THE UNIVERSITY GOES TO TOWN
Edited by J. W. Wilson

SIMON FRASER UNIVERSITY
BURNABY BRITISH COLUMBIA, CANADA
The University Goes To Town

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J.W. Wilson

Discussion Paper No. 20

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Comments are invited.
THE UNIVERSITY GOES TO TOWN

collection of community planning studies by geography students at Simon Fraser University, 1977 - 1984
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PLANNING SAFER COMMUNITIES

RESIDENTIAL DENSIFICATION

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   A Study of Location Policy for Homes for the Elderly

A TIME TO KEEP:
   A Policy Study for the Farmlands of Delta

MOTORIZED RECREATION IN THE GREATER VANCOUVER AREA

BIKEWAYS FOR BURNABY
The University goes to Town

In praise of community studies

I believe that, as Alfred North Whitehead once put it, the university is place for standing up and looking around. I also believe that community studies are an excellent means to this end. By community studies I mean the study of issues in the domain of local government and resolved by political decision-making processes. These need not be in the field of urban planning, although the studies collected here are: for example academic colleagues at Simon Fraser have done comparable work in marketing, in philosophy (the ethics of development) and in various aspects of geography.

Such studies have much to commend them:

1. Students find them stimulating (I do not subscribe to the Calvinist doctrine that it doesn't matter what you teach them as long as they don't enjoy it) and tend to commit themselves more than usual, thus taking the essential step towards real learning.

   The main reason for this, I'm sure, is that the learning process is rather more collegial, and certainly more interactive, than the usual undergraduate training. In many respects it parallels a well-done graduate program: students work on a real problem in a broad and realistic context; and they can be self-guiding and directing to the extent of their own abilities and the time available.

2. These studies confront students with the diversity of "society" and the difficulties inherent in democratic government. Furthermore they demonstrate that in real life problems have no respect for disciplines as such - a salutary corrective for academic tunnel-vision. A problem is a problem is a problem and disciplines are recognized only insofar as they bring light and resolution to it. The studies collected here have borrowed shamelessly from the fields of gerontology, communications, environmental design and criminology as well as city planning, all because they had something to contribute.
3. While the studies involve research activities these always go beyond the collection and analysis of facts to their use in democratic problem-solving. Inevitably then, moral questions arise to becloud purely "rational" approaches. Such confrontations with values seem to throw many students for a loop, that is, if they recognize their existence at all. (Hence my special regard for one student, Fred Fuchs, whose feeling for the earth was so strong that as soon as he learned what the course topic was to be (an attempt to find a legitimate home for trail bikes in the metropolitan area) he resigned from the course!) Another shocker for them is "politics", which most regard with remarkable cynicism and do not recognize as a vital element in the process by which democracies make their decisions.

4. Community planning studies usually show that, in the face of the ineluctable problems of real life, rigour - which students believe has to do in a narrow sense with method and especially statistics - has more to do with open-mindedness, honesty and conscientiousness than with technique. They show also that criteria of conscience such as humanity and equity have a prime place in the making of good public decisions.

The planning process

For the teacher, undergraduate class projects of this kind are demanding. Typically they involved a process of planning and supervision such as the following:

1. Identify a live but handleable topic
2. Scan the prospective project. Is there enough to make a project? Too much? Who would be interested in the outcome? Can you get working materials? Does it lend itself to splitting up into sub-projects for individual or pair work? Is there a literature to start with?
3. Scan the literature and place on library reserve; get working materials, maps, reports and arrange for reproduction; identify and engage external visitors/experts; plan the course in broad outline. (The last two steps are a guaranteed recipe for a preoccupied, antisocial Christmas break).

4. Execute the program, making the inevitable adjustments which will be required.

5. Present findings to the "client" - in our cases usually a group of staff planners.

6. Write a final report, such as the attached.

Some comments from experience:

The ideal topic is one of current concern or on the edge of a developing field; inherently attractive - bikeways or crime prevention through design, for example; of interest to a working body - the motorized recreation vehicle study was used by a local government Task Force; of interest to the professor; supported by an available literature which enables one to get a handle on the topic; and capable of completion within the space of a semester.

You should try to have an outside "client" to whom the topic is of interest, for outside participation is always stimulating to the students, as is the opportunity to present their work to experts. Subsequent review of such presentations is also highly worthwhile as students try to assess the viewpoints and comments of the professionals. Even more interesting is to expose the class to a variety of roles - planners, politicians and citizens, for example - but to get the best out of such meetings you need to spend time beforehand in studying the backgrounds, roles, preoccupations and constraints of the people who will be involved.

In order to achieve your objective within such a limited time span you have to plan ahead, but you must also be flexible, and in particular must allow spaces in your schedule for review, integration and replanning.

Students should be warned about the exploratory and unpredictable nature of the course especially since so many have been accustomed to a steady diet of lecture courses.

The ideal is for the students to be involved in guiding the exploration as it proceeds i.e. helping to feel the way into the topic. Normally only
the best can do this, the rest being content to do their twice-weekly assignments as ends in themselves. But it should always be tried.

Aim to produce a formal, professional-quality report on the topic. Every teacher knows how difficult it is to achieve this with a class of twenty undergraduates within a 13 week semester. My solution was to draft a report myself, have it reviewed by the class in the last few days and finish it in the month following. I believe that this extends the learning process and gives students a report writing standard to shoot for, not to mention a product they can use in job hunting.

You can expect a high-low-high pattern of interest and energy corresponding respectively to the impact of an appealing challenge, the accumulation of facts and analyses without immediate result, and the appearance of a skeletal report tying it altogether and promising to make it all worthwhile.

A broader look

I have described the benefits to the students. But these are not all. The community also benefits by having work done for which hard pressed departments do not have time or are not equipped. It is true that the stance of university studies is likely to be different - not always totally "realistic" perhaps but probably richer in its roots and viewpoints than an in-house professional study might be - and therefore poses an extra (positive) challenge to the recipients.

In a broader sense the community benefits because some of its younger members are being trained to exercise one of the fundamental duties of citizenship - the duty to make intelligent, logical and moral judgments on public issues. This is worth stressing because so much of their training focusses on their forthcoming professional roles, that is, roles in which they are likely to exercise specialist or self-interested judgments. To act for a while in the role of adviser to local governments is to play in effect the part of the collective citizen-in-general - a salutary and educative experience.

Lastly the university itself benefits, especially in these bottom-line days when so many programs require political support or have to be justified in payoff terms. Municipal politicians and their citizens come to realize that, in some measure at least, their problems are the university's problems, that young minds of some power are being trained to deal with them, and that even at this early stage they have fresh and useful things to say.
The community beyond the walls has engrossing tasks to pursue, while the university has its own compelling purposes. But it is wrong to suggest that "never the twain shall meet". There is something to be gained by all concerned when the university goes to town.

J.W. Wilson
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Simon Fraser University
PLANNING SAFER COMMUNITIES

An Exploration in Burnaby B.C.

The Regional Planning II class at Simon Fraser University, April 1984:
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<td>Sylvan Court</td>
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1. **ENVIRONMENTAL DESIGN AND MANAGEMENT: A PERSPECTIVE**

This study addresses a very old problem in a relatively new way: how can we minimize crime through better community layout and management? Since Oscar Newman's book *Defensible Space* hit the headlines a dozen years ago the environmental approach to crime has evolved steadily and has picked up a number of acronyms along the way. First there was CPTED (Crime Prevention Through Environmental Design, pronounced SEPTED); then there was CPTUP (Crime Prevention Through Urban Planning, pronounced SEPTUP); and lastly there is EDM (Environmental Design and Management, which Heaven forbid we should render phonetically; *EDM please), the term used in the Solicitor General's Report.\(^1\) While we concentrate here on the design aspects of EDM (i.e. CPTED and CPTUP) we prefer the general label EDM. Our main reason for this is that EDM brings together the two aspects, design and management of the environment, which simply should not be considered separately. The elements of these two aspects are summarized in Table 1, and while concentrating on the design part we stress the equal importance of the management part. The three Burnaby case studies make it quite clear how important the Police Department's knowledge of the community is to sensitive design strategies. When it is further recalled that not only policing strategies but also citizen self-protective programs are the responsibility of the police it will be very clear that design and management - specifically community planning and police programs - should never be put asunder.

\(^{1}\) Webster's Dictionary, 1975: "EDEMA: a swelling due to excessive accumulation of fluid in a serious cavity." Stop!
Design Strategies

1. Target-Hardening
   i. Improving hardware (e.g. deadbolt locks) which restricts illegal access to buildings or building units
   ii. Using vandal-resistant materials (e.g. ceramic instead of plaster wallcoverings) which decrease the likelihood and seriousness of vandalism

2. Detection Hardware
   i. Alarms
   ii. Cameras

3. Improving Surveillance Potential
   i. Reducing concealment opportunities
   ii. Improving lighting
   iii. Improving placement of windows
   iv. Improving visibility of locations for indoor and outdoor resident service and activity areas
   v. Increasing pedestrian and street traffic

4. Controlling Access and Escape
   i. Controlling access to and escape from the general area (e.g. through restricted street configurations)
   ii. Using real or symbolic barriers to control circulation within the area (e.g. defining zones of influence)
   iii. Improving ease and speed of response to crime (e.g. improving access for police/security personnel)

5. Fostering Territoriality and Social Cohesion
   i. Clustering dwelling units
   ii. Decreasing height and size of developments
   iii. Distinguishing between resident and non-resident space
   iv. Reducing incompatible or conflicting uses of space
   v. Reducing differentiation between specific environments and neighbouring areas

Management Strategies

1. Resident Strategies
   i. Education programs (e.g. talks, newsletters)
   ii. Resident or community surveillance programs (e.g. Neighbourhood Watch)
   iii. Self-help Programs (e.g. escort services, hot-line to private security)
   iv. Resident or tenant associations

2. Landlord Strategies
   i. Private security personnel
   ii. Improved building image and maintenance
   iii. Improved rental and eviction policies

3. Police Strategies
   i. Consultation and liaison (e.g. with planning/housing authorities)
   ii. Public relations programs
   iii. Team or neighbourhood policing
   iv. Security surveys and inspection programs
   v. Operation Identification

4. Community Strategies
   i. Improved recreational facilities and programs
   ii. Improved social services and crisis intervention services

Table 1
ENVIRONMENTAL DESIGN AND MANAGEMENT (EDM)

An outline of Strategies

2. **CRIME: WHAT AND SO WHAT?**

This study deals with a limited spectrum of crimes, particularly those which occur in residential environments. They are often called street crimes or crimes of opportunity, that is, they result when offenders perceive an opportunity to commit a crime and feel free to do so. This definition implies that if the immediate opportunity were removed or made to seem prohibitively risky, prospective criminals would be deterred, which provides the basic rationale for crime prevention through design.

The following list shows those offences of this kind which are considered most serious from the combined viewpoints of seriousness, frequency, fear of crime and costs incurred by victims and the criminal justice system:

- Burglary (break and enter)
- Robbery (primarily on streets)
- Theft
- Motor vehicle theft
- Vandalism
- Arson
- Trespass
- Indecent assault
- Other assaults (bodily harm, etc.)
- Rape
- Homicide and attempted murder

How prevalent is such crime in Canada? Table 2 gives an indication.

In more detail Table 3 gives RCMP figures for crime in Burnaby in 1980. This shows that a crime was being committed in Burnaby roughly every hour around the clock. Almost half of them were automobile-related (theft and vandalism); and of these, as well as break-and-enter offences, at least three out of every four were committed by juveniles. Even these statistics tell only a small part of the story, for "the number of criminals who are actually apprehended, convicted and effectively deterred from further criminal involvement is a miniscule proportion of the overall offender population." Furthermore, according to the Solicitor-General's Report (page 239) the available statistics indicate that in Canada crime is generally on the increase. But these are merely dry statistics. What do they really signify for the average citizen? They certainly affect his pocketbook: in Burnaby in 1983 the cost of policing amounted to $10.5 million out of a total municipal budget of $138 million - 13 percent of the total. It has been estimated that its share of police expenditures costs the
### Comparison of 1976 Residential Burglary Rates (Per Population and Per Dwellings)

<table>
<thead>
<tr>
<th>Metropolitan Centre</th>
<th>Residential Burglary Rate Per 1,000 Population</th>
<th>Residential Burglary Rate Per 1,000 Dwellings</th>
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<tr>
<td>St. John's</td>
<td>3.41</td>
<td>0.9</td>
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<td>Halifax</td>
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<td>1.9</td>
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<td>Saint John</td>
<td>4.6</td>
<td>1.4</td>
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<td>Chicoutimi</td>
<td>7.16</td>
<td>1.8[^2^]</td>
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<td>Jonquière</td>
<td>3.51</td>
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<td>Quebec</td>
<td>9.8</td>
<td>1.1</td>
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<td>Montréal</td>
<td>16.01</td>
<td>2.2</td>
</tr>
<tr>
<td>Hull</td>
<td>12.48</td>
<td>2.1[^2^]</td>
</tr>
<tr>
<td>Ottawa</td>
<td>12.4</td>
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<tr>
<td>Oshawa/Whitby</td>
<td>3.05</td>
<td>1.5</td>
</tr>
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<td>4.78</td>
<td>1.1</td>
</tr>
<tr>
<td>Hamilton</td>
<td>7.16</td>
<td>1.5</td>
</tr>
<tr>
<td>St. Catharines/Wellao</td>
<td>6.24</td>
<td>2.3[^2^]</td>
</tr>
<tr>
<td>Kitchener/Wellao</td>
<td>3.83</td>
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<td>5.5</td>
<td>1.5</td>
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<tr>
<td>Windsor</td>
<td>5.95</td>
<td>1.5</td>
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<tr>
<td>Sudbury</td>
<td>4.5</td>
<td>1.6</td>
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<tr>
<td>Thunder Bay</td>
<td>4.79</td>
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<td>Winnipeg</td>
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<td>Saskatoon</td>
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<td>Regina</td>
<td>7.8</td>
<td>2.4[^2^]</td>
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<tr>
<td>Calgery</td>
<td>7.18</td>
<td>2.2[^2^]</td>
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<td>Edmonton</td>
<td>11.39</td>
<td>2.9[^2^]</td>
</tr>
<tr>
<td>Fort McMurray</td>
<td>7.88</td>
<td>--[^2^]</td>
</tr>
<tr>
<td>Vancouver</td>
<td>14.33</td>
<td>1.5[^2^]</td>
</tr>
<tr>
<td>Burnaby</td>
<td>8.18</td>
<td>--[^2^]</td>
</tr>
<tr>
<td>Victoria</td>
<td>8.53</td>
<td>0.7</td>
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[^2^]: Indicates this figure is one of the five highest comparable rates.

#### Table 2: Crime in Canada

Source: The Solicitor General's Report pp. 245, 247
<table>
<thead>
<tr>
<th>Rank</th>
<th>Type</th>
<th>No.</th>
<th>%</th>
<th>Details</th>
<th>No.</th>
<th>%</th>
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<td></td>
<td>Auto-related</td>
<td>3918</td>
<td>44.6</td>
<td>Theft from, under $200</td>
<td>1236</td>
<td>14.1</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Vandalism of</td>
<td>1126</td>
<td>12.8</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Theft from, over $200</td>
<td>986</td>
<td>11.2</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Theft of auto</td>
<td>570</td>
<td>6.5</td>
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<td></td>
<td>Residential</td>
<td>2902</td>
<td>33.0</td>
<td>Break and enter</td>
<td>1398</td>
<td>15.9</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Vandalism</td>
<td>621</td>
<td>7.1</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Theft under $200</td>
<td>583</td>
<td>6.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Theft over $200</td>
<td>300</td>
<td>3.6</td>
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<tr>
<td></td>
<td>Commercial</td>
<td>1730</td>
<td>19.7</td>
<td>Break and enter</td>
<td>555</td>
<td>6.3</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Theft under $200</td>
<td>499</td>
<td>5.7</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vandalism</td>
<td>406</td>
<td>4.6</td>
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<td></td>
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<td></td>
<td>Theft over $200</td>
<td>270</td>
<td>3.1</td>
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<tr>
<td></td>
<td>Exposure</td>
<td>197</td>
<td>2.2</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Arson</td>
<td>23</td>
<td>0.3</td>
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<td>--</td>
<td>--</td>
</tr>
<tr>
<td></td>
<td>Rape</td>
<td>13</td>
<td>0.2</td>
<td>--</td>
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Table 3:  
Reported offences in Burnaby, 1980 (3)
Burnaby family about $120 per year in taxes.

Crime also affects their insurance bills. "Insurance premiums have been increasing over the past few years and all property-owners - both private and public landlords, and individual homeowners - are affected by these increases. The Insurance Bureau of Canada has conservatively estimated the cost of all insurance-related crime in 1981 in Canada at $1.3 billion. A large proportion of this figure represents property loss and damage resulting from occurrences of the EDM target crimes."(5) Spread evenly over 25 million people this in turn would amount to more than $150 per family.

But money does not tell the whole story either, for crime has many purely social ramifications. Consider, for example:

• victims and their injuries and losses
• fear of crime, which can cause corrosive anxieties
• effects on behaviour, as when people stop going out of doors - to a favourite park for example
• in extreme cases abandonment of a home or neighbourhood

Is crime prevention worthwhile? "... one does not have to refer to allegedly soaring crime rates or the public's fear of crime to justify increased attention to crime prevention. (It) makes sense under any circumstances because it is concerned with forestalling crimes before they occur and is thereby aimed at reducing the fear, inconvenience and suffering caused by criminal behaviour, not to mention the considerable costs associated with the activities of the criminal justice system". (6)

3. THE ECOLOGY OF CRIME(7)

The dynamics of crime

A crime will be committed in any place only if four elements are present:

• an offender, intent on committing the crime
• a victim, seen by the offender to be vulnerable
• a physical setting which brings them together in the same area
• a social environment which does not inhibit the performance of the act

Given this definition it is not surprising that EDM research has shown that the location of crime is strongly related to both social, physical and geographic factors. Most of the research which supports this was carried on in large American cities, notably New York, and
often in very large public housing projects, and it might be argued that nothing in Canada compares either with their social conditions (especially large racial minorities) or the scale of their housing projects. However, according to the Solicitor General's Report "... certain Canadian environments are at least beginning to exhibit similar characteristics to those described in the American literature. The possibility of more serious conditions developing here should therefore not be dismissed out of hand."(8)

Social factors

There is general agreement that crime is strongly related to social factors, more so in fact than to physical factors. The strongest social correlate is low income, but in relation to crime this is only a surrogate for a number of social conditions such as:

- high unemployment, with accompanying social and psychological problems
- single-parent families (often headed by a female) and a large proportion of teenage children
- a number of feelings and attitudes commonly associated with poverty, such as bitterness, resentment, alienation from the wider society, defensiveness and hostility towards authority

Physical factors

Crime has also been shown to be related to physical features of buildings and grounds, such as:

- lack of clarity about the status of spaces in and around buildings i.e. whether intended for private, public or semi-public use. In large, high-rise public housing projects the high incidence of crime in lobbies, stairwells, elevators and corridors has made it clear that such areas are not seen to "belong" to any group in particular. The same is true of their grounds; high crime rates are found in outdoor spaces that are not clearly associated with specific buildings and not habitually used by them;
- inadequate security features, either in terms of surveillance capability (e.g. proper lighting, potential for observation by casual observers or police), or inadequacy of locks on doors and windows;
- inadequate control of access to the buildings and their surroundings by illegitimate users;
- unattractive appearance and poor maintenance.

This list somewhat de-emphasizes Newman's finding that crime rates are related to the size of projects, the height of the buildings and the
number of other public housing projects nearby. However, it would be wise to recall Newman's explanations of these findings. Project size, he argues, concentrates large numbers of poor people together, producing conglomerations of the most helpless - the elderly poor and families with female heads of households - along with concentrations of teenage children. The presence of other public housing projects simply exacerbates this situation and is all the more likely to produce a "critical mass" of criminally inclined people. Height, he feels, results in too many people using a single lobby, entry and set of elevators, resulting in their inability to recognize each other and thus develop social ties.

Thus social and physical factors may be intertwined, sometimes making for explosive situations. They can also mitigate one another. Affluent people provided with guards and electronic equipment can live in safety in high-rises while there is no conceivable environment that could not be wrecked by malicious gangs of determined teenagers. Nevertheless, regardless of physical circumstances, harmonious living is most likely to result when residents are of like ages, lifestyle and backgrounds, have lived in the same building for many years and engage in many sharing activities.

Geographic factors

Some circumstances which foster crime arise beyond the individual building or its block and these do not happen in a purely random way. Empirical research has shown that opportunity crimes tend to be clustered around the main nodes of their perpetrators' lives (home, workplace or favourite hang out) or their customary travel routes. They come to know these areas very well through daily use and tend to commit their crimes within a very few blocks of the nodes and routes. Thus fairly definite and predictable areal patterns emerge with foci such as:

- low income housing developments
- "hot spots" such as pubs, pool halls, video arcades, high schools, parks or any places likely to become hangouts
- large institutions (hospitals, shopping centres, for example) especially when they or associated parking activities encroach on residential areas
- transit nodes (bus stops and rapid transit stations and interchanges) where crowds of anonymous people are in constant motion
- high transiency areas
areas infiltrated by people who are merely passing through on unrelated journeys (e.g. on the way to school, work or a community centre)

Whatever the setting, it is the aim of design to foresee the possibility of crime and, as far as layout and equipment are capable of doing so, to prevent it from happening.

4. **DESIGN STRATEGIES**

**Objectives and limitations**

From the elements, already recounted, which give rise to the "dynamics" of crime it follows that a crime is likely to result when the prospective offender "reads" certain "cues" in the environment, presumably perceiving a ready availability of suitable victims or targets and a low probability of being detected or apprehended. These cues in turn are believed to reflect a number of factors such as:

- ease of access to victims/targets (i.e. little time or skill required to do the deed and get away)
- vulnerable victims/targets (e.g. passive victims and "soft" targets)
- absence of witnesses (or presence of passive witnesses)
- anonymity or "invisibility" of the criminal
- ease of escape

The preventive task of design is to change these cues as far as possible, and this leads a definition of sub-objectives for design:

- to increase the technical difficulty and risk attending the commission of a criminal act - e.g. using stronger doors and locks, (target-hardening) and using electronic surveillance devices (e.g. cameras, video, intercoms)
- to increase the surveillance capability of the area i.e. to facilitate observation of suspicious behaviour by both casual observers (residents, service people, etc.) and law enforcement personnel (police, private security personnel)
- to control access and escape i.e. to make it more difficult for criminals to penetrate the environment (building or grounds) and to escape after the commission of a crime
- to induce proprietary feelings - a feeling of territoriality - among residents - i.e. to foster a concern for what goes on in their neighbourhood
- to improve the social organization of residents - i.e. to reinforce residents' sense of community and willingness to intervene in the event of suspicious behaviour

This definition in turn leads to the five types of design strategies already noted in chapter 1. The essence of each of these strategies is discussed below. Before starting this blow-by-blow account however it
is well to make some general observations which should totally dispel any thought that those strategies could be used in any single-minded, paint-by-numbers fashion.

- There is little empirical evidence which categorically states that design strategies, except target hardening, will effectively prevent crime.
- Crime-preventive design strategies may have unexpected side effects (for example, burglar bars on windows which have no release mechanisms would obstruct exit in times of emergency).
- They are likely to conflict with other environmental goals (eg. privacy, appearance).
- They are usually easiest and cheapest to install if conceived as part of the initial overall design of the building or area.
- If they have to be retrofitted, they are likely to meet resistance from residents who have already adapted to their environment or who do not regard crime prevention as their prime objective.
- They are most likely to be effective if they are supported by appropriate management strategies involving participation of residents and others in crime prevention activities.

Despite this litany of caveats the Solicitor General's Report concludes that "Taken as a group the design strategies of the EDM approach appear to make sense". But we must also conclude that design for crime prevention must be approached very thoughtfully and circumspectly and must be tailored to the unique circumstances of each setting.

Before embarking on a discussion of strategies however it is necessary to clarify two central concepts - "territoriality" and "social cohesion". The promotion of these two concepts is the avowed purpose of several strategies and a secondary objective of many others. At the same time both of them, while simple to define in general terms, are always enmeshed with other factors, which makes them extremely difficult to isolate.

**Territoriality and social cohesion**

"Territoriality" refers to residents' feelings about their own "turf", specifically feelings of a proprietary and protective nature. Many design strategies, some directly, other indirectly, attempt to prevent crime by mobilizing these feelings. But it is acknowledged that those feelings by themselves are not enough, for, to be effective, they need to be followed by action, and action may be inhibited by other social or psychological factors. Furthermore, ideally "territory" ought also to be recognized by the potential offender. Thus territoriality strategies do not offer a simple, direct connection between design and
effect but a highly problematic one. Furthermore little research has been done which documents the value of territorial mechanisms, although much has purported to show that no-man's land areas and those whose purposes are not clear attract intrusion and crime.

"Social cohesion" means the extent to which a group or community has commonly accepted canons of behaviour and acts collectively. But this can have roots and antecedents that have nothing whatever to do with response to crime. Indeed it is thought that effective resistance to crime usually stems not so much from the onset of crime as from the prior existence of active groups in the community.

**Design strategies**

1. **Target-hardening and vandal-proofing**

   **Target-hardening** is aimed at frustrating illegal access to buildings, mainly through physical devices. The means of doing this is a surprisingly wide variety of hardware devices or techniques, some of which are shown in Table 4. These are believed to be effective either because the criminal may not have skill or tools to circumvent them or because the extra time required to do so causes him to become apprehensive and abandon the attempt. (A 1980 study in Chicago reported that if an entry can be delayed for only four minutes, a burglar is likely to give up). Simple and effective as target-hardening strategies might seem, they have been subjected to a variety of criticisms such as their limited range of application, escalation of effort by criminals, displacement of crime to other areas, increased fear, the fostering of a "fortress mentality" and the costs and difficulties of implementation.

   **Vandal proofing** has, in addition to its direct purpose, the indirect purpose of improving the image of an environment, for "... vandalized street lighting can... encourage thieves; and the general air of neglect created by graffiti, broken windows and other signs of vandals can be frightening."(11) It involves both vandal-resistant materials (e.g. ceramic tiles, plastic glazing) and skilful design, for example concealing mechanical
<table>
<thead>
<tr>
<th>AREA</th>
<th>WHAT TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplies, meter, boilers, etc.</td>
<td>Mark whatever you can for identification. Lock meters and supplies.</td>
</tr>
<tr>
<td>Roof</td>
<td>Secure skylights (tamper-proof grills, bared). Fire exits should open only from inside, and sound alarm if opened.</td>
</tr>
<tr>
<td>Basement</td>
<td>Access from basement should be only to ground floor. Keep exits to rest of building locked from outside.</td>
</tr>
<tr>
<td>Elevators</td>
<td>Provide: 24-hour, vandal-resistant lighting; waiting area fully visible from lobby, or beyond, with no blind corners; convex mirror in upper back corner; audio-intercom or CCTV, recessed against vandalism; heavy plastic shield for indicator lights; stainless steel mushroom call buttons; capacity of guard to stop elevator if intruder pushes in; eliminate emergency stop button if local codes permit.</td>
</tr>
<tr>
<td>Stairwells</td>
<td>Use 24-hour, vandal-resistant lighting. Restrict entry from stairwell to upper halls.</td>
</tr>
<tr>
<td>Fire Doors</td>
<td>Use panic hardware (vertical bolt, crash bar) inside, nothing outside, with automatic closing and possible alarm when opened.</td>
</tr>
<tr>
<td>Entry Door</td>
<td>Install intercom system with buzzer and telephone hookup to control access. Preferably only one entrance door. All doors should be as strong as main door and monitored in same way.</td>
</tr>
<tr>
<td>Doors</td>
<td>Minimum 1 3/4&quot; thick, preferably metal or metal sheathed (solid core wood is the next best). Should be flush to wall (if panels, these must be 1/2&quot; thick minimum). If sliding glass, should be break-resistant and lock from inside. Barlock vertical. Peep hole, 1/4&quot; with wide angle lens. Chain latch not recommended, easily broken.</td>
</tr>
<tr>
<td>Door Frames</td>
<td>Should be flush with wall. Heavy-duty (metal preferable), solid, minimum 2&quot; thick, if wood. Tamper resistant connectors.</td>
</tr>
<tr>
<td>Locks</td>
<td>Well-made, 1&quot; dead latch, key-in lock, with 6-pin brass cylinder. Also vertical bolt or 1½&quot; horizontal bolt, strong metal. If lock extends beyond door, it needs bevel ring, escutcheon plate. Spring latch not recommended.</td>
</tr>
<tr>
<td>Windows</td>
<td>Need locks, preferably key-type. Security screen (removable from inside), grilles or bars (steel, not aluminum, for accessible windows).</td>
</tr>
<tr>
<td>Alarms</td>
<td>Use local alarm (contact switch, foil strips on windows, motion detectors, etc.) and/or central alarms (connected to police or other security persons). Possible distress signal for the elderly.</td>
</tr>
<tr>
<td>Lobby</td>
<td>24-hour, vandal resistant lighting. Lexan/glass on inner doors for visibility. No dark corners or hiding places. CCTV or other monitoring system. Control access to lobby. Doors should open out.</td>
</tr>
<tr>
<td>Mailboxes</td>
<td>Heavy (16-gauge) metal, no perforations. Use cylinder (6-pin) locks. Openings as small as possible. Standard design for easy repair. Keep inside lobby, visible 24 hours.</td>
</tr>
<tr>
<td>Laundry/Social Rooms</td>
<td>Relocate near lobby if possible (basement bad). Use 24-hour lock, CCTV or other monitoring system. Tokens in laundry or vending machines preferable, not coins. Separate area for teenage socializing.</td>
</tr>
<tr>
<td>Storage Rooms</td>
<td>Windowless (basement). Extra strong doors and locks. Locked bins for resident storage.</td>
</tr>
<tr>
<td>Office</td>
<td>Visible from lobby. Safe bolted to floor. Grilles, bars, alarms for collection windows. Special locked cabinet for master keys, etc. Keep records of personnel with keys.</td>
</tr>
<tr>
<td>Garage</td>
<td>Self-closing doors, key or card operated. Doors to building as strong as main door. CCTV or other monitoring system.</td>
</tr>
<tr>
<td>Fencing</td>
<td>Decorative (chain fence is too institutional). Leave no area undefined (i.e., open to all).</td>
</tr>
<tr>
<td>Lighting</td>
<td>5-10 footcandles, minimum. High intensity (mercury, sodium vapour, floodlights). Plastic translucent globes. Use taller light stands (cover more area, hard to vandalize).</td>
</tr>
<tr>
<td>Parking Lot</td>
<td>Needs good lighting, CCTV or other monitoring system. Restricted access. Door(s) to buildings must be heavy duty and secure. Preferably, lot should be visible to tenants.</td>
</tr>
<tr>
<td>Recreation</td>
<td>Limited access, CCTV or other monitoring system. Clear demarcation from adult areas.</td>
</tr>
<tr>
<td>Landscaping</td>
<td>No dense shrubs or trees that offer hiding places. Benches and proper lighting.</td>
</tr>
<tr>
<td>Fire Escapes</td>
<td>Lowest ladder normally 12' from ground. Visibility from ground underneath.</td>
</tr>
</tbody>
</table>

Source: The Solicitor General's Report p. 91
fixings, service ducts and rainpipes, recessing and screening light fixtures, raising planted areas, protecting susceptible plantings (especially young trees) with other prickly or thorny plantings, ensuring small - unit hard landscaping (e.g. cobblestones, brick) is securely laid, using vertical rather than horizontal boarding in fences, and securing copings of low walls (e.g. with concrete stop ends and corners).

2. Detection hardware includes alarms, intercoms and electronic surveillance devices such as cameras and closed circuit T.V.

Alarms are most commonly used in commercial and industrial settings and in schools, and have been found to be effective there in both deterrence and apprehension of criminals. Their major problem typically lies in high rates of false alarms.

Cameras have been used mainly in public housing developments, and do not appear to have been particularly successful. Significant criticisms have been raised, revolving mainly around the issues of cost (both installation and maintenance - which can be very high as a result of vandalism), displacement of crime to other areas, the need for supervision, residents' feelings of invasion of privacy and increased fear. As a result it has been suggested that cameras may have to be justified by serious need and the ineffectiveness of other less intrusive techniques.

3. Improving surveillance potential

The subject of surveillance is inherently problematic because effectiveness implies a) that in order to be deterred by surveillance criminals will have to take serious account of it, which is somewhat in question. b) that if it is to lead to prevention of crime residents will have to proceed beyond surveillance to preventive action, which does not always happen. Thus the effectiveness of surveillance-oriented design depends on two kinds of social response to the situation. One difficulty here is that while many studies have shown the relationship between crime and poor surveillance, few have documented the positive effects of improved surveillance. Nevertheless the Solicitor General's Report, point-
ing out that surveillance potential depends primarily on skilful
design, concludes that surveillance strategies are probably
justified, especially in new developments. In the light of these
qualifications four design strategies to improve surveillance
potential are addressed.

3.1 Reducing concealment opportunities

For all residential buildings suggestions include:

• avoiding solid fencing and shrubbery which conceal
  windows or door
• locating garages, storage sheds and parking areas so
  that they do not provide hiding places, especially
  close to targets
• avoiding partitions around entry points
• avoiding breezeway-type entranceways

Within multi-family buildings:

• avoiding blind turns in corridors
• avoiding alcoves or recessed areas in corridors, lobbies
  and parking garages

3.2 Improved lighting

One of the easier and less expensive of surveillance strategies,
improved lighting, is particularly appropriate to underground
garages, interior corridors and stairwells, sidewalks around
buildings and alleys or walkways in general. While there is
evidence to show that it reduces fear, there is little to
show categorically that improved lighting by itself reduces
crime. (It really needs to be supported by improved citizen
or police response to suspicious behavior). However even
lighting as a strategy is not without its critics, one in
particular being that crime is likely to be displaced from
well-lit to ill-lit areas. Others relate to vandalism,
maintenance costs and citizen objections.

3.3 Improved placement of windows

Improved window placement is given general approval by the
Solicitor General's Report on the basis of "commonsense and
general observation." This strategy argues that residents'
informal surveillance of critical areas such as children's play
and parking areas will be improved if windows in prime activity
centres in the home - especially kitchens and family and living rooms - are strategically placed. It also postulates that residential facilities such as laundry rooms, lockers, parking areas, recreational areas and even bus stops should be placed in residents' line of sight; and further that the grouping of compatible activities such as laundry rooms and toddlers' play areas will lead to even more comprehensive casual surveillance. Such concepts would of course be easy to implement at the building design stage. However, developers of multi-family buildings may be unwilling to locate service functions in the more attractive and marketable areas of their buildings rather than in the basement. Furthermore residents may not wish to have such functions near their own dwelling units.

It is clear then that while anti-crime strategies should be integral aspects of building-and-site design they are likely to come into conflict with other building objectives. Thus they will tax the ingenuity of the architect - and the conscience of his client - to the full. Lastly they will put a premium on thorough "activity analysis" and the application of environmental design knowledge and principles at the earliest stages of design.

3.4 Increasing pedestrian and street traffic.

The aim of this strategy is both to deter criminals by increasing the number of "eyes on the street" and to foster greater interaction between neighbours and strengthen the social cohesion of the neighbourhood. Suggested ways of achieving this are: to provide a mixture of residential and "appropriate" commercial uses in neighbourhoods; to locate outdoor amenities (tennis courts, children's play areas, benches for strollers in parks, etc.) in strategic places, and to develop street patterns which support these aims. Two supporting strategies are: to remove abandoned derelict buildings, which discourage normal circulation and attract crime; and to limit the use of alleys in residential areas.

There is probably considerable need for reservations regarding
this strategy. For one thing the "right" amount of traffic in a residential area is an elusive quantity, and amounts both less and more than this may work against the objective, lesser amounts by providing not enough "eyes", greater by increasing the number of potential offenders in the vicinity and the degree of anonymity available to them. For another thing it is generally acknowledged that the precise mixture is very important, and specifically that known generators of crime and fear - such as liquor stores, pubs, pinball parlours, bars, arcades, pool halls and discos should not be encouraged in residential areas. Furthermore the question of mixtures is likely to be a highly controversial one, involving many different groups and interests.

4. Controlling access and escape

This section deals with control of access through spatial design as opposed to mechanical or electronic means. It discusses three approaches: discouraging traffic from entering residential areas; restricting and channeling traffic within residential areas, distinguishing private from public spaces and creating zones of territorial influence; and facilitating the work of police and other security groups. All of these may be criticized depending on the circumstances. If they are proposed for existing areas they may become foci for heated controversy between different citizen groups (traffic diverters, anyone?) and different civic agencies (traffic engineers, firemen, police); if built into new areas they will presumably not only be cheaper but more acceptable to incoming residents. Then, if they succeed in making an area relatively safe they may simply result in displacement of crime to other areas.

The first approach attempts to reduce the penetrability of residential areas by keeping out "through" streets and using non-continuous street types such as cul-de-sacs and loops. Research in general suggests that there is a strong relationship between area accessibility and crime. This may seem to run counter to Newman's experience that large super blocks without
interior streets have high crime rates and that the provision of public streets will reduce these. However the Solicitor General's Report suggests that both of these arguments may be valid, each for its own setting, (i.e. one for relatively low density development, the other for high densities featuring large and tall buildings) and that this apparent anomaly merely makes the case for choosing solutions that fit the circumstances of each case.

The second strategy attempts to control access and escape by the use of both real and symbolic barriers within an area. Their purpose is to distinguish more clearly between private and public spaces and thus to define zones of territorial influences towards which residents will adopt protective attitudes. This idea is relevant both to the interior design of large buildings and to the design of spaces around them. Thus it is often recommended that all parts of the site of large projects should be allocated clearly to some building or part of it, nothing being left vaguely "public". For this purpose many design elements can be used as real or symbolic barriers - fences, signs, pathways, paving textures, landscaping, doors, gates, pillars, low walls or light standards, for example.

This strategy also raises many questions. The most basic of these questions whether design elements will create an effective (i.e. activist) sense of territoriality in residents unless their social characteristics so dispose them. Another argues that symbolic barriers will work only if intruders recognize and respect them and that we do not know this. Practical criticisms are that barriers may hinder the work of both service and security personnel, reduce the surveillability of an area, and inconvenience residents to the point where they themselves ignore or violate the barriers.

The following table shows the utility of different site features for various purposes and illustrates the design conflicts which can occur.
### Constructions Elements

#### Valuation Key
- Most Effective
- Effective
- Average
- Least Effective

<table>
<thead>
<tr>
<th>CONSTRUCTED ELEMENTS</th>
<th>Eliminating Unassigned Space</th>
<th>Minimizing Penetrability</th>
<th>Maximizing Surveillance</th>
<th>Minimizing Design Conflicts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground Covers</td>
<td>The quality of a ground surface can indicate its intended use. Ground covers define yard, garden and lawn areas.</td>
<td>In subtle symbolic barriers when planned in a planning field or city.</td>
<td>Excellent where surveillance is required.</td>
<td>When mass planned, they subdivide areas but do not effectively separate conflicting uses or groups.</td>
</tr>
<tr>
<td>Low Shrubs</td>
<td>Provide a residential character helpful in defining yard, garden and lawn areas and in developing shaded sitting areas.</td>
<td>Able to form a symbolic barrier, independent upon planning or use.</td>
<td>May substantially block surveillance of adjacent areas, depending upon planning layout.</td>
<td>May provide adequate separation of use areas, however, mid-sized shrubs are more effective.</td>
</tr>
<tr>
<td>Mid-sized Shrubs</td>
<td>Effective as making areas semi-private to private, depending upon planting layout.</td>
<td>Symbolic barriers that may be used as real barriers depending upon plants and layout.</td>
<td>Most large trees will not hinder surveillance, though smaller flowering trees may.</td>
<td>Excellent buffer/barrier to separate conflicting areas.</td>
</tr>
<tr>
<td>Trees</td>
<td>Provide a residential character helpful in defining yard, garden, and lawn areas and in developing shaded sitting areas.</td>
<td>Define the project perimeter, or as symbolic barriers limit access to controlable points.</td>
<td>If of sitting height, they encourage use and activity in adjacent areas, thereby contributing to surveillance.</td>
<td>Mass plantings of small flowering trees can effectively separate use areas by forming screen barriers.</td>
</tr>
<tr>
<td>Low Walls</td>
<td>Delinate and separate sub-areas of a project site if 18&quot;-24&quot; in height. Can serve as sitting elements contributing to use of site sub-areas.</td>
<td>Effective impenetrable barrier.</td>
<td>Effectively block visual surveillance.</td>
<td>Provide good symbolic separation of use areas.</td>
</tr>
<tr>
<td>High Walls</td>
<td>Limit access and help delineate and separate sub-areas of the project site. From private spaces, i.e. yards and patio areas.</td>
<td>Do not hinder surveillance — if metal picket or woven mesh four types.</td>
<td>Physical barriers separate use areas. Can block noisy unattractive areas.</td>
<td>Symbolically separate uses, such as an active play area and an adjacent walkway.</td>
</tr>
<tr>
<td>Low Fences</td>
<td>Define and separate sub-areas of the project site. Can create semi-private areas such as individuals yards.</td>
<td>Profiled physical barrier, mapping penetrability of the project site.</td>
<td>If of short height or placed in a manner so not to block surveillance.</td>
<td>Separately conflicting uses and activity areas.</td>
</tr>
<tr>
<td>High Fences</td>
<td>Minimal effect. Limit access and help delineate and separate sub-areas but do not actually contribute to use of space.</td>
<td>As an access point, gives concurrence traffic, thereby increasing surveillance possibilities.</td>
<td>Do not contribute toward separating conflicting uses of areas.</td>
<td>Symptomically separate uses, such as an active play area and an adjacent walkway.</td>
</tr>
<tr>
<td>Gates</td>
<td>Assign space as entry and passage. (circuitous)</td>
<td>As a means to control access while stopping penetrability.</td>
<td>Do not hinder surveillance.</td>
<td>Effectively separate auto and pedestrian traffic.</td>
</tr>
<tr>
<td>Bollards</td>
<td>Prevent vehicle access, freeing space for pedestrian use. They define space and may serve as sitting elements.</td>
<td>As vehicular access, but permit free access for pedestrians and cyclists.</td>
<td>Do not hinder surveillance.</td>
<td>Safety define areas, but may not separate conflicts.</td>
</tr>
<tr>
<td>Paving Materials and Textures</td>
<td>Particular materials and patterns can indicate use and extent of sub-areas, and contribute to residents sense of territoriality.</td>
<td>Form subtle symbolic barriers. Contrasting patterns and materials can extend transition zones.</td>
<td>Should be sized, shaped and located so as not to block surveillance.</td>
<td>Can separate conflicting uses as well as buffer noisy or unattractive areas.</td>
</tr>
<tr>
<td>Slopes and Berms</td>
<td>Can be used to define use areas and contribute to the development of play and sitting areas.</td>
<td>Form symbolic barriers that discourage penetration of the project site.</td>
<td>Due to change in grade, may limit surveillance from lower areas.</td>
<td>May separate conflicts, while not disrupting pedestrian traffic. As certain locations could be extra wide for siting.</td>
</tr>
<tr>
<td>Stairs and Ramps</td>
<td>Define passage and pedestrian routes. Supplies access from one level or area to another.</td>
<td>As symbolic barriers at the project perimeter or at an on-site use area and at building entrances.</td>
<td>These elements encourage outdoor activity and residential use, thereby increasing surveillance.</td>
<td>Should be grouped and located as identity with a particular group and function. Adequate facilities must be provided for other groups to avoid conflicts over use. (Applies to both site furniture and play equipment structures.)</td>
</tr>
<tr>
<td>Site Furniture</td>
<td>These elements are useful in developing a space for assigned uses, such as living areas, game table areas, etc.</td>
<td>Capable of limiting penetrability of site sub-areas and encourage outdoor activity of residents.</td>
<td>These elements encourage outdoor activity and residential use, thereby increasing surveillance.</td>
<td>Should be grouped and located as identity with a particular group and function. Adequate facilities must be provided for other groups to avoid conflicts over use. (Applies to both site furniture and play equipment structures.)</td>
</tr>
<tr>
<td>Play Equipment</td>
<td>These elements are useful in developing a play area to serve an assigned user group.</td>
<td>May function as symbolic barriers limiting penetrability, particularly activity used.</td>
<td>Encourages increased surveillance of area if play elements are actively used.</td>
<td>These elements encourage outdoor activity and residential use, thereby increasing surveillance.</td>
</tr>
<tr>
<td>Site Lighting</td>
<td>Extends the time period during which use areas can be actively used.</td>
<td>May limit, at least initially, permeability of site areas.</td>
<td>Effective and safe levels of lighting greatly aid night surveillance and residents' sense of security.</td>
<td>These elements encourage outdoor activity and residential use, thereby increasing surveillance.</td>
</tr>
</tbody>
</table>

### The Security Capability of Site Elements

The third strategy attempts to facilitate the work of the police and others by improving the identifiability and accessibility of housing units. It recommends large, clear and well lit number signs for individual units and strategically located orientation maps and signboards for large and extensive housing complexes. As mentioned earlier, good lighting and intelligible street patterns will also constitute parts of this strategy.

5. Fostering territoriality and social cohesion

Several design strategies depend for their success on their ability to promote territoriality and social cohesion, which in turn should cause the residents to repel or inhibit crime.

5.1 Clustering and decreasing development size and height

This strategy eschews massive high-rise projects in favour of low-rise buildings (often ground-oriented) in clusters which incorporate ground space in the form of courtyards and enclosures. These strategies are also seen as helping to reduce the contrast between developments and their surroundings, as discussed later. There is quite a bit of research to support these strategies in general terms although it has also been pointed out that they are likely to work best if the development is inhabited by people of similar or compatible life-styles.

5.2 Distinguishing between resident and non-resident space and reducing conflicting uses

This strategy - operating mainly at the block or project level - attempts to design common spaces in such a way as make residents feel that they are "their" spaces, not outsiders'. At the same time it acknowledges the dangers of conflict between residents when certain types of space have to be shared. Diagram 1. illustrates both of these concerns.

5.3 Reducing contrasts between neighbouring environments

This strategy aims to minimize strong differences in appearance between new developments - especially public housing projects - and existing neighbouring environments. This can be measured not only by choice of the bulk and height of the new buildings (even within the same overall density) but also by careful attention to their massing and facades, as shown on Diagram 1.
Development showing private and shared spaces.

Development separated

Development integrated

Development and the surrounding community

Source: The Solicitor General's Report pages 133, 135, 136
A question of emphasis

Some researchers have pointed out that EDM design embraces two reasonably distinct approaches to crime prevention - the defensible space approach and the opportunity approach. The former concerns itself with strategies intended to promote territoriality and social control, the latter with strategies aiming to control ease of access and the presence of potential offenders. One of the major criticisms of the defensible space approach has been the failure of empirical research to support a clear link between social controls and physical design. Now an impressive new field study from Atlanta shows that crime rates there were much more strongly related to opportunity than to the absence of social controls, crime being lower in areas that had better defined boundaries, fewer "through" streets and fewer non-residential land uses.\(^{(12)}\) This study also makes an interesting point about the well-known - and successful - Hartford Project, where all three approaches were taken to crime reduction - design changes, police programs and citizen activities.\(^{(13)}\) That point is that although the two "management" programs were implemented early, there was no significant reduction in crime until the design changes were put in place a year later.

The point here is not to downgrade defensible space approaches but to suggest that since opportunity factors tend to fall within the ambit of community planning - through the design of neighbourhoods, street patterns and control of land uses - planners may have a larger role to play in crime prevention than had hitherto been thought.

In this connection it is interesting to note the conclusions of the Cornerstone Report regarding the characteristics of Burnaby's "high" and "low" crime areas:

"...high crime areas have the following factors in common:
- they are located adjacent to major traffic arteries;
- they are divided by traffic arteries or traffic flows
- they have easy access into the area from any direction and easy movement through the areas - the street pattern in all areas is based on the grid;
- they have traffic generators - malls, commercial strips, liquor outlets, etc."
As well, two of the areas have high population densities coupled with high transiency pockets. "(14)

On the other hand features common to the three low crime areas are:

- "socio-economic uniformity;
- lack of easy access into the residential core; and
- no commercial developments." (15)

5. **TUMBLER RIDGE**

An unusual opportunity for the application of EDM principles in the original design of a town was presented by Tumbler Ridge, the new coal town in northern British Columbia. The following is a sketch of these applications. (16)*

**Town structure**

Tumbler Ridge has an essentially cellular structure articulated by a hierarchical system of streets and pathways (Diagram 2). The basic "cells" are neighbourhoods intended to accommodate up to 500 people each, along with the central "cell" of the Town Centre. The neighbourhoods are themselves structured, an attempt being made to compose them of clusters of 10-12 houses. (17)

The major elements of the road network are 1) The main regional highway, which skirts the town 2) two arterial highways taking off the main highway, which on one hand bracket the Town Centre and on the other distribute traffic to and from the neighbourhoods. What is notable about this pattern is the way it channels traffic through its very "lean" network to focal points such as the Town Centre and the neighbourhood entry points. What has been traded off, of course, is network redundancy and flexibility (useful in cases of road blockage) and the opportunity to enter and traverse the neighbourhoods by multiple paths.

**The neighbourhoods**

Given their limited overall size and their substructure of housing "clusters", the neighbourhoods are distinguished by a number of other features: 1) well defined boundaries or edges, formed by forests; topographic features, or berms along main roads - all intended to promote local identity and feelings of territoriality and social cohesion;

*Note that although the principles set out in the Master Plan have generally been followed the specific designs contained in the Plan have not necessarily been implemented. The Town Centre is being built substantially as planned.
Typical Neighbourhood Structure & Road Layout

Tumbler Ridge: Cellular Structure
(It might be mentioned in passing that forests in Tumbler Ridge are also used as windbreaks to mitigate the severity of the local winds);  
2) neighbourhood road patterns (described by the planners as "lattice networks") which severely limit freedom of "through" and "in-out" traffic and thus circumscribe casual infiltration; 3) formal gateways emphasizing the access points to the neighbourhoods from the arterials.  
(Diagram 2)

An interesting problem was addressed at the points where children would pass between residential properties to get to their elementary school - how to inhibit loitering in sheltered spots adjacent to private properties? The solution was the "funnel vortex", a configuration designed to subliminally induce the children to move quickly through the "funnel". The essence of the funnel-vortex, which was derived from work done by the Michigan School of Marketing Research, lies both in its configuration (Diagram 3) and in the materials used - smooth vertical boards (difficult to climb or perch on) about 5 feet high (low enough to be looked over by adults but high enough to give visual protection to the flanking properties).

The Town Centre

Concern for crime prevention is evident in three aspects of the town centre design (Diagram No. 3). The first is the choice of elements comprising the centre. Most of these could be expected, given the goal of making maximum use of limited resources in a small town, hence the presence of the stores, the pub/hotel, health and social services, library, recreation centre and community college. But three buildings deserve mention: 1) the Town Hall, located on the height of land and distinguished by design and colour as almost a caricature of a town hall - this to provide a crucial point of reference and identity for the town; 2) the Public Safety Building (including RCMP), also conspicuously sited so as to overlook a large parking lot and to look down the length of the centre on the north side; 3) the secondary school, deliberately located in the centre - close to the library and a video games arcade, for example - so as to meet any teen-age problems head-on with a lot of surveillance.

Second, the layout of the centre and its parking provisions in relation to roads is such as to facilitate direct use of the peripheral access roads without the necessity of driving down the main shopping street.
The funnel - vortex

TOWN CENTRE FACILITIES
1. Recreation and Community Centre
2. Library
3. Secondary School
4. Community College
5. Health and Social Services
6. Food Store
7. Retail/Commercial
8. Hotel
9. Town Hall
10. Public Safety
11. Apartments
12. Future Town Expansion
13. Municipal Parking
14. Motel
15. Future Hospital

TOWN CENTRE MASTER PLAN
Third, certain aspects of building design and layout were undertaken with natural surveillance in mind, specifically: the staggered (non-aligned) arrangement of store buildings so that half of the end of each building would be in reasonably open view; the provision of glass walls on the front and side walls of each building; and the location of a laundromat (well lit, extended hours, adult clientele) at the rear of one group of buildings.

It is to be hoped that there will be opportunities to carry out site research on Tumbler Ridge in order to find out how the various EDM designs work in practice.

6. **THREE BURNABY CASE STUDIES**

The following case studies were chosen mainly because information on the incidence of crime was readily available from the Cornerstone Report of 1981, which is the basis of the comments made here on area crime. Their purpose here is not to underscore the existence of crime in Burnaby but to provide examples of method. That method is, in essence, the posing and answering of four questions:

- What's the (crime) problem?
- What's the setting?
- Why is it happening there?
- What can be done about it?

**SOMERSET HOUSE (MAYWOOD AREA)**

The Maywood Area (Diagram 4) is one of Burnaby's "high" crime areas. In 1980 the crimes committed there were predominantly auto-related, those being four times more frequent than residential break-and-enter.

The development of the area is very mixed both in age and in type and it contains a number of features often related to crime: a major highway and associated commercial development; a department store, a pool hall, a disco (said to be a major hang out) and a large, natural park; a mixture of old and new buildings
Single family
Low-rise apartments
High-rise apartments

Commercial
Crimes July 1980
Somerset House

SOMERSET HOUSE - THE SETTING
with a relatively high overall density and many vehicles parked on the street.

The overall income level is relatively low and the proportion of transients in the population is said to be high (perhaps 40 percent), which may be why a Neighbourhood Watch Program failed. Most of the population are in their twenties, and most of the offenders in the area - "a rough crowd" - were people in their teens and twenties. Teenagers (from inside or outside the area) - the attractions of the area are said to be the only thing they can afford - are said to be a special problem. Most of the crime occurs south of the railway line where there are many older, low income houses, both single and multi-family. The target building, Somerset House, is quite close to the greatest cluster of crimes in the area (Diagram 4), but well away from the Kingsway strip and insulated from it by the railway line. Somerset House (Diagram 5) is a relatively new, handsome high rise apartment building (11 storeys) which is one of a group of four such buildings set in an open park-like site. Unlike the others it is a rental building and is occupied by older and younger couples - no children, no pets. It sits at the corner of a major arterial (Imperial) and a major connector (Patterson) and the intersection is controlled by a traffic light. Both streets are well lit. There is a bus stop right in front of Somerset House.

To the west Central Park is effectively open since the log fence around it presents no real barrier to entry. To the southwest a cemetery with trees and many larger monuments and stores is similarly open. The single family houses facing Somerset House on the south side have a number of bushy trees in their front yards, greatly limiting the possibility of neighbourly surveillance. In effect, Somerset House is over-
Residents violate landscaping in cutting the corner

Garage dark and ramp walls shield intruders

Entrance and hallway dark and shielded by canopy

Central Park - an easy escape route

Round and first floor suites vulnerable

Houses across the street are partly screened
looked only on its east and north faces, and that by impersonal highrise buildings.

From the security point of view Somerset House is characterized by several features: (Diagram 5)

- The grounds, while well maintained are obviously not regarded by everyone as private, for there is some evidence of people crossing the grass. In one case these are probably Somerset House residents taking a short cut across the corner; in the other they could be outsiders cutting transversely across the larger site to get to the bus stop. In any event, given the symbolic and ornamental nature of the landscaping it is scarcely surprising that no territoriality seems to be accorded to the site as a whole.
- The ground and floor apartments are easily accessible from the ground.
- The lobby, accessible through a locked door and an intercom, is poorly lit, has a curtained window and is not visible from the road.
- The entrance door is further shielded and shaded by a massive concrete canopy, very poorly lit, which entirely cuts off the possibility of surveillance from the apartment block to the east.
- The underground parking garage is accessible by a steep ramp whose walls soon shield anyone walking in. Within it and around one corner, access is controlled by a vertical-lift, metal screen gate, key-operated. This takes over a minute to open and close. There are many massive concrete columns which afford concealment possibilities. It is dimly lit.
- It is clear that some at least of the residents are not all security-conscious, being indifferent to the presence of strangers and not given to locking their cars.
- No special security measures are taken by the management (although tenants are apparently warned to be careful) because crime is not seen as a serious problem. What crime does occur consists of theft from cars in the underground garage and theft from apartments.

While the level of crime in Somerset House could scarcely be called serious and, that being so, residents and management would probably reject any palliative proposals that would impinge on
their comfort, privacy or pocket books, what could be done to reduce crime? Possibly the following:

- **For the grounds:** thicken the landscaping across the corner (inexpensive but doesn’t address an important problem); build a low (symbolic) fence or wall around the perimeter (wouldn’t take away from the sweep and spaciousness of the site, but would be costly and wouldn’t deter anyone determined to trespass); alternatively, keep a special watch for trespassers – who are probably very few in number – and demand that they respect the privacy of the site

- **For the entrance and lobby area:** remove the curtains; exchange the spotlights in the lobby ceiling for open fixtures; install better lights around the entrance door; trim the shrubbery in front of the canopy (all inexpensive, but it is not known if the door and lobby have ever been means of entry for burglars)

- **For the garage:** install a lift door at the foot of the ramp – assuming the existing one wouldn’t fit; install better lighting (both expensive)

- **Generally:** impress on tenants (making a special point of doing this with all new tenants) the importance of safety habits – locking doors and windows, habitually speaking to others in elevators, lobby and garage; put to its proper use the basement room designed as a recreation room but now used for storage; publicize within the building any incidents of crime when they happen.

What could/should not be done?

- Owing to its open location on two main streets nothing can be done to diminish the accessibility/vulnerability of Somerset House
- It would not be reasonable to fence off Central Park
- It would take away from the pleasant, open appearance of the site to build a high fence
- It would not be reasonable to ask the neighbours to the south to reduce their landscaping in order to facilitate surveillance of Somerset House

**Villa Adria (Burnaby Heights)**

Crime in Burnaby Heights (Diagram 6) is also dominated by auto-related offences, these being five times more frequent than the next most serious offence, residential theft.
VILLA ADRIA - THE SETTING
The area consists mainly of middle-aged to old single family houses occupied by lower middle income people, but there is much multi-family occupancy based on renting, and a lot of transiency. Albert Street, one block north of Hastings, contains many relatively new low rise apartments. Major features consist of Hastings Street, a heavily travelled arterial with its long and substantial commercial strip, and on the western border the Pacific National Exhibition complex with its massive parking lots. Specific criminogenic elements include Burnaby Inn (formerly the Admiral Hotel) on Hastings Street, which contains a beer parlour and a cabaret; a liquor store, a small chain grocery store and a pool hall; and Burnaby Heights Park, known as a young people's hangout. The area is subject to a considerable amount of east-west infiltration of traffic.

More than half of the crimes in the area are believed by the police to originate with people living outside the area, and relatively little of it involves juveniles. There is a strong crime focus near the Burnaby Inn and a marked tapering off of crime to the north of Hastings. The target building is Adria Villa, a low rise apartment building about 15 years old, in good condition and occupied by middle income people. To the east are similar apartment buildings; to the north across the lane are older single-family houses in good repair; on the west is more such housing and a small parking lot associated with Hastings Street stores; on the south across Albert Street are a small, older, nondescript apartment house and the extensive parking lot of the Burnaby Inn. Albert Street accommodates a lot of street parking and carries a considerable mount of traffic. Lighting on both Albert and Gilmore is good.

The Burnaby Inn parking, which is open on the east side to an adjacent auto dealer's parking lot, is poorly surfaced, and
is insulated from Albert Street by a low concrete block wall featuring two small walk-through openings and an old vehicle opening now blocked off by concrete highway dividers. Car access to the lot is directly off Hastings Street.

From a security point of view Villa Adria is, with a few exceptions, a satisfactory building (Diagram 7):

• Its territory is very well defined, front and back, by stone or concrete walls and it gives the appearance of care and good maintenance.
• The entrance and lobby are highly visible, well defined, well lit, and guarded by locks and an intercom. Mail boxes, which attract regular attention from residents are at the front of the lobby and highly visible.
• Outsiders surveying the building soon become aware that they themselves are being watched by residents.
• The patios of the lower apartments are easily accessible from the ground and concealment is facilitated by a number of substantial trees immediately in front of them.
• The underground garage, accessible from the lane, is open, ill-lit and open to casual inspection from the flanking sidewalk on Gilmore.
• Crime is not taken very seriously in the building, despite occasional breaking into cars, both in the garage and on the street, and into apartments, and no special security measures have been taken except by individual residents on their own suites.

In this situation what could be done to reduce crime?

• For the grounds: clear the tree trunks up to ground floor balcony level only (residents would probably object to trimming the bulk of the foliage above that level, whatever its surveillance advantages, because of the privacy it gives.
• For the garage: build up the side wall of the garage ramp to six feet to frustrate casual "casing" of the garage below (reasonably inexpensive); improve interior lighting (expensive); install keyed security gates at the foot of the ramp (expensive because two gates would be necessary, or one gate plus a new wall).
• Off the property: request the Burnaby Inn to fill in the old vehicle access on Albert Street with masonry walling; repair and maintain the lighting; improve
Villa Adria

Underground garage, dark and lacking a site, can be "cased" easily from the side and rear of building.

Ground floor suites vulnerable from street.

Concrete highway barriers block off disused entrance in parking lot rear wall.

Entrance well defined and interior clearly visible.

Burnaby Inn and its parking lot. Note missing overhead light and parking in street.

VILLA ADRIA
the surface, markings and maintenance of its parking lot; and at least maintain its present patron management practices, particularly in the cabaret with its relatively late hours. (This acknowledges that recent changes in dress and behaviour codes have already brought about significant improvements in patron behaviour)

What could not be done would be to change the street and traffic patterns in this heavily used area or to change mixed pattern of land use and the associated mixtures of people and activities.

**Sylvan Court (Edmonds Area)**

Crime in the Edmonds area consists almost equally of auto-related offences and residential break-and-enter and theft. In terms of residential development the Edmonds area (Diagram 8) is quite mixed - single family, low rise and some high rise apartments; old rather low income, newer middle income, and relatively new, low income. It is traversed by two major arterials, Kingsway and Canada Way, and another - Edmonds Street. Along all of these, especially Kingsway, there is a mixture of commercial - institutional development including a supermarket, a sizeable shopping mall, a liquor outlet, a bowling alley and a hotel attractive to young people.

There is little crime in the single family areas but there are pockets near the trafficked streets and focussed on low rise, subsidized - rental housing. It is believed that many of the offences involve juveniles who live in the area, one of the tightest clusters being adjacent to the Edmonds School. Interestingly, the police aver that there is less crime than there used to be, possibly as a result of a substantial new recreation centre, the assignment of a probation officer to the area and a Purpose Program offering special teaching and counselling for problem children. The target complex here is Sylvan Court, a tight group of low-rise buildings fronting on Kingsway, although the bulk of
Single family
Low-rise apartments
High-rise apartments
Commercial
Crimes July 1980
Sylvan Court

SYLVAN COURT - THE SETTING
the buildings - which lie behind - are accessible by a rather tortuous route off 16th Avenue.

The complex (Diagram 9) consists of 15 walkup buildings, arranged with two courts on the inside (the larger containing a small swimming pool, a wading pool and an equipped playground area) and three main parking areas on the outside. Each building contains ten apartments entered from a central stairwell. This is a low-income subsidized rental project. There appear to be several families with young or teen-age children, including single-parent families.

The following features of the area appear relevant (Diagram 10):

- The project is ill-defined physically at several points, notably the entrances and parking lot on the east side
- Maintenance is poor: there is much litter and entrance doors often have no locks
- Outside lighting is poor and sparse
- There is a vacant lot just at the eastern approach which is unfenced, unkempt and littered
- The project obviously acts as a "through" route for outside children (as well as insiders, possibly) and a panel in the western boundary fence has been torn down, leading to a pathway through private grounds to Edmonds Street nearby.
- Much of the shrubbery, especially on Kingsway is quite extensive and dense and would both conceal intruders and impede surveillance
- It is possible to drive all the way around the complex by a combination of public streets and private parking lots
- There is evidence of active surveillance by parents of children in the playground area
- There is very little possibility of natural surveillance on the eastern approach, which passes mainly along the sides or backyards of adjacent properties.

This being a low income area, much of the crime problem is probably socially based. Nevertheless what could be done?
The south access is very poorly defined; a gateway would help.

Parking lot and public street are scarcely distinguishable; a fence/wall would help.

The access to the parking area looks like a public way; a gateway would help.

Dense foliage at the front of the project.
The boundaries of the complex could be greatly "sharpened" - by building a medium-height wall or fence around the eastern parking lot and confining access to one opening in the centre; by constructing a symbolic gateway on the south face and another at the entrance of the western parking lot off Kingsway.

The all-too-easy access around the project could be restricted by turning the northern parking lot into a cul-de-sac stopped off at the northeast end (or by blocking off the entry onto Kingsway).

The maintenance of the whole area should be greatly improved.

Better area lighting should be installed.

Some of the shrubbery against the face of the buildings on Kingsway could be reduced.

The northerly boundary fence should be repaired, the neighbours to the north required to prevent the passage of trespassers across their property, and some efforts made by the management and/or police to accost and change the habits of trespassers using that pathway.

Special efforts should be made by all the social agencies in the area, including the police, to attend to the special needs and problems of the residents of the complex.

It will be noted that nothing has been said about "hardening" outside doors, because, with so many children in the area such a move would either not be acceptable to the residents or might in fact be subverted if it were taken. Such security measures should be directed towards the hardening of individual suites.

The residents should be consulted regarding all of these proposals, full advantage being taken of this opportunity to give them some feeling of control over their surroundings. As far as possible agreed works should be carried out without charge to the residents, being regarded as faults in the original design of the complex. Proposals objected to by the residents (e.g. turning the northern parking lot into a cul-de-sac might be a case in point) should not be proceeded with.

Altogether these three case studies, each of them unique, cover quite a range of settings, and they make it clear that indeed much can be done through design to make citizens' everyday lives more secure. To this topic we now turn, asking what the Department of Planning and Building Inspection can do through its program to achieve this end.
7. **PLANNING FOR SAFETY IN BURNABY**

The Burnaby Outlook

We believe that Burnaby's development in the years ahead will require serious thought about public security.

For example:

- Although the municipality's land area is now largely developed there still are a number of sites which could support large scale developments and because of Burnaby's central location in the metropolitan area some of them are likely to be of high density.
- According to the residential compaction study recently approved by Council Burnaby can expect a steady stream of redevelopment and residential compaction projects. These will inevitably result in one of the crime-producing situations mentioned in this report - encroachment on existing neighbourhoods by new denser developments.
- There will continue to be a threat to residential neighbourhoods from traffic infiltration.
- There will be several ALRT stations where security could become an important problem.
- There will be the usual continuous stream of land use changes, raising problems relating to land use mixtures and compatibilities that have implications for public safety.

**Community planning and EDM**

At least as far as zoning is concerned, safety is one of the objectives laid down by the Municipal Act: "In making regulations under this [zoning] section, the Council shall have due regard to health, safety, convenience and welfare of the public..."(19) Thus in giving effect to safety provisions, planning would merely be doing what it has been directed to do. To this endeavour EDM now has quite a lot to offer in the way of both concepts and techniques arising from the experience - mainly in the United States - of the last dozen years or so.

In passing we should take note of one fear that has been expressed about EDM - that it might be treated as an over-
riding end in itself and allowed to produce fortress communities governed by fear. If EDM were left to single-purpose agencies, such as the police, this might be a legitimate concern, but it should pose no problems for community planners, who are accustomed to working with multiple objectives as a matter of course. Crime-oriented design strategies do indeed frequently collide with others based on beauty, privacy, freedom of movement and cost, for example, but such conflicts the community planner takes in his stride as inevitable and soluble by one means or another.

What is interesting, on the other hand, is the extent to which many EDM principles echo some classic prescriptions from planning theory. One in particular harks back to the theory of the neighbourhood, which stipulated an area of limited size, preferably with easily identifiable boundaries, containing a few neighbourhood-oriented commercial facilities and featuring a road pattern designed to discourage "through" traffic - all of which are now advanced as promoting territoriality and safety. Another reverts back to Buchanan's *Traffic in Towns*: "There must be areas of good environment ... where people can live, work, shop, look about and move around on foot in reasonable freedom from the hazards of road traffic, and there must be a complementary network of roads ... for effecting the primary distribution of traffic to the environmental areas,"(20) that is, defined neighbourhoods set in a network of main roads. EDM may indeed be a re-birth, but it has long and deep roots in planning ideas.

**Safety-oriented Planning processes**

It may well be that in Burnaby there will be a place for EDM ideas in relation to new developments of some scale. In that case they should be applied directly in the process of project design. In passing it has been noted that some of the EDM design features in Tumbler Ridge were based directly on elements from *A Pattern Language*,(21) which would seem to be a particularly fertile source of ideas and principles.
Where EDM has to be applied to existing situations common-sense demands that the approach start with analysis of the crime situation being addressed. The approach would look something like the following:

1. Analyze the crime situation:
   Who is doing what to whom? Where, and from what points of origin (generation)? At what times? Approaching and escaping how? etc.

2. What physical elements (land uses, buildings, streets, alleys, etc.) are involved and what is it about them that permits the crime to take place?

3. What solutions are available to change the physical environment.

4. How would these solutions support or facilitate management by police and others?

5. Evaluate the solutions/changes in relation to other urban objectives e.g. accessibility, appearance, privacy, and cost-effectiveness, recognizing the various parties involved in these considerations.

6. Consult parties affected by changes.

7. Make recommendations.

**Implementation**

If EDM is to have any effect thought must be given to mechanisms available for implementation. The established ones are well known but the possibility of modifying or adding to their provisions would have to be investigated in each case.

**Building Inspection:** The applicable strategies are target-hardening, vandal-proofing and detection hardware. The Solicitor General's Report mentions several publications of interest such as *Protecting your home against burglary*, CMHC, 1981; The Design Council 1979 (on vandal-resistant materials); and a number of American publications. Checking of costs of proposed additions/changes would be desirable as well as advance consultation with the building industry.

**Subdivision control:** the applicable strategies are those governing street-cum-lotting patterns, and it is noted that the Municipal Act gives the Approving Officer both authority
and a degree of discretion in determining "the public interest". Two matters would merit consideration
1) whether in the Burnaby situation it would be worthwhile to amend the subdivision bylaw to acknowledge EDM principles 2) whether it would be worthwhile to prepare an advisory document on subdivision design for the use of developers.

Land use planning: For ordinary situations the Zoning Bylaw would apply. It would be worthwhile to consider whether any additions or modifications might be made to accommodate safety considerations. Here it might be noted that at least one other B.C. municipality (Matsqui) is now proposing to add to its zoning bylaw three provisions governing 1) the location of children's play areas in apartment or townhouse zones 2) the standard of lighting in parking lots 3) the provision of resident-controlled gates on underground parking garages.

For special situations the Community Plan mechanism may apply, normally governing land use (by reference to zoning categories), open spaces and street patterns. Thought might be given to the possibility of preparing Design Guidelines for use in individual Community Plans, similar to those incorporated in the False Creek section of the Vancouver City Zoning Bylaw. In Comprehensive Development zones some additions might be necessary to give effect to EDM principles, possibly in the form of Design Guidelines of a general nature or specific to each zone.

In rezoning cases it should be possible to make safety-oriented judgements and proposals properly documented by reference to EDM literature.

A Maintenance Bylaw: In two of the three Burnaby case studies it is argued that poor maintenance was responsible for giving
an area an unkempt, nobody-cares image which breeds disrespect, vandalism and possibly crime. Maintenance bylaws from other places should be sought and the desirability of adopting one in Burnaby considered.

Other powers: Study should be given to the existence of, or need for, other powers which the municipality could use in combatting crime. One case in point would be the control of business licences. Another would be the provision of incentives, possibly by a fee reduction, for developments which included approved EDM measures in their design.

Early advice to developers and builders: If any changes were to be made to codes or bylaws to embody EDM techniques they should be applied in the early stages of project scrutiny.

Police role in development approvals

It has been said that we build our cities in ways that harbour and even encourage crime, then leave the police to pick up the pieces. Such a situation could be ameliorated if the police were to have a role in development approvals, as they have in Matsqui. Whether this could best be through a place on a Staff Committee or by a system of referral should be studied.
REFERENCES


(2) Ibid., page 9.

(3) Crime Prevention through Environmental Design and Management: Case Study, Burnaby, B.C., Cornerstone Planning Group, Vancouver, B.C. April 1981 page 10 (referred to henceforth as The Cornerstone Report).

(4) The Solicitor General's Report, supra. p. 34

(5) Ibid. p. 271

(6) Ibid., pp. 33, 34

(7) Ibid., mainly from section 2.2 of Chapter 2

(8) Ibid., p. 16

(9) Ibid., mainly from Chapter 5

(10) Ibid., page 139

(11) Ibid., p. 95


(15) Ibid., p. 58

(16) For information on Tumbler Ridge we are greatly indebted to Mr. R.A. Rabnett of R.A. Rabnett and Associates, architects and planners, Vancouver, and Mr. Gary Paget, Senior Policy Analyst, B.C. Ministry of Municipal Affairs.
(17) The basic concepts behind the town and neighbourhood structures are to be found in patterns #14, 15, 28 and 37 set out in *A Pattern Language*, Alexander et al, Oxford University Press, New York, 1977.

(18) A very extensive discussion of EDM procedure all the way from problem definition to evaluation is to be found in *The Solicitor-General's Report* pp. 216-226.

(19) B.C. Municipal Act, R.S.B.C. 1979, Chap. 290, s. 716(2).


(21) *A pattern language*, supra.

(22) See also *The Solicitor-General's Report*, pp. 216-226.
RESIDENTIAL DENSIFICATION

AN EXPLORATION IN BURNABY, B.C.

The Regional Planning II class at Simon Fraser University: Claire Allsopp, Joanne Barkely, Julie Brierly, Sue Cornish, David Cruickshank, Joe Cuzzetto, Chris Ege, Ron Fralick, Ray Kawaguchi, Randy Lambright, Alison MacLise, Wes Muir, Steve Myers, Carolyn O’Fallon, Maureen Parkinson, Sheane Reid, George Samways, Kim Smith, Harinder Thandi and Professor J. W. Wilson

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THE BASIC PROPOSITION

A good case can be made for densifying "inner suburbs" - such as most most of Burnaby's residential areas - which consist of single family homes on relatively large lots. While that case will not be made here, it can plausibly be argued that the introduction of additional low-density housing into these areas would benefit many parties - the present property owners, prospective home-buyers and the municipalities. But one problem is obvious - that such a change in a well-established environment would probably be resisted by many of the affected residents.

This report describes a densification scheme for a block in East Burnaby and how residents reacted to it.

THE BLOCK

The block chosen for the exercise, that bounded by 16th and 15th avenues and Cumberland and Wright streets, is shown in context on maps 1, 2 and 3. The block is atypical in that it features a row of lots 190 feet deep. These appeared to offer a good opportunity for subdivision and for insertion of new houses into the middle of the block without producing a density totally out of keeping with the area as it is now.

The block lies within Planning Study Area 18 (Cariboo-Armstrong) but a windshield survey suggested that it "belongs" more properly in Area 19 (Second Street), which is noticeably different from Area 18 in terms of both actual physical change and residents' attitudes towards change. It would not be wise to make too much of this perceived affiliation since it cannot be proved that the residents of the study block share the typical attitudes of Area 19 simply because (or if) its physical conditions are more typical of that area. Nevertheless since it will later be averred on the basis of personal interviews that the block's residents seem remarkably open to change it seems prudent to note the differences between these two areas.

As regards recent changes ("pressure for change") Table 1, pages 18 and 19, of Burnaby's Residential Neighbourhood Environment Study rates Area 18 as "low-moderate" and Area 19 as "moderate-high" in terms of (measured) pressure for change. The difference between them seems to be mainly in the age of houses, the number of housing sales and the number of demolitions, all of which are higher in Area 19 than in Area 18. Area 18 is probably considerably biased by the number of more expensive properties adjacent to Cariboo Road which probably means that its western end is not dissimilar to Area 19 as a whole. Our windshield survey tended to confirm this evidence and interpretation.

Similarly a comparison of the indicators adduced in Burnaby's Resident Opinion Survey, Volume 3 suggests that Area 19 is considerably more receptive to change than Area 18. This is most clearly shown by aggregated answers to questions 27 ("what things do you currently like about this neighbourhood that you would never want to change?") and 28 (the acceptability of non-single family housing types). As regards question 27 and concentrating on the factors of "low density", "no more traffic", (architectural) "character of the neighbourhood", "quiet"
THE GROWTH OF THE GREATER VANCOUVER AREA, 1921-1951

MAP 1
THE HISTORICAL CONTEXT

THE LOWER MAINLAND REGIONAL PLANNING BOARD
MAP 2

THE BURNABY CONTEXT

LEGEND
- RESIDENTIAL
- COMMERCIAL
- COMMERCIAL RECREATION
- INDUSTRIAL
- CIVIC AND INSTITUTIONAL
- RECREATION AND CONSERVATION
- AGRICULTURAL

GENERALIZED LAND USE

BURNABY PLANNING DEPARTMENT
APRIL, 1975.
PSA 19
Second Street

PSA 18
Cariboo-Armstrong

THE LOCAL CONTEXT
and "no commercial building" we find that only 12 percent of respondents in Area 19 care about them compared with 21 percent in Area 18. Low density, the most popular issue was favoured by only 27 percent in Area 19 and 35 percent in Area 18.

As regards question 28, in Area 19 a majority (61%) of residents are apparently ready to accept Vancouver Specials, duplexes and suites in single family houses, compared with a minority (46%) in Area 18. Furthermore the proportion of residents in Area 19 willing to accept triplexes, townhouses and garden apartments is twice that in Area 18, even though in both cases we are dealing only with a relatively small minority (24% versus 13%).

Despite the hazards of the statistical evidence, and provided that our block is better described by the evidence of Area 19 than Area 18 it appears that there ought to be considerable openness to change in the block. Furthermore the more familiar the housing types involved, the less resistance to change should be. Under these circumstances we might also speculate that the ways in which change is handled will be crucial to its acceptance.

THE SCHEME

The scheme adopted was a very conservative one based on the belief that there would likely be resistance to any proposal to alter a familiar environment. Thus it was decided to work, if possible, with well-established mechanisms (in this case R9 zoning) and unexceptionable i.e. single family houses. Even so the resulting scheme could increase the density by 50 percent and cause a considerable change in the "feel" of the block.

On the assumption that R9 zoning would be applied to the new lots created, the subdivision pattern shown on Map No. 4 was devised. This would permit single-family development on small (4000 sq. ft.) lots in the "new" part while retaining the greater development flexibility inherent in R5 zoning on the residue.

This subdivision pattern would in effect turn the main lane into a street whose minimum paved width would presumably have to be 28 feet. In addition appropriate services would have to be installed in the lane - water, hydrants, sewer, drains, power and street lighting - to satisfy the requirements of the Engineering and Fire departments.

Within the new lots site planning was carried out using R9 envelopes and the guidelines set out by Barbara Pettit in her thesis study The Homeowner as developer; a solution. The houses assumed were typically modest ones of around 1000 square feet and absolutely no difficulty was experienced in siting them within the R9 envelopes and according to Pettit's siting rules. The resulting scheme is shown on Map No. 5 and on the attached photograph of a scale model of the scheme by Pettit.
A Possible Denigration Scheme

MAP 5
The cost and financial figures for the scheme, from rough figures provided by the Burnaby Engineering and Taxation departments are as follows:

**Conversion Economics**

<table>
<thead>
<tr>
<th></th>
<th>800 sq. ft.</th>
<th>1000 sq. ft.</th>
</tr>
</thead>
<tbody>
<tr>
<td>House building costs</td>
<td>$40,000.</td>
<td>$50,000.</td>
</tr>
<tr>
<td>Mortgage rate</td>
<td>12 1/2%</td>
<td></td>
</tr>
<tr>
<td><strong>Construction cost</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>$4,000</td>
<td>$5,000</td>
</tr>
<tr>
<td><strong>Carrying cost/year</strong></td>
<td>5,000</td>
<td>6,250</td>
</tr>
<tr>
<td><strong>Monthly cost</strong></td>
<td>415</td>
<td>520</td>
</tr>
<tr>
<td><strong>Taxes (land &amp; building)</strong></td>
<td>90.</td>
<td>100.</td>
</tr>
<tr>
<td><strong>Repair maintenance</strong></td>
<td>35.</td>
<td>40.</td>
</tr>
<tr>
<td><strong>Total monthly cost</strong></td>
<td>540.</td>
<td>660.</td>
</tr>
<tr>
<td>Feasible rent</td>
<td>750. ?</td>
<td>850. ?</td>
</tr>
</tbody>
</table>

It should be possible at today's rental levels to make a profit of perhaps $200/month on a new house.

An owner having the necessary capital could make a return of $600-$700/month, a return on capital of about 15 percent.

**Subdivision**

It would be necessary to have capital for the servicing costs ($20,000 per lot) or to post a performance bond prior to subdivision.

**The Approach to the Residents**

The approach to the residents was taken very carefully and in the first place our activities in the area were made known to them at a very early stage by a brief hand-delivered letter. This letter, which identified us as students engaged on a purely academic exercise, served to allay some suspicions and challenges we would otherwise have met.

A certain amount of background reading was done, the most useful source being Communication of Innovations, Rogers and Shoemaker, Free Press, 1971.

This book provided valuable perspective on the relationship between "change agents" (ourselves) and the intended recipients of change (the residents) and suggested some probable general outcomes which might be expected. A succinct summary of the main variables affecting the probability of change proposals being adopted is shown in the following diagram (Rogers-Shoemaker page 158).
A paradigm of variables determining the rate of adoption of innovations.

- Variables Determining Rate of Adoption
- Dependent Variable to Be Explained

Perceived Attributes of Innovations
1. Relative advantage
2. Compatibility
3. Complexity
4. Trialability
5. Observability

Type of Innovation-Decision
1. Optional
2. Collective
3. Authority

Communication Channels (e.g., mass media or interpersonal)

Nature of the Social System (e.g., modern or traditional norms, degree of communication integration, etc.)

Extent of Change Agents' Promotion Efforts

RATE OF ADOPTION OF INNOVATIONS

Source: Rogers & Shoemaker
In interviewing residents, which we did in pairs, we presented ourselves as students investigating the proposition that densification in inner suburban areas would have many advantages, their block having been chosen as a suitable study project. This stance successfully defused what might otherwise have been seen by the residents as a threatening situation; at the same time it later raised the possibility that our ideas and questions may not have been taken seriously. In introducing ourselves we used a structure of ideas worked out in advance to justify our presence. We used a three dimensional model of the block (previous photograph) and a blown-up air photo on which existing features could be seen. These were most useful in gaining an audience and focusing attention.

In order to give order and comparability to results we used the attached Survey Sheet. This was designed first to elicit spontaneous and undirected responses to our presentation, second to provoke responses to specific questions if spontaneous answers were not forthcoming.

Before describing the findings of the survey it is well to set out some of its limitations. Twenty one responses were obtained from twenty five households. These could be differentiated in many ways - owner v renter, by degree of direct exposure to the effects of the scheme, by prospects of gain, etc. - but any such breakdown immediately leads to problems of statistical validity (which would be true for any survey of a single block), given the typical scatter of the responses. In addition it is clear that not enough time was available either for training of the interviewers or for full assimilation of the questions by the interviewees.

A tabulation of the results is shown in Appendix II. Not surprisingly the responses to the two general questions ("what do you think of the scheme?" and "Would you be happy to live with it?") were somewhat different. In both cases there was very little dissent but the OK/not sure proportion was 4 to 1 for the first and 1 to 1 for the second. Combining the two there was a considerable preponderance of favourable versus uncertain views. Thus we feel justified in saying that at least there was a considerable degree of openness to the proposal.

Enough specific problems were foreseen by the residents, especially those whose properties would be affected directly, to suggest that they were not merely exhibiting "a non-specific resistance to change", as speculated by Vischer. The major problems mentioned were, as percentages of the total number of respondents:

- Loss of privacy 67% (reinforced by comments on congestion and loss of space)
- Changes in views/appearance 50%
- "Undesirable" types of people (associated mainly with renting) 50%
- Parking difficulties 40%
- Loss of (property) value 25%
- Capital requirements 20%

Comparison with some of the residents' attitudes discussed earlier suggest that these findings are indeed plausible.
1. What do you think of our scheme?
   - OK
   - Not Sure
   - Bad
   - It depends

2. Would you mind having new people coming to live in the block?
   - Yes
   - Not sure
   - No
   - It depends

3. Do you think it would affect the appearance and "feel" of the block?
   - Yes
   [3a] eg. spaciousness, views and appearance, privacy, quiet
   - Not sure
   - No
   - It depends

4. Do you think you would be happy living in this situation?
   - Yes
   - Not sure
   - No
   - It depends

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>Family?</th>
<th>Years here?</th>
<th>Staying?</th>
<th>Occupation</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
SOME GENERAL OBSERVATIONS

1. While a good case can be made for densification as a concept it will always be unpredictable and tricky to do because of a) site difficulties b) resident reactions.

2. Any densification program will necessarily have to be approached on a block-by-block basis, each block being unique. This does not mean, however, that interest in block schemes would be confined to each block: neighbourhood and community reactions can be foreseen.

3. Search for suitable blocks should be guided by the following considerations:
   a) Local receptivity to change, probably related to local experience of change, as suggested by the Residential Neighbourhood Environment Study
   b) physical suitability based on lot size and house siting
   c) location in or on the fringes of larger areas where substantial change can be expected

4. a) Engineering services will not normally be a problem where densification is confined to single blocks in isolation and where it does not more than double the number of households.
   b) If densification is to be pursued a general strategic-type study should be undertaken in which the three factors set out in item 3) above are related to the capacity of key engineering services.

5. If promising-looking blocks are identified exploratory densification plans should be prepared. These should pay particular attention of the provision of engineering services, parking and house types, siting and controls. They should assume the CD (Comprehensive Development) zoning controls will be used. Particular attention will be essential to the control of building bulk and to house-and-site designs which maximize privacy. (Note that R9 zoning in this case would permit the construction of houses whose bulk would not be in keeping with the scale of present houses and the "feeling" of the block as a whole).

6. The average householder is not expert in development matters such as subdivision, house design and construction, and the management or sale of property. In addition there will always be differences in opinion between property owners as to what should be done. Under these circumstances what the municipality does and how it does it will be crucially important. It will have to help the residents with unfamiliar technical and administrative tasks and do so in open, non-threatening and responsive ways. In particular municipal plans and policies should be drafted which would cover the following and could quickly be reviewed and finalized in the event of fast-moving discussions with residents. These should be regarded as essential inputs which residents would have to have in order to decide whether to accept the scheme or not.
a) Possible site development plans as in item 5) above

b) Financial implications for the individual residents and any proposals the municipality might devise to help homeowners who lack ready capital.

c) Programs which might be used to implement the scheme, such as replotting, local improvement, and assistance with subdivision, house design and contracting

d) Engage in open discussion with the people of the block, being ready with all the information and tentative policies which the residents would need in order to make decisions. Ample time would need to be allotted for presentation, repetition, discussion, surveys and scheme review.

It is acknowledged that a dilemma may exist as regards the timing and sequence of steps 5 and 6 above. Too much block-specific preparation in advance would undoubtedly be viewed as "scheming" by the municipality and resented accordingly. Too little would mean that the residents would not be able to give informed or decisive responses and might lead to delays and to unwelcome uncertainty for them. The ideal would be for the municipality to carry out as much of the preparatory work as possible on a general (non-block-specific) basis, to approach block residents at a very early stage and to be ready to move with dispatch if these approaches met with a favourable reception.
NEIGHBOURHOOD SURVEY: GENERAL RESPONSES
(All Responses Classified by Lot Number)

(1) What do you think of this scheme?
   O.K. - 1, 2a, 2b, 3, 9, 11, 12, 13, 15, 16, 17, 18, 20, 21, 22, 24
   Not Sure - 5, 7, 14, 23
   Bad - 8

(2) Do you think you would be happy living with this scheme?
   Yes - - 2a, 3, 5, 7, 11, 12, 13, 16, 20, 22
   Not Sure - 1, 2b, 14, 15, 17, 18, 21, 23, 24
   No - 8, 9

(3) Problems perceived by the residents:
   Privacy - 2b, 3, 5, 7, 8, 9, 14, 15, 16, 18, 20, 21, 23, 24
   Undesirable Types of People - 1, 3, 7, 8, 12, 14, 15, 17, 18, 20, 23
     (largely associated with renters)
   Views/Appearance - 1, 2b, 3, 7, 8, 9, 15, 16, 17, 18, 23
   Traffic/Parking - 2b, 3, 9, 13, 17, 18, 20, 21
   Congestion/Crowding - 3, 8, 12, 15, 17, 20, 23, 24
   Physical Space - 2b, 5, 7, 8, 9, 14, 17, 23
   Loss of Value - 1, 3, 9, 14, 17, 20, 23
   Noise - 2b, 9, 14, 18, 21
   Capital Outlay - 1, 3, 5, 9
   Topography - 3, 9

(4) Benefits perceived by the residents:
   More People/Children - 2b, 5, 13, 15, 21
   New Houses - Improved Appearance - 5, 12, 13, 17, 20
   Increased Safety - 13, 17
   Better Services - 11, 17
   Affordable Housing - 13, 22
   Less Maintenance - 13, 23
Better Land Utilization - 20, 23

Good Investment - 23

(5) Additional Significant Comments:

If development was done tastefully then there would not be any problems (i.e. space, views, privacy).

Lots - 13, 22

Loss of Back Lane Access
Problems with Front yard facing Backyard Garbage Pick-ups

Problems Associated with conversion of lane to street
Lots - 17, 23

There would be less loitering in lane because as a street it would have more lighting. (Benefit associated with conversion of lane to street)

Lot - 17

Newcombe Connector would help to reduce non-local traffic in area.

Lots - 1, 13, 15

Increased Property Taxes as a result of increased services - inequitable distribution of 'costs' of development.

Lot - 1
### Table for Survey Analysis

(Numbers Indicate Total Number of Responses)

<table>
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<th>FACTORS</th>
<th>OWNER/OCCUPANT LOT TYPE I *</th>
<th>OWNER/OCCUPANT LOT TYPE II *</th>
<th>OWNER/OCCUPANT LOT TYPE III *</th>
<th>OWNER/OCCUPANT LOT TYPE IV *</th>
<th>LOT TYPE V</th>
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<td>What do you think of the scheme?</td>
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<td></td>
<td></td>
<td></td>
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<td>O.K.</td>
<td>4</td>
<td>2</td>
<td>3</td>
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<tr>
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<tr>
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<td>0</td>
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<td>0</td>
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<tr>
<td>Could you live with it?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Yes</td>
<td>2</td>
<td>1</td>
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<td>3</td>
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<tr>
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<td>Problems:</td>
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<td>Topography</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
</tbody>
</table>

* TYPE I - Potential to benefit through subdivision of their lot
* TYPE II - Affected directly by loss of land for development of lane into a street
* TYPE III - Indirectly affected through proximity to the development (face the lane)
* TYPE IV - Not really affected due to peripheral location, away from development
* TYPE V - Includes all houses that are currently being rented
**FACTORS**

**Benefits:**

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Owner/Occupant Lot Type I</th>
<th>Owner/Occupant Lot Type II</th>
<th>Owner/Occupant Lot Type III</th>
<th>Owner/Occupant Lot Type IV</th>
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<tr>
<td>More People/Children</td>
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<td>2</td>
<td>1</td>
<td>1</td>
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<td>New Houses - Improved Appearance</td>
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<td>0</td>
<td>2</td>
<td>1</td>
</tr>
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<td>Increased Safety</td>
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<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
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<td>Better Services</td>
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<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
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<td>Affordable Housing</td>
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<td>0</td>
<td>2</td>
<td>0</td>
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<tr>
<td>Less Maintenance</td>
<td>0</td>
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<td>1</td>
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<tr>
<td>Better Land Utilization</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Good Investment</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
CAST ME NOT OFF FOR THE ELDERLY

LOCATION POLICY FOR HOMES FOR THE ELDERLY

Psalm 71:9 Cast me not off in the time of old age; forsake me not when my strength failleth.
This study makes direct use of the data and findings of Residential and Life Satisfaction of the Elderly in Institutions, 1979, by Gloria Gutman and John Mercer assisted by Arthur Fallick. We are especially indebted to Dr. Gutman for her generous support.

All photos courtesy Seton Villa Retirement Centre, Burnaby, B.C.
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**PART 1**

*General*

The elderly and their situation  
How do they feel about living in a home?  
Activities outside the home  
Home Location policy  
A tribute  

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*Analysis*

A profile of the residents  
The mobile residents  
Rating the neighbourhoods  
General findings  

**DIAGRAMS**

A profile of the residents  
Gradient walking distance  
How far do the elderly walk?  
Basic human needs  
Behavioural circuit  
The neighbourhoods rated  
Three rating schemes  
Two neighbourhoods  

**REFERENCES**
The question:

where should homes for the elderly be located?
THE ELDERLY AND THEIR SITUATION

The people studied here were residents of fifteen "personal care" and/or "intermediate care" homes in the Greater Vancouver area, that is, people who required either a minimum amount of assistance or general nursing support but were still able to do much for themselves. The homes were government-approved and run by non-profit societies in which residents pay about $8.50 per day.

Without ignoring the unique individuality of every person and the dangers of stereotyping, there are some generalizations we can safely make about the residents of these homes:

- Most are 75-85 years old
- Most have health problems
- Almost half can no longer go out by themselves
- Almost all of them are alone, most having lost their mates of many years standing
- They are fragile - their strength and resilience are limited
- They live in homes mainly because they can no longer manage by themselves
- Their productive years - in a production-oriented society - are over
- The world around them "belongs" to the young, who tend to look askance at the very old
- Their social world has shrunk and their lives are coming to an end

And they are very much aware of these things

"We really are 'with-it'. Today one old lady was banished from the lounge until tomorrow for using very bad language."  
Ellen Newton
HOW DO THEY FEEL ABOUT LIVING IN A HOME?

"In this less than half-world there are phases when time seems to freeze. Twenty-four hours don't mark one day. They stretch into an uneasy eternity."

Ellen Newton

"Frida" - The poor old man is still with us. These harsh cries sound like a despairing, broken child. As if he's trying to say he is weary past bearing of this sham of living and all that goes with it. These terrible, less than human sounds bore like blunt instruments into your senses.

"I wonder if the time will come when families and physicians can understand the torture of spirit that must be lived through in places like this. Something that flays the senses. It is pain that is deep-seated, and enduring. Different, but not less, than the pain of a scald or a crushed or twisted limb. And it must happen to any man or woman when terminal illness sentences them to life along-side the mentally ill."

Ellen Newton

"In this situation you never make a new acquaintance. Passing years spirit away some of the old ones. Distance, and bleak rooms don't make it easy for people to come to you. And you can never go to them."

Ellen Newton

"Unable to love the old we approach them via sentiment, duty and an eye to our own eventual decline. We make sure that they are housed, fed, medicated, and seated facing their favorite channel."

Ronald Blythe

- They are lonely
- They feel useless
- They are often bored
- Most of all they loath having to live alongside those who are senile and confused
- Individual feelings vary immensely but the attitudes of a lifetime persist: the independent-minded soldier indomitably on, the submissive resign themselves to the inevitable. Nevertheless theirs is an ambivalent position: they are glad for shelter, food and care and for not having to worry about them; but many feel that in entering a home they have surrendered - that they are no longer competent and autonomous people but units in a custodial institution.

Social security no. 123456; room no. 83; breakfast at 8, lunch at 2, dinner at 5, lights out 9:30; don't make a mess, don't make a noise and don't be difficult.

- Many homes do as much for them as could be expected of institutions. They provide private rooms and T.V. (for the most part), meals, a lounge, and grounds to sit in. Some provide vehicular transportation for outings; many arrange religious services provided by nearby churches; and some are visited by the members of service organizations

- But these are all provided "within the walls", and more than half of the residents are not ready to be cooped up entirely. They still want to enjoy as much of life outside as they can
WHAT DO THEY DO OUTSIDE THE HOME?

"You can escape, and live by proxy in a book for five or six hours a day, but not all day and not every day. Or listen to the radio. Television? Yes, if you can take murder and mayhem, unlimited, and can enjoy the unconscious humour of daily hospital series."

Ellen Newton

It was a warm, sunny early spring day and it just happened that directly across the street from the home, a construction project was beginning. Many residents were drawn out of the home onto the street by the activity and the sun. Many others were at windows on various floors of the building. One gentleman in particular stood out in my mind. He needed every bit of support his arms could give him, yet there he was, cane in one hand, holding the fence surrounding the construction site with the other, not wanting to miss a moment of this action. I would estimate that in the one and a half hours that I was in the area, I saw at least 30 to 40 people on the street and at least that many people looking out their windows over a prolonged period. All this attention to an event which most people would only give a passing glance to.

Jim Hurst

Families and relatives are the mainstay of the outside lives of those who have them within reach. Visiting and driving with them, even though this seldom happens oftener than once a week, is probably the most important social event in their lives.

Over half of the residents can go out by themselves and do so fairly regularly.

Less than half use the bus system; most find it difficult to do so.

Very few can walk as far as a quarter of a mile, and they tend to be deterred by:

- steep gradients
- rough sidewalks
- absence of road crossings, stop signs or traffic lights
- poor traffic visibility
- complex traffic movements (as at intersections or in shopping centre parking areas)

Some neighbourhood characteristics also deter them:

- a lot of traffic and noise
- dull featureless neighbourhoods
- vandalism and the feeling that the neighbourhood is not safe

But what about those who go out on their own? Given their physical limitations, what do they do outside?

If there are no significant deterrents in the way mobile old people engage mainly in:

- shopping and window shopping
- medical trips
- eating out and having coffee
- walking for its own sake
- a variety of social activities
HOME LOCATION POLICY

Most homesites appear to have been chosen for reasons of economy or sometimes because they were donated. But, important as they are, these are not sufficient reasons; all too often the location simply does not meet the needs of the residents. How should homes be located?

The policy goal should be to enable the elderly to participate as fully and naturally as they can in the life of the community around them. This goal was admirably expressed many years ago by Lewis Mumford:

"They should, first of all, be part of a normal mixed community, whether they become members of it at twenty-five or at seventy-five. Their quarters should be indistinguishable outwardly from those of other age groups; but they should be sited, as far as possible where there is a constant play of diverting activity, near a shopping center or a school, so that their chance of being visited, casually and effortlessly, will be increased. Frequent visits, though short, are more refreshing than formal visits, tediously prolonged, that leave desolate intervals of loneliness between them. Many people would find their own family life replenished if the grandparents, though not under their feet, were near at hand; and above all, the young would be the gainers from this; for there are special bonds of sympathy between them and their grandparents' generation, through its very detachment, which often makes them far more ready to heed their advice than that of their own parents.

Through their nearness to each other, in small units, personal contacts within their own group may easily pass beyond the pleasanties of daily intercourse, the hospitalities of a cup of coffee in the afternoon or a friendly game of cards or checkers or chess at night; it would also involve visiting each other when ill and performing little services for each other. Everything that makes the aged more independent, yet more confident of the fact that their presence is welcome, increases their capacity to love and be loved, and it is only, in the end, by providing an environment in which the gifts of love may be more easily interchanged, that old age can be kept from shrinking and drying till what is left is only a dismal waste."
But how can this ideal be translated into more specific policy objectives which can be applied to every day decision-making? We suggest that the following objectives should be sought:

"Old people don't look for gifts. They want visits from family and friends. Their need is to be cared for, too, not in isolation, but in some way not too painfully remote from the kind of surroundings where they have spent most of their lives." — Ellen Newton

"The isolation of elderly people is convention in a very ugly form." — Ellen Newton

"(Do you) in hospital feel cut-off from the outside world? If so, why? Well, one never goes to theatre, concerts or art exhibitions. One can never browse through bookshops, and fascinating boutiques, for this and that. One never has a stroll in the hills, or the Botanic Garden, or a day by the sea with sun on the water and a high wind blowing. I miss the heady scent of sage, and the ice-cold breath of wild mint, and pennyroyal at that sharp bend on the road. But you miss more intimate things. Someone at hand to laugh with at the right moment. Someone to agree, or disagree with you. And someone to linger with you over those thousands of uninteresting, so-like-each-other meals. If you are a woman you may long for an intelligent man to talk to, even for a few minutes, to give you a different point of view. And people round me. Especially, I miss children and children's voices, at work or play. Even now, when I no longer travel hopefully, to enjoy happy, living things is a good prelude to journey's end." — Ellen Newton

To distribute homes fairly uniformly amongst residential areas to allow those old people who wish to do so to live out their lives in familiar surroundings.

To locate homes as close as possible to centres of commercial and social activity featuring, at least, food and variety stores, coffee shops and restaurants, drug stores, medical offices, banks. Those things should ideally be available within two hundred yards and certainly within a quarter of a mile.

To arrange area street patterns so that the elderly need not cross heavy traffic flows.

To provide and maintain traffic controls and walkways to facilitate safe and easy walking.

To provide good transit services featuring well designed and maintained bus shelters close to the home (within one block) acceptable frequency (30 minutes and a no-change ride to centres of social and commercial activity).

To avoid steep slopes (preferably not over 5 percent gradient) which would isolate old people from their destinations.

To maintain good policing (and possibly "neighbourhood watches") to ensure safety for walking.
A TRIBUTE

We heard one interesting observation in the course of our study: "You never hear residents expressing the fears about old age that used to be so common; you know - about the "poor house". Remember how that used to strike terror into the hearts of older people?"

This brings us into the middle of a live controversy: to institutionalize or not? To parody the issue: should we incarcerate old people and subject them to the indignities and the depersonalizing effects of life in an institution? Or should we encourage them to stay in homes which are now too big and too costly for them to manage, and even if their friends have gone and the old familiar neighbourhood is now a social desert?

It is true that there are both good and bad homes for the elderly, which reflect the people who run them. And undoubtedly there are old people still living in their own homes who would be better off elsewhere. But the encouraging thing is that there are homes available which strike a happy balance: between the provision of care and security which most old people need and the maintenance of a regime which leaves residents with the greatest possible sense of independence and community.

We have seen homes which are magnificently equipped and widely used; in which residents help one another and help to manage the home; in which privacy and social activity are equally available; and in which the dictates of the institution are deliberately minimized by the management. And all this for less than ten dollars per day, that is, less than the basic Canada Pension Plan payment to people over 65.

That this is so is a tribute to all concerned - to Canada and the Province of British Columbia whose social policies make it possible; to the non-profit societies which bring such homes into being; and ultimately to understanding and imaginative managers who bridge the unbridgeable gap between the operational needs of the home and the cry of each resident for recognition of her individuality and dignity. We do indeed make progress.
PART 2
ANALYSIS
A Profile: the residents of 15 non-profit homes for the elderly in the Greater Vancouver area.


---

**Age**

- 65-75: 17%
- 75-85: 42%
- Over 85: 36%

**Sex**

- Male: 28%
- Female: 72%

**Marital status**

- Widowed: 71%
- Single/divorced: 21%
- Married: 8%

**Having living children**

- Living children: 66%
- None: 34%

**Previous address**

- Same neighbourhood: 53%
- Same municipality: 19%
- Elsewhere in GVRD: 28%

**How often outside**

- Out every day: 25%
- Occasionally: 32%
- Never out: 43%

**Use of buses**

- Use buses: 39%
- Never use buses: 61%

**Outside activities:**

- Out with family
- Shopping
- Organized trips
- Visit friends
- Medical trips
- Eating out
- Meetings, clubs
- Bingo
THE MOBILE RESIDENTS

Since our main concern was with the environment outside the home, our prime interest was in those residents who were personally mobile (ambulatory), that is, in those who use that environment directly. Thus for each home we extracted the records of those who said they walked six blocks or more and analyzed their outside activities as well as their expressed satisfactions with their neighbourhood. These constitute about half of the population of the homes.

These mobile residents are considerably more active than the others. Furthermore those who are active walkers tend also to be users of the bus system.

How is their walking affected by gradients?

This question was investigated by physically measuring the slopes around the various homes and relating gradient to the percentage of active residents who surmount them. The relationship between gradient and distance is shown below. While usable data were limited, the upper limit was quite clear and the curve as a whole is plausible.

![Gradient vs Walking Distance Diagram]

The relationship is tricky. Practically nobody will climb a slope of more than 10 percent, while a slope of 2 percent or so is not perceptible to most people. Otherwise old people will surmount slopes as shown (for example, a 5 percent gradient three blocks long) as part of a longer walk as long as the rest of the walk is flat.
How far will they walk?

This question was examined by analyzing the returns to Gutman's question No. 15 ("Is it easy for you to walk to the following facilities?" - paraphrased slightly) and relating the aggregated responses for the walking mode to the "effective distance" of the various facilities from the home. The question was not, of course, quite what we would have asked had we been doing an original survey but the results, when plotted, lead to some interesting conclusions:

1. The most marked decrease in walking occurs between one and two blocks distance. In other words for most very old people walking clearly demands great effort.

2. The attractiveness of the neighbourhood is very important. The upper curve reflects the influence of several diverse and attractive community features - a park, major shopping centres. In other words give people something worth walking to and they will walk.

3. In the case of one shopping centre which is nine blocks away from the home, the people concerned walked all the way there, then took the bus back. In other words a combination of walking and bus can double the effective walking radius, given a door-to-door bus service.

† "Effective distance" was the actual distance from the home modified by an allowance for the effect of gradient.
What don't they like about their neighbourhoods?

The following were their main voiced complaints (total 141):

1. Absence of nearby services and facilities, especially shopping and entertainment (53)
2. Noise, especially from traffic (31)
3. Traffic hazards (27)
4. Vandalism and crime (20)
5. Physical deterrents such as steep hills and dangerous paths (10)

RATING THE NEIGHBOURHOODS

The main task was to find a way of and rating the various neighbourhoods in terms of their value to elderly users. Two useful concepts for doing this were taken from Constance Perin's book With man in mind. The first was Perin's array of basic human needs. This provides a basic framework for identifying physical conditions or facilities which help to fulfill or inhibit these needs. A typical framework is shown below.

<table>
<thead>
<tr>
<th>Basic human needs and ways of satisfying them through the neighbourhood environment</th>
<th>Basic needs</th>
<th>Meaning in the neighbourhood</th>
<th>Ways of satisfying them</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety</td>
<td>Safety from traffic, animals and assault; safe walking provisions</td>
<td>Stop signs, cross walks, enough time at lights, good visibility; smooth sidewalks; dog control adequate policing</td>
<td></td>
</tr>
<tr>
<td>Sexual identity</td>
<td>Bodily satisfaction from walking, games; hair care; watching construction</td>
<td>Availability of walks, scenes of activity, and ego-boosting activities nearby</td>
<td></td>
</tr>
<tr>
<td>Expression of hostility</td>
<td>Objections to noise, danger</td>
<td>Careful siting of homes; safe design of street patterns</td>
<td></td>
</tr>
<tr>
<td>Expression of love</td>
<td>Companionable walking; helping others on streets, buses; shopping for others</td>
<td>Opportunities for cooperative activities</td>
<td></td>
</tr>
<tr>
<td>Securing of recognition</td>
<td>Personal recognition in stores, on streets; special accommodation in traffic</td>
<td>Availability of small, human-scale stores, etc. nearby</td>
<td></td>
</tr>
<tr>
<td>Expression of spontaneity</td>
<td>Social activities - singing, acting, bingo; vicarious involvement in others' games; movies</td>
<td>Availability nearby of variety of social outlets</td>
<td></td>
</tr>
<tr>
<td>Orientation of place in society and place of others</td>
<td>Watching out at crossings, etc; presence at social gatherings</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintaining membership in a definite human group</td>
<td>Acceptance by neighbours, and general public</td>
<td>Open home and facilities to public; organize local aid groups</td>
<td></td>
</tr>
<tr>
<td>Sense of belonging to a moral order</td>
<td>Recognition by others of special needs - for shelters, care on buses, protection, etc.</td>
<td>Provision of appropriate services and facilities; sympathetic treatment generally</td>
<td></td>
</tr>
</tbody>
</table>

* Adapted from Perin page 23.
The second concept was that of the "behavioural circuit", the sequence of separate operations involved in completing a purposeful activity, for example the sequence of acts involved when a resident visits a shopping mall on foot and by bus.

These circuits, focussed on significant facilities in the neighbourhood (stores, churches, shopping centres, etc.), provided the framework on which distance and environmental factors could be recorded.

Steps in circuit

- leave home
- walk 80 yards on sidewalk
- cross road (no crosswalk)
- find inconspicuous entrance to shop complex
- walk through labyrinthine complex
- walk 100 yards along sidewalk
- cross road (no crosswalk)
- walk 30 yards along sidewalk
- descend stairs to parking lot
- negotiate busy parking lot (100 yards, no marking)
- enter mall
- 40 minutes sojourn in shopping centre; rest, window shop, rest, eat
- ascend escalator and out
- cross access road by crosswalk
- wait for bus at shelter
- board bus
- show pass
- find seat
- 5 minute journey
- arise and ring bell
- descend from bus
- walk 25 yards on sidewalk
- cross road (4-way stops, no crosswalk)
- walk 50 yards on verge
- cross road (no crosswalk)
- walk 25 yards on sidewalk
- re-enter home

Behavioural circuit:
a visit to a shopping mall
Based on these concepts rating schemes were devised by which the neighbourhoods could be evaluated in a systematic way. Three working groups having been formed, three different approaches evolved as shown on Diagram overleaf and these were tried out on three pilot neighbourhoods. These schemes are shown below. Unfortunately time did not permit these to be refined and perfected and they should be regarded as exploratory only.

These schemes, all different, were obviously subjective and arbitrary to a large extent. To test their consistency and compatibility they were all reduced to a percentage-of-optimum basis and plotted as shown below. They gave results of reasonable consistency, the scores usually staying within a range of 15 to 20 percent of one another, and the three sets staying in the same position relative to one another. According to these methods there is little doubt as to the relative quality of the different home settings.

![Overall Environment Diagram](image)

![Walking Environment Diagram](image)
<table>
<thead>
<tr>
<th>FACILITIES AND ACTIVITIES</th>
<th>Inhibiting Factors</th>
<th>Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTERTAINMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Walking routes</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Passive Recreation</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Theatre, Movie, etc.</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Restaurant</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>SENIORS' CLUBS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Active Recreation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOCIAL SERVICES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Facilities</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Pharmacy</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Bus Routes</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>COMMERCIAL SERVICES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grocery Store</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Bank</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Department Store</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Liquor Store</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Hairdresser/Barber</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>BUS ENVIRONMENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shopping Center</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Medical Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Community Center</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Entertainment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NEIGHBOURHOOD QUALITY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crime Rate</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Cultural Group</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Age of Area</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Aesthetics</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

Scheme 1 identifies various facilities within walking range and gives them scores, which are reduced if access to the facility was judged to be impeded by environmental difficulties, and similarly for facilities accessible only by bus. General neighbourhood qualities are also given general ratings.

<table>
<thead>
<tr>
<th>Feature in the walking area</th>
<th>Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities</td>
<td>Score</td>
</tr>
<tr>
<td>Shopping facilities</td>
<td>0 = none</td>
</tr>
<tr>
<td>Entertainment facilities</td>
<td>1 = 1 - 4 different functions</td>
</tr>
<tr>
<td>Library</td>
<td>1 = one</td>
</tr>
<tr>
<td>Major denominational churches</td>
<td>1 = one</td>
</tr>
<tr>
<td>Medical clinics</td>
<td>1 = none</td>
</tr>
<tr>
<td>Informal meeting place</td>
<td>2 = any</td>
</tr>
<tr>
<td>Community centre with seniors' programs</td>
<td>2 = any</td>
</tr>
<tr>
<td>Indoor recreation facilities</td>
<td>2 = any</td>
</tr>
<tr>
<td>Parks</td>
<td>1 = any green area</td>
</tr>
<tr>
<td>Access to local facilities</td>
<td></td>
</tr>
<tr>
<td>Sidewalks to facilities</td>
<td>0 = none</td>
</tr>
<tr>
<td>Traffic on routes to facilities</td>
<td>1 = less than total coverage</td>
</tr>
<tr>
<td>Controls on routes to facilities</td>
<td>2 = total coverage</td>
</tr>
<tr>
<td>Terrain suitability for walking</td>
<td>2 = total coverage</td>
</tr>
<tr>
<td>Sidewalk condition for walking</td>
<td>3 = flat</td>
</tr>
<tr>
<td>Access through bus service</td>
<td></td>
</tr>
<tr>
<td>Complication of transfer</td>
<td>0 = none</td>
</tr>
<tr>
<td>Facilities passed on route</td>
<td>1 = 1 - 4 different functions</td>
</tr>
<tr>
<td>Quality of environment</td>
<td></td>
</tr>
<tr>
<td>Complexity</td>
<td></td>
</tr>
<tr>
<td>Diversity</td>
<td></td>
</tr>
<tr>
<td>Noise level</td>
<td></td>
</tr>
<tr>
<td>Security, physical</td>
<td></td>
</tr>
<tr>
<td>Security, emotional</td>
<td></td>
</tr>
<tr>
<td>Sense of belonging</td>
<td></td>
</tr>
</tbody>
</table>

Scheme II gives simple 0-1-2 scores to selected features (a) facilities generally (b) walking conditions (c) bus conditions. It also gives general values for neighbourhood qualities.

<table>
<thead>
<tr>
<th>Accessibility/availability of local facilities</th>
<th>Score 1-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corner grocery store</td>
<td>by walking</td>
</tr>
<tr>
<td>Retail store</td>
<td>by bus</td>
</tr>
<tr>
<td>Restaurant</td>
<td></td>
</tr>
<tr>
<td>Personal services</td>
<td></td>
</tr>
<tr>
<td>Bank</td>
<td></td>
</tr>
<tr>
<td>Recreation and community facilities</td>
<td></td>
</tr>
<tr>
<td>Park</td>
<td></td>
</tr>
<tr>
<td>Library</td>
<td></td>
</tr>
<tr>
<td>Entertainment facilities</td>
<td></td>
</tr>
</tbody>
</table>

The walking environment

- Grades and grade changes
- Traffic hazards
- Sidewalks
- Rest facilities
- Noise
- Traffic lights
- Crosswalks
-annies

- Accessibility/availability of buses
- Handy bus stops
- Sheltered bus stops
- Frequent service to important areas
- Transfers
- Trip time

Scheme III gives simple scores up to 5 for a variety of facilities reachable a) by walking b) by bus, and then rates walking and bus environment conditions in the same way.

Three Schemes

For rating

The Neighbourhood Environment
GOOD LOCATION
KIWANIS, WEST VAN.

POOR LOCATION
BLENHEIM, VANCOUVER
GENERAL FINDINGS - THE STUFF OF POLICY

What do we now know about the elderly that will afford a basis for the formulation of location policies?

In the first place we must note that we are not dealing with an undifferentiated mass of "old people", but with a wide spectrum of age, physical fitness, alertness and personality. This fact must temper all the facts and conclusions recorded below.

More than half of them go out, which justifies paying attention to the environment outside the homes. Furthermore they complain when their neighbourhoods are dull, featureless and lacking in social activity. It is clear that they want to be active and involved as far as they are able.

The most important activity in many of their lives is visiting or being taken out by their own families and relatives, and this should not be frustrated by barriers of space and time. It is typical of the Vancouver region that many residents (about one third) have found homes in their old familiar neighbourhoods. This suggests that there should be a reasonably broad distribution of homes between residential districts.

Walking by old people is strongly affected by several conditions:

- by traffic conditions which produce feelings of danger - speed, noise, complex turning movements and poor visibility

- by the presence or absence of specific traffic controls such as stop signs, marked cross-walks, pedestrian islands, and, very important, enough time to cross at traffic lights without a feeling of harassment.

- by gradients, which, we suspect, begin to be burdensome at about five percent and become virtually insurmountable for most at about ten percent.

- by their feeling about personal safety on the streets - freedom from purse snatching, for example.
A good bus service is very important. In one sense it enables vigorous walkers to double their walking range if they have the opportunity to take the bus back. In a broader sense it enables residents to get right away from the home and its surroundings, as those residents do who spend a whole morning or afternoon at a relatively distant shopping centre, or even downtown. It also enables residents to reach medical services which, to the extent that they involve specialists, may not be available locally.

Although many old people cannot or will not use buses (and it is not hard to understand why) the more active residents certainly do. But even for them a usable bus service implies certain standards: a safe and attractive shelter, with seats, very close to the home; frequent service; and direct (no-change) journey to centres of activity and attraction (not to mention bus steps that old people can negotiate, courteous drivers and companionable patrons).

Because many services are provided in some homes - stores, libraries, church services, for example - we do not know the full extent to which residents might use the facilities of their neighbourhoods. We assume that active old people will, given the opportunity, patronize banks, stores and restaurants, go window-shopping, have their hair cut, browse in libraries, and so on. To generalize, evidence suggests that they are much more likely to do these things where many of them are clustered together in the presence of a throng of people, as in a sizeable shopping centre (Conversely they are also likely to do them in small-scale places - such as the local variety or drug store - where they are known and recognized as individuals). In such cases it is clear that more walking will take place than where there is little activity, and every effort should be made to locate homes close to centres of activity. Ideally "close" would be within 200 yards, and never more than 400 yards.

"There's no cure for birth and death, except to enjoy the interval." - Anon
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Laurence, Margaret: The Stone Angel, A sensitive tale of a proud, recalcitrant old Canadian lady looking back sadly but with little remorse over her self-made harsh life.

Newton, Ellen: This Bed My Centre, 1980, Virago Press, London, Ely House, 37 Dover Street, W1X 4H5. The seething diary of a spirited, literate Australian lady as she suffers life in a series of old-age homes - before she signed herself out and went to live on her own again at 81.


To every thing there is a season, and a time to very purpose under the heaven; A time to be born, and a time to die; a time to plant, and a time to pluck up that which is planted; A time to kill, and a time to heal; a time to break down, and a time to build up; A time to weep, and a time to laugh; a time to mourn, and a time to dance; A time to cast away stones, and a time to gather stones together; a time to embrace, and a time to refrain from embracing; A time to get, and a time to lose; a time to keep, and a time to cast away; A time to rend, and a time to sew; a time to keep silence, and a time to speak; A time to love, and a time to hate; a time of war, and a time of peace.

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A TIME TO KEEP
THE FARMLANDS OF DELTA

Regional Planning II, Geography Department, Simon Fraser University, April 1980:
Dave Baker, Jim Bell, Ian Caldwell, Heather Cram, Jeff Crowter, Doug Deans,
Errol Freeman, Beverly Crewe, John Higham, Jill Jenner, Diane King, Knud Lilholt,
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The Regional Planning
II class,
Simon Fraser University
May 1980
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1. THE ISSUE

The Agricultural Land Reserve in Delta contains a significant anomaly: within it there are 4000 acres of land owned by the B.C. Harbours Board and originally intended for non-agricultural use. (Map No. 1) The Agricultural Land Commission has proposed that it should be given administrative responsibility for these lands in order to manage them in accordance with the philosophy of the Agricultural Land Reserves. The prime purpose of this study is to assess the validity of that proposal. It soon becomes apparent, however, that this question is only the tip of an iceberg, namely the whole problem of what should be done with the farmlands of Delta. This is the real issue, with which this study deals.

THE ANOMALY
2. THE SETTING

1. The Environment

In environmental terms Delta is a favoured area. Firstly it is considerably drier and sunnier than the main metropolitan area. Secondly, its shorelines are very rich in ecological terms. They contain extensive areas which are highly valued for their marine and wildfowl populations, as well as having potential for extensive recreational use. These characteristics are shown on Map No. 2.

However one very important aspect of the environment is that Delta is a floodplain and that settlement on it is possible only because it is dyked. In fact Delta lives in double jeopardy because it is subject not only to river floods but to combinations of river flood, high tide and on-shore winds. Thus nature smiles on man in Delta, but at the same time he is particularly vulnerable there to her whims.

NATURAL ASSETS
2. The Metropolitan Context

For over a century Delta has been primarily a farming area. This condition was easily maintained until 1959 when the Ladner ferry was replaced by the George Massey tunnel. This opened Delta to the pressures of the Greater Vancouver land market. Then the municipality installed sewerage systems which allowed the Ladner and Tsawwassen Heights areas to grow.

Today Delta is well within the metropolitan settlement area. (Map No. 3) In fact it is some fifteen minutes driving time closer to downtown Vancouver than the North Surrey area, which now accommodates about 130,000 people. That is, by virtue of its place in the metropolitan area Delta is potentially subject to the same pressures that have produced massive residential development in both Richmond and North Surrey. The main reason why this has not happened is, of course, the constraint imposed by the Agricultural Land Reserve.

In the meantime the metropolitan population continues to grow and even moderate growth estimates foresee a growth from about one to one and a quarter million in 20 years. (1) Thus the latent pressure on Delta will continue.

THE METROPOLITAN CONTEXT
3. **Industrial Development**

In terms of industrial development Delta is an integral part of the metropolitan area, as Map No. 3 also shows. There is already a considerable amount of industry along the Delta shores of the Fraser River, in addition to Annacis Island.

Looking to the future an industrial study done in 1976 made the following points (2):

1) There is a tendency for industries to be pushed out of the central area (Vancouver) because of cost, congestion and site scarcity, and to be pulled into the suburban areas for exactly the opposite reasons.

2) The availability of large sites at lower costs is of prime importance to industrial settlement (provided that other essential needs such as good access, appropriate site services and area amenities are also satisfied).

3) Delta is considered to be a high demand area for future industrial development.

4) The process of industrial settlement appears to be towards industrial estates, including specifically the B.C. Development Corporation's estate at Tilbury Island.

All of this suggests that industrial development will intensify in Delta and that pressures for concomitant urban development will continue to grow.

4. **Planning Policies**

Apart from the binding effect of the Agricultural Land Reserve Delta is also governed by the Official Regional Plan and influenced by the policies set out by the Greater Vancouver Regional District in its Livable Region Program. The basic pattern for the area is established by the Official Regional Plan, (Map No. 4) which shows three major elements 1) the agricultural zone, 2) the industrial zone, lying mainly along River Road 3) the three separate residential zones of Ladner, Tsawwassen Heights and North Delta. From an overall point of view the latter is really a part of the North Surrey area and will be largely ignored in this study.

The Livable Region Program contains two additional features, which emphasize the relationship between Delta and the metropolitan area 1) Centennial (regional) Park at Boundary Bay 2) a fastbus service connecting Ladner and Tsawwassen Heights to downtown Vancouver. Thus metropolitan planning policies recognize that Delta is an integral part of the metropolitan
area even though a large proportion of its land is designated for agricultural use.

The GVRD has just approved changes in the ORP to bring it in line with the Agricultural Land Reserve boundaries. It has also approved a change which would abolish the part of the Reserve in the Centennial Beach area, but this has still to be considered by the Agricultural Land Commission.
5. The Institutional Context

Apart from the pressures of metropolitan development in general the issue is subject to the influence of many agency programs. The main agencies are shown on Diagram No. 5. The upper half represents development-oriented agencies which are likely to add to the pressure for urban development in Delta. In addition several of them are provincial programs which could be expected to gain support from development-oriented forces within the Provincial Government.
As far as land use jurisdiction is concerned (Diagram 5 also) the lands in question lie within the ALR and are therefore preempted for agriculture by the terms of the Agricultural Land Commission Act. Nevertheless, withdrawal from an ALR is possible through direct appeal to the Environment and Land Use Committee of Cabinet. Thus the views of either the municipality of Delta or the GVRD could conceivably prevail even if they differed from those of the Agricultural Land Commission.

The municipality would understandably listen to representations from bodies such as the Delta Farmers Institute and the Delta Chamber of Commerce, as well as the general public, and these have also been shown. The GVRD, being drawn from municipal councils across the whole metropolitan region, might be expected to respond to representations not only from these two bodies and from Delta municipality but from the general metropolitan public, including conservation and environmental groups.

6. Farming in Delta

The farming situation in Delta is an important part of the context for two reasons. First, if the area were not productive in agricultural terms there would be little point in trying to maintain it as farmland. Second, it would then undoubtedly become the object of pressures to change its agricultural status, both by urban developers and by the farmers themselves. The good health and productivity of the area - which obviously depends on the presence of well motivated farmers - is therefore of crucial importance.

Up to this point farming seems to have been reasonably prosperous in Delta, although profitability is now being threatened by high land values and taxes and increasing labour costs. In addition, the farmer's life has been made more difficult in recent years by the growing pressure of urban people and urban traffic. Thus his ability to move freely with his machinery has been inhibited by large flows of high-speed urban traffic; his land and buildings have been subject to vandalism by urban intruders; and the efficiency of his field operations have been reduced by the presence of power transmission lines and their towers.

Much more serious than those irritations, however, is the fact that even as early as 1973 more than half of the farmland in Delta was in absentee or government ownership. The significance of this is profound. It means that most of the land is held by interests (a suitably impersonal word under the circumstances) or agencies which are not concerned primarily with farming. Especially they do not have the dedication to land management which would support long term investments in drainage, irrigation, buildings and equipment. To them land is not a medium of perpetual production but a commodity to be marketed for profit. The effect of this in turn on the remainder of the farmers has been considerable. It has reduced the size of the farm community and has caused some of its commercial suppliers to move to bigger, more reliable markets farther east in the Fraser Valley. It has thus weakened the human community on which farming depends.
In recent years the economic health of the farmer has improved considerably. This has been due partly to programs such as the Farm Income Assurance Program and more recently the reduction of school taxes on farm lands, and partly to the increased stability of outlook brought about by the Agricultural Land Reserves. We now understand, however, that greatly inflated production costs in relation to farmer's returns are beginning to worry many farmers. Thus we have been led to believe that the farming community in Delta is now split on the desirability or feasibility of maintaining agriculture in the long term. In this situation the policies of the Provincial Government in relation to agriculture are of paramount importance.

Against this overall background we now look at some of the main activities which seem likely to influence development in Delta.
3. INFLUENCES ON THE ISSUE

1. The B.C. Harbours Board

The significance of the B.C. Harbours Board for this study lies in its ownership of 4000 acres of land in Delta, all of it lying with the ALR. Interestingly, the purpose of this land is not entirely clear. It seems to be commonly regarded as "backup" land for the superport. In the first place however the recent Panel Report on Roberts Bank Port Expansion (3) notes that no shore land is being considered for that purpose. In the second several purposes seem to have motivated the acquisition of the land in the first place - to act as a buffer between the railway right-of-way and possible future development alongside, and to act as a corridor for any road, water supply, pipeline or electric power facilities that might become necessary. It may also be speculated that in the heady expansionist times (1968) when the land was being acquired industrial development of the lands was regarded as a real and desirable possibility.

Be that as it may, the present Board accepts without demur the pre-eminence of the ALR over its lands, and has them leased out for agricultural purposes. These are 5-year renewable leases; they do not contain options to purchase; and in general they appear to go to the highest bidder. The Board rejects charges that these conditions lead to "mining" of the land and failure to equip and manage its farms. It also points to its own investments in farm buildings as evidence of a serious attitude towards its farm properties. The Board also attempts through its disposition of leases to promote consolidation of farm units transected by its railway right-of-way. Under these circumstances the Board sees no reason why it should not continue to hold and administer its lands.

2. Transport Canada

Transport Canada recently announced its intention to reactivate its Boundary Bay Airport, originally built for war-time training purposes. (4) This decision was taken after the Ministry had satisfied itself on two basic points:

1. that there was a dire need for additional light aircraft capacity in order to reduce the hazards at Vancouver International Airport arising from the mixing of large and small planes; and that the best way to meet this need was to reactivate the Boundary Bay Airport.

2. that this could be done without significant damage to the Delta area, especially if certain conditions were observed regarding aircraft operation and airport development.
The proposal could have a positive effect on agriculture because the airport lands not needed for runways or air-associated development could be put to permanent agricultural use. At the same time agricultural use of these lands would help to protect the runway approaches and minimize the impact of nuisance due to noise. Nevertheless the proposal would also contain the seeds of industrial development for which airports seem often to act as magnets. This possibility seems particularly strong here because of the presence of both rail and a major highway close by, and of a 40 acre site within the airport lands which contains an existing network of roads, services and foundations (which once accommodated airport housing). The airport itself would require only some 25 acres for its own service purposes (hangars, maintenance shops, offices, airplane parking, flying schools, etc.) but it is easy to envisage other compatible activities attaching themselves, and in fact the report of the Environmental Assessment Panel recognizes this possibility.

Thus the reactivated airport would be ambivalent in its significance for development in Delta. It could strengthen agriculture or weaken it depending on the policies adapted by both Transport Canada and local government.

3. The B.C. Development Corporation.

The Official Regional Plan designates as industrial a considerable amount of land along the southern shore of the Fraser River roughly between Tilbury Island and Annacis Island. Quite apart from the fact that some of this land has long been in river-oriented uses, this designation is logical because of the relative centrality of the area and the presence of rail, road and water. It may be noted in passing that its accessibility will be considerably improved by the construction of the proposed bridge across Annacis Island.

An important element in this industrial strip is the Tilbury Industrial Park being developed by the B.C. Development Corporation. This however, does not seem to betoken a more extensive interest by the Corporation in the development of the Lower Fraser River.

4. The National Harbours Board

The proposed expansion of the Roberts Bank Superport represents the outreach of the East Kootenay coalfields to their markets on the Pacific Rim. It is therefore a very important provincial issue. It appears from the Report of the Environment Assessment Panel, however, that it is not a matter of great immediate significance for the land issue in question. It would just require back-up lands on shore and its effects on farm lands
would be confined to exacerbating noise, dust and traffic delays at crossings (unless grade separations were built).

It is worth noting, however, that mainly because of its potential for damage to the very valuable and sensitive marine environment the Environment Assessment Panel recommended that expansion of the superport be limited to about 200 percent of its present size and that various measures be taken to safeguard the natural environment around the port. (In passing, the Panel recommended that the Agricultural Land Commission be given responsibility for the management of the Harbours Board lands).

5. Public Works Canada

Public Works Canada is primarily a service agency, and it is significant for this study because of its responsibility for the lower Fraser River as a shipping channel. Currently the channel provides a minimum draft of 32 feet to New Westminster; current proposals (6) would increase that figure to 38 feet. This would open the Fraser River Harbour to a greater share of the world's ships, whose sizes and drafts are steadily increasing.

The river training schemes now being mooted would have the effect of making some areas of Delta's waterfront, notably in the Tilbury Island area, suitable for the development of sheltered ship berths. In addition some of the silt routinely dredged from the river bed will undoubtedly be available for land-raising or reclamation although its quantity will be considerably reduced by the construction of training works.

Overall, the program of Public Works Canada, important as it is to the Fraser River Harbour, does not seem to be especially significant for the broad land use question in Delta and is not discussed further here.

6. The Ministry of Highways

Highways are a powerful instrument in directing urban development to one area or another. Thus the Highways Department's plans as they affect Delta are very important. As we understand them these are as follows (Map No. 6):

1. The announced Annacis Island crossing will do several things. It will give some relief, for a limited period, to congestion in the George Massey Tunnel; it will give Delta improved accessibility to the central and eastern parts of the Burrard Peninsula; and in particular
it will improve the accessibility of Delta's industrial areas on the Fraser River.

2. Switching of lanes in the George Massey tunnel will also relieve congestion and thus tend to stimulate more development in Delta.
3. Proposals to improve or relocate No. 10 highway appear to have two purposes 1) to provide an improved direct link from the Valley to the offshore islands 2) to diversify the regional highway network and add to its flexibility. The routing of the highway will have considerable effects on Delta. A route following the existing alignment (but on new land) would take more arable land and exacerbate the problems of farm access; a route along the Boundary Bay shore would take good land and constitute a powerful intrusion into the Boundary Bay foreshore environment.

All of these effects also mean that there will be increased pressure on Delta's farmlands, and it may be noted that a bridge site farther east, as proposed by the GVRD from a transit point of view, would be less damaging as far as the farmlands are concerned.

Whichever route is chosen for a new No. 10, one thing is clear. With a right-of-way of 200 feet the highway would absorb 25 acres per mile. This means that in Delta it alone could take up 200 additional acres of farmland. At this point every acre of farmland lost in Delta will further weaken the status of farming, and if the Agricultural Land Commission is to be taken seriously it is incumbent on the Department of Highways to minimize such damage, even at the expense of its own costs.

7. The Agricultural Land Commission

The Land Commission's mandate under its act is very clear: "...to preserve agricultural land and encourage the establishment, maintenance and preservation of farms, and encourage uses of land in an agricultural land reserve compatible with agricultural purposes." (B.C. Agricultural Land Commission Act 5.7). It is also very strong, not only because the Act has precedence over all other provincial statutes (the Environment and Land Use Act and the Pollution Control Act) but because the Agricultural Land Reserves were all specifically approved by the Cabinet. Thus the ALR's are clearly beyond the jurisdiction of any provincial or municipal agency other than the Land Commission. Even the Provincial Cabinet can act only through the circumscribed appeal process, while only the B.C. legislature can amend or repeal the Act itself.

The Delta ALR apparently has special importance for the Land Commission. In its brief entitled B.C. Harbours Board Delta Farmlands (7) it says "The subject 4000 acres is
considered a keystone to the continued existence and development of viable agriculture in the western region of the Lower Mainland". This importance is firmly based in three basic, inter-related factors: 1) the excellent quality of the soils in the area (classes 1 to 3) 2) the existence of long established farms and farmers 3) the existence of a strong farm community centered on the town of Ladner. Thus despite the presence of many disruptive forces the area could continue to support highly productive agriculture.

At the same time the Commission states that "the (Harbours) Board has followed a policy of offering farm parcels on short term leases for agricultural purposes" and that "the short term nature of the leases with no renewal options is not conducive to sound land management...". Hence the Commission's recommendations that:

"1. The province, by means of a declaration of policy, transfer the direct administration of the 4,000± acres of provincially owned farmland in the Delta Municipality from the jurisdiction of the B.C. Harbours Board to the Agricultural Land Commission.

2. The farmland leasing policies of the Agricultural Land Commission be applied to the subject lands.

3. The Property Management Branch of the B.C. Ministry of Agriculture be assigned as the lease for the subject lands.

4. Parcels of land are to be amalgamated prior to leasing, taking into consideration the constrictions imposed by service corridors and economics of farming.

5. Any long-term leasing commitment made by the province to the owners of the expropriated lands will be honoured. The full co-operation of the individuals concerned will be sought in any parcel amalgamation."

8. The Property Management Branch

The Property Management Branch of the B.C. Ministry of Agriculture administers lands held by the Land Commission in accordance with the aims of the Commission. Its main task is the leasings of these lands, which it does in conformity with guidelines which emphasize a) the suitability of the lessee, 2) the suitability of his proposed farm plans. Most important, it offers 20 year leases with opportunity to purchase both land and buildings at quite favourable rates. There is apparently considerable demand for its land under these conditions. It is noteworthy also
that the Branch monitors the performance of its lessees and may terminate a lease if performance is unsatisfactory.

9. The Greater Vancouver Regional District

The attitude of the GVRD towards Delta reflects the policies set out in its Liveable Region Program. This establishes the following GVRD interests in Delta:

a) Strong emphasis on the conservation of agricultural land

b) A restrictive attitude towards residential development in Delta, reflecting the limitations of the Massey Tunnel; and along with that a desire to boost the use of transit services for Vancouver-oriented journeys.

c) Strong interest in developing at least one regional park in Delta (at Grauer's Beach) and in maintaining the rich natural environment of the foreshores. It is understood that the GVRD has also expressed a keen interest in Deas Island as a potential park.

10. The Municipality of Delta

The attitudes of the Municipality of Delta towards development are presumably to be found in its Community Plan 1979(8). This is a very guarded document which was "endorsed in principle as a guide" by the Delta Council in February 1980. It is therefore not a binding document in a legal sense, and much of its language is somewhat non-committal.

As regards agriculture it says (p. 63) "all developments, where applicable, shall have due consideration to: the preservation and continuing use of agricultural land for present and future food production" and (p. 65) "The necessity of preserving agricultural land in farm use and the enhancement of the agricultural economy". Its "Summary Map" (not "Plan") shows the Agricultural Land Reserve substantially as it is, with only two "undecided issues" of any significance. One is a proposal to expand Ladner slightly to the south and east, the other a rounding out of the Boundary Bay airport expansion to allow for some additional industrial development.
4. AN ANALYSIS

The basic question we face is not whether the Harbours Board land should be administered by one agency or another, but whether Delta should be thrown open to urban development or not. And this is a question of considerable regional significance, for urbanization would mean the end of farming in Delta, new pressures on its shoreline resources and the need for costly new highway facilities. It would also raise questions of cost and risk to Delta's residents. These are the main consequences by which, in our view, the question should be judged, and they are examined below.

But a prior question must first be asked. Does Delta have to be urbanized or are there alternatives? The answer is clear. There is no shortage of buildable land in the metropolitan area. Furthermore most alternative development areas are in poor-soil areas, and many of these are more centrally located than Delta. The most important of these are shown on Map No. 7. Most of these lands will not be as easy to develop as Delta's flat and open lands, and are not available in the large blocks beloved of the bigger developer. Nevertheless they are there and they have their advantages, as we shall see.

1. What is Delta's farming worth?

Like any other productive activity farming is a part of the metropolitan economy. It provides jobs and income, both in Delta and in other parts of the metropolitan area. In 1979 farm production in Delta "at the farm gate" was $25 million. By the time it got to the consumer after processing however, it was worth $65 million (9).

This multiplier is also reflected in the job spin-off from the farm. For British Columbia as a whole (10), every 100 people employed on the farm (i.e. farmers and labourers) support the following pyramid of related jobs:

- 68 in food processing
- 32 in retailing
- 28 in farm supplies
- 20 in other related activities
- 148 additional jobs.

In other words both farm jobs and farm earnings are amplified by at least an additional 150 percent by the time they have passed through the regional economy.

In addition agriculture in Delta probably represents an investment of about $100 million in land, buildings, drainage,
fencing and equipment. Most of all Delta supplies the
metropolitan area, in season, with a wide array of fresh and
relatively cheap food products - potatoes, vegetables, green
peas and beans, raspberries and strawberries, as well as some
milk and beef. It could supply much more but for the dominance
of year round supplies contracted for by the food chains from
areas such as California and Mexico. We are not able to probe
the ever-murky future and predict whether these areas will
always produce as cheaply, reliably and copiously as they do
now. It is enough to note that we already have a substantial
investment, human and monetary, in Delta's farmlands; that
they are potentially highly productive; and that they support
not only jobs in Delta but an even greater number of jobs in
the metropolitan area as a whole.

Is all this expendable in order that the farmlands may be
covered with houses? Replace productive land with land-as-
space? We hope not. But in any event this is only one of
the questions to be considered, and we now press on with the
others.

2. What would happen to Delta's shorelines?

As a peninsula Delta is almost surrounded by water-based
features which have evolved over the centuries (see Map No. 2).
These are prized by many people both in Delta and in the
metropolitan area as a whole. It cannot be argued that
they would necessarily be destroyed if Delta were urbanized.
Nevertheless it is obvious that that environment would be
affected by the close proximity of tens of thousands more
people. Also there would be constant pressure for develop-
ment of these areas in ways more immediately "useful" -
parks, marinas, jetties, wharves, harbours and related
residential and industrial developments. This is no figment
of the imagination; many such proposals have been made in
the past, and they will undoubtedly be made again.

3. What risks would attend urbanization?

This section deals with the hazards of floods and earthquakes,
subjects which are themselves hazardous. They are difficult
to pin down as they can deal only with probabilities in the
unknowable future. And many people would rather not talk
about them, and those who do are liable to be called alarmists
and scare mongers.

However several things need to be said. First, the Lower
Mainland is no stranger to floods and seismic tremors; they
have happened here. Second, when they happen they impose a
load on the public purse as victims clamour for compensation.
Given the fact, nobody grudges that. Nevertheless catastrophes
are everybody's cost and therefore everybody's business.
These are public questions and they merit sober discussion. Not to do so would be immoral and a dereliction of public duty.

As regards flood risk we cite the 1976 report of the Fraser River Joint Advisory Board, which said:

"There is a 1 in 3 probability that the 1894 flood will be equalled or exceeded during the 60-year period from 1973 to 2032."

"Floods greater than that of 1894 can and will occur, resulting in damages in the order of $500 million, always with the attendant risk to human life."

"Residential damage involving thousands of homes would constitute the major part of this loss. In addition tens of thousands of people would have to be evacuated from affected Valley areas."

Is all this simply chicken-licken alarm-mongering? It is not. We did have a major flood in 1948 which cut our ground communications with the rest of Canada. It also cost the Provincial Treasury twenty million dollars at a time when the dollar was worth three and a half times what it is now and when there were only a handful of people in the floodplains. Have a look at the photograph following. That was our region. Since then Delta has been exposed to high river levels in 1955, 1956, 1964, 1967, 1972 and 1974, that is once every five years on the average.

"Additional flood protection is essential" says the report. Well, for goodness sake can't we just heighten the dykes? No, say the engineers; "Raising the dykes... is essentially impractical ...," and they recommend, among other things, "that the responsible authorities continue to implement the existing system of floodplain management policies in the Lower Fraser Valley". In other words, keep people out of floodplains as far as possible.

As far as earthquakes are concerned there is nothing new in the fact that coastal British Columbia is an area of considerable seismic activity. (On Sunday March 30, 1978 the Vancouver Province carried the headline "B.C. is quiet - but that's just luck"). What is new is the realization that many of the soils in the Valley floor are especially vulnerable to seismic shocks.

A study published by the National Research Council in 1978 concluded that in the event of a 1 in 100 year earthquake there could be considerable soil instability and settlement in areas such as Delta (13): was this alarmist too? It was not.
The dyke at Hatzic breaks in 1948
It reflected experience with similar soil conditions in Japan in 1964 when a large number of tall reinforced concrete buildings settled, tilted or fell over.

In 1977 the B.C. Society of Professional Engineers recognized the danger of natural hazards when it proposed a Hazards Policy for the province. It said "we believe that there is a pressing need for adoption of such a policy", the key element for this study being a proposal to "establish controls on land use in areas threatened by a potential hazard". In reaching this position the Society noted that there have been three major earthquake events in or near B.C. during the last thirty years. "These were: (1) Strait of Georgia 1946, magnitude of 7.3 (2) Queen Charlotte Islands 1949, magnitude 8.1 (3) Puget Sound 1965, magnitude 6.5". It also went on to say "The loose soils of the Fraser Delta pose particularly hazardous foundation conditions in the event of a major earthquake close to Vancouver."(14)

Since then a study by the B.C. Ministry of Environment (15) has described areas such as Delta as High Limitation Areas, that is, "Areas where soil characteristics constitute severe limitations to urban development. The limitations are severe enough to make urban use of the land questionable." p. 7).

What does this imply? It does not mean that there is significant risk to ordinary timber frame buildings which are low, light and flexible. It does mean that high and heavy buildings should not be built in places such as Delta (as a matter of interest we understand that this concern recently led to a decision not to add more storeys to an important public building in Richmond).

The subject of natural hazards is a difficult one for public policy-making. The man in the street does not understand the technical concept of probability - that something is likely to happen, but nobody knows when - and does not know whether to yawn or be alarmed. Nevertheless as we see it the answer in this case is quite clear. Catastrophes may be "acts of God", but does man have to collaborate by frequenting high-risk places deliberately?
4. What would the travel implications be?

However the area develops it is inevitable that most of the residents of Ladner and Tsawwassen will work in either downtown Vancouver or the Burrard Peninsula. The question is whether their journey to work would be shorter and their consumption of gasoline smaller if they lived not in the Delta but in the alternative areas shown on Map No. 7.

For people whose jobs were located in Vancouver, including the downtown area, it would not be a matter of great importance whether they lived in Delta or in the Coquitlam or Surrey areas. The distances are comparable; travelling times would probably favour Delta; but the other areas can look forward to the possibility of transit services, which scarcely seem feasible for Delta. A very important point is that any great increase in the Delta-downtown traffic flow would certainly necessitate an expensive new westerly crossing of the Fraser River together with associated highway connections.
For people whose jobs were located in the developing eastern part of the metropolitan region the situation would be vastly different. If they lived in the Coquitlam-Surrey area rather than in Delta they would probably save themselves 15-20 miles of travel per day; they would be travelling in transportation corridors with a greater choice of routes; they could look forward in time to the possibility of transit trips as an option to travel by car; and any new crossings of the Fraser River could be designed to accommodate both transit and automobile facilities.

This very rough analysis is shown on Map No. 7.

5. What would urbanization cost Delta's citizens?

This question refers to the financial and social costs/benefits of development to the typical Delta taxpayer. It cannot be answered precisely but reasonable general answers, based on the experience of other places, can nevertheless be given.

Some kinds of development usually "pay their way", producing more municipal revenue from property taxation than they cost in terms of municipal capital and maintenance costs. Typically "at the community level, a balanced budget implies that residential developments collectively will produce a deficit. This deficit is offset by non-residential land users - industrial, commercial or agricultural" (16). These findings are borne out by several cost/revenue studies carried out in the Lower Mainland Region. The three key factors are 1) The value of the properties 2) the characteristics of their occupants, notably their income level and number of children 3) the cost of servicing the development (and Delta's high water table is likely to make ground services costly).

The facetious answer to the municipal taxation problem would be allow only expensive houses, keep out poor people, and ship out all children at age five to live with grandparents in Vancouver. More seriously the financial interests of the Delta taxpayer would best be served by minimizing residential development and maximizing industrial development (if it is capital-intensive), office and commercial development (as long as it is not in high buildings).

In certain social terms urban development would benefit Delta citizens. More citizens would support bigger shopping centres and more offices; more children would support special educational facilities and a more diverse curriculum; more citizens would support better libraries and recreational facilities. In terms of variety and range of opportunities the presence of more people would lead to a richer urban life in Delta.
6. Gains and losses; winners and losers

The question now facing us is: In Summary what would be the consequences, both positive and negative, or permitting extensive urban development in Delta, and who would feel these consequences? It is a very complex question, not only because of the many factors inherent in it but also because it will involve many gainers and losers. In order to see the problem clearly an overall balance sheet was prepared. This identifies some of the more obvious gains and losses but does not attempt to trace all the secondary and tertiary gains and losses which would undoubtedly occur. Furthermore the figures shown in it are very rough indeed, and are intended mainly to distinguish those factors which are important from those which are less so. Following that a second balance sheet was derived from the first one to highlight the question "Who gains and who loses?"

These balance sheets do not result in a nice piece of arithmetic which need only be added up to give "the answer". Every man has his own set of values and priorities and every reader would probably score the sheets in his own way. They are simply shorthand devices for summarizing the problem and making decision-making easier.

7. Weighing the balance

As we see it two factors predominate. First, the risks involved in urbanizing Delta cannot be sloughed off; second, the economic values inherent in Delta's farms should not be squandered needlessly. But however the factors are weighted, the lesson of the balance sheets seems clear. It would result in:

- too many losers and too few gainers
- the loss of too much money and amenities, public and private
- too much hazard at both public and private cost

and these losses and risks are totally avoidable, for there are better and safer places to build than Delta.

8. The Outlook for Delta

If the western parts of Delta are not to be urbanized then, what can we foresee for them?

- Two self-contained towns, Ladner and Tsawwassen, of a human scale and with strong identities, and having easy access to the commercial and cultural resources of the metropolitan area.
- An enviable natural setting
- A reasonably strong and potentially expandable industrial base
- A potentially vigorous farm industry

In saying this we do not ignore the difficulties which currently beset the farm community. It would be difficult to argue against urbanization if farming in Delta were not viable. We would only point out that various steps have been taken in recent years to make farming more stable and profitable. We believe that this concern for agriculture will continue, and urge (below) that continuing study should be given to ways and means of ensuring that farming in Delta remains viable.
## Gains and Losses from Urbanization of Delta

### Groups Affected

<table>
<thead>
<tr>
<th>Nature of gain or loss</th>
<th>Groups affected</th>
<th>Total No.</th>
<th>Dollar Value</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of farm-related jobs and income</td>
<td>Farmers &amp; farm-workers, suppliers, processing workers, etc.</td>
<td>5,000</td>
<td>25 m./year</td>
<td>Production, jobs and income all assumed permanently lost.</td>
</tr>
<tr>
<td>Impairment of natural resources and landscape qualities</td>
<td>Delta residents, Metro visitors to Delta</td>
<td>75,000</td>
<td>100,000/ year?</td>
<td>Assumes production permanently lost, but that only 1 in 4 metro families buy Delta products.</td>
</tr>
<tr>
<td>Loss of cheaper foods in season</td>
<td>Metro residents</td>
<td>250,000</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Municipal tax increases</td>
<td>Delta citizens</td>
<td>75,000</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Better services, civic &amp; commercial</td>
<td>Delta citizens</td>
<td>75,000</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td>Capital gains on land</td>
<td>Delta farmers, other landowners, Provincial Government</td>
<td>2,000</td>
<td>?</td>
<td>Assumes businesses not forced out or taken over by competition.</td>
</tr>
<tr>
<td>Increased income</td>
<td>Delta businessmen</td>
<td>200</td>
<td>?</td>
<td></td>
</tr>
<tr>
<td><strong>Net losses to people in future</strong> (Assumes metro population 1.5 million, Delta population 150,000)</td>
<td>Delta commuters</td>
<td>25,000?</td>
<td>3 m./year</td>
<td>Projects average increases in journey to work of 5 miles and net increase in daily cost of 50¢; assumes 2/3 of workers commute.</td>
</tr>
<tr>
<td><strong>Losses possible at any time</strong></td>
<td>Delta residents, Provincial taxpayers, Canadian taxpayers</td>
<td>?</td>
<td>?</td>
<td>Would depend on numbers living in floodplain; would include secondary and tertiary losses; assumes Federal Provincial Governments share relief costs.</td>
</tr>
</tbody>
</table>

### General Notes

* Column 4, "Total No.", includes families affected, not just individual workers, except in case of commuters.
* "Net losses" refers to incremental losses incurred if some people lived in Delta rather than in Coquitlam or Surrey areas.
* No account has been taken of costs which would presumably be the same whether settlement took place e.g. ground service costs, Provincial grants, etc.

### Winners and Losers from Urbanization of Delta

<table>
<thead>
<tr>
<th>Group</th>
<th>Scale</th>
<th>Gains</th>
<th>Losses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers</td>
<td>Thousands</td>
<td>Capital gains</td>
<td>Livelihood and lifestyle</td>
</tr>
<tr>
<td>Farm workers, suppliers, processing workers, etc.</td>
<td>Thousands</td>
<td></td>
<td>Livelihood</td>
</tr>
<tr>
<td>Delta residents</td>
<td>Tens of thousands</td>
<td>Better urban services</td>
<td>Higher taxes, Changed environment, Possible flood costs, Higher travel costs</td>
</tr>
<tr>
<td>Delta businessmen</td>
<td>Hundreds</td>
<td>More income? Capital gains</td>
<td>?</td>
</tr>
<tr>
<td>Land owners</td>
<td>Hundreds</td>
<td>Capital gains</td>
<td></td>
</tr>
<tr>
<td>Provincial Government</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metro residents</td>
<td>Million *</td>
<td>Fresh foods in season, recreational resources</td>
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<td>Canadian taxpayers</td>
<td>Tens of millions</td>
<td></td>
<td>Possible flood relief costs</td>
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</table>
5. AN AGENDA FOR THE LAND COMMISSION

The situation in Delta today is an intriguing one for two reasons. The first is that it is dominated by anomalous views and expectations. The Agricultural Land Reserves are firmly in place and must be presumed to represent the policy of the Provincial Government. The policies of the Greater Vancouver Regional District are firmly in place in the Official Regional Plan and the liveable Region Program. Both of these bodies support preservation of farmland in Delta. Then what is the problem? Why the uncertainty? Simply that many people obviously do not believe these policies. People still talk about "the backup lands"; the Chamber of Commerce pushes the traditional line of growth and industrial development; the Municipality of Delta, with its non-committal Community Plan, "recognizes" agriculture but seems to pursue industrial development; some farmers, chafing under the difficulties and costs of farming in Delta, would love to sell their holdings; and recent controversies have led many people, conditioned to believe that nothing can stand in the way of land market forces, to question whether the Agricultural Land Reserves can stand the pressures on them.

The second reason is that governments themselves are the major contributors to the threat to farming in Delta. This is not a reflection of a deliberate government policy but rather the result of the actions of a number of single-purpose government agencies each "doing its own thing" - the Ministry of Highway, the two Harbours Boards, Transport Canada and (in the past) B.C. Hydro. Each of these could of course produce a full justification for its presence in Delta; but that does not mean that they must have free rein in pursuing their objectives.

In this situation action is needed. The saddest thing that could happen would be for Delta's farmlands to drift and become a sort of limbo-land, not suitable for settlement but not hospitable to farming.

We believe that the farmlands of Delta should be preserved and put to full use. But we recognize that the situation in Delta today is characterized by uncertainty, unwise expectations and single-minded agency programming. In the face of this the Agricultural Land Commission has a special obligation and a special opportunity to act. Its Act gives it quite unusual statutory power in the provincial hierarchy and in the climate of today's public opinion it has immense "clout" in the pursuit of its objectives. It is important and timely that this power should be used to the full in Delta.

A number of specific problems need to be addressed as suggested below. But most of all the Commission needs to involve itself - indeed cannot avoid involving itself - in planning and policy matters. Farmland issues, especially in places like Delta, do not exist in a vacuum but in the context of a great many forces, programs and ambitions, as this study demonstrates. If the Commission is truly to fulfill its mandate it cannot remain on the defensive, forever reacting to other agencies' requests for exclusion from the Agriculture Land Reserves. That way lies inevitable erosion and ultimate subjection to the purposes of others. If resolutions are to be made and new policies achieved the Commission should be an active party in them.
With these thoughts in mind we suggest that the following issues are most deserving of the Commission's attention.

1. What steps can be taken - in the special circumstances of Delta - to ensure that its farmlands are as productive and economically viable as possible? Improved drainage and irrigation? A better farm road network? Storage facilities? Formation of a special Improvement District? Further changes in land taxation? This is the most important issue of all.

2. Is a new No. 10 highway justified by traffic volumes? If so, cannot the present alignment be upgraded? If that is not possible, which is the least destructive route from the point of view of farm productivity and natural resource conservation? And lastly can the planning of a new route include at the same time planning for a network of minor roads and overpasses which will allow farmers to function reasonably efficiently?

3. If farming is to be strengthened it is clearly dangerous to contemplate new industry, not essential to air operations, at a reactivated airport at Boundary Bay. If the airport must incur an operating deficit should not Transport Canada be required to solve that problem directly rather than by introducing a further threat to Delta's farmlands?

4. To what extent are the boundaries of the Delta Agricultural Land Reserve truly defensible? Could the Municipality of Delta become an active defender of the Agricultural Land Reserve if certain minor adjustments were made to the boundaries? Along River Road, adjacent to the industrial area, for example? An open cooperative approach to the Municipality at this point might be a constructive and rewarding step.

5. Returning to the original issue which triggered this study, we believe that the Land Commission's request that it be given administrative responsibility for the Harbours Board lands is most timely. The bestowal of this responsibility would be regarded as a token of the Provincial Government's support of the Commission and its work, and would, it seems to us, have a significant effect on the perceived stability of the Agricultural Land Reserve in Delta.

We have so far approached the problem of urbanization in Delta as if it were a decision for all time. But it is conceivable that in time the growth of the metropolitan area will make irresistible demands on Delta, and especially on its shorelines. If that day comes and serious study and debate conclude that the farmlands must go, then so be it. At this moment we believe that the region is nowhere near that point of need.

"To everything there is a season, and a time to every purpose under the heaven;... a time to keep and a time to cast away..." This study finds it unthinkable that the rich farmlands of Delta should be "cast away", It is, instead, a time to keep.
REFERENCES


5. Roberts Bank Port Expansion, Supra.


11. Ibid. p. 79.

12. See for example, the substantial environmental studies produced by Environment Canada in connection with the reviews of both the Boundary Bay Airport and the Roberts Bank Expansion issues: also Our Southwestern Shores, Lower Mainland Regional Planning Board, 1968.


14. B.C. Association of Professional Engineers,

15. Soil and surficial geology limitations to urban development, Don Benn and Lindsay Jones, B.C. Ministry of Environment, May 1979.

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<td>?</td>
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<td>Ladner businessmen</td>
<td>--</td>
<td>200</td>
<td>?</td>
<td>Assumes businesses not forced out or taken over by competition</td>
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**Net losses to people in future**
(Assumes metro population 1.5 million + Delta population 150,000)

| Extra commuting costs | Delta commuters | 25,000? | 3 m./year | Projects average increase in journey to work of 5 miles and net increase in daily cost of 50¢; assumes 2/3 of workers commute |

**Losses possible at any time**

| Flood and earthquake losses | Delta residents | Provincial taxpayers | Canadian taxpayers | ? | ? | Would depend on numbers living in floodplain; would include secondary and tertiary losses; assumes Federal Provincial Governments share relief costs |

**General notes**
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</table>
MOTORIZED RECREATION IN THE GREATER VANCOUVER AREA

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- Map 2. Distribution and orientation of riding                   | 11   |
- Map 3. Sites surveyed                                            | 13   |

### APPENDICES: (under separate cover)

1. Bibliography
2. The user surveys:
   a) The General Questionnaire
   b) Snowmobiles
   c) Four wheel drives
   d) Trail bikes
3. Noise
I. THE TASK FORCE AND THIS REPORT

Late in 1978 the Park Committee of the Greater Vancouver Regional District (GVRD) set up a Task Force to examine possible sites for the use of motorized recreation vehicles.

The Task Force contains representatives from a number of motorized groups as well as the staffs of the Provincial Government, the Vancouver area municipalities and the GVRD itself.

The Regional Planning II class at Simon Fraser University arranged to work with the Task Force, making its twenty-two members available as staff for appropriate parts of the study. The following is a report on their work, which started January 9, 1979 and ended with a presentation to the Task Force on March 27, 1979.

The terms of reference of the Task Force included a directive to develop recommendations for:

"1. Sites - a major site for competition and multi-purpose vehicular recreation, and
   - several smaller sites for trail bike activities (pilot or permanent projects)..... "

As the study progressed it focused naturally on trail bikes. Although the study does not address directly the first part of the terms of reference it may very well be found that it does contribute to the question of a multi-purpose site also.

Nevertheless, the class also undertook surveys of the four wheel drive and snowmobile groups as a contribution to the work of the Outdoor Recreation Division of the B. C. Ministry of Lands, Parks and Housing. All of these works are described here.
II THE USER SURVEYS

Basic to successful policy making is understanding of the question at issue; basic to successful planning of sites is understanding of what people want to use them for. Thus this project started by examining vehicle users and their activities. First a number of existing surveys and reports on motorized recreation were read and discussed (see Appendix 1 for bibliography). Then a general questionnaire was designed (see Appendix 2a) with which we interviewed members of the four wheel drive, snowmobile and motorcycle associations. The contacts were arranged by the associations and presumably were not a random sample of their membership. The interviews were carried out by the students in the homes of the members.

These surveys provided satisfactory results for snowmobiles (23 interviews) and four wheel drives (27 interviews). In the case of bikes, however, (38 interviews) we became concerned that club surveys might miss entirely other important groups of bike riders - especially teenagers. As a result we undertook two additional thrusts towards this group. In the first we "hung around" a number of motorcycle stores, interviewing their customers in the store (91 questionnaires); in the second we interviewed groups of bike owners in fourteen metropolitan secondary schools (98 questionnaires).

The essence of these surveys is set out below; more detailed accounts by vehicle groups are to be found in Appendix 2. We do not claim that these surveys have statistical validity, but by the time the subjects had been studied, probed, mulled over and argued about by twenty-two people we felt that we were "getting a handle" on the questions at issue. In short, as a first cut at the problem and as a prelude to more rigorous surveys by others, we felt that our research was useful and adequate for this stage.

SNOWMOBILES

1. Snowmobilers and their characteristics:

One fact which is central to understanding snowmobiling as practised by city-dwellers is that it involves a substantial financial investment - in the vehicles and their trailers. In addition many snowmobilers also own "four by four" vehicles, and a few maintain cabins in their favourite recreational areas. Hence the basic finding that the "average" snowmobiler is a married male between 30 and 50 with presumably at least an average income.
It appears that very few people snowmobile competitively. Rather they like snowmobiling because of its social nature (they almost always ride in groups) and its "escape" characteristic. The challenge of snowmobiling lies mainly in coping with speed and mountainous terrain rather than with other snowmobilers.

There appear to be two distinct patterns of snowmobiling. The first and most common is the weekend trip, in which a group will travel over 100 miles to reach the chosen site and stay there the whole weekend, the families either taking campers or occupying cabins. The second is the short trip to a local site, generally less than 50 miles away and easy of access. This is essentially a day trip or, since snowmobiling is also a night-time sport, an evening trip. Altogether most snowmobilers seem to ride at least once during the week and on most weekends throughout the winter.

2. Existing sites and their characteristics:

Four general locations have been mentioned consistently as being far the best for snowmobiling:

i) The Princeton area, because of good snow and good sites;

ii) Burke Mountain, because of proximity and accessibility;

iii) Blue Mountain, because of proximity and accessibility;

iv) Coquihalla Valley, because of good snow and good sites.

Even though they may not be adequately equipped or serviced, these sites seem to meet best the prime need of snowmobiling - attractive, really extensive sites. This need is the outcome of the range of the snowmobile (up to 150 miles per day) and the expressed need for freedom of movement, uncrowded sites and variety of terrain.

In addition to this, several other specific requirements are consistently mentioned which should be taken into account in designating special areas for the use of snowmobiles. These are:

i) reasonable probability of snow

ii) easy accessibility

iii) variety of terrain, e.g. meadows, hills, trails through the bush

iv) marked trails for safety

v) parking and unloading facilities at various elevations
vi) some provisions for "grooming" trails
vii) accommodation nearby for non-residents and campers
viii) scenery

For several reasons demands of this kind fall outside the scope of the GVRD and are given no further consideration here. Full details of the snowmobiler survey are set out in Appendix 2 b.

FOUR WHEEL DRIVE VEHICLES

1. Four wheel drivers and their characteristics:

The users of four wheel drive vehicles can be best described in terms of two sets of characteristics - life-stage and affiliation. By life-stage we distinguish specifically between young single people, married people without children, and family-centred married people.

By affiliation we distinguish between people who are members of the Four Wheel Drive Association and those who are not. We believe that the latter are far more numerous than the former, despite the fact that our survey was almost totally restricted to club members.

The following diagram (which is somewhat speculative) suggests how the four wheel drive group may be broken down in terms of the above categories:

```
Non-members Members

Single

Married, no children

Family-centred

Single

Married, no children

Family-centred
```
A second breakdown deals with the purposes of four wheel driving. It distinguishes between recreational and competitive driving, of which the former is clearly much the larger category. These two groups are not mutually exclusive, since many people drive for both reasons, and in fact many people in the competitive group keep two vehicles - one for recreation and general transportation, one for competition only. These overlapping groups are illustrated below.

One comment is in order: the members of the competitive group are - like most snowmobilers - generally older, family-centred people. This is presumably again a reflection of their financial capacity in relation to the relatively high cost of purchasing and maintaining special four wheel drive vehicles. But it also foreshadows certain behavioural characteristics: first that these people are willing and able to travel the greater distances involved in getting to competitions; second that they presumably want more challenge in the uses they make of their vehicles.

Regardless of category, four wheelers share certain common characteristics:

- they travel mainly on weekends
- they travel two to three hours for one-day trips, three to five hours on weekends
- they desire a training site at which both competition and bush-travel situations could be provided.
- they want access to logging road networks to be maintained.

2. Existing sites and their characteristics:

Five general locations have been mentioned most frequently in the four wheel drive survey:
i) The Harrison Lake area

ii) The Squamish area

iii) The Garibaldi - Cheakamus - Whistler area

iv) Strawberry Island

v) The Indian Arm area

For one-day trips 50 to 60 miles is regarded as a desirable limit and 100 miles a maximum.

A desirable four-wheeling area is regarded as having the following characteristics:

- isolation
- good scenery and variety of terrain
- access to hiking, camping and canoeing areas
- looped circuits (i.e. no back-tracking)
- challenging terrain (for vehicle and driver)

Again, such demanding characteristics can scarcely be expected to be met by the GVRD and therefore are not discussed further here. However, widespread interest was expressed in a training site (which conceivably might be found within the GVRD area) and some in a competition site.

Full details of the four wheel drive survey are to be found in Appendix 2 c.

TRAIL BIKES

1. Trail bikers and their characteristics:

Three reasonably distinct trail bike groups emerged from the surveys:

The largest group consists of high school riders with the following typical characteristics. Their average age is 14 and even at that they have already been riding for three years; they ride at any time, three to four times a week, and almost always ride (competitively) with friends; they ride smallish bikes (90-175 c.c.) with minimal safety equipment and of course have no licences; and they have no means of transporting their bikes apart from accommodating parents. From these characteristics it is clear why their ideal site is one that is close at hand, although interesting (i.e. challenging) terrain is also desired.
It is also clear why young riders have two riding patterns, one on nearby sites of any available kind for weekday or weeknight riding, and another on more spacious "regional" sites on weekends when more time and transportation are presumably available.

The second group consists of non-club members, who were contacted through bike shops. They are typically about 21 years old and have had six years' riding experience; they own larger bikes and have means of transporting them. Thus they ride mainly on weekends and at distant and acceptably spacious sites. Nevertheless they would appreciate having a suitable practice site close to the metropolitan area.

The third group consists of motorcycle club members. They are the oldest (25-40 years) and the most experienced (ten years or more), ride the biggest bikes (225-350 c.c.), and have good transportation, usually vans and campers. Thus they make a holiday weekend out of their outings and are looking for a good variety of terrain, conditions and challenges. While they want suitable regional sites for themselves, they also want smaller, more convenient sites for their children.

Despite these differences between them the groups have certain things in common. They all regard riding as a social affair; they ride for challenge and thrills; and they all want extensive and varied terrain.

2. Existing sites and their characteristics:

Three distinct kinds of presently used trail bike sites emerged from the survey:

i) Local sites: sites which are, most of all, close at hand and used almost exclusively by under-age riders who have to push or ride their bikes to get to them.

ii) Regional sites: more extensive and rewarding sites within reasonably convenient riding range.

iii) Distant sites: sites many miles away requiring considerable time to get to.

The first two types are shown on Map #1 and listed by number below. The distant sites (not shown here) consisted of the Aldergrove, Mission, Cultus Lake, Weaver Creek and Harrison Lake areas. These are not considered further in this study.
EXISTING TRAIL BIKE SITES *

(See Map 1)

Regional Sites
1. Cypress Bowl
2. Blair Rifle Range
3. Ioco
4. Westwood Area
5. Burnaby Mountain
6. Iona Island

Local Sites
1. Hollyburn Mountain Trail
2. Woodward Park
3. under Lions Gate Bridge
4. sand pits - Nancy Green Way
5. Grouse Mountain - power lines
6. Grouse Mountain - logging roads
7. Lynnmour - cemetery
8. Lynnmour - power lines
9. behind Coachhouse
10. Myrtle Park
11. University Endowment Lands
12. Burnaby Flats
13. Stride Dump
14. Brunette Creek Road
15. Buntzen Lake
16. Westwood Pits
17. Burke Mountain
18. Coquitlam River
19. Poco Trail
20. Pitt River Dyke
21. Richmond Peat Bog
22. Queensborough Dyke
23. Annacis Island
24. Point Roberts
25. Crescent Beach

* This is not a comprehensive list of existing trail bike sites, primarily because it is based only on a sample of high schools. This is particularly true of Surrey, Richmond, Delta and Langley.
Some Existing Sites

- Regional Sites
- Local Sites
These sites have only one thing in common - they are fortuitous, and consist simply of suitable places where trail bikers find they can ride without too much hassle. Otherwise they contain all kinds of sites - power line rights-of-way, dykes, rough and undeveloped areas, creekside trails, logged-over areas - areas not wanted for other purposes and acceptable to bikers.

However, the regional sites (and to some extent the local sites also) form an interesting pattern. They occur in a rough horseshoe circling the central part of the metropolitan area. Furthermore they appear to attract their riders predominantly from the nearest quadrant of that area as shown diagrammatically on Map #2.
Distribution and Orientation of Riding
The second task was to examine sites in or near the Greater Vancouver area which might be suitable for trail bike use. In all we looked at seventeen sites. They are located on Map #3 and are described below.

It must be noted, however, that these sites did not emerge from a comprehensive, open search by the class. Rather they consisted of suggestions or recommendations from the various municipal staffs. These suggestions were presumably informed by the municipal staffs' knowledge of factors such as land ownership, zoning, present use by bike-riders, and municipal policies. Nevertheless they were not chosen under common guidelines and may reflect personal assumptions or preconceptions by municipal staff as to what a trail bike site should or should not be. In addition it soon became clear that the list did not include several sites where a significant amount of riding actually takes place. Thus the site identification process was not a rigorously systematic one and it is possible, though rather unlikely, that some potentially useful sites have been overlooked.

Each site was assessed first by examining it "on paper" through the media of air photographs and municipal land use maps. Specifically this examination addressed itself to: 1) the site itself, and especially physical characteristics, use and ownership 2) the surrounding area, and especially land use 3) the noise environment. This was then supplemented by a visit to the site and to municipal offices, where any other relevant matters such as planning, engineering or recreation aspects were checked. All of these searches were guided by three general concerns: 1) utility for bike riding 2) acceptability to the surrounding area 3) availability. A general description of each site follows. The numerical fraction shown under each criterion is the unweighted score for that criterion (as discussed further in chapter IV).

SITES SURVEYED (Refer to Map 3)

1. Horseshoe Bay 9. Knight Street Bridge
2. Westport Bowl 10. Sea Island
4. Fell Avenue 12. Vancouver Landfill
b. Eagle Ridge South 14. North Surrey Landfill
6. Ioco 15. Green Timbers
7. Cewe Pit 16. Stokes Pit
8. Mary Hill Gravel Pit 17. Jackman Pit
Site No. 1
Horseshoe Bay: east of Horseshoe Bay / Gleneagles
Utility: large, wooded and attractive but side slopes steep and riding confined to lower strip with no looping potential; riding is rough and possibly dangerous; cover thin and erosion likely.
(6/12)
Acceptability: noise noticeable at low highway traffic volumes; conflict with hikers on trail
(4/9)
Costs: could be high
(1/3)
Availability: owned by British Pacific Properties; part lies in Whyte and Eagle Lakes watershed; probably unacceptable to council, residents and recreationists.
(doubtful)

(Scale of airphotos is approximately 1:12,000 unless otherwise noted.)
Site No. 2

Westport Bowl

Utility: (5/12)

Acceptability: (4/9)

Costs: (1/3)

Availability: (doubtful)

north side, Upper Levels Highway, above Fisherman's Cove, West Vancouver.

small, restricted site (8 acres effective); no variety; soft soil, poor drainage and potentially unstable slopes.

about 800 ft away from residents and audible at low highway traffic volumes; not visible except at entry point; one approach is through Westport residential area.

possibly high

almost certainly unacceptable to residents, ratepayers and municipal council.
Site No. 3  
**Blair Rifle Range**  

**North Vancouver District**

<table>
<thead>
<tr>
<th>Utility:</th>
<th>a large (640 acre) site in varied and attractive terrain, already traversed by many trails; robust and accessible.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptability:</td>
<td>under present conditions riding presents few problems; few adjacent houses, and site well shielded; a minor approach problem</td>
</tr>
<tr>
<td>Costs</td>
<td>Nil</td>
</tr>
<tr>
<td>Availability:</td>
<td>a very desirable and valuable site, owned by C.M.H.C. and B.C. Housing; scheduled for housing - not compatible with bike riding in the long term.</td>
</tr>
</tbody>
</table>

| (11/12) | (7/9) | (3/3) | (possible) |
Site No. 4
Fell Avenue

Utility: (5/12)
Acceptability: (4/9)
Costs: (2/3)
Availability: (doubtful)

on Surrard Inlet, North Vancouver City
flat, filled waterfront site; 55 acres;
attractive location but dull to ride on.

fairly noisy industrial site but bike noise
probably not acceptable to nearby offices and
marina; valuable site and for sale.

probably low

Probably not acceptable to owners and
certainly not to City Council
Site No. 5a
Eagle Ridge North

north of Port Moody, west of Westwood Race Track, north of Meridian Substation.

Utility:
(12/12)

large site; wooded, varied terrain; partly logged; accessible from both east and west; excellent trails, good views; excellent riding.

Acceptability:
(9/9)

no problems foreseen

Cost:
(2/3)

probably low

Availability:
(possible)

no apparent problems
Site No. 5b
Eagle Ridge South

Utility: (9/12)
Acceptability: (7/9)
Costs: (2/3)
Availability: (possible)

north of Port Moody, west of Westwood Race Track, south of Meridian Substation

large site, wooded, varied terrain, partly logged; accessible from both east and west; presently used by bikes and some 4-wheel-drives; several trails available.

Some complaints on noise

mainly, but not all in public hands; planned for Westwood Plateau Housing Development in early 1980's.
<table>
<thead>
<tr>
<th>Site No. 0</th>
<th>Loco</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Utility:</strong></td>
<td>immediately west of Burrard Thermal Generating Station.</td>
</tr>
<tr>
<td>(11/12 for Trials bikes only)</td>
<td>large site; many existing trails; centred on Hydro transmission line; attractive site, splendid views, good tree cover; very rugged and rocky; probably safe only for trials bikes and experienced riders; a robust site; already used for trials competitions.</td>
</tr>
<tr>
<td><strong>Acceptability:</strong></td>
<td>No nearby residences; shielded to NW by 1000 ft. mountain; adjacent developments of industrial type; not visible except to traffic passing end of road.</td>
</tr>
<tr>
<td>(8/9)</td>
<td>Probably very low</td>
</tr>
<tr>
<td><strong>Costs:</strong></td>
<td>Official Community Plan for GVRD Electoral Area B specifically forbids use of motorized recreation vehicles and local citizens strongly opposed.</td>
</tr>
<tr>
<td>(3/3)</td>
<td></td>
</tr>
<tr>
<td><strong>Availability:</strong></td>
<td>(possible)</td>
</tr>
</tbody>
</table>

(Scale of this airphoto approximately 1:25,000)
Site No. 7
Cewe Pit
Utility: (5/9)

Acceptability: (6/9)
Costs: (1/3)
Availability: (possible)

Pipeline Road, Coquitlam
about 10-15 acres, sloping, with settling pond; covered with loose sand or silt; quite pleasant; causes silt problems in nearby Coquitlam River (a salmon stream).

no nearby residents, but park across road (for model aircraft flying)

would require some surface development.

privately owned
Site No. 8
Mary Hill Gravel Pit

Utility: Port Coquitlam
(11/12)

Acceptability: a large area (370 acres) with varied terrain; (5/9)
already degraded; good access.

Costs: upper part both visible and audible from (3/3)
Availability: nearby residences and school; lower part (doubtful)
not.

Costs: probably low

Availability: owned by Genstar and H. A. Roberts and
slated for early development, depending on
timing of riverside highway; probably not
available.
Mitchell Island, Richmond
very small (4 acres) and mildly hillocky, unattractive site in an industrial setting; accessible off Knight Street bridge; ground quite robust; a good site for training only.
noisy environment; nearest houses 1/3 mile away; noise probably not a problem; site shielded and inconspicuous.
low
belongs to Ministry of Highways; presently sought by Quarter Midgets Association.
<table>
<thead>
<tr>
<th>Site No. 10</th>
<th>Sea Island</th>
<th>northeast of Vancouver airport</th>
</tr>
</thead>
<tbody>
<tr>
<td>Utility:</td>
<td>(9/12)</td>
<td>100 acres with combination of flat and hillocky ground; loose sandy soil, not well drained and not too robust; somewhat remote from most population; good site.</td>
</tr>
<tr>
<td>Acceptability:</td>
<td>(9/9)</td>
<td>more than a mile from any residences; existing environment very noisy (airport); good highway access</td>
</tr>
<tr>
<td>Costs:</td>
<td>(3/3)</td>
<td>low; fencing?</td>
</tr>
<tr>
<td>Availability:</td>
<td>(possible)</td>
<td>owned by Ministry of Transport for airport expansion; outlook uncertain.</td>
</tr>
<tr>
<td>Site No. 11</td>
<td>Richmond Landfill</td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>Utility:</td>
<td>Richmond, on Fraser River</td>
<td></td>
</tr>
<tr>
<td>(9/12)</td>
<td>large (230 acres), flat, uninteresting, covered by sand dredged from river; somewhat remote from user populations</td>
<td></td>
</tr>
<tr>
<td>Acceptability:</td>
<td>nearest residence one mile away beside cement plant; riding would probably increase noise level by 10-12dB when plant not operating; approaches adequate.</td>
<td></td>
</tr>
<tr>
<td>(6/9)</td>
<td>low</td>
<td></td>
</tr>
<tr>
<td>Costs:</td>
<td>owned by Fraser River Harbour Commission; harbour development envisaged in 5-10 years.</td>
<td></td>
</tr>
<tr>
<td>(3/3)</td>
<td>approaches adequate.</td>
<td></td>
</tr>
<tr>
<td>Availability:</td>
<td>low</td>
<td></td>
</tr>
<tr>
<td>(possible)</td>
<td>owned by Fraser River Harbour Commission; harbour development envisaged in 5-10 years.</td>
<td></td>
</tr>
</tbody>
</table>
Site No. 12

Vancouver Landfill

Utility: (6/12)

Utility: Delta

Acceptability: (8/9)

Acceptability: large site (115 acres) flat and unattractive; rather remote from using population but road access good; surface fill peat/silt - easily eroded, will expose garbage, possible leachate problem.

Cost: (1/3)

Cost: high; would require additional fill and mounding to make surface more challenging; fencing of ditches.

Availability: (possible)

Availability: owned by City of Vancouver; to be turned over to Delta when landfill complete; erosion problems must be dealt with.
Site No. 13

North Surrey Gravel Pit: east of Port Mann Bridge.

Utility: (10/12) about 150 acres; fairly steep, rough and varied in topography; good view of Fraser River; already degraded; good riding site.

Acceptability: (3/9) residents close to the site strongly object; more residential development envisaged.

Cost: (2/3) Low

Availability: (doubtful) the pit is partly publicly and partly privately owned; the municipal part not available before mid-1980's; municipal attitude very doubtful
Site No. 14
North Surrey Landfill

Utility: (8/12)
Acceptability: (5/9)
Costs: (3/3)
Availability: (possible)

just east of Port Mann Bridge on Fraser River
Typical sanitary landfill site but set in pleasant surroundings (river and treed slope) good accessibility
noise and visibility not a problem but approached through residential area.
probably not significant
trail biking not compatible with present landfill operations until filling is complete (another 8 years); park planned for site thereafter.
<table>
<thead>
<tr>
<th>Site No. 15</th>
<th>North Surrey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green Timbers:</td>
<td>B.C. Hydro transmission line ½ mile long; flat and uninteresting; easily accessible from Fraser Highway and 148th Street; seen as practice or training site only.</td>
</tr>
<tr>
<td>Utility: (7/12)</td>
<td>&lt;%= Utility %&gt;(7/12)</td>
</tr>
<tr>
<td>Acceptability:</td>
<td>Buffered by trees, except at each end, where noise and access could be a problem. Nil</td>
</tr>
<tr>
<td>Costs: (3/3)</td>
<td>owned by Surrey, leased by B.C. Hydro, seen as part of a needed park by Surrey.</td>
</tr>
<tr>
<td>Availability:</td>
<td>(possible)</td>
</tr>
</tbody>
</table>
Site No. 16

Stokes Pit

Utility: (12/12)

Acceptability: (5/9)

Costs: (3/3)

Availability: (possible)

Surrey, on Langley border

255 acres of very varied and robust terrain; excellent for riding; 40 minutes from Burnaby.

Rural area, zoned industrial; objections anticipated from visible trailer court 1700 feet away (located in Langley); significant increase in noise level likely.

Low

North end occupied by R.C.M.P. shooting range; site used occasionally for 4-wheel drive competitions; availability for trail bikes unclear.
Site No. 17
Jackman Pit

Utility:
(10/12)

Langley, near Aldergrove
a sizeable (74 acre) site; accommodates gravel
and land fill operations as well as bike
riding; unattractive except for purposeful
riding; completely degraded; incorporates a
1-mile competition track. (Motocross)

Acceptability:
(9/9)
largely excavated down to water table level;
the area is rural; no complaints about the
existing high levels of noise in pit.

Costs:
(3/3)
Low

Availability:
(possible)
already under lease to Aldergrove Motocross Club
from the Township of Langley (62 acres) and Pro-
vincial Government (12 acres) and used on a fee basis,
THE ASSESSMENT OF SITES

The system of criteria and measures used to assess the proposed sites is shown below. It evolved from a considerable amount of iteration around such questions as: the choice of measures and their precise meaning; the basic scoring system; and the overall weighting system.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Criterion Weight</th>
<th>Measures</th>
<th>Measure Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acceptability</td>
<td>3</td>
<td>Noise (above ambient)</td>
<td>3</td>
</tr>
<tr>
<td>(to adjacent areas)</td>
<td></td>
<td>Visibility (to residents)</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Approach traffic</td>
<td>1</td>
</tr>
<tr>
<td>Utility</td>
<td>2</td>
<td>Effective size</td>
<td>2</td>
</tr>
<tr>
<td>(to users)</td>
<td></td>
<td>Attractiveness</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Robustness</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Accessibility (to potential users)</td>
<td>1</td>
</tr>
<tr>
<td>Site Costs</td>
<td>1</td>
<td>Development and maintenance</td>
<td>1</td>
</tr>
<tr>
<td>Availability</td>
<td>-</td>
<td>Acceptability to owner and Municipality</td>
<td>-</td>
</tr>
</tbody>
</table>

Each measure was rated from 1 to 3 - the better the site, the higher the score. Each measure score was then multiplied by the measure weight to give a "raw" criterion value; this was then multiplied by the criterion weight to give the final value of the criterion. For results see page 34.

Availability was rated either as "doubtful" or "possible".

It became clear very early that all the judgments involved would necessarily be subjective. It also became clear that the different judgments should ultimately be made by the groups of people most affected by them and our final recommendations reflect this belief. The utility of the various sites can really only be judged by the bikers; their acceptability first by those who live near the sites and second by the politicians who are responsible for land use decisions.

Of special concern is noise. It must be assumed that in any event, very few people would welcome the sound of motorcyclists into their homes or gardens. But, more than that, we must be aware that a large proportion of the population (20 to 30 percent) is inherently much more sensitive to noise than the rest and can be seriously upset and even harmed by it. * This is not a situation that can be

* See Bryan, Noise bibliography, Appendix 3.
brushed lightly aside or resolved by talking glibly about the 'average man'. We assumed, as a principle, that the sound level produced by a properly muffled bike (assumed to be 86 dB at a distance of three feet) should not exceed the existing ambient noise level in any settled area around the site. A discussion of noise is to be found in Appendix 3.

Closely related to noise, we suggest, is visibility and both are probably connected in the minds of some people with highly unflattering images of menacing bikers and thunderous engines. These images are the cross that ordinary, well-behaved law-abiding riders have to bear in the search for public acceptance.

Site development costs could only be guessed at, but in any event the crucial factor will be who bears these costs. An implicit assumption is that suitable sites would be available free or at nominal lease costs.

It became clear very early that site availability was a crucial factor. But it was also clear that while in some cases availability could be prejudged with reasonable confidence, in others it could only be determined by negotiation between the users and perhaps the GVRD on one hand and the owners and the appropriate municipality (or electoral district) on the other. Availability is not a simple matter in itself. For example, time is an important element: some sites might be available now, others in say ten years; some might be available for only two years, others forever. Nevertheless, we decided only to distinguish between 'doubtful' sites (i.e. probably not available) and between 'possible' sites (i.e. sites which might be available or at least should not be precluded at this stage).

The weightings were of course subjective and arbitrary. Ideally we should have experimented with several weight combinations in order to test the sensitivity of the sites to various criteria and measures. However time did not permit this to be done.

The actual site assessments were of course thoroughly subjective, each having been done by one person (except in a couple of cases). However we did have the satisfaction of knowing that our assessments of the various sites coincided quite closely with those done by representatives of the motorcycle clubs who inspected them independently.

Despite the qualifications and limitations discussed above, our rating did give us a sense of the merit of the various sites for the Task Force's purposes. It also provided the basis for our final general assessment in terms helpful to the Task Force. Both the specific and the general assessment are set out on the following pages.
### SYSTEMATIC SITE RATINGS

<table>
<thead>
<tr>
<th>Proposed Sites</th>
<th>BASIC SCORES</th>
<th>W't'd Score</th>
<th>Rank</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Utility</td>
<td>Accept'ly</td>
<td>Cost</td>
<td>Score</td>
</tr>
<tr>
<td>1. Horseshoe Bay</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>64</td>
</tr>
<tr>
<td>2. Westport Bowl</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>45</td>
</tr>
<tr>
<td>3. Blair Rifle Range</td>
<td>11</td>
<td>7</td>
<td>3</td>
<td>85</td>
</tr>
<tr>
<td>4. Fell Avenue</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>48</td>
</tr>
<tr>
<td>5a Eagle Ridge North</td>
<td>12</td>
<td>9</td>
<td>2</td>
<td>98</td>
</tr>
<tr>
<td>5b Eagle Ridge South</td>
<td>9</td>
<td>7</td>
<td>2</td>
<td>73</td>
</tr>
<tr>
<td>6. Ioco</td>
<td>11*</td>
<td>8</td>
<td>3</td>
<td>92</td>
</tr>
<tr>
<td>7. Cewe Pit</td>
<td>5</td>
<td>6</td>
<td>1</td>
<td>53</td>
</tr>
<tr>
<td>8. Mary Hill</td>
<td>11</td>
<td>5</td>
<td>3</td>
<td>69</td>
</tr>
<tr>
<td>9. Knight Street Bdge</td>
<td>9*</td>
<td>6</td>
<td>3</td>
<td>76</td>
</tr>
<tr>
<td>10. Sea Island</td>
<td>9</td>
<td>9</td>
<td>3</td>
<td>93</td>
</tr>
<tr>
<td>11. Richmond Landfill</td>
<td>9</td>
<td>6</td>
<td>3</td>
<td>68</td>
</tr>
<tr>
<td>12. Vancouver Landfill (Delta)</td>
<td>6</td>
<td>8</td>
<td>1</td>
<td>66</td>
</tr>
<tr>
<td>13. North Surrey Gravel Pit</td>
<td>10</td>
<td>3</td>
<td>2</td>
<td>54</td>
</tr>
<tr>
<td>14. North Surrey Landfill</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>63</td>
</tr>
<tr>
<td>15. Green Timbers T/L</td>
<td>7*</td>
<td>7</td>
<td>3</td>
<td>65</td>
</tr>
<tr>
<td>16. Stokes Pit</td>
<td>12</td>
<td>5</td>
<td>3</td>
<td>68</td>
</tr>
<tr>
<td>17. Jackman Pit</td>
<td>10*</td>
<td>9</td>
<td>3</td>
<td>87</td>
</tr>
</tbody>
</table>

* Judged to be Special Purpose sites.
SUMMARY SITE ASSESSMENTS

1. Excellent sites for general use:
   . Eagle Ridge (upper): no drawbacks
   . Sea Island

2. Useful special purpose sites:
   . Ioco: trials and skilled riders only
   . Jackman Pit: motocross competition mainly
   . Knight Street: teaching and practice only
   . Green Timbers: teaching and practice only

3. Sites worthy of further consideration:
   . Blair Rifle Range: availability very doubtful
   . Vancouver Dump (Delta)
   . Eagle Ridge (lower)
   . Richmond Dump
   . North Surrey Landfill
   . Stokes Pit

4. Sites probably not worthy of further consideration:
   . Mary Hill
   . Cewe Sand Pit
   . Horseshoe Bay
   . Westport Bowl
   . Fell Avenue
   . North Surrey Gravel Pit
V. GENERAL DISCUSSION

1. Some Observations

Our studies have led us to the following observations:

i) Bike riding as a recreation activity is now well established and it supports and is supported by many retail and repair businesses.

ii) As far as the general public is concerned, bike riding in the urban area exists in limbo. It goes on, and most people know it goes on, but it does so largely unacknowledged and much of it on the fringe of the law. Some of it depends mainly on trespass, and a great deal of under-age riding involves infringement of the Highways Act. Its infractions of the law appear to be viewed in somewhat erratic fashion by the police, while it may be speculated that most members of the public (but by no means all) tolerate it only as long as it operates, both visually and aurally, at a subcritical level.

iii) There appears to be a considerable amount of latent opposition to bike riding by municipal administrators and politicians.

iv) The very serious problem of riding by under-age riders is not fully addressed by the array of sites examined in this report.

2. Some Arguments

In a moment we will discuss some of the pros and cons of bike riding in urban areas, but first we set out some basic assumptions which should precede this discussion:

The idea of a more-or-less free society, such as the one we live in, seems to us to imply the following:

i) You should be free to do as you wish as long as it is within the law and does not infringe on the rights of others, e.g. the right to quiet, privacy and the enjoyment of property.

ii) You should be free to spend your money as you wish on anything that is legal and not rationed.

iii) You should be free to take personal risks (e.g. as in riding a bike) but not to place other people in jeopardy by so doing.
Given these general postulates, we can set out a few pros and cons relevant to bike riding:

**Pros:**

i) Bike riding is a rapidly growing sport with a great many adherents.

ii) It is a demanding sport which takes its practitioners out of doors, involves significant challenge and risk, and requires nerve and skill on the part of the rider.

iii) It should be able to expect the same degree of public support (as in the supply of sites or in financial aid) as many other sports.

**Cons:**

i) As an energy-assisted activity bike riding tends to have unusually disruptive impacts on other people and on the natural environment. Its key characteristics are speed, momentum, range and noise and these make it area-extensive, environmentally destructive, incompatible with human-scale recreation and disturbing to both people and wildlife.

ii) In ordinary urban situations, where population density is high and land valuable, the congregation of even a few bike riders is likely to have unacceptable affects on a disproportionately large number of people.

3. Some Propositions

The above observations and arguments seem to us to have policy implications which will be very important for any decisions to be taken by the Task Force. We set these out below in the form of six propositions:

i) As areas become fully urbanised bike riding can be expected to become less and less acceptable except in special and unusual circumstances. The riding that is tolerated in vacant spots during the initial growth stages will be squeezed out progressively, both by land values and by public regulation, as the area fills in.

ii) "Special and unusual circumstances" will normally mean areas that are naturally shielded, degraded or unsuitable for higher uses, e.g. gravel pits, landfill sites or rough and out-of-the-way places.
iii) While local government might choose to support bike-riding by helping, where possible, to make sites available, it can scarcely be expected to spend significant amounts of public money for the benefit of people whose recreation activity is incompatible with almost every other public recreation activity.

iv) The natural habitat of the trail bike is rough, non-urban terrain, in which British Columbia abounds, and it should be expected that people who are willing to make substantial capital investments in trail bikes should be willing to make comparable investments in time and money to get to where they can fully use their bikes.

v) The social and environmental effects of bikes depend largely on how they are equipped and handled. Therefore the construction, equipment, maintenance and management of MRV sites should be largely the responsibility of the riders, their organisations and the private sector that supports them.

vi) Under-age riding should not be treated as a "kid's problem". It exists only because adults make it possible and it gives rise to exactly the same problems as adult riding would under the same circumstances. It should be treated in principle as an adult problem. In practice it may be expected that public authorities will continue to turn a blind eye to under-age riding as long as it continues at a subcritical level.
VI. RECOMMENDATIONS

We recommend that:

1. The Task Force should:

   i) Review this report.

   ii) Add to the review list other sites suggested by its members or their parent agencies.

   iii) Check all these sites for suitability with the help of riders themselves.

   iv) Consider the feasibility of finding a site within each of the four quadrants of the metropolitan area.

   v) Establish its own basic principles along the lines of the above propositions.

2. If it is agreed that suitable sites exist and that these are in any way a public responsibility, the Task Force should designate one or more sites to be developed on a pilot basis, without prior commitment and subject to public acceptance and monitoring of use.

3. The Task Force's report and any proposed pilot projects should be given full publicity, especially in the areas most affected, and opportunity for expression of public opinion should be arranged.
BIKE-WAYS for BURNABY

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INVITATION TO DISCOVERY

In many ways the preparation of this report was an eye-opener. As we made our way through the different parts of Burnaby we came to realise how very varied and interesting the municipality is. This is not just a matter of natural endowment, although Burnaby is well favoured in that respect. It is more a reflection of the man-made environment, in which a great many actors have played a part.

The year-by-year ministrations of successive municipal councils and their staffs have clearly borne fruit in Burnaby - in well-ordered neighbourhoods and building developments, in thoughtfully designed streets, in handsome and convenient public buildings, and in parks which are a joy and a refuge. The landscape also bears the stamp that thousands of Burnaby citizens have put on it through their homes and gardens. But most of all it reflects what these same citizens DO and can be SEEN doing in the course of their daily lives. At all ages they stroll, jog, walk their dogs, talk over fences, tend their gardens, play and watch others playing in the parks, sit in the sun, shop, lounge, play in tree houses and ride their bikes. And much more.

Of these things we normally see all too little. Our own neighbourhoods may be familiar enough; but many of us have shut ourselves off from the rest through our surrender to the automobile. The trouble is that anything we see through a car window is not quite real; it is simply more TV. But the bike changes that. The cyclist becomes a fully functioning human being again, not just the encapsulated pilot of an armoured machine. As he pedals along he is once more in touch with everything around, both physical and human.

This is the real potential of bikeways; that they could help the citizens to rediscover their own community and in so doing to recapture from the automobile something of themselves. We do not believe that we can set objectives for other people. But if this study moves any of the citizens of Burnaby to discover the benefits and joys of cycling in their own community we will be very happy indeed.

The authors
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1. DEFINITION

The term *bikeway* as used here means any route specifically designated for cycling. It may be a path reserved exclusively for cyclists or shared with pedestrians; or it may merely be space set aside or marked on an ordinary street. Nevertheless for clarity the word bikeway is used in this general sense throughout most of this report.

2. GOALS AND OBJECTIVES

The GOALS of this study are:

I. To examine the desirability and feasibility of a system of bikeways in Burnaby;

II. To formulate a bikeway plan and program which will achieve the following OBJECTIVES:

1. accommodate the needs of cyclists of all ages, skills and cycling objectives

2. promote safety in cycling

3. promote the use of bicycles as a socially desirable and efficient means of movement

4. promote public participation in the planning and programming of bikeways in Burnaby
3. BIKEWAYS IN GREATER VANCOUVER

The demand for bikeways in the Greater Vancouver area has not gone unrecognized. With little fanfare several bikeway fragments or subsystems have already been developed.

The most attractive of these have arisen in Stanley Park and the U.B.C./Endowment Lands area, where opportunities were most obvious. But several other routes in Vancouver and in West Vancouver have been developed which largely use existing streets. Then there is the very extensive (54 km) loop in Delta which takes advantage of the dykes along the South Arm of the Fraser River. And others are actively being considered. All of these are shown on Diagram 1.

These of course do not accommodate all bike travel. The great bulk of cycling clearly takes place on the street system at large and some on power line rights-of-way, foot trails, and pieces of undeveloped land. But at least a start has now been made on the provision of special routes for cyclists.

One implication of this is that planning for bikeways in Burnaby should not proceed in a vacuum. Both east and west of the municipal boundaries there are existing or potential bikeways to which a Burnaby system should be connected. In this sense too Burnaby is the key to the development of a greatly expanded metropolitan bikeway system.

4. IN PRAISE OF CYCLING

"Man's entire organism was designed to move through the environment at less than five miles per hour". E.T. Hall in *The Hidden Dimension*

"Man on a bicycle can go three or four times faster than the pedestrian, but uses five times less energy in the process. Equipped with this tool, man outstrips the efficiency of not only all machines, but all other animals as well". Ivan Illich in *Energy and Equity*
The bicycle is a modest beast: it provides limited speed and carrying capacity and it requires its rider to provide his own protection against the elements. Nevertheless cycling offers many advantages.

As personal activity it:
- is suitable for all ages
- can be done alone or in groups
- involves moderate exercise and promotes health
- does not seal the rider off from his surroundings or his fellow men

As transportation it:
- facilitates short and medium length trips
- provides door-to-door movement
- requires minimal parking facilities
- requires minimal investment in bikeways
- reduces automobile congestion on expensive roads

The bicycle itself:
- uses little raw material in manufacture
- uses no fossil fuels
- produces no air pollution and no noise
- requires little maintenance

We conclude that cycling is a socially desirable activity and that it deserves to be encouraged. Nevertheless it requires an appropriate setting if it is to be enjoyed safely and happily. This setting is examined in the rest of this report.
5. CYCLISTS AND CYCLING

In the last ten years two significant things have happened to cycling. In the first place there has been a dramatic increase in the number of bicycles sold. In the second, recent growth has taken place mainly among adults. Cycling is no longer "kid stuff"; it is now enjoyed by all ages.

A corresponding change has occurred in the vehicles themselves. Not too long ago the ordinary bike was either a fixed-gear or a 3-speed machine. More recently the field has been dominated by the 10-speed bicycle, which now accounts for 50 percent of all cycles sold, although 5-speeds are now becoming more common.

Our survey of Burnaby high schools in March 1978 confirms this change:

<table>
<thead>
<tr>
<th>Types of Bicycles in Burnaby High Schools</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-speed</td>
</tr>
<tr>
<td>1-speed</td>
</tr>
<tr>
<td>3-speed</td>
</tr>
<tr>
<td>5-speed</td>
</tr>
<tr>
<td>Racing</td>
</tr>
</tbody>
</table>

These figures are important: they mean that 85 percent of cyclists are no longer at the mercy of steep hills. (Nevertheless, 10-speeds or not, some people still will not tackle steep grades).

But it is very clear that some knowledge of cyclists' behaviour is basic to planning for them, and the next two pages address themselves to this. The following table shows a somewhat speculative Cyclists Profile gleaned from various studies. Then Diagram 2 addresses two other aspects of cycling behaviour: how far do people cycle for different purposes? and, how do cyclists react to gradients? These are complex matters and each reveals a spectrum of response.
A PROFILE OF CYCLISTS

THE CASUAL RECREATIONIST
(50% of all trips: range to 3-4 km)
- generally fairly young
- strictly a good weather cyclist
- wants a safe, pleasant route and non-taxing gradients
- may transport his bicycle by car to cycling spot

THE SHOPPER
(20% of all trips: range to 3 km)
- includes high school children and young married women
- wants a safe but direct route to the shopping area
- will use a roadway if the bikeway is not direct

THE ELEMENTARY STUDENT
(10% of all trips: range to 1 km)
- often doesn’t know the rules of the road
- may lack traffic awareness, judgement and control
- most often involved in accidents
- roams a limited area centred on home and school

THE AVID RECREATIONIST
(10% of all trips)
- fairly young
- very fit; tackles almost any grade
- cycles in all weathers
- has 10-speed or racing bike
- seeks challenging or attractive routes
- traffic-wise

THE HIGH SCHOOL STUDENT
(5% of all trips: range to 3 km)
- fairly fit
- knows the rules of the road
- sometimes reckless and lacking in control
- prefers direct route to school
- involved in shopping and casual recreation
- roams an extensive area centred on home and school

THE COMMUTER
(5% of all trips)
- fit
- very experienced and traffic-wise
- wants direct routes
TRIP PURPOSE AND DISTANCE
This graph shows how far cyclists are likely to cycle for different purposes.

THE TOLERABILITY OF GRADIENTS
Cyclists react differently to gradients depending on personality and fitness. This graph indicates how far different types are likely to cycle up different gradients without the help of gearing.

CYCLING BEHAVIOUR
Lastly, the school survey shows that three of every four children in elementary school and two of every three in high school own a bike. It also makes clear the extent to which bikes are used for non-school purposes. In other words the bike, as adults may forget, is the student's automobile.

6. CYCLING IN BURNABY

At this point we face another fundamental need: to understand the phenomenon we are dealing with - the movement of cyclists in Burnaby.

For such a traffic problem the basic analytical techniques are now well established in the planning profession. But they require appropriate data, and in highway planning a great deal of time and money are normally spent in obtaining it. In the case of cycling the data does not normally exist and certainly not for Burnaby; our academic circumstances have not permitted us to develop such data; and even if they did the winter season is obviously not the right time to do it.

Thus we had to depend mainly on judicious use of the generalized data set out in the preceding chapter. This use has consisted of (1) plotting the major cycling flows separately, for clarity (2) plotting the major cycling concentrations on one summary diagram. These are shown on Diagram 3.

Overall the analyses suggest that:

- the majority of users are young, with a tendency to circulate during the week around their homes and their schools.

- a substantial proportion of cyclists, including school children, cycle at weekends and other off-times and their destinations include parks, libraries, community centres, etc.

- cycling flows tend to be focussed on a large number of destinations widely scattered across the municipality

- there are trip concentrations in both North and South Burnaby, arising out of the tendency of schools and shops to be centrally located.
The sizes of the various foci are scaled roughly in proportion to their attractiveness for cycling. Commuter cycling has been omitted as it is only a small part of the whole and is widely scattered over the area.

The diagrams show that cycling tends to be concentrated on a large number of focal points widely dispersed across the municipality, they also show areas of trip concentration.
We do not have a satisfactory appreciation of the volume of cycling in Burnaby. What we do know is that almost 16,000 bicycles are owned by school children alone, from which we might guess that there are perhaps 25,000 in total in the municipality. If that is so then there are half as many bikes as there are cars in Burnaby, and bicycle sales continue to zoom upwards. That bikes are used in Burnaby is obvious, but it is our firm belief that they would be used a lot more if conditions for cycling were better.

According to the high school survey students generally feel that cycling in Burnaby is hazardous, and they feel threatened by the speed and volume of traffic as well as by the inconsiderate behaviour of some motorists. Clearly, if cycling is to be encouraged something must be done to enable it to be enjoyed in safety and peace of mind.

7. PLANNING FOR BIKEWAYS

In analyzing the cycling behaviours and flows to be accommodated we have taken the first step towards planning a bikeway system. But an immediate problem arises out of the variety of these behaviours and movements.

They cover a broad spectrum of cyclist types; they cover most of the municipality in a highly dispersed fashion; and they cover the daylight hours (and some of the night hours too). Can bikeways be provided that will be all things to all cyclists? We think not.

We believe that a bikeway system cannot be based on school locations. It is not simply that schools attract only a small proportion of bike traffic; nor that schools are widely dispersed; it is rather that schools draw their cyclists from all directions around them and little would be achieved merely by inter-connecting them with single bikeway routes.

The ideal time to plan bikeways for school children is when the whole neighbourhood is being planned. At that time bike routes can be designed specifically in relation to schools and
parks. Particularly good examples of this can be seen in Richmond, whose urban development started much later than Burnaby's and which inherited a much less awkward land subdivision pattern. One such example is shown on Diagram 4.

We take it for granted that bikeways will be located so as to accommodate school flows to the limited extent that is possible, and that if any opportunity arises to plan on a neighbourhood scale bikeways for school-oriented movements will be incorporated. Nevertheless in planning major bikeways in a municipality already patterned and built up, the school needs of children cannot be a prime objective.

A second constraint arises out of the fact that we have to plan a bikeway system not on a blank sheet but on the real ground of Burnaby. This immediately brings to the fore some intractable facts: the developable areas of Burnaby are already largely built up; in many areas the streets form a rigid grid pattern; the street right-of-way is usually quite limited in extent and is fully taken up by traffic lanes, parking lanes, sidewalks and utilities; and there are steep and extensive slopes in many parts of the municipality.

From these constraints it becomes clear that:

- the task is not merely to satisfy demand but to achieve appropriate balance between widespread demand and limited opportunities
- such an extensive, multi-focus demand could ideally be met only by a network of bikeways
- the existing street system will continue to accommodate most cycling trips; and part of our task is to identify the most suitable streets and make them safe for cycling, consistent with the other functions of streets.

These caveats suggest that we need to be quite clear about our objectives and priorities. It is true that we may feel obliged to modify them as we run up against further problems. But if that happens at least we will be clear as to what we are modifying; we will still have a sense of direction.
This neighbourhood in Richmond was planned in a way that greatly enhances the safety of cyclists. The street pattern as a whole discourages through traffic. Furthermore the inner area is so designed that school children can walk through the ends of the looped streets without crossing any automobile traffic at all. They can then walk or cycle through a park strip to school in complete safety.
It is also true that our objectives and priorities will have to be based on value judgements. But that is as it should be: the main thing is to be clear and explicit about them.

In the light of all these things we have adopted the following

GUIDELINES FOR PLANNING:
1) give prime consideration to the needs of ordinary pleasure cyclists, including school children, focusing these on parks and points of special attractiveness
2) serve points of specially heavy trip concentration, such as the future Metrotown.
3) give consideration to the needs of school travel, shopping and commuting as far as that is possible
4) make the system as broadly accessible as possible
5) emphasize safety
6) provide tolerable gradients
7) seek routes of maximum attractiveness and variety
8) seek a system of reasonable length (say 15-20 km) embodying flexibility by way of circular or looped forms

In practice the application of these guidelines is not easy. Experience elsewhere suggests that bikeways will not be used unless they offer the cyclist real pleasure and easy cycling. But who is "the cyclist" we are planning for? What is "real pleasure"? And what is "easy"? In order to see the breathtaking views from Capitol Hill would cyclists climb ten percent grades? Would they follow a tortuous route instead? Or would they avoid the Hill completely? Given the prospect of Deer Lake from above, would they be willing to dismount and walk a bit? Would they negotiate a specially designed snake path to reach it? Furthermore a bikeway is not a unitary thing but an assembly of bits and pieces, some very adequate, some much less so. Under these circumstances we can only suggest bikeways which are as pleasurable and as safe as possible and find ways of involving the users in making the final judgments.
Furthermore not all of these guidelines are comparable. Thus part of the problem is to evaluate the possibilities as rationally as possible and to make any trade-offs which may be necessary.

In the face of all these questions and limitations the planning process is quite difficult. But in any event it helps first to devise strategies which seem most likely to advance our goals and guidelines. To this we now turn.

8. STRATEGIES AND A CONCEPT

After one has wrestled with the problem long enough, alternating between heavenly goals and earthy gradients and street patterns, certain conclusions emerge. Ours were that:

1) a bikeway system in Burnaby should have three main sets of foci:
   (a) Burnaby's outstanding park assets, especially Burnaby Lake, Deer Lake and Central Park
   (b) the views available from many points throughout the municipality
   (c) the projected Metrotown development

2) the parks and view areas should be connected by bikeways designed for pleasurable and easy cycling: these should pick up minor parks where possible

3) where possible, routes should be located where they will attract the greatest number of adjacent residents, especially school children.

But these are only general ideas expressed in words. The problem is to move from words to routes expressed on maps. This gap was bridged in two stages. The first was to work out alternative STRATEGIES: that is, to create general theoretical forms from the verbal guidelines. Two such forms or strategies are sketched on Diagram 5.

The second stage was to translate these strategies specifically and realistically in the form of CONCEPTS. This involved a much more practical process - the process of selecting and examining specific streets or paths and weighting their characteristics against
STRATEGY: LINK UP THE PARKS

STRATEGY: DEVELOP CIRCUITS AROUND THE PARKS & LINK THE CIRCUITS

TWO BIKEWAY STRATEGIES
the bikeway design criteria. Consequently the results are reasonably realistic and represent bikeway systems which could be developed.

As the second stage was tackled certain things became clear:

SAFETY: If Burnaby is ultimately able to acquire the Oakalla and George Derby sites and connect them suitably to Deer Lake and Burnaby Lake parks it can have a magnificent bikeway system right in the centre of the municipality. But apart from that bikeways will have to be found mainly on the existing street system. And while this implies something less than the cyclist's ideal, certain planning principles will help to make the most of the situation:

1) Seek quiet residential streets; best of all, culs-de-sac with lanes through the closed end. Conversely, avoid main roads; the average cyclist feels quite unsafe on them.

2) Seek long rather than short blocks, thereby minimizing the number of intersections to be crossed.

3) Seek streets which are "open" or one side ie. which border on parks, schools, cemeteries, etc.

4) Seek areas which are subject to a minimum of cross traffic, e.g. between Broadway and the tank farms in the north, or between Rumble and the Marine Drive slopes in the south.

5) Give consideration to industrial roads, as these do not usually carry heavy volumes at any time and are almost completely empty after work hours.

ATTRACTIVENESS: It is true that in certain areas of Burnaby the views are dominant and compelling. But lovely views unfold at many points and in the most unexpected places, and distant views are not the only attractive features in the municipality. For many people the whole urban environment - people and their houses and activities - offers a dynamic and fascinating scene. This too has implications for planning: we should not be simplistic in our search for "attractiveness", thinking only of views; and we should take time to study the bikeway environment in considerable detail in order to understand the
full range of opportunities it offers. And most important, if as we are implying, beauty lies in the eye of the beholder, we would be well advised to ask the users what they think are the most appealing routes.

GRADIENTS. Outside of the central valley it is quite impossible to cycle very far in Burnaby - or to take advantage of its most spectacular views - without encountering slopes of some steepness and length. This suggests two things: what is tolerable should again be judged by the users; and easily visible maps of routes would be important to the casual user, who needs to know what lies ahead.

The bikeway system shown in Diagram 6 is a concept of what a bikeway in Burnaby might be. It should be regarded as a first expression of the strategies and principles outlined above and used as a springboard for much more thorough studies than time has permitted us to carry out.

(It may be acknowledged, by the way, that the Concept consists of two parts which were developed independently by two groups, each using its own strategy, one for North Burnaby, the other for South Burnaby. This was only made possible, however, by the fact that the two groups agreed on the focal points at which the Trans Canada Highway was to be crossed, thus providing common links between the two systems).

9. EVALUATION

The classic planning process sets out several ways of achieving set objectives. This is then followed by an evaluation process which adjudicates between the options in the light of objectives. Two such evaluation schemes were devised for this project, one for North Burnaby, one for South Burnaby. Both give effect to four of the guidelines established earlier: safety, accessibility, gradient and attractiveness. They differ however in their treatment of these variables. These schemes are set out on Diagram 7. In the ordinary way these schemes would have been
A BIKEWAY CONCEPT

- RECREATIONAL BIKEWAYS
- LINK-WAYS
- STEEP GRADES
CONCEPT EVALUATION: NORTH BURNABY

ROUTE SEGMENTS

FEATURES
rated 0 to 4
multiple 4
multi/single 3
single 2
None 1

SAFETY: weight 4
# of intersec. 3
traffic vol. 14
driveway vis. 4
Pedestrians 4
Possible Classification 3

ACCESS:

FEATURES
rated 0, 1

ATTRACTION/OPPORTUNITIES:
A. Views
B. Parks
C. Schools
D. Community Centres
E. Residential Areas
F. Ugly features

SAFETY
Intersections:

WIDTH/VALUE:
J. Narrow Road/High Volume
K. Wide Road/Low Volume
L. Limited access

Characteristics:
M. Truck Routes
N. Parked Cars
O. Bus Routes
P. Obstructions
Q. Miscellaneous

GRADE:

SEGMENT TOTALS

SEGMENT DESCRIPTIONS:

1. Barnett Highway
2. Capitol Hill, Willingdon to Holdom/Union
3. Oxford/Willingdon: to Masonic Cemetery
4. Union, Alpha to Holdom
5. Delta, Union to Brentlaw
6. Graveley-Brentlaw-Broadway to Holdom
7. Broadway, Phillips to Production Way
8. Government, Phillips to Brighton
9. Underhill from Broadway north - Forest
   Grove Drive to Broadway
10. Brighton from Government-Production Way
    to Broadway
11. Eastlake from Production Way-Beaverbrook-
    Cameron
12. Duthie from Curtis - Halifax - Phillips
    to Broadway
13. Holdom from Union - Curtis to Duthie
14. Halifax, Fell to Duthie
15. Fell, Curtis to Broadway
16. Trinity from Boundary - Gilmore to Oxford
17. First, Boundary to Gilmore
18. Gilmore, First to Trans Canada Highway
19. Spur from Broadway - Spratt to TCH.
20. Government from Brighton - Cariboo to TCH
21. Curtis from Duthie - Centennial Way
22. Government, Spur to Phillips
23. Piper, Government to Burnaby Lake
24. Broadway, Holdom to Phillips
25. Phillips & Halifax, Aden, Shellmont, Underhill & Forest Grove Drive

CONCEPT EVALUATION: SOUTH BURNABY

ROUTE SEGMENT

FEATURES
rated 0, 1

ATTRACTION/OPPORTUNITIES:
A. Views
B. Parks
C. Schools
D. Community Centres
E. Residential Areas
F. Ugly features

SAFETY
Intersections:

WIDTH/VALUE:
J. Narrow Road/High Volume
K. Wide Road/Low Volume
L. Limited access

Characteristics:
M. Truck Routes
N. Parked Cars
O. Bus Routes
P. Obstructions
Q. Miscellaneous

GRADE:

SEGMENT TOTALS

SEGMENT DESCRIPTIONS:

1. Canada Way to Deer Lake on Sperling
2. Buckingham to Burnis
3. Buckingham, Burnis to Morley
4. Morley to Imperial
5. Humphries to Elwell
6. Elwell to Walker
7. Elwell to Griffith
8. Elwell to Spiring
9. Elwell to Colborne
10. Colborne to Bryant
11. Bryant to Dufferin
12. Dufferin to Irving
13. Irving to Royal Oak

CONCEPT EVALUATION: TWO APPROACHES
applied to alternative bikeway concepts, which could thus have been compared and the better concept identified. Since time allowed only one Concept to be devised, such a comparison could not be made. Even so the evaluation schemes were valuable in that they were applied to the constituent segments of the Concept and thus showed up the "strongest" and "weakest" links in it. They were thus useful in identifying pilot projects on the basis of attractiveness and feasibility. They also show up the weaker links which should be examined for better routes.

10. PILOT BIKEWAYS

A bikeway concept has now been devised based on the structure of goals, objectives and guidelines which were worked out earlier. At this point two other considerations arise. First it would be unrealistic to expect that any such scheme would be adopted as a whole. Second the Concept inevitably reflects many subjective judgments. One in particular is the extent to which such a system would actually be used, which will depend on how safe and attractive the users perceive it to be. This is a question of real concern in that at least one city in Canada, Niagara Falls, is now abandoning some of its bikeways.

It is clear that a gradual approach to implementation is desirable. With this in mind two segments have been identified that could usefully serve as pilot projects. These would serve three purposes: to accommodate experiments in bikeway design; to act as test sections which the public might evaluate; and to offer a stimulative experience for would-be cyclists. They are shown on Diagrams 8 and 9.

As it happens these segments are quite different in nature. The northern circuit (Diagram 8), which surrounds Burnaby Mountain Golf Course, would be constructed largely of cyclists-only bikeways and the setting is green and open. The Buckingham Pilot (Diagram 9) passes entirely through built up areas and would share the streets with automobile traffic: Nevertheless it is "anchored" by very fine parks at both ends and the residential
BUCKINGHAM PILOT
35 KM. LONG: INTERMEDIATE DIFFICULTY

This bikeway is Class 4 throughout except in Robert Burnaby Park as shown.

BUKKEWAY CLASSIFICATION
CLASS 1: A PATH FOR EXCLUSIVE USE BY BICYCLES, COMpletely
SEPARATED FROM OTHER ROUTES OF TRAVEL, OFTEN
BUILT ALONG HIGHWAYS, THROUGH PARKS OR IN
PUBLIC ORCES.
CLASS 2: A LANE FOR EXCLUSIVE USE BY BICYCLES BUT NOT
COMpletely SEPARATED: USUALLY PLACED ALONG URBAN
ARTERIALS AND DESIGNATED BY SIGNS AND MARKINGS
WITH SEPARATION BY USE OF CURBS.
CLASS 3: A LANE SHARING A ROAD SURFACE AND DESIGNATED FOR
BICYCLE USE BY SIGNS AND MARKINGS. USUALY
USED ON MAJOR ARTERIALS.
CLASS 4: A ROUTE SHARING A ROAD SURFACE AND DESIGNATED BY
STUDS ONLY, OFTEN ON MAJOR LOCAL STREETS.

LEGEND
ROUTE NUMBER
ROUTE MARKERS (BICYCLES)
STEP HANS
TRAFFIC LINES
CROWD (a)
ROAD WIDTH
SCALE
1" = 20 M (25 M)
scene through which it passes is extraordinarily varied and attractive.

We believe that both pilots could be constructed for modest amounts of money. The Golf Course Pilot would be constructed largely in the course of road widenings which will be done anyway and at little extra cost; the Buckingham Pilot would involve only direction and control signs.

In order to be most useful bikeways need to be comprehensible to their users, which requires that they be appropriately identified, described and equipped with explanatory and control signs. An outline of these requirements is shown on Diagram 10.

Since use of bikeways is often accompanied by use of public parks it is also important that parks be equipped to accommodate cycling. This means not only bikeways within the parks, where that is possible, but the provision of equipment such as bicycle racks or parking devices where bikes can be locked up.

11. LEGAL AND ADMINISTRATIVE ASPECTS

The establishment of bikeways would identify a new element in the overall public transportation system; and it would identify the cyclist as a special class of traveller with distinctive needs and rights. It would therefore be a significant step in legal and administrative terms.

Experience in other places shows that three themes arise when bikeways are considered: bicycle registration, bikeway security and traffic control, and the amendment of relevant legal statutes and bylaws.

BICYCLE REGISTRATION: There is general agreement that registration of bicycles should be mandatory. The arguments in favour of this are that

1) it helps in the recovery of lost or stolen bicycles
2) it helps on occasion to identify injured cyclists
3) it helps the enforcement of safety equipment standards

A measure of the existing situation is that in 1976 only
Large maps would be located in the major parks and signs posted along the bikeways.

LARGE MAPS IN MAJOR PARKS

Large maps would be erected in major parks to explain the Bikeway System in detail. The maps would inform the public of the existence of bikeway system and thereby encourage use. The map key would provide the following information:

Explanation of Map Symbols

The bikeway system in Burnaby consists of:

CIRCUITS in areas of prime attractiveness, designed primarily for recreational use;

CONNECTORS linking most areas of Burnaby to the circuits.

DIFFICULTY (in terms of grade)

Easy
Intermediate
Expert

Description of Bikeways

CENTRAL PARK - RON MCLEAN PARK CIRCUIT 9km
DEER LAKE - ROBERT BURNABY CIRCUIT 7km
CENTRAL PARK - BURNABY SOUTH SCH. CONNECTOR 4km

Safety Reminders

Cyclists using municipal streets must obey all traffic control signs and traffic lights.

- Ride single file with traffic
- Cross at intersections only
- Don't ride on sidewalks, etc.

SIGNs ON BIKEWAYS

Signs would:

- Inform both cyclists and motorists of the existence of a bikeway
- Guide cyclists along the designated route by the use of directional arrows
- Contain information regarding -
  - Origin-destination of route and type (Circuit/Connector)
  - Grade (i.e. overall difficulty of bikeway)
- A small undetailed map of the total system.
6600 bicycles were registered in Burnaby. It has been estimated that in fact there may be six times as many bikes in the community.

SECURITY AND TRAFFIC CONTROL: There is general agreement that education of both cyclists and motorists in the ways and needs of cycling is necessary; and that this would be most effective if it were tied in with the administration of registration.

Special bikeway police units are often suggested and are in fact operating in several communities in the United States. These would patrol the bikeways using 10-speed bikes or lightweight motorcycles.

The treatment of cycling offenders is a general problem. A most interesting approach to it is in operation in Concord, California, where a special Bicycle Court has been set up to deal with juvenile offenders. The Court consists of young people, who pass the necessary judgments on violators. Emphasis laid on education as well as adjudication. The potential of such a device for education in citizenship is obvious - and exciting.

STATUTES AND BYLAWS: A brief scanning of the existing laws makes it clear that the introduction of bikeways and greater recognition of the cyclist in Burnaby would make it desirable to review several pieces of legislation. First would be the B.C. Motor Vehicle Act, in which the mutual responsibilities of the cyclist and the motorist need to be clearly established. Then Burnaby's own bylaws dealing with licencing and records would also need to be overhauled.

The legal and administrative questions involved raise many issues - of philosophy, of law, of bureaucratic procedure and of practicality. These cannot be discussed here, but they should be studied carefully as part of the review recommended in the last chapter.
12. OVERVIEW AND RECOMMENDATIONS

OVERVIEW

• We believe that cycling is a socially desirable activity and should be accommodated and encouraged by all possible means.

• We note that a great deal of cycling is done in Burnaby where it is safe to do so, but that there is much complaint by high school students that cycling is not safe in many areas.

• It is not easy to superimpose bikeways in an already urbanized area whose streets are laid out on a grid pattern. Nevertheless it is encouraging that in several areas in Burnaby the grid pattern is already being modified in the interests of the safety and quiet of residents. This automatically makes the streets better for cycling and should be encouraged.

• Despite its limitations, which arose mainly out of time constraints, a major value of this report is that it not only examines the nature of cycling in Burnaby but sets out a structure of objectives and guidelines which could guide the planning of any bikeway system in Burnaby.

• A bikeway concept has been advanced which incorporates these guidelines. More important, however, two pilot bikeways are proposed which are believed to be feasible, low in cost and likely to be used. They would be valuable for experimentation and education and seem worthy of serious consideration.

• Since bikeway planning involves much subjective judgment we think it very important that the cycling public be involved, and that this should include school students.

• The establishment of bikeways would have legal, administrative and educational implications which demand serious attention.

• Very important: the planning and provision of bikeways within the municipality must inevitably be a cooperative affair. In a utilitarian sense it will depend very largely on the efforts of the Engineering Department. If it can be persuaded that cycling is a desirable and valid use of appropriate streets and that a niche can be found for it, then a great deal can be achieved. In this connection we note that a lot has been done in Burnaby in recent years to restrict wide-open through traffic in residential areas. This alone makes these areas much safer and more pleasurable for cycling, and we hope the trend will continue.

In another sense the success of bikeways will depend on the co-operation of the Parks and Recreation Department. If cyclists are truly welcomed and accommodated in Burnaby's major parks,
especially in the central valley, Burnaby could become an urban cyclists' paradise.

It appears that so far cycling has not been given much attention in the municipality. We believe that there is a good case for giving it a much higher priority from now on. But the lead must come from the Municipal Council, which must clearly establish its own policies and then direct that priority or funds be given to the accommodation of cycling and that the attention of the appropriate departments be focussed on the job.

RECOMMENDATIONS

In the light of the above we suggest that this report be presented to Burnaby Municipal Council with the following recommendations:

1. That Council recognize cycling as a socially desirable activity and adopt as a general policy that: wherever possible, bikeways are to be provided to encourage cycling, promote cycling safety and accommodate the needs of cyclists.

2. That Council direct the Planning, Engineering and Parks Departments that as a matter of policy: the needs of bikeways are to be given full and sympathetic consideration in the design of neighbourhoods, street systems, park facilities and other facets of their work.

3. That Council establish a Working Committee on Bikeways consisting of the Director of Planning, the Municipal Engineer and the Director of Parks.

4. That Council direct the Working Committee to review this report and bring appropriate action recommendations to Council as soon as possible including recommendations as to (1) the best way to involve interested citizens, including school students, in the planning, evaluation and design of a bikeway system (2) any urgent steps, such as land designations, acquisitions or easements, which may be necessary to facilitate or safeguard a bikeway program.

5. That Council make this report available for information to the Parks and Recreation Commission, the Advisory Planning Commission, the Burnaby School Board and such other bodies and request that they consider it and communicate their view on its proposals to Council.
THE TASK: Examine justification and devise plan and program

OBJECTIVES: What do we think we want to achieve? Why? for whom?

MODEL: Specifically what is the activity we want to accommodate?

ACTION RECOMMENDATIONS: what actions should be taken now?

CONCOMITANT POLICIES: What else must we think about? (law, admin. etc.)

PILOT PROJECTS: What can we start on?

EVALUATION: How well does the proposal meet the objectives?

PRINCIPLES & STRATEGIES: Generally how do we propose to go about it?

CONCEPTS: Specifically what system/plan do we propose?

THE PLANNING PROCESS IN REVIEW
REFERENCES

GENERAL:
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WE GLADLY ACKNOWLEDGE OUR DEBT
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