REPORT NO. UMTA-MA-06-0049-77-6

UMTA/TSC Project Evaluation Series

The Norfolk Vanpool and Contract Hauler Demonstration Project

Evaluation Plan
August 1977

Service and Methods Demonstration Program

U.S. DEPARTMENT OF TRANSPORTATION
Urban Mass Transportation Administration
and Transportation Systems Center

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Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
UMTA-MA-06-0049-77-6		

4. Title and Subtitle	5. Report Date
THE NORFOLK VANPOOL AND CONTRACT HAULER DEMONSTRATION PROJECT	August 1977
	6. Performing Organization Code
7. Author(s) James L. Poage	8. Performing Organization Report No. DOT-TSC-UMTA-77-38
9. Performing Organization Name and Address U.S. Department of Transportation Transportation Systems Center Kendall Square Cambridge MA 02142	10. Work Unit No. (TRAIS) UM727/R7710 11. Contract or Grant No.
12. Sponsoring Agency Name and Address U.S. Department of Transportation Urban Mass Transportation Administration Office of Transportation Management and Demonstrations Washington DC 20590	13. Type of Report and Period Covered Final Report January - July 1977 14. Sponsoring Agency Code

15. Supplementary Notes

16. Abstract

This report presents an evaluation plan to measure the impacts of a vanpool demonstration project in Norfolk, Virginia. Under the project, the Tidewater Transportation District Commission will purchase vans with a project grant and lease them to individual drivers for use in vanpools for commuting to work at the Navy bases in the Tidewater area. The demonstration project is funded by the Urban Mass Transportation Administration as part of the Service and Methods Demonstration Program.

This evaluation plan describes the demonstration setting, the project operation, project issues, measures for evaluation and sources of data for assessing the measures.

17. Key Words	18. Distribution Statement
Van Pooling, Ridesharing, Paratransit, Demonstration Project	DOCUMENT IS AVAILABLE TO THE U.S. PUBLIC THROUGH THE NATIONAL TECHNICAL INFORMATION SERVICE, SPRINGFIELD, VIRGINIA 22161

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	68	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

PREFACE

This document was prepared under PPA UM-727 as part of the Service and Methods Demonstration Program sponsored by the Urban Mass Transportation Administration, Office of Transportation Management and Demonstrations. This report presents an evaluation plan to measure the impacts of a vanpool demonstration project in Norfolk, Virginia. Under the project, the Tidewater Transportation District Commission, the recipient of a Service and Methods Demonstration grant, will purchase vans and lease them to individual drivers for use in vanpools for commuting to work at the Navy bases in the Tidewater area.

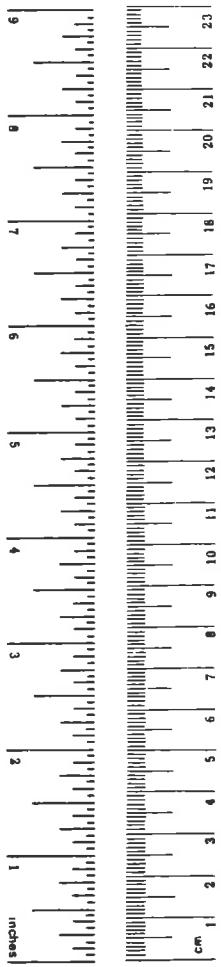
The implementation and evaluation activities are based on the anticipated project events at the time the plan was developed. This evaluation plan will be modified to reflect any changes in the project during the evaluation period.

The author would like to give acknowledgement to James Echols, Lee Carlson and Harry Reed of the Tidewater Transportation District Commission, Lynn Sajah of the Urban Mass Transportation Administration, and Bob Furniss of CACI, Inc. for their reviews and comments.

METRIC CONVERSION FACTORS

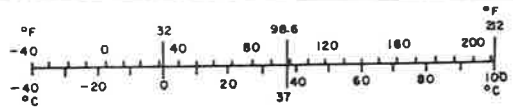
Approximate Conversions to Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
in	inches	2.5	centimeters	cm
ft	feet	30	centimeters	cm
yd	yards	0.9	meters	m
mi	miles	1.6	kilometers	km
	AREA			
in^2	square inches	6.5	square centimeters	cm^2
ft^2	square feet	0.09	square meters	m^2
yd^2	square yards	0.8	square meters	m^2
mi^2	square miles	2.6	square kilometers	km^2
	acres	0.4	hectares	ha
	MASS (weight)			
oz	ounces	28	grams	g
lb	pounds	0.45	kilograms	kg
	short tons (2000 lb)	0.9	tonnes	t
	VOLUME			
tsp	teaspoons	5	milliliters	ml
Tbsp	tablespoons	15	milliliters	ml
fl oz	fluid ounces	30	milliliters	ml
c	cups	0.24	liters	l
pt	pints	0.47	liters	l
qt	quarts	0.95	liters	l
gal	gallons	3.8	liters	l
ft^3	cubic feet	0.03	cubic meters	m^3
yd^3	cubic yards	0.76	cubic meters	m^3
	TEMPERATURE (exact)			
°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C



Approximate Conversions from Metric Measures

Symbol	When You Know	Multiply by	To Find	Symbol
	LENGTH			
mm	millimeters	0.04	inches	in
cm	centimeters	0.4	inches	in
m	meters	3.3	feet	ft
m	meters	1.1	yards	yd
km	kilometers	0.6	miles	mi
	AREA			
cm^2	square centimeters	0.16	square inches	in^2
m^2	square meters	1.2	square yards	yd^2
km^2	square kilometers	0.4	square miles	mi^2
ha	hectares (10,000 m^2)	2.5	acres	
	MASS (weight)			
g	grams	0.036	ounces	oz
kg	kilograms	2.2	pounds	lb
t	tonnes (1000 kg)	1.1	short tons	
	VOLUME			
ml	milliliters	0.03	fluid ounces	fl oz
l	liters	2.1	pints	pt
l	liters	1.06	quarts	qt
l	liters	0.26	gallons	gal
m^3	cubic meters	35	cubic feet	ft^3
m^3	cubic meters	1.3	cubic yards	yd^3
	TEMPERATURE (exact)			
°C	Celsius temperature	9/5 (then add 32)	Fahrenheit temperature	°F



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1. EXECUTIVE SUMMARY

The Urban Mass Transportation Administration (UMTA) has awarded a Service and Method Demonstration Grant to the Tidewater Transportation District Commission (TTDC) of Norfolk, Virginia, to purchase 50 vans and initiate a vanpool program for civilian and military employees at the Navy bases in the Norfolk area. Under the grant, TTDC will also try to organize an association of the private haulers who own buses and transport fellow workers to their work sites for a fee. The association would attempt to provide the private haulers with cost savings through group purchases of parts, insurance, gasoline, and other services.

The Norfolk vanpool project involves a public transit operator purchasing vans and leasing them to drivers who work for a large, local employer. In most other vanpool programs in the country, a private employer directly provides vans for its own employees. For the Norfolk project, the assessment of the effectiveness of TTDC in its brokerage role in the vanpool operation is an important issue.

The evaluation will assess the changes in the transportation supply/demand interactions caused by the introduction of vanpooling as a mode choice for Navy commuters and will assess the impacts of the changes on users, suppliers, and other groups of interest. One aspect of the evaluation involves assessing the level of service changes for commuting which vanpooling provides, such as travel time and cost. These level of service variables for vanpooling will be compared with those for other modes, such as single occupant auto, carpool, and bus. The individual behavioral response to the level of service changes will also be assessed. This includes factors such as number of vanpool riders and characteristics of riders and non-riders. Productivities and economics from both the viewpoint of TTDC and the vanpool drivers are also part of the evaluation.

Another issue of interest is the transferability of the demonstration concept of a vanpool operation which is conducted by a transit operator to serve commuters of a large, local employer. A description of the setting for the project, an assessment of the roles for the transit operator and the employer, and characteristics of the riders and drivers are important for this issue.

The following evaluation plan discusses these issues in more detail, presents measures for their evaluation, and discusses the sources of data for assessing the measures.

2. INTRODUCTION

The Urban Mass Transportation Administration (UMTA) has awarded a Service and Methods Demonstration Grant, number VA-06-0033 with a starting date of September 1976, to the Tidewater Transportation District Commission (TTDC) in Norfolk, Virginia. The grant of $490,000 is for establishing and operating a subscription vanpool service for civilian and military employees of the U.S. Navy in the Norfolk area.

2.1 Purpose of Demonstration

Traditional fixed-route, fixed-schedule mass transportation, which provides the bulk of public transportation in most urban areas, cannot provide adequate service in a viable manner in some situations. Commuters living in areas with population densities inadequate to support mass transportation often do not receive adequate service and must rely almost exclusively on the automobile. Such reliance on the automobile usually results in traffic congestion and accompanying environmental problems. Norfolk is an area with large concentrations of employment at several Navy bases and with residential areas scattered throughout a wide region. The bases have little service by traditional transit buses, and the geographical nature of the area with many separate residential areas makes adequate service by transit buses prohibitively expensive.

The Tidewater Transportation District Commission (TTDC), the local public transit operator, feels it is not an economically viable alternative to increase bus service to the naval bases. Thus, through this demonstration project, TTDC is attempting to promote para-transit as an alternative to heavy reliance on the automobile. TTDC will use the project grant to initiate a vanpool program for Navy employees and attempt to strengthen the service of private haulers to the bases. These haulers are Navy employees who own buses and transport fellow employees to work. The haulers either drive the buses themselves or pay other Navy employees to drive. Both vanpool and private hauler services are most attractive to the long distance commuter.

2.1.1 Description of Demonstration

TTDC will use most of the project grant to purchase 50 vans which will be leased to Navy employees to become drivers of vanpools carrying civilian and military Navy

employees from their residences to work sites on the Navy bases. It will be attempted to recover all operating expenses through fares charged to the riders. The program will be designed to be self-sustaining with the fares also generating enough funds to provide replacement vans.

In addition to the vanpool program, the demonstration project will provide limited support to the private haulers currently providing service to the naval facilities. These haulers generally use old school buses or inter-city buses. In some cases, one person may own several buses and have other Navy employees as drivers. Through the demonstration project, TTDC will support the formulation of an association of private haulers to improve and expand service by providing reduced costs for equipment, parts, gasoline, insurance, etc. The association will also publicize the schedules of the haulers.

2.1.2 Demonstration Objectives

The Norfolk project addresses the Service and Methods Demonstration Program objectives of expanding service area coverage and improving the productivity of transit systems. The vanpool project will make available a new mode choice for commuters and provide for carrying workers from residential areas not presently served by any TTDC operation. The support for the private haulers will encourage an improvement in service by the haulers and an increase in their productivity. The vanpool project is innovative in that a public transit operator will own the vans and lease them to employees of a large local employer rather than the vans being purchased directly by the employer as is the case in most other vanpool programs. In Norfolk, the primary role of the employer will be in publicizing the vanpool program and in assisting a vanpool driver, who has independently leased a van from TTDC, in obtaining riders for the van. The driver will deal directly with TTDC in administrative and financial matters concerning the van operation.

The Navy feels that it has a major congestion problem due to an excess of automobile traffic in its Norfolk area bases. There are about 135,000 military and civilian employees at five major Navy bases in the Norfolk region. The largest base, Sewells Point, employs about 63,000 military and civilian personnel. There are about 40,000 daily commuters to this base. Thus, the Navy is interested in promoting shared-ride commuting to the bases to reduce traffic congestion.

The large numbers of commuters to the Navy bases also cause congestion on highways in the Norfolk area. TTDC provides a small amount of bus service to the bases, but feels it cannot increase the bus service in an economically viable manner. TTDC feels that by becoming actively involved in vanpooling, it can provide a transportation alternative for Navy employees living in scattered residential areas. TTDC has local objectives of reducing traffic congestion due to traffic to and from Navy bases, alleviating pollution from commuting, promoting energy conservation, and improving the flexibility of land use by providing alternative modes of transportation to relying solely on the automobile. While the demonstration project involving 50 vans is limited in scope when viewed in the context of five Navy bases with about 65,000 commuters, TTDC believes the vanpooling project is a valuable step toward decreasing the dependence of Norfolk commuters on the single-driver auto.

2.1.3 Demonstration Issues

There are numerous issues which are of interest in assessing reasons for the effectiveness of vanpooling in the Norfolk area and for the potential of initiating similar programs elsewhere. One issue is that of TTDC purchasing the vans and functioning in a brokerage role in dealing with the vanpool drivers, contract haulers, and Navy. Some issues to be addressed on the brokerage role are:

> Effectiveness of a public transit operating agency in functioning as a broker in dealing with individual citizens (vanpool drivers), groups of citizens (private haulers), and another institution (the Navy). This also involves the effectiveness of the broker in organizing a vanpool operation and an association of private haulers.
>
> Implementation of a brokerage system--legal, institutional, administrative, technical, and coordination groundwork required to establish a brokerage system.

The vanpool program is for employees of the Navy with the vans leased from TTDC. TTDC will select the drivers and the Navy will assist the driver in obtaining passengers. Issues on the vanpool operation include:

Effectiveness of a vanpool program organized by a public transit operator in attracting and maintaining riders who work for a local employer.

Effectiveness of the vanpool program in increasing shared-ride commuting, e.g., are vanpool riders directed from solo occupant autos, carpools, or buses.

TTDC will attempt to organize an association of private haulers to provide the haulers with reduced costs on supplies and services. Issues are:

Viability of an association of numerous, independent private haulers. There has historically been a reluctance on the part of the haulers to participate with outside parties due to a fear of regulation and of competition among the haulers themselves.

Types of cost reductions and other benefits which an association can provide to the private haulers.

Extent to which association results in level of service changes for the riders of the private haulers.

Extent to which TTDC can promote the private haulers and increase their role in transportation in the Tidewater Region.

2.2 Organizational Roles (UMTA, TTDC, Navy, TSC, CACI)

The Norfolk project is funded under a U.S. Department of Transportation, Urban Mass Transportation Administration (UMTA) Service and Methods Demonstration Program grant. The recipient of the grant and organizer of the project is the Tidewater Transportation District Commission (TTDC). The U.S. Navy is the employer of commuters who are participating in the vanpool and private haulers programs. The Transportation Systems Center (TSC) of the U.S. Department of Transportation is responsible for evaluation of the project. CACI, Inc., is acting as contractor to TSC for the evaluation.

TSC has responsibility for the evaluation planning and implementation process. TSC will specify the desired output and scope of the evaluation and provide technical supervision of the contractor during the evaluation. The

evaluation process for the project requires an effective integration of TSC's, the evaluation contractor's, and the grantee's roles throughout the demonstration. Basic responsibilities of the evaluation contractor include:

- developing specifications for necessary data to be collected;
- developing a schedule of evaluation tasks and collection efforts;
- reviewing and monitoring data collection efforts for conformance to the Plan;
- designing and performing the data analyses; and
- developing interim and final evaluation reports assessing the project's implementation, operation, and impacts.

The grantee is responsible for providing the evaluation contractor with much of the information and data necessary to perform the evaluation. In addition to providing all relevant project documents (e.g., progress reports, operating procedures and documents, etc.), this includes acting as a data collection coordinator/clearinghouse to:

- keep TSC and the evaluation contractor informed of demonstration plans and activities;
- provide a chronology of project events;
- provide data and information on demonstration operations;
- collect data recorded by other organizations and agencies (e.g., Navy);
- obtain additional data if not otherwise available; and
- transmit data in a format agreed upon with the evaluation contractor.

2.3 Evaluation Overview

2.3.1 Scope of this Report

This evaluation plan has been divided into sections corresponding to the expected sections of the final evaluation report. The purpose of this is to orient the evaluation plan around the issues of interest in the demonstration project.

Chapter 3 discusses the demonstration setting, which is particularly important for drawing conclusions on the transferability of the results of the demonstration project. The operation of the project itself is described in Chapter 4 along with a discussion of the implementation. The core of the evaluation begins in Chapter 5 with a description of the responses of vanpool drivers to TTDC's efforts to initiate vanpooling and of the private haulers to the idea of an association. The ability of the vanpool program to carry riders depends, of course, on an available pool of vanpool drivers. Chapter 6 describes the level of service changes for commuters caused by the demonstration project. This includes factors which influence a commuter's decision on whether to join a vanpool, such as residential areas served by vanpools, travel time, fares, and reliability of the service. Chapter 7 on demand examines the individual behavioral responses of Navy commuters to the level of service changes caused by initiating the vanpool program. This chapter discusses the number of vanpool riders and characteristics of commuters who choose vanpooling and of those who do not. Chapter 8 discusses the economics and productivities involved in the new supply/demand levels caused by the vanpool program. Productivities and economics are of particular interest for the Norfolk vanpooling program since most previous vanpooling programs have been organized by private employers rather than by a public transit operator. Chapter 9 describes the other impacts of special concern, such as impacts on other transportation providers and reactions of the Navy and general public to the vanpool program. Chapter 10 provides a summary and discusses the assessment of transferability of the Norfolk concept of a vanpool operation.

2.3.2 Approach to Evaluation

The evaluation will be structured in the context of assessing the changes in the supply/demand interactions caused by the introduction of vanpooling and the impacts of these changes on users, suppliers, and other groups of

interest. The general organization of the evaluation will follow the description of the chapters presented in the previous section.

Since the project is supplying only 50 vans for approximately 65,000 Navy commuters, the evaluation will not perform a before/after analysis of the general response of Navy commuters. The evaluation will concentrate on the vanpools and vanpool riders and drivers. This includes the specific level of service characteristics provided by the vanpools and the characteristics of the riders and their response to the vanpools. There will, however, be some assessment of the characteristics and attitudes of commuters who did not choose vanpooling.

Much of the data on vanpool drivers will come from registration information provided to TTDC. The drivers will furnish data on operating expenses and fares collected to TTDC. TTDC will directly furnish other data on the vanpool operation and expenses since they will directly oversee some aspects, such as maintenance and insurance. Surveys will be taken of riders and drivers to provide data on their characteristics and reasons for joining vanpools. A trip log will be maintained periodically by a driver or passenger to provide data on the vanpool operation such as travel times. Some commuters who did not join vanpools will also be surveyed.

Appendix A lists the data needed for the measures discussed in the following chapters. The data in the appendix are categorized by the collection source for the data items.

3. DEMONSTRATION SETTING

A description of the demonstration setting is useful in understanding changes which will take place during the demonstration project. Information on the demonstration site is also important for considering the transferability of a similar vanpool operation to another area. The sections of this chapter discuss geographic and demographic characteristics of the site, existing transportation characteristics, existing travel patterns, and additional site data to be collected.

3.1 Geographic and Demographic Description of the Tidewater Region

3.1.1 General Description of the Tidewater Region

Tidewater, Virginia, refers to the metropolitan region comprising five contiguous political jurisdictions: the Cities of Norfolk, Virginia Beach, Portsmouth, Chesapeake, and Suffolk. This is also the area served by TTDC. The total area is 1,079 square miles. The area is bounded on the north by Chesapeake Bay, on the east by the Atlantic Ocean, on the south by the State of North Carolina, and on the west by Hampton Roads (the water channel and harbor linking the James River estuary with Chesapeake Bay). The land area area in the Tidewater Region is divided by numerous bays, rivers, lakes, and inlets. Thus, travel from some residential area to the bases is longer than if direct routes over land existed. Figure 3.1 shows a map of the Tidewater area including the location of the naval bases.

3.1.2 Demographic Description of the Tidewater Region

The total population of the Tidewater region is 750,000. The black population comprised 26.3 percent of the total in 1970. Median family income for the region was $7,563, and 20 percent of the households did not own an automobile. Tables 3-1 and 3-2 present these demographic data for the five Tidewater cities. The number of workers in various subareas are given in Table 3-3.

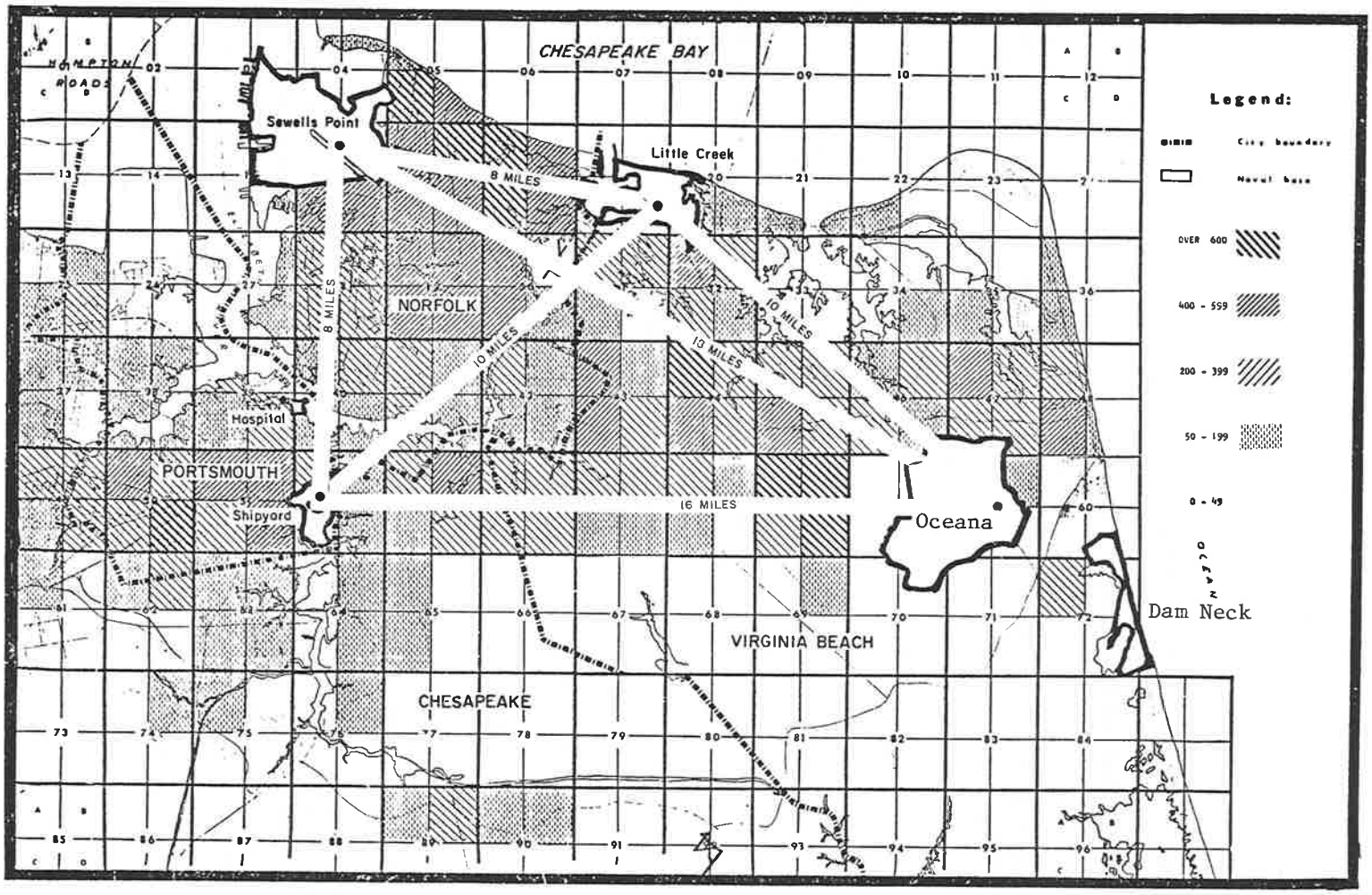

FIGURE 3.1 TIDEWATER AREA AND NAVY FACILITIES

TABLE 3-1

SELECTED AREA POPULATION CHARACTERISTICS

JURISDICTION	LAND AREA (SQ. MI.)	1970 POPULATION*	PERCENT NEGRO	PERCENT OF SPANISH LANGUAGE	PERCENT AGED 65 AND OVER
Norfolk	52	307,951	28.3	1.6	6.8
Portsmouth	18	110,963	39.9	0.7	8.0
Chesapeake	344	89,580	23.1	0.5	5.8
Virginia Beach	255	172,106	9.1	1.3	3.5
Suffolk	410	45,024	50.4	0.3	8.8
Transp. District	1079	725,624	26.3	1.2	6.2

* All data from the 1970 Census of Population and Housing

TABLE 3-2

HOUSEHOLD SIZE, INCOME, AND
AUTOMOBILE AVAILABILITY

Jurisdictions	Average Household Size*	Percent Families with Income Below $5,000	Mean Income of Families and Unrelated Individuals	Automobiles Available Number of Households			
				None	1	2	3 or more
Norfolk	3.03	36.1	$6,360	21,389	43,377	19,032	2,944
Portsmouth	3.16	33.0	7,776	8,610	11,358	7,412	1,121
Chesapeake	3.52	24.3	8,852	3,143	13,045	7,841	1,124
Virginia Beach	3.53	19.4	9,028	2,449	20,369	19,315	3,176
Suffolk	3.41	30.9	7,344	3,713	1,472	2,970	379
Transp. District	3.24	30.1	7,563	39,304	95,631	56,590	8,744

*All data from the 1970 Census of Population and Housing

TABLE 3-3. LOCATION OF EMPLOYMENT[1]

Location	Number of Workers	Percent SMSA
Norfolk CBD	12,697	5.2
Remainder of Norfolk	142,606	57.6
Portsmouth CBD	2,599	1.0
Remainder of Portsmouth	33,776	13.6
Chesapeake	14,036	5.7
Virginia Beach	41,731	16.9
Tidewater Trans. Dist. (SMSA)	247,445	100.0
Sewells Point Naval Complex	40,000[2]	

[1]Data from 1970 Census.
[2]From an Origin and Destination survey conducted by the Navy in December, 1973. This may be considered as a portion of the "Remainder of Norfolk" workers and represents average daily commuters.

3.1.3 Description of Work Sites for the Demonstration Project

The U.S. Navy operates five major naval complexes in the Tidewater Virginia Region:

1. Sewells Point Naval Complex (northwest Norfolk)
2. Norfolk Naval Shipyard (Portsmouth)
3. Little Creek Amphibious Base (northwest Virginia Beach)
4. Oceana Naval Air Station (eastern Virginia Beach)
5. Dam Neck Training and Amphibious Facility (southwest Virginia Beach).

The numbers of personnel assigned to these bases and numbers of commuters are listed in Table 3-4.

Sewell's Point Naval Complex is the largest Navy installation in the area. It is the home of the Commander in Chief Atlantic Fleet and is the largest military command center outside of the Pentagon (50-60 Admirals are based in Norfolk). This facility employs about 68% of all Navy employment in the Tidewater area and has about 40,000 commuters per day. The Sewells Point Complex is expected to grow by an additional 10,000 personnel by 1981. When cutbacks occur at other bases in the United States, Norfolk tends to grow due to consolidation of operations from the other bases into Norfolk.

3.2 Transportation Characteristics (Pre-Demonstration)

3.2.1 Supply of Transportation

The Tidewater Transportation District Commission was formed in May 1973 by the four major Tidewater cities: Norfolk, Portsmouth, Chesapeake and Virginia Beach. In 1975, Suffolk joined the District. TTDC is the public transit operator for the region.

The vast majority of Navy workers commute by automobile. This is evident from the number of commuters using different modes in Table 3-4. TTDC provides little public transit service to the naval bases. There are two local routes and two express routes serving Sewells Point. A total of 12 buses are involved in these routes. One local

TABLE 3-4

NAVY COMMUTER STATISTICS FOR TIDEWATER, VIRGINIA
(1 September 1974)

Base Complex	Number of Personnel Assigned	Transportation Modes		
		Commuters	Bus	Carpool
Sewells Point, Norfolk	73,769	42,548*	3,600	8,320
Amphibious Base, Little Creek	10,171	4,577	160	252
Norfolk Naval Shipyard, Portsmouth	10,488	10,388†	3,000	2,970
Oceana Naval Air Station	8,222	5,333	0	213
Dam Neck	2,962	1,909	0	625
TOTALS	105,612	64,755	6,760	12,380

*Includes all potential commuters. Daily commuters are dependent on the number of ships in port.

†Includes only those commuters assigned to shore activities located at the Norfolk Naval Shipyard; excludes commuters assigned to ships in overhaul, contract personnel--i.e., utilities, construction, delivery.

bus route has headways of between 6 and 20 minutes and the other 30 minutes. The two express bus routes provide service along major highways and serve park-and-ride lots. One express route has two runs in the morning and afternoon rush hours and the other express route has three runs.

Some Navy employees have responded on their own to the transportation problem by buying old buses or vans and hauling fellow workers to work. The private haulers began operating during World War II as an answer to the gasoline and rubber shortages. The private haulers operate on an individual basis in obtaining riders but must be registered with the Navy to enter the bases. About 100 operate in the Tidewater area with most serving Sewells Point. Due to pressures of meeting increasing expenses, the number of private haulers has decreased in the last few years. The fare to the user is usually $0.50 per trip regardless of the distance. The haulers travel up to 50 miles one-way. Drivers who work for a bus owner earn about $15 per week.

Employees have also formed carpools in response to the transportation problem. Table 3-4 indicates that about 12 percent of the commuters carpool. The Navy has encouraged carpooling by instituting a "carpool only" gate at Sewells Point and allocating base parking spaces around buildings to vehicles with the most occupants.

In general, the parking supply at Sewells Point is not allocated in accordance with facility demands. For example, the base supply center employs 3,000 persons but has limited parking which forces 80 percent of the workers to carpool. Other facilities on the base have an excess of available parking. Workers start and end in staggered shifts by building in an effort to reduce traffic congestion.

3.2.2 Travel Patterns

Table 3-5 gives the results of a 1974 survey of Navy employees which covered origin/destination travel patterns. A map showing the residential and base locations was given in Figure 3.1. From the Table and Figure, it is observed that approximately 15,000 employees of Sewells Point live in Chesapeake or Virginia Beach with commuting distances between 15 and 25 miles. Thus, many Navy employees live in areas which are potential candidates for vanpooling.

Table 3-5

ORIGIN-DESTINATION DATA FOR NAVY COMMUTERS*

Live Zone	Work Zone: Sewells Point	Little Creek Amphibious Base	Oceana & Dam Neck	Naval Ship Yard	Total
(1) Sewells Point	5,528	95	43	22	5,688
(2) North Norfolk	14,616	1,221	292	506	16,635
(3) South Norfolk	5,934	405	247	695	7,281
(4) Portsmouth	3,484	157	144	4,832	8,617
(5) Chesapeake	3,627	173	254	2,121	6,175
(6) Little Creek Amphibious Base	239	662	14	3	918
(7) North Va. Beach	2,004	580	191	141	2,916
(8) South Va. Beach	9,039	1,123	4,231	751	15,144
(9) Oceana & Dam Neck	248	31	2,031	17	2,327
(10) North Carolina	511	44	89	533	1,177
(11) Suffolk	477	37	20	372	906
(12) Hampton	195	6	5	47	253
(13) Newport News	132	7	6	53	199
(14) Williamsburg & Yorktown	28	2	1	12	43
(15) Other	420	53	74	254	801
Percentage of Response	56	81	81	76	

*Based on Navy Share-A-Ride Survey of 1974.

3.3 Site Data

The previous sections of this chapter have presented an overview of the demonstration site. Additional data will be collected during the demonstration to provide a more detailed description of the site and to record any changes affecting the site.

3.3.1 Geographic and Demographic Data

Geographic and demographic data describing the different residential areas in the Norfolk area will be gathered. This data will be used to compare residential areas participating in vanpooling with those which do not. Maps will be collected showing the location of residential areas, highways, and bus routes which serve the naval bases.

3.3.2 Travel Behavior Data

Ridership on public buses serving the bases and traffic volumes on highways leading to the bases will be presented. Data on travel volumes and mode are available from a 1974 survey of Navy commuters and from work the Stanford Research Institute has done in assisting the Navy in developing an Action Plan for providing transportation options for the Navy bases.

3.3.3 Exogenous Factors

Exogenous factors can influence the impact of the demonstration project in attracting riders for the vanpools and private haulers. Possible exogenous factors include weather, changes in economic conditions, changes in transportation supply, and gasoline prices and availablity. For those exogenous influences which can be anticipated, such as weather, the data gathering will be controlled to account for their influence. The levels of these factors will be monitored.

Periodic monitoring will be necessary to detect changes in exogenous factors which cannot be anticipated, such as changes in economic conditions or in gasoline prices and availability. When such a change occurs, it will be recorded and described in the evaluation report. Data collection procedures will be changed if necessary to capture the impact of the exogenous influence.

Changes in the supply of public bus service to the bases are not expected, and data from TTDC would certainly be available if any such changes do occur. TTDC is starting a program of making city buses which it owns available for lease to private haulers. There is a potential for an increase in private hauler service if the haulers are interested in leasing the buses.

4. DEMONSTRATION OPERATIONS AND DEVELOPMENT

This chapter provides a description of the development of the project to date and the institutional framework in which the demonstration is expected to operate.

4.1 Description of Demonstration

The demonstration project is aimed at increasing para-transit for employees of the Norfolk naval bases. The Tidewater Transporation District Commission (TTDC) will purchase 50 vans and lease them to Navy employees who will be drivers of vanpools. TTDC will also organize an association of the private haulers in an attempt to improve their service of hauling commuters to the naval bases.

The $490,000 project grant will be used for the purchase of 50 vans, initial insurance for the vans, a project manager and supporting staff, office space and supplies, marketing, and legal counsel for the contract haulers association. Table 4.1 provides a breakdown of the project budget.

4.1.1 Description of Vanpooling

The vanpool project will provide Navy employees with transportation for their trips to work. The drivers and riders must be civilian or military employees of the Navy. The van selected is a 12 passenger Dodge B300 Royal Sportsman purchased for approximately $6300 each.

TTDC and the Navy will conduct a marketing campaign to attract drivers. The prospective drivers will contact TTDC directly. The marketing campaign and the driver selection procedure have not yet been formulated. The drivers will collect the fares and deal directly with TTDC in matters of revenues and expenses.

TTDC will set a monthly lease fee of a fixed charge plus a mileage charge which the driver must pay to TTDC each month. The fixed fee will be calculated to include depreciation of vans, insurance, and backup vans; and the mileage charge will cover tires and maintenance. The drivers will pay for gasoline. TTDC will recommend fares for the drivers to charge their riders in order to cover the monthly lease fee and cost of gasoline. The recommended fares will be based on the first eight riders covering the expenses. The drivers will have flexibility in changing the

TABLE 4-1

NORFOLK DEMONSTRATION PROJECT BUDGET

Direct Labor, Managerial	$ 73,000
Direct Labor, Clerical	7,000
Employee Benefits	12,000
Other Administrative Costs	25,000
Purchase of Equipment	327,650
Direct Cost of Operation	20,000
Subcontracts (Marketing)	20,350
Other Project Costs	5,000
TOTAL COST	$490,000

fares from those recommended, and can keep the excess of fares collected over expenses. The drivers can also use the vans after hours within a certain distance from their residences, but they cannot sublet the vans.

The Navy will assist the driver in obtaining passengers. The Navy assistance for the vanpool program will be organized by command. A command is an organizational unit in the Navy which varies in size at the Norfolk bases from 2 to 10,000 people. Some commands have records of employees' residential locations which are used for organizing carpools. These data will be used in forming vanpools. In some commands the records are computerized and computers may be used to identify prospective members of vanpools. Other commands may use bulletin boards. It will be left to the individual commands how to organize the vanpool assistance. The form of this assistance by the Navy has not been determined. The evaluation will examine whether organizing the Navy's vanpool assistance by individual commands provides a large enough group of employees to fill the vanpools.

The individual vanpools will set the specific procedures of the vanpool operation, such as whether pickup will be at each rider's residence or at a few combined pickup points.

Many of the details of the vanpool program have not been finalized. The description of the vanpool operation in the evaluation report will include the following:

Description of vans obtained by TTDC

Driver selection process

Lease arrangements

Duties of driver

Fare structure and procedure for collecting fares

Written agreement between rider and driver delineating rights and obligations of each

Procedures by which Navy commands assist in forming vanpools

Procedures for maintenance of vans

Procedures for making the vanpool program self-sustaining

Procedures for providing backup van and for handling van breakdowns

Policies vanpools adopt for smoking, place of pickup, order of dropoff and pickup of passengers, etc.

Particular attention will be given to how these various factors in the operation of the vanpool program affect level of service. For example, fare structure has a direct impact on a prospective rider choosing vanpooling, and the maintenance program affects reliability and comfort of the ride.

4.1.2 Description of Association of Private Haulers

TTDC will support formation of an association of private haulers to improve and expand service by providing the haulers with reduced costs for equipment, parts, gasoline, insurance, etc. The project grant provides for supplying legal counsel to the association for any legal problems which arise during its formation and in obtaining the cost savings through group arrangements.

It is presently not known what form the association will take or specifically how it will provide services. There has historically been a reluctance by the private haulers to associate with outside groups due to a fear of regulation and of competition among themselves. It may be that the private haulers show little interest in an association and it may not be organized. If an association does materialize, the evaluation will examine:

Services provided by the association

Sources of revenues and expenses of the association

Organizational structure, committees, operational procedures, etc., of association

Role of TTDC with the association

Services provided by legal counsel.

4.2 Implementation

TTDC released a request for bids to supply the 50 vans in January 1977 with a deadline for response of March 1. From the eight bids received, TTDC has selected a 12 passenger Dodge B300 Royal Sportsman van. Delivery of the 50 vans is expected during July or August. TTDC has located a source for insurance, and the insurance arrangements will be completed when the lease for the vans is finalized.

Table 4.2 shows the implementation schedule for the vanpool project. Plans have not yet been completed for marketing to attract drivers, the driver selection procedures, marketing to attract riders, and procedures for the Navy commands to assist in obtaining riders. Similarly, the formulation of the private haulers association is still in the planning stage.

The evaluation will describe the implementation procedures which are used for both the vanpool operation and the private haulers association. Some factors to be considered are:

Procurement of vans and obtaining insurance

Marketing plans and strategies for drivers and riders in the vanpools

Implementation of driver selection and lease arrangements

Implementation in conjunction with Navy of procedures for matching riders and vanpools

Marketing plans and strategies for private haulers association

Legal problems associated with private haulers association

Implementation of association and its activities.

TABLE 4-2

IMPLEMENTATION SCHEDULE

	DATE
Start of Project	September 1976
Request for Bids for Van	January 1977
Request for Bids for Insuance	January 1977
Decision on Choice of Vans and Vans Ordered	March 1977
Decision on Insurance	April 1977
Delivery of 50 Vans	August 1977
Selection of Drivers	August 1977
Start of Vanpooling	September 1977

5. RESPONSE OF VANPOOL DRIVERS AND PRIVATE HAULERS

TTDC is initiating a vanpool program by purchasing vans and leasing them to drivers. Before vanpool riders can respond to this new transportation service, drivers must be selected and vans leased. TTDC is also attempting to organize an association of private haulers. In order for the association to provide benefits which may ultimately change the level of service for riders, the haulers must respond to the idea of an association. The discussion in this chapter examines the response of potential drivers and private haulers to the activities of TTDC.

5.1 Vanpool Driver Response

Vanpool drivers have responsibilities of signing a lease for a van, driving the vans, collecting fares, and purchasing gasoline. As compensation for these resonsibilities, the drivers receive free commuting trips, keep the fares collected over expenses, and have use of the vans after hours. Data describing both the response of employees interested in becoming drivers and those actually chosen as drivers will be collected.

Measures describing the response of employees who are seriously enough interested in becoming drivers to register with TTDC as potential drivers are:

number of employees interested in becoming drivers

bases and work sites of those responding

residential areas and distance from work sites of those responding

demographic - age, income, sex, family size, etc.

residential housing type

occupation

times reporting to work and leaving

current mode of transportation to work

waiting list of employees interested in becoming drivers.

Data sources are records from registering with TTDC to become drivers.

TTDC will select drivers from the employees who express interest in becoming drivers. The selection criteria and process will be described in Chapter 4 under the description of the program. Measures describing the drivers are:

demographic - age, income, sex, family size, etc.

residential location and type

work site

occupation

times reporting to work and leaving

previous mode to work

number of cars owned before and after leasing van

amount of income derived from being a vanpool driver

use of van after hours - number of trips per week made with van after hours and distance travelled in these trips

reasons for becoming a vanpool driver.

Data sources for these measures are records of vanpool drivers provided to TTDC and surveys of the drivers.

5.2 Response of Private Haulers to Association

There has traditionally been a reluctance on the part of the private haulers to associate with outside groups due to a fear of possible regulation and of competition among the haulers. Thus, there is some doubt that the haulers will be interested in participating in an association.

Measures on the response of the private haulers to the association are:

number of private haulers expressing an interest in the association - attendance at initial meetings on setting up the association

if the association is not formed, what are reasons the haulers are not interested

if the association is formed, how many drivers join

characteristics of hauler operations of those who are interested in association and of those who are not.

Data should be available from TTDC on attendance and participation of the contract haulers in initial meetings. Reasons for the response of the private haulers can be collected by surveys and by reactions expressed to TTDC, which is expected to be in direct contact with many haulers.

6. LEVEL OF SERVICE IMPROVEMENTS

A major aspect of the evaluation is assessing the trade-offs commuters are willing to make between different levels of service, such as travel time and cost, in choosing to commute by vanpool. This chapter is concerned with the project-induced changes in transportation to the Navy bases as viewed by the user. The sections of this chapter address the different categories of level of service changes which may be affected. All these level of service factors would be expected to be the factors on which a commuter bases his or her choice of whether to join a vanpool, ride with a private hauler or stay with his or her present mode. The manner in which commuters react to the level of service changes in this chapter is discussed in Chapter 7.

6.1 Coverage Changes

Coverage for vanpooling is of a different nature than that for fixed route bases. Before vanpools are established, a potential vanpool rider does not know if a vanpool will serve his or her area. After vanpools are running, the potential user knows if a vanpool serves his or her area; however, there must be a vacancy in the vanpool for the rider to join. A person can usually participate in a vanpool only if several other people in the same residential area are also interested. With fixed route service, the potential user knows the route of the bus before deciding whether to ride. The measures presented in this section will examine the subareas within the Norfolk region where sufficient residents were interested in vanpooling to form a vanpool.

The measures to be examined on coverage are:

Number of vanpools serving the different bases. This analysis includes whether priority is given to certain bases in initiating vanpools.

Description of work sites within bases which participate in vanpooling. This includes factors such as the role of individual Navy commands in assisting vanpools and the availability of parking at the work site.

Description of residential areas which have residents participating in vanpools, including geographic location and demographic characteristics.

Data for the measures can be obtained from records on driver registration, Navy records on location of employees, maps, and census information.

If the private haulers association does materialize, any changes in the routes and areas served by the private haulers will also be included in the evaluation. Data on service coverage before the project is available from TTDC which has collected information on the schedules and routes of many private haulers. It is expected that the association will publish schedules with routes which can be used as data after the start of the project. It should be noted, however, that some private haulers may not join the association, and, thus, data on private haulers may be incomplete.

6.2 Changes in Travel Distance and Time

Since a vanpool carries several passengers, commuting by vanpool would be expected to involve travelling a longer distance and for a longer time than commuting by single occupant auto or even by carpool. Travel time is likely to be an important level of service attribute in influencing a commuter's choice on whether to join a vanpool. Travel time is influenced by the distance traveled, which for vanpooling includes the collection, distribution, and line-haul portions of the trip.

The purpose of this section is to assess the total travel time, examine the factors influencing the travel time, and compare the vanpool travel time with that of other modes available to the Navy commuter. The examination of the components of travel time will consider the collection, line-haul and distribution times and the influence of number of pickups and distance between pickups on these times.

6.2.1 Components of Travel Time and Distance

The travel time for an individual rider depends on the order in which he or she boards the van. Also, the collection and distribution phases are likely to constitute the bulk of the travel time added to that which the commuter would have driving his or her car. Thus, the travel time and distances for the collection and distribution phases will be examined as well as those for the line-haul portion of the trip.

The components of travel time and distance to be measured are:

Time and distance to make pickups and dropoffs at residential areas and work sites

Travel time and distance for the line-haul portion of the trip between last pickup and first dropoff

Total commuting time and distance in vanpools. Time for longest rider, shortest rider, and average rider.

Both averages and ranges of these measures among the vanpools should be presented. Possible data sources are a log kept by a vanpool driver or rider, maps, and location of drivers and riders obtained from TTDC and Navy records.

Several types of data for different parts of the evaluation will be collected through trip logs and surveys. The questions relating to the different data can be combined into the same sets of logs and surveys.

The measures on travel time and distance will be combined to analyze how travel times vary among the vanpools as a function of number of pickup and dropoff stops and distances traveled during collection, distribution and line-haul phases of the commuting trip. Some measures for this analysis are the ratio of collection and distribution distance/line haul distance and the ratio of collection and distribution time/line haul time. Comparison of these ratios among the different vanpools will give an indication of the influence of the collection and distribution phases of the trip on the overall commuting time.

Changes in the travel times of the private haulers will be obtained from current schedules collected by TTDC and from schedules which the private haulers association is expected to compile. As mentioned in Section 6.1, not all private haulers may participate in the association, and, hence, data on private hauler travel times may be incomplete.

For vanpool and contract hauler riders who are picked up at central collection points other than their residences, the travel times to the collection points will be obtained from the riders as part of the rider surveys.

6.2.2 Comparison of Travel Times Among the Modes

Since travel time is an important factor in the choice of mode for the work trip, the travel times of the vanpools and private haulers will be compared to that for other modes. The other modes available to the commuter include single occupant auto, carpool, and transit bus if one serves the commuter's residential area. It is important that the travel times to be compared for vanpoolers and non-vanpoolers are from the same residential area. Data on travel times can be collected by asking in a survey the travel time of the vanpoolers' former mode. If this provides insufficient data, travel times can be estimated from distances between residence and work site, bus schedules, or having someone travel from the residential areas to work sites by auto and bus and record the travel time.

6.3 Fare Changes

6.3.1 Fare to User

One expected advantage of vanpooling over driving a car or even carpooling would be lower cost. The structure for setting the fares was described in Chapter 4. This chapter examines the fares actually paid by the users. Measures required are:

fares per passenger - trip by distance traveled and by area served.

fare per passenger mile.

Since the drivers have some flexibility in setting the fares, different vanpools may charge different fares for similar distances. The above measures will be compared among the vanpools to assess any such differences in fares. Data on fares will be available from records the drivers supply to TTDC.

Data on fares paid to the private haulers before and after the demonstration are not as readily available. TTDC has collected the information on the fares from some private haulers as part of an effort to provide schedules of private hauler service. It is expected that the association will also publish schedules including the fares. Fares for private haulers may possibly also be obtained directly from the haulers.

6.3.2 Cost Comparison Among Modes

Since one reason a rider may use for determining whether to join a vanpool is the cost, the evaluation will compare the cost of vanpooling with the cost of other modes. One possible data source is to ask in a survey what it cost vanpoolers to use their previous mode. Another source is to determine the cost per mile of driving a car in Norfolk and multiply this by the distance traveled from a vanpooler's residence to work site. This latter method may produce more accurate data since a former auto driver may not know his or her total driving cost but only the operating expenses such as gasoline and repairs. This distinction of perceived versus actual driving cost is important. Data on bus fares can be obtained from TTDC.

6.4 Reliability

6.4.1 Reliability of Pickup and Arrival Time

When a commuter rides a van which makes several stops and when there is a reliance on someone other than the commuter himself or herself, reliability of pickup and arrival times becomes an issue. Data on pickup and arrival times will be collected during several periods of the two year demonstration project. Sources for these data are logs kept by vanpool drivers and riders. The analysis will stress the consistency of pickup and arrival times.

Data on reliability of pickup and arrival times for private haulers are more difficult to obtain and the evaluation will probably not address this part of the reliability question for the private haulers.

6.4.2 Vehicle Reliability and Its Impact on Travelers

It is expected that the vanpool drivers will keep records of breakdowns on the vans, particularly those which affect commuter service. Measures in this section include number of van breakdowns affecting commuter arrival times (both breakdowns during a trip and before a trip which affect the vehicle planned for use), length of delays, and how workers arrived at their destinations after breakdowns. Chapter 4 discussed measures for the emergency service procedures and use of backup vans provided by the vanpooling program, and this section will discuss the effectiveness of these procedures.

The cost savings from group purchase of supplies and services by the private haulers association may enable the haulers to maintain their vehicles in better mechanical condition and lessen service disruption due to mechanical failure. Again, data on private hauler vehicle breakdowns may be difficult to obtain. If such data can be obtained from the haulers or the haulers association, the reliability of the private haulers vehicles will be evaluated.

6.5 Amenities

Some drivers may improve the attraction of riding in their vans by cleaning them frequently, adding decor changes, playing music, etc. Data related to amenities will be gathered as part of surveys of drivers and riders.

6.6 Internal Operational Procedures and Rules of Vanpools

Most vanpools are likely to set up rules or procedures affecting their operation, such as rules on smoking, procedures for determining the order of pickup and dropoff of riders, fare payment by someone missing some days due to illness or vacation, etc. Information on operational procedures adopted by the different vanpools can be obtained from surveys of the drivers.

7. DEMAND

This chapter examines the individual behavioral responses of Navy commuters to the level of service changes caused by initiating the vanpool program. The chapter investigates the number of vanpool riders and characteristics of commuters who choose vanpooling and of those who do not.

7.1 Ridership Patterns

An examination of the total ridership of vanpools provides a measure of the overall popularity of vanpooling with the Navy employees. Specific measures to be examined are:

number of vanpools

number of total riders

number of riders per van

Data can be obtained from records supplied to TTDC by the vanpool drivers.

Since there are only 50 vans in the demonstration project, there may be employees who would like to join a vanpool but are unable to do so because of capacity contraints. In order to examine this demand in excess of capacity, data on waiting lists for joining vanpools and, for those commands where possible, on the number of requests by potential users to join the vanpools.

Data on ridership for private haulers may be more difficult to obtain. If the haulers association is formed and a preliminary examination indicates ridership has increased and if the haulers are willing to provide data on the number of passengers, ridership data on the private haulers will be collected.

7.2 User and Non-User Characteristics and Attitudes Toward Vanpooling

Characteristics of the individual responses of Navy employees to vanpooling will be examined in this section. This includes reactions of both riders and non-riders.

7.2.1 Characteristics of Vanpool Riders

Measures of the characteristics and attitudes of commuters who join vanpools are:

- demographic - age, income, sex, family size, etc.
- residential type - type of housing
- work site
- occupation
- previous mode to work
- number of cars owned before and after joining vanpool
- if a car is left at home which would have been used for commuting, what is the extent of use of the car by other members of the household
- reasons for joining vanpool
- whether the level of service being provided by the vanpool is equivalent to what was expected before joining the vanpool (e.g. travel time, cost, comfort)
- whether vanpooling affects job performance because vanpooling provides a forum for informal interchange with fellow workers or supervisors.

Data sources on vanpool riders are registration records and surveys.

7.2.2 Characteristics of Non-Vanpoolers

A comparison of persons who did not join a vanpool with those who did is of particular interest in designing future vanpool programs. Measures of characteristics of non-vanpoolers are:

- demographic - age, income, sex, family size, etc.
- residential location and type
- work site

occupation

mode to work

number of cars owned by family

reasons for not joining a vanpool

reasons for choosing present mode.

With only 50 vans, some commuters may not have joined vanpools because all were filled or because no vanpool served his or her residential area. Such a demand in excess of capacity was examined in Section 7.1. It is important for the analysis of non-vanpoolers discussed in this section to include only commuters who have no interest in joining vanpools. Surveys of a sample group of non-vanpoolers are a source of data. If some commands have suitable employee records which they have collected for organizing carpools and vanpools, it may be possible to identify a sample of non-vanpoolers who live in residential area served by vanpools. Thus, the analysis could examine a group of commuters who have the opportunity for joining a vanpool but choose not to join.

7.3 Characteristics of Private Hauler Passengers

A survey can be performed of private hauler riders to obtain the same data as was listed for vanpooler riders in Section 7.2.1. However, such an effort will not be performed unless the haulers association is formed and unless a preliminary examination indicates there has been a change in ridership on the private haulers.

7.4 Stability of Vanpools

The stability of the vanpools in terms of how long riders stay with a vanpool and whether drivers can maintain a full van is an issue, particularly in Navy facilities where military personnel move frequently. Measures include:

number of dropouts from vanpools

reason for dropouts

length of stay of riders in vanpools -- average and range

how long dropout rider lived in Tidewater region

number riders joining vanpool during month

ease of replacement of dropouts.

Data sources are vanpool records and a questionnaire given to dropouts.

8. PRODUCTIVITIES AND ECONOMICS

Productivities and economics are of particular interest for the Norfolk vanpooling program since most previous vanpooling programs have been organized by private employers rather than by a public transit authority which purchases and leases vans. Measurements to be discussed are costs to TTDC and the drivers of the vanpool and private hauler association programs, revenues received by TTDC and the drivers relating to the programs, and overall productivity of the operations. Both the drivers and TTDC are included in the cost analysis since the driver will be responsible for the cost of gasoline and TTDC for the remaining costs. The driver must pay a monthly lease fee to TTDC based on fixed costs and mileage costs. The fares charged by the driver will cover the driver's lease cost and gasoline cost and provide an additional income. In the discussion on cost and revenue in this section, it will be important to distinguish who pays the different costs and who receives the different shares of the revenues.

8.1 Costs and Revenues of Vanpool Program

8.1.1 Vanpool Costs

The costs will be split into capital costs, fixed operating costs, variable operating costs, and administrative costs. The variable operating costs are dependent on mileage driven and, hence, will vary among the vanpools. The capital, fixed, and administrative costs are expected to be the same for all vans. All cost measures are costs to TTDC except where indicated:

capital cost - purchase cost of vans

fixed operating costs - insurance

variable operating costs - gasoline (this is a cost to the driver only), tires, and maintenance

administrative costs - cost of initiating vanpool program, record keeping and other administrative costs.

All these costs are costs to TTDC except for gasoline. The costs to the driver are gasoline and a lease fee set by TTDC which contains a flat monthly charge and a mileage charge. Gasoline cost will be reported by the drivers to TTDC, and other data are contained in records kept by TTDC.

Cost data will be presented on a monthly basis and will be expressed as cost per van, per van-mile and per passenger-mile.

8.1.2 Vanpool Revenue

As with costs, a differentiation will be made between vanpool driver revenue and TTDC revenues. Driver revenue is obtained from fares charged to users and TTDC revenue from the monthly base fee paid by the drivers and from the UMTA Demonstration grant. Revenue data will be obtained from TTDC which will collect data on driver revenue.

8.1.3 Net Profit or Loss

The net revenue/cost ratio will be examined to determine the economic viability of the vanpooling operation. This will be done for both the drivers and TTDC.

8.2 Cost and Revenue of Private Haulers Association

TTDC is expected to spend a limited amount of money in attempting to organize a contract haulers association. These costs will be primarily for marketing to interest haulers in an association and for holding initial meetings with haulers to organize an association. TTDC may also provide funds from the project grant for legal assistance in initiating the association. Data on these costs will be obtained from TTDC.

The association is expected to be self-sustaining once it is formed. TTDC is not expected to receive any revenue from the association.

8.3 Productivity

In a vanpool, all riders and the driver are traveling from the same general residential location to the same destination, and the vehicle is used only during the morning and afternoon rush hours. Thus, unlike most public transit operations, the productivity of vanpools is fairly constant for each trip and for most of the distance on its route. The van may be used for personal use after hours as an incentive for the drivers, but such use is not the objective of the vanpool program and will not be included under productivity of passengers carried.

Measures of productivity are:

passengers (including driver) per commuting trip

passengers (including driver) per vehicle-mile

passengers (including driver) per vehicle-hour.

The collection of data on travel time and distance was discussed in Chapter 6, and data on number of riders in Chapter 7.

Productivity from the driver's viewpoint is concerned with the amount of net revenue the driver receives for the amount of time spent driving. Net revenue collected per vehicle-hour is a measure of productivity for the driver.

8.4 Comparison of Vanpooling and Fixed-Route Service

A traditional approach other than vanpooling would have been for TTDC to initiate more fixed route bus service to the naval bases. Problems in providing bus service would probably center around the expense of serving disperse residential neighborhoods. A van carrying 12 passengers may be feasible in providing service from residential areas to the Navy bases, but a larger bus may not be feasible. Based on data on residential location of vanpool passengers and cost of vanpooling, a comparison will be made of the feasibility of initiating bus service to provide work trip transportation to those riders participating in vanpooling.

8.5 Productivity of Private Haulers

Information on productivity of the private haulers is likely to be difficult to obtain. If the association materializes and the necessary data can be collected easily, the productivity of the private haulers in terms of passengers per trip and per vehicle-mile will be evaluated.

9. ISSUES CONCERNING SERVICE PROVIDERS, NAVY AND GENERAL PUBLIC

In addition to the measures presented in previous chapters on the supply/demand interactions of the vanpool service and the productivities and economics of the vanpool operation, there are impacts on other transportation providers, on the Navy and on the general public. These other impacts are discussed in this chapter.

9.1 Impacts of Vanpooling on Other Transportation Providers

Since TTDC operates minimal bus service to the naval bases and there are only 50 vans involved in the project, it is unlikely that there will be an observable impact on public transit. However, if there should be an observable change in transit ridership, it will be reported. Data will be available from TTDC.

If there is an observable change in private hauler ridership, this will be examined. However, it is doubtful the vanpool program will decrease ridership of private haulers due to the limited size of the vanpool program and careful selection of drivers.

9.2 Navy and Vanpooling

Some of the local objectives of the vanpooling program are to reduce traffic congestion and its accompanying problems around the Navy bases. Some topics to be addressed in considering impacts on Navy bases are parking availability, congestion at base gates and on base roads, and on-time arrival of workers. However, with only 50 vans the impacts on the bases may not be large enough to be noticeable. The evaluation of impacts on the Navy bases will depend on the significance of the impacts and the availability of data.

Other issues of concern in addition to impacts on the Navy are the reactions and attitudes of the Navy to vanpooling and to TTDC's brokerage role. One aspect concerns the effectiveness of the interaction between the Navy and TTDC in initiating the vanpool program and maintaining ridership. Some questions are whether problems arise in the interaction and delays on the part of either party in carrying out their roles. The Navy's viewpoint on the effectiveness of the vanpool program is also an important issue. This discussion would also include whether

the Navy felt that vanpooling was beneficial enough that the Navy would consider taking a more active role in initiating vanpooling.

Information on Navy impacts and reactions will come primarily from surveying or interviewing TTDC and Navy personnel.

9.3 General Viability of Vanpooling

In addition to economic concerns relating to the viability of vanpooling which were discussed in Chapter 8, there are numerous other factors which influence riders to join vanpools. The evaluation will discuss the influence of such factors as vanpoolers having a common employer, effectiveness of TTDC in marketing vanpooling, attitude of Navy toward vanpooling, and homogenity of the workforce. This discussion will draw upon data collected for the aspects of the evaluation presented in previous chapters. In a sense, this will be a synthesis of factors relating to vanpool viability.

An indication of the viability of the vanpooling demonstration project will be whether TTDC feels the project was successful enough that they would like to expand vanpooling beyond the 50 demonstration vans. Thus, the evaluation will include whether TTDC would consider expanding its role in initiating vanpooling.

10. SUMMARY AND CONCLUSIONS

The evaluation plan has been designed to address the project objectives and issues discussed in Chapter 2. These are primarily concerned with the effectiveness of a vanpool program initiated and operated by a public transit operator with vans leased to employers of a local employer.

A key issue to be dealt with in the evaluation is the implication from the Norfolk vanpool experience for transferability of the Norfolk vanpool concept to other regions. Several aspects of the evaluation are important for assessing the viability of transferring results. Baseline data describing the demonstration are described in Chapter 3. That section includes a description of the residential areas, the work locations, demographic characteristics, and existing transportation services. Significant information on the level of service provided by the vanpools and on the characteristics, attitudes, and impacts of the users will be obtained through the registration process, TTDC records, trip logs, and surveys. Information on the operational and financial factors associated with the vanpool program will also be collected. From these impact assessments, the viability of transfering the demonstration project concept will be discussed.

APPENDIX A

DATA ITEMS AND SOURCES

A.1 TTDC Administrative Records

Description of Activity: Much of the information on the organization and implementation of the vanpool program and private haulers association will come directly from records maintained by TTDC.

Data Items for TTDC Administrative Records:

Description of Vanpool Program:

- Description of vans
- Driver selection process
- Lease arrangements
- Duties of driver
- Suggested fare structure
- Written agreement between rider and driver with rights and responsibilities of each
- Procedures by which Navy commands assist in forming vanpools (another data source is the Navy commands)
- Procedures for van maintenance
- Procedures for making vanpool program self-sustaining (collection of revenue for replacement vans)
- Procedures for backup vans and handling of van breakdowns
- Recommendations for vanpool procedures on smoking, order of pickup and dropoff, etc. (another data source is vanpool drivers)

Program Implementation:

- Procurement of vans and insurance

Implementation of driver selection process and lease arrangements

Implementation in conjunction with Navy of procedure for matching riders and vanpools (another data source is the Navy commands)

Marketing strategies for private haulers association

Legal problems associated with private haulers association

Implementation of association and its activities

Response of Private Haulers Association:

Number of private haulers expressing interest in association (e.g., attendance at initial meetings for organizing association)

Reasons haulers are interested or not interested in association (TTDC is expected to have direct contact with haulers while attempting to organize the association, and thus, TTDC is likely to receive opinions of haulers on the association)

Impact on Other Transportation Providers:

Change in TTDC bus ridership on routes serving the Navy bases

Brokerage Role:

Comments from TTDC on relationship of TTDC with Navy's role in organizing vanpool riders

Productivities and Economics:

Costs of vanpool program

- capital costs (purchase of vans)
- fixed operating costs (insurance)
- variable operating costs (tires, maintenance)
- administrative costs (costs of initiating vanpool program, record keeping, other administrative activities)

Revenues of TTDC

lease fee

grant

Costs to TTDC of Private Haulers Association

marketing activities

holding initial meetings

legal assistance to association

Cost and other factors involved in increasing service of fixed route buses to neighborhoods served by vanpools

Level of Service of Private Haulers (data collected from schedules of private hauler service):

Changes in routes and areas served

Changes in travel time

Changes in fares

A.2 Registration Information from Vanpool Drivers

Description of Activity: Both perspective drivers and those chosen to be drivers will deal directly with TTDC. Information will be collected from those expressing interest to TTDC in becoming drivers, and more detailed information from those selected as drivers. Information will be collected on residential areas and work sites served by vanpools and characteristics of vanpool drivers.

Data Items From Registration Process:

Response of Employees Interested in Becoming Drivers:

Number of responses of prospective drivers

Bases, work sites, and commands of prospective drivers

Residential location and distance from work site of prospective drivers

Residential housing type

Age

Household income

Sex

Number of members in household

Number of working members in household

Occupation

Current mode to work

Times reporting to work and leaving work

Number of employees interested in becoming drivers on waiting list

Description of Vanpool Drivers:

Residential location and distance from work site

Residential housing type

Age

Sex

Household income

Number members in household

Number working in household

Work site name, location, and command

Occupation

Previous mode to work

Times reporting to work and leaving work

A.3 Vanpool Driver Record Keeping

Description of Activity: The vanpool drivers will maintain records concerning the fares collected, costs, mileage, and

ridership of the vans. These records will be furnished monthly to TTDC when lease payments are made.

Data Items for Driver Record Keeping:

Level of Service:

Fares charged to riders

Number and cause of van breakdowns during month

Demand:

Number of riders in van

Economics and Productivities:

Vanpool Mileage

Total fares received

Cost of gasoline

Lease fee paid

Vanpool Driver Response:

Number trips made after-hours with van

Distance traveled for after-hour trips

Stability of Vanpools:

Number riders droping out of vanpool during month

Number riders joining vanpool during month

Length of stay in vanpool of riders who drop out

A.4 Surveys of Vanpool Drivers

Description of Activity: Periodic questionnaires will be given to vanpool drivers to collect data on the drivers and on the operation of their vans. This information will supplement that collected by TTDC through driver registration records and monthly records. Information in the driver surveys is gathered on the characteristics of the drivers and vanpool operation.

Data Items for Survey of Vanpool Drivers:

Description of Vanpool Drivers:

- Reasons for becoming a vanpool driver

Vanpool Level of Service:

- Amenities supplied by driver
  - frequency of cleaning
  - music provided
  - other
- Internal operational rules and procedures of vanpools
  - rules on smoking, eating, and drinking
  - place of pickup (at door or central points)
  - order of pickup and dropoff riders
  - fare payment policy by someone missing a ride

Vanpool Demand:

- Number requests to join vanpool at start of operation if potential riders in command contact driver rather than command
- Number on waiting list to join vanpool if waiting list maintained by driver

Stability of Vanpools:

- Procedure used to find replacement riders for those who dropout
- Length of time taken to find replacement rider for dropout

A.5 Surveys of Vanpool Riders

Description of Activity: Surveys of vanpool riders will be conducted to collect information on the characteristics of vanpool riders and on their former mode.

Data Items from Surveys of Vanpool Riders:

Vanpool Level of Service Comparison with Other Modes:

Travel time to work by previous mode

Cost of travel to work by previous mode

For vanpool riders picked up at collection points other than their residences, travel time and mode to the collection point

Vanpool Demand:

Characteristics and attitudes of vanpoolers

age

sex

household income

household size

number members of household working

residential location

housing type

work site name and location

occupation

previous mode to work

number cars owned by household before and after joining vanpool

if a car is left at home which would have been used for commuting, what is the extent of use of the car by other members of the household

reasons for joining vanpool

comments on whether level of service being provided by vanpool is equivalent to what was

expected before joining (e.g. travel time, cost, comfort, etc.)

comments on whether vanpooling affects job performance because vanpooling provides a forum for informal interchange with fellow workers or supervisors

Stability of Vanpools (asked of dropouts from vanpool):

Length of time riding in vanpool

Length of time lived in Tidewater Region

Reasons for leaving vanpool

A.6 Survey of Non-Vanpoolers

Description of Activity: A sample number of Navy commuters who are not participating in vanpooling will be selected and given a questionnaire regarding their characteristics and reasons for not joining a vanpool. Employees who are not interested in vanpooling will be chosen to exclude those who would like to participate but cannot since their area is not served by a vanpool or vanpools to their area are full. Residential location records which the Navy commands have on their employees may provide a source to identify a sample number of non-vanpoolers.

Data Items for Survey of Non-Vanpoolers:

Demand for Vanpools:

Characteristics and Attitudes of Non-Vanpoolers

age

sex

household income

family size

number of family members working

residential location

housing type

work site name and location

occupation

mode to work

number of cars owned by household

reasons for not joining a vanpool

reasons for choosing present mode

A.7 Trip Log

Description of Activity: A trip log will be completed periodically by the vanpools during the demonstration to gather information on travel time, travel distance, and reliability of pickup and dropoff times. The log will be maintained by the driver, a rider, or both. For example, the driver might begin the log at the start of a trip, and after a rider is picked up, the rider might take over the log.

Data Items for Trip Log:

Vanpool Level of Service:

Travel time

time for collection and distribution phases of trip at residential areas and work sites

time for line-haul portion of trip

total travel time

Travel distances

distance for collection and distribution phase of the trip at residential areas and work sites

distance for line-haul portion of trip

total trip distance

Reliability

deviation of actual pickup and dropoff times from expected times (there may not be a specific expected pickup or dropoff time but rather an expected interval of time. The person maintaining the log would then use judgement in determining a deviation time from the normal expected interval of pickup and dropoff time.)

A.8 Private Hauler Association

Description of Activity: Information will be collected from the private haulers association describing the association, services provided by the association, and membership response.

Data Items from Private Haulers Association:

Description of Association:

Organizational structure, committees, operational procedures, etc.

Services provided by association

Revenues and expenses of association

Response of Haulers to Association:

Membership size

A.9 Survey of Private Haulers

Description of Activity: The private haulers will be questioned regarding their interest in an association. If the association does not materialize, the reason the haulers are not interested will be solicited; if the association is formed, reasons for joining of those who do and reasons for not of those who don't will be of interest. It is likely that some private haulers will not respond to a questionnaire, so the sample of private haulers may be incomplete. But, it is expected that the reasons of those responding will be representative.

Data Items for Survey of Private Haulers:

Description of Responses to Association:

Reasons for joining or not joining association

Characteristics of hauler operations of those who are interested in association and of those who are not

Demand:

Number riders carried per trip by hauler

A.10 Survey of Private Hauler Riders

Description of Activity: It is expected that the private hauler ridership will not change sufficiently that a survey of the private hauler riders will be performed. However, if the private haulers association materializes and if a preliminary examination of the private haulers indicates that private hauler ridership has increased, an on-board survey of private hauler riders will be conducted. Information will be obtained on the characteristics and attitudes of commuters who choose to ride with the private haulers.

Data Items for Survey of Private Hauler Riders:

Demand for Private Haulers:

Characteristics of riders

age

sex

household income

family size

residential location

housing type

work site name and location

occupation

previous modes to work (if riding with private hauler less than 5 years)

number of cars owned by household

number of cars owned by household before riding with private hauler (if riding with private hauler less than 5 years)

reasons for riding with private hauler

for private hauler riders picked up at central collection points other than their residences, travel time and mode to the collection point

A.11 Data from Navy

Description of Activity: Information will be gathered from the Navy on the Navy's role in obtaining riders for the vanpools and on impacts of the program on the Navy. Data on assisting in obtaining vanpool riders will likely come from the commands. Information on impacts will likely come from interviews with base administrative personnel. Since the vanpool program involves only 50 vans, significant impacts on the Navy bases are not likely, and an extensive evaluation strategy and data collection procedures will not be implemented.

Data Items from Navy:

Demand (from commands):

Number of requests to join vanpools

Number on waiting lists to join vanpools

Impacts on Navy:

Changes in parking availability

Changes in congestion at base gates and on base roads

Changes in on-time arrival of workers

Reactions of Navy to vanpooling

Reactions of Navy to TTDC's brokerage role

A.12 General Sources

Description of Activity: Some information for the evaluation will be drawn from census data, maps, reports and studies (e.g. 1974 survey of Navy commuters, studies done by SRI, and a transportation engineering planning study on the Sewells Point base).

Data Items from General Sources:

Site Description:

Maps of the Tidewater region showing location of bases, residential areas, highways, and bus routes

Geographic description of residential neighborhoods

- size
- distance from bases
- service by transit bus
- access to highways

Demographic description of residential areas

- population
- density
- household income

Travel behavior

- ridership on public buses to bases
- travel volumes on highways to bases
- ridership in carpools

A.13 Special Data Collection

Description of Activity: Some data collection by a collector in the field or by special studies may be needed. These special data collection efforts or studies are described below.

Data Items from Special Collection Activities:

Alternate Modes:

Travel time of alternative modes collected by person traveling by auto and bus from residential areas served by vanpools to work sites (needed if survey of vanpool riders provides insufficient data on travel times by previous mode and other sources of maps and bus schedules are insufficient)

Cost of driving in Tidewater region (study to determine this cost needed if data collected on travel by previous mode is insufficient)

Exogenous Factors:

Weather

Economic conditions

Gasoline prices and availability

Events related to Navy operations.

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