1. PROJECT OUTLINE

1.1. Background and goals

The Canadian National passenger rail terminal in Vancouver (at Main Street) is currently being refurbished by VIA Rail Canada. This post-World War I building has been designated a heritage site. The terminal is being readied for sharing by VIA Rail and Greyhound bus with full occupancy expected in the Spring of 1993. It will be re-named Pacific Central Station.

Major renovations represent *opportunities for progress* and so the Research Analysis and Special Programs branch of the Transportation Development Centre undertook to work with VIA Rail in enhancing communications accessibility at the station. Such enhancement could not only assist travelers with visual, hearing (or speech), intellectual, or emotional limitations, but also improve services for *all* customers. Moreover, successful efforts at this station could set a pattern for many other busy public venues.

This facility is of particular interest to transportation planners because it brings together two major modes, inter-city rail and inter-city bus, as well as local street connections for cars, urban transit, tour buses, and pedestrian movement. Thus it may typify a pattern to be repeated often in the future.

The goal of this report is to identify, characterize, and prioritize communications enhancements deemed appropriate for Pacific Central Station (PCS). These are enhancements are to be chosen in the practical light of benefits and constraints of this particular site and this particular set of operating conditions.

1.2. How do people communicate?

A basic model of human communications has four elements.

The **Transmitter**: a person or system that provides communications or messages… such as the VIA Rail station management. If the Transmitter neglects to develop and send a message, then, of course, none gets through.

The **Channel**: a medium or technology for effectively carrying the message to the Receiver… such as a public address system in a terminal building. If the Channel is defective, such as public address systems in noisy buildings with strong reverberation, then the message can not reach the Receiver.

The **Message** or **Signal**: a piece of information or influence which the Transmitter seeks to impart to the Receiver… such as "the train will depart on Track 4." The message can be poorly composed, too complex for ready comprehension, or even inaccurate.

The **Receiver**: a person who is the intended target of a communication by the Transmitter… such as a traveller at the Pacific Central Station. The Receiver needs to have the capability to collect, understand, and/or use the message.

All these elements must be functional for communication to take place. A breakdown in any element causes the communication to fail.

1.3. Current communications at PCS and Greyhound

Current communications systems at both VIA Rail and Greyhound are simple and conventional. Since both carriers have been anticipating major refurbishment for some time, not much modernizing has taken place in the last few years. So *existing* systems may not predict *future* systems.

VIA Rail and Greyhound use remarkably similar communications approaches at their existing facilities. Similarities show up in the following ways.

Voice…

- on the VIA Rail half of the concourse, two loudspeakers are mounted on pillars; the clarity of the loudspeaker system at Pacific Central Station is inadequate because of concourse echoes and because of the low quality of the equipment;

- coverage in corners is weak; and

- the acoustical setting — characteristic of many handsome train stations of the past — is unpropitious; while it can be materially improved, it cannot be made adequate for all customers without compromising the integrity of this heritage building's appearance.

Signs and written messages

- because departures use the same tracks or bus bays at the same times for weeks, months, or even years, concourse sign boards are single, centrally located felt boards with push-on letters;

- tracks have a single sign showing track number (only two tracks will be used after refurbishment); bus bays have painted boards for written designation and flashing lights to show when the buses are boarding; and

- brochures are available in each of the concourse areas.

Architectural communications

- the layout of Pacific Central Station is very straightforward and could not be much improved; and

- the "readability" of architectural elements is relatively good — for example, train tracks are directly opposite the main entrance; layout cannot be modified very much because of heritage preservation constraints.

1.4. Main requirements for accessible communications

What are the main requirements of communications in light of travelers with limitations?

When vision is poor…

- announcements and messages borne by signs, both fixed and changing sign boards, need to be presented in a spoken form;

- conversations with other passengers for travel or social purposes can be difficult; and

- movement through buildings and especially travel to individual loading platforms need support.

When hearing (or speech) is poor…

- recurrent, changing, and emergent announcements borne by voice need to be presented in an acoustically benign environment or presented in a visual form;

- conversations with other passengers for travel and social purposes benefit from ambient quiet or need the substitution of pads-and-pencils; and

- phone-borne conversations with others outside the station need assistance in the form of amplified telephones and a public cash-operated TDD (a telex-like device).

When reading, language, or other intellectual skills are poor…

- special care is needed in making voice and written communications very plain or in providing one-on-one personal services through trained personnel; and

- orientation and wayfinding need help.

When emotional or psychiatric problems are present…

- stimuli which can potentially trigger undesirable social behaviours or phobias as well as other sources of unwanted arousal should be abated or controlled through the separation of the person from the stimuli.

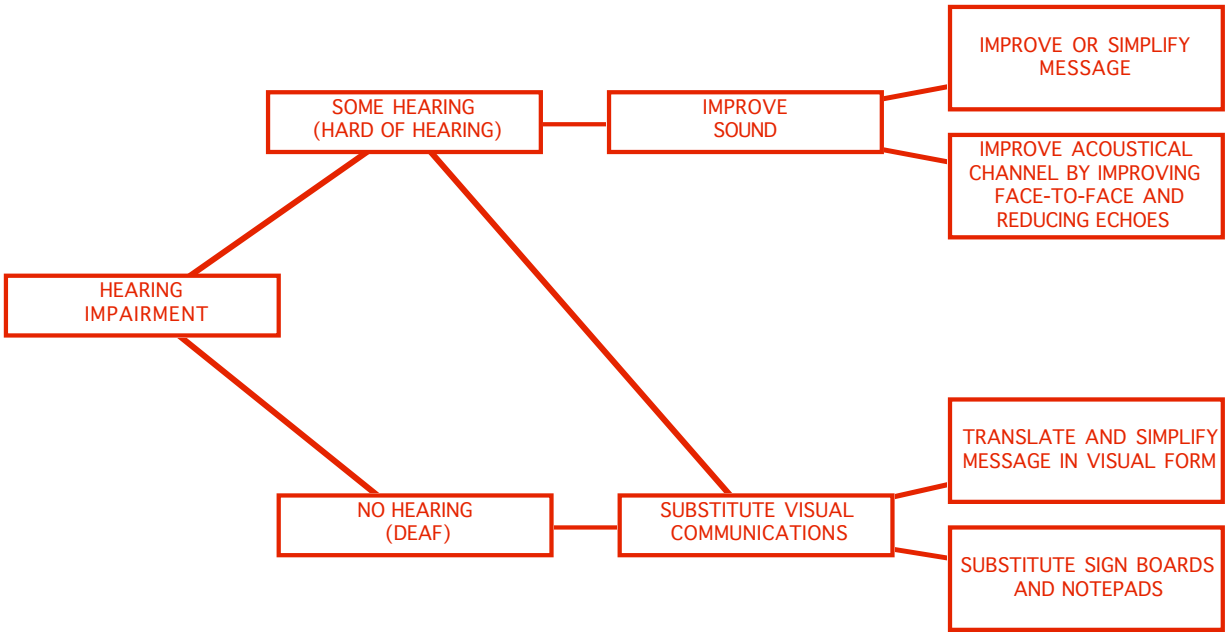
Other features…

Some features assist people with communications limitations but are not communications features *per se.* For example, it is important to have motorized automatic doors for customers with mobility problems. However, hinged doors which swing or revolving motorized doors can be hazardous to blind travelers; therefore, sliding or pocket doors are needed. A people mover — like the SCAT — is a communications device as well as a mobility aide; it provides a substitute for communicating wayfinding information because it brings the traveler directly to the coach.

1.5. **Providing accessible communications**

The general goal is to ensure the effectiveness of comprehensive communications for disabled customers. Operationally, the goal of communications services should be to enable disabled customers *to travel with ease and dignity without needing an accompanying person.*

The rationale underlying the enlargement of communications access takes each "channel" of communications separately and looks at how best to provide *improvement* to that mode or to provide a *substitute* mode. The following diagram may help clarify the *improvement* or *substitution* relationship.



2. GUIDELINES FOR IMPLEMENTATION

2.1. Introduction

This section outlines the communications needs of disabled travelers and the features that would assist them. Because any one feature might help many different groups of disabled persons (as well as many non-disabled travelers) the features are presented together. But first it is important to discuss specific communications disabilities.

2.2. What enhancements are needed?

2.2.1. *To assist visually impaired travelers*

Customers who have poor vision are helped through improvements to visual systems (such as use of high contrast images) and through the substitution of sound systems for sight. Those with serious visual impairments are helped through auditory and tactile systems and through architectural improvements and simplification to the layout.

Tactile improvements include such features as braille text and textured surfaces such as rough surfaces on the stair handrail alongside the first and last steps.

Architectural improvements relate to providing simpler and more coherent building layout (on a large scale), and such matters as toilet fixtures and the path in which doors swing (on a small scale.)

Infrastructure counts: having baggage carts available means that travelers who use canes can always have a hand free. It is strongly recommended that carts be present.

Social aspects of travel are not only congenial amenities but also essential. Assisting blind travelers to "reach out" for friendly contact is an important goal of design.

2.2.2. *To assist hearing impaired travelers*

Customers who are hard of hearing are helped through improvements to speech systems and through the substitution of visual systems for sound. Customers who are deaf are helped through visual systems.

Speech systems such as public address loudspeakers and in-person spoken announcements are barriers for deaf travelers and often, if not

carefully handled, for hard of hearing customers. People with intellectual and language deficits may also fail to understand voice announcements.

Speech announcements must be heard *when* spoken. Unlike vision, sound goes around corners but the Receiver must still be exposed to a loud enough Signal.

In the absence of a truly effective PA system, sometimes alternative technologies are used to reach hard of hearing customers. For example, they may be asked to use the inductance coil pick-up on their hearing aids or they may be issued an infra-red or an FM receiver.

By having a separate, acoustically functional space, the need for installing alternative technologies is reduced.

2.2.3. ***To assist mentally impaired travelers***

The two broad classes of mentally limited customers are those with intellectual difficulties and those with emotional disabilities.

Intellectual limitations

For those with intellectual limitations, channels of communication need to work well for *their* situation. All channels work better for such persons when noises, sights, and people are not too intrusive.

Sometimes intellectually impaired customers become disoriented. They may display unruly behaviour, although it is rarely malicious. A quiet room reduces the chances of disorientation and it also encourages pro-social behaviour.

Emotional limitations

Those with emotional limitations present a group of varied problems. The general concern is to remove these persons from situations or objects that trigger their discomfort or trigger inappropriate or phobic behaviour. Again, a quiet room helps these travelers.

2.3. **Passenger Service Lounge features**

Lounge

Payphone

With volume control receiver, credit card slot, and built in TDD; BC Tel provides such devices at the Vancouver International Airport

Speaking clock

A large face electric clock with high contrast number/background and a speech feature or a wall clock plus a table-top speaking clock

Help call button

Large area push button in bright colour with connection to service personnel

Loudspeakers

High quality, distributed low-level paging system for intelligible PA announcements

Schedule board

Arrival and departure schedules in English and French for buses and trains

"Now Boarding" annunciator

A straightforward system (e.g., pegboard, LCD, LED, flip disc) that can be either centrally controlled or local and manual; also available are systems combining schedule board and "Now boarding" announcement functions

Furniture

Ergonomic seats with lumbar support and armrests with side tables for writing/eating/drinking/reading (approx. 4-6 chairs); a rack for brochures; and for locking up gear and storing special supplies, the use of a period roll top desk may add a nice touch in a heritage building

Emergency/Exit sign

Bright-coloured sign with strobe feature, combined with alarm sound

Lighting

Ceiling and wall lights for ambient task lights for phone, table, etc.

Sound insulation

To improve speech intelligibility and to increase the peacefulness of the room

Ceiling, approx. 250 sf

Walls, approx. 550 sf
Carpet, hard, short pile 250 sf

Door bell

Large area push button with connection to personnel location to request to enter the lounge

Climate control

Climate control beyond the gross control of the general building system may be needed to ensure comfort; air conditioning can be essential for some customers

Air conditioner 8-10 000 BTU
Baseboard heaters

Window(s) on the concourse

To be able to see the concourse for information, passenger movements, social contact, and reduction of isolation, but without admitting excessive noise, thermo-pane or two panes of glass recommended

Water fountain

Wall mounted with light pressure control and wheelchair clearance

Door

Automatic, sliding (single or double width); should have simple failure mode operation

Braille information

Printed information in braille and large type, duplicating bus, train, and tourist information, prepared locally by CNIB

Washroom

Washroom should be accessible

Door

Automatic, sliding (single or double width)

Toilet

Clearance on three sides for transfer from wheelchair

Support bars

Sides and rear

Mirror

Tilting for small and tall travelers

Basin

Clearance for wheelchair users (knee and foot);
automatic tepid water spigot and soap dispenser

Dryer

Automatic hand dryer with large push button or light beam control

WC flush

Large push button for low force requirement

Hygienic paper

Cut sheet dispenser

Waste

Large opening waste disposal

Help call button

Bright-coloured, large area push button

Diaper table

Foldable wall-mounted table to change diapers; covered waste receptacle and air freshener

Lighting

Ambient: ceiling and wall mounted
Task: for mirror, controls, waste etc.

Exit

Bright-coloured sign with sound and strobe light for emergencies

2.4. Concourse features

Doors

All main entrance doors and those leading to platform should be automatic and sliding; historic doors can be re-hung for sliding operation but at additional expense as compared to motorizing them in hinged mounting

TDD

TDD unit required for callers from outside, providing information for rail and bus

Schedule board(s) (for buses and trains)

Large letter display of arrivals , departures, gate numbers, delays, and "Now Boarding" indication. Visible from all directions, centrally located (e.g., LCD or LED)

Signage

Consistent design, location and application throughout terminal with care taken to ensure visibility for persons with poor vision

Ticket counter

One low counter for wheelchair users and all counters should be configured for ease of conversation in a noisy environment

Exit

Bright-coloured sign with strobe and alarm sound

Loudspeakers

Additional speakers are required in baggage pick-up area (near the conveyer belt) and in the newly renovated restaurant section

Multilingual touch screen information device

A touch screen CRT presenting information in spoken and in large letter format in as many languages as appropriate and covering station information as well as tourist, transit, and other matters; priority of

implementation depends on how completely the information kiosk will be manned.

Pathfinding for blind travelers

To assist blind travelers, treatments of the walking surface can be applied. These are detectable by cane as well as by feel or sound when walked across.

2.5. Platform and bus bay features

Car indicator

Large signs on platform indicating car numbers, sleepers, and *VIA 1* class, as well as bus bays; these can be controlled centrally or manually at the site

Platform and bus bay edges

Warning strip to indicate edge of loading areas with tactile, sound quality, colour contrast, and colour brightness elements chosen to serve those with poor vision or who are otherwise preoccupied

Weather protection

Weather protection for all coaches along the train platform; at present, the bus loading area is reasonably compact and weather protection is already in the plan; the demands for seismic reinforcement, questions about how high the covering needs to be, and the possibility of using the existing partial covering, have not yet been considered, resulting in a soft estimate at this time

Leveled platform

Platform height same as train floor, "high level loading," which would

- benefit *all* riders
- greatly heighten the ease of train travel
- let riders see inside coaches and improve their orientation to the rolling stock
- reduce accidents
- speed boarding and alighting
- permit hiring staff with bad backs because lifting efforts are reduced
- facilitate servicing the train
- lower Workers' Compensation claims

- reduce the need for staff to help people climb on board and deal with luggage

This station is a line terminus, and therefore does not have freight trains whizzing through on tracks alongside platforms. Freight trains need more clearance than passenger trains do, and this clearance is greater the greater their speed. The cost estimate for building a higher platform was secured by VIA Rail.

People and baggage mover

Electric people mover (e.g., SCAT) to transport walking impaired and elderly people along platform to train coach (or secondarily for the shorter distances to buses) and to provide staff care for intellectually impaired customers; while a people mover reduces some need for baggage carts, it cannot eliminate all need; the cost estimate includes two units.

Baggage carts are not communication aids, narrowly defined. But it is very important to have baggage carts for the benefit of all but the most athletic of customers. Travelers who use long canes can free one hand for use with their cane.

2.6. **Technologies for implementing features**

2.6.1. ***Information technologies***

2.6.1.1. **High quality P.A. system**

A good voice system installed throughout concourse and platform areas, including washrooms, can handle both recorded and live audio messages.

The general public, as well as visually impaired, hearing impaired, cognitively impaired, and elderly persons can be served.

Technologies include ceiling baffles, acoustical treatment of walls and floors; speakers with a wide frequency range and, most important of all, a sufficient number of speakers with appropriate directional patterns to eliminate echoes.

2.6.1.2. **Audio loop for concourse and platform**

An audio loop or other transmitter systems can be installed around the perimeter of a transportation space. This provides listening systems for hard of hearing travelers for orientation and identification of facilities and for hearing messages.

Suitable technologies include induction loops (which work with the telephone pick-up coil built into most hearing aids), infrared light beams used with dedicated receivers, or AM and FM wireless broadcast systems, again used with matching dedicated receivers.

Other than the telephone coil, systems require arrangements for distributing and otherwise managing receivers.

2.6.1.3. **Payphone**

Payphones should have volume controlled receivers, be low mounted with seats, and combined with Telecommunication Device for the Deaf (TDD) units in protective drawers, and with credit card readers to handle payment. Task lighting for operation of phones and TDD is helpful.

Integrated devices by Bell and B.C. Tel. are available; separate payphones and stand alone TDDs at the VIA Rail or Greyhound ticket counters can be used.

2.6.1.4. **Signage system… audio**

Spoken messages to direct to and identify important points in the terminal for visually impaired travelers are now increasingly feasible.

The Télecité technology in use in the Montreal subway system is the latest elaboration of this effort. Talking signs can be installed as well as a system of transmitters at crucial points in the terminal with recorded audio messages, that can be received by travelers who tune into the transmitter range.

Adequate computer or human service capacity is assumed.

2.6.1.5. **Task light**

For improved access, increased light levels for door areas, openings, and other points of customer use are advisable; posts, thresholds, and door contours can be highlighted in bright colours too.

Halogen spot lights and mini fluorescent tubes are feasible technologies.

2.6.1.6. **Signage system… visual**

Signs are needed for identification of and direction to facilities: background/letter contrast, colour, size, location, consistency, use of international symbols, multilingual text, lit, non-glare surfaces and finishes.

Signs serve the general public, elderly persons, and those with hearing, speech, or cognitive impairments.

The most flexible technologies use electronic boards (LED, LCD) or video monitors. However, a backlit, signage box system or even printed boards/panels or separate letters on boards can be used.

Fixed messages form the basic set of information boards. It is assumed that the facility provides this sort of basic information.

2.6.1.7. **Moving signage system**

For special messages, emergencies and evacuations, moving signs, synchronized with P.A. announcements, can be used. Design should recognize the influence of colour, contrast, background, moving speed, letter size, message content, strategic location points, etc.

Customers served include the general public, elderly, multilingual and foreign persons, as well as those with hearing or cognitive impairments.

Technologies most frequently adapted are LED moving letters and video monitors.

2.6.1.8. **Use of colour and brightness**

Contour and brightness bring about differentiation and contrast for wall to floor junctions, along corridors, entrances, rooms, pathways, and in elevators.

Painted surfaces, metal, vinyl, melamine, plastic, veneer, or covered non-glare surface finishes should be used.

It is assumed that this level of care is already anticipated by the architects.

2.6.1.9. **Departure-Arrival Schedule Board**

Train and bus movement boards are needed. They should be large, with light-coloured letters, dark background, and no glare; they should face the main entrance and other main pedestrian generators with messages for departures, arrivals, delays, changes, times, gate numbers, and with a “now boarding” flashing light or line signifier.

Everybody is benefited by good signage: the general public, those with visual, hearing, speech, or cognitive impairments, elderly persons, and wheelchair users.

Technologies include electronic LED and LCD boards and airport-like video monitors and flip disc displays. While low-tech solutions — such as magnetic or felt boards with hand-positioned letters — can work well, they are cumbersome and, given ordinary human behaviour patterns, often languish unused.

2.6.1.10. **Central Info-Centre**

Having a central place for information means accessible information in visual, audio, graphic, and multilingual media for locations of facilities, directions, printed lay-out maps, seats for elderly persons, and accessible areas for wheelchairs.

Imposing this sort of control of information helps hearing, sight, and speech impaired persons, wheelchair users, and elderly and language impaired persons.

Technologies include the *Communicaid c*omputer terminal with a touchscreen. This provides multilingual audio and text information, laser printed maps with shortest route, a built-in seat for elderly persons and wheelchair accessibility.

Lower tech but serviceable are manned information posts with a person trained in different languages and sign language; pre-printed maps with manually drawn-in short routes; and braille brochures and maps.

Still lower in technology and service are un-manned posts with printed material in large print, braille, and different languages, as well as recorded audio tapes.

2.6.2. ***Pathfinding technologies***

2.6.2.1. **Tactile tiles**

Tiles can be applied from the entrance to information areas, to ticket counters, to waiting spaces, to platform walkways, etc. A wide path, detectable by cane and foot, needs to be provided.

They assist people who are visually impaired.

Technologies available include pre-cast pieces, and epoxy bonded elements made from concrete or rubber-like substances. It is practical to bond tiles onto a surface such as the area around a bus door location or platform edge. But it would be unsafe to surface mount tiles by bonding in the middle of a large concourse, because the tiles would be a tripping hazard.

2.6.2.2. **Elevators**

Elevators *can* assist travelers with communications disabilities. They most often relatively straightforward means of vertical movement and thus remove the need for more complex routes to be followed on stairs and ramps.

Elevator controls can incorporate tactile and braille markings at waist level for "up" and "down," as well as audio and visual information for floor indication.

This can help visually and hearing impaired visitors.

2.6.3. ***Safety technologies***

2.6.3.1. **Emergency and Evacuation situations**

For emergencies, visual and audio warnings for a situation, e.g. "fire" or "power failure," and for instructions when evacuation is required.

Enhanced emergency communications help the general public, elderly customers and those with visual, hearing, intellectual, or language impairments.

Technologies in widespread use — and mandated in many places for new construction — include flashing and strobe lights, bells, sirens; audio message systems; moving letter systems; and built-in directional lights near to the floor and/or walls leading to next exit. Even simpler devices such as flashing exit signs with audio alarms can be useful.

2.6.3.2. **Handrails and grips**

Handholds along corridors, walkways, steps, stairs, around furniture, and in washrooms, with tactile cues for the end of the run, can be very useful.

These benefit visually impaired and elderly travelers.

Materials include stainless steel, aluminum, wood, or plastic with changes in visual and tactile surface patterns and profiles.

2.6.3.3. **Automatic sliding doors with audio and tactile warning**

Motorized doors — sliding to avoid the hazards of hinged motion — can incorporate spoken messages, e.g. “Entrance to terminal,” “Exit to Quebec Street.”

These would benefit visually impaired persons and the general public.

There are several brands of automatic sliding doors; they can be actuated by stepping or rolling on to a floor mat, overhead proximity sensors, or by blocking a light beam; the door action should certainly be accompanied by a recorded audio warning; floor mats marking the door’s swinging trajectory which are readily discriminable by foot are also worthwhile.

2.6.3.4. **Visual, audio, and tactile warning signals**

For on-ramp and off-ramp areas to and from escalators and moving sidewalks, high contrast edge treatment can be very helpful.

Benefited are frail elderly and visually impaired persons.

Technologies include handrails with tactile treatment leading to ramps, tactile warning tiles or switch-mats in high contrast colours; recorded audio warning messages combined with a sensor before stepping on and off.

2.6.3.5. **Surfaces**

Finish of walls, floor. ceiling, furniture, ticket counters, and signage should be non-glare.

Technologies as in previous entry and materials with non-glare surface finish are useful. Minimizing visual noise is a desirable goal, but may conflict with the architect’s purposes.

2.6.3.6. **Step edges**

To reduce the danger of falls, high colour contrast combined with anti-slip surfaces can be used.

The best available materials are composite with embedded aluminum oxide grit or traditional painted and baked edges, plastic edge inserts, or add-on surface treatments or inserts.

2.6.4. *Other functions and technologies*

2.6.4.1. Accessible washroom

Washrooms should have wheelchair accessible stalls with appropriate grips and handrails, an emergency button, and room for a companion. For highest service, they should be equipped with a P.A. system, moving message and audio alarm, tilting mirror, knee clearance lavatory, automatic water and soap dispenser, tactile floor tiles to exit, wc, urinal, and lavatory; ideally, washrooms throughout facility should be designed to incorporate these features.

This kit will assist wheelchair users, as well as visually and hearing impaired travelers.

2.6.4.2. Ticket counter

A ticket counter (VIA Rail or Greyhound) needs an area of lower wicket height for wheelchair access and a dialogue device to allow hearing, speech, and language impaired travelers to communicate with an agent.

Technologies such as *Translaid* (a multilingual translation terminal) can provide dialogue with the ticket or information agent in eight languages in audio, text, and graphic mode simultaneously.

Also available are handheld personal translators with a text print-out strip or audio interpreters. Paper and pencil and "question and answer" sheets in different languages are used by airlines.

3. PLANNING FRAMEWORK

3.1. Choosing features for implementation

On what basis can communication accessibility features be ranked? Given finite resources, what features should be implemented? How does an organization decide what features are important and what to install first in light of system considerations?

Cost, cashflow, and technical feasibility

Evaluating costs is a subtle matter which includes both costs at the outset and life-cycle costs for maintenance, replacement, etc. Sometimes a feature (such as the unisex washroom in the PSL) should be implemented in order to preempt another installation. For example, wheelchair accessible stalls will be needed in each of the two small concourse washrooms unless a single unisex washroom is built first.

Cashflow matters too. While improvements to the concourse loudspeaker system are important, the existing system can suffice until funds are available to upgrade it. The costs of installing additional control, amplification, and loudspeaker units are not appreciably higher if done in a later year.

Technical feasibility refers to the risk that an innovative technology will not meet expectations or even that it will not work at all. Technical feasibility is affected by budgets; it is improved when more money is available because better quality units can be developed and/or purchased. Likewise, ample funding means that spare units can be stockpiled against times of breakdown.

How critical is the need?

The features recommended in this report range from the *highly necessary* to the *strongly desirable.* While no single feature is critical for all travelers, all the features recommended are important to some.

The question to be answered is, "How much dignity, independence, or satisfaction is gained by introducing a given feature?"

Service reach

Who will benefit from the feature? Some features help almost everybody. For example, well designed, well illuminated large-type sign boards serve all travelers.

Some features that would benefit those with communications disabilities would also help foreign tourists: touch screen information system in the concourse, for example, could be adapted at little additional cost.

System integration and good sense

Some features overlap the function of other features. Installing an induction loop system for hearing-aid users does not provide better intelligibility than an echo-free room with high quality loudspeakers. But, at some added cost, an induction loop can be installed to cover other spaces within the terminal.

On the other hand, some features depend on the presence of other features. For example, it makes no sense to plan a miniature destination sign board inside the PSL unless there are plans for an electronic sign in the main concourse.

3.2. Constraints at PCS

For Pacific Central Station, several compelling constraints exist.

Overall…

- as a heritage site, alterations should not undermine historic values;

- every mode of communication will inevitably function poorly in a space as noisy, active, and large as the main concourse; there are numerous competing sensory and information stimuli;

- it is difficult to ensure the security and maintenance of gear housed in a public concourse; for example, if a braille schedule is custom produced, it may be damaged from excessive handling by curiosity seekers if left exposed in the concourse; and

- some travelers will inevitably need personal assistance from trained staff.

for visual communications…

- as with many transportation settings, emergent information forms a large and especially significant proportion of messages; visual channels lack the reach and impact of sound — sound permeates a concourse and travels around corners; those who depend exclusively on a visual mode of communications (hearing impaired travelers) must be located near the sign for it to function as well as a loudspeaker;

- face to face conversation is, in part, visual communication, but service staff need to remember to turn to face their hard of hearing customers; and

- changeable or programmable electronic sign systems are neither in place nor contemplated; fixed sign boards or manual updating may suffice if a station has only one or two central sign boards.

for auditory communications…

- providing intelligible sound in a large, hard-surfaced concourse defies the best intentions; with some forethought, good sound can be contrived in such a space if tackled from the start; it cannot be so readily accomplished as a retrofit 70 years after initial construction.

architectural communications…

- the existing layout is a good one and the simplicity of both the bus and the rail operations is a beneficial context for communications;

- a change to reserved seats in VIA Rail economy-class coaches should reduce line-ups at boarding times; these line-ups play havoc with sight lines and confuse wayfinding; and

- some modest architectural changes are outlined below; however, some worthwhile features are prohibitively expensive as retrofits.

For some passengers, communications and other forms of stimulation need to be reduced. Customers with mental limitations need a quiet room away from crowds and stentorian loudspeaker announcements.

Likewise, some passengers need to be easily available to staff and, conversely, for staff to be on-call for them —perhaps using a call button.

Communications in emergencies also must be considered. Serving disabled travelers in emergencies is difficult when special-needs customers are spread throughout a big building.

3.3. Choices for implementation

Ideally *all* the areas of communications would be enhanced at this station. However some desirable improvements are deemed impractical for implementation at PCS. The following explains the authors' choices.

3.3.1. *Information technologies*

By and large, high technology information approaches, while powerful and appropriate for certain transportation venues, are difficult to apply to the main concourse of PCS. The station's size and acoustical intractability, as well as heritage protection, make P.A. audio loop installations impractical.

Those displays at the higher-tech end of the range likewise cannot be put into place because the computer infra-structure does not exist here.

Some information features, not suitable for the main concourse, can be built into a protected service lounge — the *Passenger Service Lounge* — on a smaller, simpler scale.

Task lighting, payphones suitable for hearing impaired users, and improved visual signage systems should be implemented.

3.3.2. *Pathfinding technologies*

Tactile tiles are a very worthwhile feature for blind travelers. It is recommended that these be installed along platform edges.

Within the concourse, tactile tiles are not feasible because the terrazzo floor would have to be torn up in order to avoid a surface mount tripping hazard. Moreover, the layout is already straightforward, the paths often cross passenger queues, and the permission of the heritage authorities would need to be sought.

Elevators are not needed because all passenger movement is at grade.

3.3.3. *Safety technologies*

Emergency communications should be enhanced and this can be done easily. Such features are required by the BC Building Code and need not be costed as a special item in this set of recommendations.

Features related to level changes, ramps and stairs, are not applicable.

The use of sliding doors rather than hinged motorized doors is strongly recommended even though this conflicts with heritage conservation. An expensive alternative is to use the original doors but have them rebuilt into a sliding door mechanism.

3.3.4. *Other functions*

Washroom facilities in the station are marginal. Enhancements are recommended. As a reasonable compromise, a highly enhanced washroom, built as part of the special service lounge, is recommended.

A low-height ticket station is recommended.

3.4. The recommended approach

It seems advisable to develop modifications along two lines:

- moderate enhancements in the mainstream of travel… the main concourse, platforms, and bus bays; and

- setting aside a room as a Passenger Service Lounge (PSL), which can house other enhanced features.

Why create a separate space? A quiet room is needed for some kinds of travelers with limitations. Likewise some communications gear is best operated, secured, and maintained in a room separated from the main concourse.

Associated with a PSL could be a high quality accessible washroom. By being separate from the main washrooms, it could be used by both sexes. It could be commodious enough to allow an accompanying person or professional to enter to assist the disabled traveler, if necessary.

Finally, a PSL could serve a range of customers besides those with accessibility hurdles to contend with; for example, breast-feeding mothers and parents with infants can be served, as well as frail elderly and temporarily disabled travelers.

Two caveats…

Of course, the provision of the PSL with its emphasis on serving disabled customers should not interfere with either of the following:

- the fullest possible support of the integration of disabled customers into mainstream services in accordance with their wishes and also to avoid medicalizing the space or segregating disabled passengers; and

- the broadest possible hospitality of the PSL for all customers with appropriate needs.

3.5. Main sites and features within this approach

3.5.1. *Passenger Service Lounge*

A Passenger Service Lounge could include:

- arrival and departure information
- amplified payphone and public TDD
- speaking clock
- help call button
- quality loudspeaker
- emergency annunciators, visual and auditory
- information in braille
- isolation from concourse noise but sight of concourse movement

as well as

- suitable furnishings
- climate control
- an accessible, large unisex washroom

3.5.2. *Concourse communications*

Concourse communications could be helped by:

- improved schedule sign board
- multilingual self-serve touch-screen information
- improved wayfinding signs
- amplified payphones
- improvements to the ticket counter; for example, equipment to permit eye-height conversation with wheelchair users and increased face-front contact with hearing or speech impaired customers.

3.5.3. *Platform and bus bays*

Other features out-of-doors which might be incorporated are:

- car indicators alongside train coaches and bus bays
- tactile and high-contrast edge markings along boarding areas
- weather protection
- a people mover, principally for the train platform, which would serve trains of 14-16 cars in size.

3.6. B.C. building code and emergency needs

Mandated requirements

This report does not address all needs of disabled travelers. Some of the mobility needs are covered under ordinary provincial building codes or fall within the accepted practices of qualified architects. This report takes it for granted that all mandated accessibility features and life safety requirements have been taken into account.

For example, it is assumed that smoke detectors with suitable connections to multi-mode alarm systems will be put in place where needed.

Emergency egress

Emergency egress for all passengers needs thorough analysis, although the risks are fairly low in this setting. Reaching disabled customers and providing for their orderly and safe egress is, of course, very important.

Emergency communications planning has been under active reconsideration by architects and psychologists for the past decade. Part of this reconsideration is the special needs of disabled users. Emergency planning needs to be undertaken for such customers. Three areas of concern are: receiving emergency warnings; orientation in smoke-filled or congested environments; and the regimen of evacuation. All of these need more than the usual care when spaces are filled with smoke and there is the tension of human fear.

A PSL would help with the provision of service to travelers with special needs during emergencies by locating them in one place. Staff responsible for the PSL could develop and rehearse evacuation procedures.

For the main concourse, strobe lights are needed to warn deaf travelers. These lights can be mounted so as to highlight escape paths and exit doors and thus serve all customers during the emergency.

4. RECOMMENDATIONS

4.1. Priorities

Exhibit 7 indicates the Basic, Second Priority, and Third Priority features of a good upgrade for Pacific Central Station in Vancouver.

Since the majority of features are designated as *Basic,* some words of comment are in order.

This report encourages early construction of so many features for two fundamental reasons. The first is simply that most of these features are needed if Pacific Central Station is to support minimal independent dignified travel by disabled customers, as understood in today's travel market, and in VIA Rail's policies. The second is a "domino theory" of construction. In short, one act of construction or commitment leads to another.

It makes no sense to build walls but to neglect setting sound barrier batts within them. Once VIA Rail is committed to the creation of a customer lounge, for example, then chairs are needed, a help call button and a pay-TDD (at no cost to VIA Rail) becomes essential, and so on. Likewise, once a commitment to construct a washroom is made, fixtures cannot be omitted unless function and hygiene are to be sacrificed.

4.2. Prices

Prices for the recommended features are shown in Exhibit 7. These are high/low estimates based on reasonable commercial practices.

Prices do not include the cost of installation. For some features (e.g., furniture, for example) this is minimal, while for other features (e.g., a water fountain) installation costs are comparable to equipment costs.

Some features are needed for routine customer service and should not be deemed a charge to the accessibility budget (sign boards, easy to read wayfinding signage, or basic fixtures in the washroom). In other cases, there may be an added expense to ensure that features are usable by all (for example, a large-sized call button should replace a small-sized call button). Again, only the added *marginal cost* of enhancement is an *accessibility* expense.

Some features that enhance accessibility are mandated by law or are routinely implemented by progressive corporations. For example, a people mover or intelligible PA systems are reasonably expected to be seen in any

new facility. Therefore, their cost should not be attributed to enhanced communications, but to the basic station kit.

- **Basic recommended features total $64 270.**

- **Second priority features add another $31 300 (including a soft estimate for the cost of a custom schedule board for the PSL).**

- **Third priority features at $90 700 include a second people mover (such as the SCAT), a water fountain for the PSL, and soft estimates for major capital improvements to the platform.**

5. CONCLUSION

5.1. Nothing is more important than staff performance

Studies of disabled travelers routinely find that good service is the most important single variable in their satisfaction. In transportation studies, disabled people tend to report that employee attitudes are reasonably wholesome and staff do show a willingness to assist disabled travelers. *But staff often lack the technical know-how to provide good help.*

The training of staff is, therefore, essential to the running of a successful operation. It is important for VIA Rail to fulfill their corporate policy of providing a half-day of training in serving disabled customers; this should be mandatory for all Vancouver employees. There is some reason to feel that a training shortfall is present — perhaps because so many of the Vancouver employees are part-time or seasonal.

Other aspects of human resources planning should be undertaken. Staff members with special aptitude for customer service should be designated accessibility coordinators. A coordinator should be present at times when travelers are numerous. The staff member who ordinarily provides customer service and aid to travelers can simply add accessibility to their skills.

Once staff are trained to an acceptable level of competence, management must ensure that they continue to perform services to special travelers competently and courteously.

Not all customer services depend on hardware

Some important improvements to communications and accessibility require no material feature or hardware to be added to the station. These improvements flow from service performance improvements. For example…

- the existing PA system should be used routinely to duplicate written or sign board information for the benefit of those who did not (or could not) read it or for those who might not be able to understand it;

- existing or planned sign board, message, and signage systems should be used as much as possible to communicate messages borne by the PA system or conveyed by one-on-one speech.

5.2. A systems planning approach

To ensure that newly introduced features are right for target audiences and to ensure the achievement of a standard of independent travel (without needing accompanying persons), a few more steps need to be taken in preparing the system as a whole. Some of these steps can be taken by VIA Rail jointly with Greyhound.

Vancouver systems

Customers need to be made aware of new features. The features can be promoted by distributing brochures and pocket guides and through contact with voluntary organizations. Active liaison with voluntary organizations has been very effective for public transit operators and makes sense for the Pacific Central Station too.

For example, if VIA Rail or Greyhound are using cassette tapes to provide information to blind customers, travelers should be reminded to bring along cassette players.

Within the station, accessibility and general customer satisfaction can be enhanced through attention to "customer interface" details. For example, the general wayfinding signage should be easy to read by people with a range of eyesight acuity. Doors should be easy to open and handles which are easy to grasp should replace round door knobs. TDD access for buying tickets should be considered even if the access demands the expense of an *800* number.

Outside the station, arrangements for paratransit pick-up should be formalized in consultation with these bus operators. Likewise, tourist information for hotels or phones for hailing cabs need to be developed with sensitivity to the full range of users.

VIA Rail across the country

While improvement to any one station is helpful *in its own right*, having both origin and destination stations accessible is more effective. Physical and communications accessibility while on-board a train or bus should also not be forgotten. But incremental improvements — at any place or any time in the system — are worthwhile even though comprehensive system accessibility is still in the future.

5.3. Implementation and evaluation

5.3.1. *Implementation*

"Implementation" is that step which takes features from blueprints through construction.

Implementation of accessibility features sometimes goes wrong for two common reasons. First, those who produce the features may not understand this area of work. They may lack specialized professional knowledge or personal intuition about accessibility requirements. The contractor may erroneously prefer shiny tiles over matte ones because they look more hygienic. The contractor may not understand that matte finishes are better because they reduce visual glare. Likewise, the contractor's own eyesight may be excellent, so that glare and night blindness are not perceived as a barrier.

Second, those who manufacture or construct the features may have no solid history of work experience to fall back on. For many sorts of construction, years of experience guide the worker. But in these cases, there may be no conventional approach for them to follow. For example, the mastic used on tactile tiles may be wrong and the tiles may come loose.

To overcome these limitations, it is important for the design, architecture, construction, and project management people to remain vigilant. They should keep an eye out for departures from the plan, and ensure that their intentions — as embodied in the specification — have been carried out.

5.3.2. *Evaluation*

After the building is complete and occupied, it is essential to evaluate results. Unanticipated changes in operations could render some of the features more of a hindrance than a help. For example, if a small curb is built to control rainwater run-off, perhaps the SCAT transporter will be unable to climb over it.

Design is not an exact science. Operators, carriers, and consultants can always learn and improve. The best evaluation assesses performance through the eyes of the user. Determining user's reactions permits fine tuning of the existing design and improvement of future designs.

Evaluation should take place at two or three stages. One special time is at start-up. Errors and mishaps of all sorts are most common in the opening days of operations. Nobody is familiar with the site and no ameliorating work-arounds have been developed by management. Likewise, the problems are more striking to operators and evaluators because they too are new and thus their powers of observation are more acute. Problems are therefore more clearly visible to everybody.

After some weeks or months, managers have begun to provide fixes. These make-do fixes may be, for example, hand-lettered signs on cardboard to supplement missing information on main sign boards. The building may be repairing itself: door catches may be less stiff and paths may have started to be worn on the floors.

The importance of evaluation cannot be overemphasized. Without evaluation there can be no lessons learned. It should be pursued with scientific care, not left to impression and to the weakness of staff memories. The time to begin evaluation is before changes are put in place. That way, baseline observations can be made and the benefits of the improvements charted.

5.4. Enhancements may pay for themselves

Can enhancements pay for themselves? In a general sense, improvements to customer service are, by the marketing philosophies prevalent these days, important steps to competitive success. In short, service pays for itself.

In the present case, many disabled travelers require accompanying persons in order to be able to make their trip. These accompanying persons travel free on both VIA Rail and Greyhound. If enhancements to the station could remove the need for such free-traveling guests, the disabled traveler could make the trip independently — comfortably, pleasantly, safely, and with dignity. The assistant's seat could then be available for a paying passenger.

5.5. Recommendations

It is recommended that the basic package of features be implemented during the period of construction. Procedures for avoiding pitfalls during construction are presented in this chapter.

In addition, the human resource support outlined above should be developed. Most of the human resource initiatives are already mandated under VIA Rail's service policies.

Undertaking a professional evaluation of results within one year will benefit Pacific Central Station, the two carriers, and future users of transportation terminals.

The investment in a Passenger Service Lounge should not diminish the importance of accessibility and hospitality to disabled customers in the main spaces of the terminal and on the train platform and bus bays. Nor

should other parts of the system of travel be neglected — reservations, access to the site from home, and, of course, rolling stock.

6. EXHIBITS

6.1. **Exhibit 1. Outside and the inside of the station**

6.2. **Exhibit 2. Location for the Passenger Service Lounge**

6.3. **Exhibit 3. Views of the ticket counter and information desk**

6.4. **Exhibit 4. Concept sketch of accessible features in a Passenger Service Lounge with an integrated washroom**

6.5. **Exhibit 5. View of the Information Desk as seen from the main entrance of the Station**

6.6. **Exhibit 6. A concept sketch of the train platform**

6.7. **Exhibit 7. Table showing prioritized recommendations and cost estimate**