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F I N A L   R E P O R T

# TransLink Monitoring Program



*prepared for the*

Service Technical Unit  
Office of Technical Assistance and Safety  
**FEDERAL TRANSIT ADMINISTRATION**  
Washington D.C.

*by*  
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TRANSPORTATION MANAGEMENT CONSULTANTS

Philadelphia, PA

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## TABLE OF CONTENTS

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### I. INTRODUCTION

- TransLink Program Overview
- Monitoring Program Overview
- Monitoring Report Organization

### II. TRANSLINK DESCRIPTION

- TransLink Tickets
- TransLink Equipment
  - TransLink Use
- Ticket Distribution and Processing

### III. TRANSLINK USER SURVEY

- Survey Approach
- Length of Time Using TransLink
  - Ticket Purchasing
- Use of Other Prepaid Media
  - Transit Services Used
  - Trip Purposes

- Ticket Use Experience
- Reasons for Using TransLink

#### IV. SALES AND RIDERSHIP

- TransLink Sales Trends
- Trends in Sales of Other Tickets
- Total Revenue, Discounts and Refunds
  - TransLink Ridership
  - TransLink Transfers

#### V. EQUIPMENT RELIABILITY

#### VI. OTHER IMPACTS

- Dwell Times
- Driver/Station Agent Acceptance
- Agency Involvement and Staff Commitment
  - Inter-Operator Agreement

#### VI. CONCLUSIONS AND PROGRAM FUTURE

- Conclusions
- TransLink Program Future

#### APPENDIX: Agreement between BART and CCCTA

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### **LIST OF EXHIBITS**

I-1 Service Area Map

II-1 TransLink Ticket

II-2 Bus Ticket Validator

II-3 Operator Control Unit Panel

II-4 Current Alternatives for TransLink Users

III-1 TransLink User Survey Card

III-2 Crosstabulation - Question 2 by Question 3

III-3 Crosstabulation - Question 6 by Question 8

III-4 Crosstabulation - Question 11 by Question 6

III-5 Crosstabulation - Question 14 by Question 6

IV-1 Trends in TransLink Sales Revenue

IV-2 Revenue by Ticket Type

IV-3 Revenue Trends by Ticket Type - Total Sales BART

IV-4 Revenue Trends by Ticket Type - Transportation Center

IV-5 Revenue Trends by Ticket Type - Concord BART Kiosk

IV-6 Revenue Trends by Ticket Type - Total Sales CCCTA

IV-7 Revenue Trends by Ticket Type - Total Sales All

IV-8 Cumulative Gross Revenue

IV-9 TransLink Refunds by Reason

- IV-10 TransLink Attributable Refunds per 450 Linked Trips
- IV-11 Trend in BART Rail Ridership
- IV-12 Trend in BART Express Ridership
- IV-13 Trend in CCCTA Ridership
- IV-14 Trend in BART Rail/BART Express Transfers
- IV-15 Trend in BART Rail/CCCTA Transfers
- IV-16 Trend in CCCTA to BART Express Transfers
  
- V-1 CCCTA BTV Failures
- V-2 CCCTA BTV Failures per 1,000 Boardings
  
- VI-1 TransLink Program Participants

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More information on the TransLink program is available from:

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## I. INTRODUCTION

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### TransLink Program Overview

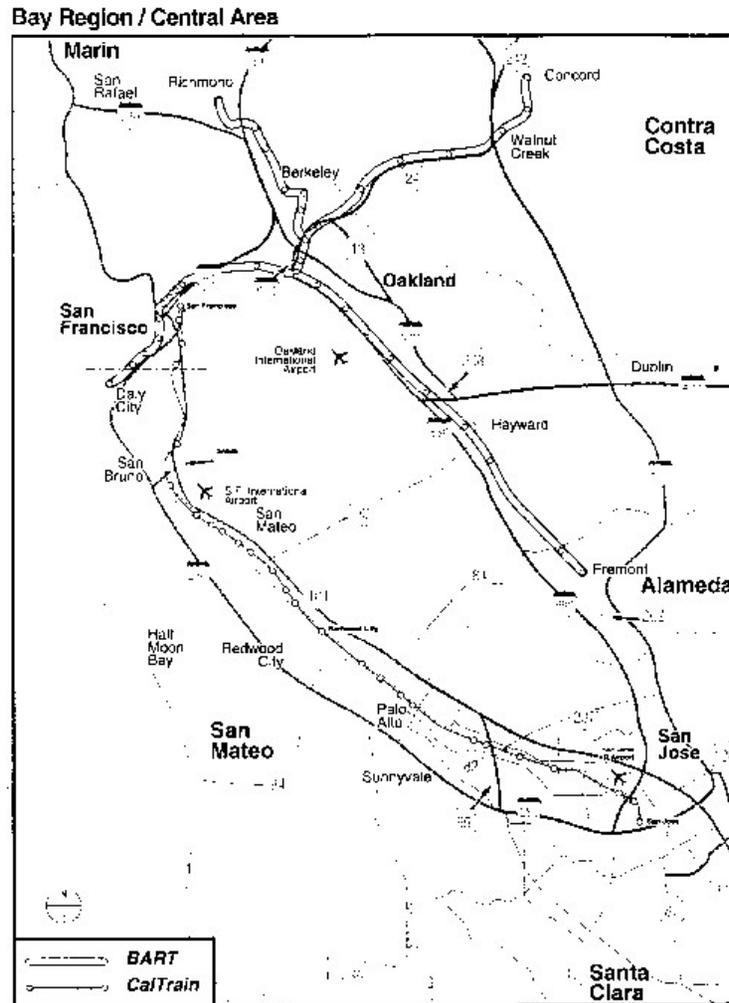
TransLink tickets were first introduced to transit riders in the San Francisco Bay Area in May 1993. TransLink is the first on-board, computer automated joint transit fare collection program using magnetic strip technology in the United States. It allows transit passengers to use just one ticket to pay an exact amount for the fare on both bus and rail. Presently, the TransLink ticket can be used for travel on BART trains, County Connection buses, and BART Express buses. These three transit services are described below:

- The Bay Area Rapid Transit District (BART) operates a 71.5 mile automated rapid transit system. Its "X"-shaped network consists of four different lines serving 34 stations in Alameda, Contra Costa, San Francisco, and San Mateo Counties. BART fares are distance-based and range from 80¢ to \$3.00 one-way for travel between stations. BART has a fleet of 590 railcars.
- The Central Contra Costa Transit Authority (CCCTA) operates a fleet of 112 buses on 23 local and five express fixed-routes under the name "The County Connection". BART feeder service is a major component of County Connection routes. All but one local route and one express route connect with BART at five different stations. The County Connection charges a flat \$1.00 fare for local service and \$1.25 for express routes.
- BART Express Bus Service consists of 12 routes that connect outlying areas to five different BART stations. Most routes operate seven days a week; two are peak commute services only and one is a weekday only service. BART contracts for this service with a private operator. A fleet of 45 buses is used for the service. There are two fare zones, with fares of 75¢ and \$1.15 respectively.

A map of the service area follows as Exhibit I-1.

Exhibit I-1 Service Area Map

**Exhibit I-1  
Service Area Map**



These three transit systems are the participants in the demonstration phase of the TransLink program. Other public transit operators in the region will be joining the TransLink program in the future. A detailed phase-in schedule has been developed. The next to come on line will be AC Transit, the major bus operator in the East Bay.

The TransLink program has been developed under the sponsorship of the Metropolitan Transportation Commission (MTC), the regional transportation planning agency for the nine-county San Francisco Bay Area. There are 23 public transit operators in the MTC region. MTC first proposed the idea of a universal ticket in 1978 as a way to improve transit access. In the intervening years, MTC has worked with the transit operators to develop interim multi-modal passes and

tickets valid on two or more transit systems. The May 10, 1993 inauguration of the TransLink ticket program was a major step toward a universal ticket for Bay Area transit.

### Monitoring Program Overview

Recognizing the importance of these innovations to the transit industry, and continuing its efforts to promote further fare integration, the Federal Transit Administration has sponsored the monitoring of the TransLink demonstration. Monitoring assistance has been provided to MTC and the transit operators through the FTA's Office of Technical Assistance and Safety, Office of Mobility Enhancement, Service Assistance Division.

The monitoring period is the 12 months from October 1, 1993 through September 30, 1994. This eliminated the early start-up months from the review period. Performance was monitored in three basic areas: ticket sales, usage characteristics, and equipment reliability. The monitoring efforts consisted of both primary and secondary data collection. A survey of TransLink ticket users was conducted in the Spring of 1994. The trends in ticket sales and equipment reliability over the demonstration period were recorded and analyzed. These results will assist the local participants and other interested observers in understanding the TransLink program and pursuing transferrable components.

### Monitoring Report Organization

This report presents the results of the TransLink monitoring effort. The report is organized into the following sections:

- TransLink Description - a description of the TransLink ticket, the fare collection equipment used in the program, and the institutional relationships;
- TransLink User Survey - the findings from a survey of purchasers of TransLink tickets;
- Sales and Ridership - the volumes and trends in ticket sales and ticket usage during the 17-month monitoring period;
- Equipment Reliability - information on failure rates for the different equipment components;
- Other Impacts - comments about on-board dwell time, driver and station agent acceptance, agency involvement and level of staff commitment, and the interoperator agreement; and
- Conclusions and Program Future - a discussion of the "lessons learned" and future plans for the TransLink program in the San Francisco Bay Area.

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## II. TRANSLINK DESCRIPTION

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The stored value card is not new technology. It has been used for fare collection on the BART system since it first opened, over 20 years ago. However, this is the first time that the technology is being used on-board buses and in combination with BART. Further, unlike the combined ticketing flash passes implemented previously, TransLink allows the participating transit operators to monitor usage more carefully and divide fare revenues more equitably.

This section provides a description of the equipment used in the TransLink program, the procedures for using a TransLink ticket and accounting for that trip among the participants, and the institutional relationships among the participating agencies.

### TransLink Tickets

The TransLink system is built around a magnetic stored value card similar to the ticket BART already was using. A sample TransLink ticket is shown in Exhibit II-1. There are two columns on the Trans Link ticket, one for BART fares and one for bus fares. There is one total monetary value stored in the ticket, which is indicated by the last value printed on the ticket, whether it's in the bus column or the BART column.

During the monitoring period, TransLink tickets were sold in two denominations: \$30 and \$75. The ticket provided a 6.25 percent point-of-sale discount. That is, the \$30 TransLink ticket provided \$32 worth of bus and BART fares; the \$75 ticket provided \$80 worth of fares. In addition, there were built-in discounts for a bus/BART transfer. The discount was greater than the cash fares for boarding the bus or using the BART-to-bus paper transfer. Another feature of the TransLink ticket was the last ride bonus: one final ride can be made on BART or a bus with the ticket, regardless of the value remaining. The ticket can have as little as 5¢ remaining and it can be used for the longest ride in the BART system.

Exhibit II-1 TransLink Ticket



Effective February 1995, BART and CCCTA revised the pricing and discounts for TransLink tickets. The point of sale discount was eliminated. TransLink tickets now are sold in \$30 and \$60 denominations. There is no additional stored value beyond the face value. To better target the ticket to BART customers who use connecting County Connection or BART Express buses, there now is a greater point-of-use discount upon transferring between BART and a bus. Previously, there was a 25¢ discount per trip for transfers from bus to BART. This has been increased to 50¢. The 75¢ per trip discount for BART to bus transfers and the last ride bonus still are provided with a TransLink ticket. Finally, there is no time limit for using the stored value of the TransLink ticket.

A special "Tickets-to-Go" kiosk was built and installed at the Concord BART station to sell TransLink tickets. TransLink tickets are sold at other BART ticket sales outlets, including some stations, outside vendors, and employers. There are a total of 65 outlets that sell the TransLink ticket. The County Connection's Transportation Center in Walnut Creek is one of the outlets.

In addition to the TransLink ticket, BART sells several different ticket types through in-station and off-site outlets. The tickets sold at outlets include the Blue, high value ticket (\$32, sold for \$30); the Red and Green reduced fare tickets for children, persons with disabilities, and senior citizens; and the BARTPlus ticket in various combinations for stored value BART use and unlimited bus use. Several major supermarkets and drug stores serve as BART ticket outlets. A number of banks, check cashing services, and retail stores are outlets, as are the "commute stores" in several communities and certain employers. Not all outlets sell all types of tickets.

### TransLink Equipment

There are three types of equipment that a passenger using a TransLink ticket might encounter: BART fare gates, BART Express/CCCTA Bus Ticket Validators (BTVs) and Credit/Debit Vending (C/DV) machines. Each of these is described below.

**Bus Ticket Validators (BTV)** - A TransLink ticket used on board a County Connection or BART Express bus is inserted into a Bus Ticket Validator (BTV), which deducts the appropriate fare amount due, then records and prints the remaining balance on the ticket. During the monitoring period, each TransLink ticket could handle 21 lines of print space. When the 21st print line is used and there is still value remaining on the ticket, the BTV beeps and displays an alert to the bus operator. The BTV prints five asterisks on the 22nd print line. The operator then provides a replacement ticket that the passenger inserts into the BTV for encoding. The passenger must surrender the used ticket to the operator.

A representation of the BTV unit is shown in Exhibit II-2. County Connection and BART Express use BTVs that are separate from their existing farebox. There are several components to the BTV. Two important components are the Operator Control Unit (OCU) and the Data Storage Module (DSM). The OCU is the primary interface between the bus operator and the BTV. The DSM stores all of the information related to transactions. Each of these units is described below.

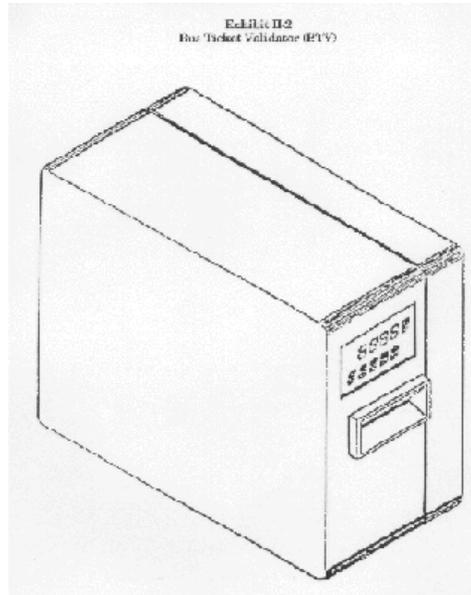
- **Operator Control Unit (OCU)** - The OCU consist of a panel of buttons and a display that the operator uses to program the BTV. A diagram of a typical OCU for CCCTA is shown in Exhibit II-3. When a TransLink ticket is inserted into the BTV the BTV presents the transaction's information to the operator on the OCU display. The operator also uses the OCU panel to record non-TransLink transactions.

Each day prior to pull-out, the operator logs into the BTV via the OCU panel. The operator enters his/her ID number, bus number, paddle number, route number and trip number. Since all of the routes operated in the system are programmed into the BTVs, an operator need only use the OCU panel to give the BTV the necessary information so that the proper fares are deducted. Furthermore, the OCU enables an operator to change the route assignment at any time through out the day. Therefore, every BTV is capable of being used anywhere within the transit system.

At the end of the last trip, the operator logs off the BTV by entering his/her ID number and paddle number. The BTV's memory then is ready to be uploaded to the Garage Microprocessor System (GMS).

- **Data Storage Module (DSM)** - The DSM stores all of the BTV's transactions. When a bus is brought in for servicing the DSM is removed from the BTV and replaced with a fresh one. The contents of the DSM are uploaded to the Garage Microprocessor System (GMS). The data then are loaded into the agency's main system for processing. If the DSM is nearing its maximum capacity, the operator is alerted through the OCU panel. This alert is displayed until the DSM has been removed and replaced.

Exhibit II-2 Bus Ticket Validator



**Fare Gates** - The ticket is used in the BART fare gate in the same manner as the BTVs. BART fare gates have been modified to recognize this ticket, deduct the appropriate distance-based fare, and imprint the remaining value on the TransLink ticket. During the monitoring period, the fare gates accepted TransLink tickets up to the 21st print line. When the 21st print line of a valued ticket was reached, the fare gate automatically issued a replacement ticket and captured the used ticket.

As of February 1, 1995, new software was installed on the fare gates that changed this to replacement after the 18th print line. This change was made to channel the majority of ticket replacement activities to the fare gates rather than on-board buses. This change is intended to lessen the ticket replacement problems that had been experienced on the bus BTVs.

When the TransLink program started, not all fare gates had been modified. Passengers were instructed to use a fare gate displaying the TransLink decal. At a minimum, at least one fare gate at each BART station was usable for TransLink tickets.

**Credit/Debit Vending (C/DV)** - The program also includes the installation of TransLink Credit/Debit Vending (C/DV) machines. These machines were not in place during the monitoring period. A total of 25 machines are being purchased for 15 stations throughout the system. The machines will accept a credit card, ATM cards, or currency and sell \$30, \$40, \$50 and \$60 TransLink tickets as well as BARTPlus tickets. As of January 1995, the start-up date for C/DVs had been delayed until May 1995.

### TransLink Use

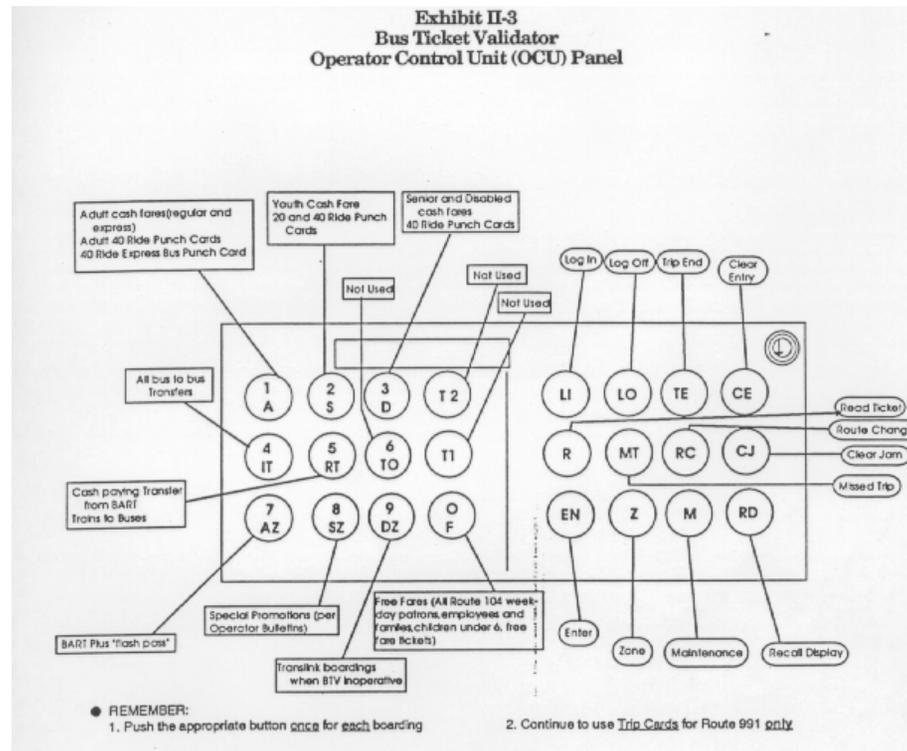
TransLink passengers have a variety of travel alternatives open to them. As the diagram presented in Exhibit II-4 illustrates, there are different ways to purchase a TransLink ticket. After purchasing a TransLink ticket, passengers have three basic travel alternatives. Within each alternative there are certain options that are available as well, depending on the riders trip origin. Once riders have entered a participating transit system, they can proceed to their destination in a variety of ways. The alternatives are described below.

- **BART Rail Trips** - A TransLink user originating on BART Rail enters the system through the TransLink fare gate. The user then proceeds to his destination and exits the BART system in a like manner. At this point the user may end the trip or continue by transferring to a BART Express or CCCTA bus.
- **BART Express Trips** - A passenger originating on BART Express inserts a TransLink ticket into the BTV, which deducts the appropriate fare and imprints the remaining value. These riders have three options available to them. The passenger may end the trip on BART Express simply by alighting the bus at their destination. Or, the passenger may continue the trip by transferring to County Connection bus. Lastly, the passenger may continue the trip by transferring to BART Rail.
- **CCCTA Trips** - TransLink users originating on County Connection buses board the bus using the BTV. These users have three options available to them. First, they can end the trip on the bus by alighting at their destination. Second, they can alight the County Connection bus and transfer to a BART Express bus. Third, they can transfer from County Connection to BART Rail by using the fare gates in the manner described previously.

The TransLink tickets, fare gates and BTVs provide the flexibility needed for passengers to make a variety of trips. Although the current alternatives are limited to the three transit systems, the incremental addition of more operators to the

program in the future will create more trip alternatives, including more possibilities for multi-operator trips. TransLink appears to be capable of addressing the wide variety of trip possibilities as more operators are brought on-line. The obvious benefit to the passenger is the simplicity TransLink bestows on trips that would otherwise be complicated in a non-integrated fare collection environment.

Exhibit II-4 Current Alternatives for TransLink Users



### Ticket Distribution and Processing

For this initial stage of the program, BART is serving as the clearinghouse, and is responsible for ordering, encoding, and distributing tickets for sale. In this capacity, BART also is responsible for collecting TransLink revenues and disbursing revenues to the other participating agencies. BART reports extracted fares from TransLink usage on BART Express buses and BART trains; CCCTA reports extracted fares from TransLink usage on County Connection buses to BART. BART has been responsible for the fare gate modifications and the purchase and installation of credit/debit vending machines. CCCTA has taken the lead on all matters pertaining to the acquisition and use of the Bus Ticket Validator equipment.

The current cycle of TransLink activities is described in more detail below. This includes activities associated with fare media distribution, ridership tracking, treasury/cash management, and security/data integrity.

**TransLink Fare Media Distribution** - TransLink is the only shared fare media in the region that is processed by electronic readers. BART manages all stock procurement, inventory control, encoding and distribution for the TransLink fare media on behalf of BART, BART Express, and CCCTA.

- **Procurement:** BART's Purchasing Department is responsible for ticket stock procurement for TransLink. Vendor selection is based on BART's established competitive procurement practices. The Purchasing Department receives the blank ticket stock from the vendor, verifies tickets received to tickets ordered, and enters the tickets into stock inventory.
- **Encoding:** When TransLink tickets are required, BART's Accounting Department requests the tickets from the Money Vault. An employee of the Money Vault signs for the number of tickets requested by Accounting and removes the tickets from the inventory. The tickets are taken to the encoding room by the same employee that signed for the tickets. The tickets then are encoded with the required dollar amount(s). Once the tickets are encoded the employee re-boxes the tickets and takes the encoded tickets from the Money Vault, drives to the BART administrative office and delivers the encoded tickets to the Accounting Department.
- **BART Distribution:** The Accounting Department verifies that the tickets received equals the tickets requested. Once this verification is completed the Accounting Department divides the encoded tickets into discreet stacks by vendor. The tickets are packaged and shipped to the vendors via overnight courier service.
- **CCCTA Distribution:** CCCTA orders TransLink tickets from BART. A third-party sales vendor or BART notifies CCCTA when to order a new supply of TransLink tickets.
- **TransLink Ticket Sales Funds Collection:** BART funds the CCCTA TransLink ticket sales on a monthly basis. CCCTA pays BART for all TransLink tickets sold at the end of each month.

BART's Accounting Department is responsible for specific tasks in relation to off-site vendors that sell TransLink tickets and other media. This includes preparing the monthly OTSR report (Off-site Ticket Sales Report), establishing

the level of ticket sales by off-site vendor, and collecting ticket sales funds from vendors.

- **TransLink Refund Processing:** If a TransLink ticket is mutilated or demagnetized and normal ticket processing is not possible, the patron can request a refund. The key to the refund process is the TransLink refund form, completed by the station agent. Information entered on the refund form includes, date, the serial number of the TransLink ticket, agent's I.D. number and the reason for the claim. The patron must surrender the damaged ticket so that it can be attached to the form.

The TransLink refund form serves as a "trip pass". The station agent can issue a trip pass for a period of up to five days. The agent lists the days and trips the passenger expects to make on the trip pass, up to the remaining value on the ticket. This time period is consistent with the time frame for processing refunds. The five days are measured from the time the refund request is received by BART to the date the response is mailed to the customer. The BART Accounting Department is responsible for investigating all refund requests, determining the cause of the problem, and responding to the customer. The average turn around time for refunds at this time is two to three days. If the patron does not want a trip pass, a straight refund for the amount of the damaged ticket can be issued by the Refund Section of the BART Accounting Department.

Bus drivers are provided forms for passengers with problem TransLink tickets that request a refund. Since bus drivers do not have the time to complete a detailed refund form, they use a "buck slip" that lists the bus number, run number, date and time, TransLink card serial number, remaining value, and the bus operator's number. The bus passenger presents the form to the BART station agent, who completes the full refund form and trip pass.

**TransLink Ridership Tracking** - The participating operators track TransLink ridership according to their established procedures. BART's automated fare collection system records the number of TransLink uses and transfers from CCCTA and BART Express buses at the fare gates that form the barrier entrance to each station. Data from the barriers are moved to the host computer system daily and compiled in the Data Acquisition System (DAS) reports. CCCTA's and BART Express' BTVs store TransLink ridership information in the data storage module (DSM). DSMs are removed daily; the contents are extracted to a garage microprocessor system (GMS). The GMS transfers these data to the host computer system. Ticket data are downloaded weekly and adjusted to historical data. BART, BART Express and CCCTA reconcile TransLink transfer data monthly. Settlement also occurs monthly. Transfers from BART Express to BART and from BART to BART Express are reconciled internally. BART invoices CCCTA for transfer activity from CCCTA to BART and BART Express; CCCTA invoices BART for all trips taken on CCCTA using TransLink. Each agency reviews the invoice, approves the invoice, cuts and mails a check for the amount of the invoice.

**Security/Data Integrity** - Security for TransLink is physical. Ticket stock is maintained and encoded in the Money Room, a physically secure environment consisting of a man-trap entrance/exit, guards, cameras, and dress code. The integrity of ridership data collected by CCCTA was impacted by system spikes during the first eight months of implementation. This problem reportedly has been resolved, although data manipulation continues to adjust ridership levels to within historical expectations.

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### III. TRANSLINK USER SURVEY

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#### Survey Approach

Though sales information can identify the size of the TransLink market, no other information was able to explain the characteristics of this market. A survey of TransLink users was designed to obtain this information. The objectives of the TransLink user survey were to:

- develop a profile of TransLink users, including the transit operators they ride on, their ticket purchasing activity, and their travel patterns; and
- obtain information on TransLink user experiences and opinions about the program.

A survey card was developed, in consultation with MTC and operator staff. The survey consisted of 15 questions. A sample follows as Exhibit III-1. When printed, the cards included serial numbers that could be traced to overall point of distribution.

The survey was designed to be handed out at sales locations. MTC distributed close to 10,000 surveys to 14 different entities. Individual locations received between 250 and 3,000 surveys to distribute. For large retail outlets (e.g., major supermarket chains), the distribution had to be made to a central location with a request that the surveys be delivered to the individual stores. There was no control beyond this and there is some speculation that some of the larger retail outlets did not participate in the survey process.

The surveys were distributed in the Spring of 1994. Recognizing that a user may not buy a TransLink ticket very often, the distribution was scheduled to last for several weeks. The survey was designed as a postage paid card. MTC provided the postage paid permit.

April 29, 1996

*return mailer here*

**TRANSLINK USER SURVEY  
RECEIVE A BONUS . . .**

Serial Number: \_\_\_ \_\_\_ \_\_\_

*THANK YOU . . .*  
for buying a **TransLink** ticket. We appreciate you using public transportation and this new program. Please help us improve the program by taking a few minutes to answer the following questions. Then simply fold the form, seal it with tape, and mail it in, postage free.

When we receive your **completed** survey form **before (date)**, we'll send you (premium) as a token of our appreciation. Remember to **clearly print** your name and address on the return label so we can send your (premium) to you quickly. Your answers will be kept anonymous and confidential.

*Recycling*  
*Logo here* Printed on recycled paper.

1. Is this the first-time you are buying a **TransLink** ticket?  
o Yes o No

If No, when did you buy your first**TransLink** ticket?  
(Please check only one.)

1993          1994  
o April-June o Jan.-March  
o July-Sept. o April-June  
o Oct.-Dec.

2. Which**TransLink** tickets did you buy today? (Circle the number of tickets of each value that you bought.)  
Number Purchased  
\$32 (for \$30) 1 2 3 or more  
\$80 (for \$75) 1 2 3 or more

3. How did you pay for this **TransLink** ticket?  
(Check only **one**.)  
o Cash  
o Credit card  
o Check o Bank ATM card  
o Other (*please specify*)

4. Did you use any of the following tickets and passes on a regular basis before you first purchased a**TransLink** ticket? (Check **all** that apply)  
o BART High Value Ticket (\$30)  
o BARTPlus  
o BART Express Fast Pass  
o BART Express 20-Ride Ticket  
o CCCTA Commuter Card  
o CCCTA 20-Ride Punch Card  
o CCCTA 40-Ride Punch Card

5. Do you still use any of the following tickets and passes on a regular basis? (Check **all** that apply)  
o BART High Value Ticket (\$30)  
o BARTPlus  
o BART Express Fast Pass  
o BART Express 20-Ride Ticket  
o CCCTA Commuter Card  
o CCCTA 20-Ride Punch Card  
o CCCTA 40-Ride Punch Card

6. Which transit services will you use with your **TransLink** ticket? (Check only **one** per row.)  
Frequently Sometimes Never  
BART Rail o o o  
County Connection bus o o o  
BART Express bus o o o

7. How often do you use the following transit services? (Check only **one** per row.)

Frequently Sometimes Never

- MUNI
- AC Transit
- SamTrans
- Others (please list)

8. How many days next week will you use your **TransLink** ticket for the following types of trips? (Check only **one** in each row.)

Days per week

4 or more 2 to 3 1 or more Never

- Commuting: work
- Commuting: school
- Shopping/social/recreation
- Personal business or medical
- Other

9. Which days next week will you use your **TransLink** ticket? (Check **all** that apply.)

- Mon
- Tues
- Wed
- Thurs
- Fri
- Sat
- Sun

**IF YOU HAVE USED A *TRANSLINK* TICKET IN THE PAST, PLEASE ANSWER THE NEXT THREE QUESTIONS.**

10. Has using a **TransLink** ticket changed how often you use transit? (Check only **one** per service.)

- BART County
- BART Rail Connection Express bus
- Use more than before.
- Use about the same.
- Use less than before.
- Did not use before.

11. Approximately how long does it take you to use up your **TransLink** ticket?

- One week.  Two weeks.
- Three weeks.  One month.
- More than one month.

12. Have you experienced any of the following situations?

Frequently Sometimes Never

- Needed a replacement ticket
- for more print space
- Unable to read print
- BART faregate failure
- BART faregate out-of-service
- Bus equipment failure
- Bus equipment out-of-service

13. What are the **first** and **second** most important reasons that you bought this **TransLink** ticket? (Check only **one** per column.)

- Most Important 2nd Most Important
- More convenient than paying separately
- Overall discount (saves money)
- Discounts on transfers
- Last ride bonus
- Flexibility to use any portion
- for bus or rail
- Ability to use on multiple systems

- No expiration date    
 Ability to buy a high face value card    
 Don't have to carry cash    
 Other

14. Overall, how satisfied are you with **TransLink** ?

- Very satisfied  Dissatisfied  
 Satisfied  Very dissatisfied

15. Considering all aspects of **TransLink** , do you think that it's a good idea to continue?

- Yes, continue as is.  
 Yes, continue it, but change  
 No, do not continue

Please use the space below for any other comments about **TransLink**.

Please fold and seal with tape before mailing. Thank you!

A total of 1,953 responses were received. It was estimated that approximately 6,560 of the 10,000 surveys were handed out, yielding an overall response rate of 30 percent.

All responses were processed using SPSS (Statistical Package for the Social Sciences) PC software. The following discussion highlights the findings from the survey of TransLink users.

### Length of Time Using TransLink

Except for a small group of riders that assisted CCCTA with the test of the equipment, most riders first were able to purchase TransLink tickets when the program was introduced to the public, in May 1993. According to the responses to the survey, the entry into the program peaked between October 1993 and March 1994.

*Is this the first time you are buying a TransLink ticket?  
 If not, when did you buy your first TransLink ticket?*

Response	Frequency	Percentage	Cumulative
No, April-June 1994	72	4	4
No, Jan.-Mar. 1994	498	26	30
No, Oct.-Dec. 1993	509	27	57
No, July-Sept. 1993	367	19	76
No, April-June 1993	294	15	91
Yes	168	9	100
TOTAL	1,908	100	

The majority of respondents had been using a TransLink ticket for about six months at the time of the survey. As shown above, entry into the program appears to be slowing down, suggesting that the initial market has been tapped. This also may coincide with the marketing efforts for the program. Now that these users have been attracted to the program, new users may not start purchasing TransLink tickets until more transit operators are participating in the program.

### Ticket Purchasing

Users could purchase either a \$32 or an \$80 TransLink ticket. Since the tickets do not expire, users could purchase more than one ticket at a time. According to the survey results, the purchase of a single \$32 ticket was the dominant activity. This was the response of 71 percent of TransLink users. Another 17 percent were purchasing two \$32 tickets at the time of the survey, while 8 percent were purchasing three \$32 tickets. The \$80 ticket was less popular. Only 3 percent of respondents were purchasing a single \$80 ticket. The purchase of multiple \$80 tickets was even less common. TransLink ticket users appear to have figured out that buying multiple \$32 tickets was a better deal than buying a single \$80 ticket, given the discount in the pricing (\$32 worth of travel for \$30 compared to \$80 of travel for \$75) and the last ride bonus with each farecard.

TransLink tickets can be purchased in a number of ways. Cash is the dominant approach, identified by more than three-quarters of the respondents.

How did you pay for this TransLink ticket?

Response	Frequency	Percentage
Cash	1,507	78
Check	274	14
Employer Subsidy	54	3
Commuter Check	46	2
Combination/ Other	40	2
Credit Card	9	
*Bank ATM Card	2	
*TOTAL	1,932	100

\* = Less than one percent

This survey was taken prior to the introduction of credit/debit vending machines (C/DV) that will permit the purchase of TransLink tickets with a credit card or bank ATM card.

These responses are consistent with the tendency to purchase a single \$32 ticket. A cross tabulation of the two questions follows as Exhibit III-2.

Use of Other Prepaid Media

The TransLink ticket complements or replaces other multiple-ride passes and tickets offered by the operators at the time the program was introduced. TransLink ticket users were asked to identify any types of tickets they were using prior to TransLink as well as any they were continuing to use. The high value BART ticket was used commonly in the past (86 percent of respondents) and still continues to be used by a majority of the respondents. The "blue" high value BART farecard offers the same discount as a TransLink ticket (\$32 worth of travel for \$30). However, a high value BART ticket can be used only on BART. Further, it does not include a last ride bonus, like a TransLink ticket does. Stored value tickets purchased from a BART vending machine in the station also were used in the past by a large number of respondents and continue to be used. The BART Plus ticket, which includes a set amount of BART stored value and unlimited bus use for the time period, was used by 12 percent of respondents and continues to be used by 9 percent. The other offerings for BART Express and CCCTA bus service were used and continue to be used less frequently, as shown below:

Did you use any of the following tickets and passes on a regular basis before you first purchased a TransLink ticket?

Do you still use any of the following tickets and passes on a regular basis?

Exhibit III-2												
TransLink User Survey												
Crosstabulation - Question 2 by Question 3												
QUESTION 2		QUESTION 3									Row Total	
		Cash	Credit Card	Check	Bank/ATM Card	Commuter Check	Employer Subsidy	Cash plus Commuter Check	Cash plus Personal Check	Cash plus Credit Card		
\$32 (One)		Frequency	1125	5	142	2	25	46	12		14	1371
		Row Percent	82%	*	10%	*	*	3%	*		*	100%
		Column Percent	75%	56%	52%	100%	54%	85%	67%		93%	71%
\$32 (Two)		Frequency	218	3	71		16	6	3	2	1	321

	Row Percent	68%	*	22%	5%	2%	*	*	*	*	100%	
	Column Percent	14%	33%	26%	35%	11%	17%	40%	100%	7%	17%	
\$32 (Three or more)	Frequency	112	1	38	5	2	3	1			162	
	Row Percent	69%	*	23%	3%	*	2%	*			100%	
	Column Percent	7%	11%	14%	11%	4%	17%	20%			8%	
\$32 (Unspecified)	Frequency	8		1							9	
	Row Percent	89%		11%							100%	
	Column Percent	*		*							*	
\$80 (One)	Frequency	35		20							55	
	Row Percent	64%		36%							100%	
	Column Percent	2%		7%							3%	
\$80 (Two)	Frequency	2									2	
	Row Percent	100%									100%	
	Column Percent	*									*	
\$80 (Three or more)	Frequency	2		1							3	
	Row Percent	67%		33%							100%	
	Column Percent	*		*							*	
\$32 and \$80 (Combination)	Frequency	3		1			2				6	
	Row Percent	50%		17%			33%				100%	
	Column Percent	*		*			40%				*	
Column Total	Frequency	1505	9	274	2	46	54	18	5	1	15	1929
	Row Percent	78%	*	14%	*	2%	3%	*	*	*	*	100%
	Column Percent	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Question 2 - Which TransLink ticket did you buy today? (How Many?)	* = Less than 2 percent.											
Question 3 - How did you pay for this TransLink ticket?												

Type of Ticket	Used Before	Still Use
BART High Value tickets	86%	52%
BART TVM ticket	42%	57%
BARTPlus	12%	9%
BART Express Fast Pass	2%	1%
BART Express 20-Ride ticket		• *
CCCTA Commuter Card	2%	1%
CCCTA 40-Ride Punch Card	3%	1%

TOTAL CASES	1,840	606
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Note: Question permitted multiple responses. Total cases is the number of surveys with at least one response.

- = Less than one percent

### Transit Services Used

Currently, the TransLink ticket can be used on three different transit services in the Bay Area. The ability to use one ticket for a trip involving multiple operators is a key feature of the TransLink program. Users were asked how often they expected to use their TransLink ticket on BART rail, BART Express buses, and CCCTA buses. As shown below, most respondents are frequent users of BART rail service. Frequent users of CCCTA and BART Express bus services accounted for 19 and 12 percent of the respondents, respectively. Further, a significant percentage of respondents did not expect to use the bus services at all. And ten percent of respondents users did not expect to ride BART rail service at all.

*Which transit services will you use with your TransLink ticket?*

Response	Frequency	Percentage
BART Rail		
Frequently	1,465	88
Sometimes	35	2
Never	159	10
Total Cases	1,659	100
County Connection bus		
Frequently	248	19
Sometimes	561	42
Never	517	39
Total Cases	1,326	100
BART Express bus		
Frequently	138	12
Sometimes	321	29
Never	664	59
Total Cases	1,123	100

Several major transit operators are not in the TransLink program yet. This lack of options during the demonstration phase may be inhibiting responsiveness to the TransLink ticket. Current users were asked how often they used the services of three other large transit operators, whose services connect with BART rail service: San Francisco Municipal Railway (MUNI), Alameda-Contra Costa Transit District (AC Transit), and San Mateo County Transit District (SamTrans). The responses, summarized below, show a strong tendency to ride MUNI:

*How often do you use the following transit services?*

Response	Frequency	Percentage
Muni		
Frequently	122	8
Sometimes	905	56
Never	598	37

Total Cases	1,625	100
AC Transit		
Frequently	79	5
Sometimes	488	33
Never	901	61
Total Cases	1,468	100
SamTrans		
Frequently	32	2
Sometimes	177	13
Never	1,133	84
Total Cases	1,342	100

It is important to recognize that these responses represent the propensity only of those now buying TransLink tickets. It is not an assessment of the overall market for TransLink.

### Trip Purposes

TransLink tickets are being used for the daily commute to work. Almost 95 percent of respondents answered that they expected to use their TransLink ticket four or more days in the next week for a work trip. Another 4 percent said they would use the ticket for work trips on two to three days of the next week. As shown below, TransLink tickets also are used for occasional shopping or personal business trips. However, this appears to be incidental to the commute to work trip for which the ticket was purchased.

*How many days next week will you use your TransLink ticket for the following types of trips?*

Response	Frequency	Percentage
Commuting: Work		
4 or more days per week	1,798	95
2 to 3 days per week	83	4
1 day or less per week	11	1
Never	11	1
Total Cases	1,903	100
Commuting: School		
4 or more days per week	35	4
2 to 3 days per week	24	3
1 day or less per week	36	4
Never	789	89
Total Cases	884	100
Shopping/Social/ Recreation		
4 or more days per week	11	1
2 to 3 days per week	90	8

1 day or less per week	579	53
Never	414	38
Total Cases	1,094	100
Personal Business/Medical		
4 or more days per week	10	1
2 to 3 days per week	46	5
1 day or less per week	450	44
Never	507	50
Total Cases	1,013	100

A cross-tabulation of these responses with the earlier question about the transit services that will be used indicated that those making frequent work trips (4 or more days per week) would be using the following:

- BART Rail 55 %
- County Connection bus 29 %
- BART Express bus 17 %

Additional information from this cross-tabulation follows as Exhibit III-3.

Virtually all travel with a TransLink ticket is done on weekdays. Users were asked which days next week they will use their ticket. The responses for the individual weekdays ranged from 95 to 97 percent. Only 13 percent expected to use the ticket on Saturday; only 5 percent anticipated Sunday use.

By making transit easier to use, a side benefit of the TransLink ticket could be more trips made on transit. TransLink ticket purchasers who had used a TransLink ticket in the past were asked if TransLink had changed how often they used BART rail, County Connection bus, and BART Express bus. A noticeable number stated they now were using the services more.

*Has using a TransLink ticket changed how often you use transit?*

Exhibit III-3 TransLink User Survey													Exhibit III-3 TransLink User Survey									
Crosstabulation - Question 6 by Question 8													Crosstabulation - Question 6 by Question 8									
QUESTION 6	QUESTION 8												QUESTION 8									
	Commuting: work				Commuting: school				Shopping/social/recreation				Personal business or medical				Other					
	4 or more	2 to 3 days	1 day or less		4 or more	2 to 3 days	1 day or less		4 or more	2 to 3 days	1 day or less		4 or more	2 to 3 days	1 day or less		4 or more	2 to 3 days	1 day or less			
	days/week	per week	per week	Subtotal	days/week	per week	per week	Subtotal	days/week	per week	per week	Subtotal	days/week	per week	per week	Subtotal	days/week	per week	per week	Subtotal	Row Total	
BART Rail	Frequency	1410	61	8	1479	26	19	29	74	11	74	502	587	7	42	383	432	3	2	8	13	2585
	Row Percent	55%	2%	*	57%	*	*	*	3%	*	3%	19%	23%	*	2%	15%	17%	*	*	*	*	100%
	Column Percent	54%	50%	50%	54%	41%	53%	45%	45%	61%	46%	54%	53%	44%	50%	52%	51%	43%	67%	53%	52%	53%
County Connection	Frequency	748	39	7	794	25	10	21	56	3	53	272	328	6	24	225	255	2	1	3	6	1439

Row Percent	52%	3%	*	55%	2%	*	*	4%	*	4%	19%	23%	*	2%	16%	18%	*	*	*	*	100%
Column Percent	29%	32%	44%	29%	40%	28%	32%	34%	17%	33%	29%	30%	38%	29%	30%	30%	29%	33%	20%	24%	30%

**BART Express**

Frequency	431	21	1	453	12	7	15	34	4	35	157	196	3	18	135	156	2	4	6	845
Row Percent	51%	2%	*	54%	*	*	2%	4%	*	4%	19%	23%	*	2%	16%	18%	*	*	*	100%
Column Percent	17%	17%	6%	17%	19%	19%	23%	21%	22%	22%	17%	18%	19%	21%	18%	19%	29%	27%	24%	17%

**Column Total**

Frequency	2589	121	16	2726	63	36	65	164	18	162	931	1111	16	84	743	843	7	3	15	25	4869
Row Percent	53%	2%	*	56%	*	*	*	3%	*	3%	19%	23%	*	2%	15%	17%	*	*	*	100%	
Column Percent	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

Question 6 - Which services will you use with your TransLink ticket?

Question 8 - How many days next week will you use your TransLink ticket for the following trips?

\* =  
Less  
than 2  
percent

\* =  
Less  
than 2  
percent

Question 6 - Which services will you use with your TransLink ticket?

Question 8 - How many days next week will you use your TransLink ticket for the following trips?

Response	Frequency	Percentage
BART Rail		
Use more than before	262	17
Use about the same	1,169	77
Use less than before	2	
<ul style="list-style-type: none"> <li>Did not use before</li> </ul>	92	6
Total Cases	1,525	10

County Connection bus		
Use more than before	269	24
Use about the same	391	35
Use less than before	13	1
Did not use before	435	39
Total Cases	1,108	100
BART Express bus		
Use more than before	112	12
Use about the same	213	23
Use less than before	15	2
Did not use before	574	63
Total Cases	914	100

● = Less than one percent

These responses reflect the passenger's perception of their usage, and may not be consistent with actual ridership counts. Similarly, passengers favorably inclined towards TransLink may be inclined to respond positively, to bolster how the program fares in the survey.

It is interesting to note that only six percent of respondents were not BART users prior to purchasing a TransLink ticket. However, a large percentage were not County Connection or BART Express bus users before purchasing a TransLink ticket.

Ticket Use Experience

Prior to the survey, no information existed on how long it took the typical passenger to "use up" a TransLink ticket. Survey respondents were asked to indicate how long it takes for them to use up the value on their TransLink ticket. The survey results show that most tickets are used up within one or two weeks. This means, the typical TransLink user is taking advantage of the last ride bonus two to four times a month.

*Approximately how long does it take you to use up your TransLink ticket?*

Response	Frequency	Percent age	Cumulative
One week	721	42	42
Two weeks	771	45	87
Three weeks	149	9	95
One month	57	3	99
More than one month	24	1	100
TOTAL	1,722	100	

A cross-tabulation of this question with the earlier question regarding frequency of use of the three transit services is provided as Exhibit III-4. This shows that those using up a ticket within one week describe use the following services:

- BART Rail - Frequently 42%
- BART Express Bus - Sometimes 28%
- County Connection Bus - Sometimes 17%
- County Connection Bus - Frequently 8%
- BART Express Bus - Frequently 5%
- BART Rail - Sometimes 1%

The operator staff is aware of reliability issues that arise in the field with the TransLink equipment. To determine how these situations are perceived by the TransLink users, respondents were asked how often they had encountered six different situations:

- needed a replacement ticket for more print space
- unable to read print
- BART faregate failure
- BART faregate out of service
- bus farebox failure
- bus farebox out-of-service

<b>Exhibit III-4</b>											
<b>TransLink User Survey</b>											
<b>Crosstabulation - Question 11 by Question 6</b>											
		QUESTION 6									
		BART Rail			County Connection			BART Express			
		Frequently	Sometimes	Subtotal	Frequently	Sometimes	Subtotal	Frequently	Sometimes	Subtotal	Row Total
QUESTION 11											
One week	Frequency	545	6	551	107	227	334	60	362	422	1307
	Row Percent	42%	*	42%	8%	17%	26%	5%	28%	32%	100%
	Column Percent	42%	19%	41%	45%	45%	45%	47%	44%	44%	43%
Two weeks	Frequency	600	10	610	90	217	307	49	351	400	1317
	Row Percent	46%	*	46%	7%	16%	23%	4%	27%	30%	100%
	Column Percent	46%	31%	46%	38%	43%	41%	38%	43%	42%	43%
Three weeks	Frequency	111	5	116	30	42	72	12	72	84	272
	Row Percent	41%	2%	43%	11%	15%	26%	4%	26%	31%	100%
	Column Percent	8%	16%	9%	13%	8%	10%	9%	9%	9%	9%
One month	Frequency	36	5	41	9	15	24	3	30	33	98
	Row Percent	37%	5%	42%	9%	15%	24%	3%	31%	34%	100%
	Column Percent	3%	16%	3%	4%	3%	3%	2%	4%	3%	3%
More than one month	Frequency	14	6	20	3	3	6	4	10	14	40
	Row Percent	35%	15%	50%	8%	8%	15%	10%	25%	35%	100%
	Column Percent	*	19%	*	*	*	*	3%	*	*	*
Column Total	Frequency	1306	32	1338	239	504	743	128	825	953	3034
	Row Percent	43%	*	44%	8%	17%	24%	4%	27%	31%	100%
	Column Percent	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Question 11 - Approximately how long does it take to use up your TransLink ticket?											
Question 6 - Which services will you use with your TransLink ticket?											

\* = Less than 2 percent

The first condition is a function of the fare charged for each trip. Someone making many short trips might reach the end of a farecard and still have stored value remaining. However, someone making longer trips might not experience this

situation. All of the other situations would reflect problems with the equipment. The responses are summarized below:

*Have you experienced any of the following situations?*

Response	Frequency	Percentage
Needed a replacement ticket for more print space		
Frequently	177	13
Sometimes	742	55
Never	432	32
Total Cases	1,351	100
Unable to read print		
Frequently	97	8
Sometimes	328	28
Never	729	63
Total Cases	1,154	100
BART faregate failure		
Frequently	60	5
Sometimes	328	29
Never	741	66
Total Cases	1,129	100
BART faregate out of service		
Frequently	177	13
Sometimes	742	55
Never	432	32
Total Cases	1,351	100
Bus farebox failure		
Frequently	97	8
Sometimes	328	28
Never	729	63
Total Cases	1,154	100
Bus farebox out of service		
Frequently	60	5
Sometimes	328	29
Never	741	66
Total Cases	1,129	100

The relatively low incidence of bus farebox-related failures may reflect the characteristics of the respondents, many of whom do not ride either a County Connection or BART Express bus.

A cross-tabulation of these responses with the earlier question about services that will be used (Question 6) was prepared. Furthermore, the response for Question 6 were filtered in order to isolate BART only, CCCTA only and BART Express only users. In conducting this cross-tabulation it was found that the majority of CCCTA and BART Express TransLink users also ride on BART Rail. As such, meaningful results for the cross-tabulation were possible only for

BART Rail only riders. As shown below, "unable to read print" was cited as the single most common problem. Faregate failures and faregate out-of-service problems together comprised 54 percent of all problems experienced by BART Rail TransLink users. The overall distribution of problems experienced by BART Rail TransLink users is as follows:

- Unable to read print 32%
- BART faregate failure 29%
- BART faregate out-of-service 25%
- Needed a replacement ticket 9%
- Other 5%

Additional information on equipment reliability will be presented in the next section of this report.

### Reasons for Using TransLink

The final questions in the survey asked why passengers used a TransLink ticket, how satisfied they were with the program, and whether the program should continue. The reasons given were consistent with earlier questions and suggest that many TransLink users only ride BART rail and are attracted to this ticket by its pricing. TransLink purchasers were given a list of nine reasons to purchase the ticket and asked to select their first and second most important reasons. As shown below, the fare integration aspects of the TransLink ticket, though important, were less of a factor than the overall fare discounts and the last ride bonus.

*What are the first and second most important reasons that you bought this TransLink ticket?*

Reason	First Reason	Second Reason
Overall discount (saves money)	38%	29%
Last ride bonus	33%	27%
More convenient than paying separately for bus and rail	16%	9%
Ability to buy a high face value card	4%	6%
Flexibility to use any portion for bus or rail	2%	5%
Don't have to carry cash	2%	4%
Ability to use on multiple systems	2%	6%
No expiration date	2%	8%
Discount on transfers	1%	4%
Other	1%	1%
TOTAL CASES	1,300	1,272

In order to make the TransLink ticket attractive, the transit operators went beyond the discount that was in effect for the high value BART ticket (providing \$32 worth of BART rail travel for \$30). A TransLink ticket also offered discounts on transfers and the last ride bonus. This combination of point-of-sale discount, discount on transfers and last ride bonus appealed to both BART only riders as well as BART-to-bus riders. As such, many BART only riders were using TransLink simply to take advantage of the tremendous savings it provided.

TransLink users also were very satisfied by the program. Almost three-quarters of the respondents (74 percent) said they were very satisfied. Another 25 percent said they were satisfied. Less than one percent were dissatisfied or were very dissatisfied. A cross-tabulation of the ratings with the question on transit services used shows which services those who were very satisfied ride and at what frequency:

- BART Rail - Frequently 43%
- BART Express Bus - Sometimes 28%
- County Connection Bus - Sometimes 18%
- County Connection Bus - Frequently 6%
- BART Express Bus - Frequently 4%
- BART Rail - Sometimes 1%

The other aspects of this cross-tabulation are provided in Exhibit III-5.

TransLink ticket purchasers also were asked if the program should be continued. More than three-quarters of the users (77 percent) responded with an unqualified "yes". Another 23 percent answered "yes", but suggested improvements, such as expanding it to other transit providers, increasing the number of sales outlets, increase the discount, and improve reliability of the different TransLink-related equipment. Only 0.1 percent stated that the program should not be continued.

**Exhibit III-5**

**TransLink User Survey**

**Crosstabulation - Question 14 by Question 6**

		QUESTION 6										
		BART Rail			County Connection			BART Express			Row Total	
		Frequently	Sometimes	Subtotal	Frequently	Sometimes	Subtotal	Frequently	Sometimes	Subtotal		
<b>QUESTION 14</b>												
<b>Very Satisfied</b>		Frequency	1073	20	1093	160	443	603	89	702	791	2487
		Row Percent	43%	*	44%	6%	18%	24%	4%	28%	32%	100%
		Column Percent	74%	57%	74%	66%	80%	76%	65%	78%	76%	75%
<b>Satisfied</b>		Frequency	349	15	364	74	106	180	43	194	237	781
		Row Percent	45%	2%	47%	9%	14%	23%	6%	25%	30%	100%
		Column Percent	24%	43%	25%	31%	19%	23%	31%	21%	23%	24%
<b>Dissatisfied</b>		Frequency	12		12	5	2	7	4	6	10	29
		Row Percent	41%		41%	17%	7%	24%	14%	21%	34%	100%
		Column Percent	*		*	2%	*	*	3%	*	*	*
<b>Very Dissatisfied</b>		Frequency	7		7	2	1	3	1	1	2	12
		Row Percent	58%		58%	17%	8%	25%	8%	8%	17%	100%
		Column Percent	*		*	*	*	*	*	*	*	*
<b>Column Total</b>		Frequency	1441	35	1476	241	552	793	137	903	1040	3309
		Row Percent	44%	*	45%	7%	17%	24%	4%	27%	31%	100%
		Column Percent	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

\* = Less than 2 percent

Question 14 - Overall, how satisfied are you with TransLink?

Question 6 - Which services will you use with your TransLink ticket?

Since the most frequent suggestion was to expand to other transit providers, selected by 6 percent of all respondents, a cross tabulation of this question was made with the question about other transit services used. Approximately half of the users suggesting expansion also use Muni. Another third use AC Transit.

**IV. SALES AND RIDERSHIP**

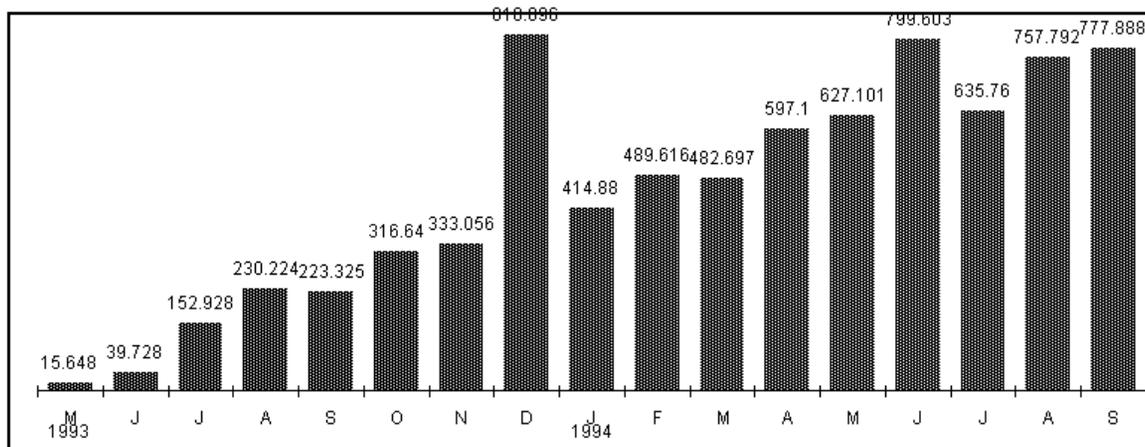
This section highlights several key trends in the sales and use of TransLink tickets during the monitoring period. Based on information provided by BART and CCCTA, this section describes the trends in the sales of TransLink ticket and other multi-ride fare media, the revenue generated by TransLink sales, refund volumes and reasons, ridership trends that were occurring on the three participating transit services during the monitoring period, and trends in transfer activity between the participating services.

TransLink Sales Trends

To measure the success of the TransLink Program, the trend in sales revenue from TransLink sales was reviewed for the period from May 1993 through September 1994. The month-to-month trend in TransLink sales revenue during this time period, which is presented in Exhibit IV-1, shows that TransLink sales have grown tremendously since the program's inception in May 1993. Initial monthly sales totaled \$15,648. By the end of the monitoring period in September 1994 TransLink sales revenue had increased approximately 48 times to a total of \$777,888 per month.

The trend line in Exhibit IV-1 shows two months where sales were significantly higher than surrounding months - December 1993 and June 1994. In these two months there was a significant increase in the number of pre-purchased tickets, presumably as outlets make their purchases and transmit their receipts. As a result, the months immediately following show a sharp decline in sales revenue, particularly January 1994. While sales revenue in the months of January and July 1994 declined, they were still greater than in the months that preceded the peak (November 1993 and May 1994), resulting in a consistently upward trend.

Exhibit IV-1 Trends in TransLink Sales Revenue



Trends in Sales of Other Tickets

The purchase of a TransLink ticket to an existing rider means that another type of ticket won't be purchased. Therefore, the sales trends for other fare media also were tracked for the monitoring period. Of particular interest were the sales trends for tickets that were considered to have a similar market as the TransLink ticket. These included the following:

- **CCCTA 40-Ride Punch Card** - The 40-Ride Punch Card provides a ten percent discount from the regular base fare. The punch card is good for 40 single rides on County Connection buses.
- **BART High Value Ticket** - Also known as the Blue ticket or BART-30, the High Value Ticket can be purchased for \$30 and provides \$32 worth of transit on BART Trains.
- **BARTPlus** - BARTPlus tickets are sold in a variety of denominations \$28 to \$61. BARTPlus tickets provide for unlimited local rides on nine different bus systems. In addition, the ticket also contains a fixed value (usually \$11 to \$13 less than the ticket price) which can be used for rides on BART Rail. Like the TransLink tickets, BARTPlus tickets also provide a last ride bonus. That is, passengers can take one last ride with as little as 5¢ left on their ticket.

The primary purpose of tracking the sales of these media was to determine whether the introduction of the TransLink led to declines in the sales of these other tickets. Sales revenue for each of the tickets described above was reviewed for the period from January 1993 through September 1994. The months from January to April 1993 were included in order to provide a baseline for sales revenue prior to the introduction of TransLink.

TransLink tickets and the tickets described above can be purchased at a variety of locations. Sales statistics for these tickets was provided by BART and CCCTA. Ticket sales revenue for TransLink tickets, the BART-30, BART Plus, and CCCTA-40 Ride is presented quarterly in Exhibit IV-2. Sales are grouped by type of sales outlet. There is one aggregate statistic for all BART sales, whether internal to the system at its stations or through its network of outlets. CCCTA sales statistics are presented separately for the CCCTA Transportation Center in Walnut Creek, the kiosk at the Concord BART Station, and its external CCCTA outlets. A CCCTA total also is presented in Exhibit IV-2 along with total sales statistics for BART and CCCTA. Trends by individual ticket type are discussed below.

Exhibit IV-2							
Revenue By Ticket Type							
BART Sales	1993				1994		
	First	Second	Third	Fourth	First	Second	Third
	Quarter						
TransLink	\$0	\$5,486	\$469,916	\$1,283,512	\$1,205,768	\$1,799,636	\$1,936,040
<i>% Change</i>	--	--	8465.7%	173.1%	-6.1%	49.3%	7.6%
BART-30	\$5,857,984	\$5,658,298	\$4,844,404	\$4,874,412	\$4,224,230	\$4,400,220	\$3,153,244
<i>% Change</i>	--	-3.4%	-14.4%	0.6%	-13.3%	4.2%	-28.3%
BART Plus	\$1,290,507	\$1,106,113	\$943,572	\$1,029,993	\$870,482	\$925,328	\$805,912

	<i>% Change</i>	--	-14.3%	-14.7%	9.2%	-15.5%	6.3%	-12.9%
CCCTA-40 Ride		N/A	N/A	N/A	N/A	N/A	N/A	N/A
	<i>% Change</i>	--	--	--	--	--	--	--

		1993				1994		
		First	Second	Third	Fourth	First	Second	Third
		Quarter						
TransLink		\$0	\$14,805	\$31,231	\$30,645	\$33,615	\$33,390	\$35,415
	<i>% Change</i>	--	--	110.9%	-1.9%	9.7%	-0.7%	6.1%
BART-30		\$32,160	\$28,260	\$22,440	\$22,410	\$22,620	\$19,980	\$18,570
	<i>% Change</i>	--	-12.1%	-20.6%	-0.1%	0.9%	-11.7%	-7.1%
BART Plus		\$53,603	\$37,034	\$28,596	\$26,299	\$29,712	\$26,449	\$22,451
	<i>% Change</i>	--	-30.9%	-22.8%	-8.0%	13.0%	-11.0%	-15.1%
CCCTA-40 Ride		\$13,721	\$11,306	\$9,931	\$9,907	\$10,719	\$9,750	\$7,777
	<i>% Change</i>	--	-17.6%	-12.2%	-0.2%	8.2%	-9.0%	-20.2%

		1993				1994		
		First	Second	Third	Fourth	First	Second	Third
		Quarter	Quarter	Quarter	Quarter	Quarter	Quarter	Quarter
TransLink		\$0	\$35,085	\$105,330	\$127,815	\$165,630	\$189,735	\$199,785
	<i>% Change</i>	--	--	200.2%	21.3%	29.6%	14.6%	5.3%
BART-30		\$0	\$47,490	\$86,820	\$89,162	\$98,430	\$89,880	\$83,190
	<i>% Change</i>	--	--	82.8%	2.7%	10.4%	-8.7%	-7.4%
BART Plus		\$0	\$36,043	\$60,382	\$64,403	\$72,421	\$64,898	\$51,032
	<i>% Change</i>	--	--	67.5%	6.7%	12.4%	-10.4%	-21.4%
CCCTA-40 Ride		\$0	\$1,365	\$3,490	\$3,096	\$3,820	\$3,775	\$3,033
	<i>% Change</i>	--	--	155.7%	-11.3%	23.4%	-1.2%	-19.7%

Sources: BART Ticket Sales; CCCTA Monthly Sales Reports.

N/A = Not applicable

		1993				1994		
		First	Second	Third	Fourth	First	Second	Third
		Quarter						
TransLink		N/A						
	<i>% Change</i>	--	--	--	--	--	--	--
BART-30		N/A						
	<i>% Change</i>	--	--	--	--	--	--	--
BART Plus		N/A						
	<i>% Change</i>	--	--	--	--	--	--	--
CCCTA-40 Ride		\$7,595	\$7,210	\$5,075	\$7,280	\$5,810	\$5,075	\$4,585
	<i>% Change</i>	--	-5.1%	-29.6%	43.4%	-20.2%	-12.7%	-9.7%

		1993				1994		
		First	Second	Third	Fourth	First	Second	Third
		Quarter						
<i>Total Sales - CCCTA</i>								

TransLink	\$0	\$49,890	\$136,561	\$158,460	\$199,245	\$223,125	\$235,200
% Change	--	--	173.7%	16.0%	25.7%	12.0%	5.4%
BART-30	\$32,160	\$75,750	\$109,260	\$111,572	\$121,050	\$109,860	\$101,760
% Change	--	135.5%	44.2%	2.1%	8.5%	-9.2%	-7.4%
BART Plus	\$53,603	\$73,077	\$88,978	\$90,702	\$102,133	\$91,347	\$73,483
% Change	--	36.3%	21.8%	1.9%	12.6%	-10.6%	-19.6%
CCCTA-40 Ride	\$21,316	\$19,881	\$18,496	\$20,283	\$20,349	\$18,600	\$15,395
% Change	--	-6.7%	-7.0%	9.7%	0.3%	-8.6%	-17.2%
	1993				1994		
	First	Second	Third	Fourth	First	Second	Third
	Quarter						
TransLink	\$0	\$55,376	\$606,477	\$1,441,972	\$1,405,013	\$2,022,761	\$2,171,240
% Change	--	--	995.2%	137.8%	-2.6%	44.0%	7.3%
BART-30	\$5,890,144	\$5,734,048	\$4,953,664	\$4,985,984	\$4,345,280	\$4,510,080	\$3,255,004
% Change	--	-2.7%	-13.6%	0.7%	-12.9%	3.8%	-27.8%
BART Plus	\$1,857,174	\$1,805,625	\$1,582,638	\$1,717,429	\$1,500,662	\$1,557,030	\$956,900
% Change	--	-2.8%	-12.3%	8.5%	-12.6%	3.8%	-38.5%
CCCTA 40-Ride	\$21,316	\$19,881	\$18,496	\$20,283	\$20,349	\$18,600	\$15,395
% Change	--	-6.7%	-7.0%	9.7%	0.3%	-8.6%	-17.2%
<i>Sources: BART Ticket Sales; CCCTA Monthly Sales Reports.</i>							
<i>N/A = Not applicable</i>							

**BART Sales** - BART High Value Tickets (BART-30) sales have decreased as TransLink sales revenue increases. As shown in Exhibit IV-3, in the first quarter of 1993, prior to TransLink's inception, sales for BART-30 tickets totaled nearly \$6 million. With the start of TransLink midway through the second quarter, BART-30 sales already were showing a decline. This decline continued throughout the monitoring period and in the third quarter of 1994, BART-30 sales totaled only \$3.2 million, approximately half as much as it did in the first quarter of 1993. BARTPlus sales revenue experienced a similar decline over the monitoring period. Between May 1993 and September 1994, BARTPlus sales revenue declined 38 percent from \$1.3 million to \$805,912. However, the price of BARTPlus tickets was increased by \$4 in March 1993. Therefore, not all of the decline in BARTPlus sales revenue between May and September 1993 is attributable to the introduction of TransLink.

As a point of comparison, BART's gross passenger revenue over the monitoring period essentially remained stable. Gross passenger revenue between October 1993 and September 1994 remained within a range of \$9 million to \$11 million per month. Since gross passenger revenue did not experience a significant increase or decrease during the monitoring period, this suggests that the much of the loss in BART-30 and BARTPlus revenue was the result of a shift from these media toward TransLink tickets.

**CCCTA Sales** - CCCTA sales information was reviewed for activity at the County Connection Transportation Center in Walnut Creek and the Concord BART Kiosk, the two places in the CCCTA system where TransLink tickets are sold. The trends in sales at these two locations also was reviewed. The trends in CCCTA sales revenue by ticket type and sales location are presented in Exhibits IV-4 through IV-6. The following discussion provides highlights for sales at the County Connection Transportation Center, the Concord BART kiosk, and the composite total of CCCTA sales.

#### Exhibit IV-3 Revenue Trends by Ticket Type - Total Sales BART

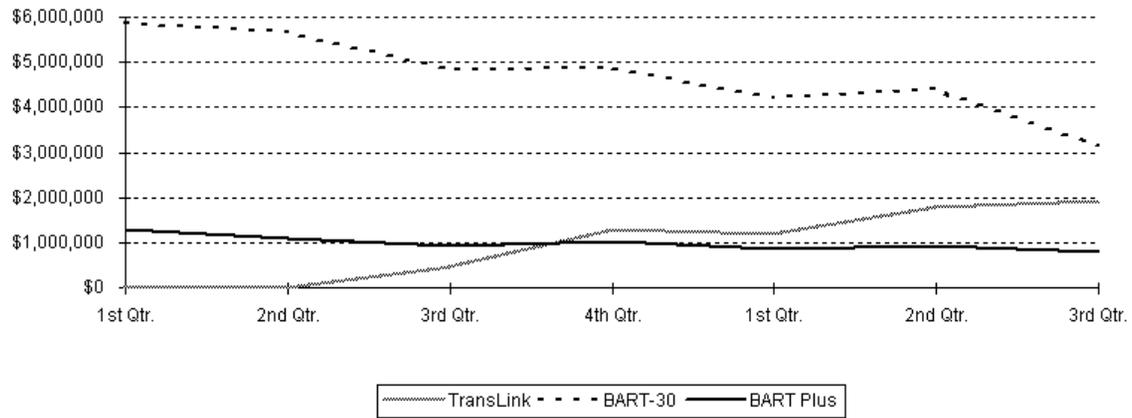


Exhibit IV-4 Revenue Trends by Ticket Type - Transportation Center

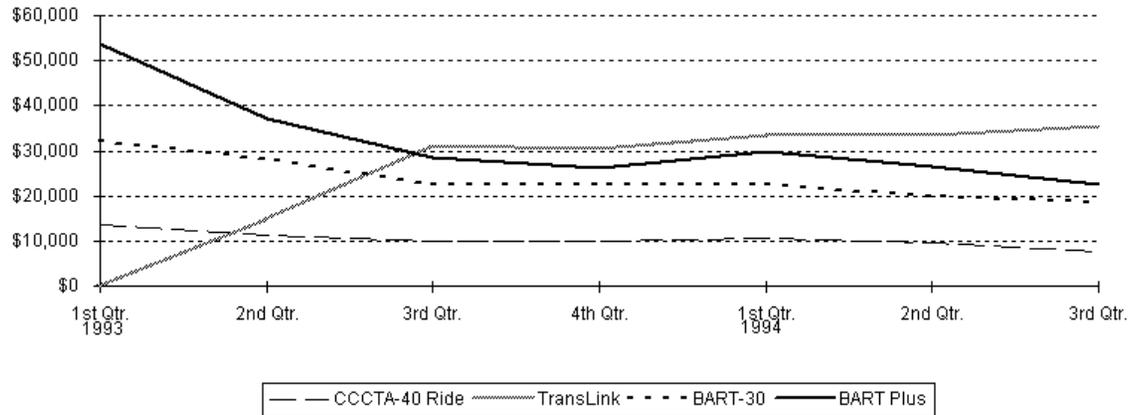


Exhibit IV-5 Revenue Trends by Ticket Type - Concord BART Kiosk

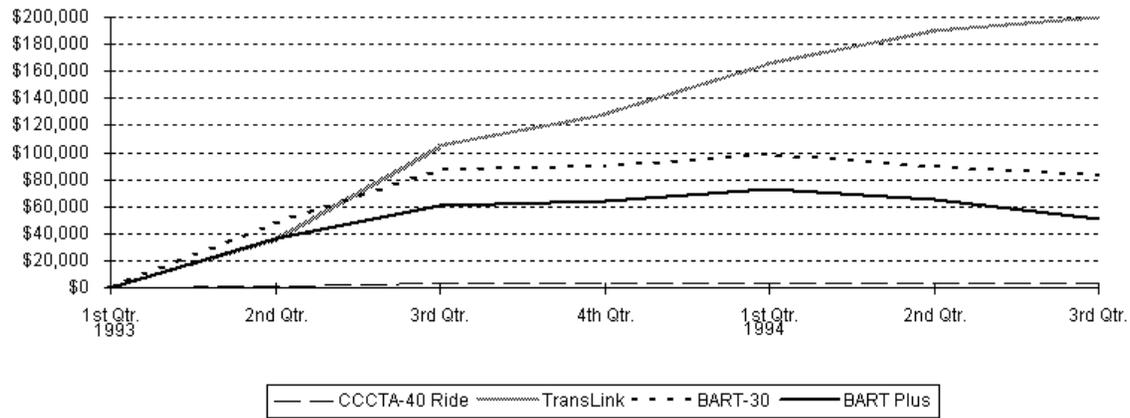


Exhibit IV-6 Revenue Trends bt Ticket Type - Total Sales CCCTA

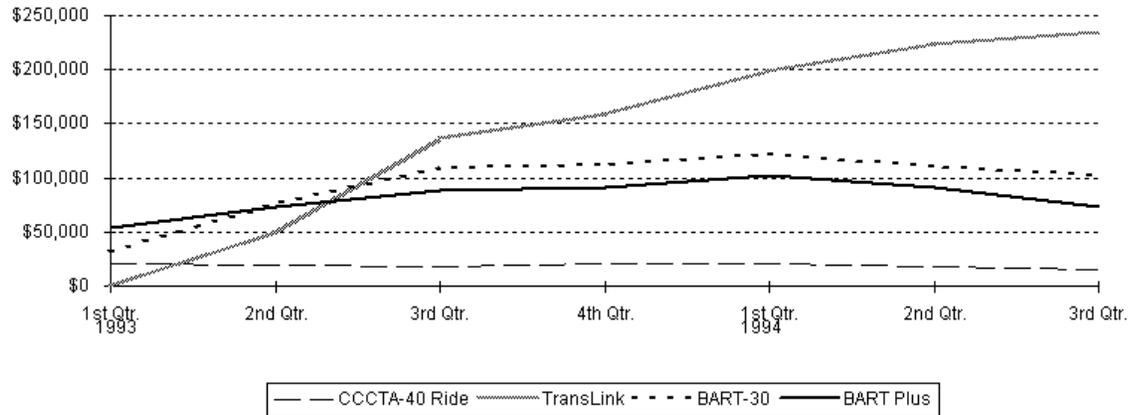
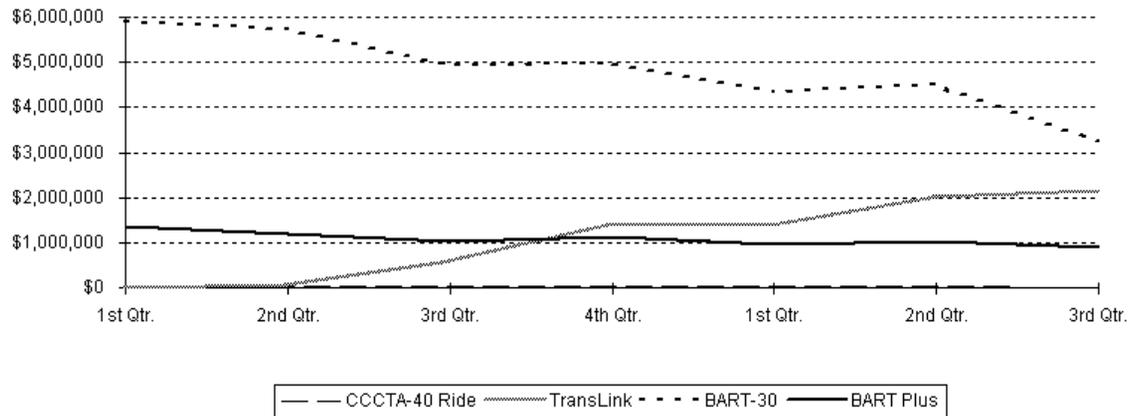


Exhibit IV-7 Revenue Trends by Ticket Type - Total Sales All

- County Connection Transportation Center** - Ticket sales at the Transportation Center for BART-30, BARTPlus and the CCCTA 40-Ride Punch Card began to show sharp declines during the second quarter of 1993 (Exhibit IV-4). The most notable downturn was the decline in BARTPlus sales, a decrease of more than 30 percent between the first and second quarter of 1993. From the third quarter of 1993 onward, the decline in sales revenue for BART-30, BARTPlus and CCCTA 40-Ride began to taper off, though moderate decreases continued. During this same period, TransLink sales revenue increased moderately. By the end of the third quarter of 1994, sales revenue from BART-30, BARTPlus, and CCCTA 40-Ride tickets all had declined by more than 40 percent from their first quarter 1993 levels.
- Concord BART Kiosk** - The kiosk at the Concord BART station opened in April 1993, meaning a baseline for each of the ticket types does not exist. As shown in Exhibit IV-5, all ticket types exhibited a steady increase in sales revenue from the second quarter 1993 through the first quarter 1994. During the second and third quarters of 1994, TransLink sales revenue continued to climb while revenue for the other tickets began to show moderate declines. BART-30 sales revenue decreased 17 percent from the first through the third quarters of 1994; BARTPlus sales revenue declined 24 percent; and CCCTA 40-Ride sales revenue exhibited a decrease of 27 percent between the first and third quarter of 1994.
- Total Sales** - The sales of all ticket types except the CCCTA 40-Ride punch cards increased steadily until the third quarter of 1993, as shown in Exhibit IV-6. This reflects the opening of the Concord BART kiosk in April 1993. Sales results for the period prior to April 1993 were those at the Transportation Center only. Between the third quarter of 1993 and the first quarter of 1994, BART-30 and BART Plus sales began to taper off; TransLink sales continued to show significant growth through the third quarter of 1994. Sales revenue for the other ticket types began to decline in the first quarter of 1994. The most significant decline for BART-30 revenue occurred in the second quarter of 1994 when sales decreased by 9 percent. The most significant declines for BARTPlus and the CCCTA 40-Ride revenue occurred in the third quarter of 1994 with decreases of 20 percent and 17 percent, respectively.
- Total Sales (All)** - The composite trend in sales revenue for all locations is similar to the individual trends. The revenue trends for each ticket type, including TransLink, BART-30, BARTPlus and CCCTA 40-Ride, are presented in Exhibit IV-7. Only TransLink experienced a growth in sales revenue through the entire monitoring period. Between the second quarter of 1993 and the third quarter of 1994, total TransLink sales increased approximately 38 times from \$55,376 to nearly \$2.2 million, respectively. Only between the fourth quarter of 1993 and the first quarter of 1994 did TransLink sales revenue show a decline, which was only 2.5 percent.



Over the monitoring period, BART-30 sales declined by 45 percent from \$5.9 million in the first quarter of 1993 to \$3.3 million in the third quarter of 1994. BARTPlus ticket sales declined by 48 percent from \$1.9 million in first quarter 1993 to \$956,900 in third quarter 1994. CCCTA 40-Ride tickets sales declined over the monitoring period from \$21,316 to \$15,395, a decrease of 28 percent. The most significant decreases in revenue occurred in the third quarter of 1994 and were 28 percent for BART-30, 39 percent for BARTPlus, and 17 percent for CCCTA 40-Ride.

Total Revenue, Discounts and Refunds

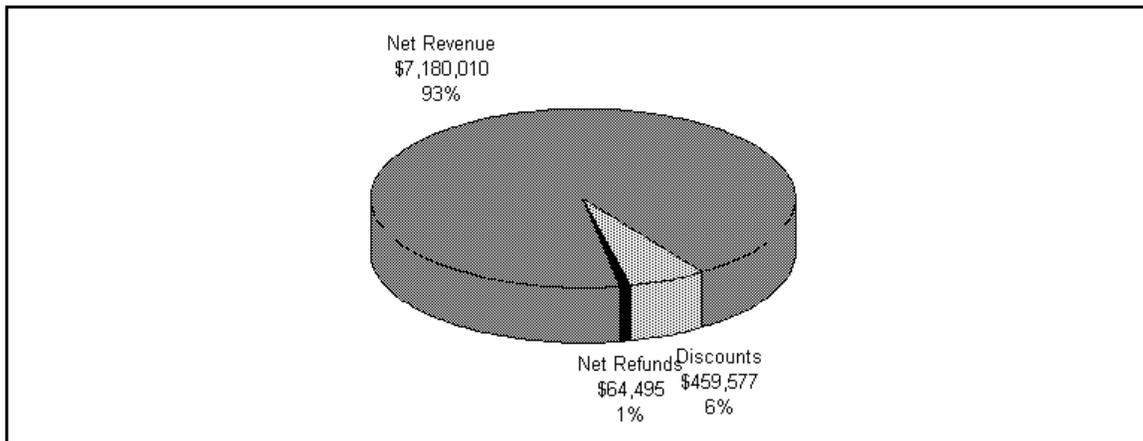
During the period from May 1993 through September 1994, the sale of TransLink tickets generated \$7.7 million. As shown in Exhibit IV-8, the total revenue generated by TransLink ticket sales is comprised of three elements: net discount, net refunds, and net revenue.

Gross revenue is based on the face value of the ticket. The discounts represent the difference between the face value and the sales price of a TransLink ticket (e.g., the \$2 off a \$32 ticket and the \$5 off the \$80 ticket). The discounts were equal to six percent of TransLink gross revenue during this 17-month monitoring period, or a total of \$459,577.

Approximately one percent of TransLink gross revenue was used for refunds. Net refunds during this period totaled \$64,495. Thus, TransLink net revenue was 93 percent of the cumulative gross revenue for the monitoring period, or \$7,180,010.

Discounts are inherent to the TransLink Program concept. However, refunds are the result of external factors. Typical factors prompting a refund include damage to a TransLink ticket by the fare gate or BTV, a mechanical malfunction of the fare gate or BTV, and damage to the ticket by a patron. As shown by the breakdown in Exhibit IV-9, the majority of refunds were the result of equipment failure. More than half of all refunds were the result of TransLink tickets becoming demagnetized by a fare gate or a BTV. Only 9 percent of the refunds were attributed to patron damage or other causes. Of the remaining reasons for issuing refunds, fare gate and BTV malfunctions represented 14 percent of all refunds. The remaining 11 percent of all refunds were caused by the inability to retrieve a TransLink ticket from a BTV.

Exhibit IV-8 Cumulative Gross Revenue



Another important factor in examining refunds is the frequency at which refunds occurred. By comparing the number of refunds each month with the number of trips made by those using TransLink tickets, an average refund rate can be developed. Information for the period from March 1994 through September 1994 follows as Exhibit IV-10. In this case, the refund rate is expressed as the number of refunds per 450 linked trips. As shown in this exhibit, the overall refund rate is very low for BART Rail, and was in a range of 0.16 to 0.31 refunds per 450 linked trips. The refund rate for bus users was calculated as a composite of CCCTA and BART Express experience. The refund rate for bus during this same period was consistently above one per 450 linked trips. Furthermore, bus refunds exceeded two per 450 linked trips in three of the seven months that were examined. Only once during the period examined did bus refunds fall below one per 450 trips. In September 1994, bus refunds decreased to a level of 0.61 per 450 linked trips. Overall, BART Rail's refund rate averaged only 0.21 per 450 trips while the refund rate for bus averaged 1.77 per 450 trips.

TransLink Ridership

In addition to tracking the revenue generated from the sale of TransLink tickets, a review of ticket usage also was conducted. Trends in ridership by TransLink ticket users were examined for the period from May 1993 to September 1994 for all three operators that accept TransLink tickets: BART Rail, BART Express bus, and CCCTA's County Connection bus. The trend lines for each of these operators are presented in Exhibits IV-10 through IV-12. The trend lines for BART Rail and BART Express show unlinked trips. The trend line for CCCTA includes some linked trips.

Exhibit IV-9 TransLink Refunds by Reason

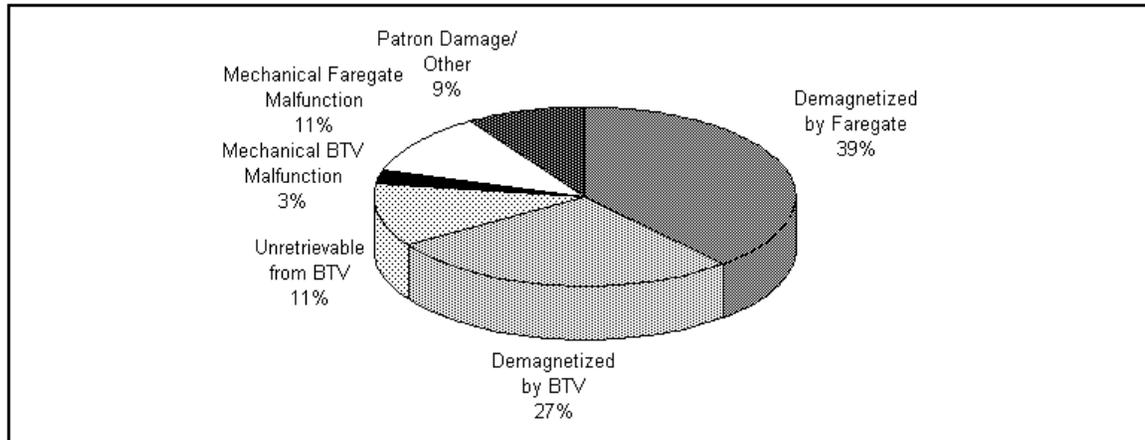


Exhibit IV-10						
TransLink Attributable Refunds per 450 Linked Trips						
March 1994 through September 1994						
Month	BART Rail Only			To/From Bus		
	Number of Refunds	Number of Trips	Refunds per 450 Trips	Number of Refunds	Number of Trips	Refunds per 450 Trips
March 1994	128	263,478	0.22	185	31,722	2.62
April 1994	89	248,980	0.16	82	28,264	1.31
May 1994	187	270,723	0.31	165	29,484	2.52
June 1994	134	303,437	0.20	152	29,488	2.32
July 1994	124	286,990	0.19	95	26,042	1.64
August 1994	171	349,937	0.22	75	28,324	1.19
September 1994	122	350,642	0.16	39	28,612	0.61
Total	955	2,074,187	0.21	793	201,936	1.77

Source: TransLink Refund Reasons

**BART Rail** - TransLink ridership has steadily increased since the program inception in May 1993, as illustrated in Exhibit IV-11. As would be expected, the most significant gains occurred during the first few months of the program. Between May and October 1993, TransLink ridership on BART trains increased nearly 1,700 percent from 6,750 passengers to 121,740 passengers. The growth rate started to slow down in October 1993, though the overall trend line has continued upward.

There were two months during the monitoring period when TransLink ridership on BART Rail showed a decline. In April 1994 ridership registered a 7 percent decline, from 262,970 passengers in March to 244,580 passengers in April. TransLink ridership declined by 6.1 percent between June and July 1994 from 296,276 to 278,227 passengers, respectively. In both cases, the lower month's ridership still exceeds the monthly volume two months earlier, continuing the growth in usage. Furthermore, it is possible that the number of weekdays in each of these months may have had an influence on the ridership trend. In the later months of the monitoring period, TransLink ridership seems to have stabilized. Between August and September 1994, for example, ridership registered an increase of less than one percent.

**BART Express** - TransLink ridership on BART Express buses does not appear to have achieved a significant increase during the early part of the monitoring period. As shown in Exhibit IV-12, TransLink ridership between May and October 1993 was relatively stable. TransLink monthly ridership during this period generally stayed within a range of 2,000 to 3,000 passengers. TransLink ridership on BART Express buses shows significant gains between November 1993 and May 1994. Monthly increases during this period ranged from 13 to 60 percent. Ridership reached its first peak in May 1994 with a total of 20,057 TransLink passengers. A second peak was reached in August 1994 when TransLink ridership totaled 21,422 passengers. However, between August and September 1994 TransLink ridership on BART Express decreased 28 percent, falling to a level of 15,408 passengers.

Exhibit IV-11 TransLink Ridership Trend in BART Rail Ridership

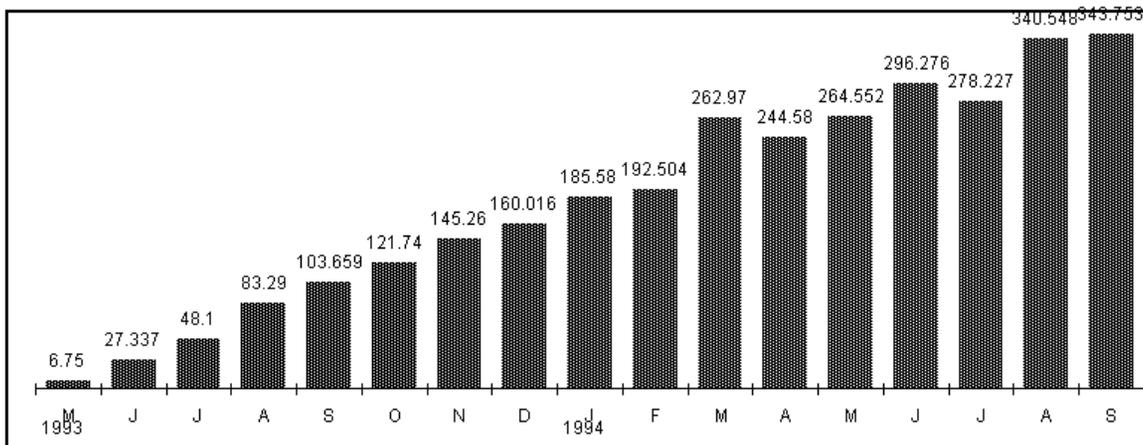
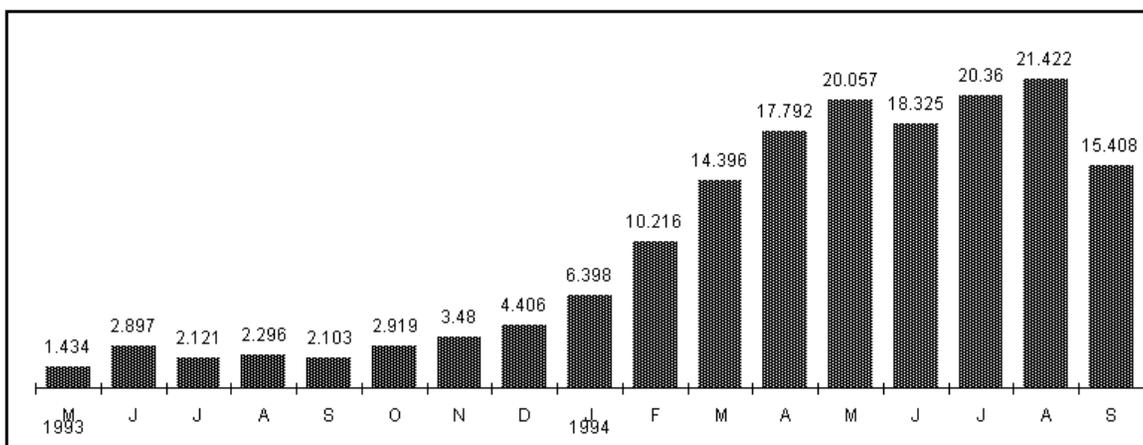


Exhibit IV-12 TransLink Ridership Trend in BART Express Ridership



**CCCTA** - CCCTA's TransLink ridership trends show the most variability of any of the services. As shown in Exhibit IV-13, CCCTA TransLink ridership exhibited significant growth between May 1993 and October 1993. In May 1993, there were 2,314 passengers boarding County Connection buses using a TransLink ticket. Ridership climbed steadily through October 1993 when it reached a level of 7,338 passengers, an overall gain of 217 percent. In November and December, TransLink ridership declined 21 percent and 9 percent, respectively. CCCTA TransLink ridership did not recover until March 1994 when it reached a level of 9,283 passengers. In April 1994, the trend exhibited a downward shift

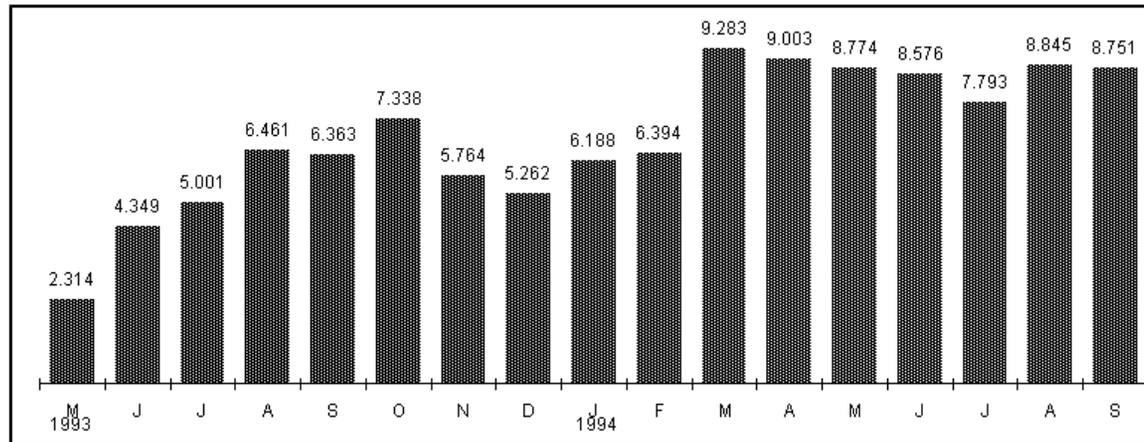
that extended through July 1994 when TransLink ridership totaled 7,793 passengers, its lowest level during the six month period from April through September 1994. Although the trend line declined during most of this period, there were some signs of stability. TransLink ridership remained within a range of 8,000 to 8,700 passengers in five of the six months between April and September 1994.

### TransLink Transfers

The main concept behind the TransLink Program is establishing a universal fare instrument for Bay Area operators. Ideally, TransLink will allow passengers to make linked trips seamlessly. That is, using only one ticket, passengers will be able to ride various modes and operators without the need for a paper transfer or a combination of cash or fare media. To understand the extent to which TransLink users are taking full advantage of the transfer portion of their tickets, the trends in TransLink transfers were examined.

Passengers can use a TransLink ticket to transfer to BART Rail from BART Express or CCCTA buses. Likewise, passengers can transfer to BART Express or County Connection buses from BART Rail. TransLink tickets also can be used to transfer between CCCTA and BART Express buses. The BART staff has defined the total size of the BART/CCCTA and BART/BART Express market based on past ridership surveys. Using TransLink usage statistics from the BART fare gate barriers, the BART staff estimates that TransLink riders account for approximately 15 percent of the total BART/CCCTA and BART/BART Express market. The other 85 percent are using other fare media to pay for their trip on the two services.

Exhibit IV-13 TransLink Ridership Trend in CCCTA Ridership



TransLink makes it easier to make a BART-to-bus and a bus-to-BART transfer. Without a TransLink ticket, a passenger wishing to make a BART-to-bus transfer must obtain a transfer from inside the paid area of the BART station. When boarding a connecting CCCTA or BART Express bus, the passenger presents the transfer and pays 65¢. A passenger beginning their trip on a CCCTA or BART Express bus, without the transfer from inside a BART station, cannot transfer to BART rail service without paying two separate full fares. The TransLink program includes discounts on bus and rail fare when a transfer is made in either direction. TransLink transfers from BART-to-bus cost 25¢ and do not require a paper transfer. When transferring from bus-to-BART, TransLink now provides a discount of 50¢ from the regular BART fare. Thus, TransLink provides a means by which passengers can transfer seamlessly between BART Rail and CCCTA and BART Express buses.

The trends in interoperator transfers during the monitoring period are discussed separately in this section for the BART Rail/BART Express bus, BART Rail/CCCTA bus, and CCCTA/BART Express connections.

**BART Rail/BART Express Transfers** - Transfers between BART Rail and BART Express increased steadily through most of the monitoring period, as the trend line in Exhibit IV-14 illustrates. Between May 1993 and December 1993, transfers increased nearly 400 percent from 2,201 each month to 10,836, respectively. Transfers continued to increase until March 1994, when it reached a level of 16,309. Although April 1994 showed a decline in the number of transfers, the months following (May 1994 through August 1994) showed a consistently upward trend. BART Rail/BART Express transfers reached their highest level during the monitoring period in August 1994 with 19,469 transfers, continuing to increase market share.

**BART Rail/CCCTA Transfers** - The trend in transfers between BART Rail and CCCTA - presented in Exhibit IV-15. This exhibit distinguishes between the direction of the transfer, either from a CCCTA bus to BART Rail or from BART Rail to a CCCTA bus.

Exhibit IV-14 TransLink Ridership Trend in BART Rail/BART Express Ridership

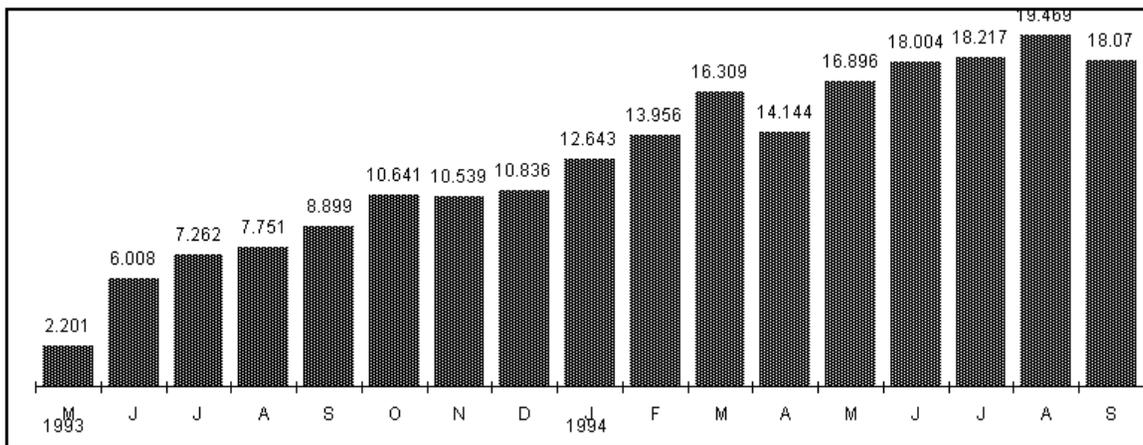
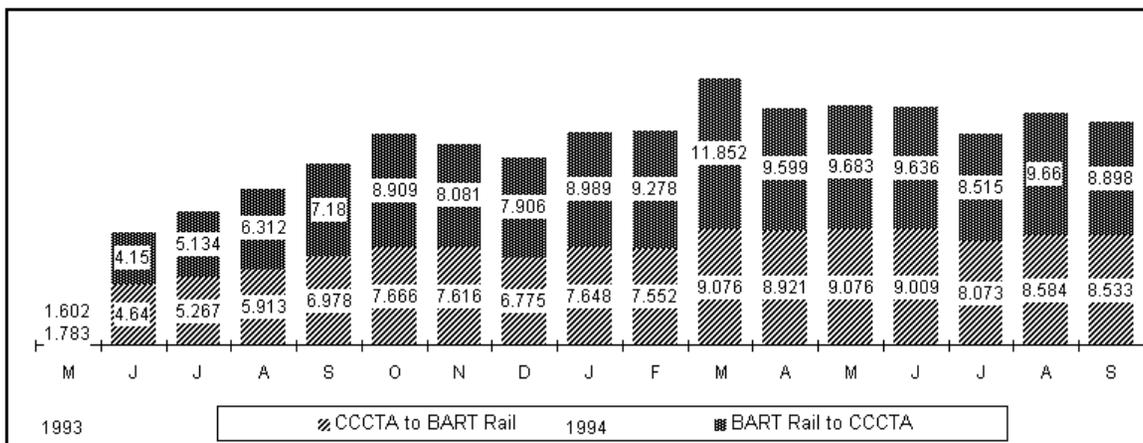


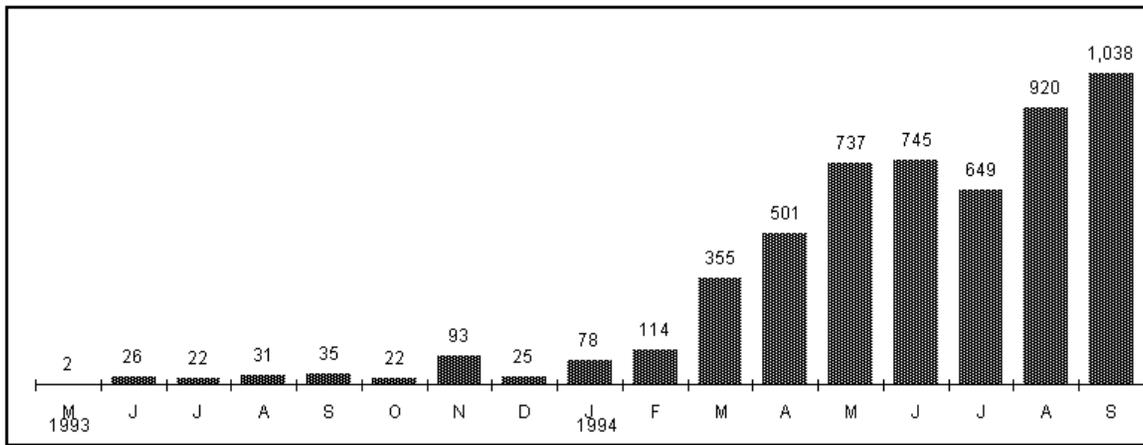
Exhibit IV-15 TransLink Ridership Trend in BART Rail/CCCTA Transfers



- CCCTA Bus to BART Rail** - The variability seen earlier in CCCTA's TransLink ridership trend (Exhibit IV-13) also is evident in the trend in CCCTA bus to BART Rail TransLink transfers. In comparing the two exhibits (IV-15 and IV-13), it appears that nearly all of the TransLink riders on CCCTA buses use their tickets to connect with BART Rail. However, it is interesting to note that in 11 of the 17 months of the monitoring period, total CCCTA TransLink ridership reported by CCCTA was less than the number of transfers from CCCTA to BART Rail that were reported by BART. For example, CCCTA reported 4,349 passengers using Trans Link tickets in June 1993. In that same month, BART reported 4,640 passengers transferring to its rail service from a CCCTA bus. Obviously, at least 309 TransLink trips were misreported. The exact cause of the discrepancies could not be determined, though "glitches" in the TransLink hardware or software are the likely contributors. These discrepancies make it impossible to assess the trend in CCCTA to BART Rail transfers accurately.
- BART Rail to CCCTA** - During the first eleven months of the TransLink Program, BART Rail to CCCTA transfers increased steadily. At the program's inception in May 1993, transfers by TransLink users totaled 1,602 per month. By March 1994, BART Rail to CCCTA transfers had reached a monthly level of 11,852. Following March, transfers declined 19 percent to a level of 9,599 in April. From April through September 1994, transfers generally were stable keeping within a range of about 9,000 to 9,700. The only exception was in July when BART Rail to CCCTA transfers totaled 8,515.

**CCCTA/BART Express Transfers** - In addition to transferring to and from BART Rail, CCCTA TransLink riders can transfer to a BART Express bus. As the trend line presented in Exhibit IV-16 illustrates, bus transfers did not achieve significant gains until March 1994. At this time, bus transfers more than doubled from 114 in February to 355 in March. From March through September 1994 bus transfers increased steadily with the exception of July. Between June and July 1994, bus transfers declined from 745 to 649, respectively. Following July 1994, bus transfers started to pick up again increasing to 920 in August and 1,038 in September.

Exhibit IV-16 TransLink Ridership Trend in CCCTA to BART Express Transfers



## V. EQUIPMENT RELIABILITY

Important to the proper functioning of TransLink is the reliability of the equipment. The two essential components are the BART fare gates and the bus ticket validators (BTVs). When functioning properly these components deduct the fare stored on the TransLink ticket and then imprint the remaining value. However, a variety of problems can disrupt this process. This section presents a discussion of the problems that have been experienced. The purpose of this discussion is to highlight the types of problems that have occurred within the TransLink program and their magnitude. It is not intended to dissuade others from implementing similar innovations.

Information related to equipment reliability was available only for CCCTA's BTVs. BART fare gate information by type of failure was not available. Therefore, it was not possible to review TransLink-related gate failures. The information provided by CCCTA was the Radio Dispatcher Log of TransLink Problems. These reports contain a daily log of all BTV problems reported by operators to the dispatcher. CCCTA Radio Dispatcher Logs were made available for a one-year period from October 1, 1993 through September 30, 1994. This is five months after the formal start of the program. CCCTA operators also were using BTVs on a trial period prior to the full implementation of the TransLink program.

The Radio Dispatcher Logs provided by CCCTA were compiled to yield monthly totals for nine separate BTV errors. Any BTV error generates a code that is displayed on the operator control unit (OCU). Each error is accompanied by a "beep" to alert the operator. The error codes include the following:

Exhibit V-1												
TransLink Equipment Reliability												
CCCTA BTV Failures												
	Error 31	Error 32	Error 34	Error 35	Error 37	No Power	Bad T/V	BTV OOS	Misc.	TOTAL	Percentage	
October '93	0	13	8	0	1	8	8	14	18	70	4.3%	
November '93	5	29	28	7	1	17	15	28	25	155	9.5%	
December '93	1	39	34	0	1	12	5	2	29	123	7.6%	
January '94	6	43	44	0	4	13	13	11	57	191	11.8%	
February '94	8	31	35	1	1	12	19	12	71	190	11.7%	
March '94	0	24	19	0	0	6	15	15	24	103	6.3%	
April '94	4	22	3	0	0	2	11	26	16	84	5.2%	
May '94	9	32	8	0	0	5	9	15	13	91	5.6%	
June '94	3	29	6	0	0	7	15	18	16	94	5.8%	
July '94	2	30	8	0	0	2	8	15	2	67	4.1%	
August '94	6	70	10	0	3	3	20	26	27	165	10.2%	
September '94	23	116	23	0	1	3	24	56	46	292	18.0%	
<b>TOTAL</b>	<b>67</b>	<b>478</b>	<b>226</b>	<b>8</b>	<b>12</b>	<b>90</b>	<b>162</b>	<b>238</b>	<b>344</b>	<b>1625</b>	<b>100.0%</b>	

Percentage	4.1%	29.4%	13.9%	0.5%	0.7%	5.5%	10.0%	14.6%	21.2%	100.0%
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**LEGEND:**

Error 31 -	Resettable Problem/Ticket Jam
Error 32 -	Non-Resettable. Equipment out-of-order
Error 34 -	Data Storage Module (DSM) absent or poor communication
Error 35 -	Data Storage Module (DSM) full
Error 37 -	Data Storage Module (DSM) header fault - Not properly initialized
BTV OOS -	Communication Failure
Bad T/V -	Failure to validate
Misc. -	Miscellaneous problem

**Percentage by Month**

	Error 31	Error 32	Error 34	Error 35	Error 37	No Power	Bad T/V	BTV OOS	Misc.	TOTAL
October '93	0.0%	2.7%	3.5%	0.0%	8.3%	8.9%	4.9%	5.9%	5.2%	4.3%
November '93	7.5%	6.1%	12.4%	87.5%	8.3%	18.9%	9.3%	11.8%	7.3%	9.5%
December '93	1.5%	8.2%	15.0%	0.0%	8.3%	13.3%	3.1%	0.8%	8.4%	7.6%
January '94	9.0%	9.0%	19.5%	0.0%	33.3%	14.4%	8.0%	4.6%	16.6%	11.8%
February '94	11.9%	6.5%	15.5%	12.5%	8.3%	13.3%	11.7%	5.0%	20.6%	11.7%
March '94	0.0%	5.0%	8.4%	0.0%	0.0%	6.7%	9.3%	6.3%	7.0%	6.3%
April '94	6.0%	4.6%	1.3%	0.0%	0.0%	2.2%	6.8%	10.9%	4.7%	5.2%
May '94	13.4%	6.7%	3.5%	0.0%	0.0%	5.6%	5.6%	6.3%	3.8%	5.6%
June '94	4.5%	6.1%	2.7%	0.0%	0.0%	7.8%	9.3%	7.6%	4.7%	5.8%
July '94	3.0%	6.3%	3.5%	0.0%	0.0%	2.2%	4.9%	6.3%	0.6%	4.1%
August '94	9.0%	14.6%	4.4%	0.0%	25.0%	3.3%	12.3%	10.9%	7.8%	10.2%
September '94	34.3%	24.3%	10.2%	0.0%	8.3%	3.3%	14.8%	23.5%	13.4%	18.0%
<b>TOTAL</b>	<b>100.0%</b>									

**LEGEND:**

Error 31 -	Resettable Problem/Ticket Jam
Error 32 -	Non-Resettable. Equipment out-of-order
Error 34 -	Data Storage Module (DSM) absent or poor communication
Error 35 -	Data Storage Module (DSM) full
Error 37 -	Data Storage Module (DSM) header fault - Not properly initialized
BTV OOS -	Communication Failure
Bad T/V -	Failure to validate
Misc. -	Miscellaneous problem

**Percentage by Type of Failure**

	Error 31	Error 32	Error 34	Error 35	Error 37	No Power	Bad T/V	BTV OOS	Misc.	TOTAL
October '93	0.0%	18.6%	11.4%	0.0%	1.4%	11.4%	11.4%	20.0%	25.7%	100.0%
November '93	3.2%	18.7%	18.1%	4.5%	0.6%	11.0%	9.7%	18.1%	16.1%	100.0%
December '93	0.8%	31.7%	27.6%	0.0%	0.8%	9.8%	4.1%	1.6%	23.6%	100.0%
January '94	3.1%	22.5%	23.0%	0.0%	2.1%	6.8%	6.8%	5.8%	29.8%	100.0%
February '94	4.2%	16.3%	18.4%	0.5%	0.5%	6.3%	10.0%	6.3%	37.4%	100.0%

March '94	0.0%	23.3%	18.4%	0.0%	0.0%	5.8%	14.6%	14.6%	23.3%	100.0%
April '94	4.8%	26.2%	3.6%	0.0%	0.0%	2.4%	13.1%	31.0%	19.0%	100.0%
May '94	9.9%	35.2%	8.8%	0.0%	0.0%	5.5%	9.9%	16.5%	14.3%	100.0%
June '94	3.2%	30.9%	6.4%	0.0%	0.0%	7.4%	16.0%	19.1%	17.0%	100.0%
July '94	3.0%	44.8%	11.9%	0.0%	0.0%	3.0%	11.9%	22.4%	3.0%	100.0%
August '94	3.6%	42.4%	6.1%	0.0%	1.8%	1.8%	12.1%	15.8%	16.4%	100.0%
September '94	7.9%	39.7%	7.9%	0.0%	0.3%	1.0%	8.2%	19.2%	15.8%	100.0%
<b>TOTAL</b>	<b>4.1%</b>	<b>29.4%</b>	<b>13.9%</b>	<b>0.5%</b>	<b>0.7%</b>	<b>5.5%</b>	<b>10.0%</b>	<b>14.6%</b>	<b>21.2%</b>	<b>100.0%</b>

**LEGEND:**

Error 31 -	Resettable Problem/Ticket Jam
Error 32 -	Non-Resettable. Equipment out-of-order
Error 34 -	Data Storage Module (DSM) absent or poor communication
Error 35 -	Data Storage Module (DSM) full
Error 37 -	Data Storage Module (DSM) header fault - Not properly initialized
BTV OOS -	Communication Failure
Bad T/V -	Failure to validate
Misc. -	Miscellaneous problem

- ERROR 31 - Resettable problem/Ticket Jam
- ERROR 32 - Non-resettable problem; equipment out-of-order
- ERROR 34 - Data Storage Module (DSM) absent or poor connection
- ERROR 35 - Data Storage Module (DSM) full
- ERROR 37 - Data Storage Module (DSM header fault - not properly initialized)

Three other codes are used on the dispatcher logs to describe various problems:

- BTV OOS - Communication failure
- Bad T/V - Failure to validate
- Misc. - Miscellaneous problem

Monthly BTV failures by error code for the period from October 1993 through September 1994 are shown in Exhibit V-1, along with an annual total and percentages. There were 1,625 failures reported during this time, or an average of 135 per month in CCCTA's fleet of 112 buses. The number of failures varied greatly each month. The highest number of monthly failures (292) occurred at the end of this period (September 1994). The next highest numbers of failures occurred in January and February 1994 when there were 191 and 190 failures, respectively. The incidents in these three months accounted for 40percent of all failures reporting during this 12-month period. At the other extreme, there were only 67 failures in July 1994 and only 70 in October 1993.

ERROR 31 (resettable problem/ticket jam) was the most common problem encountered with the BTVs. There were 478 incidents of ticket jams during the evaluation period. Ticket jams represent nearly 30 percent of all BTV failures. Despite their relatively high incidence, ticket jams do not result in a significant disruption since the operator can reset the BTV. The second most common problem category was for miscellaneous problems (344 incidents), representing 21 percent of all failures. Essentially, the miscellaneous category includes those problems for which the maintenance personnel could find no exact cause. The least encountered problems were ERROR 35 (DSM full) and ERROR 37 (DSM header fault). Together, these two types of failures comprise a little more than one percent of all BTV failures.

In measuring BTV reliability further, the number of failures per 1,000 boardings was calculated and is presented in Exhibit V-2. The average for the 12-month period was 7.8 failures per 1,000 boardings. However, there was great variability in this indicator, ranging from a low of 4.1 BTV failures per 1,000 boardings to a high of 16.6 failures. There were five months when the rate was less than five failures per 1,000 boardings. Many of these "good" months were clustered in the Spring and Summer of 1994. Performance declined in August 1994 and again in September 1994. This time period coincides with the completion of the BTV contractor's work and the transition of these activities to CCCTA.

<b>Exhibit V-2</b>	
<b>TransLink Equipment Reliability</b>	
<b>CCCTA BTV Failures per 1,000 Boardings</b>	
CCCTA	BTV Failures

	TransLink	Total	per 1,000	Percentage
	Boardings	BTV Failures	Boardings	Change
October 1993	16,450	70	4.3	-
November 1993	14,405	155	10.8	152.9%
December 1993	13,452	123	9.1	-15.0%
January 1994	15,995	191	11.9	30.6%
February 1994	16,808	190	11.3	-5.3%
March 1994	22,627	103	4.6	-59.7%
April 1994	18,602	84	4.5	-0.8%
May 1994	18,457	91	4.9	9.2%
June 1994	18,212	94	5.2	4.7%
July 1994	16,308	67	4.1	-20.4%
August 1994	18,495	165	8.9	117.1%
September 1994	17,629	292	16.6	85.7%
TOTAL	207,440	1,625	7.8	

## VI. OTHER IMPACTS

This section discusses other impacts from the TransLink program, particularly the effect on day-to-day operations. The following discussion provides observations regarding dwell times, driver and station agent acceptance, agency involvement and staff commitments, and institutional agreements. This information is based on discussions with the staff from the participating agencies.

### Dwell Times

Boarding bus passengers must carry out a transaction with the BTV. This takes a few seconds longer than boarding and showing the driver a flash pass or presenting a paper transfer. It also is slightly longer than the time required to deposit a cash fare or ticket in the farebox. However, if a cash paying passenger does not have cash in hand, or has difficulty inserting a dollar bill in the farebox, a BTV transaction will be faster.

On the inbound portion of the trip, the additional seconds required by the TransLink rider were absorbed into the operation without a noticeable impact on on-time performance. A more significant impact was expected where concentrations of TransLink users boarded at the same time, such as at a BART station. County Connection and BART Express buses typically use the BART station as a layover point, with recovery time built into the schedule at this location. Thus, any additional time required in the boarding process was accommodated without changing the total travel time.

No statistical information was maintained on the actual boarding times before and after TransLink or their impacts on the operation. However, neither CCCTA nor BART Express schedules have been revised to add more time as a result of the TransLink ticket.

### Driver/Station Agent Acceptance

A passenger using a TransLink ticket was expected to have more interaction with a driver or station agent, particularly if the passenger was unfamiliar with the program or a malfunction occurred. This had the potential for increased conflict. CCCTA trained its drivers in the use of the OCU and BTV. A training manual was prepared and distributed as well.

Prior to the demonstration, CCCTA conducted a test of the TransLink equipment on one bus line. Surveys and focus groups were held with the riders who volunteered to try the ticket. A focus group of drivers also was conducted. The training program was one of the topics discussed at the driver focus group. There was a wide range of opinion on training. Drivers noted that training should be more individualized, since people have different levels of computer knowledge. Hands-on training time was considered important by the drivers. Having a reference card or a summary of the training manual to use on-board also was suggested.

The users noted in the surveys and focus group discussions that drivers were very helpful, particularly if there was a problem with a ticket. Some participants noted there was less interaction with the driver, and viewed the fare collection system as totally automated.

BART station agents are trained to perform "fingertip maintenance" on the fare gates, which extended to TransLink tickets. Initially, when TransLink tickets were not accepted at all fare gates, a passenger using a fare gate that was not modified received a "see agent" message. The agent, seeing the TransLink ticket, would advise the passenger of the correct fare gate to use. In the case of a failure, the agent would issue a temporary trip ticket so that the passenger could continue their trip. This is comparable to BART's existing refund procedures.

No systematic before and after data were maintained regarding this aspect of the program. There is no evidence of an increase in the level of conflict between passengers and operators/stations agents attributable to TransLink.

## Agency Involvement and Staff Commitment

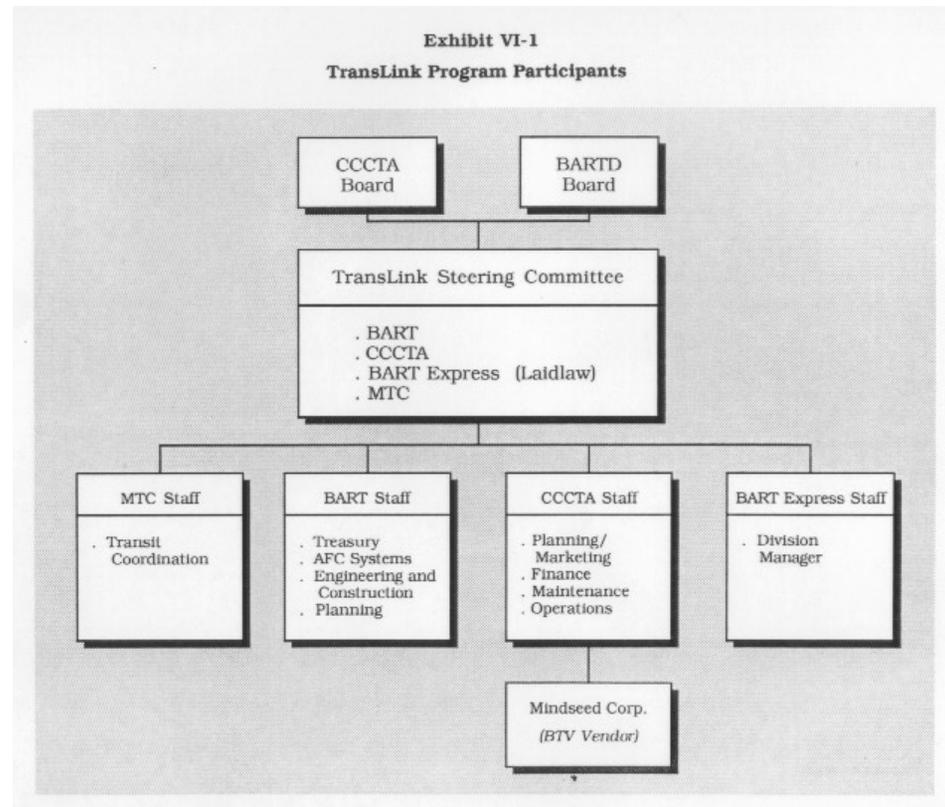
During the start-up and phase-in of TransLink, the program was guided by a steering committee comprised of staff from the Metropolitan Transportation Commission (MTC) and the three operators. The chart in Exhibit VI-1 identifies the key participants within each organization.

MTC has been responsible for overall project direction and oversight. Within MTC, the staff from the Transit Coordination section led the effort. In addition to its efforts during the early stages of TransLink, MTC currently is guiding the expansion of the program. It has contracted with two different consultant teams for assistance. One team is providing support for the development of TransLink technology. This includes assisting AC Transit, the next operator scheduled to join the program, in obtaining fareboxes that incorporate the BTV functions. The other team is reviewing the organizational structures needed to support the program, particularly the responsibilities for the TransLink Central Clearinghouse. The clearinghouse contractor's efforts are being advised by a TransLink Clearing House Committee, with staff from many of the region's transit operators.

CCCTA has been the lead transit operator on the initial TransLink BTV project. Its activities, with consultant assistance, leading up to full implementation included preparation of the specifications for both hardware and software; procurement and acceptance testing of the BTVs and related equipment; and training and promotion of the program. Prior to the multi-operator demonstration, CCCTA conducted an initial test on one route in its system. Its on-going activities focus on the continued operation and maintenance of the equipment. CCCTA's participation involves staff from Planning and Marketing, Finance, Maintenance and Operations. CCCTA also coordinated the work of the BTV vendor.

To prepare for the start of the program, BART had to modify its fare gates to accept a TransLink ticket. Some of these modifications were completed in time for CCCTA's initial test. BART also has been responsible for the procurement, installation and testing of the C/DVs. Throughout the demonstration period, BART has served as the clearinghouse for the program. In this capacity, it performs all functions related to ticket coding, distribution, and sales; refunds for bad tickets; and revenue reporting and reconciliation. BART staff from four different departments were involved: Treasury, AFC Systems, Engineering and Construction, and Planning. BART Express is operated by a private provider under contract to BART. Its participation in the TransLink program is directed by the contractor's division manager.

Exhibit V-1 TransLink Equipment Reliability CCCTA BTV Failures



Implementation of new technology cuts across all parts of the organization. Though none of the operators involved have kept specific records of the amount of staff time devoted to the development and implementation of TransLink, it is recognized that the program has required the involvement of staff at all levels and in all key functional areas. Within CCCTA, for example, a TransLink task force was established, with representatives from all departments. This internal group met frequently during the implementation and demonstration stages to discuss TransLink issues. The group continues to meet regularly. Staff from AC Transit attend these meetings to assist with their eventual implementation of the program, to better understand the depth and breadth of TransLink's impact within the organization.

## Inter-Operator Agreement

The TransLink program was introduced to the public before the formal agreement between BART and CCCTA was finalized. The program was initiated in May 1993. Several months later, in August 1993, there was a draft agreement for the review and approval of the CCCTA and BART boards.

The agreement between BART and CCCTA, dated September 20, 1993, contains 13 articles, which cover the following topics:

- I. Description of the Program
- II. TransLink Demonstration Program Administration
- III. Responsibility
- IV. Information Reporting
- V. Public Information
- VI. Cooperation
- VII. TransLink Pricing, Discount, and Revenue Sharing
- VIII. Records and Audits
- IX. Non-precedent Setting
- X. Responsibility
- XI. Indemnity
- XII. General Provisions
- XIII. Effective Date of Agreement

A copy of the agreement is appended to this report.

By implementing the program without a formal agreement, essentially CCCTA and BART decided to resolve issues as they came up. This decision expedited the program implementation schedule. It also recognized that in a new program, it is impossible to anticipate all possible issues up front and some things must be learned as you go along. The alternative would have been to try to resolve all issues prior to implementation, including the procedures and responsibilities to be followed by the different parties.

The TransLink clearinghouse function and its interrelationship with the rest of the BART organization is complex. Neither party (BART or CCCTA) anticipated the degree of complexity that would be involved in implementing TransLink, or the difficulties that would arise in trying to resolve different issues, where multiple departments throughout the organization had to be involved. This was particularly difficult for CCCTA, which was used to a more streamlined and informal operating style.

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## **VII. CONCLUSIONS AND PROGRAM FUTURE**

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### Conclusions

MTC is required by state law to adopt rules and regulations that provide for the coordination of fares and schedules for all public transit systems within its jurisdiction. Prior to TransLink, fare coordination consisted of a series of interoperator transfer agreements and bus flash passes with stored value for use on the BART system. More extensive coordination was not possible with the then available technology because of the wide range of fares charged by the different operators and the need to generate a specific level of revenue. Operators also were reluctant to support global coordination efforts merely for the sake of coordination, particularly for few interoperator connections.

TransLink represents a major step forward for fare integration in the San Francisco Bay Area. With this multi-operator stored value ticket, each operator receives revenue for each trip made, enhancing the revenue they are generating over an unlimited ride flash pass. By initiating the program with two bus systems that feed BART, and whose passengers transfer to BART, the program has addressed an existing travel pattern. This pragmatic approach has combined advanced fare collection technology with realistic operating conditions.

The following are the conclusions and "lessons learned" from the TransLink program demonstration. They focus on the basic concepts underlying the TransLink program, user acceptance, caveats for introducing technology, and institutional arrangements for interoperator fare programs.

### Conceptual Framework

- The concept of a universal ticket is a workable one. Existing technology can support the concept of seamless fare collection and improve fare coordination among multiple operators in the region.
- Pre-TransLink transfer arrangements were hampered by the incompatibility of the bus fare collection systems with BART's barrier fare collection system. The TransLink ticket simplifies and enhances a passenger's ability to transfer from BART to a connecting bus. It makes a significant enhancement to the bus to BART transfer.
- Through automation such as that used for TransLink, interoperator fare programs can exist with minimal involvement of transit operating personnel. For experienced passengers, drivers and station agent activities generally are limited to responding to failures.
- TransLink was incorporated within the existing fare structures and procedures of the participating operators. In subsequent steps, the TransLink ticket is likely to replace some of the fare programs and media in use in the Bay Area.

### User Acceptance

- Virtually all TransLink users are satisfied with the program. The vast majority of survey respondents indicated that the program should be continued.
- The survey of all TransLink users showed a relatively high proportion of BART only riders. Thus, many tickets were not being used on a connecting bus service, though this was the primary target market for this universal ticket. While this result is surprising at first, it can be attributed to several factors:
  - Relatively few BART riders use a CCCTA or BART Express bus as their access mode. Like many rail systems oriented to suburban commuters, the dominant access mode is the automobile. The BART stations served by CCCTA and BART Express buses have extensive parking areas and "kiss-and-ride" facilities. Thus, TransLink riders are reflecting the general mix of all BART riders.
  - With only CCCTA and BART Express in the program at the present time, there are limited transfer opportunities for TransLink users. Those passengers that transfer to or also use the bus services of AC Transit, Muni, or other major operators in the region, are a much larger market for interoperator travel. For the most part, this market is not yet part of the TransLink program.
  - The last ride bonus and point of purchase discount have attracted many BART riders to TransLink. These provisions offer a greater savings than any other BART ticket. The last ride bonus probably was the reason that the \$32

TransLink ticket was more popular than the \$80 ticket.

- Recent changes in TransLink pricing respond to this by shifting from a point-of purchase discount to a point-of-use discount. The last ride bonus will continue. This change took effect in February 1995, beyond the monitoring period.
- TransLink is being used on CCCTA buses almost exclusively by passengers who transfer to BART. This, in fact, was a major market for whom the ticket was intended. Most County Connection bus routes provide service to a BART station. Many CCCTA riders transfer to BART to continue their trip.
- BART staff estimate that TransLink tickets are being used by 15 percent of the market that rides a CCCTA or BART Express bus to a BART rail station. The other transferring passengers are using different fare media to pay their bus and rail fares. Some of these riders may be eligible for reduced fares, which are not accommodated in the current TransLink program.
- After significant growth at the start of the program, both sales and ridership related to TransLink appear to be leveling off. Again, this suggests that the market for the initial program has been tapped. For significant growth to occur in the future, additional operators will need to be added to the program.
- The program to date has been oriented to regular commuters for whom the outlay of at least \$32 was not a problem.
- The stored value on a TransLink ticket does not expire, unlike BARTPlus tickets. Thus, the ticket can be used by occasional riders, as well as regular commuters.

#### Technology Introduction

- Some problems can be expected with during the start-up and phasing-in of any new technology, including the off-the-shelf TransLink equipment. The number of BTV failures during the monitoring period appears to have been at a manageable level.
- The participants in the TransLink program moved forward with implementation, knowing that all procedural matters had not been finalized. This was preferred over delaying the implementation of the technology. It appears that BART and CCCTA did not anticipate the magnitude of the activities that were involved in the clearinghouse function for TransLink, particularly as they related to the handling of TransLink failures and refunds.
- Some time should be spent defining procedures and responsibilities prior to start-up. While it is important to address as many situations as possible at the outset, it is likely that some will "fall through the cracks". Rather than trying to prepare for all possible events, the TransLink program has demonstrated phased implementation, using a "real world" laboratory.
- Implementation of new technology cuts across all parts of the organization. The task force approach taken by CCCTA assured that the different departments remain involved in the program, even if a department is not active in the program at that time.

#### Institutional Responsibilities

- TransLink has been spearheaded by MTC, the regional transportation planning agency for the San Francisco Bay Area. In this capacity, MTC can facilitate interoperator efforts and judge the demonstration program from a regional perspective.
- Implementation of the TransLink program has been a relatively small daily effort for the three participating operators. Most agency personnel performed Trans Link activities in addition to other responsibilities. No significant impacts on existing responsibilities have been identified by the staff at the participating agencies.
- During the TransLink demonstration phase, revenue management or clearinghouse activities were "piggy-backed" onto BART's existing functions. A region-wide program may or may not rely on this arrangement to serve as the clearinghouse.

#### TransLink Program Future

MTC and the transit operators in the San Francisco Bay Area are moving ahead with plans to extend the TransLink concept. MTC currently is evaluating various expansion alternatives. A key element is likely to be the establishment of a central clearinghouse for overseeing the operations of the program, including interface with financial institutions, ticket sales and processing, revenue allocation among the operators, and statistical reporting. The clearinghouse could be established within an existing transit system (e.g., BART) or be established as an independent third party. A proposed operating plan for such as clearinghouse is being evaluated. The preparation of the plan has been a cooperative effort of the transit operators, who have guided the definition of activities and responsibilities.

Other technology alternatives also are being considered. As initially designed, TransLink required no change to existing BART technology. BART did not alter its magnetic stripe, stored value, barrier fare collection system. At the same time, the bus operators wanted integrated data reporting and minimal additional operations and maintenance costs from TransLink. These parameters became major design constraints for the TransLink technology that was specified for the new fareboxes for AC Transit. The Request for Proposals with this specification resulted in only one bid, which did not meet the region's needs with respect to the TransLink portion of the farebox.

The TransLink concept is a dynamic one. For example, BART now is exploring options for upgrading its fare collection system. Further, the clearinghouse project has been a catalyst for detailed consideration of implementation requirements by the operators. A by product of this effort has been more enthusiasm and support for the program. Operators tend to view TransLink more favorably if it accomplishes more than simply provide an interoperator ticket.

MTC is reexamining the TransLink technological design in order to move forward with a regional bid for equipment. This may mean using stand-beside electronic equipment rather than integrating additional equipment into bus fareboxes. While this would be more cost effective for the bus operators, it will require modifications to the BART fare collection system. The regional fare collection platform that results is expected to be upgradable and flexible for future needs.

Partnerships with private sector companies also are being considered as a way of generating external funding for the TransLink project. Candidate sponsors would be banks, credit card companies, telephone companies, and others that would benefit from issuing stored value cards to transit riders.

MTC expects to select the desired technological specification by the Fall of 1995. Implementation of the TransLink concept to other operators in the region is expected to begin in early 1996.