



John A. Dyer
General Manager

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April 7, 1983

TO: Board of Directors

FROM: John A. Dyer

SUBJECT: Proposal for New RTD Bus Stop Information Sign Program

For your consideration this Report contains a Proposal for a new RTD Bus Stop Information Sign Program.

The Report consists of the following:

- I. Recommendation and Background
- II. Analyses and Conclusions
- III. Description and Cost Estimates
- IV. Photos and Exhibits

Respectfully,

John A. Dyer

By: Jack Stubbs
Acting Manager,
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A. Fortuno

By: Anthony Fortuno
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I. RECOMMENDATION
& BACKGROUND

PART I

RECOMMENDATION

It is recommended that the District implement a new bus stop information program consisting of the following described signage:

- o For single-line stops, an aluminum panel sign, displaying the RTD trademark, line number and destination. Details and photos are contained in Part IV of this report. This sign is applicable to 28,000 District stops, or 93.3% of all bus stops.
- o For two-line stops, aluminum panel sign, displaying the RTD trademark, line numbers and destinations. See Part IV for more detail. This sign is applicable to 1,000 stops, or 3.3% of all District stops.

The single-line panel and the two-line panel together are applicable to almost 97% of all District bus stops.

- o For multi-line stops of three or more lines, a modular aluminum panel, displaying the RTD trademark and up to six line numbers and destinations. Two additional modules, sans trademark, can be mounted on the same post to or about 975 of the District stops with 3 or more lines. Some 25 or less stops, with more than 18 lines, will require two posts which can accommodate up to 36 lines. The maximum number of lines at any single District stop is 27. See Part IV for more details and photos.
- o For transit centers and specially-designated locations where complexity of services exists because of the convergence of lines, kiosks, utilizing the same graphic format as the foregoing signs. See Part IV for more details and exhibits.
- o For signage at Metro Rail station vicinities, consistent use of graphics (colors, type face, size, etc.) to be finalized in cooperation with architectural consultant.

BACKGROUND

The District operates 200 bus lines utilizing some 30,000 bus stops in its 2,280 square mile service area. Almost all bus stops are identified by a triangular aluminum plate, commonly referred to as the RTD target. The sign marks only the bus stop location. No additional information is displayed at more than 25,000 bus stop locations.

Since at least 1974, staff has been searching for and experimenting with means of providing more information to patrons at boarding sites. Various configurations of information signs capable of providing specific line schedule and route information have been installed and evaluated. A major premise for these pilot programs has been that signage which provides service information will result in a reduction of demands upon the telephone information system, fewer requests for written information, a reduction of queries to operators, and fewer complaints.

Types of bus stop information signs tested to date have included 3,200 fiberglass cubes in the San Fernando Valley, 14 kiosks on Spring Street, 12 Lexan cubes in the area of the Los Angeles International Airport, an aluminum panel in the Mid-Cities area, and three additional configurations in the South Bay Demonstration Project. Each of these sign types have provided patrons with additional service information, including line numbers, destinations, frequency of service and route maps.

PRESENT SIGNAGE

In addition to the latter types of signs, the District uses various types of bus stop signs, including the Rack and Slat, Park 'n' Ride, Subscription Service, etc.

RACK AND SLAT

The rack and slat type sign has been in use for many years at stops predominantly in the Downton area serving multiple lines. This sign consists of a metal frame, or rack, mounted on a metal post below the target. The rack contains a number of slats on which the line number and destination are stenciled. Where a large number of lines converge, two posts with rack and slats are used.

KIOSK

"Kiosk" is the name given to the triangular, metal-frame structure utilized along Spring Street, at Union Station (Macy & Alameda), and at Aliso and Alameda. Each of the three frames is 16" across and stands 8' high. Each of the three frames can accommodate five information signs of Lexan and aluminum, measuring 15" x 10-5/8" in a single vertical plane, for a total of 15 signs. The kiosk also accommodates the RTD service mark.

In addition, a two-sided kiosk has been developed to supplement the triangular kiosk, at locations served by ten or less routes. Total fabrication and installation of 12 kiosks costs \$2,400.

LEXAN CUBE

Another experimental program was the installation of the Lexan Cube for displaying information on the District's Airport Express Service. This sign consists of 6" x 22" Lexan panels mounted as a modular cube on a metal post below the target. Service information is printed on coated stock and inserted within the cube. This insert is held against the Lexan surface by foam, which forms the cube's core. Two plastic caps enclose the top and bottom of the cube. Procurement and installation costs of a single Lexan cube was \$98. There are twelve in use at this time.

The primary advantage of the Lexan Cube is that new service information is relatively inexpensive to print, and changes can be responded to quickly. The disadvantages include plastic cap breakage, vandalism in the cracking of the cube, and foam saturation by moisture, causing the cube to "sweat" internally, adversely affecting the inserts. Laminating the insert has improved resistance to moisture. In an effort to improve on the Lexan Cube, a 6" x 22" modular aluminum cube was designed and fabricated. Information signs on pressure sensitive paper were designed to stick to the aluminum surface. This approach was abandoned due to the high cost.

ALUMINUM PANEL SIGN

When new service was instituted in the Mid-Cities area in Feb. 1976, this sign was installed at 3,400 bus stop locations. The sign consists of a vertical aluminum metal panel, 6" x 22". It was mounted on the steel post beneath the target at eye level. Each panel displayed line number, line name, frequency of schedules and a route map. The Mid-Cities signing program including the costs for labor and materials, amounted to \$405,000. While in effect, the costs of maintenance, decal replacement (due to rapid schedule and route changes), and vandalism exceeded \$89,000. This cost figure equates to \$119 per stop for the original installation and \$26 per stop for necessary maintenance. This project was aborted in 1977.

SAN FERNANDO VALLEY INFORMATION SIGNS

In 1979, the Board approved the purchase of bus stop information signs for installation in the San Fernando Valley. The signs purchased were cube configurations, manufactured by Watco Identification Systems, Inc. The Watco signs consisted of four fiber-reinforced polyester panels attached to a metal frame. Each panel was attached to the frame by pop rivets at the top and bottom. Bus information was baked directly into each panel.

Installation of 3,200 information signs started in January, 1980 and was completed in October, 1980. The signs cost about \$60 per cube and installation ran about \$32 per unit. The purchase of the signs and the labor necessary for installation were funded by an UMTA grant. However, no federal funds were available for sign maintenance and routine replacement.

The Watco cubes provided substantial service information, including fare data, to patrons at bus stops. There were two major and costly drawbacks associated with these signs. First, they offered little resistance to vandalism and graffiti; second, the signs could not be easily and inexpensively changed to reflect new route and schedule information.

SOUTH BAY DEMONSTRATION SIGN PROJECT

Results of the foregoing signage experiments provided the motivation for more information sign tests. Accordingly, staff undertook the South Bay Demonstration Sign Project in 1981. This recently completed project involved extensive field research concerning the durability and adaptability of several bus stop information signs. Three different information signs were tested: the Transi-Tube, the Guide-A-Ride, and a District prototype sign, similar to the Mid-Cities sign.

The Crocket Transi-Tube information sign was tested in the South Bay area along the route of Line 813. The Transi-Tube appeared to be fairly vandal-resistant during the test period. Graffiti also proved to be only a minor problem. However, most of the Transi-Tubes tested developed a moisture build-up between the information sheet and the protective cover. The moisture then led to mildew and water damage to the information insert. Another disadvantage was the single sheet information panel. In such a configuration, a change to any portion of the sheet would necessitate the replacement of the entire insert. Field experience also showed that Transi-Tube's plastic lid expands in the heat, making it difficult to remove without stripping the threads. Signage hardware for this project was provided free of charge by the vendor. Retail price: \$120.

The Almac Guide-A-Ride sign was also tested as part of the South Bay Demonstration Sign Project. It was placed along the route of Line 810. The amount of vandalism and graffiti encountered by the Guide-A-Ride during the test period was relatively small. Unlike the Transi-Tube, the Guide-A-Ride was not as susceptible to moisture build-up within the enclosed portion of the sign. Several information panels showed evidence of water damage, discoloration and fading. Signage hardware for this project was provided free of charge by the vendor. Retail price: \$98.

The third and final information sign tested in the South Bay area was designed by the Operations Dept. and installed along the route of Line 232. This sign, with its construction of Lexan bolted to an aluminum panel, withstood most vandalism. However, bulging of the Lexan cover occurred. Prototype hardware was fabricated in the District's South Park Shops.

BUS STOP POSTS

Over the years, the District has installed several types of bus stop posts. With the implementation of the San Fernando Valley Signage Program, the District began using a 1-3/4" post. The following is a summary of posts currently in use:

1-3/4" Square Post	4,000
U-Shaped Post	20,000
Round Post & Brackets on light standards	<u>6,000</u>
TOTAL	30,000

Bus stop posts vary in height, from 7 to 12 feet.

II. ANALYSES &
CONCLUSIONS

PART II

ANALYSIS & CONCLUSIONS

A. ANALYSIS

Preliminary Analysis

Preliminary analysis consisted of the following four major elements:

- o A review of existing District bus stop signage, with emphasis on identifying the positive and negative characteristics of each type.
- o An on-site inspection and review of bus stop information signage in Atlanta, Seattle and Portland, and review of signage in other cities.
- o A review of professional signage system standards.
- o A review of 74 reports, studies, manuals and memoranda from RTD and other organizations on bus stop signage, visual communications and marketing. A bibliography and copies of these documents are available on request.

Continued Analysis

With the completion of preliminary analysis, Staff established the following criteria for use in evaluating existing signage and proposed signage:

- | | |
|----------------|---------------------|
| o User Profile | o Information Level |
| o Durability | o Cost |
| o Adaptability | o Timing |
| o Flexibility | o Design Integrity |

This criteria is detailed as follows:

- o User Profile -- Definition of public to which bus stop information signage is directed, e.g. non-rider, first-time rider, infrequent rider, moderate rider, frequent rider. Determine literacy of the target user. Should the signage accommodate multi or bi-lingual information? Determine visual limitations of signage, e.g. visual acuity, etc.

- o Durability -- Evaluate the extent to which signage can withstand and resist vandalism. Evaluate the amount of maintenance necessary to restore a vandalized sign. At what point does it need to be replaced? Evaluate whether the signage invites vandalism. Does it appear vulnerable? Are there obvious pry-points that encourage vandalism, such as with a knife-blade? Will the surface withstand a blow without shattering or breaking? Is the material resistant to gouging by keys, knives and screw-drivers? How easily can spray paint graffiti be removed? Is it fireproof? Is it susceptible to fading, discoloration, or weather seepage? How frequently will it require revision as a result of service changes?

- o Adaptability -- Determine the extent to which District equipment can be utilized. What type, and how many of the existing posts can be used? Does it require standard, off-the-shelf mounting hardware, or will it need specially-designed, tailor-made hardware? Does it require the use of standard materials, or new and untried materials? Can it be maintained by the existing complement of Stops & Zones personnel, or will it require expansion of that unit? Can revisions be made by the District's silkscreen shop?

- o Flexibility -- Determine the maximum number of lines the signage system can handle and the corresponding number of posts required to handle the maximum number. Determine types of service the signage can address. Can it be used to identify bus stops for special services to the Dodgers' Stadium ... special shuttle service, such as the Minibus and Westwood shuttle? Can it identify special boarding and discharging instructions, etc.?

- o Information Level -- Evaluate the various levels of information that can be incorporated in a bus stop signage system:

Zero Echelon - Marks bus stop only

1st Echelon - Line number and destination

2nd Echelon - Summary headway information,
and basic route information

3rd Echelon - Detailed schedule information,
detailed route information and
user information

Evaluate the level of information displayed versus required upkeep, due to service changes.

- o Cost -- Determine initial cost, installation cost and ongoing maintenance cost, on an annual basis, due to service changes, vandalism and wear. Consider the effect on other costs for dispensing information, e.g. telephone information calls, complaints, questions to drivers, etc.
- o Timing -- Evaluate the length of time required to install the signage on a District-wide basis.
- o Design Integrity -- Evaluate the message language in terms of system discipline, simplicity, readability and consistency to insure a high confidence level. Evaluate design elements, e.g. use of colors, trademark and language, for consistency with other District forms of visual identification. Evaluate its potential adaptability and compatibility to Metro Rail vicinity signage. Evaluate the manner in which it integrates with or intrudes upon the surrounding environment. Evaluate the graphics and aesthetic features of the signage.

B. CONCLUSIONS

Preliminary Conclusions

Upon completion of the preliminary analysis, Staff drew the following conclusions:

1. Function:

The bus stop information sign represents a major element of a transit agency's visual identification and public communications program, affecting both passengers and non-passengers alike. Intentionally, or otherwise, it performs the following functions:

- o Signals: It signals a bus stop to both the operator and the rider.
- o Transmits: It transmits and confirms information, from the simplest type of message -- the bus stops here -- to an extensive, complex message containing detailed schedule information, a map of the bus line route, fare information, instructions on how to acquire additional information, etc.

- o Triggers: It triggers and creates a monumental number of visual impressions upon passengers and non-passengers alike. These impressions reflect the personality of the agency itself, e.g. "the agency is a modern, efficient organization, providing reliable service". . . or "the agency is an outmoded, inefficient organization, providing inferior service."

By doing so, it creates innumerable feelings and attitudes, both consciously and subliminally, about the agency among riders and non-riders alike, and is a factor in inhibiting or encouraging bus ridership.

- o Trains: It trains and conditions riders on the use of the system.

2. Corporate Identification

Staff also concluded that bus stop information signage represents a significant element of what should be regarded as a comprehensive corporate identification and marketing communications system to the public. Bus stop signage, therefore, should be consistent with, and coordinated, with other elements of the agency's communications system, e.g. timetables, telephone information, service brochures, advertising, publicity, headway signs, vehicle identification, etc.

As an example of the foregoing, the manner in which any specific bus line is identified by way of its destination, or other designation, should be consistent whether it is identified on a headway sign, at a bus stop, on the timetable, in line specific advertising, in a news release, or when referred to by a telephone information operator.

Staff identified examples in which the same District line was identified in one manner on the electronic headway sign, in a second manner on the timetable, and in still a third manner on a bus stop sign. Staff determined that there were at least four departments (Scheduling, Planning, Print Shop and Marketing) involved in naming and identifying bus lines. It concluded that the absence of consistency within the District is, in all likelihood creating confusion among the public, as well as impressions that are characteristically negative. To avoid inconsistency and duplication of efforts by more than one department, organization needs to be addressed.

3. Organization and Planning

Staff determined that at properties where there was some reasonable degree of success with bus stop information signage, there existed a centralized function in a specific department with the authority and the responsibility to control graphic design, and to make the necessary decisions to insure consistency and conformity. Control, coordination and consistency were identified as the three basic elements required to execute an effective visual identification program. Staff concluded that within the District there was some coordination, little control, and no consistency. This is evidenced by the pot pourri of signage deployed throughout the system, widespread inconsistency in the identification of line names, and in the more than 20 variations of the design and paint schemes applied to retrofitted buses.

4. Communications/Design

Staff concluded that the development of an effective bus stop information system represents a formidable design and communications problem, requiring sound experience in professional graphic arts and materials, and a thorough understanding and knowledge of public communications. The problem is not new to the District. It has been addressed in similar fashion at least since 1974, as shown by a Marketing Dept. memo dated April 16, 1974, which stated:

"Why new bus stop signs? ...Presenting a modern image is part of this job... demand for information would suggest that we improve the bus stop sign... Many of the signs currently in use are in need of replacement... the size and complexity of the RTD system complicates the project... Vandalism and weathering are constant threats to street signs ... current RTD signage, the simple triangle, identifies only the RTD Bus Stop."

It is evident that the problem has surfaced and been discussed regularly by the District; that various solutions have been attempted; but that no successful solution has been determined.

Staff concluded that this problem is underlined by the dilemma of what the public perceives it needs versus what is operationally practical for a transit property to provide. This dilemma, in the opinion of the Staff, has not been solved at any urban property, in terms of satisfying the public's needs on the one hand, and having a system that is both cost-effective and practical on the other.

5. Graphic Design Manual

It was determined by Staff that a graphic design manual is an essential document to achieve control and consistency, once the authority and responsibility has been delegated to a specific department. The Marketing staff is of the opinion that until such time as a graphic standards manual is developed for the District, a comprehensive visual and communications program for the District is unlikely to be achieved. The development of graphic standards to produce the recommended bus stop information signage system in Part III is a step regarded as essential before implementation is initiated.

6. Initial Unit Price vs Cost of Maintenance

Staff concluded that the initial unit price of a bus stop information sign is significantly less important than the ongoing cost of maintaining a sign system. It concluded that the unit price should be measured against estimated maintenance costs per year, over a 10-year period.

7. Solutions to Problem

Staff concluded that its basic direction should be to determine a solution for the problem that would be cost-effective and applicable to the 28,000 signs that represent the single-line stops in the system, and to the 1,000 bus stop signs that represent two-line stops in the District.

The solutions for handling the balance of the system should evolve and be designed as an extension of the latter. It also determined that the proposed solution should be first deployed and implemented in the Downtown area -- the most highly-visible sector to riders and non-riders. The Downtown sector presently displays, by most graphic standards a rather inferior and unattractive "slat & rack" system for multiple-line stops. Over the past seven years, District experiments with bus stop signage have focused in sectors significantly less visible than Downtown, e.g.: Mid-Cities, San Fernando Valley and South Bay. It is the opinion of Marketing staff that the Downtown and Westside areas should be given the highest priority in considering implementation of a new bus stop information signage system, particularly in light of the 1984 Olympic Games.

Final Conclusions and Parameters

Having applied the criteria described in Section A to evaluate existing District and other signage systems, Staff reached the following conclusions which set the parameters for developing and designing the recommended bus stop information signage system described in Part III of this report.

1. User Profile

The user, or target audience for the recommended signage system shall be the non-rider, the first-time rider, and the infrequent rider. An infrequent rider is defined as a rider who uses the RTD at least one to three times a month. Market Research data show that the District acquires some 25,000 new riders per year, and that over a three-year period, the District will lose 50% of its new ridership.

Staff concluded that it was essential for the District to acquire new riders on a continual basis in order to maintain a stable ridership base, and that an effective bus stop signage system was a key element in acquiring new riders and increasing the usage of the infrequent rider.

2. Durability

Staff concluded that to avoid the serious and costly problems resulting from vandalism among signage systems within easy reach, and because those signage systems installed 8 feet or higher from the ground experienced fewer problems, the proposed system should be primarily installed no less than 7-1/2 feet from the ground, so as to be out of reach of most vandals. Staff is of the opinion that this parameter will avoid recurring and costly maintenance problems, essential to a system with 30,000 bus stops. However, Staff also concluded that the signage system should provide for a vandal-resistant extension, requiring minimum maintenance, that would permit presenting 2nd Echelon information at eye level at transit centers and other locations of service complexity and convergency of multiple bus lines.

3. Adapability

Staff concluded that an innovative-type bus stop signage system, utilizing new and untried methods and materials shall be avoided, and that the proposed signage system shall be within the capabilities of existing methodology and practices. It concluded that once 30,000 bus stop signs were installed, it should be maintainable on an ongoing basis by the present complement of Stops & Zones personnel. Additionally, it concluded that to avoid significant installation costs, the proposed bus stop signage system should be extensively adaptable to existing posts and utilize off-the-shelf mounting hardware.

4. Flexibility

Staff concluded that the proposed signage system should be sufficiently flexible to address any type of service provided by the District, in any type of street environment, and should be capable of displaying information on a maximum of 30 bus lines. It was the opinion of Staff that this could be best achieved by the use of a modular system. Additionally, the design system and format should be applicable to future computerized technology, e.g. typesetting, video display, etc.

5. Information Level

Staff concluded that the information to be displayed upon the proposed signage system should be limited to only 1st Echelon information (bus line and destination), but should allow for service qualifications, e.g. limited-stop service, express service, Monday-Friday service, etc.

Staff determined that had a bus stop information signage system been in place, displaying only line number and destinations, at all 30,000 stops on July 1, 1982, that during the course of the fiscal year, through June 30, 1983, some 5,500 bus stop signs would have required updating, as a result of the service changes that have, or will occur during that time period. With the addition of 2nd Echelon information (scheduling & route data), an additional 9,900 bus stop signs would have required revision. Therefore, to achieve a system that can be maintained by present resources, the group concluded that only 1st Echelon information shall be displayed, except at specially selected kiosk locations.

6. Cost

Staff determined that the costs for initial production, manufacturing and installation should be in ranges similar to those experimental signage units heretofore installed by the District, and that the value of providing line number and destination be considered. Similarly, it determined that ongoing maintenance costs due to vandalism should be in keeping with current costs and capabilities.

7. Timing

Staff determined that following the preparation of the graphic standards and specifications for the signage system, and from the date that the purchase is awarded to a vendor, it should be operationally practical to have the new signage system installed in the Downtown area, and in the San Fernando Valley to replace the 1,000 existing cube signs, within a period of six months, by utilizing only existing resources and personnel. Additionally, it determined that it should be feasible to install the new signage system on a District-wide basis within an 18-month period, by adding outside services at a reasonable cost; or within a 24-30 month period by utilizing only District personnel.

8. Design Integrity

Staff determined that the message on the bus stop information signage should be simple and easily comprehensible by the target audience; that the message should be understood, even by persons of limited literacy, but not illiterate; that the language used in designating the line name should be consistent with the terminology used in the headway sign and timetable. It determined that a line-by-line analysis would be required to achieve this consistency, and that a specific criteria for determining line designations be developed and applied to all District lines. Additionally, Staff determined that a single department should have the responsibility for designating line identification for the bus stop sign, the headway sign and the timetable.

Staff determined that the proposed signage should have a distinct graphic quality that would extend the visibility of the District trademark, and build confidence in the RTD as an agency providing a modern and efficient service to the community.

Staff also determined that the present trademark should be prominently incorporated, and the color scheme of red, orange and gold utilized for striping on District buses should be incorporated into the design in order to link the bus stop signage system to the design of our buses. Additionally, the basic design elements of the new signage should be compatible with the vicinity signage of the Metro Rail stations being developed by consultants, which will necessitate close liaison among the graphic designers involved.

Staff determined that the new bus stop information signage system to be proposed and recommended should comply to the foregoing conclusions in all criteria, and to the preliminary conclusions addressed in this section.

III. DESCRIPTION
& COST EST.

DESCRIPTION & COST ESTIMATES OF PROPOSED
NEW BUS STOP INFORMATION SIGNAGE

- o User Profile and Human Factors - see Exhibit I, Part IV.
- o Single-line stops will be identified by a 16" x 14-3/4" aluminum panel. The panel will be manufactured in 12 ga. aluminum (#7075-T6), and covered with Scotchlite decal (reflective white). The sign will display the District's 2-color service mark and 3-color striping. Below the striping, space is allocated for one information decal. The decal will measure 16" x 3", and will display line number, destination and service qualification, if any. The sign is applicable to 28,000 stops. See Photos 1 & 2 & Exhibit II in Part IV.
- o Two-line stops will be identified by a 16" x 17-3/4" aluminum panel. The sign will display the District's service mark, striping and allocate space for two 16" x 3" information decals. The sign is applicable to 1,000 stops. See Photo 3 & Exhibit II in Part IV.
- o Multiple-line stops (3 or more lines) will be identified by modular aluminum panels. Panels will range in size from 16" x 23-3/4" for a 4-line stop to 16" x 29-3/4" for a 6-line stop. The panels will be covered with Scotchlite decals and will display the District's service mark, striping, and provide space for 4 to 6-line information decals. The decals will measure 3" x 16" and will display line number, destination and service qualifications. Two additional modules, sans service mark (16" x 14" and 16" x 20") can be mounted on the same post to accommodate up to 18 line numbers and destinations. Modular aluminum panels will be mounted to a 10' post or light standard. See Photos 4, 5, 6, 7, 8 & Exhibit II in Part IV.
- o Transit Centers and other specially-designed locations will be served by one of three types of information kiosks. Types 1 and 2 can accommodate information on 12 to 32 lines. Type 3 can display information on 12 to 64 lines. See Exhibit III in Part IV.

Information will be displayed on modular unit inserts that can be designed to contain 1st, 2nd or 3rd Echelon information. See Exhibit IV in Part IV.

COST ESTIMATES

BUS STOP SIGNS

<u>With RTD Service Mark</u>	<u>Size</u>	<u>Quantity</u>	<u>ZUMAR INDUSTRIES</u>		<u>SAFEWAY SIGNS</u>	
			<u>Unit Price</u>	<u>Total</u>	<u>Unit Price</u>	<u>Total</u>
Complete one line stop sign	16" x 14-3/4"	28,000	\$12.50	\$350,000	\$11.50	\$322,000
*2-Line stop sign	16" x 17-3/4"	1,000	13.00	13,000	12.00	12,000
*4-Line stop sign	16" x 23-3/4"	1,000	15.00	15,000	13.00	13,000
*6-Line stop sign	16" x 29-3/4"	1,000	17.00	17,000	20.00	20,000
**4-Line wing sign	16" x 14"	500	12.00	6,000	10.00	5,000
**6-Line wing sign	16" x 20"	500	14.00	<u>7,000</u>	11.00	<u>5,500</u>
				\$ 408,000		\$377,500

* Sans Line number & destination

** Sans RTD Trademark

Sign hardware (See Page 19) \$ 70,600

Decal Application 2,000

TOTAL

\$480,600

\$450,100

BUS STOP SIGN SPECIFICATIONS

- 12 ga. aluminum #7075-T6; radius corners
- Baked Scotchlite white decal, with 2-color RTD service mark; red & black
- 3-1/2" horizontal stripes: bleeds 2 sides: RTD Red
PMS 137
PMS 172
- Decals to be printed on Scotchlite decal material.
- All signs printed 2 sides, with black horizontal grid lines 3" apart below 3-color stripes.

HARDWARE

2" - 10' Post

12 ga. cold rolled steel

Price includes post & 2 sleeves
Instrut, Los Angeles

<u>PRICE</u>	<u>QUANTITY</u>	<u>TOTAL</u>
\$23.00	1,000	\$ 23,000

U-Channel Brackets

For adapting sign to post
Hall Sign, Bloomington, IN

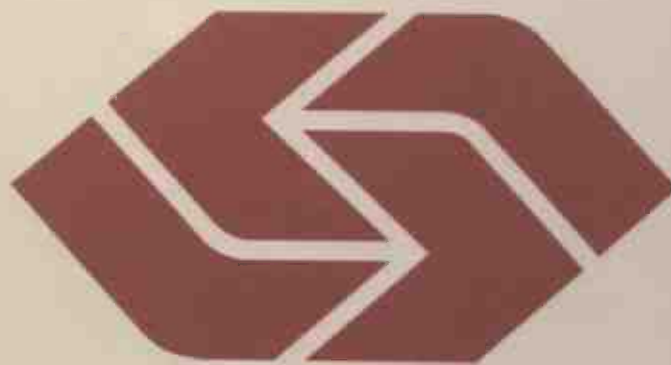
1.40	20,000	28,000
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Wing Bracket

<u>Type of Sign</u>	<u>Size of Bracket</u>	<u>No. of Holes</u>	<u>Price</u>	<u>Quantity</u>	<u>Total</u>
Single line stop	12"	2	\$ 2.22	1,000	\$ 2,220
2-line stop	15"	3	2.87	1,000	2,870
4-line stop	21"	3	3.80	1,000	3,800
4-line stop w/o logo	13"	2	2.38	1,000	2,380
6-line stop	27-1/2"	4	4.99	1,000	4,990
6-line stop w/o logo	18"	3	3.34	1,000	<u>3,340</u>
					\$19,600

Price includes nuts, bolts and freight.
Vulcan Signs, Foley, Alabama

IV. PHOTOS &
EXHIBITS



RTD

22

**Santa Monica via
Centy City/Brentwd**

Photo 1 - Recommended new RTD Bus Stop Sign for single-line stops displaying line number and destination



Photo 2 - Recommended sign for single-line stops, mounted to square post



RTD

20

**Santa Monica
via Wilshire**

21

**UCLA
via Wilshire**

Photo 3 - Recommended sign for two-line stops



RTD



20

**Santa Monica
via Wilshire**

21

**UCLA
via Wilshire**

22

**Santa Monica via
Centy City/Brentwd**

308

**Santa Monica
via Wilshire**

**Limited
Stops**

Photo 4 - Recommended module for four-line stops

309		
309	Santa Monica via Brentwood	Limited Stops
426		
426	Chatsworth via Freeway	Limited Express
26		
26	Hollywood via Virgil/Franklin	
22		
22	Santa Monica via Centy City/Brentwd	

Photo 5 - Recommended four-line wing module,
sans logo



Photo 6 - Recommended four-line module, and four-line wing, sans logo



RTD

20

Santa Monica
via Wilshire

21

UCLA
via Wilshire

22

Santa Monica via
Centy City/Brentwd

308

Santa Monica
via Wilshire

Limited
Stops

309

Santa Monica
via Brentwood

Limited
Stops

426

Chatsworth
via Freeway

Limited
Express

Photo 7 - Recommended six-line module

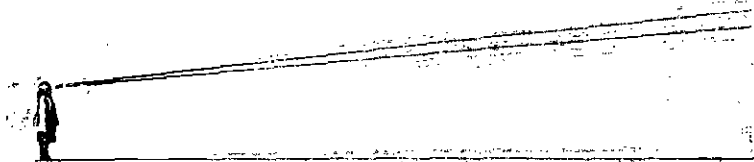


Photo 8 - Recommended six-line module on post

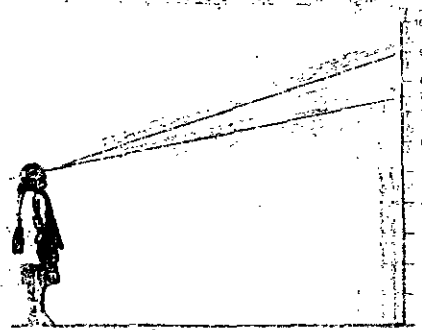
Exhibit 1: User Criteria & Human Factors

User profile

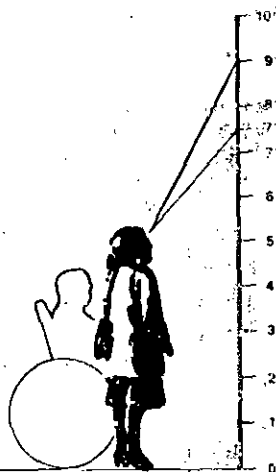
1. First-time or infrequent user of this stop.
2. Limited literacy level (but no accommodation for multi-lingual problems included in project).
3. Below average eyesight.
4. Eye level: 5'3" (shorter); 4'3" for accessible riders.
5. Ergonomics: slightly older citizen.



4' high
RTD symbol is readable
to user at 75'
on line of sight.



60 pt. helvetica medium
numerals are readable
to user at 12-15'
in low light.



30 pt. helvetica
medium is readable
to user from 2'
with reading
angle of 60°



10 pt. helvetica regular
is readable to user
at 32'-24'
on a wider cone:
6' (low) to 7' (high).

Exhibit 2: Pole sign modules

First echelon information

1 line

2 lines

4 lines

8 lines

12 lines

6 lines

12 lines

18 lines

side view

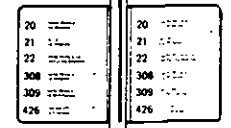
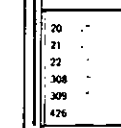
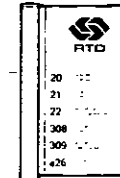
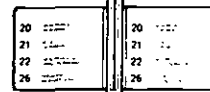
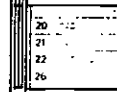
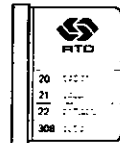
side view

side view

side view

To 9'-0"
Type A graphics
readable zone

Vandalism-prone zone



Retrofit
w/Type A graphics modules

Extender or
new pole

Extender or
new pole

Exhibit 3: Kiosk modules

Second and third Echelon information

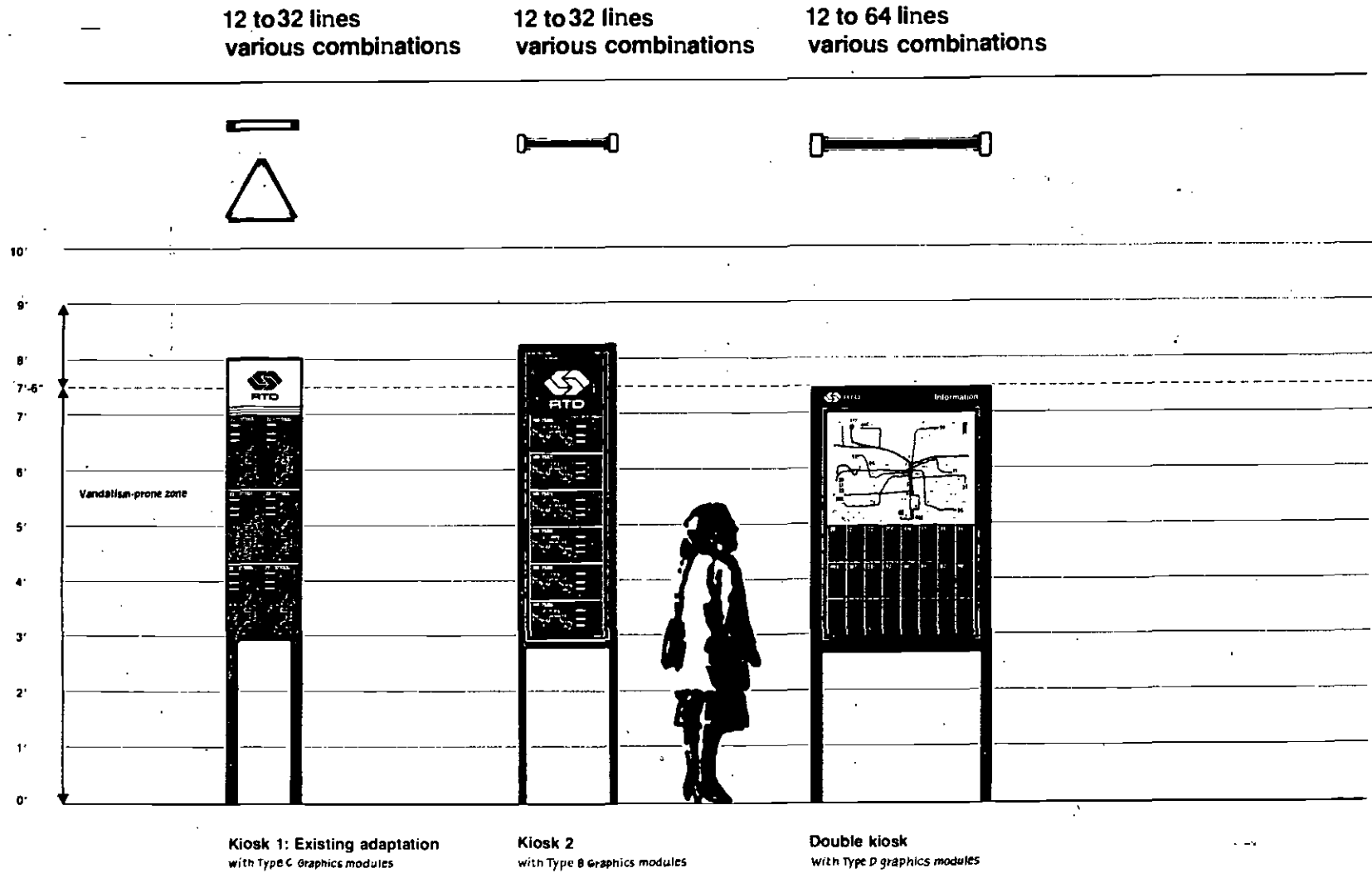
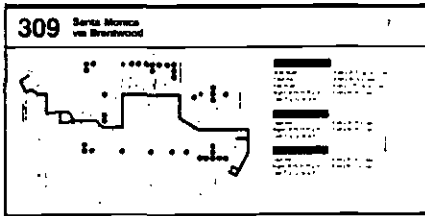


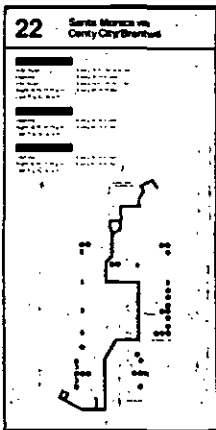
Exhibit 4: Panel modules



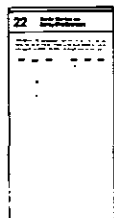
TYPE A 16" x 3"
1ST ECHELON INFORMATION
USED ON POLE SIGNS



TYPE B 16" x 8"
1ST & 2ND ECHELON INFORMATION
USED ON KIOSKS
E-W LINES



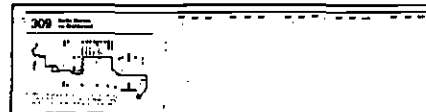
TYPE C 8" x 16"
1ST & 2ND ECHELON INFORMATION
USED ON KIOSKS
N-S LINES



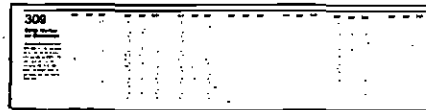
TYPE D 4" x 8"
3RD ECHELON INFORMATION
USED WITH MAP MODULES
ON KIOSKS



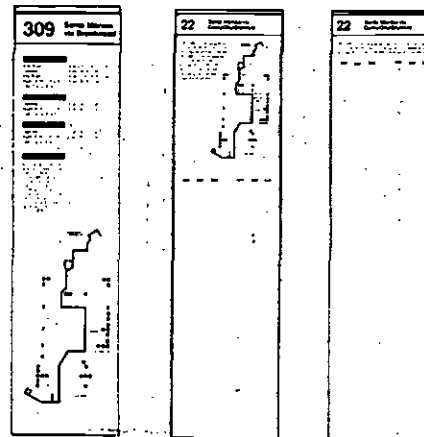
TYPE E 1 16" x 4"
2ND ECHELON INFORMATION
USED ON KIOSKS E-W
E-W LINES



TYPE E 2 16" x 4"
3RD ECHELON INFORMATION
USED ON KIOSKS
E-W LINES



TYPE E 3 16" x 4"
3RD ECHELON INFORMATION
USED ON KIOSKS WITH MAPS



TYPE F 1 4" x 16"
2ND ECHELON INFORMATION
USED ON KIOSKS
N-S LINES

TYPE F 2 4" x 16"
3RD ECHELON INFORMATION
USED ON KIOSKS
N-S LINES

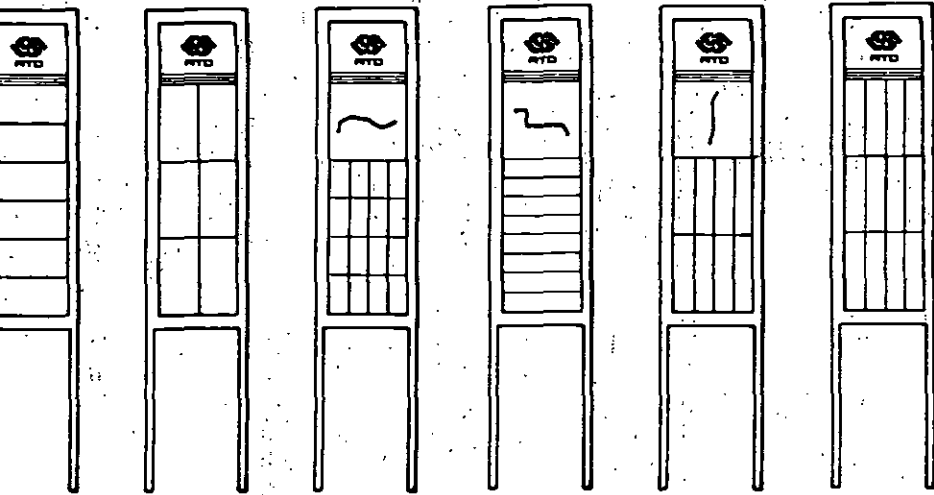
TYPE F 3 4" x 16"
3RD ECHELON INFORMATION
USED ON KIOSKS WITH MAPS

F1

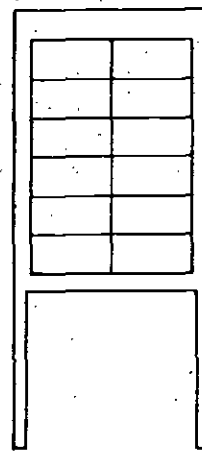
F2

F3

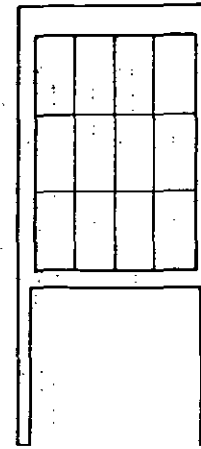
Exhibit 5: Panel combinations possible (partial)



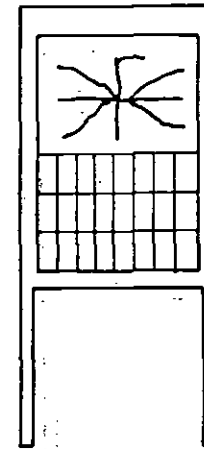
3 LINES
 3×2
 12 LINES
 $6 C \times 2$
 32 LINES
 $16 D \times 2 + MAPS$
 16 LINES
 $8 E \times 2 + MAPS$
 16 LINES
 $8 F \times 2 + MAPS$
 24 LINES
 $12 E \times 2$



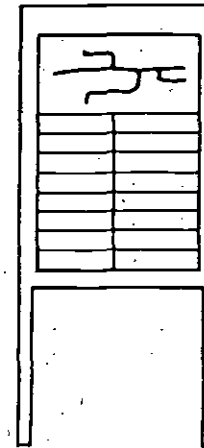
24 LINES
 $12 B \times 2$



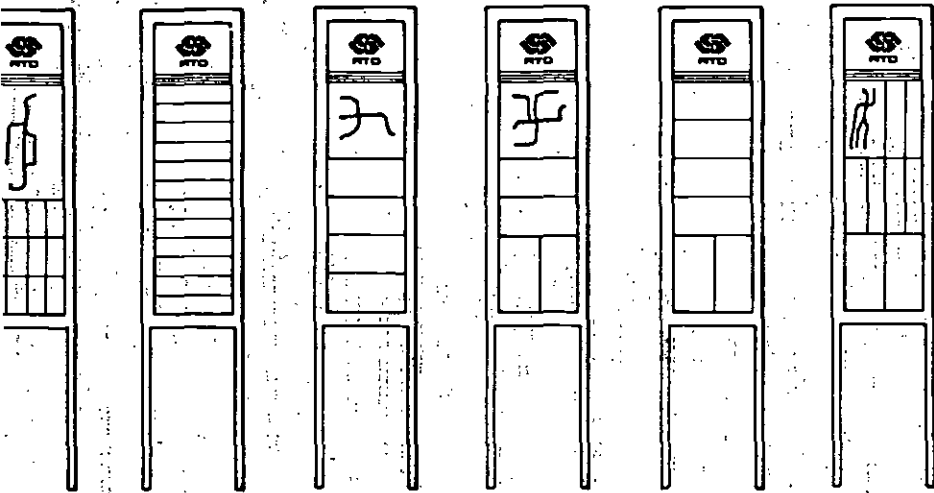
24 LINES
 $12 C \times 2$



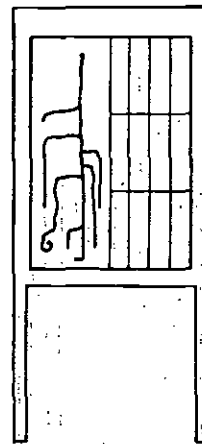
48 LINES
 $24 D \times 2 + MAPS$



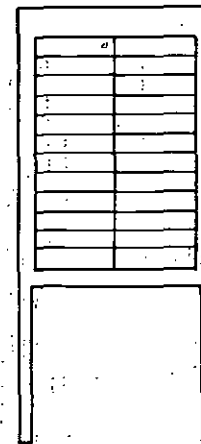
32 LINES
 $16 E \times 2 + MAPS$



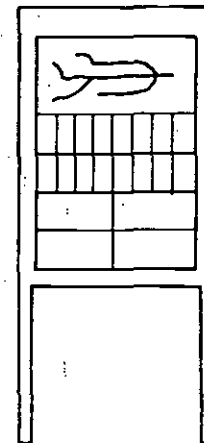
3 LINES
 $3 \times 2 + MAPS$
 24 LINES
 $12 F \times 2$
 8 LINES
 $4 B \times 2 + MAPS$
 8 LINES
 $2 B + 2 C \times 2 + MAPS$
 12 LINES
 $(4 B + 2 C) \times 2$
 16 LINES
 $(2 C + 6 F) \times 2 + MAPS$



24 LINES
 $12 F \times 2 + MAPS$



48 LINES
 $24 E \times 2$



40 LINES
 $(16 D + 4 B) \times 2 + MAPS$



32 LINES
 $16 B \times 2 + MAPS$