Methodology for Evaluating Urban Mass Transportation Act Section 16(b)(2) Applicants

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The methodology used to evaluate Virginia's applicants for capital grants for transportation aid through the Urban Mass Transportation Act's Section 16(b)(2) program is summarized. Eligible applicants include private nonprofit organizations that support program objectives of various state agencies. The previous use of essay questions to assess applicants' proposals produced inconsistent scoring results. Numerical scales of measurement were applied to a fixed-alternative and open-ended questionnaire in February 1990 to allow consistent comparisons of information and to provide consistent scoring assignments for all applicants. Specific variables were assigned different weighted values to gauge agencies of large and small fleet size by similar quality control standards. Various electronic spreadsheet functions were used to quantify and rank data. The relative significance of these measurement techniques to the evaluation process and their influence on future funding policy are discussed. These methods meet the needs and desires of Virginia's Section 16(b)(2) Review Committee and may also be useful to administering agencies of other states.

Section 16(b)(2) of the Urban Mass Transportation Act of 1964 authorizes financial assistance to private nonprofit organizations for capital projects that transport elderly and disabled individuals. Federal regulations direct state agencies to determine program criteria and to select projects for funding from all populated areas. Like other federal transportation programs, such as the programs for transit under Sections 18 and 9 of the Urban Mass Transportation Act, the Section 16(b)(2) program is designed to assist agencies with the purchase of rolling stock and radio communications equipment. However, the broad eligibility requirements, which permit applicants with diverse transportation objectives and resources to be considered together for funding, distinguish the Section 16(b)(2) program from the transit grants programs. The conflicting characteristics of human service transportation programs challenge administering agencies to design an equitable and uniform evaluation process.

The Virginia Department of Transportation (VDOT) shares the responsibility for evaluating applicants with a committee of representatives from state human service departments. To evaluate applicants' funding needs in an impartial manner, the committee modified the procedures of the review process. An advisory review subcommittee represented by staff from the Virginia Department of Health and VDOT was charged with revising the application format. Changes to the structure of the evaluation process included replacing general, essay questions with fixed-alternative and open-ended questions and substituting subjective scoring assignments with numerical measurement techniques. These modifications were made to eliminate bias caused by differences in agencies' writing styles, program goals, and client groups.

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OUTLINE OF METHODOLOGY

The previous use of essay questions to collect program data generated inconsistent responses from applicants. Grant writers applied different terms to describe service outputs and submitted various types of documentation to support their responses. Evaluations of essay replies by advisory review committee members yielded erratic scores for all applicants.

To allow consistent comparisons of information, a structured questionnaire was designed using clearly defined data classifications to limit the variety of possible responses and to standardize the data received. In addition, certain variables were compared as ratios to uniformly assess data provided by organizations with different fleet sizes.

The variables selected to measure applicants' proposals were grouped into the following criteria: operations procedures, maintenance procedures, coordination practices, service need characteristics, the proposed project's influence on fleet age and ridership, and Section 16(b)(2) funding history. Criterion weights were designated in accordance with the current operating practices of grantees. Point values for individual criteria were determined by the influence of associated variables on operating conditions related to the availability of public transportation service. The selection and weighting of discretionary criteria considered safety, reliability, and need factors that supported program goals, as agreed to by the advisory review committee.

The selection of questions for each criterion evolved from discussions with private nonprofit organizations about their operation. Through this process, the clarity and reliability of proposed variables were pretested. Agencies were also surveyed to ascertain common operating characteristics. This information was used to apply realistic standards to evaluate all applicants and to analyze whether providers should be grouped together by fleet size for scoring purposes.

A primary objective of the advisory review committee was to apply measurement techniques that did not produce large

scoring variances to the evaluation of proposals. Qualitative data were assessed by measuring responses to fixed-alternative questions and assigning point values to each possible answer. Measurements of quantitative data were completed by ranking responses to open-ended questions for all applicants and assigning specific point values on the basis of the mean and standard deviation of each sample. The Section 16(b)(2) program manager was delegated the responsibility of measuring all criteria by these techniques, excluding the coordination criterion.

Descriptions of applicants' coordination efforts to reduce service inefficiencies or expand service opportunities with other agencies were assessed by committee review. In previous reviews, committee scores relating to the coordination criterion differed greatly for each applicant. This discrepancy was reconciled by limiting applicant responses to a fixed number of alternative categories for coordination practices and assigning specific point values for each coordination classification.

Operations

Applicants are asked to provide information concerning issues related to operational procedures. Organizations identify the single most appropriate response to fixed-alternative questions on supervision levels, training and hiring practices, and sources of revenue. The focus of the operations criterion is to assess agencies' operating procedures relating to safety, financial stability, and service reliability. This criterion has a weight of 40 out of a possible 240 points.

Maintenance

The second part of the program questionnaire obtains information on the applicant's ability to provide proper vehicle maintenance procedures. Organizations identify the single most appropriate response to fixed-alternative questions, including supervision of maintenance schedules, preventive maintenance work completed in-house, and available resources to inspect and maintain equipment. The maintenance criterion has a weight of 30 points.

This criterion was weighted fewer points than others because applicants' use of different record-keeping procedures and their dependence on various vendors to perform all maintenance procedures prevented consistent comparisons of maintenance data.

The advisory review subcommittee was responsible for coding and assigning point values to fixed-alternative responses to operations and maintenance questions. Variables were given distinct values depending on their estimated influence on providing safe, reliable transportation service. Responses to questions that required support documentation were allocated fewer points because of the difficulty in verifying information.

Certain quality control variables, such as the level of operations supervision, were determined to be strongly related to an agency's fleet size. In this case, coded responses were assigned different weighted values to gauge applicants of large and small fleet size by similar standards. Specifically, a small agency was defined as an organization operating one to five vehicles, excluding spare vehicles. Large agencies include organizations operating six or more vehicles during regular service hours.

Only 5 of the 18 questions used to assess applicants by quality control standards were assigned different weighted values to adjust for fleet size differences.

Coordination Practices

The applicant's description of its cooperative planning efforts to reduce service inefficiencies or expand service opportunities with other organizations is significant because of this criterion's heavily weighted value. The coordination criterion is weighted 60 points.

Service Needs

This criterion measures applicants' operations by conditions that influence the use of equipment. Organizations indicate whether public transportation service is available in their service area, the average number of unduplicated clients transported each month, the distance traveled to a maintenance garage, and the average number of miles operated per month.

Agencies are awarded a fixed number of points on the basis of whether public transportation service is available in their service areas. A ranking of the number of miles traveled to a maintenance garage to complete major repairs is produced for all applicants. Rankings of data ratios are generated for the total number of clients transported per vehicle and total miles operated per vehicle. This criterion is weighted 50 points.

Proposed Project's Influence on Fleet Age and Ridership

This criterion assesses applicants' need for requested equipment on the basis of related fleet age, ridership, and service use characteristics. Applicants are asked to indicate whether the requested equipment will be used to maintain, expand, or initiate service and to indicate the model year and mileage of each vehicle in their fleet.

Agencies obtain larger point values by demonstrating that the purpose of the proposed project is to replace equipment that has exceeded its useful life. Scoring assignments are also determined by a ranking of applicants' ridership figures per the total of requested vehicles and base fleet vehicles less than 5 years old or with less than 100,000 accumulated miles. This criterion is weighted 40 points.

Prior Funding

This criterion is designed to assign points on the basis of the applicant's Section 16(b)(2) funding history to allow for an equitable distribution of grant awards. A total of 20 points is awarded to organizations that have not received funding within 2 years of their application date. Agencies that have received funding during this 2-year period but did not receive equipment each year obtain no points. Organizations that received funding for two consecutive years before their application date were assigned -20 points.

QUESTIONNAIRE DESIGN FOR OPERATIONS VARIABLES

Table 1 gives examples of questions related to the supervision of applicants' transportation programs. Questions 1 through 4 differentiate between management responsibilities and operational duties. Responses to Questions 1 and 2 were not assigned point values because the questions' broad scope makes inconsistent comparisons likely. By addressing general transportation issues first and progressively narrowing the focus of Questions 3 and 4 to operations procedures, the probability of obtaining reliable data increases.

The purpose of Question 3 is to indicate whether large agencies allow a driver to serve as supervisor of operations while operating a vehicle. Large agencies are penalized 5 points subject to confirmation that a driver divides his responsibilities between supervising operations and driving duties. The objective of Question 4 is to survey the number of hours devoted to supervising operations by large and small agencies. Scoring assignments are based on four categories

TABLE 1 EXAMPLES OF SCORING ASSIGNMENTS FOR OPERATIONS QUESTIONS

1. Who is ultimately responsible for developing policy and procedures for your agency's transportation program?

		LARGE AGENCIES	SMALL AGENCIES
	* = Not Scored		
Executive Director	___	*	*
Program Director	___	*	*
Assistant Director	___	*	*
Transportation Manager	___	*	*
Transp Coordinator	___	*	*
Administrative Asst.	___	*	*
Driver	___	*	*
Other (Please Specify	_____		

2. How many hours per week does that person allocate towards managing your agency's transportation program?

		LARGE AGENCIES	SMALL AGENCIES
	* = Not Scored		
40 or more hours	___	*	*
30 to 39 hours	___	*	*
20 to 29 hours	___	*	*
less than 20 hours	___	*	*

3. Who is responsible for supervising day to day operational duties for your agency's transportation program?

		LARGE AGENCIES	SMALL AGENCIES
Executive Director	___	(0)	(0)
Program Director	___	(0)	(0)
Assistant Director	___	(0)	(0)
Transportation Manager	___	(0)	(0)
Transp Coordinator	___	(0)	(0)
Administrative Asst.	___	(0)	(0)
Driver	___	(-5)	(0)
Other (Please Specify	_____		

4. How many hours per week does that person spend on supervising day to day operational duties?

		LARGE AGENCIES	SMALL AGENCIES
40 or more hours	___	(8)	(8)
30 to 39 hours	___	(4)	(6)
20 to 29 hours	___	(2)	(6)
less than 20 hours	___	(0)	(0)

6. What percent of your agency's total budget is provided through donations or contributions?

		LARGE AGENCIES	SMALL AGENCIES
20% or more	___	(0)	(0)
10% -19%	___	(2)	(2)
5% - 9%	___	(4)	(4)
1% - 4%	___	(6)	(6)
0%	___	(8)	(8)

10. What percent of your agency's drivers do not receive wages?

		LARGE AGENCIES	SMALL AGENCIES
50% or more	___	(0)	(2)
30% -49%	___	(2)	(4)
10% -29%	___	(2)	(4)
1% - 9%	___	(4)	(6)
0%	___	(8)	(8)

11. Does your agency require drivers to submit their motor vehicle record with their application prior to hiring?

		LARGE AGENCIES	SMALL AGENCIES
Yes	___	(2)	(2)
No	___	(0)	(0)

ranging from less than 20 to 40 or more hours of supervision.

The difference in scoring assignments for large and small agencies exists at the intermediate levels of supervision. Small agencies that supervise operations between 20 and 39 hr per week are assigned more points than large agencies supervising operations for the same number of hours.

Question 6 gauges the financial stability of each organization by requesting applicants to indicate the percentage of their budget that is provided through contributions or donations. Scoring assignments are determined by the level of unsecured funding for all applicants regardless of fleet size.

The purpose of Question 10 is to measure the applicant's ability to ensure service reliability by determining the percentage of the agency's drivers who are unpaid volunteers. Applicants receive scoring assignments on the basis of their fleet size and the proportion of employees who are volunteer drivers. Applicants obtained fewer points for employing a larger percentage of volunteer drivers than paid drivers because of the absence of financial incentives to influence service delivery and employee turnover.

Question 11 is designed to evaluate applicants' ability to provide safe transportation service. Organizations indicate whether they require candidates for operator positions to submit a copy of their motor vehicle record before hiring. Applicants were also asked to indicate whether they require drivers to provide documentation that a physical examination was completed before the first day of employment. Although both of these personnel procedures are significant in providing safe service, scoring assignments for these questions were proportionately lower than for other questions because of the difficulty in validating responses.

SUMMARY OF OPERATIONS RESULTS

The responses to operational questions from 53 applicants are summarized in Table 2. The data are grouped by possible scoring alternatives for large and small agencies. As indicated previously, the objective of Question 3 (Table 1) was to penalize large organizations that assign supervisory responsibilities to a driver. However, 100 percent of the large agencies indicated that drivers are not responsible for supervising operations (Table 2). Although this variable did not influence applicants' scores, it will be used in future reviews to evaluate their assignment of supervisory responsibilities.

Table 2 indicates that only 38 percent of the large agencies allocate 40 or more hours to supervising operations. All the small agencies reported that their transportation programs are supervised less than 40 hr per week. Summary results for the breakdown of unsecured funding levels were consistent for both applicant groups. The largest difference in replies for unsecured funding levels corresponded to the 20 percent category. Eight percent of the large agencies disclosed that their total budget is provided through donations of 20 percent or more; 22 percent of the small agencies indicated that they relied on contributions for the same amount.

The percentage levels of volunteer drivers for both applicant groups were also comparable (Table 2). Twenty-two percent of the small agencies do not require the review of motor vehicle records for employment purposes, compared with 8 percent for the large agencies. Thirty-eight percent of the large agencies and 59 percent of the small agencies indicated that they did not require driver candidates to complete a physical examination as a condition of employment.

TABLE 2 OPERATIONS RESULTS

	Large Agencies		Small Agencies	
	N	Percent	N	Percent
Supervisor of operations				
Driver	0	0.0	0	0.0
Other	26	100.0	27	100.0
Total	26	100.0	27	100.0
Hours of supervision				
40 or more	10	38.0	0	0.0
20-29	6	24.0	9	33.0
20 or less	10	38.0	18	67.0
Total	26	100.0	27	100.0
Unsecured Funding				
20% or more	2	8.0	6	22.0
10-19%	4	15.0	3	11.0
5-9%	4	15.0	4	15.0
1-4%	12	46.0	11	41.0
0%	4	15.0	3	11.0
Total	26	100.0	27	100.0
Volunteer Drivers				
50 % or more	3	12.0	1	4.0
10-49%	2	8.0	0	0.0
1-9%	1	3.0	2	7.0
0%	20	77.0	24	89.0
Total	26	100.0	27	100.0
Use of Motor Vehicle Records for Employment Purposes				
Yes	24	92.0	21	78.0
No	2	8.0	6	22.0
Total	26	100.0	27	100.0
Use of Physical Examinations for Employment Purposes				
Yes	16	62.0	11	41.0
No	10	38.0	16	59.0
Total	26	100.0	27	100.0

QUESTIONNAIRE DESIGN FOR MAINTENANCE VARIABLES

Table 3 gives examples of questions used to evaluate applicants' management procedures to maintain equipment and extend the useful life of vehicles. Question 15 is designed to assess the preventive maintenance procedures completed by applicants without assistance from vendors. Scoring assignments were based on providers' ability to reduce vehicle downtime and mileage by completing maintenance procedures without outside assistance. Scoring assignments were aggregated for each type of preventive maintenance procedure completed by the applicant's staff. Large and small agencies were evaluated by identical scoring assignments.

The ability of organizations to monitor the condition of their equipment is measured by evaluating where vehicles are parked overnight (Table 3). Applicants obtained more points by indicating that vehicles are parked overnight in a central location. Applicants were also evaluated on their ability to protect vehicles from vandalism. Organizations obtained more points if they park vehicles in areas with security fencing.

SUMMARY OF MAINTENANCE RESULTS

The results of the responses to the maintenance questions are summarized in Table 4. The data are grouped together by possible scoring alternatives for large and small agencies. The results indicate that there is little difference between large and small agencies in the amount of preventive maintenance procedures completed without outside assistance. Eighty percent of the large agencies reported that they do not complete any repairs in-house, compared with 82 percent of the small agencies.

The tabulated responses to Question 16 indicate that agencies park their vehicles in a variety of locations. Fifty-four percent of the large agencies park their vehicles at drivers' homes in combination with other locations. Table 4 indicates that 81 percent of small agencies park vehicles overnight at a program site. Agencies also differed in the amount of security fencing provided for their vehicles. Fifty-eight percent of the large agencies indicated that security fencing is not provided, compared with 82 percent of the small agencies.

SUMMARY OF SERVICE NEEDS RESULTS

Table 5 summarizes a ranking of the average number of miles operated per month for each vehicle in an organization's fleet. Agencies were asked to provide the total number of miles operated per month for all vehicles. The data were sorted in descending order by using data base management functions. Scoring assignments were based on the mean and standard deviation of the sample and the question's weighted point value. The question weight for this variable was 12 points. Agencies that ranked above the mean value obtained more than 50 percent of the total possible points.

Scoring assignments were established by categorizing point values on the basis of the standard deviation of the sample. Data ratios were cross-referenced by checking current odometer readings in relationship to the model year of each vehicle in an agency's fleet. The table indicates that 8 of the 10 agencies with the highest average vehicle mileage operate fewer than six vehicles.

This type of measurement technique was also used to evaluate the influence of proposed projects on ridership and fleet age by ranking the number of clients transported per the combined number of requested vehicles and base fleet vehicles that have not exceeded useful life standards.

SUMMARY OF FINDINGS

Figures 1 and 2 summarize average criterion scores for large and small agencies. The total possible points for each criterion is indicated by the placement of a square symbol. The results

TABLE 3 EXAMPLES OF SCORING ASSIGNMENTS FOR MAINTENANCE QUESTIONS

15. What preventive maintenance items does your agency complete without the assistance of an outside contractor, service station, or garage?

		LARGE AGENCIES	SMALL AGENCIES
Oil and Lube Filter Change	___	(1)	(1)
Change Transmission Fluid	___	(1)	(1)
Flush Radiator/Change Coolant	___	(1)	(1)
Replace Spark Plugs	___	(1)	(1)
Contract all maintenance	___	(0)	(0)

16. Where are your agency's vehicles parked overnight?

		LARGE AGENCIES	SMALL AGENCIES
Drivers' Homes	___	(0)	(2)
Program Site(s)	___	(6)	(6)
Parking lot furnished by Government Agency	___	(6)	(6)
Other (Please Specify)	_____		

TABLE 4 MAINTENANCE RESULTS

	Large Agencies		Small Agencies	
	N	Percent	N	Percent
Preventive Maintenance Items Completed In-House				
0 Items	21	80.0	22	82.0
1 Item	2	8.0	2	7.0
2 Items	1	4.0	0	0.0
3 Items	0	0.0	0	0.0
4 Items	2	8.0	3	11.0
Total	26	100.0	27	100.0
Location of Parked Vehicles				
Drivers' Homes	3	11.0	5	19.0
Program Site/ Public Agency	9	35.0	22	81.0
Combination of Locations	14	54.0	0	0.0
Total	26	100.0	27	100.0
Security Fencing Provided				
All Vehicles	1	4.0	3	11.0
Some Vehicles	10	38.0	2	7.0
No Vehicles	15	58.0	22	82.0
Total	26	100.0	27	100.0

TABLE 5 SAMPLE RANKING OF NUMBER OF MILES OPERATED PER VEHICLE (QUESTION WEIGHT = 12, SAMPLE MEAN = 1,476, STANDARD DEVIATION = 918)

SIZE	RANK	AGENCY NAME	AVG. NUMBER OF MILES PER MONTH, PER VEHICLE	SCORE
Small	1	Vector Industries	4400.0	12
Small	2	Eastern Shore Rural Health	4000.0	12
Large	3	Lewis Puller Center	3100.0	10
Small	4	Danville Association ARC	3063.0	10
Small	5	Central Virginia Health Ctr.	3000.0	10
Small	6	Friendship Industries	2862.5	10
Small	7	Mental Retardation Services	2800.0	10
Small	8	Goochland Fellowship	2750.0	10
Small	9	Northwestern Workshop	2520.0	10
Large	10	New River Valley Workshop	2337.5	8
Large	11	Rappahannock Adult Activities	2222.2	8
Large	12	Sussex Adult Activity Service	1943.7	8
Large	13	ARC Greater Prince William	1832.8	8
Large	14	Community Alternatives	1783.3	8
Large	15	Rappahannock AAOA	1750.0	8
Large	16	Marc Workshop	1666.7	8
Large	17	Mountain Empire of the S.West	1575.4	8
Large	18	Peninsula Agency on Aging	1471.4	4
Small	19	Richmond Community Senior Ctr	1426.0	4

Double underline indicates - Greater than Mean Value

Total Number Ranked = 53

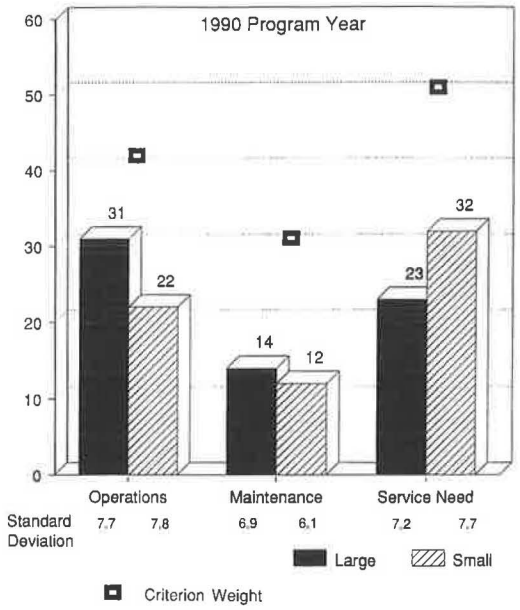

FIGURE 1 Average scores by criterion and fleet size—operations, maintenance, and service need.

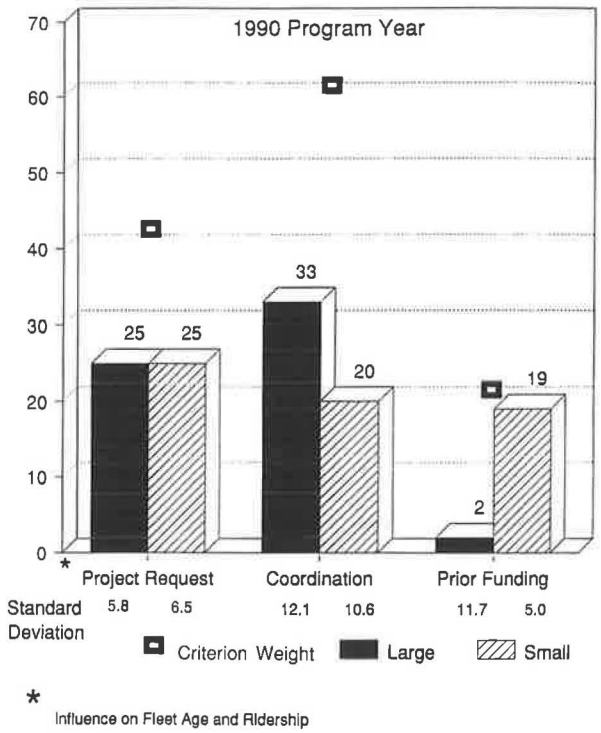

FIGURE 2 Average scores by criterion and fleet size—project request, coordination, and prior funding.

indicate that average criterion scores for operational procedures, maintenance procedures, service need, and the proposed project's influence on ridership and fleet age differed by fewer than 10 points for large and small agencies. Only the coordination criterion and the Section 16(b)(2) funding history criterion differed significantly. The standard deviation values were also similar except for the coordination and prior funding criteria.

Of the seven questions used to evaluate operations strategies, the average difference in scores for all variables was 1 point (Figure 1). This result can be attributed to the frequency of similar responses from large and small agencies to questions concerning defensive driver training and unsecured funding levels. Large agencies obtained, on the average, more points than small agencies for the use of physical examinations as a condition of employment. However, the question's low scoring assignment offset the influence of the average point spread between the two groups. This factor contributed significantly to reducing overall scoring differences between groups for this criterion.

The differences in maintenance criterion scores (Figure 1) were also insignificant for large and small agencies because of the type of measurement techniques applied to evaluate applicants and the similarity of responses received. The service need criterion results (Figure 1) indicate that the availability of public transportation is similar for large and small agencies. In addition, the use of applied measurement techniques to evaluate service need indicates that both groups accumulate similar vehicle mileage per month. Service need scores differed greatly in the average number of clients transported per month for all vehicles excluding spare vehicles. Large agencies ranked proportionately lower for this ratio than small agencies.

The variables used to measure the proposed project's influence on fleet age and ridership included service use alternatives and the number of clients transported per vehicle less than 5 years old or with less than 100,000 accumulated miles (Figure 2). Average criterion scores were similar for both groups because most applicants indicated that requested equipment would be used to replace vehicles. Also, the ranking of data for client ridership and fleet age generated an even distribution of scoring assignments for the two groups. Coordination scores, on the average, were much greater for large than small agencies. Large agencies obtained more points by demonstrating a more active involvement in maintaining cooperative service arrangements than small agencies. Average scores for the prior funding criterion reflect that large agencies have received Section 16(b)(2) funding more frequently than small agencies in the past 2 years.

In 1990, the described methodology caused more small fleet agencies to be recommended for funding than in previous years. Sixty-three percent of the small agencies that applied for financial assistance were funded for capital assistance, and 8 of the 10 applicants ranked highest were small agencies. Evenly distributed applicant scores for both groups and lopsided prior funding scores, which favored small agencies, caused the shift in funding.

CONCLUSION

It is uncertain that the continued use of this methodology will produce similar results, because applications are not received from the same organizations each year and agencies' operating practices are subject to change. However, it is certain that future applicants will be assessed by specific, consistent scoring procedures, thus increasing the ability of the administering agency (VDOT) to screen applications equitably and make effective planning decisions.

The methodology reduced scoring variance compared with previous reviews. However, the use of discretionary scoring assignments established a bias toward certain management procedures and practices. The evaluation process could be improved by designing more precise standards to gauge responses to fixed-alternative questions. In addition, future scoring assignments should not undervalue the significance of independent variables, such as safety procedures and personnel policies, that greatly influence program goals yet require support documentation to validate data.

Consideration should be given to reducing the criterion weight for prior funding opportunities. Although this criterion assists in providing a more even distribution of equipment, it does not guarantee improved funding for applicants that provide safe, reliable transportation service where public transportation service is unavailable.

ACKNOWLEDGMENTS

The authors gratefully acknowledge work by many others on this project, including Cheryl Lynn, Linda Eads, Felicia Woodruff, and Charles Badger of VDOT and Rosanne Kolesar of the Virginia Department of Health. Any errors or inaccuracies in this document, however, are entirely the authors' responsibility.

Information and views contained in this paper are solely those of the authors and do not represent the official opinions of the Virginia Department of Transportation.

Publication of this paper sponsored by Committee on Rural Public Transportation.