
APPENDIX E

The Seven Planning Factors: H-GAC's Implementation of The Concept

H-GAC has been developing a consistent planning framework for the seven planning factors required by the Transportation Efficiency Act for the 21st Century (TEA-21). This framework will link the criteria used to evaluate specific projects for both the long-range Regional Transportation Plan (RTP) and the short-range Transportation Improvement Program (TIP). There are four steps involved in the framework:

1. The Seven Planning Factors
2. H-GAC planning goals and objectives
3. Performance measures for inclusion in the RTP
4. Performance measures for inclusion in the TIP

Seven Planning Factors

TEA-21 formulated seven planning factors that were required to be addressed in the Metropolitan Transportation Plan (MTP). These seven factors replaced the 16 metropolitan and 23 statewide planning factors that were part of the prior transportation legislation (ISTEA). The seven factors are:

1. Support the economic vitality of the United States, the States and metropolitan areas, especially by enabling global competitiveness, productivity and efficiency;
2. Increase the safety and security of the transportation system for motorized and non-motorized users;
3. Increase the accessibility and mobility options available to people and freight;
4. Protect and enhance the environment, promote energy conservation and improve quality of life;
5. Enhance the integration and connectivity of the transportation system, across and between modes, for people and freight;
6. Promote efficient system management and operation; and
7. Emphasize the preservation of the existing transportation system.

H-GAC's Planning Goals and Objectives

Using these planning factors and comments received from the general public, H-GAC initiated a process to translate these factors into specific planning goals and objectives. The Transportation Policy Council (TPC) has approved an overall mission for the Metropolitan Planning Organization (MPO): *Enhance mobility by providing an efficient, affordable, safe, and environmentally responsible transportation system for both people and goods.*

Goals and Objectives

1. Improve transportation safety and security.

- Reduce the number and severity of motor vehicle crashes in the region by evaluating high-risk locations and implementing projects and programs to mitigate unsafe facilities and locations.
- Improve security measures on vehicles and at facilities.
- Improve facilities associated with Hazardous Material Routes, Hurricane Evacuation Routes (HER) and Emergency Management Operations.
- Reduce frequency and severity of crashes involving trucks and trains.
- Improve navigation in the Houston Ship Channel.
- Identify and protect high-value, high-risk facilities, particularly at ports and airports.

2. Reduce congestion and improve access to jobs, markets and services.

- Improve transportation system effectiveness and reliability by implementing projects and programs that mitigate recurring traffic congestion.
- Increase transportation system efficiency by improving peak period traffic operations through expanded incident management and transportation demand management (TDM) projects and programs.
- Grow the transportation system consistent with community goals.
- Increase the number of travel choices for people by developing a variety of transportation solutions that meet the unique needs of each community in the region.
- Improve the reliability, effectiveness and efficiency of goods movements within and through the region by mitigating freight movement bottlenecks.

3. Be environmentally responsible.

- Improve regional air quality by implementing projects and programs that have beneficial air quality impacts, including demand management.
- Ensure that negative environmental impacts of regionally significant transportation projects are mitigated, as needed, to comply with federal law and local concerns.

4. Preserve and maintain existing transportation infrastructure.

- Prioritize and coordinate roadway improvements to maintain mobility levels and minimize travel delays. Ensure adequate funding allocations to support improved roadway conditions.

The RTP evaluation process includes both quantitative and qualitative criteria for systemwide comparisons and for project level prioritization as summarized in the table below.

RTP GOALS	PLANNING FACTOR	PERFORMANCE MEASURE	PROJECT (P) SYSTEM (S)
1. Safety/Security	1,2	Serious Crash Risk	P
2. Reduce Congestion	1,3,5,6	Travel Time Index, TT Savings	S, P
3. Improve Access	1,3,5	User Benefits, TCR, Travel Times	S
4. Environmental	4	AQ Conformity, Cost/lb reductions	S,P
5. Preservation, Maint.	1,7	Pavement Condition Rating	P

Development of Performance Measures

The goals and objectives were converted into quantifiable measures during a two-year process. H-GAC translated the RTP goals into very specific performance measures. Performance measures are quantifiable indices that allow submitted projects to be evaluated and monitor the effectiveness of finished projects to see whether they actually accomplished their purposes.

Stages in Development

There were several steps in the development process. There was a review of performance measures used by other Metropolitan Planning Organizations and by other organizations. The initial list contained 30 performance measures. These were narrowed down into 13 specific performance measures grouped into seven general categories:

1. Traffic

- Congestion Burden Index
- Travel Rate Index

2. Transportation Choice

- Transit Choice Ratio
- Bicycle Choice Ratio
- Pedestrian Choice Ratio

3. Safety

- Safety Improvement Index for Hazard Elimination Program (HEP) projects
- Safety index for non-HEP projects

4. Environmental Justice

- Accessibility Index

5. Financial/Funding

- Local Participation
- Benefit-cost Ratio

6. Economic Development

- Major Employment Centers Supported

7. Goods Movement

- Truck Burden Index
- Truck Congestion Index

This list was scaled down further to correspond to the seven planning factors and H-GAC goals. That list yielded nine specific measures grouped into six categories:

1. Traffic

- PM peak travel time
- Average speed (weighted by VMT)

2. Transportation Choice

- Percentage of home-based work trips by transit

3. Safety

- Crash risk (serious crashes per 100 million VMT)

4. Environmental Justice

- Percentage of households with no vehicles
- Percentage of households with no vehicles living farther than 0.5 miles from an existing transit route

5. Economic Development

- Lane miles per employee
- Lane miles per capita

6. Goods Movement

- Percentage of trips by commercial motor vehicles

Empirical Test of the Proposed Measures

Documentation for the travel variables came from the travel demand model, and crash data came from H-GAC's serious crash database. Tests were conducted with these indices on one freeway corridor (IH-610 E.) and six project corridors, representing both smaller roads and larger arterials (Bellaire Blvd., Hempstead Highway, FM 2978, FM 762, Harris Road, 7th Street). The measures held up well and distinguished the different projects.

Performance Measures Used in the 2025 RTP

After the initial test of the measures, the performance measures were further refined. Discussions were held with staff and with H-GAC's Technical Advisory Committee, Transit Stakeholders Committee, Bicycle/Pedestrian Committee, TIP subcommittee and the Operations Task Force. The use of these measures was clarified by combining the actual scoring of the measures with a benefit-cost analysis of the impacts of the project on travel mobility.

Intent

The intent of the scoring system is to prioritize projects for the RTP. The proposed scoring system is one way to rank the projects within the projected financial revenues. The rank and scores are not a commitment to funding; they are a means for determining what types of transportation improvements are financially possible over the next 20 years.

In the RTP, projects are sponsored by a jurisdiction or agency and are often estimated a number of years in advance and include limited project details (scope and budget). In many cases, however, no final design or engineering decisions have been made. There are often multiple design alternatives that could be developed. The projects are, therefore, conceptual with some preliminary engineering and rough cost estimates. Detailed concerns about these projects cannot usually be obtained.

The TIP is a subset of the RTP and identifies projects that are most ready to be implemented. To be considered in the TIP, a project must have previously been included in the RTP. Additional criteria is applied to projects in the TIP in order to identify their readiness, such as whether the final design and engineering has been completed, all environmental impact analyses have been completed, and all sources of funding have been determined.

Dimensions of Scoring

Scores for the projects have two parts, the benefit-cost ratio and an evaluation of the planning factors. The benefit-cost ratio is an estimated travel time savings resulting from the implementation of the project. This calculation is determined by evaluating the

difference in vehicle hours traveled on the existing plus committed network (existing facilities + TIP 2004-2006) and 2025 networks with the forecasted 2025 projected volumes. This travel-time saving benefit is 50 percent of the total score.

The planning factors account for the other 50 percent of the total score. The final list has nine factors and is scored as follows:

1. **Economic Development.** The intent is to provide points to areas where the employment levels are exceeding the capacity of the roadways. The measure that was selected was the number of lane miles per 1,000 employees. Currently, the regional average stands at 8.6 lane-miles per 1,000 employees. The measure is estimated from the year 2000 employment allocated to Traffic Analysis Zones around the proposed project. If there is adequate capacity to handle the employment levels, this percentage will be high. Conversely, if the number of employees is large relative to the roadway capacity, this percentage will be low. The percentage indicates the extent to which there is adequate roadway capacity for the employment level.
2. **Crash Risk.** The intent is to provide points to areas of high crash risk with the assumption that the project will improve safety. H-GAC uses the measure defined by the National Safety Council, which is the number of crashes per 100 million VMT. Because the H-GAC database uses information from DPS that includes only the more serious crashes (fatalities, injuries and serious property damage), the actual measure is serious crashes per 100 million VMT. Projects with a high crash risk impose many costs on the corridor and the region, including travel time delays, poorer air quality, and high medical, personal and insurance costs. Points are assigned based on whether the serious crash risk is higher than the state average (150) or higher than the regional average (197).
3. **Transportation Choice.** The intent is to provide points to projects that have a high use of transit facilities or projects that include bicycle and pedestrian facilities. The performance measure used is the transit percentage. If the project facility has a higher percentage of transit trips than the regional average (currently 3.1 percent), then the project receives points. Points are then received based on standard deviations above the average.
4. **Environmental Justice.** The intent is to provide points for areas with high transit need. The performance measure used is the percent of households without vehicles within a one-mile radius of the proposed project. The regional average is 7.8 percent. Points were given based on standard deviations above and below the average. Since enhancing the quality of life and improving the environment are components of this planning factor, it is a difficult benefit to measure. More emphasis can be placed on this factor after the design of the project and right of way implications have been established.
5. **Goods Movement.** The intent of the score is to provide points for projects along corridors with substantial freight volumes or facilities that connect ports and airports. The performance measure used is truck percentage. If the project has a higher percentage of commercial truck vehicles than the regional average, the project received points. The points are assigned based on standard deviations above the regional average (6.3 percent).

6. **Congestion.** Congestion accounts for 50 percent of the total score. Calculated by the benefit-cost ratio, congestion takes into consideration travel time benefit and the annual cost of the project.
7. **Rehabilitation and Preventive Maintenance.** Staff did not rank individual projects in the category. This project category, as a whole, is considered a priority. Rehabilitation and preventive maintenance accounts for nearly 50 percent of the roadway dollars.
8. **Evacuation Routes.** The intent is to provide extra points for those facilities that are recognized Department of Public Safety evacuation routes or intersect with those evacuation routes. The intention is to emphasize the importance of building infrastructure that can withstand the region's hard rains and floods. On the other hand, if a facility is in a flood plain it will be evaluated for its design to improve drainage or have documentation that the roadway will be elevated to accommodate such potential flooding. New projects that have the potential for providing an alternative to an evacuation route are awarded points for being evacuation routes.
9. **Priority Corridors.** Points are given to facilities that fall into one of the following categories:
 - Major corridors
 - NHS facilities
 - Cross jurisdictional boundaries
 - Fill gaps or relieve bottlenecks

Other Possible Criteria

Staff is aware that there are additional dimensions that cannot currently be quantified that are important to the region. For example, projects that improve connectivity should receive additional points. Conversely, projects should be evaluated based on their potential negative impacts (e.g., a project that increases crashes on a road or negatively impacts a community). As the methodology progresses, we can investigate and document changes in regional and national policy and adjust the methodology appropriately.

The 2006 –2008 Transportation Improvement Program

In addition to the RTP point system described above, staff continues to evaluate the methodology and is expanding the process for the development of the Transportation Improvement Program (TIP). The intent of the scoring system at the TIP level is to prioritize projects for funding commitment, evaluate project readiness and provide short-range benefits to the region. The factors used in the scoring system include:

- Local funding commitment for short range projects
- Substantial readiness required (conformity, right of way)
- Extensive project detail
- Ranking indicates priority
- Impacts to land use known
- Community impacts known

- Construction/Implementation time within 3 years

Additional factors can be established for TIP projects because much of the design work is started and there is more quantifiable data available. These projects can be evaluated more closely on their community and environmental impacts, innovative features and overall local benefit. At the TIP level, policies can be created to deal with factors, such as projects that have a negative impact on transit, the environment, bicycle, pedestrian interests, or safety.

Adjustments to the scoring methodology are being incorporated into a new electronic format for TIP consideration submittals. H-GAC will ask the project sponsors questions to gather details about the impacts of the various projects. TIP project analysis evaluates not only additional data for the above planning factors but requires additional factors to determine benefits:

1. **Environmental justice** - Increased evaluation of the local impacts of projects is requested. Information requested includes the number of residents and businesses relocated with the implementation of the project, impacts on parks, wildlife and other environmentally friendly locations, detailed descriptions on land use, information about petitions for or against the project and information about the number and accessibility to schools in the area.
2. **Emergency routes** - Beyond analysis of tropical storm related evacuation routes, the TIP evaluation assesses benefits for facilities that could provide outlets during chemical emergencies, other accidental hazardous material incidents or as a result of breaks in homeland security.
3. **Transportation Choice** - TIP level analysis includes the evaluation of benefits or potential negative impacts on transportation options. Such impacts could be whether existing bike/hike facilities would be removed, if the project will be designed to include additional choice options such as bike lanes or diamond lanes, or if there any impacts or benefits for the disabled.
4. **Goods Movement** - Additional information evaluated includes any plans in the facility area for new ports or transfer stations. Staff requests an estimated completion date for the new port or station to determine if the facility implementation schedule is consistent with that location and what impact it will have on the flow of goods and services. Information on any freight studies conducted along or in the vicinity of the project is also requested.
5. **Safety** - Additional data is requested to provide more detail about how the design of the facility will address safety concerns.
6. **Coordination** - Coordination information is also being used to evaluate projects submitted for inclusion into the TIP. Efforts include either coordination with construction along other facilities, or coordination with other transportation agencies or local jurisdictions.
7. **Intelligent Transportation Systems (ITS)** - The ITS selection process is becoming more detailed than in previous years. A new task force has been established to review local projects, and determine selection and ranking criteria. The evaluation of ITS projects will require more information about how the sponsor will follow the standards and guidance provided in ITS architecture. System coordination, overall improvements and maintenance, delay savings, throughput, and community impacts

are just a few of the factors evaluated in determining the benefit of projects in the ITS system.

All projects in the TIP are calculated with the same quantitative data used to develop the scores for the RTP. The TIP analysis then goes beyond quantitative analysis and incorporates more subjective criteria allowing for adjustments to the selection and ranking process. Such qualitative analysis allows transportation planners to address regionally significant impacts resulting from the implementation and development of various projects. These impacts include community and environmental concerns, and land-use impacts, as well as political considerations. The process of developing methodology is ongoing and adjustments to the methodology will continue to be made as new information and measures become available.