and other agencies responsible for activities funded through the UPWP. The RRT's responsibilities include: 1) coordinating the UPWP work activities and schedules; 2) providing information on the status and progress of UPWP activities; 3) providing a forum for inter-agency input to UPWP activities; and 4) conducting technical reviews.

Another key committee reporting directly to the Board is the Transportation Policy Committee. It is intended to provide other viewpoints regarding technical and policy-oriented transportation issues. Its membership includes DRCOG Board members and individuals representing the public and private sectors. RTD, which is not represented on this committee, has expressed concern about the lack of transit representation. It has formally submitted a request to DRCOG to become a voting member; however, a decision regarding its membership was pending at the time of the review.

The Transportation Advisory Committee (TAC) which supports the Transportation Policy Committee, includes traffic engineers and transportation planners from municipalities, counties, and implementing organizations in the region. It also includes ex-officio participants from state and federal agencies. All members are appointed by DRCOG to: 1) review the transportation planning process and advise on the methods of planning, programming, and implementation; 2) review and provide advice to the Transportation Committee on plans and programs and amendments as they affect local governments; 3) advise the Transportation Committee on local government concerns dealing with transportation issues; and 4) develop regionwide standards for construction, operation, and maintenance of the transportation network.

To make use of citizen expertise and encourage public input, ad hoc advisory committees are established to address issues such as providing transportation services to the elderly and individuals with disabilities, and improving bicycle and energy usage. The committees are disbanded once their objectives are met. During the life of the committees, members work with DRCOG staff in preparing and reviewing elements of the region's transportation plan and programs.

Advisory task forces are also established for corridor and location studies to assure participation in the planning process by affected units of government and public agencies. These advisory committees are established as sub-committees of the Transportation Advisory Committee. Membership is frequently broadened to include other affected groups.

Observations and Suggestions

1. **DRCOG is commended for developing a comprehensive committee structure for incorporating regional and local transportation planning interests** into the plan and program development process. The committee structure permits the involvement of locally elected officials in the development of the region's transportation policy. Also, ample opportunity exists for technical staff from different transportation related agencies, and public and private representatives to participate.

2. DRCOG is commended for including RTD and CDOT as major participants on the Transportation Committee. **The inclusion of RTD on the Transportation Policy Committee and the DRCOG Board of Directors is encouraged. ISTEA regulations encourage the inclusion of representation from agencies that operate or administer major modes or systems of transportation as voting members of MPOs' policy bodies.**
3. DRCOG's Transportation Planning Prospectus, which was prepared in 1981, is out-of-date, and **needs to be updated to accurately describe the organization, and roles and responsibilities of the agencies participating in the urban transportation planning process.** In terms of organization and depth, the 1981 Prospectus effectively demystifies the planning process and provides sufficient information to any citizen on how to participate and influence decision-making.

B. Unified Planning Work Program

The UPWP is prepared annually by DRCOG in cooperation with CDOT and RTD through the MPO committee structure. This is done in accordance with the joint FHWA/FTA metropolitan planning regulations as defined under ISTEA. It is adopted by the DRCOG Board upon the recommendation of the Transportation Committee.

The document describes all urban transportation-related planning activities, including air quality planning, that are anticipated in the region each year. The regional 1993-1994 UPWP is composed of projects with an overall budget of \$10.6 million. Of the \$10.6 million, approximately \$1.7 million represents the DRCOG planning budget with the remaining \$8.9 million representing one time special grants received by RTD, the City and County of Denver and others. The UPWP primarily contains federally funded activities, although RTD regularly includes its more significant, non-federally financed projects. ISTEA requires the UPWP to include all significant planning activities regardless of funding source and implementation responsibility. By doing this, DRCOG will present a single comprehensive description of regional transportation planning to public agencies, the private sector, and citizens.

Work items that are included in the UPWP are developed by the participating agencies. However, before their inclusion in the UPWP, they are discussed at RRT meetings. These meetings provide an opportunity for the participating agencies to discuss differences in opinions with respect to work task priorities and to reach a consensus regarding which work tasks should be included each year. The issues and needs of local governments are expressed through the TAC and other advisory committees which support the 3-C planning process. This provides local governments with an opportunity to modify or influence work priorities.

The UPWP is very well organized. Its introduction describes how the UPWP's tasks ensure the continuation of the urban transportation planning process and the development of the RTP and its elements. The status of the RTP and its elements are described. This description includes a list of tasks related to the continued development of the transportation plan which were identified and completed under the preceding work program.

The document's introduction identifies which of the projects that have been included in the UPWP are regional priorities. These projects are:

- evaluation of alternative development/transportation scenarios;
- adoption of the interim 2015 Regional Transportation Plan, including bicycle and pedestrian elements;
- preparation of transportation inputs for SIP development; and
- further definition and implementation of a Congestion Management System (CMS).

These priorities are consistent with the requirements of ISTEA and the CAAA. However, no information is provided on how annual regional planning priorities are developed, what the priorities are and how these priorities drive the selection of the UPWP's work elements and tasks. This information needs to be provided to ensure that a clear rationale exists for the decisions made by the RRT and that the public understands what criteria were used to select tasks.

The UPWP establishes the importance of air quality planning and describes how it has been integrated into the 3-C planning process. The section that is dedicated to this topic describes: 1) the extent to which the adopted 2010 RTP and the proposed interim 2015 RTP include transportation proposals which would reduce air pollution; 2) the air quality conformity analysis that DRCOG completed of the 1993-1995 TIP; 3) what state and regional agencies participate in air quality planning; and 4) what tasks have been included in the current UPWP to enhance air quality and transportation planning.

The UPWP is organized into the following ten work elements:

- Program administration and management;
- Monitoring and performance analysis;
- Comprehensive regional planning;
- Transportation planning data base;
- Methods development and refinements;
- Surface transportation planning;
- Transportation plan maintenance;
- Transportation system management analysis;
- Transportation Improvement Program; and
- Local technical assistance.

At the beginning of each work element, an objective statement is included. This is supported with a succinct list of products that will be undertaken during the year, and the agencies that will be involved. Tables are included at the end of the UPWP document which identify expenditures by agency and funding source for each of the work elements.

Observations and Suggestions

1. **DRCOG is commended for developing a well organized UPWP that clearly establishes its importance in managing the 3-C planning process and continuing the development of the RTP.**

2. **The UPWP's format for the work elements could be enhanced to improve its use as a management tool.** This could be accomplished by briefly describing or identifying the following: 1) the approach that will be taken to complete different work elements; 2) the relationship to work conducted in previous years; 3) the completion dates for each of the products; and 4) the funds and funding sources for each of the products.
3. **The priorities or criteria used by the RRT for selecting tasks to be undertaken for each of the work elements could be documented within the UPWP.** By doing this, the document would be more responsive to the requirements of ISTEA and the CAAA. In addition, it would provide the public with a more complete picture of the rationale for selecting certain activities.
4. **The UPWP should include all regionally significant transportation planning and management activities in the Denver region, regardless of funding source.** RTD is commended for regularly including its more significant, non-federally financed projects. The inclusion of all significant projects is a requirement of the ISTEA Final Rule. It will improve the quality of the 3-C planning process by providing a more coordinated and informed mechanism for setting priorities in accordance with regional goals, and programming scarce resources.

C. Self-Certification

Self-certification was completed by the MPO on July 28, 1993, following the independent planning review. The governor also found the planning process to be in compliance with ISTEA on October 15, 1993.

IV. Products of the Planning Process

A. Regional Transportation Plan

The development of a system-wide transportation plan is an important product of a region's coordinated, cooperative, and continuing transportation planning process and is a major focus of the ISTEA Final Rule. The most recent transportation plan, known as the Regional Transportation Plan (RTP), was adopted by the DRCOG Board in July, 1987. It has a 2010 planning horizon. In response to the ISTEA requirements for a financially constrained plan, DRCOG was developing a 2015 RTP. It will examine the impact of six alternative investment scenarios (based on different expectations of revenues) on mobility and air quality. Following the adoption of the 2015 RTP, DRCOG will proceed with the development of a 2020 RTP which will include scenarios that examine different urban forms and transportation services. (More information on ongoing planning activities is discussed in section V.C.)

The adopted RTP is not a very extensive document. Instead, it is a glossy fold-out which succinctly identifies goals and policies for guiding facility development as well as surface transportation facility needs. In comparison to plan documents prepared by other MPOs, the fold-out format is innovative. It is also very readable, which facilitates an understanding of the regional transportation planning process by the public.

The RTP is a needs based plan that includes \$11.2 billion of highway and transit improvements. At the time the RTP was developed, DRCOG estimated that this level of investment would be necessary to maintain current levels of mobility. Highway and transit improvements are estimated to cost \$8.9 billion and \$2.3 billion, respectively. The RTP estimated that \$4.0 billion in revenues would be available from current sources during the planning period (1987 - 2010). To fund the improvements, the RTP recommends raising the additional revenue from local and regional sources; however, no specific recommendations for funding the \$7.2 billion shortfall are identified. The costs of the six different scenarios being developed for the 2015 RTP are being constrained to \$3.7 billion to \$4.4 billion.

The transportation demand projections embodied in the current RTP do not reflect current economic, demographic, and land use projections. Over the last year, these demographic and land use projections have been revised and will be used in the preparation of the 2015 plan. The earlier projections of population and employment levels did not incorporate the impact of the economic downturn that the region experienced from the mid-1980s to the beginning of the 1990s. The new demographic projections, which incorporate the effects of the recession, indicate that the original 2010 population and employment growth estimates will be delayed by about seven years.

The RTP identifies roadways which are regionally significant. These include freeways, major regional arterials, and principal arterials. The plan only details facility needs at the corridor level (and not the street level). The responsibility for determining specific alignments and design treatments rests with the appropriate state and local agencies. As part of the RTP, an expanded and upgraded freeway and major regional arterial system is proposed. These improvements, which would add 3,600 lane-miles to the existing roadway system, would approximately double

existing capacity, but would still leave over 25 percent of the roadway network below level of service D.

The transit component of the RTP includes the existing bus network and a proposed rapid transit network. The bus system, however, is only discussed briefly. No detailed information is provided regarding the maintenance or expansion of the bus system to serve travel demand or support the utilization of a region-wide rapid transit system for the target year of 2010.

The proposed rapid transit system calls for the development or implementation of the most cost-effective solutions in the region's most congested corridors. It does not identify what any of those solutions would be by corridor. Instead, it states that the solutions could include busway/high occupancy vehicle lanes, light rail lines, or other technologies. The system network that is proposed in the RTP includes seven different corridors and proposed station locations.

In many respects, the RTP fold-out is an umbrella document supported by stand-alone plans that address elements of regional transportation planning, including:

- "Mobility Management in the Denver Region" -- This is essentially a short-range plan that identifies strategies or actions for achieving greater efficiency from the existing transportation network. It was last updated and reaffirmed in February, 1992.

The actions identified in the plan are intended to reduce trips, manage or facilitate travel on the freeway system, reduce traffic conflicts on arterial roadways, and enhance alternative forms of transportation through "low capital-intensive" projects. To accomplish this, the plan identifies the following categories of region-wide activities: trip reduction programs, parking policies, ridesharing, and telecommuting. The plan also recommends the adoption of similar activities at the subarea and corridor levels.

- "Elderly and Handicapped Transportation Plan" -- This plan, which was updated in June, 1991, provides policy direction regarding the provision and delivery of transportation services to the region's elderly and handicapped population. Since funding for elderly and handicapped special services transportation is a critical issue, three different service options were considered in the plan. These options included: 1) meeting all the demand; 2) continuing to service the same percentage of travel demand; and 3) meeting the current level of trips served.

To determine long-term elderly and handicapped travel demand at the regional level, DRCOG began by examining national trends. Total annual travel demand for the elderly and persons with disabilities (i.e., special services) is currently estimated at 9 million trips. Since 1980, travel demand for this market segment increased by 29 percent. DRCOG has projected that travel demand of the elderly and persons with disabilities will increase to 15.4 million trips or by 71 percent by the year 2010.

- The "Regional Bicycle Transportation Plan" -- DRCOG has prepared a work plan for updating this plan. Completion of the update is anticipated to occur during the fall of 1993. The plan will include strategies and actions to improve pedestrian and bicycle movement and safety within the region. The intent of the plan is to enhance the

perception of walking and bicycling as viable alternative modes of travel to the single occupant motor vehicle.

The transportation needs identified in the RTP are based on the market-based urban development scenario and policies in the Regional Development Plan (RDP). New policies are being developed to better reflect intermodal and multimodal concerns as well as land use and transportation interrelationships. These policies are being developed by MPO committees.

A "vision" task force, which includes six board members, local transportation directors, and representatives from environmental, business, and neighborhood groups, was formed specifically to identify different urban form and transportation scenarios. This "visioning" activity is intended to form the basis of the MPO's 2020 RTP. DRCOG intends to develop a staging component for project implementation of the RTP after the 2020 RTP process is concluded.

TCMs, adopted through the SIP process, are included in both the RTP and the TIP. A TCM progress report is prepared as part of the conformity analysis. This report demonstrates the implementation and scheduling of TCMs. When developing demand estimates for the RTP and the TIP, the effect of TCMs is taken into account through reductions in travel demand or increases in speeds on various facilities. As part of the 2020 long-range plan visioning process, a broad range of TCMs, including pricing strategies, will be considered.

In preparation of the RTP, public meetings are regularly held at key milestones in the development process. A public hearing is conducted prior to adoption. Special efforts are made to ensure that adequate notification is given to organizations and agencies representing minority and women's viewpoints. This includes sending news releases to minority newspapers and radio stations, and sending plan and program materials to minority groups and chambers of commerce.

DRCOG is actively pursuing the development of a CMS with the Pikes Peak Area Council of Governments (PPACG). During this effort, CDOT has provided leadership and financing. The current activity focuses on establishing the common system elements and vision. A committee consisting of members of CDOT, DRCOG, PPACG, RTD, Springs Transit, APCD, RAQC, FHWA, and FTA has been established to provide guidance.

Observations and Suggestions

1. **Future RTPs should be comprehensive in that they incorporate detailed information about the region's short-term travel management strategies, elderly and handicapped plan, and pedestrian and bikeway plan.**
2. **The development of a short to medium range plan (2015) with financial constraints along with a longer range "vision" plan (2020 and beyond) to guide future regional development and project selection is a realistic approach to meeting ISTEA requirements.** This is a realistic approach to meeting ISTEA requirements or concerns regarding land use, congestion management, and public involvement. In particular,

DRCOG is commended for its "visioning" task force, and its decision to include representatives from a range of public interest groups.

3. The 1987 RTP format is attractive and facilitates public understanding of the regional transportation planning process; however, in the future **the long-term planning effort could be improved by also documenting the multi-modal system alternative analyses that are used for developing the regional transportation plan.** This will include quantitatively evaluating the tradeoffs of different transportation investments, including a range of TCMs and Transportation System Management (TSM) strategies.
4. The region has adopted strategies such as the Eco Pass, recently introduced by the RTD, as a potential means of modifying transportation travel demands over the longer term. **The implementation of additional pricing-type strategies is encouraged.**
5. **A discussion on new or alternative sources of revenues to finance the needed level of transportation improvements could be included in future RTPs.** This would establish that the RTPs comply with ISTEA requirements, and provide for the electorate and public officials a basis for decision-making on how to best raise additional revenues.

B. Transportation Improvement Program

DRCOG, as the MPO, takes the lead in the annual preparation and approval of the TIP. The overall process, which takes about six months, begins with DRCOG requesting CDOT, RTD, and local implementing agencies to recommend projects using a "Project Recommendation Form." The implementing agencies are given approximately six weeks to complete the forms and return them to DRCOG. During the next month, DRCOG staff evaluate the projects and prepare a draft TIP. A public meeting is then held to review the draft. Revisions are made in response to public comment and a final draft document is prepared. Before the document is recommended by DRCOG's Transportation Committee to its Board for adoption, it is circulated for public review and a public meeting is held. After the TIP is adopted by the Board, it is submitted to the Governor for his approval.

DRCOG's latest TIP, which covers the period from 1993 to 1995, is the first one to be developed in response to ISTEA. To prepare a TIP post-ISTEA, DRCOG prepared three different "white papers" to establish its policy for TIP development and project selection. The documents outline the categorical funding changes under ISTEA, including the new funding provision for congestion mitigation and air quality management; describe the funding flexibility that permits the transfer of funds from one category to another; and indicate the legislative requirement for a financially constrained program.

Critical to the 3-C planning process, as redefined under ISTEA, is whether or not the TIP is a strategic document for implementing the long-range transportation plan. This is clearly understood by DRCOG. In its "white paper" titled "Policy on Transportation Improvement Program Preparation," DRCOG identifies the five objectives or strategies for guiding project selection and ensuring efficient maximization of the existing transportation system and scarce resources. These strategies are:

- maintain and improve the integrated, intermodal, metropolitan transportation system;
- implement TCMs;
- manage mobility to relieve traffic congestion;

- consider multi-modal solutions to transportation needs; and
- provide a continuous and complete transportation system.

To actually select projects, DRCOG has developed a six step project evaluation and priority ranking process that is documented in the "white paper" titled "1993-1998 Transportation Improvement Program Selection of Projects." By doing this, DRCOG establishes its role as defined by ISTEA and changes the TIP from a compilation of "wish lists" submitted by CDOT, RTD, and the region's jurisdictions to a realistic and strategic document. In addition to programmed projects, the TIP includes projects that were submitted but determined ineligible to be programmed and all significant projects funded solely by local units of government.

The project selection process establishes project categories for evaluation, criteria for evaluation, and a quantitative method for scoring and ranking projects. In addition, the process requires that each of the projects submitted be derived from an acceptable plan. If they are not, they are eliminated from consideration.

The project selection steps are:

1. Candidate Project Lists/Project Submittal. Projects are submitted by agencies for consideration. If the project is to be included in the first three years of the TIP, it must be ready for implementation and have dedicated local financial support.
2. Project Pre-screening. A project may advance directly to the TIP without evaluation if it passes an initial screening. To pass the screening, a positive response to the following three questions is required:
 - Does the project emanate from an approved plan source?
 - Is the project committed by inclusion in the annual element of the preceding TIP or by funds having already been spent or obligated for construction?
 - Have match commitments been made?
3. Initial Funding Category Assignment. Projects are assigned to the most appropriate funding category. The assignment may change later in the process to maximize the use of federal funds.
4. Project Evaluation. The regional strategies are used to first prioritize candidate projects for funding within each funding category. For many of the funding categories (such as Interstate Maintenance, National Highway System, Surface Transportation Program, Bridge, and Section 9), the highest rank is given to rehabilitation, reconstruction, and maintenance projects. Following this, the projects are submitted to an evaluation of their attributes based on pre-established criteria. This consists of assigning points to each of the attributes, based on pre-determined point ranges, and calculating a project score.
5. Draft Priority Selection. The results of the project evaluation process are reviewed. Project funding demands by category are compared with reasonably expected levels of funding by category. Projects that cannot be funded within each category are then identified.

6. Final Funding Category Assignment. The funding category assignments or transfer funds are adjusted between categories (per ISTEA provisions) as appropriate to maximize use of federal funds, and to assure that local and regional needs are addressed.

Although the 1993-1995 TIP document describes MPO's policy on TIP preparation, includes a financial plan, and outlines how the projects included in the TIP are consistent with regional strategies and ISTEA, it does not describe the project selection process. Since project selection is critical to the TIP process, policy-makers and citizens would probably be very interested in its inclusion so that they would have a better understanding of what projects get included (or excluded). A review of the selection process as presented in the "white paper" indicates that DRCOG has established what appears to be a highly objective method based on quantifiable evaluation criteria. Its inclusion would demystify the process for the general public, as well any special interest groups questioning the inclusion of a project.

The TIP chapter that is titled "Relationship to Regional Goals and ISTEA" lists the projects that implement each of the five regional strategies and the funding level being expended on each strategy. For example, of the \$417 million in proposed expenditures, 46 percent will be expended on transportation control measures and air quality related projects, 39 percent on system continuity and completion, 9 percent on managing mobility, and 6 percent on maintaining and improving the system. Even so, the chapter does not establish any direct links to the RTP or to the evolving regional transportation planning process (for example, the 2015 and 2020 plans) as defined by ISTEA. Specifically, DRCOG does not state whether or not the five regional strategies have also been (or will be) adopted to guide the development of the 2015 and 2020 RTPs.

Prior to the adoption of the 1993-1995 TIP, the annual element of the TIP was deliberately over-programmed by up to 50 percent. To respond to ISTEA's requirement for financially constrained plans and programs, DRCOG limited the number of projects that local jurisdictions could submit. DRCOG noticed a shift in the mix of projects submitted by local jurisdictions to include enhancement type projects, such as pedestrian bridges and services for the elderly and persons with disabilities.

The MPO tracks the development of projects included in the TIP through surveys and meetings with local and state sponsors. In February 1993, DRCOG requested its TIP project sponsors to provide project milestone information and obligation schedules. Of the total \$223 million programmed in the 1992-96 TIP, only \$627,000 in projects were delayed.

According to DRCOG staff, to maximize the flexible funding provision under ISTEA for plan and program development purposes, DRCOG needs CDOT to identify the regional allocation of federal funds by funding category. Despite requests, the state has been reluctant to identify the regional allocation of funding to the region by category. Even without this information, DRCOG is considering highway to transit transfers in its preparation of its revised RTP and TIP.

A component of the 1993-1995 TIP was air quality conformity analysis. In conducting the analysis, EPA's interim guidance was employed to estimate region-wide mobile emissions for a 1990 base case, and 1995 build and no-build scenarios. From this analysis, DRCOG concluded that the implementation of the 1993-1995 TIP (the build scenario) would contribute to continued reductions in carbon monoxide (CO) and hydrocarbons (HC). The annual CO and HC emissions

would drop from 1,199 and 117 tons per day, respectively, to 806 and 97 tons per day. In addition, the region has programmed \$191.3 million in the TIP for TCM and air quality related projects. These projects include transit improvements, ridesharing, bicycle facilities, traffic signal projects, and high occupancy vehicle (HOV) lanes.

Observations and Suggestions

1. **DRCOG is commended for developing an objective, quantifiable method for evaluating TIP project submittals and selecting which projects should be included in the program.**
2. **The TIP could include a description of the methodology as well as the criteria used to prioritize projects for inclusion in the TIP. Although the methodology has been documented in a "white paper", its inclusion would strengthen the TIP document, demonstrate its objectivity, and establish crucial links to the long-range plan. Citizens and advocacy groups will increasingly demand this type of specificity to determine if the TIP's projects comply with the requirements of ISTEA and CAAA. By doing this, DRCOG would more firmly establish the TIP as a strategic short-term planning document for implementing region-wide projects.**
3. **Even though the TIP document describes the relationship between regional goals and what projects have been included in the program, the linkage between the TIP could be more clearly defined. Without doing this, it is not clear that the strategic goals identified in the TIP are the same ones that are driving the preparation of the new RTP.**
4. **DRCOG is commended for its efforts to include all significant projects that are funded by local units of government in the TIP. This is consistent with the ISTEA requirement for air quality non-attainment areas to include all regionally significant projects to be funded with non-federal funds in their TIPs. This provision improves regional coordination of transportation projects, and creates opportunities for assessing the benefits from all programmed traffic and transit improvements. It also enhances DRCOG's ability to link regional and local transportation and land use planning, and to analyze the conformity of the TIP with the SIP.**
5. **To maximize the flexible funding provision under ISTEA, CDOT needs to adequately indicate the state's regional distribution of federal funds by funding category. Since at least 65 percent of the ISTEA authorization is flexible, DRCOG needs this information to identify projects, test scenarios in its development of a long-range transportation plan, and select projects for inclusion in the TIP.**
6. **DRCOG is commended for its efforts through surveys and meetings with implementing agencies and local jurisdictions to track the technical and financial milestones of regional transportation projects.**

V. Elements of the 3-C Transportation Planning Process and Related Activities

A. Evaluation of the Impact of Major Investments

The Denver region does not have formal guidelines on when to evaluate implemented major highway and transit investments, and the methodologies to be applied. These evaluations are not formally recognized as the responsibility of specific agencies or working groups; no guidance exists on which agency should take the lead for conducting these types of studies. The MPO is not involved with actively monitoring roadway conditions or evaluating the performance of region-wide transit investments.

As implementing agencies, RTD and CDOT monitor the condition and performance of their systems as a means to determine future investments. As an example, RTD currently evaluates transportation service investments against planning forecasts and Board objectives. Ridership is monitored on all routes to ensure the routes meet service standards. Efforts are then made to adjust or promote the route before decisions are made regarding restructuring or elimination of service. Similarly, utilization is monitored at park-n-rides and this information is used to guide expansion/improvement decisions.

Observations and Suggestions

1. **DRCOG, RTD, and CDOT could develop a formal process to evaluate implemented major transportation investments against planning forecasts and the objectives of the region's long-range transportation plan.** These evaluations could be elements of a sound 3-C planning process, contrasting actual to forecasted impacts on cost, ridership (in the case of transit), automobile usage (vehicle trips or miles travelled), and other relevant factors, including land use and air quality. These analyses would allow testing of assumptions underlying project approval related to land use, demographics, and pricing policies, and would allow assessment of the validity of analytical methods. Investment assessments are becoming increasingly important given ISTEA's efficiency mandate and the scarcity of national and regional financial resources.

B. Monitoring, Surveillance, and Reporting

Numerous data collection and preparation activities are conducted by the MPO, CDOT, RTD, and local jurisdictions. The purpose of these activities is to reappraise the long range transportation plan, complete corridor and sub-area studies, assess transit services, and complete air quality analyses. A metropolitan area regional data collection plan, known as the Regional Monitoring Program (RMP), was prepared in the early 1980s. It systematically identifies and prioritizes what data elements are important to planning and programming, and what contributions need to be made by DRCOG, RTD, and CDOT.

The RMP was structured around the MPO's adopted goals and policies. The manual described procedures for collecting data about the performance and characteristics of the transportation system. It also presented data collection procedures for monitoring demographic and land use patterns that affect transportation.

DRCOG maintains an extensive inventory of data on the physical condition and performance of the transportation systems. The different categories of data include: 1) road and lane miles; 2) interchange location and spacing; 3) interchange ramp meter locations; 4) traffic signal inventory; 5) highway system maps showing facilities by functional classification; 6) lanes and interchanges; 7) snow system route maps; 8) bus system; 9) bus miles by service type; 10) bus fleet size; 11) lift-equipped buses; 12) specialized provider vehicles; 13) park-and-ride lot capacity; 14) HOV lane miles; 15) bicycle facilities by jurisdictions; 16) CBD parking spaces; and 17) state highway sufficiency ratings.

In response to transportation monitoring requirements in ISTEA, DRCOG has included a task in the UPWP which would update the RMP. The task calls for the design of a regional monitoring system and program to provide up-to-date information on the characteristics, uses and performance of the region's congestion and pavement management activities, bridge, safety, public transportation, and intermodal transportation facility systems. This effort would integrate existing data collection activities conducted by DRCOG, CDOT, and RTD into a data base. In addition, performance measures would be developed to assess the adequacy of existing services and facilities, on both a regionwide and a local area basis, and to identify immediate problems requiring short-term attention.

CDOT and RTD gather extensive data on the physical condition of the transportation systems. CDOT's data collection activities include the preparation of Highway Performance Monitoring System (HPMS) data summarized at a regional level, the development of highway sufficiency ratings, and estimates of travel volumes on state highways. CDOT conducts traffic counts at cordon lines and then linearly extrapolates them to develop projections. RTD has a ridecheck program and system inventory that monitors the physical condition and performance of the transit network, including bus fleet size, passengers per revenue mile, and operating cost per passenger.

DRCOG regularly prepares base and future year demographic estimates at the traffic analysis zone (TAZ) level. The continuous tracking and updating of population and employment trends is critical to keeping the 3-C planning process current. The demographic information includes population, households by three categories of income and five categories of household size, and employment by five groups based on Standard Industrial Classification (SIC) codes. DRCOG's primary use of this data is to produce existing and future year travel demand estimates. They are also used for assessing regional growth and development patterns, and conducting congestion management and air quality planning analyses.

As part of the regionwide effort to determine what transportation facilities are needed to serve existing and future travel demands, a 1985 Regional Household Travel Survey (sample size was approximately 1300 to 1400 households) and a 1986 On-Board Bus Travel Survey were conducted. Basic data regarding the propensity for travel (i.e., travel volumes and modes, and trip purpose) were largely obtained from the surveys. The surveys also provided data regarding trip distribution (i.e., trip originations and destinations) which were expanded using the region's travel demand model.

From an analysis of the data, the MPO was able to make the following observations about the region's travel patterns and its transportation facility needs:

- The region's radial roadway system does not adequately accommodate the significant suburb-to-suburb travel. Roadway improvements are needed which would satisfy east-west and north-south suburban travel patterns.
- At least 50 percent of the travel originating in a sub-area within the region stays within that subarea, suggesting the need to improve the capacity of the local street network.
- The prime area for transit service is largely within the more densely developed and closer-in areas within the City and County of Denver. For example, 58 percent and 84 percent of the transit work and shopping trips, respectively, are less than 20 minutes in duration.

DRCOG recognizes the need for comprehensive travel behavior data; however, it does not anticipate that it will have sufficient funds to undertake any regionwide surveying activities over the short-term. It recently conducted a Boulder County origin and destination study to develop trip rates and travel patterns, and plans on conducting a similar study in Jefferson County.

RTD and DRCOG plan on conducting a market research study to identify significant clusters of potential transit users who do not have convenient bus service from their homes to their place of work, shopping, or other destinations. This study will identify and rank potential users by TAZs, determine the transit potential, and recommend service improvements including new routes or improved routes or schedules.

Highway and transit trends are also monitored by DRCOG and reported in a periodic "Mobility Report". As a result of the extensive use of graphs, charts, and tables, the recent "Mobility Report" is extremely readable. The report includes information on trip making, trip length, travel mode, congestion on the system, revenues and expenditures made by implementing and operating agencies, and air quality impacts of the transportation network. Some of the conclusions included in the "Mobility Report" are:

- Vehicles miles traveled (VMT) increased by 35 percent to 28.4 million miles per day between 1980 and 1990.
- The average home-to-work travel time increased by 6 percent to 23.5 minutes during this time period.
- The state considers 40 percent of its roads in the region to be in poor condition.
- Alternative modes of transportation - transit, carpooling, and vanpooling - have decreased as a percentage of work trips from 34.7 percent in 1980 to 25.1 percent in 1990. The number of people carpooling fell from 20.2 to 12.5 percent, and public transit use fell from 6.1 to 4.2 percent.
- Bus service miles and fleet size increased by 42 and 16 percent, respectively, since the early 1980s.

DRCOG is beginning to use geographical information software (GIS) as a resource to integrate data bases and conduct transportation analyses. It is currently using Atlas GIS as its GIS package. DRCOG is moving cautiously in acquiring another GIS system, as it is concerned about the cost of data acquisition and periodic maintenance as well as software/hardware costs of such a system. CDOT, RTD, and APCD have each invested heavily in separate GIS systems and are actively using them. The different agencies, including DRCOG, are considering the integration of their respective systems.

Observations and Suggestions

1. **DRCOG is commended for the data collection plan that it prepared with the cooperation of other agencies in the early 1980s. The plan encourages efficient use of resources, coordination among agencies, and the use of consistent planning assumptions. Given how old this plan is and the demands for additional research to meet ISTEA and the CAAA that exist, DRCOG is encouraged to follow through with its commitment to update it. DRCOG could consider the incorporation of the updated data collection plan into the Congestion Management Plan.**
2. **DRCOG is commended for monitoring land development trends, travel patterns, and levels of traffic and transit service in the region (as documented in the recent Mobility Report). Data useful in identifying the location and intensity of congestion could be necessary to develop effective congestion management strategies. Travel time (speed and delay) studies, which would produce this data, have been included in the UPWP in the past, but have been dropped or deferred due to time or budget constraints.**
3. **DRCOG and Boulder and Jefferson counties are commended for undertaking (or planning to undertake) sub-area transportation studies which included travel behavior surveys.**
4. **The region is encouraged to conduct any sub-regional or regional travel behavior surveys with a sufficient sample size that will enhance its travel demand forecasting capabilities or long range planning efforts. This research will allow DRCOG to recalibrate the region's travel demand model and enhance its ability to respond to the demands stemming from ISTEA and the CAAA.**
5. **DRCOG could enhance its MPO functions by further developing a GIS capability. With this capability, DRCOG would be able to manage the extensive data that are collected, and conduct analyses which combine demographic data, travel and congestion information, and air quality pollutant information. The region should attempt to develop an integrated GIS capability to be shared by DRCOG, RTD, and CDOT. This will ensure efficient use of resources, coordination among agencies and the use of consistent assumptions.**
6. **In response to ISTEA requirements, an inventory of intermodal facilities and terminals, and goods movement should be developed.**
7. **HPMS data will become increasingly significant as a means of monitoring travel and highway system performance in the region. DRCOG should work closely with CDOT to insure the adequacy of these data. And, as HOV facilities and transit services are introduced, a major need will be to monitor persons as well as vehicles.**

C. Ongoing and Corridor Multi-Modal Planning Approach

DRCOG has pursued what it calls an integrated approach to regional planning. By monitoring the region's growth and development, it has been able to assess existing travel patterns, forecast

future travel demand, and formulate long range plans that incorporate multi-modal investment strategies. In 1985, DRCOG adopted the Regional Development Framework (RDF) which identified urban development goals for the metropolitan area that influenced the development of the 2010 RTP. The 2010 RTP states that transportation services should be provided to support the development principles adopted in the RDF. These principles call for: 1) compact urban development; 2) maintenance of Denver's CBD as the region's focus; 3) balanced communities of mixed land uses; and 4) a development pattern which supports a multi-modal transportation system.

The presentations made by DRCOG staff during the planning review indicated that the passage of ISTEA had created an opportunity for it to enhance its integrated planning approach. DRCOG is currently rethinking its vision for regional growth and development, considering the impact of urban form on transportation patterns, developing a congestion management system approach, formulating alternative long range, multi-modal transportation scenarios, and assessing the affordability of these different scenarios. So far, this has resulted in the adoption of new socioeconomic forecasts and a mobility management plan to improve the efficiency of the transportation system. DRCOG is currently working with a consultant to develop its congestion management system plan.

DRCOG has established a task force to identify a preferred long-range vision for regional growth and development. One of the objectives of this analysis is to consider the impact of transportation improvements on urban form. The task force, which includes six DRCOG board members, local transportation directors, and representatives from recreation, open space, and environmental groups (e.g., the Environmental Defense Fund), chambers of commerce, and neighborhood associations, began by identifying ten guiding principals. At the time that this review was conducted, the task force was evaluating a range of alternatives which include different transportation improvements.

This "visioning" undertaking establishes a framework for evaluating long range transportation investments. As part of the development of a 2015 RTP, DRCOG has been evaluating the following six transportation investment scenarios: 1) completion of all existing projects (these are projects that are currently under construction and scheduled for completion in 1995); 2) completion of existing projects plus those that are committed in the TIP; 3) completion of committed projects with future investments primarily in highways; 4) transference of all possible funds to transit, facilitating the construction of a 90 mile LRT system; 5) an equal investment in highway and transit construction; and 6) the construction of C-470 and the Northwest Parkway to create an outer beltway. These evaluations consist of developing future system networks, completing travel demand analyses, comparing the costs of implementing each of the scenarios, and conducting air quality analyses. Once this is complete, the alternatives will be ranked and then presented to the DRCOG's Transportation Committee and Board, and eventually to the public.

Socioeconomic forecasts are essential inputs to the development of a regional growth and development plan, estimation of travel demand, and formulation of a long range transportation plan. The 2010 RTP, which was adopted in 1987, was prepared using socioeconomic forecasts that were prepared in the mid-1980s. In 1992, DRCOG prepared and adopted new socioeconomic forecasts which are being used to generate travel demand estimates for its 2015

and 2020 regional transportation plans. The socioeconomic forecasts, which were used to prepare the 2010 RTP, were prepared at the tail end of a regional economic boom and did not anticipate the severity of the economic downturn that the region experienced during the mid to late 1980s. The 1992 forecasts indicate that the level of population and employment projected in the mid-1980s for 2010 will not occur until 2017.

The socioeconomic forecasting process begins with DRCOG preparing regional level population and employment estimates, and allocating them to 54 regional statistical areas (RSAs) using a multivariate regression model which incorporates land use type variables. For the most recent set of forecasts, the model was recalibrated using 1990 U.S. Census data. DRCOG then disaggregates the RSA estimates to 1,400 TAZs using locally prepared development plans. To develop employment estimates, DRCOG uses county unemployment records, and site specific employment records obtained from Contacts Influential (Trinet).

In addition, DRCOG, CDOT, and RTD routinely undertake regional system plans and studies to support long range planning activities. DRCOG provided the review team with an extensive list of sub-area, corridor, feasibility, and environmental impact studies that the agencies have undertaken since the late 1980s. A few of the studies that were provided to the review team are discussed below. Recently, a Denver International Airport Access Task Force was formed by CDOT and DRCOG to address surface access to the new airport and intermodal issues. In addition, an unfunded project has been included in the UPWP to examine the feasibility of converting the Denver Union Terminal to an intermodal facility.

Similarly, local jurisdictions advance the implementation of the RTP by conducting corridor studies and developing corridor specific plans. For example, the City and County of Denver has completed corridor plans for Federal Boulevard and Colorado Boulevard, both of which are state highways. These locally funded plans addressed transportation, land use and urban design and were completed in cooperation with DRCOG, CDOT, and RTD.

In 1990, DRCOG published a study that recommended a system of high occupancy vehicle (HOV) lanes on existing and planned freeways. The goals of the study were to increase the person carrying capacity of the existing and planned freeway system, and to encourage the use of HOVs. The report contained an evaluation of the freeway corridors, identified and described the relationship of HOV lanes to rail or other exclusive guideway rapid transit, discussed implementation actions and issues, and described an HOV incentives package.

The study recommended a system consisting of 6 inter-connected HOV corridors at an estimated cost of \$890 million (\$140 million for HOV lanes, \$690 million for structures, and \$60 million for right-of-way). Each of the system's proposed routes were evaluated to determine their cost effectiveness using criteria developed for the Houston transitways. DRCOG concluded that portions of the recommended HOV lane system are cost effective; however, at a lower level of cost effectiveness than lanes constructed in Houston. The study anticipated that the vehicle occupancy on any of these lanes at the time of opening would be no less than two people, even though the system would be designed for three-plus vehicle occupancy. To date, a limited number of miles of HOV lanes have been constructed in the Santa Fe Drive corridor, and along the northern portion of I-25 from 20th Street to 120th Avenue.

In response to a provision in a 1990 state law which precludes the RTD Board from taking any action "relating to the construction of a regional fixed-guideway mass transit system until such system has been approved by the designated Metropolitan Planning Organization," DRCOG conducted assessments of RTD's light rail proposals known as the Metro Area Connection (MAC) and the MAC extension. In the MAC assessment, DRCOG concluded that the segment constituted a critical link in the regional transit system and that RTD should pursue the timely extension of the project.

These segments, which are approximately 5.3 miles in length are currently under construction. The transit line will extend from 30th Avenue and Downing Street, northeast of downtown, pass through Five Points, the CBD, and the Auraria Campus, and end close to the I-25 and Broadway intersection (approximately 2 miles south of downtown). In each of its assessments, DRCOG reviewed the proposed alignment, the technology, ridership estimates, project cost and financing, traffic and environmental impacts, and neighborhood concerns. A number of design, traffic, operational, and environmental concerns were identified in each of the assessments; however,

DRCOG concluded that the MAC alignment and its extension are consistent with the RTP, and that RTD's ridership estimates are reasonable.

In 1989, RTD completed the Southeast/Southwest Threshold Analysis which determined that transit investment in the Southwest Corridor would have the lowest cost per new rider. The Southwest Corridor begins in downtown Denver and proceeds south/southwest to North Highlands Ranch in Douglas County, following the alignment of U.S. 85 (also known as South Santa Fe Drive). In response to the threshold analysis, RTD initiated an alternative analysis and draft environmental impact statement to select a preferred, financially feasible transit project. The following six options were chosen for consideration:

1. **No-Build.** Only currently committed transit and highway improvements included in the adopted 1993-1995 TIP would be undertaken. This would include the development of Bus/HOV lanes.
2. **TSM.** This alternative would include low cost improvements, such as signal and traffic operations improvements, that would affect bus transit efficiency and service.
3. **Enhanced TSM.** This alternative would consist of developing enhanced bus/HOV lanes along South Santa Fe.
4. **Busway.** This would consist of developing a bus-only facility in the transit corridor now reserved within the railroad right-of-way.
5. **Fixed Guideway - LRT.** This alternative would consist of manually controlled light rail vehicles operating on standard gauge tracks. It would be an extension of the MAC line which is currently under construction.
6. **Commuter Rail.** Passenger train service would be initiated, and it would operate on the same tracks with the existing freight service. A third set of tracks and signal modifications would be necessary to allow both freight and passenger service to operate efficiently.

In March, 1994, following 75 public meetings, the RTD Board of Directors voted to adopt the fixed guideway LRT option. The line would extend for another 8.7 miles and cost approximately

\$126.6 million. Before construction can begin, which is anticipated to occur as early as 1997, DRCOG's approval is needed.

Based on its 1985 Travel Survey, DRCOG concluded that about 21 percent of the region's travel occurs in this sub-area. This resulted in DRCOG, along with the Greater Denver Chamber of Commerce, initiating a sub-area study that focused on mobility improvements in the southeast quadrant, primarily along the I-25 employment corridor. Emphasis was placed on identifying strategies to reduce the number of single-occupant vehicles on area roadways through improved transit and rideshare services. The study recommended that RTD evaluate bus route extensions, personalized bus route deviations, and shuttle ride service from a time transfer point at a transit hub to suburban neighborhoods. Other recommendations included initiation of an express bus link to the Denver International Airport when it opens, and the expansion of the region's guaranteed ride home to all employees in the area.

Observations and Suggestions

1. DRCOG and RTD are commended for **conducting a number of different corridor and sub-area studies that examined a range of transit solutions**. By considering a range of alternatives, the region demonstrated a commitment to identifying cost effective solutions that will reduce congestion and air emissions.
2. **The planning agencies are commended for initial efforts to develop a congestion management system**. The agencies should also move forward with the development of intermodal and public transportation management systems. These management systems, which are required by ISTEA, will ensure the effective management of existing and new transportation facilities.
3. **Due to state legislation that requires the approval of a regional fixed guideway system by the designated MPO before it can proceed, strong links exist between the RTP and the planning and implementing activities of an implementing agency**. It is this type of linkage that is encouraged by ISTEA.

D. Consideration of Air Quality

The Denver region is classified as a moderate non-attainment area for CO, and currently meets the CAAA's qualifications as a transitional non-attainment area. For fine particulate matter (PM₁₀), the region has been classified as a moderate non-attainment area. It is currently struggling with how to quantitatively estimate PM₁₀ emission levels and determine what transportation measures would effectively reduce these types of emissions. Even though no guidance has been available from the United States Environmental Protection Agency (EPA) on how to estimate a PM₁₀ budget, the Denver metropolitan element for the PM₁₀ SIP has been prepared and submitted to EPA. The region's transportation and air quality planners believe that the development and implementation of an effective PM₁₀ strategy will be the region's greatest air quality hurdle.

The percent of emissions attributable to mobile sources varies by pollutant. For example,

approximately 55 percent of PM₁₀ and 90 percent of CO emissions are attributable to mobile sources.

Air quality planning in the Denver region is a cooperative effort conducted by the State of Colorado Health Department's Air Pollution Control Division (APCD), Colorado Air Quality Control Commission, Regional Air Quality Council (RAQC), and DRCOG. CDOT and RTD participate in the region's air quality planning through the 3-C planning process.

The RACQ, which was created in 1989 by the governor, is the lead agency for air quality planning in the Denver non-attainment area. It is responsible for preparing SIPs and identifying TCMs for effectively reducing emissions. The TCMs are identified by working with implementing organizations, including the state legislature and local governments, to obtain commitments necessary to effectively implement and enforce the measures.

APCD is responsible for performing the technical analysis that serves as the basis for strategy development and attainment demonstration. It prepares emission inventories, conducts air quality modeling, analyzes air quality data, and provides technical advice and assistance. In addition, it assists the RACQ with identifying and analyzing the effectiveness of control measures. Similarly, the RACQ staff assist APCD with portions of the technical analysis.

The Colorado Air Quality Control Commission is a nine member citizen panel appointed by the Governor to perform a variety of regulatory duties outlined in state statute. The Commission adopts rules and regulations to implement state law, and is also responsible for adopting a comprehensive SIP meeting all requirements of the CAAA. The Commission also adopts rules and regulations to implement the plan.

As the region's MPO, DRCOG is responsible for developing the long-range transportation plan and TIP for the region. For the purposes of regional air quality planning, DRCOG is the authoritative source for the population, employment, traffic demand, and congestion estimates that are necessary to produce air pollution inventories.

As required by the CAAA, DRCOG conducts the air quality conformity analyses of the transportation plan and the TIP. In doing this, DRCOG produces the travel demand estimates for the long-range plan and TIP using its regional travel demand model. APCD then generates emission inventories using EPA's Mobile Emissions Model (MOBILE). DRCOG also sponsors two programs that are intended to reduce emissions. They are a regional rideshare office that produces carpool matchlists, organizes vanpools, and sponsors with RTD the Eco Pass (an annual bus pass with a guaranteed ride home program); and a traffic signal coordination program that coordinates traffic signals between communities and along major travel corridors.

TCMs, adopted through the SIP process, must be included in both the Regional Transportation Plan and the TIP. When developing demand estimates for the long-range plan and the short-range TIP, the effect of TCMs is taken into account through reductions in travel demand or increases in speeds on various facilities. Since the late 1970s, the region has adopted a range of TCMs which include employer based programs, vanpooling, a carpool location service, HOV lanes, parking management, episodic restriction on auto use, ramp metering, traffic signalization improvements, and implementation of a regional bicycle plan. TCMs that are planned or are

being implemented include the construction of a 5.3 mile light rail line, expansion of the parking management program, continued construction of HOV lanes, and display signs instructing motorists to turn off engines while idling for prolonged periods of time.

To conduct the conformity analysis for the 1993-95 TIP, DRCOG selected 1990 as the base year, and developed "no-build" and "build" scenarios for 1995. This was consistent with the interim guidelines for the CAAA in place at the time of the review. The "no-build" scenario, which is referred to by DRCOG as the non-TIP committed network, includes the 1990 highway and transit network plus highway improvements made between 1990 and 1992, and local, regional, and state highway and transit projects not financed with federal funds. The build scenario, or the 1995 TIP network, includes the 1995 network described above plus the 1993-95 TIP's highway and transit projects. Travel demand analysis indicated that the implementation of the "build" scenario would result in a lower level of VMTs per day than the "no-build" scenario. The estimated VMTs for the 1990 base case, and the non-TIP, and 1995 TIP scenarios are 36.02 million, 42.83 million, and 42.59 million, respectively. The analysis indicated that the "build scenario" would result in daily reductions in the tons of CO and HC. The 1990 CO emissions inventory is estimated to be 1,199 tons per day versus 830 and 806 for the "no-build" and "build" alternatives. For HC, the 1990 base year emission inventory is estimated to be 117 tons per day versus 98 and 97 for the "no-build" and "build" alternatives.

Observations and Suggestions

1. **The region is commended for its cooperative and inclusive air quality and transportation planning relationships.** The air quality problems of the region, as well as the action needed to overcome them, seem to be well understood by the planning process participants.
2. When identifying a broad range of TCMs, **the RACQ and APCD are encouraged to work closely with regional agencies, such as DRCOG and RTD.** These agencies have the background as well as the analytical tools to evaluate the measures' effectiveness.

E. Outreach Efforts

DRCOG, RTD, and CDOT have independent outreach efforts. Each organization relies on citizen input at public meetings and hearings. DRCOG regularly conducts public meetings prior to adopting a TIP or RTP. Before projects are submitted to DRCOG for inclusion in the TIP, DRCOG expects that the local governments or agencies who are sponsoring the projects have involved the public. As part of RTD's alternative analysis for improving transit in the Southwest Corridor, RTD conducted approximately 75 public meetings and forums. Additional public meetings on the preferred alternative (which is the extension of the MAC light rail line) were conducted by DRCOG staff prior to its submittal to the DRCOG Board for approval.

Citizen Participation

DRCOG regularly solicits citizen participation in the planning process. Different techniques include: 1) distribution of a monthly newsletter to thousands of people in the region; 2) scheduling of public meetings and hearings; and 3) inclusion of citizens on task forces which are

charged with addressing specific problems or issues. DRCOG also has a public affairs department which is responsible for preparing press releases; responding to inquiries from citizens', journalistic, and business interests; preparing newsletters and annual reports; and ensuring that important planning documents are available to the public. When an important study is published, DRCOG's public affairs department advertises its availability and distributes copies to public libraries.

Recently, DRCOG organized the Vision 2020 Task Force, which is comprised of DRCOG board members, local transportation directors, and representatives from public interest groups (e.g., recreation, open space and environmental groups, and neighborhood associations), to participate in the preparation of the regional development and transportation plans. A Bicycle and Pedestrian Advisory Committee, which includes citizen advocates, was also recently formed to assist in the revision of the MPO's plans.

In the preparation of the RTP, public meetings are regularly held at key milestones in the development process and prior to its adoption by the DRCOG Board. In developing the TIP, copies of a draft document are circulated to public libraries in advance of a public hearing. Prior to adopting the 1993-1995 TIP, two public hearings were held before the DRCOG Board at which more than 250 individuals and organizations attended and testified.

For major corridor studies, RTD involves citizens in the planning process by holding public hearings, organizing advisory committees, and issuing newsletters. The advisory committees typically consist of representatives of local governments and other groups located within the corridor. Examples of project-specific citizen involvement programs include the Southwest Corridor Alternatives Analysis, the MAC light rail project, the downtown express bus/HOV lane project, and the Commuter Rail Implementation Study.

RTD also solicits public input on all service changes. Surveys are distributed on bus routes where changes are being considered, and public meetings are held before the service changes are finalized. To secure citizen participation on service to the new Denver International Airport, sixteen public forums were organized to discuss proposed routes and possible fare structures.

RTD is governed by a 15 member elected Board of Directors. (Up until the early 1980s, the Board had been appointed.) The members are elected to four year terms from each of the districts (based on census tracts) comprising RTD's service district. The elected Board is expected to provide more direct citizen input than an appointed Board in the development of the region's transit policies and its capital investment decisions to improve or expand transit services.

Minority Participation

Special efforts are made by DRCOG to ensure that adequate notification is given to organizations and agencies representing minority and women's viewpoints. This includes sending new releases to minority newspapers and radio stations, and sending plan and program materials to minority groups and chambers of commerce.

Minority representation on DRCOG's board and committees is dependent on the electoral process (i.e., minority candidates winning elected offices), and the extent that private individuals have

a stake or interest in an ongoing planning activity. Representation on the DRCOG Board requires that the person be a locally elected official and selected by his/her peers from his/her jurisdiction. During the planning process, care is taken to assure that wherever transportation improvements are needed, including minority areas, negative impacts are avoided or mitigated.

RTD has increased its outreach efforts to citizens in minority neighborhoods. To publicize issues that would be important to these neighborhoods, notices are placed in publications with high minority market penetration. In addition, community leaders are often personally contacted and public meetings are conducted in the target neighborhood. An example is the Whittier neighborhood which requested a route change to provide improved access to a grocery store and physician services. The requests were noted and the route change was made to incorporate the suggestions brought forth in the neighborhood meeting.

The MAC is a project that heavily impacts minority neighborhoods. The line runs through minority neighborhoods at both ends. RTD's involvement in the neighborhoods included meetings with business leaders, the development of a citizens' advisory committee, and public meetings in various community centers.

Private Sector

Individuals representing the private sector have participated on DRCOG's boards, advisory councils, or committees to the extent that they have had interests in the planning process or different issues that are facing the region. Most recently, efforts have been made to include private sector representatives on the Transportation Committee of the Board. Over the past several years, DRCOG has been working with a transportation management association type organization, located in the southeastern portion of the metropolitan area, to address congestion mitigation issues.

In the past, private transportation providers have been given the opportunity to review draft TIPs, and, at a special meeting, to discuss the document and present their views regarding projects and different services that they could provide. With the expansion of the public involvement process since the passage of ISTEA, private providers are now notified when a TIP public hearing is scheduled.

Observations and Suggestions

1. DRCOG and RTD work hard at communicating with the public and providing an open planning process; however, **outreach efforts could be expanded to include large employers, employer associations, labor organizations, financial, real estate, and development associations.** This proactive approach would be consistent with ISTEA requirements for public involvement.
2. The DRCOG Board could consider policies which ensure that citizen participation at the board and committee levels **more closely reflects the metropolitan area's minority population.**

VI. Tools, Skills, and Data Bases for Transportation Planning

A. Travel Demand Forecasting

DRCOG uses a state-of-the-practice four-step travel demand modeling process. Demand estimation begins with the development of regional level estimates of demographics and economic growth. These are allocated to 54 regional statistical areas using numerous factors, including the number of miles of 4-lane roadways and interchanges. (During 1994, miles of rapid transit facilities and stations will be added to the demographic distribution model.) The estimates are then disaggregated to a 1,500 zone system using local development plans.

The first modeling step is trip generation. Average weekday trip ends are generated for each forecast year using cross-classification models that are based on segmented household (by income and size) and employment (by three categories of SIC codes) data. Trips are generated for the following trip purposes: 1) home-based work; 2) home-based non-work; 3) non-home based; 4) commercial trips; 5) internal/external trips; and 6) external/external trips.

The trip ends are then factored into half-hour segments using data from a 1971 origin-destination survey and a 1985 small sample household survey (which yield similar time-of-day distributions). For each half-hour, total trips are then compared with an aggregate measure of system capacity derived from total lane-miles by type of facility. This permits the identification of periods of the day with significant levels of congestion. It also facilitates identification of the times of day when the a.m. and p.m. peak periods begin and end. A current one-hour a.m. peak period is expected to stretch to a two-hour peak period by the year 2010. (No runs as yet have been made for the more distant forecast years.)

Work and non-work trips are distributed for the peak and off-peak periods, respectively. A gravity model with the impedance function reflecting only highway travel times is used for all trip purposes except external-external trips. For the external-external trips, a simple Fratar model is used. (A more complex model previously was used which took costs, carpooling, and transit use into account. The model was difficult to explain to decision-makers, and FTA would not allow different trip tables to be developed for various alternatives. As such, it was dropped from the model chain in 1992.) Special K-factors are applied for the Boulder urbanized area to account for the fact that this area's trip-making tends to be more self-contained than estimated by the original gravity model.

A multinomial logit model is used to split mode trips among five modes: drive alone; carpool (2 persons); carpool (3 or more persons); walk to transit; and, drive to transit (park-ride plus kiss-ride). Independent variables in the model include typical measures of travel times (in-vehicle, walk, first wait, transfer, etc.) and costs (transit fares, auto operating costs, and parking costs), plus a CBD indicator. Results obtained to date have seemed reasonable considering available empirical data, and because the Independence from Irrelevant Alternatives property has not been a significant problem in estimating modal shares.

An equilibrium capacity constraint process is used for A.M. and P.M. peak period assignments. The assignment model is iterated 11 times for the A.M. peak and 6 times for the P.M. peak to achieve equilibrium. An all-or-nothing assignment process previously was used for the off-peak

period, but two iterations are now being performed to obtain more realistic link speeds. Estimated link loads have been checked against available traffic counts.

Estimates of truck trips are derived in large part from old survey data (from the 1970s). DRCOG staff would like to survey trucking firms again, but this is relatively expensive. Some classification counts have been done, and the estimates of truck movements have been used in estimating air pollution.

Estimated speeds resulting from the assignment process have been checked against data collected with speed guns and from some speed-and-delay runs. Estimated and measured speeds have compared very closely on freeways. For arterials, estimated speeds have been about 10-15 percent lower than the comparable measured speeds. This resulted in a recalibration of the assignment model to better match arterial speeds.

DRCOG is responsible for all aspects of modeling, with the exception of external traffic volumes, which are jointly developed with the CDOT. RTD and DRCOG have been working jointly on the development of micro-computer techniques that could be used by RTD to conduct sketch planning for the Southwest Corridor Alternatives Analysis.

Land use and travel demand forecasting are interrelated because land use forecasts use highway networks as a factor in distributing growth. In addition, the impact of beltways is considered in growth allocations (increased land development activity due to increases in accessibility). The resultant demographic data sets are used to estimate demand, which in turn is used to design the highway network. DRCOG has produced "white papers" that assess the probable impact of beltways and rapid transit facilities on growth patterns.

Ridership counts on RTD vehicles in major travel corridors are used to validate regional model forecasts. On numerous occasions, ridership data have been used to improve the accuracy of the regional travel demand forecasts. As RTD's major transportation investments come on line, ridership will be closely monitored and compared with forecasts.

B. Data Bases

Current traffic counts are obtained for all federally funded projects. Base year model results are compared to base year traffic counts for individual facilities and adjustments are then made to future year estimates, as appropriate. Vehicle occupancy studies are also conducted on a project basis and used in planning for HOV facilities.

The forecasting models were last validated for 1990. Validation started with census estimates of population and households, and local estimates derived from private sector surveys of employment. The model run results were checked against 1990 traffic counts taken on approximately one-third of all arterial and freeway highway links, HPMS estimates, RTD estimates of linked and unlinked transit patrons, and RTD estimates from ride-check programs of route and corridor ridership. The validation runs are summarized in the model documentation and adequately reflect available travel data.

A small sample survey of 1,400 households was conducted at a regional level to collect origin and destination data in 1985. In 1992, a 2,300 household survey was conducted in Boulder County to gather detailed origin and destination information, emphasizing alternative mode use, and a supplemental 300 household survey was conducted in the Broomfield/Louisville/Lafayette area in 1993. Extensive use will also be made of the 1990 Census of Transportation planning package when it becomes available; however, budget constraints have limited data collection activities on a region-wide basis.

Observations and Suggestions

1. **DRCOG is to be commended for maintaining a well-documented, state-of-the-practice multimodal travel demand modeling process.** Continued use and refinement of the process by participating agencies will likely prove cost-effective.
2. Many, if not most, MPOs now use micro-computer techniques exclusively for all aspects of transportation planning. As experience and time and budget permit, **DRCOG could shift away from the mainframe and utilize a micro-computer package** for travel demand forecasting. This would eliminate duplication of the travel demand estimation efforts that are ongoing at RTD as well as enhance coordination with RTD.
3. Because the last region-wide home interview survey was conducted over 20 years ago, it appears advisable for **DRCOG to undertake a new survey as soon as possible.** This is necessary to better understand the impact of dramatic population growth and increases in multi-vehicle and two worker households on travel patterns. The updated travel survey will also prepare the region to address ISTEA and CAAA concerns.

C. Costing Methodologies

Since the passage of ISTEA, DRCOG has begun to expand the cost and revenue estimating process to include all transportation costs and revenues. DRCOG has been working with CDOT and RTD to define the cost and revenue categories and the components related to each category.

The operating agencies (CDOT, RTD, local governments, and paratransit agencies) will be providing the operating and maintenance (O&M) cost estimates for use in regional resource allocation and planning programming. DRCOG is reviewing the historical expenses of local governments and will be working directly with them to forecast O&M costs for 20-25 year periods. The results of the management systems are expected to affect the forecasts in future years. According to CDOT, management system outputs will most likely not be in a usable form in the early part of 1995 for forecasting O&M costs.

Short term roadway, transit, and enhancement project costs are defined by the sponsor agency. Other project costs are determined from an annual survey as a tool to maintain the regional transportation inventory and short term forecasts for non-federally funded improvements.

DRCOG maintains a roadway inventory file and cost estimating model for use in forecasting major capital improvements on arterials beyond the TIP time period. Special cost factors are

included for major bridges, and residential and commercial relocations. This cost estimating process was designed to estimate regional system roadway costs for planning purposes.

Observations and Suggestions

1. **DRCOG's costing methodologies appear appropriate for assessing transportation plan and corridor sketch planning alternatives.**

VII. Ongoing Transit Planning

A. Organizational Issues

RTD, which was created by the Colorado General Assembly in 1969 to develop, maintain, and operate a public transportation system for the Denver metropolitan area, is governed by a 15-member Board of Directors. Each of the directors represents one of the fifteen districts comprising RTD's service area and is elected to a four year term. The service area contains most of the metropolitan area; however, its boundaries and those of the MPO do not coincide.

In addition to maintaining and operating the public transportation system, RTD has actively pursued the expansion of its system to include fixed rail. Since its inception, RTD has conducted a number of fixed rail planning studies; however, only recently has it secured the political and public support to move forward with the construction of two short segments of the proposed light rail system, known as the MAC and the MAC extension.

Clearly, RTD sets the direction for long term transit development in the region. In doing this, RTD conducts planning studies and service assessments; however, it also works closely with DRCOG in its efforts to develop a regional long term transportation plan. (RTD is a member of DRCOG's Transportation and Regional Planning Advisory committees.)

Even though RTD is the region's transit operating agency, a provision of a 1990 state law precludes it from implementing any portion of its fixed guideway plan without the approval of the designated MPO. This provision establishes a strong link with the regional transportation planning process, and essentially, provides a mechanism for local jurisdictions to assess the viability of different fixed rail proposals. As required, DRCOG conducted assessments of the MAC and MAC extension proposals, and concluded that they constituted critical links in the regional transit system. DRCOG is currently reviewing RTD's most recent proposal to extend the MAC southwest along the Santa Fe highway corridor.

By the end of 1993, RTD was expected to complete a ten year strategic plan that would have dovetailed with DRCOG's 2015 transportation planning effort. As in the 2015 RTP, RTD stated (in the planning review meetings) that the strategic plan would evaluate different service options or scenarios, identify capital investment priorities, and address financing issues. It is intended to be a market based plan in that RTD would first attempt to identify service needs and then determine what types of service would best satisfy the observed travel demand. For the different service options, RTD indicated that it would consider alternatives, such as vanpools and demand responsive services, as well as identify rapid transit corridors.

To facilitate planning, RTD and DRCOG routinely exchange data. RTD provides DRCOG with information on its route ridership, park-n-ride use, and its financial capacity. DRCOG provides RTD with population, employment, traffic demand, and congestion estimates which it needs to identify trends, conduct service assessments, and identify new routes.

Any major expansion of a transit system, particularly one that calls for the development of a rapid transit component, needs to be justified. Typically, this is accomplished by demonstrating whether or not demand exists for this service, and assessing the cost effectiveness of the capital

outlay. RTD's strategic plan provides RTD with an opportunity to document the rationale, as well as the market demand estimates, for rapid transit development in certain corridors, and to present financial or cost effectiveness measures. Even though DRCOG's 2010 Plan calls for rapid transit development, particularly to serve peak period demand, it does not include demand estimates or the cost analysis for assessing the proposal's market feasibility.

The 2010 Plan anticipates that transit patronage will increase by 160 percent from 131,000 to 341,000 trips per day if a rapid transit system is built and the existing bus fleet is doubled. Neither the plan nor any of RTD's documents discuss at length how this increase in transit demand will occur. Moreover, the projected increase in transit demand (of 160 percent) appears to be overly optimistic given recent ridership trends. From 1987 to 1992, transit ridership increased from 38,830,000 to 44,994,000, at an average annual growth rate of 3 percent.

For short term planning and programming purposes, each year RTD prepares and adopts a five year Transit Development Program (TDP). It is updated annually to ensure that the program reflects changing transit needs within the region. In its 1992 TDP, RTD identified the following three priorities:

1. Complete the Metro Area Connection (MAC) rapid transit project;
2. Implement the provisions of the Americans with Disabilities Act (ADA); and
3. Maintain the RTD fleet at an appropriate size and in good condition to provide needed high quality bus service.

In addition to identifying transit development priorities, the TDP includes a comprehensive description of RTD's goals and their current status.

Observations and Suggestions

1. **RTD and DRCOG are commended for their effective exchanges of data.** By doing this, the two organizations improve the consistency in their planning efforts.
2. RTD and DRCOG should define for the public and the region's elected officials **the role of the different plans and programs which address transit development.** This would provide a clearer picture of the inter-relationships of the following three documents: 1) TDP; 2) strategic transit plan; and 3) regional transportation plan.
3. **RTD is commended for its TDP.** It establishes short term goals and priorities, and itemizes expenses and the sources of funds.
4. **RTD's strategic plan should include the rationale and the market demand estimates for rapid transit development in certain corridors and the financial or cost effectiveness measures that are necessary to justify the investment.**

B. Performance of Existing Service and Development of New Service

According to the 1992 TDP, RTD provides transit service on 154 routes. RTD measures its level of service by service hours and service miles. In addition, it annually monitors operating and

maintenance costs. These measures, by themselves, do not provide a clear picture of the efficiency of existing service. Other measures, such as operating and maintenance cost per service hour or operating and maintenance cost per service mile, would give RTD performance indicators which could be discounted to a base year to compare efficiency levels between different years.

In 1989, the RTD Board of Directors adopted a minimum operating ratio (fare revenue/operating cost) of 30 percent, excluding ADA paratransit service. Over the five-year period covered in the TDP, RTD farebox recovery ratios are expected to range from a high of 34 percent in 1993 to a low of 30 percent in 1995 and 1996.

According to the 1993-1994 UPWP, RTD will conduct a market research study which will focus on identification of geographic clusters of potential transit users who do not have convenient bus service from their homes. The information will provide the basis for developing service improvement strategies. Past market research has resulted in the initiation of improved late-night service and the RockiesRide which consists of bus service from locations (such as malls) within the metropolitan area to Colorado Rockies games.

Routes or trips not meeting productivity standards are publicly promoted or changed to increase ridership. If the changes and promotional efforts do not bring these routes or trips up to minimum standards, the service may be eliminated. These standards include minimum riders per unit of service and a maximum operating cost per passenger.

ISTEA encourages the development of multi-modal facilities to increase the efficiency of the transportation network. RTD currently operates 49 park-n-ride facilities with a total capacity of 9,359 cars. Individual park-n-ride lots range in size from 20 to 1,541 cars. In addition, RTD coordinates its service with Greyhound and AMTRAK services, and plans on examining the possibility of extending the MAC to the new Denver International Airport (DIA). RTD has recently entered into a major investment study with DRCOG and CDOT to examine a variety of transit and highway options to serve the corridor between downtown Denver and DIA. The City and County of Denver has also recently initiated a study, along with the Union Pacific Railroad, to examine the feasibility of running trains, powered with diesel locomotives, between Union Station (located in lower downtown) and DIA.

Observations and Suggestions

1. RTD could expand its performance evaluations to indicate areas where efficiency improvements can be made. **Additional measures of cost effectiveness and efficiency could be developed to improve evaluation of future activities.**
2. RTD is commended for its multi-modal development and coordination with Greyhound and Amtrak.

C. Transit Structure, Vehicle, and Equipment Planning (Capital Planning)

As part of its preventative maintenance (PM) system, RTD evaluates its rolling stock and equipment. The evaluations are based on manufacturers' recommended specifications and time

schedules. RTD also coordinates these evaluations with its annual TDP process. Each department surveys its own equipment and submits replacement and rehabilitation needs for inclusion in the TDP.

At the end of 1992, RTD operated a total of 619 vehicles, and leased an additional 79 vehicles to private operators. Over the next five years, RTD will replace 250 buses and increase the fleet size by 23 buses so that it will be able to expand its service. Vehicle replacement is based on a schedule of service life which is assumed to be 12 years. In addition to purchasing new buses, RTD plans to rehabilitate its small buses by upgrading them with new engines. All revenue vehicles will also receive new fareboxes capable of reading special passes and collecting ridership data.

The bus purchases and the replacement engines for RTD's small buses will have a beneficial effect on air quality. The new buses are designed in accordance with more stringent EPA emissions standards, and the replacement engines are equipped with particulate traps or other emission reduction equipment. As part of the region-wide effort to improve air quality, RTD is exploring the feasibility of using buses that are powered with methanol and compressed natural gas (CNG).

RTD has a Maintenance and Administrative Facilities Program that provides for improvements to operating facilities. The goals of this program are to improve efficiency, reduce operating cost, and provide a safe and improved work environment. Projects such as renovating administrative buildings and repairing bus garages fall under this program.

Observations and Suggestions

1. **RTD is commended for its preventative maintenance system.** It provides a basis for identifying maintenance problems early, determining future costs, establishing a capital investment program which corresponds with actual equipment needs, and minimizing disruptions in service due to equipment failures.
2. **RTD is commended for its effort to reduce emissions** by purchasing new buses and exploring the feasibility of using alternative fuel buses.

D. Transit Management Analysis

RTD evaluates one-third of all salaried employee positions each year. This evaluation involves an analysis of job function, responsibilities, training needs, supervision, and salaries. The results are used to improve employee efficiency and productivity, and to maintain parity among RTD employees.

RTD also periodically evaluates all salaried employee positions to determine the factors that lead to effective performance. The performance indicators that are developed from this survey are used to improve RTD training programs. The current Professional Development Program (PDP) was developed in response to the last survey in the fall of 1990. The next survey will be conducted in the fall of 1993, and will be used to chart and adjust the progress of the PDP.

New training programs for staff are initiated annually based on an "Annual Needs Assessment" report. The training division offers professional development funds to support personnel who attend college classes or professional seminars. In addition, classes are offered to train personnel for new legislation such as the Americans with Disabilities Act (ADA).

A Transportation Loss Report form is filled out for each service accident that involves an RTD vehicle or its passengers. The accident reports are reviewed by RTD's Safety Department and Claims Department and each accident is categorized according to its type. RTD's Safety Department monitors all accident reports that are submitted and maintains a central file system to store reports. Accident reports are analyzed to determine if any safety patterns are developing.

For the purposes of increasing ridership, RTD has developed and introduced several new programs that target different market segments. These programs include:

- **CommuterCheck.** Employers provide vouchers valued at \$15 per month toward the cost of the employee's monthly bus pass.
- **Eco Pass.** Employers buy ID cards that serve as valid bus passes for all full-time employees. The cost of the Eco Pass is a function of the level of service available at the employer location.
- **CU Student Pass Program.** A special University of Colorado student transportation fee provides free bus transportation within Boulder, and enables students to ride the bus between Boulder and Denver for \$1.00.

RTD's ridership has increased by more than 15 percent since 1987; however, the extent to which this increase can be attributed to each of these programs is unknown. RTD has had insufficient tracking to determine the effects.

Observations and Suggestions

1. The five year TDP could include projected labor costs and programs aimed at improving the efficiency of the work force. This could include **addressing issues such as wage increases, the use of part-time drivers, and layoffs.**
2. **RTD is commended for its innovative programs to attract new riders.** The success or failure of these and other programs should be documented to determine their cost-effectiveness relative to other strategies. This would consist of tracking ridership increases and determining what percentage of the increase can be attributed to each of the new programs, and contrasting program costs to ridership gains.

E. Financial Planning

DRCOG's 2010 RTP estimates that transit improvements between 1987 and 2010 will cost \$2.3 billion and its revenues will be \$0.7 billion. Even though the plan states that local regional sources will have to finance the revenue shortfall, it does not include a discussion of possible actions that could be pursued to generate additional capital.

In early 1994, RTD identified and assessed a variety of potential new revenue sources as part of its "Decide-the-Ride" program. "Decide-the-Ride" was a large-scale public outreach and participation effort that gained valuable public input regarding various potential long-term transit service and funding scenarios for RTD.

RTD's short-range financial capacity is analyzed each year as part of the development of the TDP and the TIP. A recent Financial Capacity Analysis performed by an independent consultant, KPMG Peat Marwick, on behalf of the FTA, concluded that RTD has the financial capacity necessary to undertake the projects proposed in the 1993-1995 TIP.

RTD's capital and operating revenue comes from a variety of sources. The local sales and use taxes account for over two-thirds of RTD's total revenues. Future revenue from this source is projected based on population and inflation forecasts. Between 1993 and 1997, the region's population is expected to increase to over two million, or by about 5 percent; in contrast, transit-related revenues (from transit dedicated sales and use taxes) are projected to increase by over 29 percent. The discrepancy is due to inflation rates which were estimated to range from 4.8 percent to 5.5 percent per year for this period of time. These figures may be high considering the area's most recent inflation rates, which range from 2.0 percent in 1989 to 4.3 percent in 1990. This overestimation of the inflation rate probably has resulted in overly optimistic consumer spending projections. Since the review, in developing the most recent TDP, RTD staff have indicated that they have adjusted the projected inflation rates for future years to more realistically reflect what the region has recently experienced.

Farebox revenues make up the second most important revenue source for RTD. Farebox projections are based on meeting a specified operating ratio of 30 percent or more, not on ridership projections. Over the five-year period covered by the July 1992 TDP (1993 to 1997), projected farebox revenues are expected to increase over 53 percent in nominal dollars. The forecasted increase is based on only a 19 percent increase in ridership, however. This translates into a 28 percent increase in nominal dollars in fares over the five-year period. Since the review, according to RTD staff, it has begun to use more conservative inflation rate projections in the development of financial projections for the TDP.

FTA Section 9 formula grants are assumed to be constant over the five-year period between 1993 and 1997. In addition, projected revenues from other sources such as advertising and leasing are assumed to be relatively constant over this period.

Observations and Suggestions

- 1. In the long range plan documents that are made public, RTD needs to itemize transit improvement costs (i.e., by project) and account for all revenues necessary to complete these projects.**
- 2. RTD is commended for incorporating into its planning process an outreach program that focused on the identification of new revenue sources which could be acceptable to the electorate and public officials.**
- 3. Instead of basing projected farebox revenues on specific operating ratios, they could**

be based on ridership projections and expected yield per passenger. The assumptions that are made regarding farebox projections should be documented in the TDP.

4. To achieve more accurate forecasts of future costs, RTD could use **inflation rates specifically for operations and maintenance of transit rather than the Consumer Price Index (CPI).**

F. Planning for the Americans with Disabilities Act (ADA)

As of 1993, 92 percent of the fixed route service fleet was accessible. These buses provide all local, limited, and express service, and most regional service. One sub-fleet of intercity buses is not accessible; these buses are scheduled to be replaced with accessible buses by 1997.

RTD currently provides a limited subscription paratransit service for persons with disabilities. This service, called handyRide, is operated for RTD in the Denver area by Mayflower Contract Services and in the Boulder County area by ATC. Since this service does not comply with the service criteria established by the ADA, it will be replaced by RTD's ADA paratransit service, known as Access-a-Ride. Access-a-Ride was to be phased in between August 1993 and January 1997. To implement the first phase, a competitive bid process was followed and the service contract was awarded to Metro Mobility, Inc., an existing, local private, non-profit transportation provider. In addition, RTD has purchased sixteen converted vans that comply with ADA requirements.

RTD received notification on July 12, 1993, that its 1993 ADA Paratransit Implementation Plan Annual Update was approved by FTA.

Observations and Suggestions

1. **RTD is commended for its strong commitment toward achieving ADA mandates.**

G. Outreach Activities and Related Considerations in the Urban Transit Planning Process

The transit planning outreach activities are discussed in Section V.E.

In addition to its citizen outreach activities, RTD has established the Equal Opportunity and Disadvantaged Enterprise Program, which sets project specific disadvantaged business enterprise (DBE) goals. Relevant DBE companies are notified for each upcoming RTD contract that is greater than \$10,000. In 1992, RTD held a day-long seminar with Minority Enterprises, Inc., to inform DBE's about light rail job opportunities.

Involvement of the Private Sector

In May, 1988, the Colorado General Assembly passed legislation that required RTD to solicit bids from private operators to provide at least 20 percent of all service hours in the District by January 1, 1990. Currently, over 20 percent of RTD fixed-route service is provided by private

sector operators under contract with RTD. The state's policy of having the private sector provide at least 20 percent of all service hours is intended to increase RTD's competitiveness and to encourage efficiency. If the private operator's bid exceeds RTD's cost for operating the service, then RTD can operate the service.

When a new capital project is contemplated, the opportunities for private/public partnerships are identified and evaluated. These opportunities have included: 1) joint use park-n-ride facilities; 2) leasing air rights above facilities; and 3) turn-key construction projects.

One example of public/private partnership is the 16th Street Transit Mall. This is a former public street, one mile long, which was reconstructed as a pedestrian and transit shuttle facility in the Denver Central Business District (CBD). A free shuttle bus runs the length of the mall, linking two major transit centers which serve as connecting points for most of the express and regional bus routes serving the CBD. Operation and maintenance costs of the Mall are funded by a special assessment district which collects a property tax from property owners on and near the Mall. RTD applied for and was awarded a federal grant to design and construct the Mall.

RTD identifies opportunities for the operation and maintenance of capital facilities by private contractors as a matter of course during its annual budget process. Such items as snow removal, pavement maintenance and repair, and landscape maintenance are routinely bid out. Private operation and maintenance of facilities is considered at the completion of construction, rather than during the planning and design process.

Observations and Suggestions

1. **RTD is commended for its efforts to include minorities when considering new transit services or changes. It is also commended for its Equal Opportunity and Disadvantaged Enterprise Program** which sets goals for securing the participation of DBEs in providing contractual services.

H. Planning Activities for a Drug-Free Work Place

RTD has a variety of programs to ensure a drug-free work place. One program is a mandatory pre-employment drug test which must be passed before a person can be hired. New employees go through an orientation during which RTD's Alcohol and Controlled Substances Policy Implementation Guidelines are reviewed. A video that depicts the policy and its guidelines is also shown during the orientation.

If an employee voluntarily seeks assistance to overcome drinking or chemical dependency, the employee is given the opportunity to participate in treatment or rehabilitation programs without being subjected to disciplinary actions. Upon successful completion of a treatment or rehabilitation program, the employee will undergo random drug testing for one year.

When an employee is involved in an accident or is suspected of being under the influence of alcohol or controlled substances, the employee will be tested and subjected to disciplinary rules that are described in the Policy Implementation Guidelines.

At the time of the planning review, RTD was developing a program called "Preventing Substance Abuse," a three hour training course to teach supervisors how to carry out RTD's Alcohol and Controlled Substances Policy. RTD will eventually offer a one hour version of the course to all employees.

RTD has no evaluation methods for its existing programs; however, it maintains a limited number of statistics on testing rates. Evaluation criteria are currently being developed as part of the Preventing Substance Abuse program.

I. Transit Capital and Operating Plans and Programs

See Section VI-C.

VIII. ISTEA Planning

ISTEA defines a broad range of requirements and new initiatives related to metropolitan transportation planning. ISTEA also requires the U.S. Department of Transportation to certify the metropolitan planning process in transportation management areas (TMAs). Although regulations on ISTEA planning requirements were not finalized at the time of the Denver area review, Interim Guidance had been distributed by FHWA and FTA.

One objective of the planning review was to assist DRCOG, RTD, CDOT, and other planning agencies to anticipate ISTEA changes, and to prepare for future formal certification. The FHWA and FTA were also interested in problems encountered in anticipating ISTEA provisions, and how these problems were resolved.

This section focuses on planning related to ISTEA, as observed at the time of the review, and summarizes relevant observations made in earlier sections of this report (indicated in parentheses).

A. General Observations

In many ways, DRCOG and the region's planning agencies are in a strong position to meet ISTEA requirements. This review of DRCOG's planning process indicates that its approach to regional planning has been in the spirit of ISTEA for some time.

In its planning, DRCOG has recognized the interaction that exists between land use and transportation. Even though land development is market driven and land use controls rest with local jurisdictions, DRCOG has tracked regional growth and development patterns, attempted to establish a regional growth and development vision, and incorporated existing and forecasted land activities in its transportation planning. Within the past two years, it has organized a task force composed of planners, politicians, business people, and environmentalists who are charged with identifying a vision for regional growth and development. This vision is intended to establish a foundation for congestion management planning and development of alternative scenarios for the RTP.

Since the late 1980s, DRCOG has been examining mobility and congestion management issues. This has resulted in the adoption of a regional goal that calls for maximizing the utilization of existing facilities without major additional resources and completing a number of studies which establish a sound foundation for the development of the congestion management system plan required by ISTEA. These studies identify measures to reduce vehicular travel, discuss strategies for implementing mobility management programs, and examine the feasibility of developing an HOV system. At the time of the planning review, DRCOG was working with a consultant on the development of a congestion management plan.

In addition, DRCOG has been involved since the early 1980s in long-range planning for bicycles and pedestrians. A bicycle and pedestrian plan was adopted in 1983 and later amended in 1991. The 1993-94 UPWP includes a task that calls for the preparation of a new bicycle and pedestrian plan. DRCOG intends to identify strategies to encourage bicycling as a form of transportation

and, in particular, as a means to access transit routes. The development of the plan is intended to be a cooperative effort with CDOT, RTD, APCD, and RAQC participating.

Even though the 2010 RTP was not financially constrained, DRCOG estimated how much it would cost to implement the plan and how much revenue would be available during the planning period from state, federal, and private sources. A shortfall of \$8.3 billion was estimated, and the plan recommended that additional revenues be raised through local and regional sources. As required by ISTEA, DRCOG has initiated a planning process which will result in a financially constrained plan. This will be accomplished by considering a range of transportation and regional growth and development scenarios, and applying realistic financial forecasts.

DRCOG has also made significant progress in developing a quantifiable and objective process for identifying and determining which capital investment projects should be included in the TIP. For 1993 to 1995, DRCOG prepared its first post-ISTEA TIP. Project selection was guided by an interest in maintaining and improving the efficiency of the regional transportation system, implementing TCMs, managing mobility to relieve traffic congestion, and considering multi-modal solutions. In addition to producing a financially constrained program, DRCOG produced a strategic document for implementing long range transportation goals (see section IV.B.).

In conducting corridor studies, RTD has analyzed a range of alternatives to determine which one would be the most cost effective solution, considering environmental impacts and actively involving potentially affected citizens. For example, in its alternative analysis for the southwest corridor, six different alternatives were considered, ranging from low cost improvements to the development of a fixed guideway commuter rail line. The alternatives analysis was completed with an active outreach program that included 75 public meetings.

DRCOG intends to organize a forum for all parties interested in transportation issues to discuss various aspects of ISTEA and to provide further opportunity for involvement in the process.

B. Flexible Transfers of Funds

A major feature of ISTEA is the flexibility to transfer funds between highway, transit, and other program categories. Currently, as part of the update to the RTP, DRCOG is considering a number of different scenarios which would require a transfer of significant funds from highways to transit for the implementation of the light rail system.

The 1993-95 TIP calls for transfers of \$197,000 in STP funds to RTD to aid Special Transit in Boulder County in the provision of evening transit services for the elderly and persons with disabilities. It also calls for the transfer of \$1.4 million of STP dollars to RTD to aid in making public mass transportation improvements in the City of Boulder.

Critical to the decision regarding transfer of National Highway System, Bridge, and Interstate Maintenance funds is the identification of an allocation of these dollars to the Denver Metro area from the Colorado Department of Transportation. With respect to the TIP, DRCOG has asked the state to identify available funds to the region by funding category; however, the state has been reluctant to agree to do so. Without an indication of the amount of funds by category, it becomes difficult to address funding flexibility among the modes when selecting projects for

inclusion in the long range transportation plan and the TIP. The MPO is currently working with a consultant to prepare a methodology to evaluate the cost effectiveness of using Congestion Management and Air Quality (CMAQ) funds for a range of proposals.

The MPO does not distribute funds to local governments or political subdivisions on the basis of any formulas or percentages. This is documented in the "Policy for the Preparation of the TIP" which was adopted by the DRCOG Board. This policy, however, does state that the needs across the entire region will be considered when selecting projects.

C. Multi-Modal Integration

ISTEA identifies multi-modal integration as an important feature in the transportation system. DRCOG and RTD are moving toward adopting ISTEA's multi-modal emphasis in long range and corridor planning. This is evident in the options that have been included in the most recent RTP and the alternatives that were considered in the alternatives analysis for the southwest corridor. They incorporate Transportation System Management (TSM) and Transportation Demand Management (TDM) strategies as well as transit and highway improvements. At an institutional level, agencies representing all modes are involved in regional planning.

Even though the region has not yet established a formal process to identify and prioritize multi-modal integration initiatives, an unfunded task has been included in the UPWP to examine the feasibility of converting the Denver Union Terminal into an intermodal facility. CDOT and DRCOG also recently organized the Denver International Airport Access Task Force to address surface access to the new airport and intermodal issues.

D. Emphasis Areas

ISTEA identifies fifteen factors that must be considered as part of the planning process for all metropolitan areas. MPOs are expected to review their planning processes to assure that these factors are explicitly and substantially reflected in the planning process and its products. Because compliance was required by October 1, 1993, MPOs were expected to begin reviewing planning processes and making adjustments to include these factors. Several of these areas, which were discussed during the review, are identified below.

- **The Preservation and Efficient Use of Existing Transportation Facilities.** DRCOG has adopted a strategy to guide project selection for the TIP and the preparation of the 2015 RTP, which calls for: 1) maintenance and improvement of the integrated, intermodal transportation system; 2) implementation of TCMs; 3) management of mobility to relieve traffic congestion; and 4) consideration of multi-modal solutions. In conjunction with the ISTEA mandate calling for the efficient management of financial resources, DRCOG has begun preparing financially constrained TIPs and plans.
- **Congestion Management and Mobility.** As stated earlier, DRCOG has been examining mobility and congestion management issues since the late 1980s. They are currently developing a congestion management plan and utilizing a model to evaluate the impact of TCMs.

- **Land Use.** DRCOG has established a task force to identify a preferred long-range vision for regional growth and development. One of the objectives of this analysis is to consider the impact of transportation improvements on urban form. This vision is intended to establish a foundation for congestion management planning and the development of alternative scenarios for the RTP.
- **Enhancements.** DRCOG has worked since the early 1980s on long range planning for bicycles and pedestrians. A bicycle and pedestrian plan was adopted in 1983, and later amended in 1991. DRCOG will be developing a new bicycle plan which will identify strategies to encourage bicycling.
- **Expansion of Transit.** The efforts of RTD, in conjunction with DRCOG, demonstrate aggressive efforts to expand and enhance regional transit service. RTD is encouraged to pursue TSM and TDM strategies along with extending the MAC.
- **Intermodal Integration.** An unfunded task force has been included in the UPWP to examine the feasibility of converting the Denver Union Terminal into an intermodal facility. CDOT and DRCOG also recently organized the Denver International Airport Access Task Force to address surface access to the new airport and intermodal issues.

E. Outreach Efforts

ISTEA directs MPOs to "provide citizens, affected public agencies, representatives of transportation agency employees, private providers of transportation, and other interested parties with a reasonable opportunity to comment" during the development of transportation plans and transportation improvement programs. Participants should be adequately informed and given access to official information, and allowed opportunities to influence plans and TIPs in the early stages of their development.

Discussion of the adequacy of involvement by a broad range of public agencies in area planning is provided in section V.E.

DRCOG and RTD provide a range of mechanisms for effective participation of citizens and private operators in the planning process. In addition to inviting citizens to regularly participate on advisory committees, DRCOG's Board meetings are open to the public, and DRCOG frequently schedules public meetings to review important planning documents.

RTD is managed by an elected board of directors that encourages responsiveness by the agency to the electorate. It has also effectively notified and provided opportunity through public meetings for citizens to participate in corridor studies.

Observations and Suggestions

1. **DRCOG is commended for incorporating many of the fifteen factors into its planning process.** DRCOG, RTD, and CDOT are encouraged to incorporate additional factors,

such as rights-of-way preservation, efficient freight movement, and transit security, in their planning.

2. **Further integration of the region's transit, congestion, and air quality planning as part of the RTP development process could allow the region's planning agencies to maximize the use of the flexible funding feature.**
3. **DRCOG and RTD are commended for their effective outreach efforts; however, they need to formalize their citizen participation activities to further respond to ISTEA requirements.**

APPENDIX 1

Participants in Denver Region Planning Review

US Department of Transportation/Federal Transit Administration

Region 8:

Don Cover, Director, Programs Operation Staff

Headquarters:

Deborah Burns, Project Manager

US Department of Transportation/Federal Highway Administration

Region 8:

Robin Smith, Air Quality - Urban Transportation Planner

Colorado Division Office:

Ron Lorenz, Planning and Right-of-Way Manager

DuWayne Ebertowski, Planning and Air Quality Specialist

Headquarters:

Barna Juhasz, Chief, Planning Analysis Division

US Department of Transportation/ John A. Volpe National Transportation Systems Center (Volpe Center)

William Lyons, Volpe Center Project Manager

Robert Brodesky, Senior Technical Analyst

George Wickstrom, Consultant

Denver Regional Council of Governments (DRCOG)

Robert Farley, Executive Director

David Pampu, Deputy Executive Director

George Scheuernstuhl, Director of Transportation Planning

Jeff May, Highway and Transit Coordinator

Larry Mugler, Director of Development Services

Liz Rao, Transportation Planner

John Coil, Transportation Planner

Regional Transportation District (RTD)

David Baskett, Director, Planning and Development

Regional Transportation District (RTD) cont'd.

Jennifer Heisler, Systems Planning Manager
Robert Concienne, Paratransit Manager
Martha Hecox, Operations and Administration Manager
Bill Van Meter, Transportation Planner

Colorado Department of Transportation

Bill Stringfellow, Manager, Transportation Planning Business Group
Frank McGhghy, Senior Transportation Specialist

Colorado Department of Health, Air Pollution Control Division

Jim DiLeo, Planning Grants Officer

Regional Air Quality Council

Ken Lloyd, Executive Director

US Environmental Protection Agency (EPA) Region 8

George Gerstle, Environmental Scientist

APPENDIX 2

Agenda for Urban Transportation Planning Review Meeting

July 13-15, 1993

Denver Regional Council of Governments
2480 W. 26th Avenue, Suite 200-B
Denver, CO 80211-5580
(303) 455-1000

Tuesday, July 13, 1993

at Embassy Suites, Downtown

8:00 - 8:40

Meeting of Federal Review Team

at DRCOG

9:00 - 9:30

Don Cover
FTA, Region 8

Welcome and introductory remarks

Robin Smith
FHWA, Region 8

Deborah Burns
FTA, Headquarters

Objectives for planning review

Barna Juhasz
FHWA, Headquarters

Introductory remarks

Bob Farley, DRCOG

Introductory remarks

9:30 - 9:45

William Lyons,
USDOT, Volpe Center

Overview of meeting and schedule

Format for all sessions - Discussion of urban transportation planning process.

Each session begins with a topic overview from regional agencies, building on written responses, with discussion led by review team members. (Roman numerals following topics below refer to questionnaire, which provides discussion questions).

Tuesday, July 13 (cont.)
at DRCOG

Local Transportation Issues (I.B.).

9:45 - 10:15	Dave Pampu, DRCOG	Presentation
10:15 - 11:00	Robin Smith, FHWA, Region 8 Deborah Burns, FTA Headquarters	Discussion

Organization and Management of the Process -- Agencies' Roles and Responsibilities (II).

11:00 - 11:45	George Scheuernstuhl, DRCOG Bill Stringfellow, CDOT Dave Baskett, RTD	Presentations
11:45 - 12:45	Ron Lorenz, FHWA, Colorado Division Deborah Burns, FTA Headquarters	Discussion
12:45 - 1:45	Lunch	

Products of the Process (III).

1:45 - 2:30	Jeff May, DRCOG	Presentation
2:30 - 4:30	George Wickstrom, Volpe Center William Lyons, Volpe Center	Discussion

Wednesday, July 14, 1993
at DRCOG

Elements of 3-C Process (Multi-Modal Dimension) (IV).

8:15-8:45	Jeff May, DRCOG	Presentation
8:45-10:15	Robert Brodesky, Volpe Center George Wickstrom, Volpe Center	Discussion

Transportation Planning Techniques (V).

**Travel demand forecasting methodologies (V.A.), and
Costing methodologies (V.B.).**

10:15-11:15	Jeff May, DRCOG John Coil, DRCOG	Presentation
	DuWayne Ebertowski, Colorado Division George Wickstrom, Volpe Center	Discussion

ISTEA Planning (VII).

11:15 - 11:45	George Scheuermstuhl, DRCOG	Presentation
11:45 - 1:00	Barna Juhasz, FHWA, Headquarters William Lyons, Volpe Center	Discussion
		<i>Topics:</i> Flexible funding (VII.A.) Multi-modal integration (VII.B.) Congestion management System (VII.E.) Project selection (VII.J.) Other topics
1:00 - 2:00	Lunch	

Note: The meeting will reconvene at 2:00 P.M. at RTD.

Wednesday, July 14, 1993 (cont.)

On-going transit planning (VI).
at RTD

2:00-5:00

Dave Baskett, RTD

Introductory
remarks/
presentation

Don Cover, FTA, Region 8
William Lyons, Volpe Center

Discussion

Topics:
Organizational issues -
strategic
planning (VI.A.)

Service performance and
development (VI.B.)

Structure, vehicle, and
equipment planning
(VI.C.)

Transit management
analysis (VI.D.)

Financial planning
(VI.E.)

Americans with
Disabilities Act (VI.F.)

Outreach activities
(citizen and minority
participation, DBE,
private sector
involvement) (VI.G.)

Planning for a Drug-
Free Work Place
(VI.H.)

Transit capital and
operating plans and
programs (VI.I)

Thursday, July 15
at DRCOG

Approach to Air Quality (Clean Air Act) (IV.D. and Supplemental Questions in Enclosure 1b).

9:00 - 9:45	Jeff May, DRCOG Karin Kudebeh, APCD Ken Lloyd, RAQC George Gerstle, EPA	Presentations
9:45 - 10:30	Robin Smith, FHWA, Region 8 Robert Brodesky, Volpe Center	Discussion
10:30 - 12:00	Federal Review Team	Prepare and complete draft findings
12:00 - 1:00	Lunch	
1:00 - 2:30	Don Cover, FTA, Region 8 Robin Smith, FHWA, Region 8	Meeting summary -- and follow-up actions (VII)
		Regional concerns
		Next steps

APPENDIX 3

Documentation Provided by Denver Regional Agencies

Denver Regional Council of Governments (DRCOG)

- "1993-94 Unified Planning Work Program for the Denver Region" (Draft)
- "1993-95 Transportation Improvement Program and Amendment Number 1," April 28, 1993
- "Policy on Transportation Improvement Program Preparation," June 10, 1992
- "Transportation Improvement Program Procedural Manual - Project Evaluation and Priority Determination," August, 1992
- "1993-98 Transportation Improvement Program Selection of Projects," September 10, 1992
- "2010 Regional Transportation Plan and Amendments," December, 1990
- "Regional High Occupancy Vehicle Lane System," April 1990
- "Study Design for the Development of a Multi-Modal Regional Transportation Plan," March, 1993
- "Transportation Models for Regional and Subarea Planning in the Denver Region," April 10, 1992
- "Mobility Management in the Denver Region," February, 1992
- "Elderly and Handicapped Transportation Plan," June, 1991
- "Regional Transit Development Program," May, 1991
- "Regional Pedestrian and Bicycle Transportation Plan Work Program"
- "Southeast/Southwest Transit Threshold Analysis Summary," November 29, 1989
- "The New Airport Area - Access and Mobility," September, 1992
- "Mobility - The Southeast Area," July, 1991
- "Surface Transportation Data File," September, 1991
- "Travel in the Denver Region," February, 1988
- "Metro Area Connection Extension DRCOG Assessment," September, 1992
- "Metro Area Connection" - DRCOG Assessment Report, July, 1991

"Transportation Measures to Reduce Vehicular Travel," October, 1991

"Suburban Mobility Design Manual," February 1993

"Mobility" (Draft), June 29, 1993

"Status of Transportation Control Measures Contained in the 1979 and 1982 State Air Quality Implementation Plans for the Denver Region," January 20, 1993

"1993-1997 Transit Development Program," July 1992

"Prospectus for Transportation Planning in the Denver Region," May 20, 1981

Regional Transportation District (RTD)

"1993-1997 Transit Development Program," July 1992

"Today and Tomorrow," October, 1992

Memorandum with Adopted Goals and Objectives, August, 1992

"Strategic Plan for Transit Services," July, 1993

"Service Standards," June, 1992

"1990 Rider and Non-Rider Profiles"

"1993 Public Opinion Survey," February, 1993

Fact Sheets on Access to the Denver International Airport

"Development of a Fully-Allocated Cost Model," August, 1989

"Transit and Intercity Coach Inspection and Preventative Maintenance Procedures Book," October, 1983, Revised December, 1988

Memorandum - Assessment of Training Needs, July 9, 1992

Letter from KPMG Peat Marwick to RTD discussing Financial Capacity Analysis, December, 1992

U.S. 36 Corridor Fact Sheet

"ADA Paratransit Implementation Plan - Annual Update," January, 1993

Metro Area Connection Public Relations Brochures

"Metro Area Connection - Proposal"

"Southwest Corridor Spotlight," May, 1993

"Southwest Corridor AA/DEIS - Scoping Information Report," December, 1992

"Alcohol and Controlled Substance Policy - Implementation Guidelines," November, 1987

"RTD Rapid Transit Planning History," February, 1992

"Suburban Mobility Design Manual," February, 1993

Colorado Department of Transportation

"Overview - Colorado Department of Transportation, Fiscal Year 1993"

Regional Air Quality Council and Colorado Department of Health Air Pollution Control Division

"Colorado State Implementation Plan for Particulate Matter (PM₁₀)," May 20, 1993

Colorado Department of Health Air Pollution Control Division

"Colorado State Implementation Plan for Air Quality - 1982 Carbon Monoxide and Ozone Revision," June 18, 1982

"1990 Base-Year Carbon Monoxide Emission Inventory for the Denver Non-Attainment Area," November, 1992

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