EVALUATION OF RIDEFINDERS' FY 2012 TRANSPORTATION DEMAND MANAGEMENT (TDM) PROGRAM IMPACT

FINAL REPORT (11-5-12)

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SECTION 1 INTRODUCTION AND OVERVIEW OF EVALUATION SYSTEM

For many years, RideFinders, the commuter assistance program serving the Richmond, Virginia metropolitan region, has provided travel information and assistance services to residents, employees and visitors of the Richmond region. The program offers a variety of Transportation Demand Management (TDM) services designed to reduce reliance on single-occupant vehicles for travel. TDM actions can facilitate and encourage use of non-drive alone "shared ride" travel options such as carpooling, vanpooling and public transit or non-motorized transportation options, such as biking or walking. TDM actions such as telework and compressed work schedules can enable travelers to avoid a trip entirely or shift the time the trip is made to a less congested time of day.

During Fiscal Year 2012, RideFinders surveyed key service user groups to assess their use of and satisfaction with the services and the role of the services in influencing or assisting commuters to make changes in their travel to work. The results of each of those surveys have been documented in individual reports. But the surveys also provided data to estimate the combined impact of RideFinders' services. This report documents those impacts – reductions in vehicle trips and vehicle miles traveled – resulting from RideFinders' TDM programs, between July 2011 and June 2012.

> *"The friendly, courteous, polite team at the store is the reason I return so often."*
>
> 2011 RideFinders Commuter Store Survey

TDM Performance Indicators

The goal of the impact assessment is to document the overall impacts of RideFinders' TDM program. But the evaluation system developed for RideFinders defines performance by a progression of actions that track with the behavior transformation continuum typically applied to social marketing models:

- Awareness — Build initial awareness of options/concept
- Familiarity — Increase appreciation and understanding of specific options
- Consideration/Trial — Try one or more options/have a favorable experience
- Desired behavior — Adopt the behavior in everyday living

The RideFinders impact evaluation adapts this model for a seven-step "continuum" of results. The first five steps mirror the social behavioral change model described above. The sixth category assesses the factors influencing the behavioral changes. The final category defines external impacts resulting from the behavior changes. The 2011-2012 evaluation estimates transportation impacts, but future evaluations also could include other personal or social impacts, such as enhanced quality of life, personal travel savings and other outcomes or benefits of travel behavior changes.

Travel Behavior Change Continuum

1) Awareness of modes/TDM services
2) Attitudes toward modes, willingness to try new mode
3) Participation in services
4) Satisfaction with services and repeated use
5) Utilization of modes, travel changes
6) Influences on decisions to change
7) Impacts from travel changes

The primary focus of this report is category 7, Program impacts, but indicators in categories 3 (Participation), 5 (Utilization), 6 (Influences), also are relevant to this report, as they are used as components in the calculation of impacts. Following are brief explanations of each category and typical sources of data for RideFinders' TDM Program evaluation.

- Participation (category 3) – Program participation refers to the number of customers who receive services from RideFinders, for example, the numbers of employer clients and the number of commuters who use the RideFinders.com website or participate in the vanpool program. Participation data are captured primarily through on-going program tracking by RideFinders staff.

- Mode Utilization/Travel Change (category 5) – In the context of TDM performance, travel change refers to changes commuters make in how, when or where they travel as a result of TDM services they received. In this evaluation, travel changes are characterized by three indicators:

  1) Trial placement rate – percentage of targeted commuters who tried a new travel mode after receiving a TDM service, but did not continue. A related element is the duration of the new travel arrangement – how long did the travel change last?
  2) Continued placement rate – percentage of targeted commuters who made a travel change and continued the change.
  3) Alternative mode placements – the total number of people in the targeted population who made a change to an alternative mode.

  These indicators are assessed by surveying a sample of the targeted population to ask about their travel patterns during the evaluation period and identifying commuters who made a travel change.

- Influence on Change (category 6) – Because many factors influence travel behavior, the evaluation also examines the role the service played in influencing the travel change. Influence typically is assessed through surveys of customers who use the service and make a travel change.

- Impacts (category 7) – Finally, two TDM performance indicators represent the contribution of the TDM services to regional travel objectives, including:

  1) Vehicle Trip Reduction – Measure of reduced single-occupant travel – e.g., "cars off the road." This is typically measured by surveying a sample of service users about their current travel and their travel before they used the TDM service.

These survey data are used to derive a multiplier factor that represents the average number of trips reduced per user.

2) Vehicle Miles Traveled (VMT) Reduction – A second measure of reduced single-occupant mileage, either by vehicle trips eliminated or reduced length of existing vehicle trips. VMT reduction also is typically measured through a survey of service users. In this case, survey data are used to derive a multiplier factor for the average miles per trip reduced.

The factors noted above are applied in the impact calculation methodology to calculate TDM program impacts resulting from commuters' travel changes. These calculations are briefly described below. Section 2, which presents the results of the FY 2012 impact calculation, explains specifically how this basic approach was implemented in the RideFinders evaluation.

> *"I like that the Commuter Store is in a location that is very convenient to my job and that the staff there are always pleasant, professional and helpful."*
>
> 2011 RideFinders Commuter Store Survey

Impact Calculation Approach

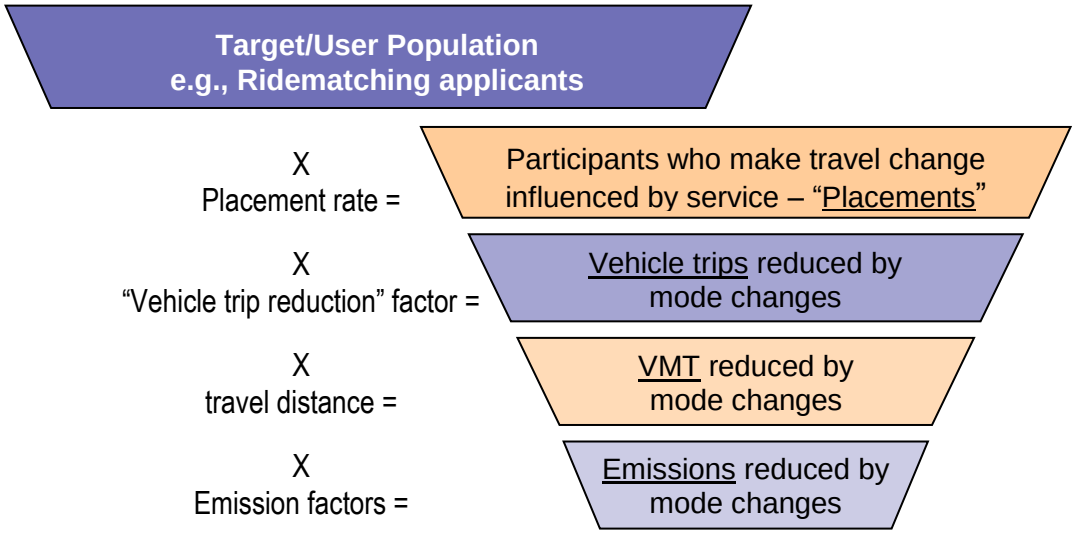
Figure 1 on the next page illustrates the method developed to calculate travel impacts for the RideFinders program. As shown, it consists of a series of multiplication steps beginning with a definition of the population of interest for a particular service. A series of multiplier factors derived from a survey of users are then applied to the population to calculate service impacts. This method is applicable for any service for which participation can be tracked and multiplier factors can be developed. Each service will have a unique set of factors, depending on the characteristics of the users and the service, but the basic calculation method is the same for all services.

A brief description of each of each step is presented below.

1. Estimate commuter population "base" for the service

   A TDM service is designed to influence or encourage a targeted set of travelers to shift to non-drive alone modes. These travelers represent the *population base* or *population of interest* for that service. Depending on the service, this could be, for example, all commuters, students, employers, vanpool riders, ridematching service applicants or another targeted group. Population base estimates were identified for each service from RideFinders' tracking data.

Figure 1: Impact Calculation Multipliers Series



2. Calculate "placement rate"

   Placement rate refers to the percentage of commuters in the population base who are "placed" in an alternative mode after receiving a service. Placement rates are calculated from survey data of a sample of the population and vary from one service to another, depending on the characteristics of the service and population. To collect placement rate data, commuters are asked several questions:

   - How do you travel now – what modes do you use and how often do you use them?
   - Did you make any changes in your travel since you received "X" service?
   - How did you travel before you received this service?
   - Did the service encourage or assist you to make this change?

   Respondents who made a travel change that was influenced by the service are considered "placements." Two rates are calculated and are distinguished by the length of time the commuter uses the alternative mode after shifting. The *Continued* rate represents commuters who made a shift to a new alternative mode and continued using the new mode. The *Temporary* rate represents commuters who tried a new alternative mode but shifted back to original mode within the evaluation period. Delineation between temporary and continued change is important because temporary changes are credited only for the duration of time the new mode was used.

3. Estimate the number of new alternative mode placements

   Step 3 estimates the number of new commuter placements in alternative modes. This is the expected number of commuters who started or increased use of alternative modes as a result of the service. It is calculated as:

   Alternative mode placements = Total Population base (from Step 1) x Placement rate (from Step 2)

4. Calculate the vehicle trip reduction factor for new placements

   Using the same survey data used to calculate placement rate, the vehicle trip reduction (VTR) factor is calculated as the average daily vehicle trips reduced per placement, taking into account three types of changes:

   1) Shifts to an alternative mode, from driving alone or from another alternative mode
   2) Increased use of alternative modes
   3) Increase in the number of riders in an existing carpool or vanpool

   The VTR factor combines the trip reduction results of all placements into an average reduction. Shifts from alternative modes to drive alone are not included, since these changes are not the intended result of TDM services. Appendix 1 presents an example of a basic calculation of a VTR factor.

5. Estimate vehicle trips reduced

   The number of daily vehicle trips reduced for the service is estimated by multiplying the number of commuter placements by the VTR factor:

   Trips reduced = Total placements (from Step 3) x VTR factor (from Step 4)

6. Estimate vehicle miles traveled (VMT) reduced

   The daily VMT reduced is calculated by multiplying the number of daily vehicle trips reduced (Step 5) by the average commute distance for commuters who made a travel change. The average distance is calculated from the same survey data used to calculate the placement rate and VTR factor.

   VMT reduced = Total vehicle trips reduced (from Step 5) x one-way travel distance

7. Adjust vehicle trips and VMT for access mode

   Emission reduction is calculated by multiplying vehicle trips reduced and VMT reduced by emission factors. But because commuters who drive-alone to meet a carpool, vanpool or bus create a “cold start,” the air quality analysis subtracts these access trips and the VMT driven to the meeting point from the vehicle trip and VMT reductions. These “adjusted” vehicle trips reduced and VMT reduced, rather than the initial totals, are used as the base for calculation of emissions reduced. Because vehicle access distance trips are typically short, the total vehicle trip reduction is reported as the travel impact, but the adjusted VMT is reported as the VMT reduction for the program.

8. Estimate emissions reduced

   Daily emissions reduced as a result of the program are estimated by multiplying the adjusted VMT reduced by regional emission factors (grams of emissions produced per travel mile). The emissions factors used in the 2012 evaluation were provided by VDOT; they match factors used for VDOT environmental calculations for the Richmond metropolitan region. The emissions factors account for emissions created from a “cold start,” when a vehicle is first started, a “hot soak,” that occur when the vehicle is later turned off, and the emissions generated per mile of travel by a warmed-up vehicle.

   Emissions reduced = Adjusted VMT reduced (from Step 7) x Per mile emission factor

9. Estimate the energy savings

   Energy savings is reported as gallons of gasoline saved and is estimated by multiplying the adjusted VMT reduced by an average fuel consumption factor for the regional mix of light duty vehicles.

The approach defined in these steps was used to calculate the FY 2012 impacts for the RideFinders TDM program. The results of the calculation are presented in Section 3.

> *"It [ERH] allows me to stick to my conviction of helping the environment. It is also a valuable program in case of emergencies, because I will not be taking the transit if I know there will be no way for me to get back home in case of emergencies. The assurance that this program exists gives me the confidence to use the transit system."*
>
> 2011 RideFinders Emergency Ride Home Survey

SECTION 2 SERVICES INCLUDED IN THE EVALUATION

Description of Services Included

The method used to calculate the impacts described in Section 1 starts by estimating individual impacts for each RideFinders service offered. To identify the services to be included in the evaluation, the consultant met with RideFinders staff to obtain a clear understanding of the activities undertaken in each service and the target population for each service. These discussions also defined the research plan for surveys and other data collection activities for each service. Ultimately, eight specific services were defined for the evaluation:

- Vanpooling
- NuRide financial incentive
- Employer support – Commuter Choice
- Employer support – Telework
- Ridematching
- Commuter Store
- Emergency Ride Home
- RideFinders.com website

> *"Having a way to get home in an emergency was one of the key deciding factors in my giving up my downtown parking space and commuting to work by bus."*
>
> 2011 RideFinders Emergency Ride Home Survey

- **Vanpooling** – RideFinders helps commuters start a vanpool by matching at least seven people to share the ride in a vanpool vehicle. Using information from its ridematching database, RideFinders also helps commuters find existing vanpools that have space available for additional riders.

- **NuRide** – NuRide is a commuter rewards program that offers registered users the opportunity to earn rewards for carpooling, vanpooling, biking, walking, teleworking and taking public transportation. Users earn rewards when they make a trip by one of these modes and report the trip on the NuRide website.

- **Employer Support – Commuter Choice** – Employer Commuter Choice gives employees an attractive alternative to driving to work alone and an incentive to choose transit or vanpools. Commuter Choice refers to the Internal Revenue Code [(26 USC 132(f)], which permits employers to offer employees a tax-free benefit to commute to work by bus or vanpool. Employers select which one of the program options to implement. RideFinders offers three options: employer-paid benefit, employee pre-paid tax benefit and share the fare benefit.

- **Employer Support – Telework** – RideFinders serves as a resource center for program development at employer sites, providing technical assistance and financial incentives to employers who are considering the establishment of a telework program or for those employers who already have informal telework programs. Teleworking means working away from a central workplace, either at home or another alternate work location, all or part of the week.

- **Ridematching** – Ridematching is a free RideFinders service that helps commuters who want to carpool or vanpool find potential pool partners. Using a database of commuters that includes information on their home and work locations and the time they want to travel, this computerized system matches commuters whose travel locations and times might be compatible for sharing a ride. Commuters who register provide information about their travel and receive the names and contact information for commuters they can call to try to arrange a carpool or join a vanpool. Matched commuters arrange their own meeting points, times and frequency of riding to suit their individual needs.

- **Commuter Store** – The RideFinders Commuter Store is a retail outlet located in downtown Richmond. At the Store, walk-in users can purchase GRTC Go Cards and Care tickets, get transit schedules, maps and guides, buy postage stamps, register for services or get advice about travel around the Richmond region. The Store is open Monday-Friday, 8 a.m. to 4:30 p.m.

- **Emergency Ride Home** – One of the most commonly cited concerns from commuters for not ridesharing, even though they would like to, is not having a way home from work in the event of illness, accident or emergency. Some commuters forego the benefits of a green commute "just in case" they need their car. Emergency Ride Home (ERH) is a safety net that eases commuters' concerns about being stranded without a personal vehicle. The ERH Program provides eligible, enrolled commuters who carpool, vanpool, bike or ride the bus to work at least three days a week with a ride home or to their vehicle if an emergency occurs while at work. There is no cost to register for the program. RideFinders offers four free ERH rides per year.

- **RideFinders.com Website** – The RideFinders website, RideFinders.com, provides online access to information about all RideFinders offerings including carpooling, vanpooling, transit, ridematching, biking, telework, Emergency Ride Home and employer resources. Visitors can register for any of these services. The site also provides an air quality ozone alert.

> *"RideFinders seems to have found an extremely reliable cab service. It's a huge fail-safe in the event of emergency and a terrific incentive. Four vouchers is an extremely generous offer."*
>
> 2011 RideFinders Emergency Ride Home Survey

Service Overlap

Table 1 lists all the individual services that ultimately were included in the FY 2012 impact calculation, along with a designation for the evaluation "tier" for each service: primary, secondary or support. This designation of evaluation tiers was established as there can be substantial overlap among the programs. RideFinders' TDM services are designed to work together as an attractive package of services. For example, a commuter might receive a ridematch, register for Emergency Ride Home, and see RideFinders' program marketing, but the commuter should be counted only once in the impact calculation. The service user surveys that were used to collect program evaluation data included questions to help determine which services were used alone and which were used in combinations with other services. Additionally, the consultants solicited input from RideFinders to identify if various TDM services stood alone or if they overlapped with other services.

Table 1 – RideFinders' Services in FY 2012 Impact Calculation

Service	Evaluation Tier Primary, Secondary, Support
- Vanpool	Primary (vanpool)
- NuRide financial incentive program	Primary (carpool)
- Employer support – Commuter Choice	Primary (transit)
- Employer support – Telework	Primary (telework)
- Ridematching	Secondary (carpool, vanpool)
- Commuter Store	Secondary (transit)
- Emergency Ride Home	Secondary
- RideFinders.com website	Secondary
- General advertising/marketing	Support

Using input from these sources, the consultants classified each RideFinders service into one of three categories: primary, secondary or support.

- Primary services were defined as those that were likely to be used alone, or if they were used in combination with other services, were likely to have the most direct motivational impact of the services used.
- Secondary services were expected to be used in combination with other services but with less direct influence. The designation of primary versus secondary also took into account how readily data could be collected on the use and impacts of the services.
- Support services included services such as marketing, which primarily inform commuters of travel options or other program services; in essence, they offer a "referred" influence. They can directly motivate mode change with no intermediate contact, but these impacts are difficult to measure. Unlike services that require a registration, most information and outreach services do not record names of individual users who can be contacted in a follow-up survey.

Support service impacts are best measured through a regional survey that assesses commuters' awareness of informational messages and defines mode changes that were motivated by the messages. Due to the lack of available data for this purpose, the FY 2012 evaluation does not attempt to quantify independent impacts from marketing activities. Referred impacts are included, however, through use of the referred services that they promote.

When Asked What Else RideFinders Could Do to Help Promote Alternative Commute Methods to an Organization's Employees, Responses Included:

"Learn to promote alternative transportation in little bits and help people realize it does not have to be an all or nothing proposition to start using alternative trans. RideFinders could do programs about how to bite off little bits of getting greener and recognizing that our everyday driving, not just commuting, could be done greener."

SECTION 3 FY 2012 PROGRAM IMPACTS

Summary of Impacts

Table 2a presents the collective daily impacts produced by RideFinders' services during FY 2012. The table shows two sets of results, one listed as "Directly Influenced Changes" and a second noted as "All Changes." In a TDM evaluation, it can be difficult to determine if an observed mode change is the result of the TDM service or the result of other factors unrelated to the TDM service. For this reason, the evaluation of RideFinders' services calculated two impact levels.

> *"I love taking the bus but it is so reassuring to know that if you really need to get home ASAP for something unexpected, it is possible [with ERH]. It makes taking the bus that much better! It was soooo helpful the day I had to use it."*
>
> 2011 RideFinders Emergency Ride Home Survey

The "All Changes" column in table 2a reports impacts assuming that all travel changes that occurred following use of RideFinders' TDM services were motivated or assisted by the services. This likely overstates the true impact somewhat. The second, more conservative estimate, "Directly Influenced Changes," includes only changes that commuters reported were directly influenced by the TDM service. This estimate almost certainly undercounts the impacts by excluding mode changes that the commuter reported were motivated by other factors but that were facilitated by the TDM service. For these changes, the service might have played a supporting role.

Both the high and conservative levels of impacts are reported, but the "true" impact of the services likely falls somewhere between these two extremes. As shown, RideFinders helped at least 4,918 travelers make a travel change and might have assisted as many as 6,543. The number of daily trips reduced through RideFinders' services is between 5,051 and 6,964 and the VMT impact is between 123,411 and 163,158 daily VMT reduced. The high and conservative estimates for emission and energy impacts also are shown. Details of the impact calculations are presented in Appendix 2. Table 2b presents the results for the same impact indicators over an annual period.

But even the "directly influenced" impacts likely represent a conservative estimate, in that they credit only changes for commuting trips. Several RideFinders programs, such as the RideFinders.com website and NuRide, also assist users to make travel changes for non-work trips, and the service user surveys found that non-work changes did occur. It was not feasible through these surveys to estimate a specific level of trip or VMT reduction for non-work trips, but these changes would increase the overall trip and VMT reductions. Additionally, the assessment likely undercounts the impacts of RideFinders' marketing efforts because the calculation does not include changes commuters make without using any of the eight RideFinders services specifically included in the calculation.

Table 2a – FY 2012 RideFinders' TDM Program Daily Impacts

Impact Indicator – Daily Impacts	Directly Influenced Changes	All Changes
Placements (new alternative mode users)	4,918	6,543
Daily Vehicle Trips reduced		
- Total RideFinders region	5,051	6,964
- Within Richmond PDC region	4,653	6,453
Daily Vehicle Miles Traveled reduced		
- Total RideFinders region	123,411	163,158
- Within Richmond PDC region	69,832	94,365
Emissions reduced (daily pounds)		
– Nitrogen Oxides (NO_x)	229	303
– Volatile Organic Compounds (VOC)	240	317
– Carbon Dioxide (greenhouse gases)	123,100	162,750
Energy savings – daily gallons of gasoline saved	5,185	6,855

Table 2b – FY 2012 RideFinders' TDM Program Annual Impacts

Impact Indicator – Annual Impacts	Directly Influenced Changes	All Changes
Annual Vehicle Trips reduced		
- Total RideFinders region	1,262,650	1,740,950
- Within Richmond PDC region	1,163,150	1,613,150
Annual Vehicle Miles Traveled reduced		
- Total RideFinders region	30,852,750	40,789,550
- Within Richmond PDC region	17,458,100	23,591,200
Emissions reduced (annual pounds)		
– Nitrogen Oxides (NO_x)	57,200	75,600
– Volatile Organic Compounds (VOC)	60,000	79,300
– Carbon Dioxide (greenhouse gases)	31,778,500	40,691,3000
Energy savings – annual gallons of gasoline saved	1,296,334	1,713,843

Impacts Occurring with the Richmond PDC Region

Note that Tables 2a and 2b also show impacts at two geographic levels: "total RideFinders region" and "within Richmond Planning District Commission region (PDC)." RideFinders total service area includes 12 counties and independent cities, while the Richmond PDC region is slightly smaller; three of the jurisdictions in RideFinders' service area (City of Hopewell, City of Petersburg, and City of Colonial Heights) are outside the PDC.

Analysis of home and work locations of RideFinders' service users indicated that some users lived or worked outside the PDC, thus, while they would either start or end their commute trip in the PDC, a portion of their travel would occur outside the PDC. For this reason a second impact calculation was performed to count only the impacts that occur within the PDC region.

This calculation primarily affected the VMT calculation. All vehicle trips that either started or ended in the PDC were counted as being in the PDC even if the other trip end was outside the PDC. And the total emission reduction produced by RideFinders' services was counted as within the PDC, because emissions are airborne, thus, their movement is not restricted by geographic boundaries.

But VMT, which are highly related to the level of congestion on PDC region roads, were divided to count only the miles that actually were traveled in the PDC in the "within PDC region" impacts. Because some of the services, such as vanpooling, attract commuters who travel very long-distances, a sizeable share of VMT reduced occur outside the PDC.

As shown by Table 3, below, 92% of the total vehicle trip reduction occurs within the PDC region and 57% of the VMT reduced occurs within the PDC. But the "within PDC region" discounts vary by service. The PDC share of vehicle trip reduction ranges from 82% (RideFinders.com website) to 99% (Commuter Store), with five of the services having at least 95% of the reduction occurring within the PDC. The PDC share of the VMT reduction ranged from 35% (vanpool) to 95% (Commuter Store). For this measure, five services had "within PDC region" shares of at least 50%.

Table 3 – Percent of RideFinders' Impacts Within PDC Region – Overall and by Service

Service	Vehicle Trips Reduced	VMT Reduced
- Overall – all eight services	92%	57%
- Vanpool	85%	35%
- NuRide financial incentive program	95%	60%
- Employer support – Commuter Choice	95%	70%
- Employer support – Telework	85%	68%
- Ridematching	96%	45%
- Commuter Store	99%	95%
- Emergency Ride Home	97%	54%
- RideFinders.com website	82%	47%

> *"I am the coordinator of a vanpool and some riders will not join without this much needed service [ERH]. It really helps that the service is free to the riders in the vanpool."*
>
> 2011 RideFinders Emergency Ride Home Survey

Summary of Impact Calculation

The evaluation system was built on two essential elements: the calculation methodology defined in Section 1 and data on participation, utilization, influence, and impact data collected from multiple sources. Three types of data serve as the basic factors for the TDM impact measurement: 1) Level of participation in TDM programs, 2) Incidence of new use of alternative modes as a result of the program, and 3) Average trip and vehicle miles traveled reduction from individual mode shifts.

Service Participation – Table 4 presents the participation figures used for the calculation, reflecting services users during FY 2012.

Table 4 – Program Participation in Individual Services in FY 2012

Service	Participation/Users
- Vanpool program	1,216 vanpoolers
- NuRide financial incentive	1,341 registrants
- Employer – Commuter Choice	51 employers, 34,588 employees
- Employer – Telework	43 employers, 1,530 employees
- Ridematch Database	933 applicants
- Commuter Store	6,407 annual customers, 356 unique commuters
- Emergency Ride Home	1,327 registrants
- RideFinders.com website	88,839 annual visitors, est. 32,665 unique commuters

In defining the participation/population base, the impact calculation also considered that some participation counts reflect multiple uses of a service by a single user. For example, a commuter might use the RideFinders.com website several times in a month to check schedules for various trips. It is fairly easy to track the number of "unique users" if they are known by name or other identifier. But for RideFinders.com and the Commuter Store, the method adjusts the base participation counts to convert them into a measure of "unique users" during the evaluation period. The adjustment factors were derived from questions on user surveys that estimate the number of uses during the evaluation period and divide the participation count by the average number of uses.

"It is nice to get rewarded for using public transportation and I appreciate seeing how my use of carpooling is saving energy and reducing pollution."

2012 RideFinders NuRide Survey

Impact Multiplier Factors (Placement Rate, VTR Factor, Travel Distance – The impact calculation method applied a series of service-specific multiplier factors to the participation counts to estimate impacts. Table 5 presents the base placement rates and the "direct influence" factor, representing the percentage of service users who said their travel change was directly influenced or assisted by the service. For example, 24% of ridematch applicants shifted to a new alternative mode after receiving the service and 50% of those applicants said the ridematch service influenced or assisted them to make the change.

Table 5 – Impact Multiplier Factors – Placement Rates

Service	Placement Rate		Direct Influence Factor
	Continued	Temporary	
- Vanpool program	100%	0%	90%
- NuRide financial incentive	33%	1%	57%
- Employer – Commuter Choice	15%	0%	75%
- Employer – Telework	31%	0%	100%
- Ridematch Database	24%	0%	50%
- Commuter Store	28%	1%	38%
- Emergency Ride Home	57%	0%	33%
- RideFinders.com website	22%	0%	73%

"You are car-free in everyday traffic when you come or go from work. And you know if there's an emergency at work, you can depend on RideFinders to get you a taxi home. NuRide provides all kinds of fun coupons."

2012 RideFinders NuRide Survey

Table 6 shows the vehicle trip reduction (VTR) factors and the one-way travel distances of commuters who made mode changes after using each service. For example, the continued placement rate for the Ridematch database is 24% and the continued VTR factor is 0.76 trips per day. Generally, the methodology used multiplier factors derived from data collected for RideFinders.

Table 6 – Impact Multiplier Factors – VTR, Travel Distance, Overlap Discount

Service	VTR Factor		One-Way Travel Distance		Overlap Discount – Credit to Service
	Continued	Temporary	Continued	Temporary	
- Vanpool program	0.84	---	69.0	---	100%
- NuRide financial incentive	0.92	0.92	19.3	19.3	90%
- Employer – Commuter Choice	1.20	---	16.0	---	70%
- Employer – Telework	0.26	---	16.0	---	100%
- Ridematch Database	0.76	---	40.2	---	55%
- Commuter Store	1.37	1.37	13.4	13.4	80%
- Emergency Ride Home	1.45	---	26.9	---	48%
- RideFinders.com website	1.40	---	26.00	---	19%

Table 6 also shows the "overlap discount" credit for each service. This adjustment corrects for use of multiple services, to count each user in only one service. So, for example, 100% of the vanpool program impacts are assigned to this service, but only 19% of the impacts of the RideFinders.com website are credited to this program, because the program overlaps with many other programs.

The calculation approach first calculated impacts for each individual service as if it was a stand-alone service. To correct for the overlap and avoid double or triple counting participating commuters, the consultants derived discount factors to reflect the estimated share of the service impact that was independent of other services. These discount factors were multiplied by the trip and VMT impacts calculated for each service individually to reduce individual service impacts. The final step in the calculation was to add all the discounted impacts for each program together, to produce the total aggregate impacts for all services combined. These impacts were presented in Table 2 above.

"I get to support the environment by reducing carbon emissions and get rewarded for the same. It's like getting recognized for your good work."

2012 RideFinders NuRide Survey

Conclusions

In FY 2012, RideFinders' programs helped more than 5,000 commuters shift from driving alone to transit, carpool, walking and other modes, eliminating more than 123,000 vehicle miles of travel (VMT) each day. About 4,650 of these trips and nearly 70,000 of the VMT were removed from roads within the Richmond Planning District Commission (PDC) region.

Clearly, RideFinders provides an important customer service by making it easier for commuters to find alternatives to driving alone. But RideFinders' services also have an impact on traffic congestion in the Richmond region. For example, consider that each morning, about 5,800 vehicles travel in each direction along I-95 through downtown Richmond during the peak morning commuting hour.

Imagine adding even 1,000 vehicles to that road during the morning rush hour, and it's clear that the road would be at a virtual standstill. But RideFinders has focused much of its attention on travel to downtown Richmond and other dense employment areas of the region. So it's likely that a substantial portion of the vehicle trips it removes from the area's highways each day would otherwise be traveling on the region's busiest highways.

Greater use of sustainable modes also benefits the environment through reduced vehicle pollutant emissions. During FY 2012, RideFinders' programs eliminated 154,900 pounds of oxides of nitrogen (NOx) and volatile organic compounds (VOC), two of the pollutants that are instrumental in forming smog. And RideFinders' programs reduced more than 30 million annual pounds of carbon dioxide, the primary greenhouse gas, contributing to the region's efforts to address global warming.

Growth in Richmond's population and employment will place new demands on the region's transportation system in the future, with continued consequences for traffic congestion and the environment. This will make the services that RideFinders provides all the more essential to maintain a travel environment that supports quality of life and a vibrant business climate.

> *"I like that it [NuRide] gives financial incentive for people to take an active role in protecting our environment."*
>
> 2012 RideFinders NuRide Survey

APPENDICES

1 Basic Calculation of VTR Factor

2012 Impact Calculation Worksheets

2-a Calculation Factors (With Influence Discount)

2-b Vehicle Trip and VMT Impacts – Calculation by Program/Service

2-c Program/Service Overlap Factors

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Appendix 1 – Basic Calculation of VTR Factor

The vehicle trip reduction (VTR) factor represents the average number of vehicle trips that a commuter "placed" in an alternative mode would reduce per day. The VTR factor combines the trip reduction results of three possible types of travel changes that new commuter placements might make:

1. Drive alone commuters who shift to an alternative mode
2. Commuters who currently use an alternative mode and shift to another alternative mode (e.g., from carpool to transit)
3. Commuters who currently use an alternative mode and increase their weekly frequency of alternative mode use (e.g., from carpool one time per week to carpool three times per week) or increase the number of riders in a carpool or vanpool

Shown below is a brief example of how the VTR factor would be calculated for seven commuters who made the following travel changes:

- Placement 1 – shifts from driving alone, five days per week, to a two-person carpool, five days per week
- Placement 2 – shifts from driving alone, five days per week, to transit, five days per week
- Placement 3 – shifts from driving alone, five days per week, to teleworking, two days per week and driving alone three days per week
- Placement 4 – shifts from driving alone, five days per week, to two-person carpool, two days per week and driving alone three days per week
- Placement 5 – shifts from a two-person carpool, five days per week, to transit, five days per week
- Placement 6 – shifts from transit, five days per week, to a two-person carpool, five days per week
- Placement 7 – increases the frequency of carpool from one day per week to three days per week, driving alone the other two days

The VTR factor is calculated by determining the number of vehicle trips all placements would reduce together and dividing that total by the number of placements. We assume that a commuter makes two trips a day, one from home to work and a second from work to home. Thus, a commuter who drives alone would make two vehicle trips each day. If the commuter carpools, he would make ½-vehicle trip to work and ½-trip back home, for a total of one vehicle trip per day. A commuter who uses transit, bikes or walks is assumed to make zero vehicle trips. A commuter who teleworks also makes zero vehicle trips on telework days.

Shown on the next page are the travel modes and the numbers of vehicle trips each of the seven commuters described above would make for each day of the week before the shift to an alternative mode and after the shift. The third column shows the net vehicle trips (number of trips after the shift minus number of trips before the shift). The final column shows the total weekly trips reduced. Note that commuter placement #6 actually increases his weekly commute trips, because he shifts from a higher occupancy alternative mode (transit) to a lower occupancy mode (carpool).

Sample VTR Calculation

Travel Modes Before and After Shifts to Alternative Modes by Commuter and by Day of the Week

	Vehicle Trips Before Shift					Vehicle Trips After Shift					Vehicle Trips Net Trips					Weekly
	M	T	W	T	F	M	T	W	T	F	M	T	W	T	F	Change
Placement 1	D	D	D	D	D	C	C	C	C	C						
DA to 2p CP	2	2	2	2	2	1	1	1	1	1	-1	-1	-1	-1	-1	-5 trips
Placement 2	D	D	D	D	D	T	T	T	T	T						
DA to TR	2	2	2	2	2	0	0	0	0	0	-2	-2	-2	-2	-2	-10 trips
Placement 3	D	D	D	D	D	D	D	C	C	C						
DA to TC/DA (part-time)	2	2	2	2	2	2	2	2	0	0	0	0	0	-2	-2	-4 trips
Placement 4	D	D	D	D	D	D	D	C	C	C						
DA to CP/DA	2	2	2	2	2	2	2	2	1	1	0	0	0	-1	-1	-2 trips
Placement 5	C	C	C	C	C	T	T	T	T	T						
2p CP to TR	1	1	1	1	1	0	0	0	0	0	-1	-1	-1	-1	-1	-5 trips
Placement 6	T	T	T	T	T	C	C	C	C	C						
TR to 2p CP	0	0	0	0	0	1	1	1	1	1	+1	+1	+1	+1	+1	+5 trips
Placement 7	D	D	D	D	C	D	D	C	C	C						
DA/CP to CP	2	2	2	2	1	2	2	1	1	1	0	0	-1	-1	0	-2 trips
Total weekly trips	11	11	11	11	10	8	8	7	4	4	-3	-3	-4	-7	-6	-23 trips

Total placements	= 7 placements (travel for each shown above)
Total trips reduced per week	= 23 trips per week (all placements together)
Total trips per day (all placements together)	= 23 trips per week/5 days per week
	=4.6 trips per day
Average trips reduced per placement	**= 4.6 trips per day/7 placements**
	= 0.66 trips per placement

The seven commuter placements would reduce a total of 4.6 trips during a single day, thus the average number of trips reduced per day by each of the seven placements would be 0.66. This is the VTR factor.

Appendix 2-a – Calculation Factors (With Influence Discount)

2012 Impact Calculation

	Vanpool	NuRide	Employer-Commuter Choice	Employer-Telework	Ridematch	Commuter Store	ERH	Website
Participation base								
- Total number of uses	1,216	1,341	34,588	1,530	933	5,510	1,327	32,665
Repeat use discount								
- Average annual use*	1.0	1.0	1.0	1.0	1.0	18.0	1.0	3.9
- Repeat adjustment	100%	100%	100%	100%	100%	6%	100%	26%
Customer base								
- Number of unique users	1,216	1,341	34,588	1,530	933	306	1,327	8,376
Placement rate								
- % users with cont. mode chg.	100%	33%	15%	31%	24%	28%	57%	22%
- % users with temp. mode chg.	0%	1%	0%	0%	0%	1%	0%	0%
- % changers influenced	90%	57%	75%	100%	50%	38%	33%	73%
Adjusted placement rate								
- Continued rate	90%	19%	11%	31%	12%	11%	19%	16%
- Temporary rate	0%	1%	0%	0%	0%	0%	0%	0%
VTR factor								
- Continued VTR	0.84	0.92	1.20	0.26	0.76	1.37	1.45	1.40
- Temporary VTR	0.00	0.92	0.00	0.00	0.0	1.37	0.00	0.00
- Temporary duration (wks.)	0.0	28.0	0.0	0.0	0.0	10.0	0.0	0.0
- Temporary duration %	0%	54%	0%	0%	0%	19%	0%	0%
One Way distance								
- Cont. distance	69.0	19.3	16.0	16.0	40.2	13.4	26.9	26.0
- Temp. distance	0.0	19.3	0.0	0.0	0.0	13.4	0.0	0.0
Drive Alone access								
- % who DA to alt. mode	91%	40%	40%	0%	59%	40%	42%	40%
- DA distance to alt. mode	11.0	2.5	2.5	0.0	6.1	2.5	2.5	2.5

* - Ave. annual use for website includes correction for page views and multiple visits to site.

Appendix 2-b – Vehicle Trip and VMT Impacts – Calculation by Program/Service

2012 Impact Calculation

	Vanpool	NuRide	Employer-Commuter Choice	Employer-Telework	Ridematch	Commuter Store	ERH	Website
Placements								
- Continued Placements	1,094	252	3,787	474	112	33	250	1,345
- Temporary Placements	0	8	0	0	0	1	0	0
Vehicle Trips Reduced								
- Continued Vehicle Trips	919	232	4,545	123	85	45	362	1,883
- Temporary Vehicle Trips	0	4	0	0	0	0	0	0
- Total Vehicle Trips Reduced	919	236	4,545	123	85	45	362	1,883
VMT Reduced								
- Continued VMT	63,431	4,479	72,718	1,973	3,421	598	9,736	48,962
- Temporary VMT	0	0	0	0	0	4	0	0
- Total VMT Reduced	63,431	4,479	72,718	1,973	3,421	602	9,736	48,962
Drive Alone Access Adjustment								
- DA access trips	837	94	1,818	0	50	18	145	753
- DA access VMT	9,202	236	4,545	0	306	45	362	1,883
- Net vehicle trips reduced	83	142	2,727	123	35	27	217	1,130
- Net VMT reduced	54,229	4,243	68,173	1,873	3,114	557	9,374	47,079
Double Count Correction								
- % credited to other program	0%	10%	30%	0%	45%	20%	52%	81%
- Net credit to program	100%	90%	70%	100%	55%	80%	48%	19%
Program Sum (adj. double count)								
- Total placements	1,094	234	2,651	474	62	27	120	256
- Total Vehicle Trips Reduced	919	212	3,181	123	47	36	174	358
- Net VMT Trips Reduced	54,229	3,884	47,721	1,973	1,713	446	4,500	8,945

Appendix 2-c – Program/Service Overlap Factors

2012 Impact Calculation

Impacts discounted

Base Program	NET	Vanpool	NuRide	Employer-Commuter Choice	Employer-Telework		Ridematch	Commuter Store	ERH	Website
Vanpool	**100%**									
NuRide	**90%**	10%								
Employer – Commuter Choice	**70%**	15%	15%							
Employer – Telework	**100%**									
Ridematch	**55%**	20%	10%	15%						
Commuter Store	**80%**		10%	10%						
Emergency Ride Home	**48%**	22%	10%	20%						
RideFinders.com Website	**19%**		13%				20%		48%	

Appendix 2-d – Notes on Data Sources

2012 Impact Calculation

Participation Counts

- Vanpool ridership = all vans, new and existing = 1,216
- NuRide – 1,341 participants
- Employer program – Commuter Choice = 34,588 employees at 51 worksites
- Employer program – Telework = 1,530 employees at 43 worksites
- Ridematch – 933 applicants active from July 2011 to June 2012
- Commuter Store – 6,407 annual customers, 86% employed (5,510), 18 users per year, 306 unique commuters
- ERH – 1,327 active participants
- Website – 88,839 total visitors; assume factor of 2.2 to convert to unique visitors (goDCgo web use statistics)

Placement Rates

- Vanpool ridership – assumed to be 100% – all riders are alt. mode users
- NuRide – NuRide survey
- Employer program – Commuter Choice – EPA Commuter model, using data from Commuter Choice survey
- Employer program – Telework – Telework surveys (baseline, 1st and 2nd follow-up years)
- Ridematch – Ridematch survey
- Commuter Store – Commuter Store survey
- ERH – ERH survey
- Website – Website survey

Influence Discount

- Vanpool ridership – assumed to be 90%
- NuRide – NuRide survey
- Employer program – Commuter Choice – estimated
- Employer program – Telework – assumed
- Ridematch – Estimated
- Commuter Store – Commuter Store survey
- ERH – ERH survey
- Website – Website survey

Appendix 2-d (cont.)
2012 Impact Calculation – Notes on Data Sources (cont.)

VTR Factor
- Vanpool ridership – Vanpool survey
- NuRide – NuRide survey
- Employer program – Commuter Choice – Assumes primary shifts to transit, four days per week
- Employer program – Telework – Telework survey
- Ridematch – Ridematch survey
- Commuter Store – Commuter Store survey
- ERH – ERH survey
- Website – Website survey

Travel Distance
- Vanpool ridership – Vanpool survey
- NuRide – NuRide survey
- Employer program – Commuter Choice – 2007 VASOC
- Employer program – Telework – Telework survey
- Ridematch – Ridematch survey
- Commuter Store – Commuter Store survey
- ERH – ERH survey
- Website – Website survey

DA Access
- Vanpool ridership – Vanpool survey
- NuRide – 2007 VASOC
- Employer program – Commuter Choice – 2007 VASOC
- Employer program – Telework – Not applicable
- Ridematch – 2006 RF placement survey
- Commuter Store – Commuter Store survey – 2007 VASOC
- ERH – 2007 VASOC
- Website – 2007 VASOC