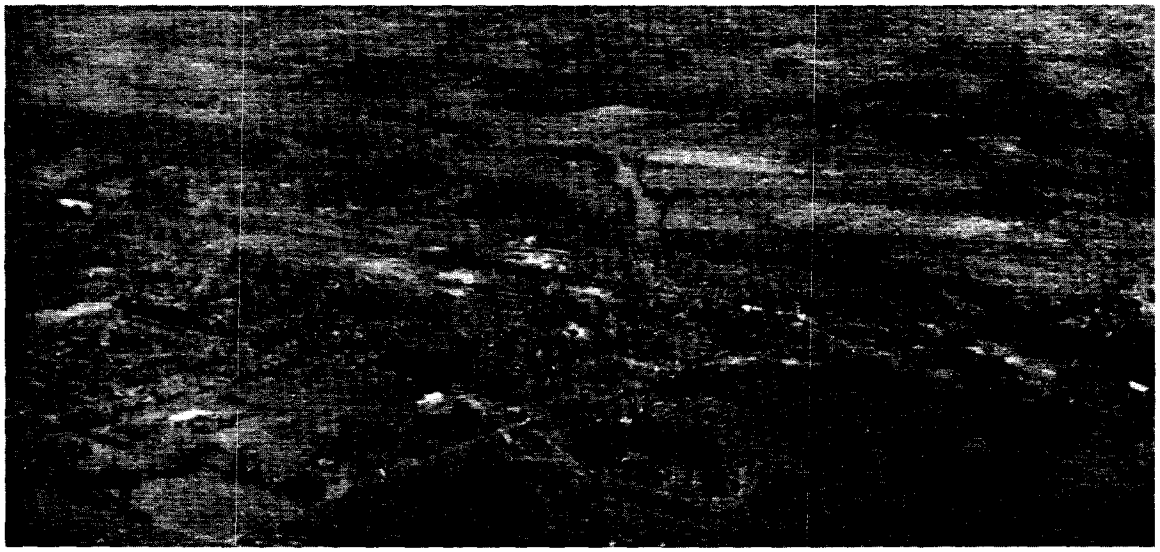
Comprehensive Planning Study for the Cherry Point-Ferndale Sub Area of Whatcom County, Washington



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Prepared for the
Whatcom County Planning Department
by
Jones Associates, Inc.
Planners, Economists, Engineers, Surveyors

November, 1979

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COMPREHENSIVE PLANNING STUDY FOR THE CHERRY POINT-FERNDALE SUB AREA OF WHATCOM COUNTY, WASHINGTON

U.S. DEPARTMENT OF COMMERCE
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

Prepared for
Whatcom County Planning Department

November, 1979

JONES ASSOCIATES, INC.
Planners, Economists, Engineers, Surveyors

This report has been prepared under the auspices of the Whatcom County Planning Process and has been made possible with grant monies received from the State of Washington, Department of Ecology, and authorized by Section 308(C) of the Coastal Zone Management Act of 1972.

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PROFESSIONAL CERTIFICATION

This report has been prepared by the staff of Jones Associates, Inc., acting under the direct professional supervision of the Principal whose seal and signature appear hereon.

The conclusions and recommendations contained herein are the results of independent professional investigation, analysis and design and, except where noted, represent the opinions of Jones Associates, Inc., an inter-disciplinary consulting firm which does not have any past, present or contemplated future financial interest in the project which is the subject of this report.

Jones Associates, Inc., makes no warranty, either expressed or implied, as to its findings, recommendations, conclusions, or professional advice except that they were promulgated after being prepared in accordance with generally accepted practices under the direction of duly licensed professionals.

Project Number 79141, Whatcom County Planning Department

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CONSULTING
ENGINEERS

November 30, 1979

Mr. Michael Nicholson
Planning Director
Whatcom County Planning Department
Whatcom County Courthouse
Bellingham, Washington 98225

Dear Mr. Nicholson:

We are pleased to transmit to you the Comprehensive Planning Study for the Cherry Point-Ferndale Sub Area of Whatcom County, Washington. The study contains the preliminary information necessary for you to develop the final plan for this portion of Whatcom County. The report contains descriptions of existing conditions within the Sub Area for land use, the physical environmental setting, transportation/circulation, utilities and community facilities.

We have also identified existing and potential issues and concerns associated with each of these topics. The concluding portion of this report is made up of planning recommendations and implementation strategies that should be considered to promote orderly growth and to lessen the adverse impacts of such growth in the Sub Area.

It has been a genuine pleasure for me and other Jones Associates staff members to work with you and your Department in this effort. We look forward to being of assistance to you in the future.

Very truly yours,

JONES ASSOCIATES, INC.

Donald L. Corson

Donald L. Corson
Project Manager

DLC/so

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BACKGROUND

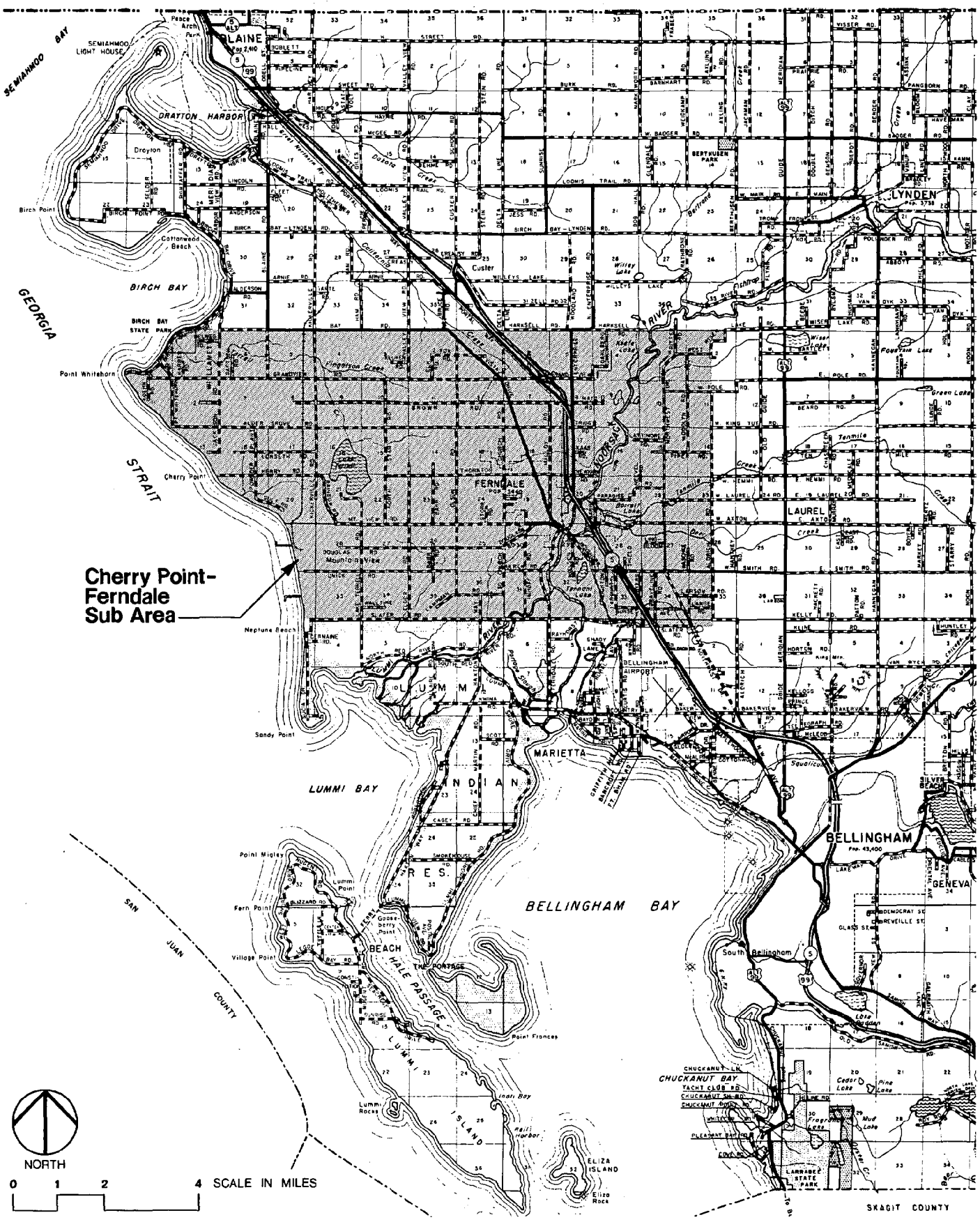
Purpose of Study

The purpose of the Cherry Point-Ferndale Sub Area Study is to provide an incremental step in revising the 1970 Comprehensive Plan for the County. As a way to define and resolve land use-related issues unique to different parts of the County, the County Planning Commission divided the County into ten Sub Areas to be analyzed as separate planning units. The Cherry Point-Ferndale Sub Area is one of the ten and is shown in Figure 1, Vicinity Map.

The purpose of this document is to provide the residents of the Cherry Point-Ferndale Sub Area and the staff of the Whatcom County Planning Department with a sound basis for planning for future changes and growth. The material in this report does not constitute a final plan for the Sub Area. Included in this report is a thorough discussion of existing conditions, and an analysis of present and potential problems regarding land use, physical environmental conditions, transportation and utility networks and community facilities. Recommendations made represent the consultants' best judgment regarding workable solutions to the existing or potential problems identified for the Sub Area. These recommendations are provided as a basis for finalizing the Sub Area Plan through the public review process. The recommendations are presented as policies and implementation strategies that, when adopted, will be consolidated with similar policies and strategies for other Sub Areas. Together, all these policies will make up the revised Whatcom County Comprehensive Plan.

Methodology

This document is the product of original research, compilation of existing data and information and independent analysis. Land use



Vicinitiy Map

figure 1

information was gathered through an in-field survey of current land use for every ownership parcel in the Sub Area outside the Ferndale city limits. Each parcel was coded as to location and land use. From tax assessor and county records, staff determined parcel size, zoning classification and whether or not the parcel was platted or not.

This Sub Area Study is divided into three sections. The first describes baseline conditions of land use, physical environmental conditions, transportation and utility systems and community facilities. The second identifies both general and specific issues that the consultant team identified as either currently or potentially present. The final section contains planning recommendations and implementation stragegies that will promote orderly growth and reduce the potential for adverse growth impacts. Also included are several appendicies that offer detailed information regarding Sub Area physical environmental conditions and economic and population trends. Land platted or not, was compiled from tax assessor and county records. Land use data was tabulated with computer assistance. Land use was mapped within the Sub Area according to uses found in the field survey. This detail of land use information has never been available before and is an important addition to the data base for the County.

Documents from the County, City of Ferndale, school districts, other local organizations and state and federal agencies were gathered and personnel at major industries in the Cherry Point area were interviewed. From these sources, relevant information was compiled regarding the physical environment, transportation and utility systems, and community facilities in the Sub Area. Existing and potential uses concerning these topics were identified by the consultant team.

In turn, solutions to these issues were formulated and are presented here as planning recommendations and implementation strategies about such things as rezoning portions of the Sub Area, improving streets or utilities or including new community facilities.

EXISTING CONDITIONS

BASELINE CONDITIONS

LAND USE

This section describes the existing conditions and the land use characteristics in the Cherry Point-Ferndale Sub Area. The description is both a quantitative and a qualitative analysis of the Sub Area land uses that identifies this Sub Area's unique set of land use facts.

The discussion will cover five topics:

- An Overview: Cherry Point-Ferndale Land Use
- A Brief Landscape Appraisal
- A Description of Land Use Patterns, 1979: Quantitative Summary and Map Analysis
- A Description of Land Use Trends
- A Summary of Existing Land Use Policy

CHERRY POINT-FERNDALE LAND USE: AN OVERVIEW

Cherry Point and Ferndale, only five miles apart, offer considerable land use contrasts. Photographs in Figures 2 and 3 portray some of these differences.

Ferndale, a town of 3,440 population, is the residential and commercial hub of the Sub Area. Immediately adjacent to Ferndale, land use is mixed between single-family-residential, commercial and agricultural uses. Farther away from the City in all directions, land use is predominantly agricultural.

In contrast, land use around Cherry Point is dominated by large-scale industrial users that take advantage of the fact that water deep enough to accommodate large ships is only some 1,000 - 2,000 feet off shore. The largest industrial occupants are the Mobil and Atlantic Richfield oil refineries and Intalco Aluminum. Immediately to the east of this industrial area, land use is composed of woodlots, pasture, row crops and the Lake Terrell State Game Range.

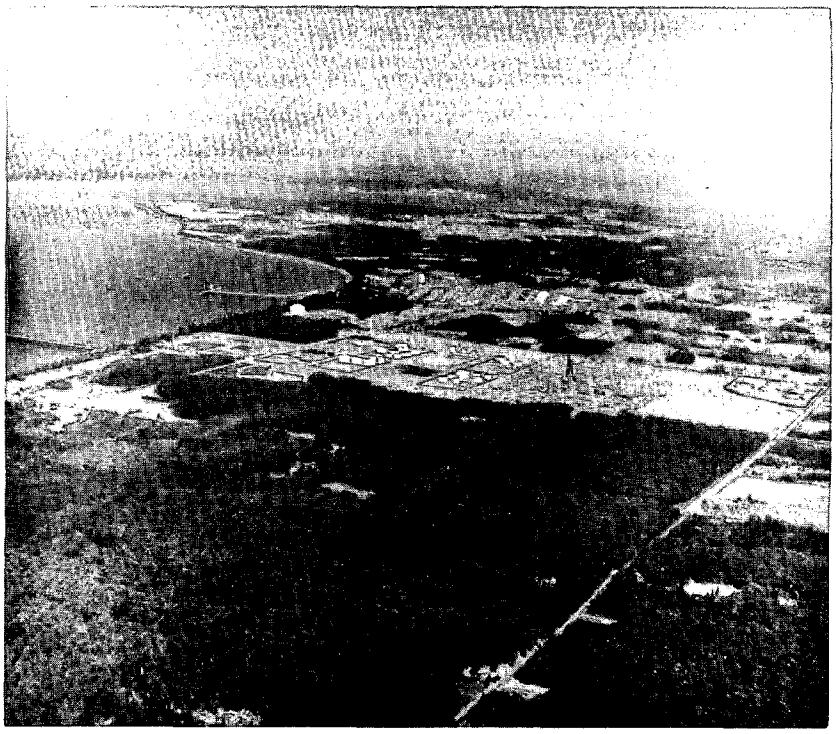
Between the Ferndale residential-commercial area and the industrialized sections of Cherry Point, agriculture, interrupted by large blocks of forest land, is the primary active land use (see Figure 2). These two uses predominate in the five miles between Ferndale and coastal industries, and this distance, with the visual relief from both residential-commercial uses and industrial uses, provides an effective buffer between the two.

CHERRY POINT-FERNDALE LAND USE: A BRIEF LANDSCAPE APPRAISAL

Photographs A-F in Figure 3 offer ground views of representative scenes of the Cherry Point-Ferndale Sub Area. Scenes like these make up the visual character, the landscape, of the area. Past and present types of land use are expressed in this landscape, as are the outward appearances of underlying physical environmental characteristics. These cultural and physical elements combine to make this Sub Area look different from others in Whatcom County. The existing landscape contains elements that should be considered in future land use planning, because land uses that look markedly different from current uses are not usually well accepted by residents; the changes don't "fit" in well. This aspect of land use will be discussed in more detail in the Issues and Concerns Section.

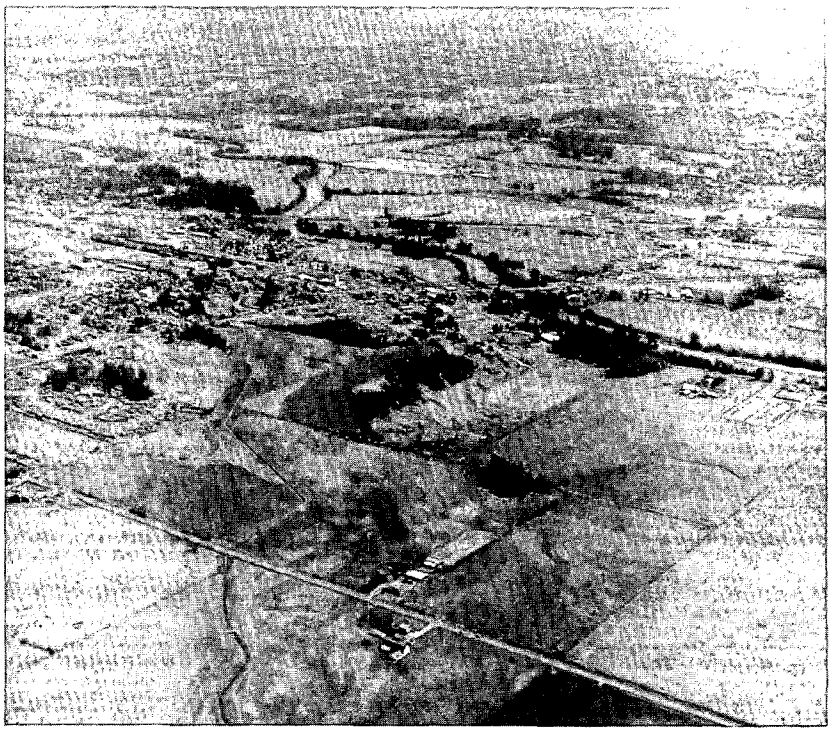
Views from different vantage points within the Sub Area reveal contrasting land uses. Agricultural uses contrast with the Ferndale urbanizing rim and the Cherry Point industrial area. Wooded areas contrast with nearly cleared fields, and the even topography of the Nooksack flood plain contrasts with the hummocky uplands of north Ferndale.

These contrasts create various senses of enclosure and space within the Sub Area. Views are expansive in the flood plain and along the south and east facing the slopes of north Ferndale's hills. These hills are a major visual aspect of views to the north from the Nooksack River flood plain and from the Interstate 5 corridor.



Cherry Point and Point Whitehorn looking north. Mobil Oil, Intalco Aluminum and Atlantic Richfield facilities are shown in the foreground, middle and background.

A

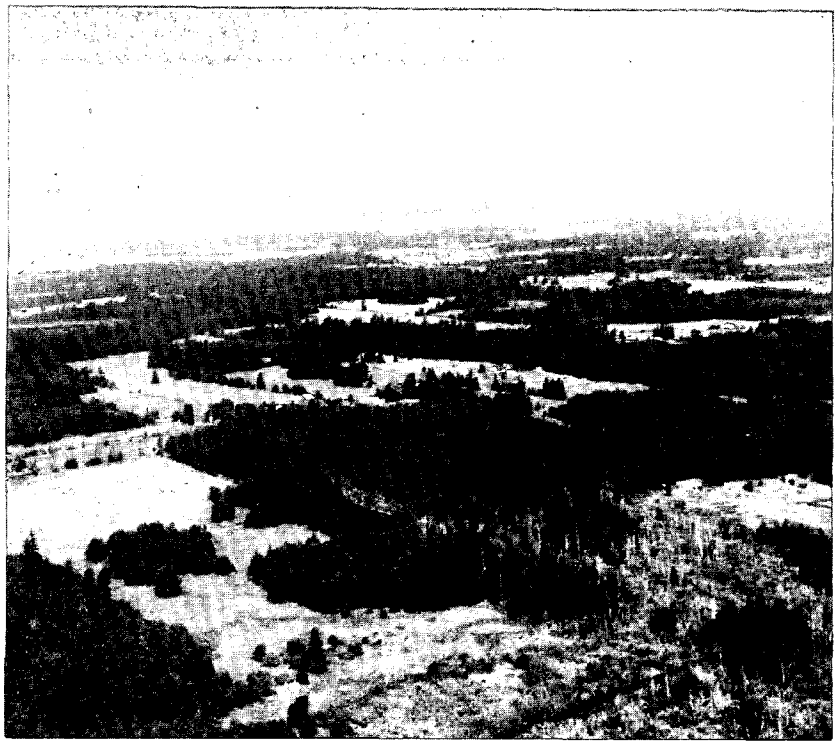


City of Ferndale looking east. The Nooksack River and Interstate 5 divide the Sub Area. Agricultural uses predominate around the City.

B

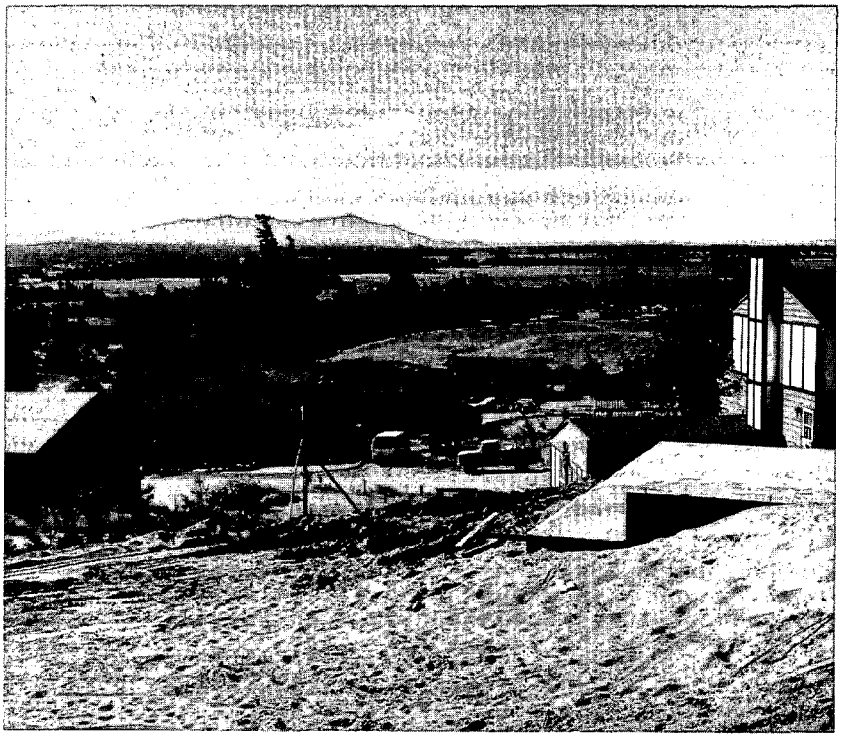
Aerial Photographs of the Sub Area

figure 2



Central portions of the Sub Area contain a mixture of forest cover and pasture. The Atlantic Richfield facility is shown in upper left.

C



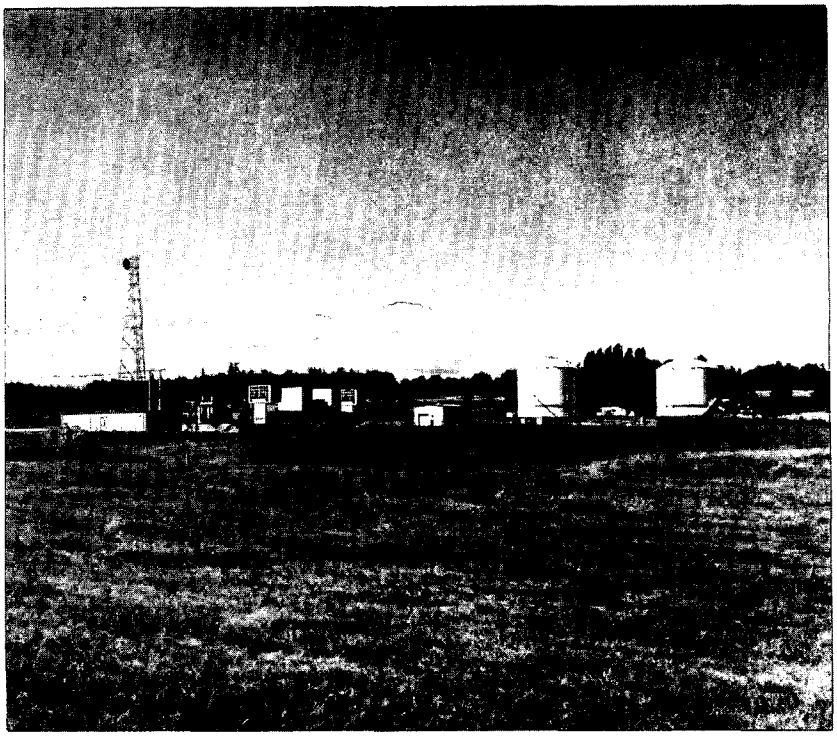
View to the south from North Ferndale hills. **A**

View north from Grandview Road into North Ferndale hills. **B**

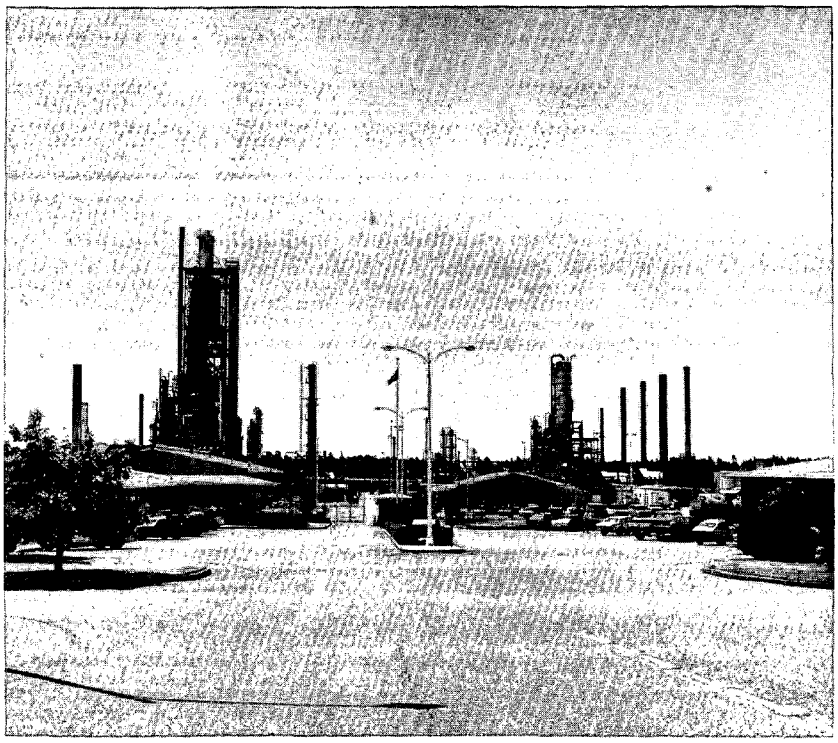
Representative Scenes in the Cherry Point-Ferndale Sub Area

figure 3

Row crops and pasture land farm buildings are major parts of the landscape in the central portion of the Sub Area. **C**



Industrial facilities are mixed in with agricultural uses in the western part of the Sub Area. **D**



Heavy industries, like the Mobil Oil refinery above, dominate the areas where they are located. **E**

Shoreline views are mixtures of industrial and natural features. **F**

LAND USE PATTERNS 1979:
QUANTITATIVE SUMMARY AND MAP ANALYSIS

General land uses and their locations, described earlier in the Overview Section, are discussed in this section in more detail. Table I, Land Use Distribution, and Figure 4, Land Use, are the products of original research and represent levels of informational detail that have not been available in the County until this study.

A critical element of the study and planning process was the assessment of the kinds, quantities and locations of land uses currently within the Sub Area. To accomplish this assessment, the entire Sub Area, making up nearly 60 square miles, was reviewed in the field on an ownership parcel by parcel basis. Parcels within the City of Ferndale were excluded. Nearly 3,500 parcels were given a land use code number that represented a specific land use type. This information was assembled with Whatcom County Assessor's Office data regarding acreage per parcel and tax status so that it was possible to determine the number of acres in the entire Sub Area and the area breakdown per land use type. Information regarding each parcel, such as its size, whether it was platted or not platted, what land use zone and census tract it was located in and whether it was occupied or not, was entered into a computer. Acreage tabulation was performed on the basis of industrial land use codes with computer assistance. Land use was then mapped on a parcel by parcel basis and is shown in Figure 4.

Table I, which describes in detail some of the land use facts regarding this Sub Area, highlights information already generally known about the area, but also uncovers other aspects of land use not so generally acknowledged. Of the 37,228 acres in the Sub Area, 24,594 acres, or 66.1 percent is in agricultural use. Of this, half is livestock, pasture, or has no predominant agricultural use. Lesser agricultural uses for this Sub Area are cropland, dairy and poultry. This use distribution contrasts with other parts of the county where dairy, cropland or no agricultural uses predominate at all.

TABLE 1

LAND USE DISTRIBUTION CHERRY POINT - FERNDALE SUB AREA

	Acreage	Residential: Total Number of Lots	Residential: Residential Occupied	Residential: Other Occupied	Residential: Vacant	Residential: Dwelling Units	Residential: Establishments	Residential: Mobile Homes	Residential: % in Open Space	Zone(s)	Census Tract(s)
Overall											
Short Plats	509.10	84	38	24	22	44		11	16	S3,SF1,SF5,GB,LI, GP,AG,RF,LIID,HIID, CZ,S4,RMD7,ROS	2,103,104, 105,106,
Long Plats	427.47*	739	544	15	180	518		51	0	SF1,GP,S4	2,103,104,105 106
Metes & Bounds	36291.79	2600	755	1555	290	1720		447	40	S3,SF1,SF5,GB,LI,GP, AG,RF,HIID,CZ,S4, ROS,RMD7,LIID	2,103,104, 105,106
TOTAL ACREAGE (CHERRY PT SUB AREA)	37228.36	3423	1337	1594	492	2282		509	39		
Commercial											
Retail	43.91					19		3	0	S3,GB,GP	2,103,105, 106
Services	138.73					13		0	0	SF5,GB,GP	104,105,106
Subtotal	182.64					32		3	0		
Industrial											
Non-Manufacturing	205.09					3		0	0	SF1,SF5,GB,LI,GP, AG,HIID,ROS	2,104,105,106
Manufacturing	1950.39					3		0	0	GB,GP,RF,HIID	2,105,106
Subtotal	2155.48					6		0	0		
Public & Quasi Public											
Education	10.86					0		0	0	GP	2
Parks & Recreation	637.61					5		0	0	S3,GP,LIID,HIID, S4,RMD7,ROS	2,104,105, 106
Governmental Services	8.21					0		0	0	GP	104,106
Other	28.46					2		0	0	S3,SF1,SF5,GP,RF	2,104,105, 106
Subtotal	685.14					7		0	0		
Communication/Utilities/Transportation	201.85					1		0	0	U,SF1,SF5,GP,RF, HIID,S4	2,104,105,106
Agriculture											
Cropland	8327.90					139		36	64	S3,SF1,SF5,GP,AG, HIID,CZ	2,103,104,105 106
Dairy, Poultry	3266.44					89		12	80	SF1,SF5,GB,LI,S3, GP,AG,RF,HIID	2,103,104,105 106
Other Agricultural Land	12999.48					444		62	47	S3,SF1,SF5,GB,LI,GP, AG,RF,LIID,HIID,CZ	2,103,104,105 106
Subtotal	24593.82					672		110	57		
Forest	5786.43					63		9	8	S3,SF1,SF5,LI,GP,RF, LIID,HIID,S4,RMD7	2,103,104,105 106
Vacant											
Vacant (Undeveloped)	1341.17					1		0	0	S3,SF1,SF5,GB,LI,GP, RF,HIID,LIID,CZ,S4	2,103,104,105 106
Open Space	60.99					0		1	100	GP,HIID	103,105
Subtotal	1402.16					1		1	4		
SUBTOTAL: NON-RESIDENTIAL ACREAGE	35007.52										
Residential											
Long Plat Residential Acreage	427.47*										
Metes & Bounds Residential Acreage	1645.19										
Short Plat Residential Acreage	148.18										
SUBTOTAL: RESIDENTIAL ACREAGE	2220.84										

*includes 26% vacant and non-residential acreage.

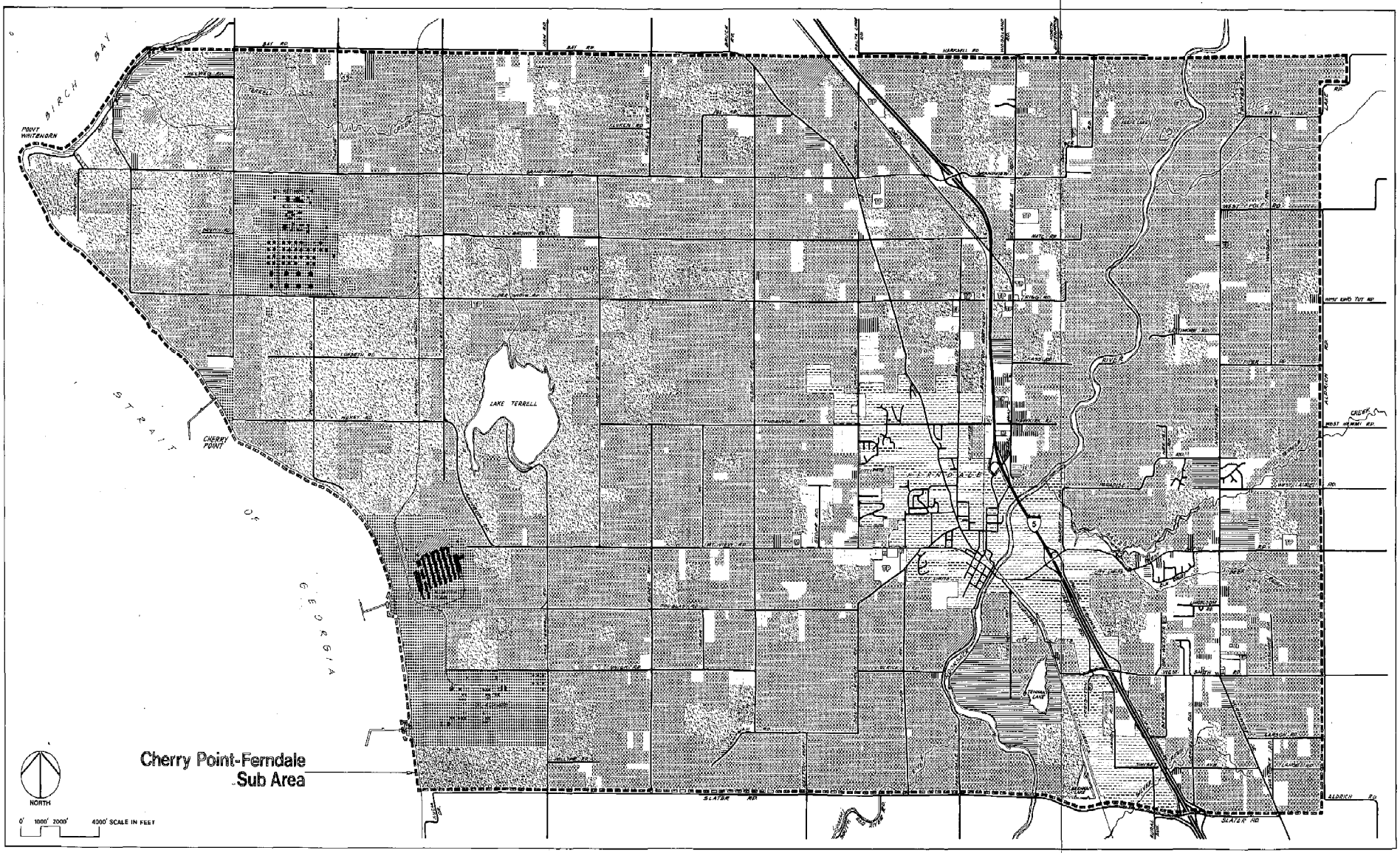
Single family residential and industrial uses are distant but nearly equal as major secondary uses in the Sub Area. Residential use is the predominant use on 2,221 acres while industrial use is found on 2,155 acres. The majority of residential acreage is unsubdivided which fits with the overall agricultural character of the Sub Area. Nearly the entire industrial acreage is devoted to manufacturing with the bulk of the manufacturing acres divided between Mobil and Atlantic-Richfield oil refineries and Intalco Aluminum.

Comparatively minor in terms of acreage within the Sub Area are commercial uses with 183 acres, Public and Quasi-Public uses with 685 acres, and Communications/Utilities/Transportation with 202 acres.

Contrasting with these active uses are the acres that are not currently actively used. Forest cover makes up 5,786 acres of the Sub Area or approximately 15.5 percent. This makes forest use the second largest land use in the Sub Area. Vacant land, too, is significant within the Sub Area making up some 1,402 acres. Of this, 61 acres are currently under the tax advantage of formally designated "open use," which is an agreement with the County by which the owner will not develop his land for five years. Together, Forest land and Vacant land throughout the Sub Area make up 7,188 acres or approximately 19.3 percent of all other land uses excluding agriculture. This figure serves to underscore the fact that passive uses within the Sub Area are important, if for no other reason than that there is a lot of it and that it is a major visual and land use characteristic of the Sub Area.

Figure 4 is a map of land uses within the Cherry Point-Ferndale Sub Area. Land uses mapped represent actual uses found to be present and may or may not correspond to underlying zoning. For example, if the predominant use of a parcel is commercial-retail but is found in a single family residential zone, the commercial-retail use will be shown.

Both active and passive uses of the land are portrayed. Agriculture, as a generalized land use is shown to predominate in a diagonal



- Single Family Residential
- Multi-Family Residential
- Trailer Park
- Commercial
- Communications/Utilities/Transportation
- Industrial
- Public & Quasi-Public
- Agriculture
- Forest
- Vacant
- City of Ferndale

Source: Field Inventory, 1979.

Land Use

figure 4

zone across the map from northeast to southwest parallel to the course of the Nooksack River. Agriculture also predominates in the uplands northwest of Ferndale.

The scale of industrial land use in the Cherry Point area is clear on the map as are the locations and sizes of areas in forest cover. The fact that the Sub Area has comparatively little retail-commercial space or multifamily use is borne out in the map.

More important than quantity, however, are the locations of the various land uses. Although there is little retail-commercial space, it is located in distinct districts around West Smith Road and Northwest Avenue and along Portal Way. Parcels in multifamily use are few in number, as well, and appear to be randomly located in the Sub Area with concentrations on Mountain View Road west of Ferndale and West Smith Road.

Overall, land use is much more mixed within the Interstate 5 corridor than the Sub Area as a whole and the parcels are smaller. Land use also tends to be mixed along arterials leading to the freeway. Land use adjacent to West Axton Road, for example, illustrates a patchwork of residential and commercial uses.

Vacant land is evenly distributed throughout the Sub Area except in the southwest quadrant but usually occurs in small parcels. Issues related to this and other land use distributions will be discussed later in the Section describing Land Use Issues and Concerns.

LAND USE TRENDS

As a basis for assessing the type and degree of land use change over the last several years since the writing of the last Comprehensive Plan, 1969 and 1970 aerial photographs of the Sub Area were compared with aerial photographs taken in 1978.

In 1970 the Atlantic-Richfield oil refinery was in the early development stages. Intalco Aluminum and Mobil Oil were both well established. To the east, agricultural uses were nearly the same as they are now. Strip residential development was present along West Axton Road, Portal Way and Northwest Drive. Only a few of the residential subdivisions around north Bellingham were developed.

The primary changes in land use in the Sub Area over the last ten years have been a gradually increasing density of population through the Interstate 5 Corridor and an increasing sprawl along major arterials. Three areas located within the corridor were analyzed for changes in overall density between 1969 and 1978 to assess the magnitude of land use change. These areas were centered on Portal Way, West Axton Road between the freeway and Northwest Drive, and West Smith Road between the freeway and Northwest Drive. These areas were chosen because, from comparing aerial photographs taken in 1969 and 1978, these areas seemed to have changed the most. In the view of the study team, they also represented potential land use changes in other parts of the Sub Area in the future.

Table II, Population Density Changes In Three Representative Areas of the Sub Area, represents the type of changes that were found to have occurred in the last ten years. In general, the population density has increased in each area and this has been primarily related to the development of residential subdivisions along West Axton Road and West Smith Road. Averaging the three areas together, overall density has increased from .20 residential units per acre to .36 units per acre. Significantly, however, the number of persons per household has declined in the last ten years from 3.2 to 2.8. This implies that population density per acre is not growing at the rate that the density of residential units per acre is. In effect, smaller household sizes are taking up more space.

In making specific comparisons between the three areas, the study team noticed that both overall population and the number of residential units have increased significantly in areas adjacent to Portal Way and West Axton Way. The population rose from approximately 211 to 325 along

TABLE II

POPULATION DENSITY CHANGES IN THREE REPRESENTATIVE AREAS OF THE SUB AREA

		1969				1978			
	ACRES	RES. UNITS	UNITS/AC.	POP/HSHLD	POP/ACRE	RES.UNITS	AMTS/AC	POP/HSHLD	POP/AC
Portal Way	191	68	.36/ac	3.1	1.1/Acre (211 total)	116	.61/ac	2.8	1.7/Acre (325 total)
Axton Way	259	48	.19/ac	3.1	.58/Acre (149 total)	138	.53/ac	2.8	1.5/ac (386)
W. Smith/ Northwest	567	83	.15/ac	3.1	.45/Acre (256 total)	111	.20/ac	2.8	.55/ac (311)

Portal Way and from approximately 149 to 386 along West Axton Way. Likewise, the density of residential units per acre increased from .36 to .61 per acre along Portal Way and from .19 per acre to .53 per acre along West Axton Way.

There has been a smaller increase in population and dwelling unit density in the West Smith Road - Northwest Drive area. The population increased from approximately 256 to 311 and the density of dwelling units per acre rose only from .15 per acre to .20 per acre.

One possible explanation for the differences in growth rates between these areas is that the West Smith Road - Northwest Drive area, which is the center of the community of North Bellingham, was already built-up in 1970 while the other two areas were not. Also related to the growth differences between the areas is that Bellingham has historically exerted pressure to develop in a south to north direction, toward North Bellingham.

Following this scenario of south to north development, the West Smith Road - Northwest Drive area can be expected to continue to infill and density can be expected to increase substantially especially if more mobile home parks and subdivisions are developed.

Similarly, density along Portal Way and West Axton Way could increase significantly if more mobile home parks and subdivisions are developed there.

Another way of assessing the type and rate of land use change in the Sub Area is to review and evaluate platting and building permit activity. Figures 5, 6, 7 and 8 illustrate trends in residential, commercial and industrial activity since 1970 within the Sub Area, the county and in the City of Ferndale.

Probably the most common characteristic among all three areas is that development tends to be cyclic. Local development rates vary with

interest rate changes and with any regional and national economic factors that are reflected in local demand.

Residential development in the Sub Area, as shown in Figure 5, Subdivision Trends, illustrates the relationship between long plats (5 or more lots) and short plats (4 or less lots).

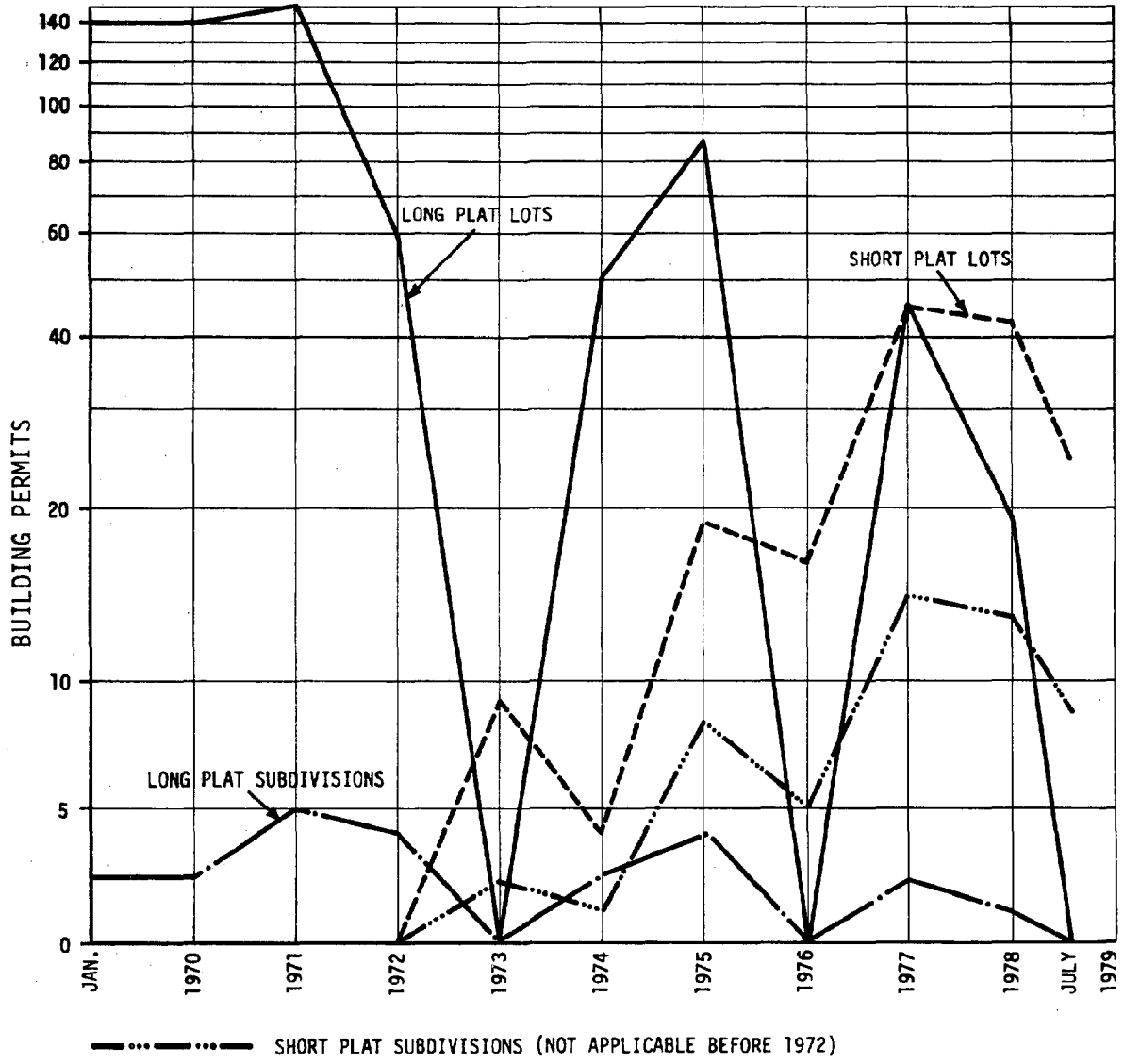
The number of long plats per year has varied between none and five since 1970 but the number of lots platted has ranged between 130 in 1971 and 0 in both 1973 and 1976. These years (1971, 1973 and 1976) roughly correspond to regional economic boom and slump years.

Short plats have increased in number over these same years, and, since the enabling legislation was passed in 1972, the number of short plats has been larger than the number of long plats in five of the seven years. This is not surprising since the short plat process is simpler than the long plat process. However, the number of lots in short plats has been larger than the number of lots in long plats since 1976. This fact is significant in light of the urban services and utilities implications accompanying potentially scattered large lot development.

In contrast, in the City of Ferndale the number of long plat lots has always been larger than the number of lots in short plats except for 1975. The comparative success of long plat subdivisions in Ferndale is probably indicative of the availability of utilities.

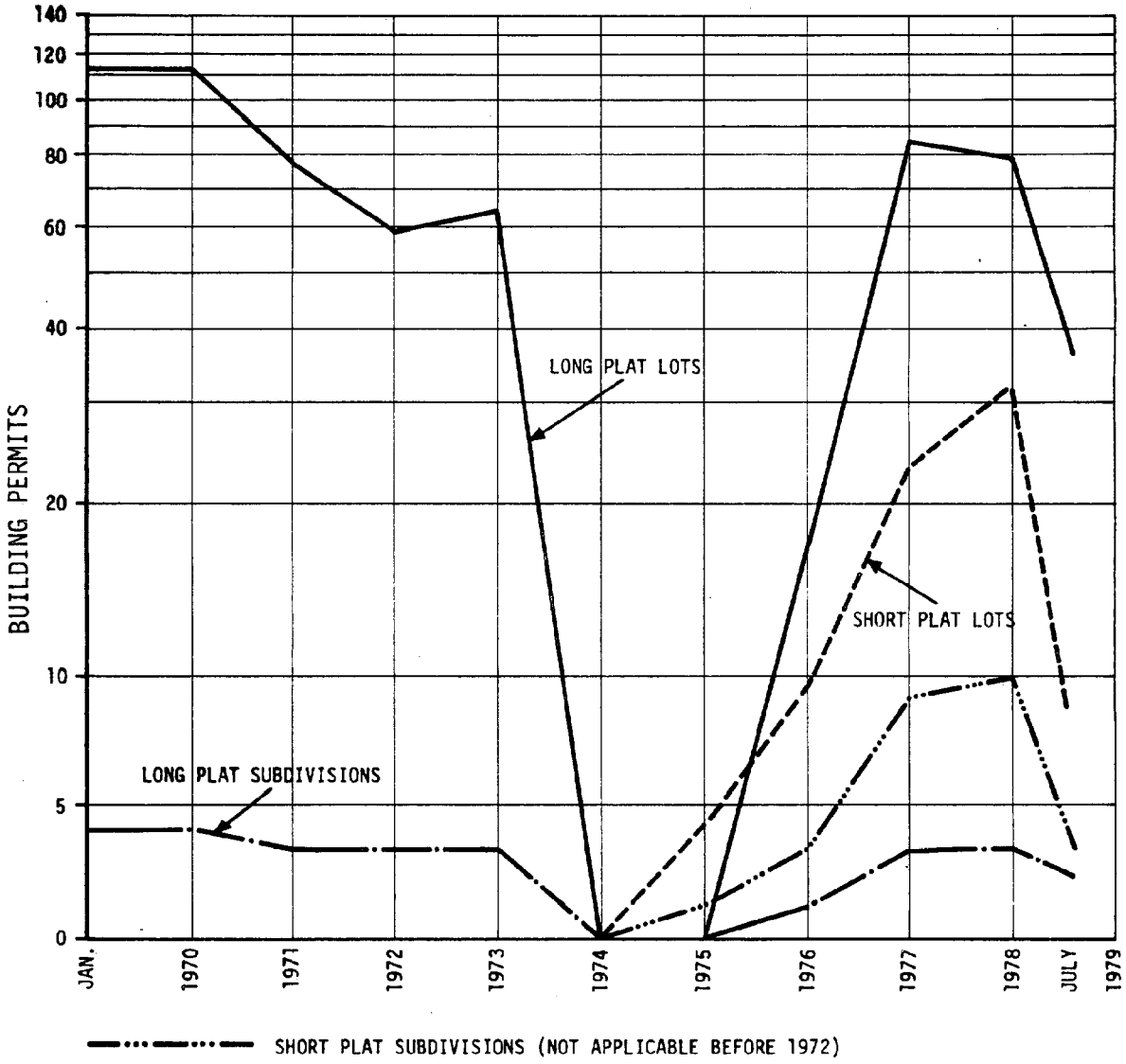
On a county-wide basis, a rough parallel exists between the development rates of residential, commercial and manufacturing activity with the exception that in 1974 and 1976 housing development improved while commercial and manufacturing activity declined. In 1973 and 1975, however, the opposite condition existed. Together, these cycles might be a local illustration of a "catch up" situation in which increased industrial employment is reflected in the housing market the following year as industry and commerce come into full production. The fact that Sub Area residential development trends mirror County-wide residential trends

FIGURE 5



SUBDIVISION TRENDS IN THE CHERRY POINT-FERNDALE SUB AREA: 1970 TO 1979
(EXCLUDES FERNDALE)

FIGURE 6



SUBDIVISION TRENDS IN FERNDALE: 1970 TO 1979

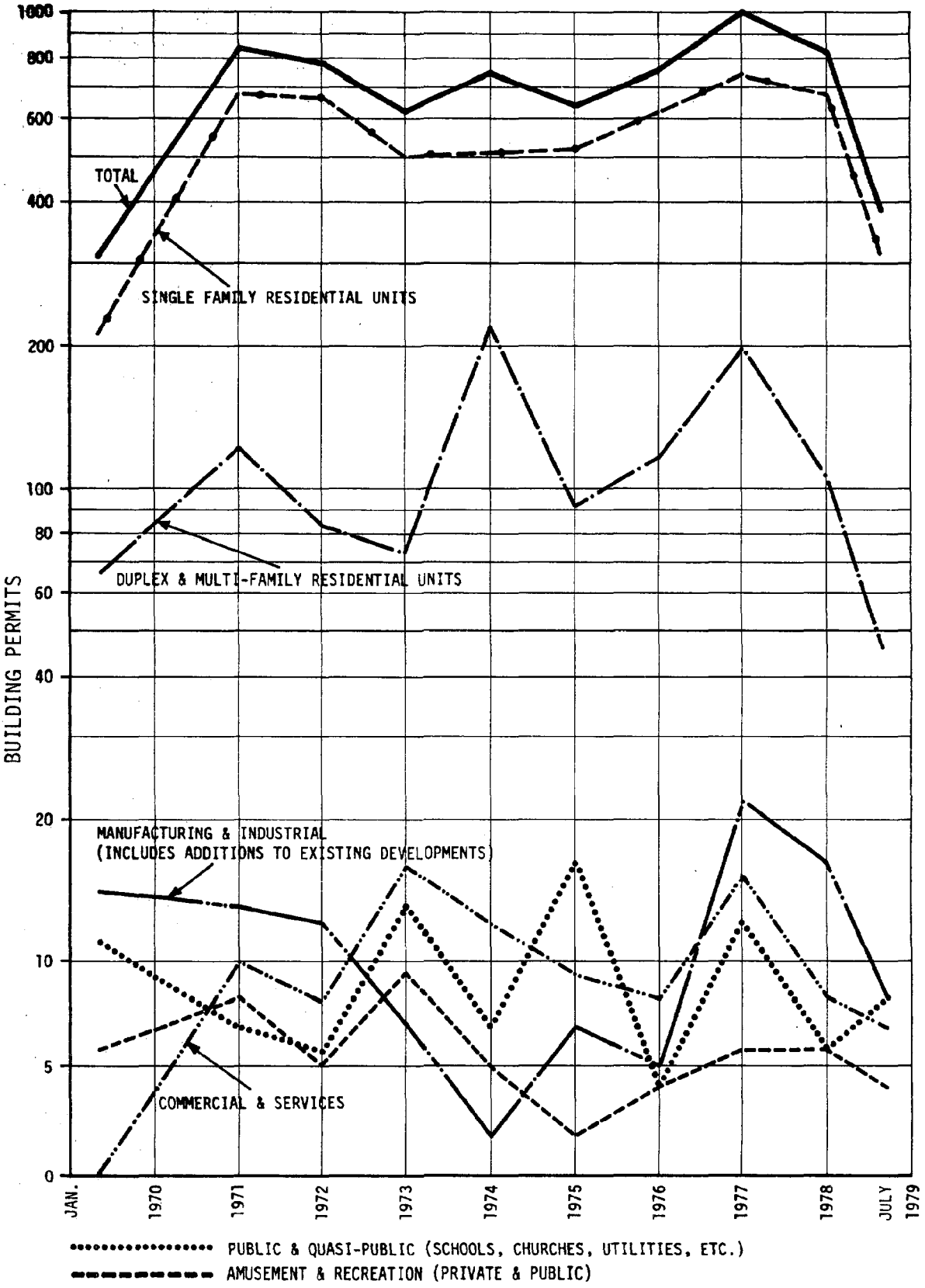
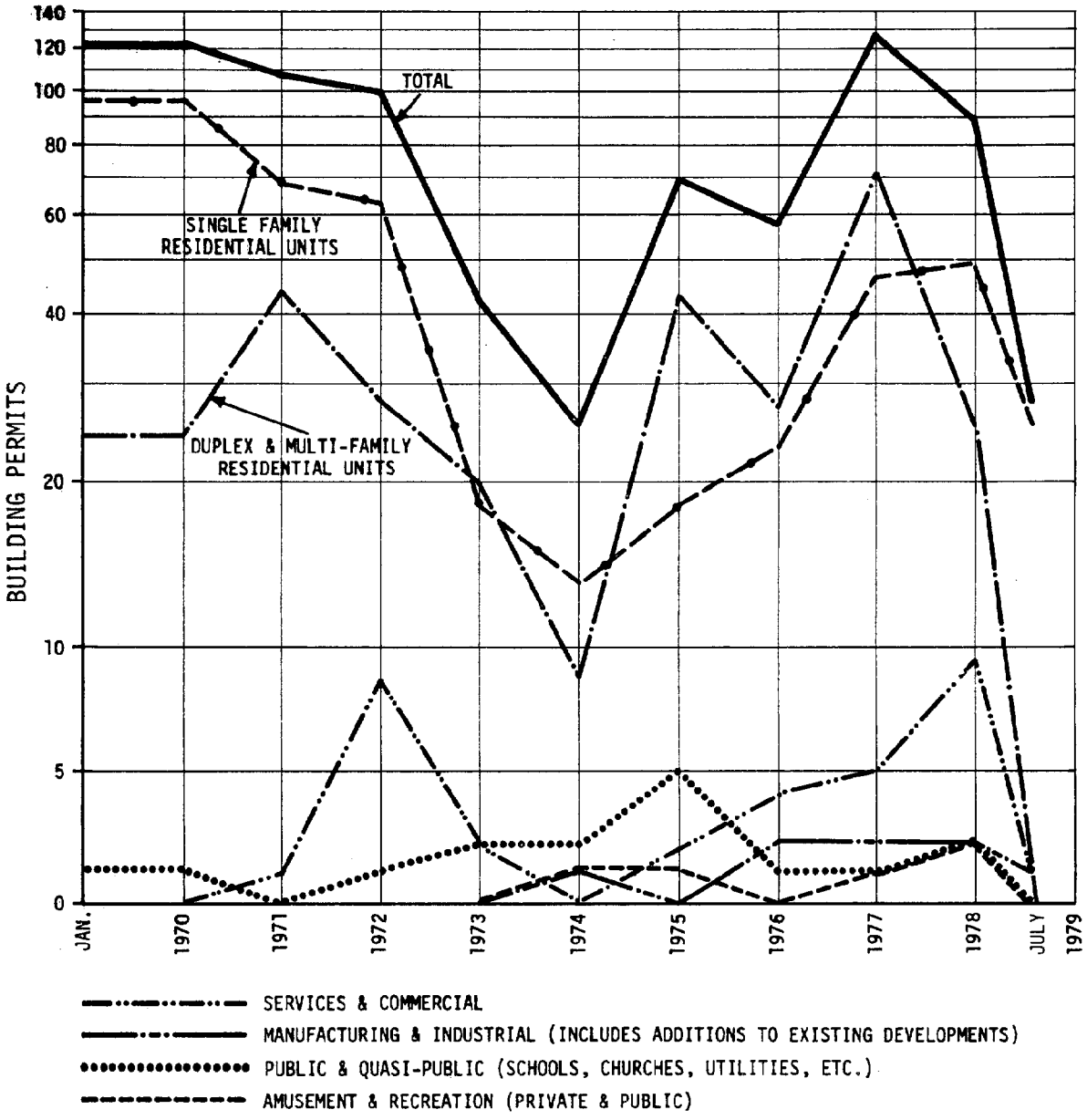


FIGURE 7 DEVELOPMENT TRENDS IN WHATCOM COUNTY: 1970 TO 1979

FIGURE 8



DEVELOPMENT TRENDS IN FERNDALE: 1970 TO 1979

would suggest that land use change related to the conversion of land to residential use has historically been most affected by County-wide growth rather than by the growth of just the City of Ferndale.

Several land use trends can be expected to continue in the Sub Area. The most accessible areas can be expected to develop most rapidly. Areas on either side of Interstate 5 and adjacent to surface roads with direct access to the freeway will have the most development pressure. Specifically, Slater Road, West Smith Road, West Axton Road, Portal Way and Grandview Road can be expected to be the corridors and subcorridors of growth. This growth will probably take the form of in-filling on a parcel-by-parcel basis of both already developed areas, such as North Bellingham and commercial/residential strips.

Some evidence indicates the possibility for continued randomly-located areas of higher density residential use with multifamily and mobile home parks. Trends indicate an overall increase in population density, but, because of falling household size, the number of residential units can be expected to continue to rise at a higher rate than the population. Residential expansion will probably occur in an increasing number of short plats outside the City of Ferndale, but near the city limits more long subdivisions can be expected.

Overall growth trends for all types of activity will probably continue to be cyclic with the potential over the long term of evening out as new industries add to the stability of the county economic base. Over the next ten to fifteen years, however, industrial development of vacant land on Cherry Point will be sporadic but intense and will contribute to the cyclic building trends within the Sub Area, County and City of Ferndale.

EXISTING LAND USE POLICY AND LAND USE REGULATIONS

Land use is presently guided and regulated by the Whatcom County Comprehensive Plan and the Whatcom County Interim Zoning Ordinance. The

Comprehensive Plan was originally adopted in 1970 and has been amended several times to reflect the more detailed studies of land use issues since that time. The Interim Zoning Ordinance was adopted in 1972 and, likewise, has been amended from time to time.

. Whatcom County Comprehensive Plan

The Whatcom County Comprehensive Plan, as adopted in 1970, served to capsulize baseline physical and socio-economic information and to provide a general guideline for the future development of the county. The plan assumed a low population growth rate of 7100 new households for the county over the next 20 years and also assumed that growth would continue to be low density. Its primary goals were to keep future development from "scattering" and to promote development around existing activity centers. To this end, and to provide for an enhanced physical and living environment, a set of major objectives were adopted. These are given below:

1. Enhancement of Environment
   a. Prevention and abatement of pollution
   b. Protection of natural scenic beauty
   c. Encouragement of attractive development
   d. Elimination of congestion and squalor
   e. Satisfaction of recreational needs

2. Conservation of Resources
   a. Orderly timing in the conversion of land from rural to urban development to protect the agricultural economy
   b. Management of soil, forest, fish, mineral and water resources for optimum long-range benefits
   c. Consideration of public interests in development of water areas, drainage features and related lands
   d. Recognition of indirect benefits and ecological considerations in resource use

Since the original adoption of the Plan in 1970, several amendments have been accepted. In 1977 an amendment was adopted that established Community Councils that were charged with the responsibility of fostering the public review of impacts of major developments within their communities. Revisions of policy statements regarding Rural, Agricultural, Primary Industrial, Forest Land and Business have also occurred. The Comprehensive Plan has been a general guide and was not intended as a body of implementation procedures. The Zoning Code has been the main tool for policy implementation.

. Whatcom County Interim Zoning Ordinance

The Whatcom County Zoning Ordinance provides for 41 land use designations that range from types of Suburban Residential Districts through Recreation and Open Space Districts to Contract Zone Districts. The zoning ordinance also governs such specific facets of land use as off-street parking and loading requirements, non-conforming uses, variances and the manner for appeal of zoning decisions. The zoning ordinance at present does not contain a Subdivision Ordinance or a portion regulating mobile home parks.

. Zoning in the Cherry Point-Ferndale Sub Area

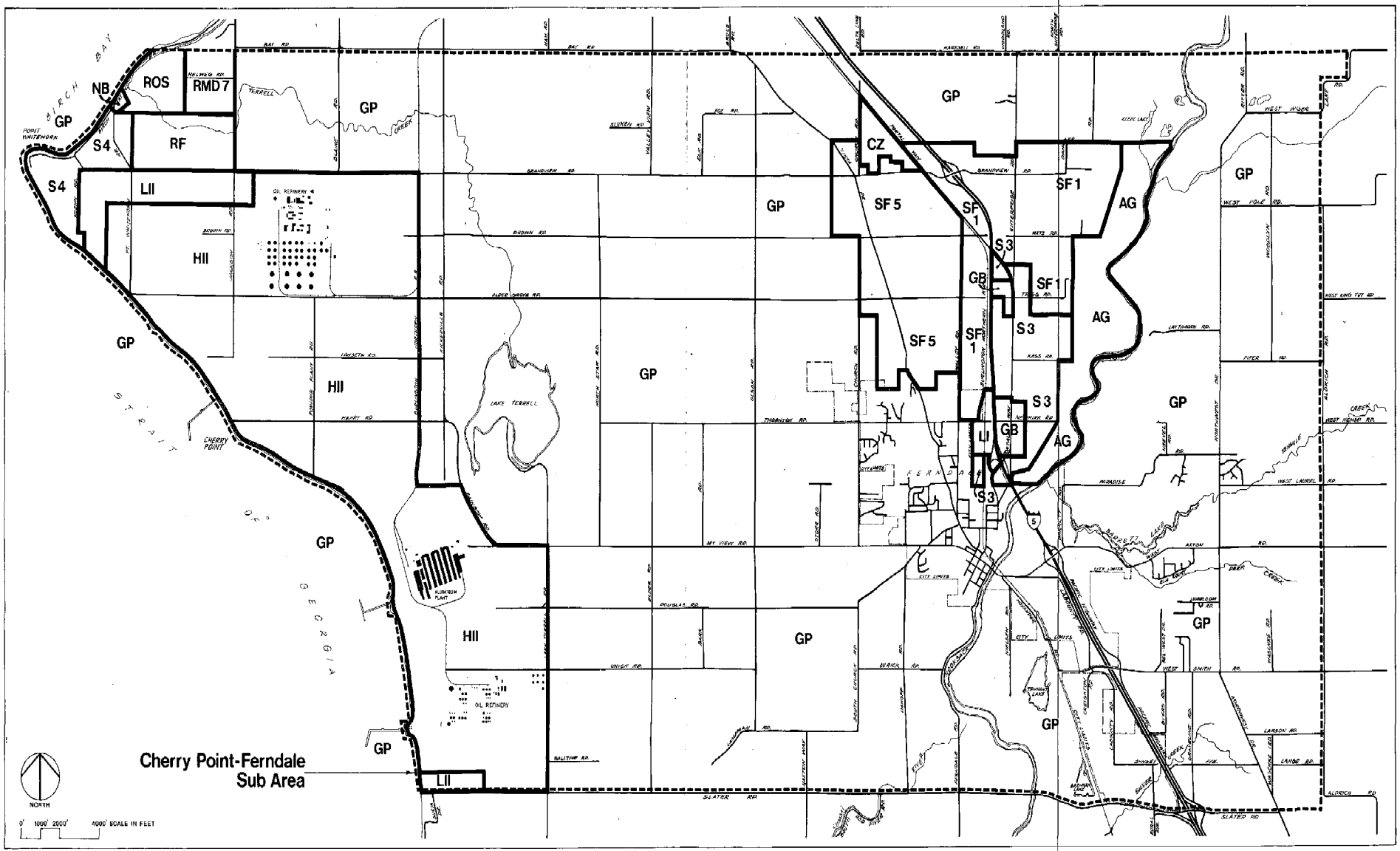
Zoning throughout the Sub Area is shown in Figure 9 and a breakdown by acreage is shown in Table III. Of the 41 zoning classifications in the County, twelve are found in the Sub Area. Of the twelve, the ones covering the largest area are General Protection (GP) and Heavy Impact Industry (HII). Zoning classifications are most varied around Point Whitehorn and along the Interstate 5 corridor. Issues and concerns related to zoning are found in the Section where land use issues are discussed.

Table III

Cherry Point - Ferndale Sub Area

Acreage by Zone

	Zoning Classification	Acreage
SF1	Suburban Farm Once Acre	968
SF5	Suburban Farm Five Acre	989
S3	Suburban - 3 Families/Acre	827
S4	Suburban - 4 Families/Acre	280
RMD7	Residential Medium Density/Acre	155
GB	General Business	99
GP	General Protection	27,632
AG	Agriculture	807
LII	Light Impact Industrial	314
HII	Heavy Impact Industrial	4,882
ROS	Recreation and Open Space	164
CZ	Contract Zone	112
		37,229



SF5 Suburban Farm Five Acre District
SF1 Suburban Farm One Acre District
S4 Suburban District 4 Families/Acre
S3 Suburban District 3 Families/Acre
RMD7 Residential Medium Density District 7 Families/Acre
NB Neighborhood Business District
GB General Business District
LII Light Impact Industrial District
HII Heavy Impact Industrial District
GP General Protection District
CZ Contract Zone District
ROS Recreation and Open Space District
RF Rural Farm District
AG Agriculture District

Source: Whatcom County Planning Department, 1979.

Zoning

figure 9

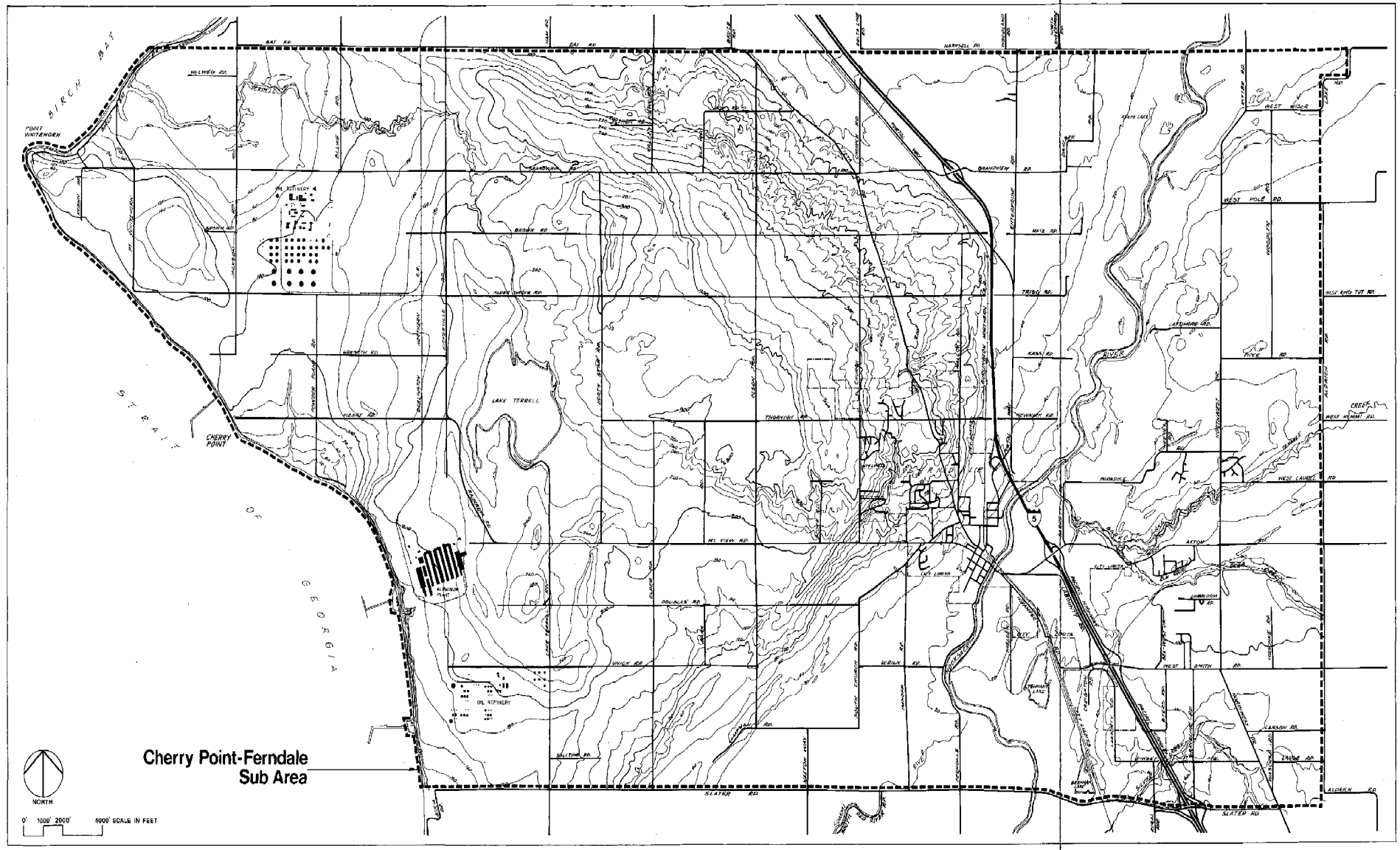
PHYSICAL ENVIRONMENT

GEOLOGY

The Cherry Point-Ferndale Sub Area has three major topographical areas: the sea cliffs on the west which flank the Strait of Georgia; the Mountain View Uplands north of Ferndale which rise to slightly over 300 feet; and the lowlands which occupy the area adjacent to the Nooksack River flood plain. On-going tidal cycles, periodic river flooding, erosion through weathering or stream activity and human alteration has and continues to modify the physical landscape. Sub Area topography is shown in Figure 10.

The geological formations within the Cherry Point-Ferndale Sub Area are the result of processes occurring from the Late Cretaceous and the Early Tertiary periods (50-70 million years ago) to the present time. During this primaeval time, the lowlands of western Whatcom County were part of a vast flood plain. Fast-moving streams deposited materials in the lowlands, which, combined with land mass sinking and with later uplifting and deformation, created the sandstones, conglomerates and shales of the Chuckanut Formation. This rock material is exposed along Chuckanut Drive south of Bellingham but is not exposed within the Cherry Point-Ferndale Sub Area. The Chuckanut Formation does however, form the bedrock beneath the Sub Area and has been reached during well drilling at depths from near sea level to over 500 feet below sea level.

During the Pleistocene period beginning 2 to 3 million years ago, continental glaciation sculpted the terrain and produced the present topography. Ice, some three thousand feet thick, advanced into and retreated from the area at least four times and left behind sand, gravel, silt and till (an unsorted and unstratified material of mixed clay, sand, boulders and gravel). Each glaciation deposited material on top of the previous glacial material thereby obscuring earlier evidence. In the Cherry Point-Ferndale Sub Area only a single deposit is visable as evidence of ice advances that occurred before the most recent glacia-



20' Contours

Source: U.S. Geological Survey.

Topography

figure 10

tion. This older deposit, called Cherry Point silt, is composed of horizontally laminated clay and silt with small sandy layers and is exposed along the sea cliffs of Cherry Point to a maximum of 140 feet. Its base is known to be below sea level, and its irregular upper surface is the result of historic erosional activity.

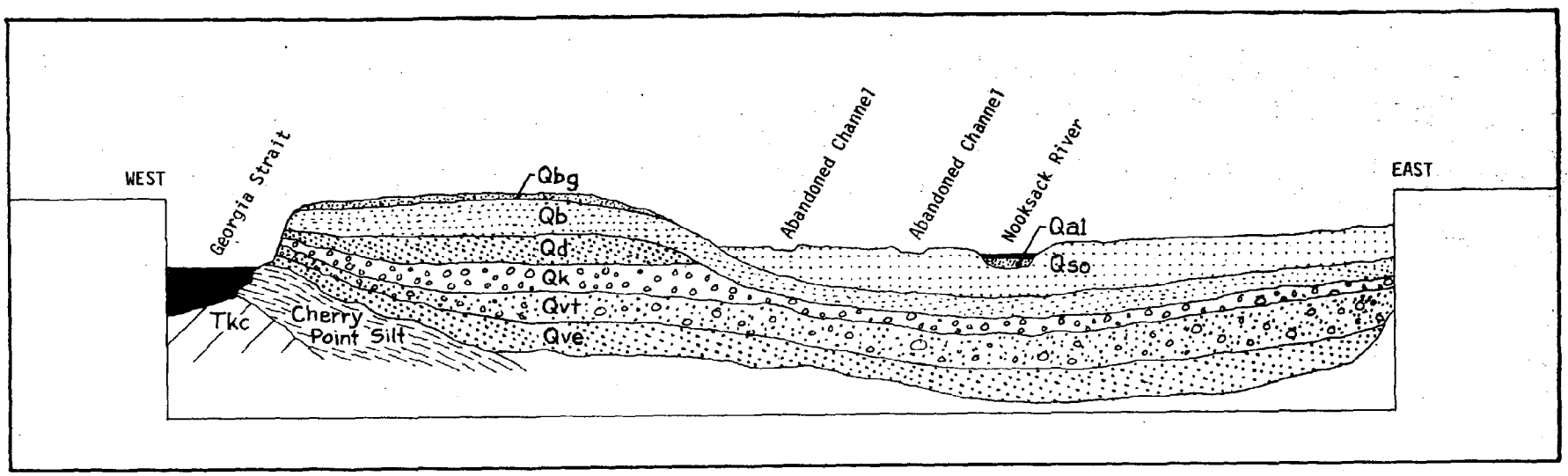
The last glacial period, termed the Fraser Glaciation, began about 20,000 years ago and lasted approximately 10,000 years. It occurred in three phases: the Vashon Stade, the Everson Interstade and the Sumas Stade. (A stade is a glacial advance of ice associated with continental glaciation.) During the Vashon Stade, the ice sheet reached a maximum of one mile in thickness and extended to an area just south of Olympia, deepening the Puget Sound Trough. Figure 11 is a cross sectional description of the Sub Area's geology.

. Vashon Stade

The Vashon Stade is associated with two formations in the Cherry Point-Ferndale Sub Area: The Esperance Sand Member and Vashon Till. They are collectively known as Vashon Drift.

The Esperance Sand Member, typical of glacial outwash stream deposits, is exposed in sea cliffs and overlies Cherry Point Silt. It reaches a maximum thickness of 45 feet in the sea cliff exposure but pinches out between Cherry Point Silt and Vashon Till in other locations. Because of permeability in its sands and gravels, Esperance Sand probably serves as an aquifer (a geological material that holds and transmits water) for moderately deep wells in the Sub Area.

The compact composition of sand, silt, clay, pebbles and a few boulders, which characterizes Vashon Till, is the result of compression by the overriding Vashon ice flow. Vashon Till is exposed in sea cliffs along the Strait of Georgia where it reaches a thickness of 10 to 30 feet.



DIAGRAMMATIC GEOLOGIC CROSS SECTION
OF THE
CHERRY POINT-FERNDALE SUB AREA

Qal - Recent Alluvium, Floodplains, Beach & Spit Deposits
Qbg - Sand & Gravel Overlying Bellingham Glaciomarine Drift (Wave-Washed Mantle Lag)
Qso - Sumas Outwash
Qb - Bellingham Glaciomarine Drift
Qd - Deming Sand
Qk - Kulshan Glaciomarine Drift
Qvt - Vashon Till
Qve - Esperence Sand Member
Tkc - Chuckanut Formation

Note: Vertical and horizontal scales are not accurate.

Source: Modification of Diagrammatic Geologic Cross Section
Folio of Whatcom County, Washington
Map I-854-B
U.S. Geologocal Survey

FIGURE 11

. Everson Interstade

About 13,000 years ago, when sea levels rose in response to melting continental glaciers, the Everson Interstade began. Three deposits in the Cherry Point-Ferndale Sub Area are associated with this period.

The oldest is Kulshan Glaciomarine Drift, a deposit of massive blue-gray, unsorted, unstratified materials. Its character is the result of the floating ice melting and dropping contained debris on the, then lowered, sea floor. It is exposed in the sea cliffs along the Strait of Georgia where younger glacial sediments are superimposed upon it. Since it is not as compact as normal till, it is presumed that a continental ice sheet never overrode the Kulshan Glaciomarine Drift.

Deming Sand was deposited on flood plains and beaches as the land surface rose in response to the weight release of the retreating ice sheet. It is composed of stratified sand, clay and gravel with interbedding of blue clay and sandy gravel. It occurs in the sea cliffs along the Strait of Georgia and in the uplands to the west of Ferndale. In both locations other glacial deposits are superimposed.

As the land surface sank for the second time during the Everson Interstade, Bellingham Glaciomarine Drift was deposited over the Cherry Point-Ferndale Sub Area and the surrounding non-mountainous areas of Whatcom County. It was the result of debris deposition on the lowered sea bottom. It consists of unsorted and unstratified sandy, silty clays with interspersed pebbles, cobbles and boulders. Its deposition occurred 11,500 to 11,000 years ago and is overlain by a wave-washed mantle of pebbles and coarse sand that is one to ten feet thick in the uplands west of Ferndale.

. Sumas Stade

During the Sumas Stade, continental ice again advanced southward to the north of Sumas. The Sumas Outwash deposit, created by melted water

from this glacial advance 10,000 years ago, occurs in the northeastern portion of the study area and to the southwest of Ferndale. Certain contemporary creeks, such as Tenmile Creek, occupy abandoned melt water channels. Sumas Outwash is composed of sand and pebble-size gravel. Lakes which occupied melt water channels or topographic depressions have since, totally or in part, filled with organic matter to form peat.

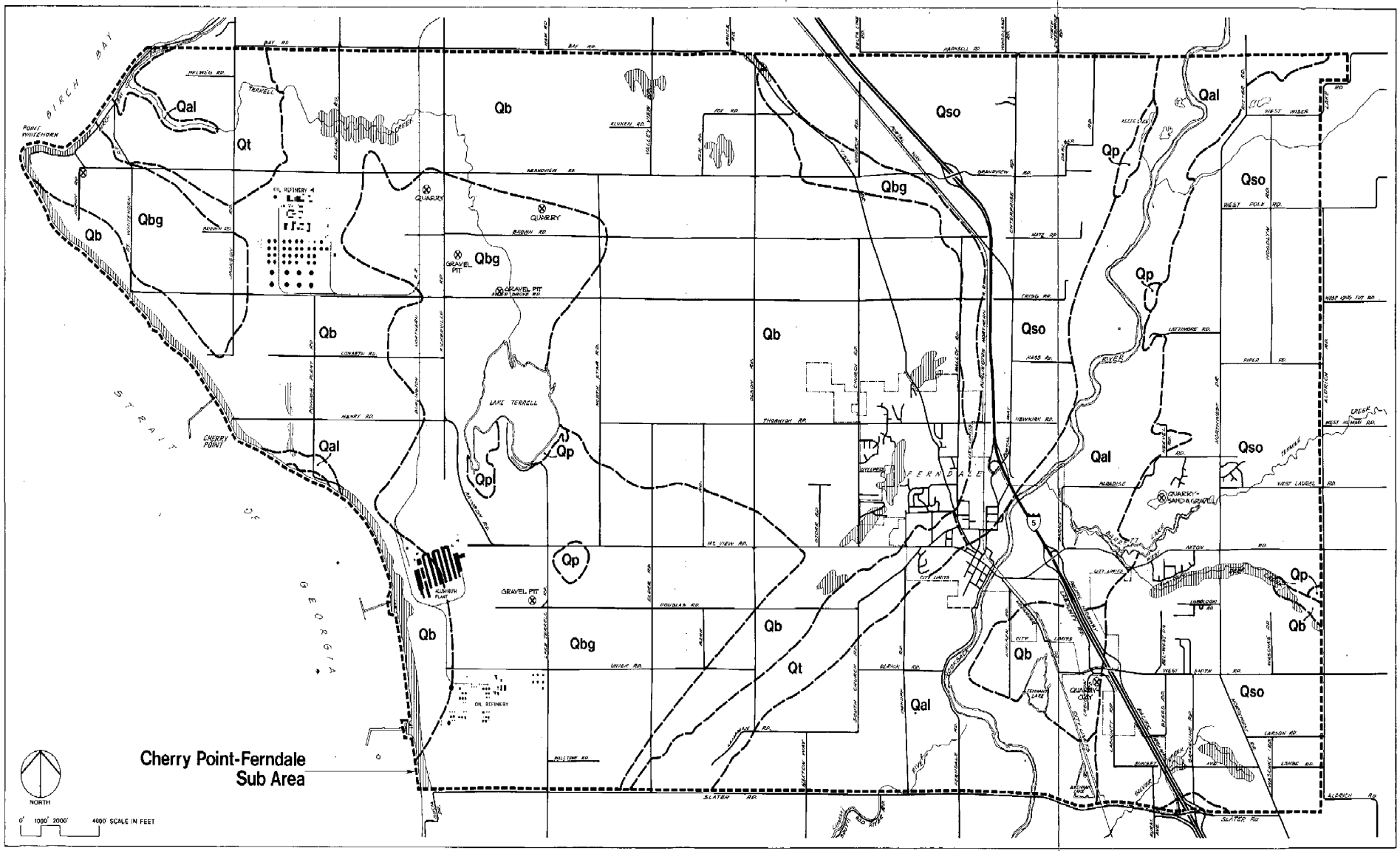
Silt, clay and fine sand deposits from the Nooksack River have also modified the landscape. In the lowlands, these deposits have joined the Lummi Peninsula, formerly an island, to the mainland. The mouth of the Nooksack River alternated between Lummi Bay and Bellingham Bay, becoming permanently located in Bellingham Bay in 1920 when levy construction restricted its meandering. Surficial geology is shown in Figure 12.

SOILS

Soils are created from the weathering of unconsolidated residues of geological formations.

Soil types found in the Sub Area, their general characteristics, constraints and capabilities are described in some detail in Appendix A, Physical Environmental Background Information. The material here will serve only to summarize the soil characteristics noted there.

Over 70 specific soils have been identified within the Sub Area. These range from peat to silty loams, gravelly sandy loam, to sandy loam. The complexity of soils in the Sub Area is directly related to the glacial history of the Sub Area. Glacial ice deposited varities of earth material which have weathered differently because of size of soil particles, permeability and characteristics of material two to three feet below the surface. Nearly half the soil types represented are varieties of silty loam. Secondary types are loam, silty clay loam, much and peat. The silty loams are found mostly on the uplands and are moderately permeable. Other soils are scattered in lower areas or local depressions.



Qal Recent Alluvial Deposits
Qbg Sand and Gravel Overlying Bellingham Glaciomarine Drift
Qb Bellingham Glaciomarine Drift
Qp Peat
Qt Terrace Deposits
Qso Sumas Outwash Sand and Gravel
Unstable Slopes - Slopes Greater than 15%, Underlain by Unconsolidated Clayey Material Subject to Slumps or Debris Flows

Sources: U.S. Geological Survey and
Don J. Easterbrook - Environmental Geology of Western Whatcom County, Washington, 1973.

Surficial Geology

figure 12

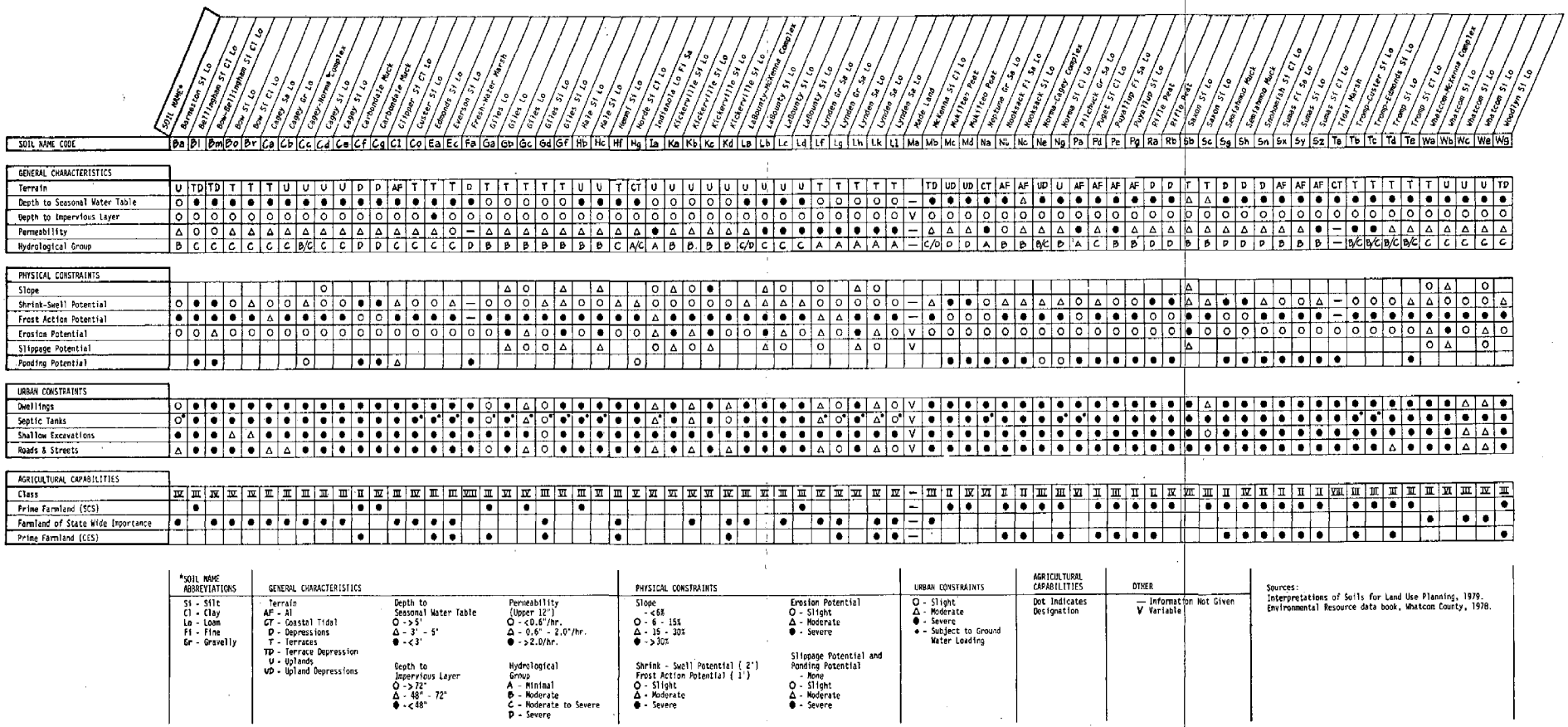
Silty loam soils generally drain well but large areas of the Sub Area regardless of of soil type are susceptible to seasonally high water tables. These latter soils are shown in Figure 23, Soils Subject To Ponding or Seasonally High Water Table. A significant problem regarding soils in the Sub Area is that many urban constraints exist because of the seasonally fluctuating groundwater level. Depending on location, dwellings may require special foundation preparation, septic fields may fail and roads and streets may be subject to "heaving" during periods of sub-freezing temperature. Figure 13 identifies a variety of characteristics of the soils present in the Sub Area.

MINERAL DEPOSITS

The mineral deposits of the Cherry Point-Ferndale Sub Area are non-metallic clay, sand and gravel. They may be of glacial origin--such as Sumas Outwash, Bellingham Glaciomarine Drift and Vashon Till or may be derived from recent alluvium. The sands and gravels, mined in borrow pits or quarries are used for construction purposes within the Cherry Point-Ferndale Sub Area, as well as in other areas. These sands and gravels are also used in concrete and asphalt manufacture. Clay, mined on site, is used in concrete manufacture. Known past and present mining operations have been located on the map of constraint areas and are indicated in the Issues and Concerns Section.

VEGETATION

The vegetation of the Cherry Point-Ferndale Sub Area may be grouped into types based on topography--uplands, low lands, fresh water lakes and streams, and salt water marshes. The upland region comprises the Mountain View area to the west of Ferndale. Here, mixed coniferous and broadleaf forests are interspersed with cultivated crops. Predominate coniferous tree types include Douglas Fir and Sitka Spuce, with Western Red Cedar occurring in localized, moist depressions. Broadleaf forest



*SOIL NAME ABBREVIATIONS	GENERAL CHARACTERISTICS			PHYSICAL CONSTRAINTS		URBAN CONSTRAINTS	AGRICULTURAL CAPABILITIES	OTHER	
Si - Silt Cl - Clay Lo - Loam Fi - Fine Gr - Gravelly	Terrain AF - Al GT - Coastal Tidal D - Depressions T - Terraces TD - Terrace Depression U - Uplands UD - Upland Depressions	Depth to Seasonal Water Table O - >5' Δ - 3' - 5' ● - <3' Depth to Impervious Layer O - >72" Δ - 48" - 72" ● - <48"	Permeability (Upper 12") O - <0.6"/hr. Δ - 0.6" - 2.0"/hr. ● - >2.0/hr. Hydrological Group A - Minimal B - Moderate C - Moderate to Severe D - Severe	Slope - <6% O - 6 - 15% Δ - 15 - 30% ● - >30% Shrink - Swell Potential (2') Frost Action Potential (1') O - Slight Δ - Moderate ● - Severe	Erosion Potential O - Slight Δ - Moderate ● - Severe Slippage Potential and Ponding Potential - None O - Slight Δ - Moderate ● - Severe	O - Slight Δ - Moderate ● - Severe • - Subject to Ground Water Loading	Dot Indicates Designation	— Information Not Given V Variable	Sources: Interpretations of Soils for Land Use Planning, 1979. Environmental Resource data book, Whatcom County, 1978.

Soils Matrix for the Cherry Point-Ferndale Sub Area

figure 13

cover includes Big Leaf Maple, Vine Maple, Red Alder, Black Cottonwood, California Filbert and Wild Cherry. Elderberry, Pacific Dogwood, Oregon Grape, blackberry, Salal and the Wild Rose are predominate species of the understory. Several varieties of ferns, fungi, lichens and mosses complete the vegetative diversity of the natural upland habitat. The natural vegetation occurs primarily in woodlots.

Cultivated crops of the uplands are mainly row or pasture crops. Row crops are generally corn and such grains as wheat and rye. There is a less intense production of pasture and hay.

Natural vegetation occurring within the lowlands is mixed coniferous and broadleaf forest, primarily Western Red Cedar and Douglas Fir. Deciduous varieties are approximately the same as in the uplands, but with the addition of Western Paper Birch. Willows and Black Cottonwoods are numerous along the Nooksack River and various stream shores. The varieties of shrubs, bushes, ferns and more primitive plants are approximately the same as those found in the uplands.

Cultivated crops exhibit more variety than in the uplands. Here, more intensive row crop agriculture is exemplified by peas, carrots, berries, bush beans, corn, potatoes and seed potatoes. Less intensive agriculture is allocated to hay and pasture.

The vegetation of the Terrell, Bennett and Tennant fresh-water lakes includes varieties of grasses, sedges, rushes, tules, lilies and cattails. Peat bogs found near these areas exhibit Douglas spirea, Labrador tea and Small cranberry trees. Mixed coniferous and broadleaf trees are found adjacent to fresh water areas.

Vegetation occurring near the Terrell Creek and Gulf Road salt water marshes include wild roses and salt water-tolerant grasses, sedges, rushes and horsetails.

WILDLIFE

Various furbearers, birds and fish occupy the Cherry Point-Ferndale Sub Area. Some species provide game potential, others are of commercial significance, while others provide recreational enjoyment in viewing. They all exist as part of complex ecosystems. Sensitive habitats are identified in the Issues and Concerns Section under Wildlife. Figure 14 identifies significant water and wildlife features.

. Furbearers

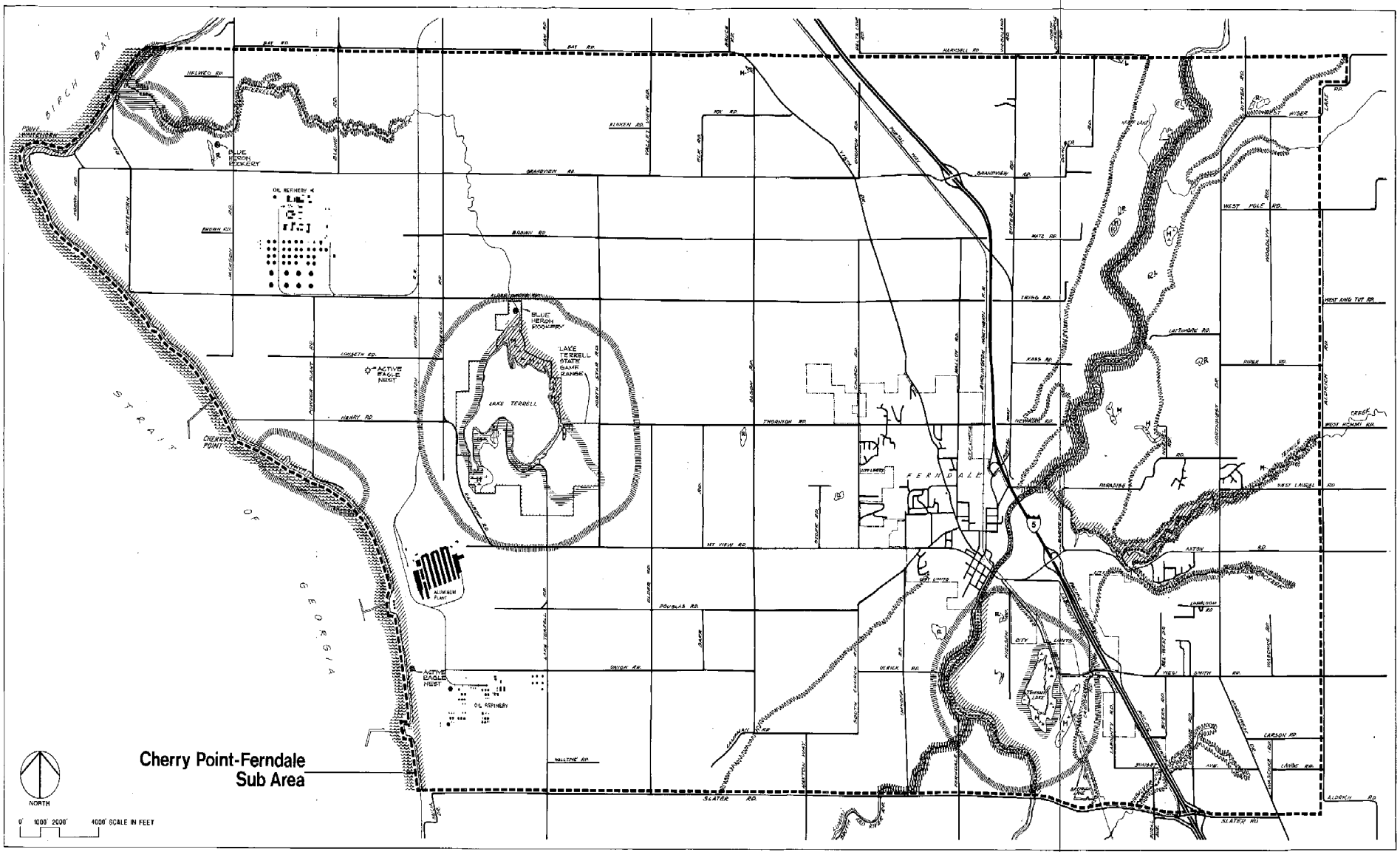
Blacktail deer are the largest mammals within the Cherry Point-Ferndale Sub Area. An exact population size is difficult to estimate but approximately 1300 animals have been counted within the Washington State Game Department's Lummi Management Unit. The Cherry Point-Ferndale Sub Area coverage is less than one-half of that for the Lummi Management Unit.

Other furbearers residing within the Sub Area include coyotes, red fox, porcupine, skunk, beaver, squirrels, mink, muskrats, martens, racoons, oppossums, rats and mice. Fresh water river otters are known to inhabitat areas adjacent to Terrell Creek. Although plentiful in Washington State, river otter population is limited within the Cherry Point-Ferndale Sub Area and a restricted hunting season has been placed upon them.

. Birds

An enormous variety of birds, both resident and migratory, occupy the Cherry Point-Ferndale Sub Area. The Christmas 1978 count by the National Audobon Society included over 130 species.

Major game bird species include ring-necked pheasant, California quail, Hungarian partridge, ruffed grouse, mallards, wood ducks and teals.



State Designated Critical Wildlife Habitat
- * Active Eagle Nest
- ● Blue Heron Rookery

Salmon Spawning & Migration Area
- (L) Lake
- (R) Reservoir
- (M) Marsh (Wetlands)

100 Year River Flood Plain
100 Year Coastal Flood Plain
Waters of Statewide Significance

Whatcom County Shoreline Designation Areas
- Aquatic
- Natural
- Conservancy
- Rural

Sources: Whatcom County Planning Department, Washington State Department of Game, Federal Insurance Administration.

Significant Water and Wildlife Features

figure 14

The Cherry Point-Ferndale Sub Area lies within the Pacific Flyway which is composed of all the known resting, nesting, feeding and rearing areas along the Pacific Coast which serve migratory species. Within the Cherry Point-Ferndale Sub Area, the Pacific Flyway includes Lake Terrell and Tennant Lake, as well as associated wetlands. Between October and December, prime resting time, over 10,000 birds have been observed in the Lake Terrell area. Salt water marshes, such as the one located near the Gulf Road, serve migratory birds as well.

Major non-game resident and migratory species include the Northern Bald Eagle, Great Blue Heron, Black Brandt, Canada Goose and Osprey. Waterfowl families include loons, grebes, cormorants, dabbling and diving ducks, gulls, shorebirds and terns. There are also several species of perching birds (such as crows and sparrows) and several species of the raptor family (hawks and owls).

. Fish

The mainstream of the Nooksack River, as well as several small tributaries and lakes, serve as habitat for various fish. All species of salmon migrate up the Nooksack River to their spawning grounds. In the lowlands, chum, pink, some coho, and fall chinook spawn in the mainstream and associated side channels. Chinook and coho rear in the mainstream before sea migration. Cutthroat and steelhead are also found in the Nooksack River. Cutthroat, trout and catfish inhabit lakes within the Cherry Point-Ferndale Sub Area.

GROUND WATER AVAILABILITY AND QUALITY

Ground water location and availability varies with soil permeability, topography and the composition of geologic units underlying the soil. The sands and gravels of modern alluvium, Sumas outwash, marine terraces, Deming Sand and the Esperance Member have been characterized as having moderate to high ground water yields. Figure 15 shows in cross

section form the general conditions of groundwater occurrance in Sub Area.

Ground water may occur above the regional water table because impervious materials prevent the downward flow of water; or it may be confined like a sandwich between two impervious layers. Ground water may also be unconfined, conforming to the regional water table. Generally, the regional water table conforms to topography, but it is located at varying depths from the land surface dependent upon the proximity to a natural discharge area, such as a stream or river, and upon the location of impervious materials. Thus, the regional water table near the Nooksack River is closer to the land surface than in the Mountain View uplands area.

Inspection of U.S. Geological Survey data on ground water, derived from well log information, yields salient points concerning the Cherry Point-Ferndale Sub Area. Wells located in the lowlands or within the Nooksack River flood plain discharge more water than those in the Mountain View uplands area. Ground water is primarily used for domestic, public and irrigation needs. Irrigation use, although perhaps near a surface water source such as a river or stream, tends to be supplied by well waters. For wells known to be drilled since 1970, those for domestic use discharge approximately 35 gallons per minute (low yield) while those for public uses discharge approximately 55 gallons per minute (moderate yield) (U.S. Geological Survey, computer printout).

Pumping rate can affect the water table in the immediate vicinity of a well. Those wells which are rapidly pumped, due to low discharge or a small well diameter tend to create a deeper core of depression (a localized depression in water table surface height) than wells of greater discharge which require less pumping.

Little information on yield is currently available for wells within the Mountain View uplands area. This is due to the limited number of wells and variations in well log data notation.

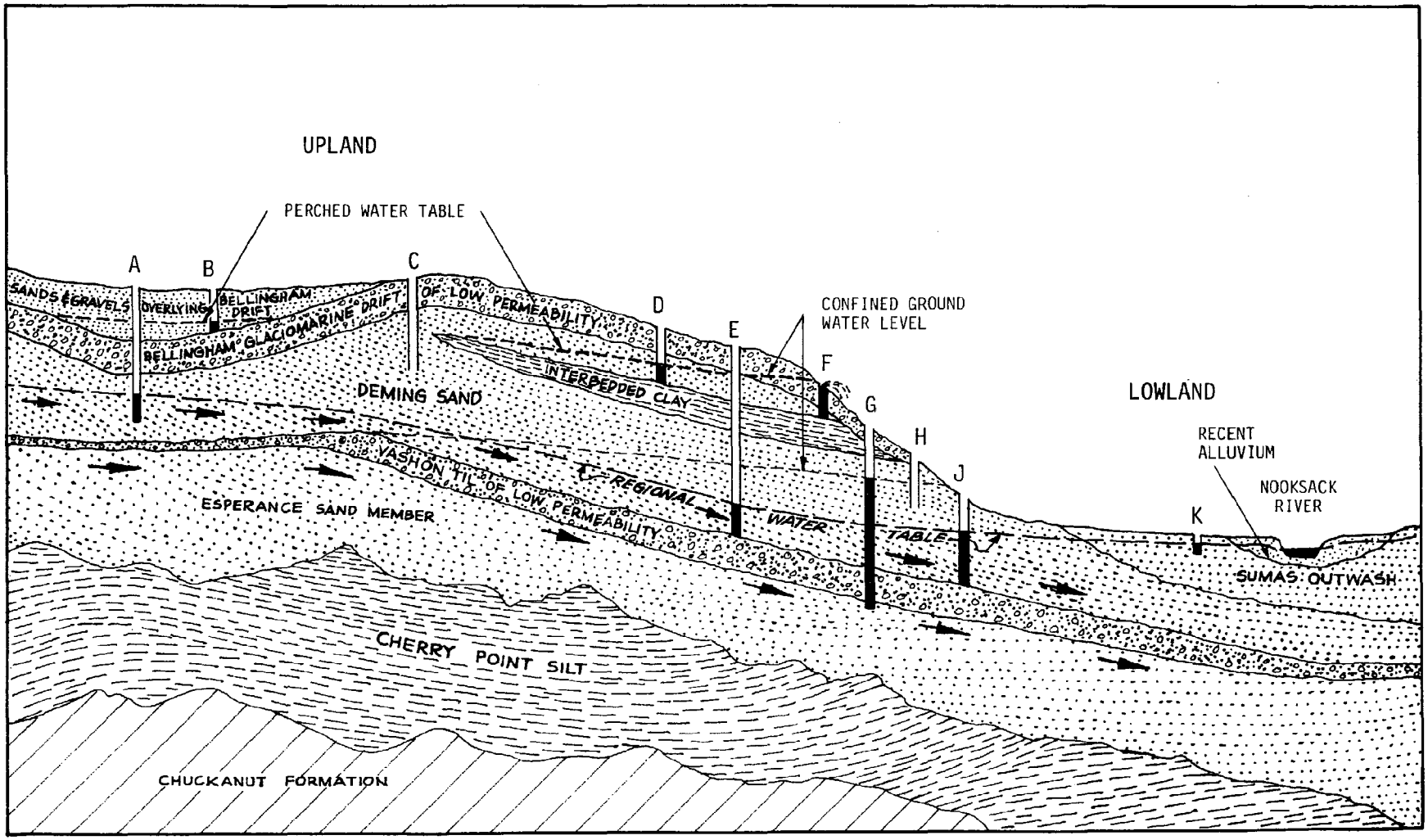


FIGURE 15

GENERAL CONDITIONS
OF GROUNDWATER OCCURANCE
WITHIN THE
CHERRY POINT-FERNDALE SUB AREA

Vertical scale exaggerated. Arrows indicate direction of groundwater movement.

Well A yields unconfined water from below the regional water table; well B yields perched water from a water body perched on glacial drift; at well C water was not encountered owing to insufficient depth; well D yields perched water from water body perched on clay zone; well E yeilds unconfined water from below the rgional water talbe; well F yields confined perched groundwater and flows because land surface is lower than the head developed on the water body as a result of the presence of the drift cover; well G yields confined water from water body confined by clay zone; at well H water was not encountered owing to insufficient depth; well J yields unconfined water from below the regional water table; and well K yields unconfined groundwater from glacial outwash materials lying below the regional water table adjacent to the river.

Source: Modification of Diagram in: Water Resources of the Nooksack River Basin and Certain Adjacent Streams, Water Supply Bulletin #12, Division of Water Resources, Washington State Department of Conservation, 1960.

Ground water quality within the Cherry Point-Ferndale Sub Area is variable. The presence of iron, thought to be caused by carbon dioxide and vegetal acid action on iron deposits, is the most objectionable chemical component. It is found in waters contained within Sumas Outwash and recent alluvial deposits. The presence of iron contributes to objectionable water taste, odor and discoloration.

The presence of nitrates is a second ground water quality factor. It is thought that nitrate occurrence is due to the use of cattle and chicken manure on agricultural lands. Commercial fertilizer use on berry and legume lands may be a secondary source.

Coliform, bacteria which are one indicator of water contamination, are not considered to be a problem by the Whatcom County Health Department.

100-YEAR FLOOD PLAINS

A 100-year flood plain is defined as an area in which there is a one percent per year chance of flooding. 100 year flood plain areas are shown in Figure 13. Flood plains are composed of three water sections: the stream channel, the floodway and the flood fringe. The stream channel is the location of the water during low or normal flow periods; the floodway is the area of the flood plain that is subject to flooding; and the flood fringe is the area that may be subject to flooding. Figure 17 is a visual representation of these areas.

Within the Cherry Point-Ferndale Sub Area, there are two such flood plain areas. One area surrounds the Nooksack River and one area is located adjacent to the shoreline of the Strait of Georgia.

The precautions advised by the Federal Insurance Administration with regard to 100-year flood plains are described in the Shorelines Management Areas section of Appendix A, Physical Environmental Background Information.

SHORELINES

This section characterizes the fresh water lakes, streams, rivers and marine shoreline areas in the Sub Area. Figure 16 summarizes the regulations for each of these shorelines as found in the county's Shoreline Management Program.

Aquatic Shorelines

. The Nooksack River, the most prominent fresh water body, is characterized as "pastoral," because its slope is less than 5 feet per mile. The section of the Nooksack River occupying the Cherry Point-Ferndale Sub Area is modified with dikes and stream channelization devices, although natural banks also occur. Banks tend to be stable and not susceptible to erosion. Meanders, which are characteristic of pastoral streams, are well developed on this portion of the Nooksack, and, occasionally, deposits are found on the inner curves of its bends. Meandering is a part of dynamic river processes; once initiated, it is self-perpetuating and difficult to restrain. Channelization, or "rip-rapping," banks will only arrest meandering downstream from that point.

Nooksack River bed materials are composed of sands and silts. Water quality is considered by the Department of Ecology to be "Class A" on a scale where "Class AA Extraordinary" is the most pure. Lesser quality water resulting from an increased coliform count does occur downstream from the municipal sewage treatment facility in Ferndale, but this lower section of the River is also flanked by agriculture, recreational and urban activities.

. Tenmile Creek is a pastoral stream with a gradient of approximately 7 feet per mile. Weakly developed meanders are present and erosion has been a severe problem on cleared bank slopes. Adjacent land uses are primarily agricultural with some residential development, and water quality has been adversely affected by livestock waste seepage.

P - Permitted subject to policies and regulations.
C - Permitted as a conditional use subject to policies and regulations.
N - Not permitted.
* - Refer to notes for additional comments.

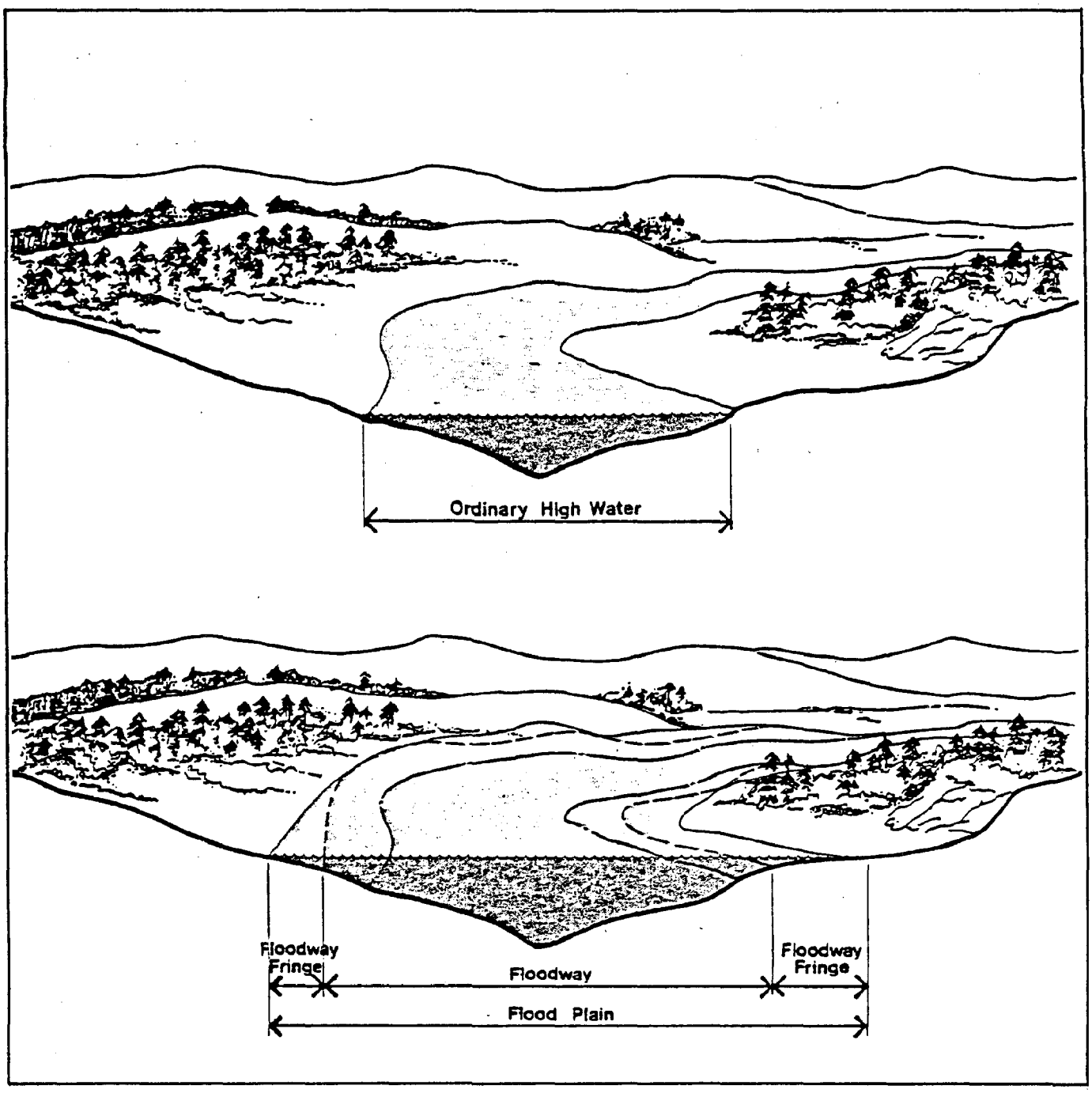
Source: Whatcom County Shoreline Management Program, 1978.

SHORELINE DEVELOPMENT	Rural	Conservancy	Natural	Aquatic	NOTES
Agriculture	P	P*	P*	N	Conservancy: Agricultural development, including feedlots of less than 250 animal units, is permitted. Natural: Only stock grazing and native products subject to sustained yield harvest are permitted.
Fisheries & Aquaculture	P	P*	P*	C*	Conservancy: Only development, not requiring extensive alteration of natural features, is permitted. Natural: Only developments which do not require structures, alterations of natural features, or mechanized harvest practices are permitted. Aquatic: If not on tidelands or shorelands of natural shoreline designation, structures and alterations of natural features are permitted as a conditional use.
Commercial	P*	P*	N	N C*	Rural: Only shoreline dependent or related commercial development is permitted. Conservancy: Only comprehensive plan or zoning ordinance encouraged or permitted developments of commercial resort, restaurant or campgrounds, are permitted. Aquatic: Only limited water surface dependent developments accessory to land uses consistent with the shoreline management program or restaurants, are conditionally permitted.
Dredging	P	C	N*	C	Natural: Only dredging as one element of an approved shore restoration or enhancement plan, is permitted.
Flood Control Works	P C*	P N*	N	N P*	Rural: Channelization and dams are permitted as conditional uses. Conservancy: Channelization and dams are prohibited. Natural character erosion control means or current deflectors are preferred to bank revetments. Aquatic: A dam, not adjacent to a conservancy or natural shoreline area, is permitted.
Forest Practices	P	P	N P*	P*	Natural: Only forest practices to maintain or restore a desired stage of natural plant succession, or to suppress diseases, fires or insect epidemics, are permitted. Aquatic: Hydraulics approval pursuant to the fish and game code (RCW 75.20.100) shall be obtained for wheel and crawler machinery.
Historical Sites Interpretative Centers & Signs	P	P* C*	C*	N	Conservancy: Only interpretative centers, not requiring extensive structures and signs, are permitted. Restoration of historical structures or extensive structure interpretative centers are conditionally permitted. Natural: Only interpretative centers compatible with and subordinate to the area's physical and visual character are conditionally permitted.
Archeological Excavation	C	C	C	C	
Landfill	P	C* N*	N P*	N P*	Conservancy: Landfill with vegetative stabilization or other natural character erosion control is conditionally permitted. Landfill to create new uplands is prohibited. Natural: Only landfill, as one element of an approved shore restoration or enhancement plan, is permitted. Aquatic: Only landfill for fisheries and aquaculture is permitted.
Marinas Launch Ramps	P P	C P	N N P*	P* P*	Natural: Only primitive launch ramps, which facilitate hand launching of small craft and protect natural shores, if materials and design are site compatible, are permitted. Aquatic: Marinas and launch ramps permitted, if adjacent shorelands designations are consistent with these uses (example: rural).
Mining	P	C	N	N P*	Aquatic: Only accreditional bar scalping in streamways is permitted.
Piers & Docks	P C*	P C*	N P*	P* C*	Rural: New pier development, including expansion of existing piers, is conditionally permitted. Conservancy: New pier development, including expansion of existing piers, is conditionally permitted. Natural: Only public access, interpretative or nature observation facilities, compatible with and subordinate to the area's physical and visual character, are permitted. Aquatic: Dock and pier development permitted if shoreland designations are consistent with these uses. New pier development, including expansion of existing piers, is conditionally permitted.
Port & Industrial	P*	P*	N	C*	Rural: Shore dependent or related industrial and port development are permitted if adjacent shorelands, subject to county ordinance, are consistent in use. Conservancy: Shore dependent or related industrial and port development are permitted if adjacent shorelands, subject to county ordinance, are consistent in use. Aquatic: Port development and log storage are conditionally permitted.
Recreation	P	P*	N P*	P* C*	Conservancy: Only recreational development, not requiring extensive structures or substantial alteration to topography, is permitted. Natural: Only minor structures such as trails, small picnic areas, primitive roads, viewpoints, restrooms, or interpretative vacilities; or development which preserves or restores natural features, is permitted. Aquatic: Surface water dependent recreational developments are permitted. Underwater parks are conditionally permitted.
Residential	P*	P* C*	N	N P*	Rural: Single family and multi-unit residential developments are permitted. Conservancy: Single family developments are permitted. Multi-unit developments are conditionally permitted. Aquatic: Only water surface dependent developments, as an accessory to residential developments, is permitted (example: docks).
Road & Railways	P	P*	N P*	N P*	Conservancy: Road and railway development only for access to shore dependent or related uses, or other approved development, or to cross a water body or wetland. Natural: Only primitive roads, providing access to non-commercial recreational developments, are permitted. Aquatic: Only bridge crossings and access to water surface dependent uses, such as ferry terminals, are permitted.
Shore Defense Works Beach Feeding Breakwaters Bulkheads Gabions Groins Jetties Protective Berms Revetments Seawalls	 P C P C C C P P P	 P C* P* N N C* P P* P*	 P* N N N N N P* N N	 P* C* N N* M* C* P* N N	Conservancy: Permitted uses are acceptable if less rigid and artificial means are not feasible. Conditional uses are permitted if they are accessories to shoreline dependent developments. Natural: Permitted uses are acceptable if necessary to restore an eroding accretion shoreform or to retard erosion elsewhere. Aquatic: Permitted uses are acceptable if necessary to restore an eroding accretion shoreform or to retard erosion elsewhere. Conditional uses are acceptable if located offshore rural or conservancy shoreline areas. Groins and gabions are not permitted offshore of conservancy or natural shoreline areas.
Signs	P	P	N P*	P*	Natural: Only sign development for trail marking, hazard warning, or interpretative, scientific or educational purposes, is permitted. Aquatic: Only signs, numbering two or less per premise, and for shoreline dependent uses, are permitted.
Utilities	P	P C*	N*	P* C* N*	Conservancy: Sewage treatment plants and fuel pipelines are conditionally permitted. Natural: Only maintenance of existing utilities within this shoreline area is permitted. Aquatic: Submarine electrical or communications cables, and water intakes are permitted. Submarine water and sewer lines, fuel pipelines, and sewer outfalls are conditionally permitted. All other utility developments are prohibited.

Whatcom County Shoreline Management Program Regulations Pertaining to Developments Within the Cherry Point-Ferndale Sub Area

figure 16

FIGURE 17



Source: Whatcom County Shoreline Management Program, 1978.

TYPICAL FLOOD PLAIN

. Terrell Creek, in the western part of the Sub Area, drains a 15-square-mile area. Its origin is Lake Terrell and its terminus is Birch Bay. Meandering is slightly developed, and bank instability occurs in the lower portion near Birch Bay.

. Lake Terrell is the largest lake within the Cherry Point-Ferndale Sub Area. Its surface area is approximately 435 acres and shore frontage is approximately 4 miles. The shoreline is generally marsh and occasionally swamp. Swamp and peat formations indicate a lake of larger size in the recent geological past. The entire shoreline is natural with the exception of a small dock and boat launch ramp. Water depth reaches a maximum of 12 feet. Terrell Creek is the surface outlet for the lake. Adjacent land uses are predominantly within the Lake Terrell State Game Range or are agricultural.

. Tennant Lake in the southeastern part of the Sub Area has a surface area of approximately 43 acres with shore frontage of approximately one mile. The entire shoreline is natural marsh land. Ground water is the primary source, and water depth is shallow. An intermittent stream serves as the surface outlet into the Nooksack River. Adjacent land uses are agricultural, and, as part of Hovander Park, recreational.

. Bennett Lake has a surface area of approximately 40 acres with a shore frontage of 3 miles. Beaver dams at the western end of the lake have drowned Tenmile Creek to form the long sinuous lake form. The shoreline is marsh and water depth reaches a maximum of 20 feet. The lake is supplied and drained by Tenmile Creek. Adjacent land uses are primarily agricultural with some residential development. All shorelines are privately owned.

Constraint areas regarding these water bodies concern 100-year flooding, bank instability and maintenance of wildlife habitats. These topics are discussed at length in the Issues and Concerns Sections of those respective topics.

Marine Shorelines

The entire western boundary of the Cherry Point-Ferndale Sub Area is fronted by a marine shoreline which adjoins the Strait of Georgia. This shoreline, running in a northwest to southeast direction, is generally in a natural, unaltered condition with the exception of industrial development and its related piers. Because this section concerns shorelines landward of the ordinary high water mark, information relating to tidelands is omitted. From Point Whitehorn to the northern boundary of the Cherry Point-Ferndale Sub Area only minor developments, such as a small boat launch facility, occur.

Northwesterly from the Gulf Road, exposed sea cliffs, composed of stratified and unstratified glacial materials, reach a maximum of 100 feet in height. Southeasterly from this point, these cliffs, which are up to 180 feet in height, are often covered with vegetation. Occasional steep gullies cut into both cliff sections. These cliffs, due to slope angle and material composition, are susceptible to erosion with resultant beach deposition becoming a source of material for "long shore transport." Water action compounds the erosion potential by eroding the base of cliffs which causes oversteepening and sloughing. The shoreline adjacent to the Gulf Road is the only non-cliffed shoreline within the Cherry Point-Ferndale Sub Area.

Longshore transport, a part of the shore formation process, is the movement of materials along a beach by wave action. It affects the area that is wetted during mean high tides; the beach segment that remains dry during all but extreme high or storm tides; and the cliffs and sloping terrain landward of the surf.

The potential energy for movement of shore materials involved in this process, as defined by Bauer, is affected by the orientation of the shore to prevailing winds, the angle at which waves strike a beach, the amount of material available for transport and the presence of natural or artificial barriers to wave movement. The Cherry Point-Ferndale Sub

Area coastline has over 100 miles of northwesterly fetch and sea cliffs provide considerable material for transport. Thus, the Cherry Point-Ferndale Sub Area coastline forms a high energy zone.

Bauer has classified the beaches near sea cliffs of the Cherry Point-Ferndale Sub Area as Class II. This type of beach, occurring in high energy zones, has a shallow berm which remains dry at ordinary high tides but is wetted during all higher tides. The narrow, unstable backshore is actively involved in the shore processes of beach feeding and long shore drift.

These shore processes move materials that range in size from sand and gravel to cobbles and boulders. These materials originated in the sea bluffs. Generally, fragment size decreases along the beach from north to south, although medium-sized fragments are most prevalent. De position of these materials may form accretion beaches. The accretion beaches of the Cherry Point-Ferndale Sub Area include those of Birch Bay, the shoreline adjacent to the Gulf Road and Sandy Point. Materials are constantly deposited and removed along the shore process corridor, but it is in the areas of accretion that net buildup occurs. This buildup is termed a berm or foredune. Where these processes have been interrupted adjacent to industrial pier bulkheading, pocket beaches are forming.

The accretion beaches in the Cherry Point-Ferndale Sub Area are classified as Class I. Here, the more developed berm is wetted only under storm tide conditions. A salt water marsh is located landward of the Class I beach adjacent to the Gulf Road. This marsh is biologically productive and serves as a waterfowl habitat. Class I beaches also offer shore access which is otherwise limited and thus can serve recreational purposes. The net long shore drift of the Birch Bay accretion beach moves in a southwest to northeast direction, as is evidenced by the location of the current mouth of Terrell Creek. Originally, creek waters entered Birch Bay in the area that is now the state park. Over time, long shore drift and deposition have caused the mouth of the creek to move approximately two miles to the northeast. Picnic areas associated

with the state park and a road are located on the developed berm. Landward of this berm are the estuarine waters (the mixing of fresh and salt waters) of Terrell Creek. Wetlands occupy the areas adjacent to fresh waters of Terrell Creek. Since the estuary and wetlands are biologically productive and serve as waterfowl habitats, they have been delineated on the map of constraint areas and are discussed in the Issues and Concerns Section under Physical Environment.

Water quality for this section of the Strait of Georgia is classified as "Class AA Extraordinary," although local conditions of lesser quality may be occurring proximate to industrial outfalls.

TRANSPORTATION/CIRCULATION

Roadways, railways and sidewalk/pathway systems provide transportation routes for the movement of people and goods within the Cherry Point-Ferndale Sub Area. Residents rely on the automobile as their major form of transportation and use a network of roadways for access and circulation within the Sub Area. Sidewalk/pathway systems, although not offering connecting routes throughout the areas, are used primarily for recreational use or for short trips by pedestrians, bicyclists and equestrians. Railways provide for the movement of goods to and from commercial and industrial facilities and are another important mode of transportation in the Sub Area.

Roadway System

The circulation of cars, trucks, school buses and motorcycles is accommodated by a network of streets and highways throughout the Sub Area. This street and highway network provides residents of the Area with access to and from their places of residence and employment and to and from centers of cultural, social, commercial and recreational activity. It also provides for the movement of goods to and from commercial and industrial facilities within the Sub Area. This roadway network includes a freeway, several classes of arterials and local access streets that together provide the backbone of the transportation system.

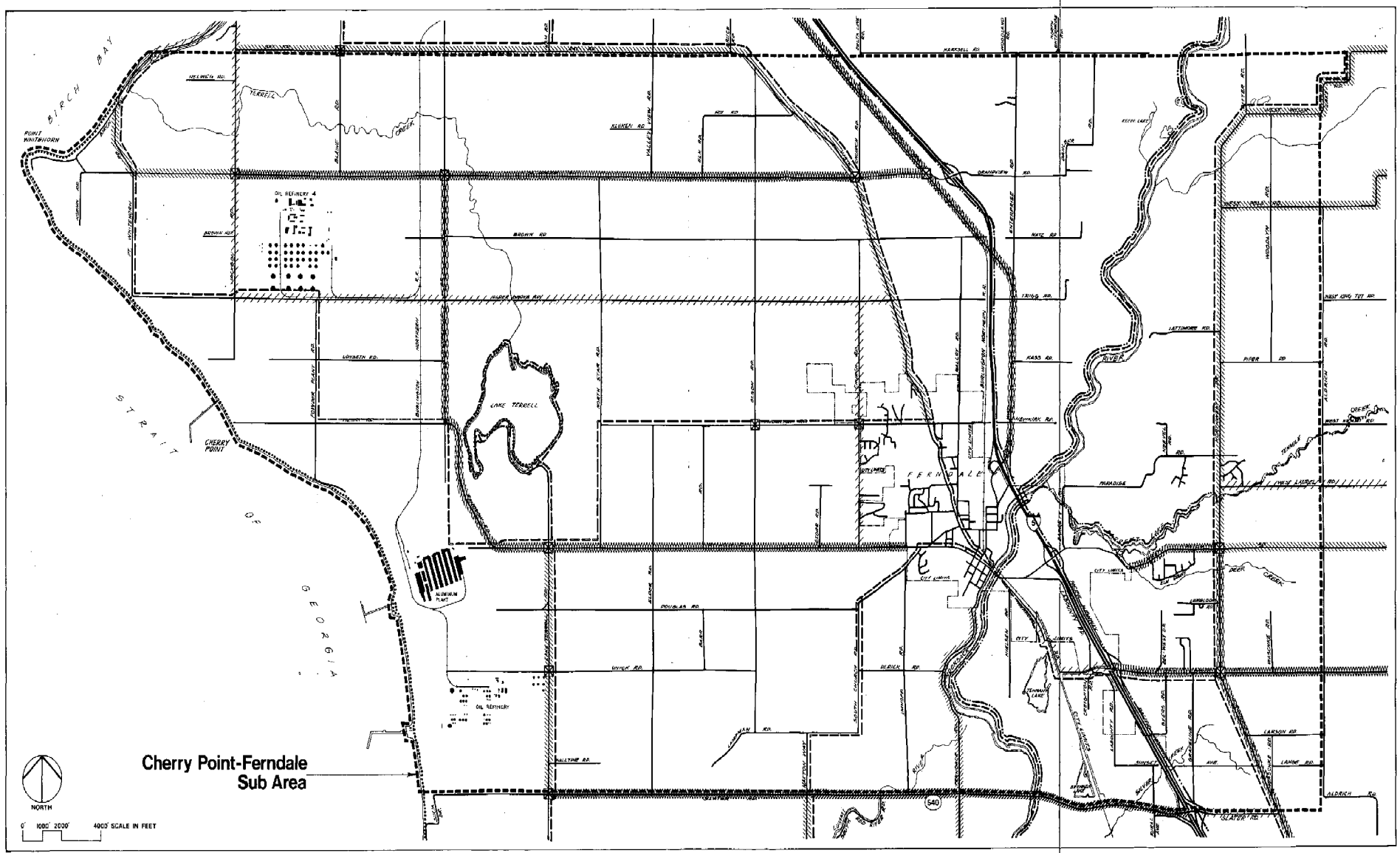
The alignment of existing roadways, together with the identification of roadway classifications, is shown in Figure 18, Existing Roadway System. Interstate 5, a portion of the National System of Interstate and Defense Highways, passes through the Cherry Point-Ferndale Sub Area and provides regional access to and from the Sub Area. Principal routes providing for vehicular traffic movements between parts of the Sub Area and providing connections to I-5 are Portal Way, Grandview Road, West Axton Road, West Smith Road, Northwest Drive, Kickerville Road, Mountain View Road and Slater Road.

Portal Way is a major arterial paralleling I-5 for approximately twelve miles from Ferndale to the town of Blaine. Grandview Road, Mountain View Road and Slater Road provide important east-west routes that accommodate traffic to and from industrial areas near Cherry Point. West Axton Road and West Smith Road provide access to I-5 and the Ferndale area from the eastern portion of the Sub Area. At the present time, there is an overpass at West Smith Road, but there is no interchange that provides direct access to I-5. Indirect access is provided by a frontage road, lying on the east side of the freeway. This road provides a route to Ferndale and, from there, to the Axton Road interchange of the freeway. Access from Smith Road to Ferndale is also provided via Hovander Road.

A complete listing of arterial roadways within the Sub Area is presented in Table IV, Arterial Roadway Data. Information presented in this table includes the arterial classification, right-of-way width, roadway width, shoulder width, existing average daily traffic (ADT) volume and the speed limit for arterial roadway segments.

This traffic volume information was obtained from data collected by the Whatcom County Engineering Department in 1978 and is presented graphically in Figure 19, 1978 Average Daily Traffic. Right-of-way information was obtained from Whatcom County Assessors' maps, and roadway and shoulder width information was collected during in-field inspection of these roadways in August, 1979.

Traffic accident information was obtained for the years 1974 through 1978 and is presented in Figure 18, Existing Roadway System. Each mark in this figure represents the approximate location of a reported motor vehicle accident during the years 1974 through 1978. As shown in this Figure, Portal Way, Enterprise Road, Axton Road, Bay Road and Slater Road all show a large number of accidents. Intersections around which a relatively high number of accidents are clustered include Slater Road at Graveline Road, West Smith Road at Northwest Drive, Axton Road at Northwest Drive, Axton Road at Aldrich Road, Harksell Road at



- Interstate Highway
- State Highway
- Major Arterial
- Minor Arterial
- Collector Arterials
- 4-Way Stop
- Proposed Bicycle Trails
- Proposed Horse Trails
- Proposed Hiking Trails

Whatcom County Engineering Department.

Transportation System

figure 18

T A B L E IV

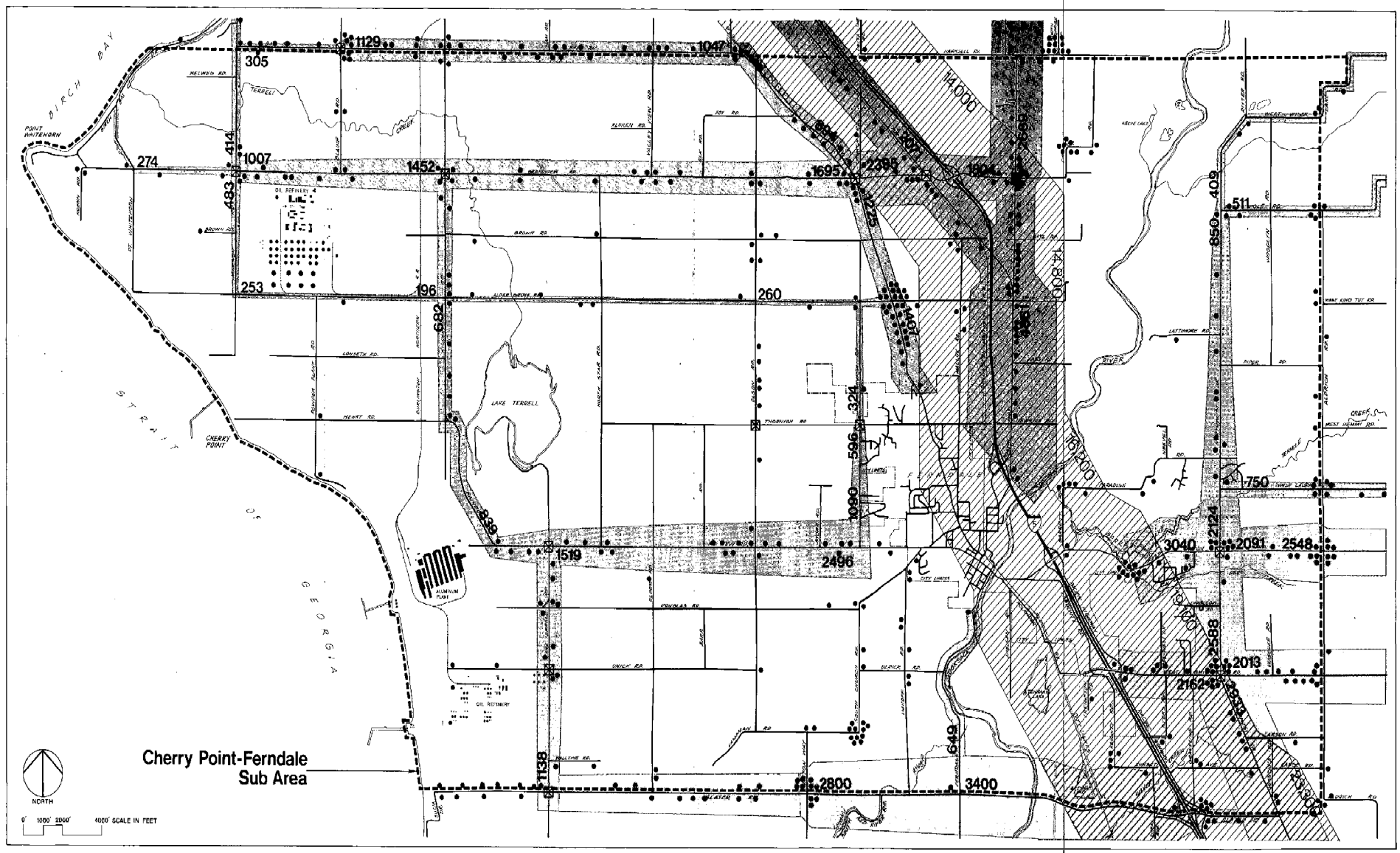
ARTERIAL ROADWAY DATA

	ROADWAY	LIMITS	ARTERIAL CLASS.	RIGHT-OF-WAY WIDTH (FT)	ROADWAY WIDTH (FT)	SHOULDER WIDTH (FT)	EXISTING VOL (ADT)	SPEED LIMIT
1	Slater Rd	I-5 to Haxton Way	St Hwy	80	22	6	3500	55
2	Slater Rd	Haxton Way to Lk Terrell Rd	Major	80	24	4	1900	50
3	Northwest Dr	Slater Rd to W Smith Rd	"	60	20	6	2935	45
4	Northwest Dr	W Smith Rd to W Axton Rd	"	33	24	4	2275	45
5	W Smith Rd	I-5 to Northwest Dr	"	60	22	4	2160	40
6	W Smith Rd	Northwest Dr to Aldrich Rd	"	60	22	0	2355	50
7	W Axton Rd	Ferndale CL to Northwest Dr	"	60	24	4	3040	40
8	Portal Way	Custer to Enterprise Rd	"	90	20	0	2020	50
9	Portal Way	Enterprise Rd to Ferndale	"	80	20	8	4860	35
10	Grandview Rd	Portal Way to Vista Dr	"	60	22	2	2395	45
11	Grandview Rd	Vista Dr to Olson Rd	"	60	23	4	1695	50
12	Grandview Rd	Olson Rd to Kickerville Rd	"	60	22	6-8	1395	50
13	Grandview Rd	Kickerville Rd to Jackson	"	40-60	23	6	1005	45
14	Kickerville Rd	Grandview Rd to Rainbow Rd	"	60	21-22	0	755	40
15	Rainbow Rd	Kickerville Rd to Mt View Rd	"	60	21	3	900	35
16	Mt View Rd	Rainbow Rd to Lake Terrell Rd	"	60	20	4	2105	50
17	Mt View Rd	Lake Terrell Rd to Olson Rd	"	60	20	4	2005	50
18	Mt View Rd	Olson Rd to Church Rd	"	60	20	3	2500	50
19	Mt View Rd	Church Rd to Ferndale	"	40	20	0	3430	35

TABLE IV

ARTERIAL ROADWAY DATA

	ROADWAY	LIMITS	ARTERIAL CLASS.	RIGHT-OF-WAY WIDTH (FT)	ROADWAY WIDTH (FT)	SHOULDER WIDTH (FT)	EXISTING VOL (ADT)	SPEED LIMIT
20	Bay Rd	Jackson Rd to Blaine Rd	Secondary	60	18	0	400	40
21	Bay Rd	Blaine Rd to Vista Dr	"	60	20	0	1130	50
22	Vista Dr	Bay Rd to Grandview Rd	"	60	21	0	1000	45
23	Vista Dr	Grandview Rd to Alder Grove Rd	"	60	20	0	1225	45
24	Vista Dr	Alder Grove Rd to Ferndale	"	60	20	0	1475	45
25	Blaine Rd	Grandview Rd to Bay Rd	"	60	18	0	400	35
26	Grandview Rd	Jackson Rd to Pt Whitehorn Rd	"	60	18	0-2	325	45
27	Lk Terrell Rd	Mt View Rd to Unick Rd	"	60	20	3-6	1240	35
28	Lk Terrell Rd	Unick Rd to Slater Rd	"	60	20	2	1310	35
29	Ferndale Rd	Slater Rd to Ferndale	"	60	18	0	650	35
30	W Axton Rd	Northwest Dr to Aldrich Rd	"	40	19	0	2550	35
31	Northwest Dr	W Axton Rd to Paradise Rd	"	33	19	0-2	2125	35
32	Northwest Dr	Paradise Rd to Lattimore Rd	"	33	20	0	1260	35
33	Northwest Dr	Lattimore Rd to W Wiser Lk Rd	"	33	19	0	850	35
34	W Wiser Lk Rd	Ritter Rd to Woodlyn Rd	"	33	18	0	-	-
35	W Pole Rd	Northwest Dr to Aldrich Rd	"	40	17	0	510	35
36	W Laurel Rd	Northwest Dr to Aldrich Rd	Collector	40	19	0	650	35
37	Slater Rd	I-5 to Northwest Dr	"	40	17	0	700	35
38	Hovander/ W Smith Rd	I-5 to Ferndale	"	40	17	0	-	-
39	Church Rd	Alder Grove Rd to Mt View Rd	"	40	18	0	1090	35
40	Alder Grove Rd	Jackson Rd to Vista Dr	"	60	19	0	260	35
41	Jackson Rd	Alder Grove Rd to Bay Rd	"	40-50	18	0	480	40



1978 Average Daily Traffic

figure 19

North Enterprise Road, Alder Grove Road at Vista Drive, Haxton Way at Slater Road and Lampman Road at South Church Road.

A comparison of 1970 average daily traffic with 1978 average daily traffic on arterial routes in the Sub Area is presented in Table V, Traffic Volume and Capacity. These volumes indicate a general traffic volume increase of approximately 35 percent on the Sub Area arterials between 1970 and 1978. Average daily traffic on several arterials (Kickerville, Rainbow and Lake Terrell Roads) has declined since 1970, due, possibly, to the increased use of east-west routes. Additional information in Table V, Traffic Volume and Capacity, includes the estimated peak hour traffic volumes and the roadway capacities for arterials in the Sub Area. In general, arterial routes throughout the Area are of adequate capacity to accommodate existing traffic flows.

A comparison of existing Sub Area arterial characteristics with accepted arterial standards (American Association of State Highway Officials, A Policy on Geometric Design of Rural Highways, 1965, Washington D.C., 1966) indicated that arterial roadways in this area are generally substandard. Recommended minimum roadway and shoulder widths for two-lane rural roadways are generally greater than those of existing arterial roadways in the Sub Area. The recommended minimum width of surfacing for roads similar to those identified in Tables IV is 22 feet. Recommended minimum shoulder widths are 4 feet. These recommended standards vary according to traffic volume and design speed and, for roadways similar to those of the Sub Area, vary between roadway widths of 20 to 24 feet, and shoulder widths of between 4 to 10 feet.

Roadway subgrade conditions on many roadways within the Sub Area preclude truck and bus travel during freeze-thaw periods. During these times, truck traffic could cause severe damage to roadway surfacing, because the shrinking and swelling of the subgrade materials often results in weakened roadways that are easily damaged by heavy loading. All-weather roads, roads that can accommodate truck traffic at all times of the year and under any weather conditions, within the Sub Area are:

TABLE V

TRAFFIC VOLUME AND CAPACITY

	ROADWAY	LIMITS	ARTERIAL CLASS.	VOLUME 1970 ADT	VOLUME 1978 ADT	ESTIMATED PEAK HOUR VOLUME	CAPACITY (VEHICLES PER HOUR)
1	Slater Rd	I-5 to Haxton Way	St Hwy		3500	420	1302
2	Slater Rd	Haxton Way to Lk Terrell Rd	Major	1750	1900	228	1391
3	Northwest Dr	Slater Rd to W Smith Rd	"	2550	2935	352	1198
4	Northwest Dr	W Smith Rd to W Axton Rd	"	1600	2275	273	1391
5	W Smith Rd	I-5 to Northwest Dr	"	1700	2160	259	1228
6	W Smith Rd	Northwest Dr to Aldrich Rd	"	1800	2355	283	991
7	W Axton Rd	Ferndale CL to Northwest Dr	"	1550	3040	365	1391
8	Portal Way	Custer to Enterprise Rd	"	1250	2020	242	917
9	Portal Way	Enterprise Rd to Ferndale	"	3100	4860	583	1198
10	Grandview Rd	Portal Way to Vista Dr	"	1750	2395	287	1110
11	Grandview Rd	Vista Dr to Olson Rd	"	940	1695	203	1309
12	Grandview Rd	Olson Rd to Kickerville Rd	"	880	1395	167	1302
13	Grandview Rd	Kickerville Rd to Jackson	"	570	1005	121	1391
14	Kickerville Rd	Grandview Rd to Rainbow Rd	"	960	755	91	973
15	Rainbow Rd	Kickerville Rd to Mt View Rd	"	1100	900	108	1113
16	Mt View Rd	Rainbow Rd to Lake Terrell Rd	"	2150	2105	253	1124
17	Mt View Rd	Lake Terrell Rd to Olson Rd	"	2200	2005	241	1124
18	Mt View Rd	Olson Rd to Church Rd	"	2500	2500	300	1073
19	Mt View Rd	Church Rd to Ferndale	"	2850	3430	412	917

TRAFFIC VOLUME AND CAPACITY T A B L E V

	ROADWAY	LIMITS	ARTERIAL CLASS.	VOLUME 1970 ADT	VOLUME 1978 ADT	ESTIMATED PEAK HOUR VOLUME	CAPACITY (VEHICLES PER HOUR)
20	Bay Rd	Jackson Rd to Blaine Rd	Secondary	360	315	38	858
21	Bay Rd	Blaine Rd to Vista Dr	"	980	1130	136	917
22	Vista Dr	Bay Rd to Grandview Rd	"	680	1000	120	954
23	Vista Dr	Grandview Rd to Alder Grove Rd	"	940	1225	147	917
24	Vista Dr	Alder Grove Rd to Ferndale	"	780	1475	177	917
25	Blaine Rd	Grandview Rd to Bay Rd	"	290	400	48	858
26	Grandview Rd	Jackson Rd to Pt Whitehorn Rd	"	380	325	39	910
27	Lk Terrell Rd	Mt View Rd to Unick Rd	"	2050	1240	149	1135
28	Lk Terrell Rd	Unick Rd to Slater Rd	"	1450	1310	157	1021
29	Ferndale Rd	Slater Rd to Ferndale	"	1050	650	78	858
30	W Axton Rd	Northwest Dr to Aldrich Rd	"	980	2550	306	888
31	Northwest Dr	W Axton Rd to Paradise Rd	"	860	2125	255	939
32	Northwest Dr	Paradise Rd to Lattimore Rd	"	550	1260	151	917
33	Northwest Dr	Lattimore Rd to W Wiser Lk Rd	"	370	850	102	888
34	W Wiser Lk Rd	Ritter Rd to Woodlyn Rd	"	-	-	-	858
35	W Pole Rd	Northwest Dr to Aldrich Rd	"	200	510	61	828
36	W Laurel Rd	Northwest Dr to Aldrich Rd	Collector	-	650	78	888
37	Slater Rd	I-5 to Northwest Dr	"	180	700	84	828
38	Hovander/ W Smith Rd	I-5 to Ferndale	"	-	-	-	828
39	Church Rd	Alder Grove Rd to Mt View Rd	"	430	1090	131	858
40	Alder Grove Rd	Jackson Rd to Vista Dr	"	140	260	31	888
41	Jackson Rd	Alder Grove Rd to Bay Rd	"	300	480	58	858

the Interstate-5 freeway, Vista Drive, Portal Way, Enterprise Road, Lake Terrell Road, Slater Road, Bay Road and Grandview Road.

Recommended standards for rural roadway paving and shoulder width and subgrade preparation are illustrated in Figure 20, Arterial Roadway Section. The Roadway section presented in this Figure is for major, secondary and collection arterials in rural areas. This section illustrates a typical asphalt concrete road section. Actual surfacing design should be based upon soils and traffic analysis. Use of a similar roadway section with curbs, gutters and enclosed drainage would be suitable for urban arterials.

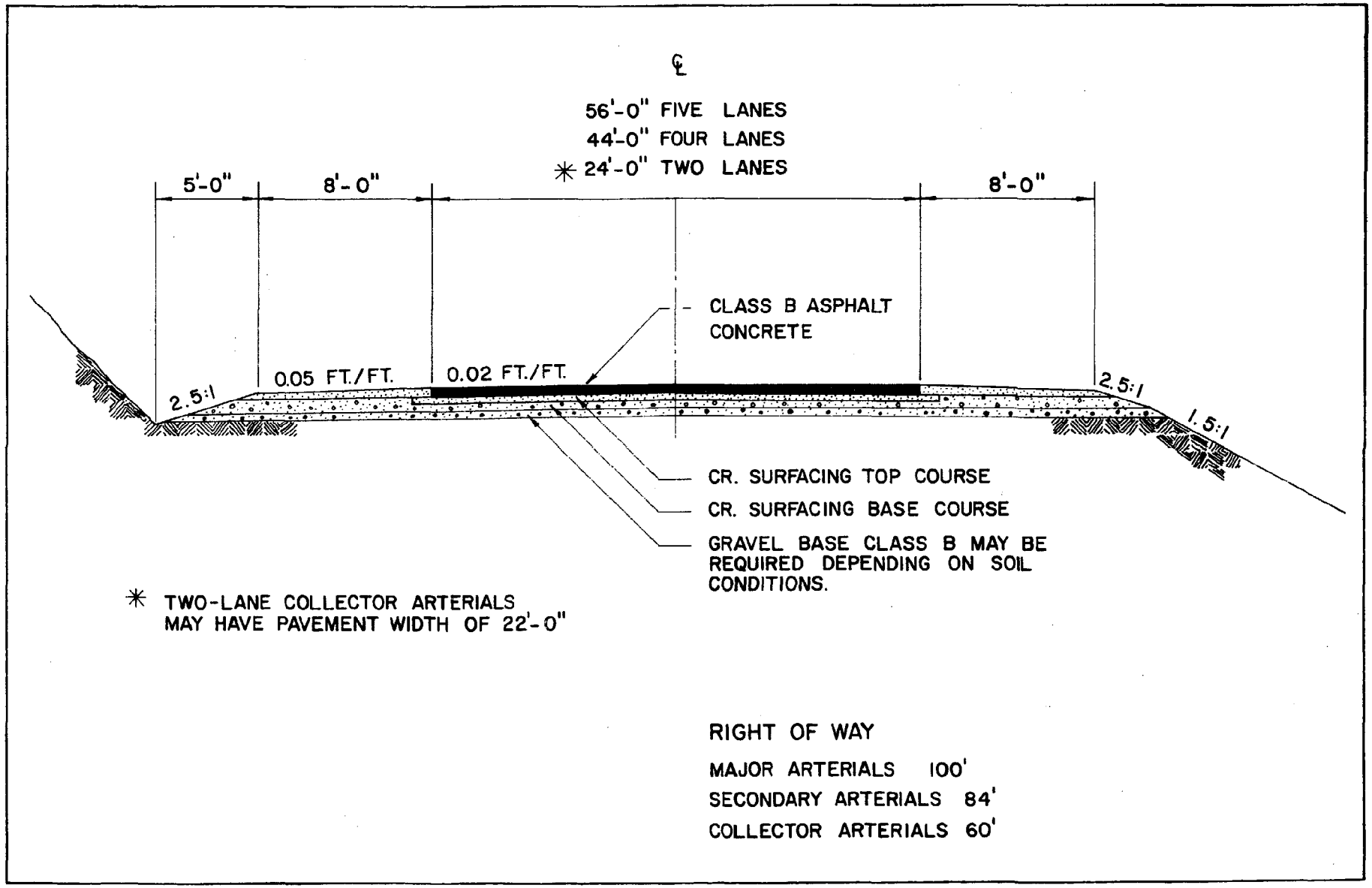
Roadway Maintenance

The roadway network in the Cherry Point area of the County is maintained by the Whatcom County Public Works Department. The Cherry Point area lies in District No. 3 of the county, and uses funds allocated to this district for roadway improvements. After 1980, the county will no longer be allocating roadway funds on a district basis.

As an indication of budget allocations, based upon the approximately $2.3 million budget of the county road fund for District No. 3 in 1979, the following breakdown of county road funds uses is presented:

Construction	18%
Maintenance	63%
Reimbursables	5%
Administration (including engineering)	13%
Facilities (roads and ferry)	17%
	100%

Maintenance items include traveled way and shoulder work, seal coating, patching, storm drainage, bridges, lighting, traffic control devices, snow/ice removal, road cleaning, paint striping, vegetation control, mowing, ferry operation and administration for maintenance activities.



Arterial Roadway Section

figure 20

Roadway improvements planned in the study area, that are included in the 1980 annual construction program list for Whatcom County, include: Grandview Road, Slater Road and Vista Drive. These roads are all scheduled for preliminary engineering work, grading, draining and surfacing and light bituminous surface treatment or pavement improvements. Improvement of a railroad crossing on Grandview Road is also scheduled.

TRANSIT

The only transit system available to residents of the Sub Area is a commercial carrier that provides service twice daily between Ferndale and Bellingham, leaving Bellingham at 9:30 a.m. and at 2:30 p.m. and leaves downtown Ferndale at 10:15 a.m. and 3:15 p.m. bound for the depot in downtown Bellingham.

RAILROADS

Industrial rail service to the Cherry Point-Ferndale Sub Area is provided by the Burlington Northern Railroad Company. The industrial railroad network within the Sub Area consists of a mainline route, generally paralleling the Interstate 5 corridor, and a spur line extending from this mainline route at a point approximately one mile north of the Sub Area to industrial sites in the western portion of the Sub Area (Figure 17). The mainline route provides connections between the Seattle-Everett area to the south and the Westminster-Vancouver, B.C. area to the north.

The tracks in the Sub Area are in very good condition, the oldest being less than twelve years old. The mainline tracks were built in 1968 (Burlington Northern Railroad, personal communication, August 6, 1978).

Commercial and industrial operations in the Cherry Point-Ferndale Sub Area are served by three trains per day northbound from the Seattle-Everett area and three trains per day southbound from the Vancouver and Westminster areas. A local service train provides service six days per

week originating in Ferndale at 6:30 a.m. This local serves all Cherry Point industries except Arco. Two locals combine to serve Arco and leave Ferndale at 8:30 p.m. The industries in the study area served by the Burlington Northern Railroad include Arco, Intalco, Mobil, Calgas, Houston Chemical and other smaller shippers.

Approximately 250 rail cars per month are handled from the Cherry Point area. In terms of a rail traffic load, this would constitute a moderate to heavy load. Burlington Northern Railroad (BNRR) would expand rail service to accommodate increased rail service requirements and, according to a BNRR source, is looking forward to further growth in this area (Burlington Northern Railroad, telephone conversation, Dennis Anderson, August 6, 1978).

The nearest stations for passenger service trains are located in Bellingham and Blaine. These trains are part of the Amtrak system of rail passenger service.

COMMERCIAL VESSEL FACILITIES AND AIRPORTS

The western portion of the Sub Area is adjacent to the Strait of Georgia which serves as a primary commercial vessel traffic lane between the Strait of Juan de Fuca to the southwest and Vancouver, B.C. to the north. Arco, Intalco and Mobil have pier and berthing facilities in the Strait of Georgia. These marine transfer facilities are used by Arco and Mobil to receive crude oil shipments from tanker vessels and by Intalco to receive raw materials from cargo vessels. The pile-supported piers support the roadway, pipeline and conveyor systems that connect the berths to the shore. The water depth at mean lower low water (MLLW) is 65 feet at the Arco berthing facility, 38 feet at the Intalco facility and 42 at the Mobil facility.

Three airports, located in Bellingham, Blaine and Lynden serve the Cherry Point-Ferndale Sub Area. Bellingham International, approximately 4 miles to the southeast of Ferndale is the largest of the three facili-

ties. This airport has three hard-surfaced runways of suitable length to accommodate medium-size commercial passenger and transport aircraft.

The Blaine and Lynden airfields, located approximately 12 miles northwest and approximately 13 miles northeast of Ferndale, respectively, consist of single hard-surfaced runways of limited length and capacity. The great majority of air traffic at both facilities consists of small single- and twin-engine passenger aircraft.

TRAILS

Nearly all trails for walking, bicycling and horseback riding within the Sub Area are limited to existing roadways and relatively undeveloped paths at the shoulders of these roadways. Other locations within the Sub Area offering available routes for hikers and/or riders include areas adjacent to the Nooksack River, Lake Terrell and the shoreline along the Strait of Georgia.

Previous studies in which improvements and expansions of trail systems in the Sub Area have been discussed include the Whatcom County Trail Plan, prepared for the Whatcom County Park Board in 1973 and revised in 1975, and the Whatcom County Department of Parks and Recreation, Marine Shorelines Study of Public Access and Recreation Sites in Whatcom County, prepared in 1976.

The Whatcom County Trail Plan, identified general and specific objectives and criteria to aid in implementing a trail system provide a network of bicycle, hiking and horsetrails in Whatcom County. In the trail plan study, specific recommendations for trail development were discussed for various geographical areas of Whatcom County. Geographical areas that included the Cherry Point- Ferndale Sub Area were the Whatcom Basin and Nooksack River areas.

Bicycle trails identified in the trail plan include: routes along the Nooksack River, which have been identified as the "backbone" of the

county-wide trail network; a route from Ferndale to the Nooksack River via South Church Road and Haxton Way; a route from the Nooksack River, along the Lake Terrell Road to a trail around Lake Terrell; a long route connecting Ferndale to Birch Bay State Park via Thornton Road, North Star Road, Mt. View Road (these roads also provide a route from Ferndale to Lake Terrell), Rainbow Road, Henry Road, Powder Plant Road, Alder Grove Road, Pt. Whitehorn Road and Birch Bay Drive; an alternate route connecting Ferndale with the Birch Bay Recreational Area via Vista Drive, Bay Road, Blaine Road and Alderson Road; and a major route along Northwest Drive and West Wiser Lake Road that is a portion of the Bellingham-Lynden Loop trail.

Identified horse trails include a route along the Nooksack River; a route from Ferndale to Goshen (approximately 12 miles ease of Ferndale) along Barrett Lake, Ten Mile Creek and Hemmi Road; and a route along the Interstate-5 frontage road and portal Way that is a portion of the route linking Bellingham and Blaine.

Identified hiking trails include the Nooksack River route, a path around Lake Terrell and the beach along the Strait of Georgia from Neptune Beach to Pt. Whitehorn.

Many of the trails identified above could be suitable for some combination of hiking, bicycling and horseback riding uses under some conditions. Shared use of some trails may not be practical because hiking trails are not properly surfaced to accommodate bicycles and extensive horse use may result in trail surfaces that are unusable for hiking use. Also, hiking trail use is generally more compatible with horse trail use than with bicycle use, because bicycles require a harder, smoother surface.

Development of many of the proposed trails could be accommodated with existing county rights-of-way and on other publically-owned lands. The identification of these rights-of-way and public lands as well as those lands that would need to be acquired to provide a network of trails

for various uses are described in the Trail Plan and Public Access studies.

Public access to trail areas and recreational sites is discussed in the Marine Shorelines Study of Public Access and Recreation Sites in Whatcom County. Access to trails and the implementation of a designated trail system that ties this trail system with existing and planned land use is an important consideration in meeting trail needs for recreational and transportation purposes. Access to the beach along the Strait of Georgia has been proposed in the Public Access study for a site near Alder Grove Road near its junction with the Pt. Whitehorn Road and a site off Gulf Road. Existing public access to the beach and potential beach trails include an unnamed right-of-way at Pt. Whitehorn, Henry Road and Urick Road. These rights-of-way, however, provide only legal access at the present time as actual access routes to the beaches have not been developed due to steep banks and because private tidelands exist adjacent to these possible access routes.

UTILITIES

Utility services extend throughout the Cherry Point-Ferndale Sub Area, providing water, wastewater disposal, energy, storm drainage and solid waste disposal services. These services are, to a great extent, concentrated around Ferndale but also extend to the industrial areas near Cherry Point.

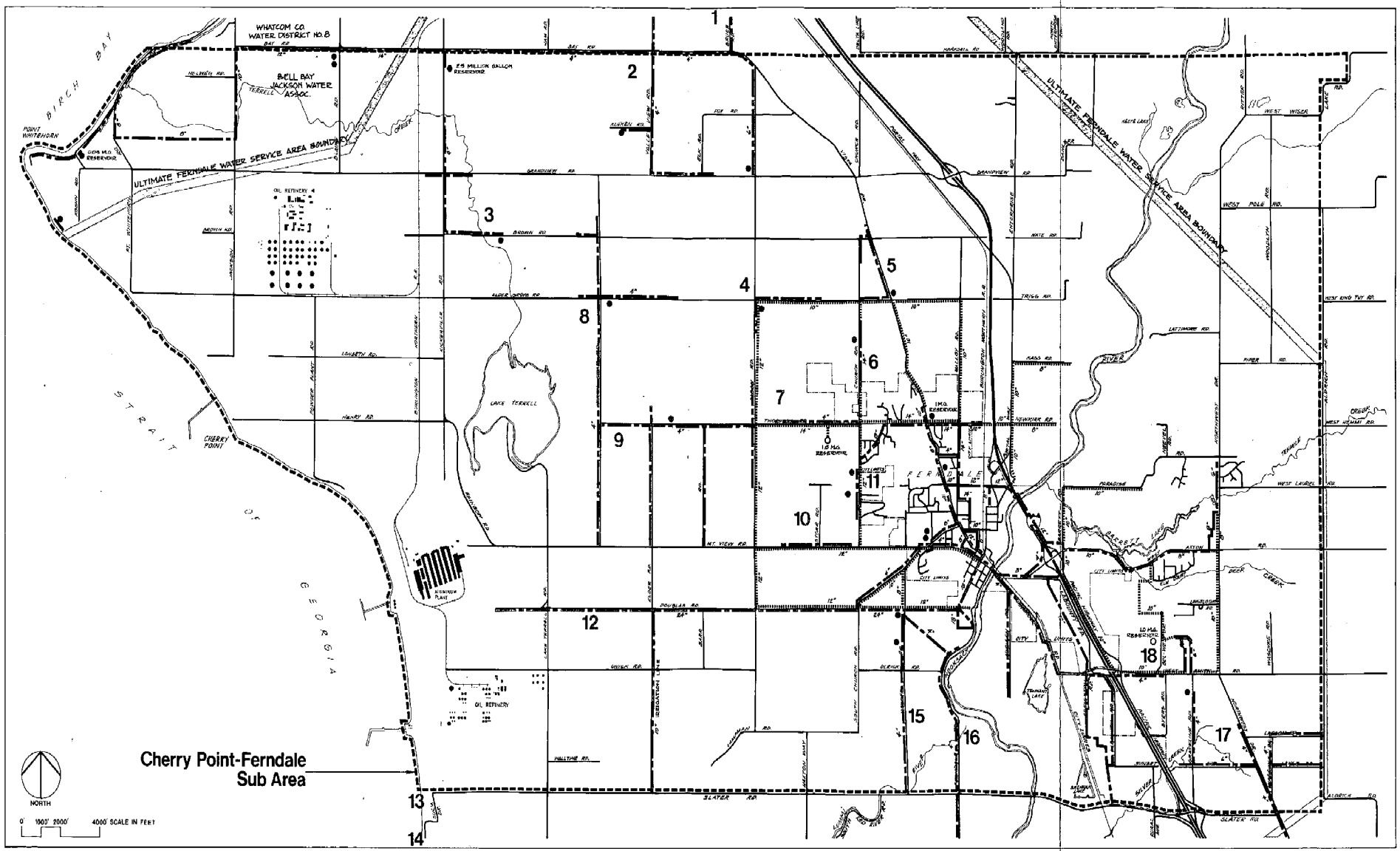
The existing utility system, supporting as it does the existing land uses within the Sub Area, will be described below.

WATER

The principal existing water supply, distribution and storage system serving the Cherry Point-Ferndale Sub Area is shown on Figure 21, Water System. (This figure excludes service lines to residential and commercial areas.) The primary source of water for this system is the Nooksack River.

Also shown on this figure are the locations and names of water associations that supply water to limited areas outside the Ferndale/ Public Utility District service area. These systems, developed from wells, generally service residential and agricultural uses in many parts of Sub Area. The water associations are granted franchises to provide water service to a particular area and are responsible for water system maintenance and operation within this particular area. The quality of the system's well water generally meets U.S. Public Health Service standards; the iron content in some parts of the Sub Area may limit water use to irrigation purposes.

Water service to the City of Ferndale and to industrial facilities in the Cherry Point area is provided through a series of distribution mains from the Nooksack River source, water treatment plant and pump station. This service, provided by the Whatcom County Public Utility



- Existing Wells and Storage Facilities
- Existing Water Lines
- Proposed Storage Facilities
- Proposed Water Lines
- 20 Water Associations

1 Custer Water Ass'n.
2 Old Settlers Water Ass'n.
3 Pleasant Valley Water Ass'n.
4 Aldergrove Water Ass'n.
5 Orchard Water Ass'n.
6 Baker View Water Ass'n.
7 Thornton Water Ass'n.
8 Lake Terrell Water Ass'n.
9 North Star Water Ass'n.
10 Mt. View Water Ass'n.
11 Central City Water Ass'n.
12 Elder Road Water Ass'n.
13 Neptune Beach Water Ass'n.
14 Sandy Point Water Co.
15 Fertile Meadows Water Ass'n.
16 River Road Water Ass'n.
17 Northwest Water Ass'n.
18 Belfern

Source: Whatcom County Engineering Department, City of Ferndale, Whatcom County, Water District No. 8.

Water System

figure 21

District (P.U.D.), has a capacity of 12,500 gallons per minute (gpm) and, because the treatment plant has been sized and built to more than double the 4.5 million gallons per day (mgd) capacity, the installation of additional filters and pumps could allow a capacity of approximately 10 mgd (City of Ferndale Engineering Department, September 6, 1979, personal communication). The Ferndale/P.U.D. system is set up to allow the City of Ferndale to draw water from this system first and during peak demand periods, the City of Ferndale can draw so much water that supplies to the County P.U.D. system, serving the industrial area to the west, are reduced. The City of Ferndale is able to draw water at approximately 3,000 gpm.

Expansions of the water distribution facilities in the Ferndale Service Area and its extension to other parts of the Cherry Point-Ferndale Sub Area are discussed in the current comprehensive water plan for the Ferndale Service Area. According to this plan, the existing service area, now encompassing the City of Ferndale, would be expanded to provide service to almost the entire Sub Area.

The Point Whitehorn area, an area of approximately three square miles lying in the northwest corner of the Cherry Point-Ferndale Sub Area, is not included in this proposed water service area. The Point Whitehorn area is currently served by the water storage and distribution facilities of Whatcom County Water District No. 8. Water District No. 8 provides water service along Bay Road and Jackson Road to Point Whitehorn and the Birch Bay area and has proposed a water system that will provide future service to the area lying generally north of Grandview Road and west of Kickerville Road as well as future expansions of service near Point Whitehorn.

WASTEWATER DISPOSAL

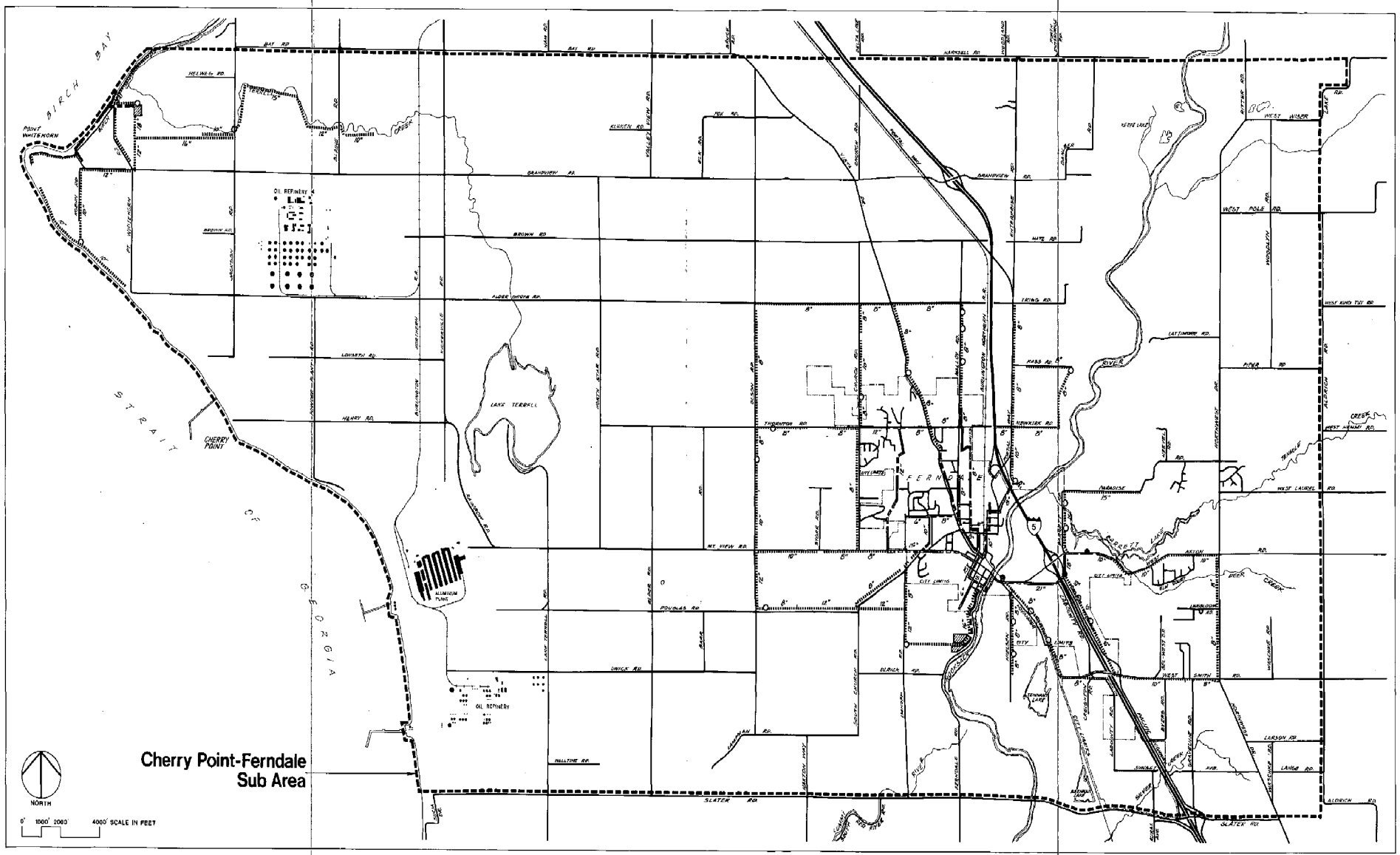
Two types of wastewater disposal systems are being used in the Sub Area: sewer systems with centralized treatment facilities and individual on-site disposal systems with septic tanks and drainfields.

The sewer system is limited to the City of Ferndale where the density of development necessitates such a system. This system is shown on Figure 22, Sewer System. As indicated, the sewer system serves only Ferndale where the sewerage system collects wastewaters and conveys them to the sewage treatment plant along the Nooksack River south of Ferndale. Treated wastewater from the aerated lagoon treatment facilities is discharged into the Nooksack River. This treatment plant and its effluent currently meet state and federal requirements.

Based upon information presented in the existing comprehensive sewer plan for the Ferndale Service Area, modifications of the existing sewage treatment plant were recommended that would accommodate expected future waste loads. To accommodate such loads, it was recommended that the existing plant be modified and expanded into an extended aeration process with increased capacity to accommodate future loads. The size of these future loads was based upon the expected growth in Ferndale and in the Ferndale Service Area which extends five miles in an east-west direction and three miles in a north-south direction, an area of approximately nine and one-half square miles within the Sub Area.

Sewer service in this area and in other adjacent areas would be provided contingent upon annexation to the City of Ferndale and would require further expansion of the treatment plant (City of Ferndale, September 6, 1979, personal communication). Treatment of a significant volume of industrial waste at the sewage treatment plant is not anticipated and these facilities will, therefore, be treating mainly domestic sewage. The sewage treatment plant is currently operating at approximately 70 percent of capacity.

Storm water inflow and groundwater infiltration of the sewerage system adds to wastewater flows and loads at the treatment plant. During wet seasons, such inflow/infiltration is substantial and can double normal wastewater flows to the plant. The inflow and infiltration is due to direct connections between the stormwater lines and the sewer system; groundwater infiltration is due to broken or cracked sewer pipes, open



Existing Sewer Lines
Existing Pump Station
Existing Treatment Plant
Proposed Sewer Lines
Proposed Pump Station

Sewer System

Source: City of Ferndale and
Whatcom County Water District No. 8.

figure 22

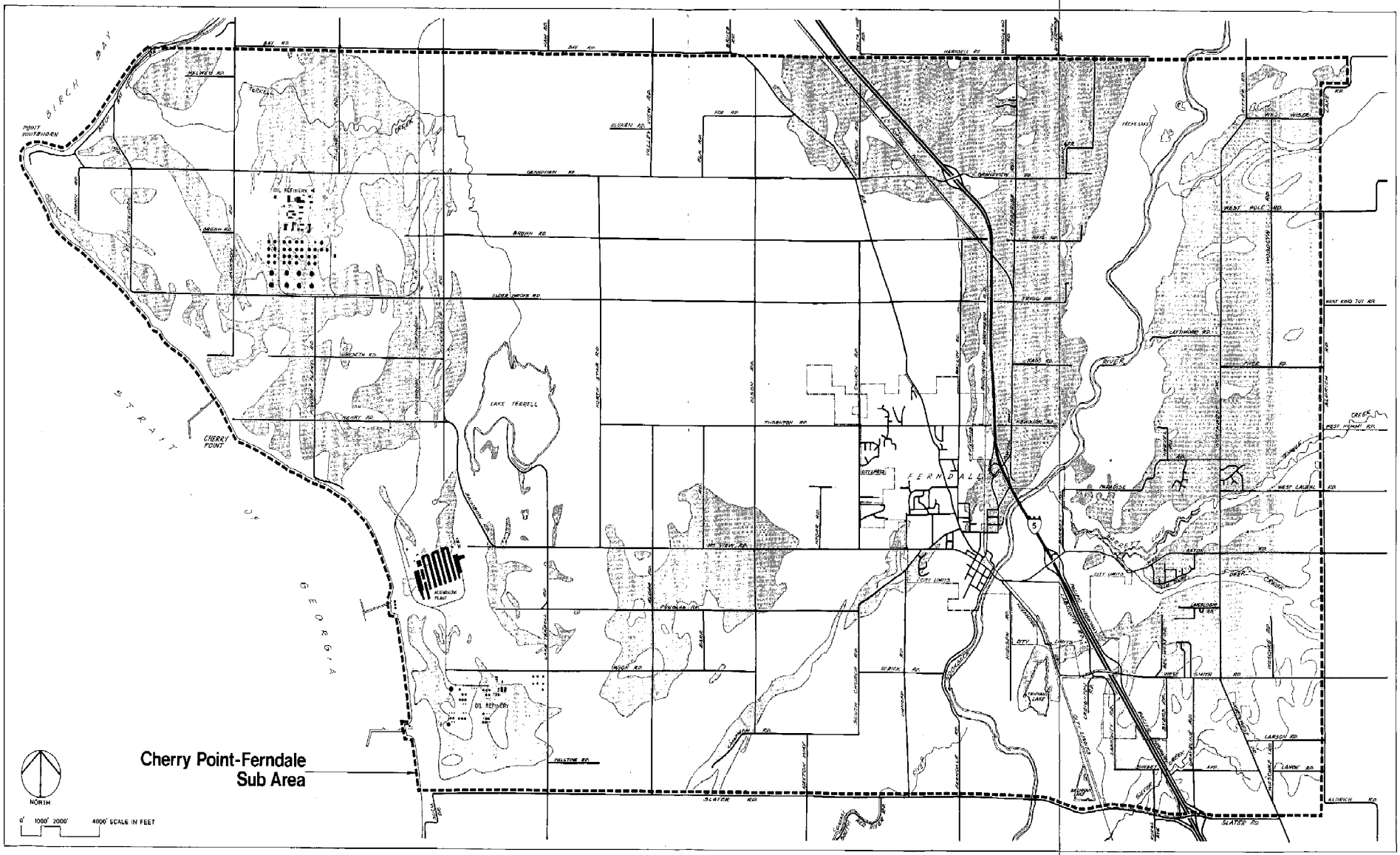
joints, improper side sewer connections and damaged manholes. According to the existing comprehensive plan, such infiltration accounts for a major portion of increased flows in the sewerage system during wet times of the year (City of Ferndale, July 23, 1979, personal communication).

The present sewer is adequate to accommodate wastewater flows from Ferndale.

Throughout a large portion of the study area, septic tanks and drain fields are utilized for wastewater disposal. Figure 23 indicates areas within the Sub Area that have limitations for conventional septic systems because soils there are subject to ponding or seasonally high water table. The map is based on Soil Conservation Service data. The Soil Conservation Service has rated each soil type in terms of its suitability for conventional septic systems. Soils with more than one limiting factor are given a "severe" rating which indicates that the area of a particular soil type has limitations for use as a septic tank drainfield. A rating of "severe" does not preclude the use of septic tank systems in the area nor does it indicate that a conventional septic system will fail, but indicates that larger lot sizes or special septic design features may be required to provide an adequate disposal system. Septic tank and drainfield systems used for disposal of large quantities of wastewater are subject to approval by the Washington State Department of Ecology. On-site wastewater disposal for single families and for other land uses that produce relatively small amounts of wastewater are subject to approval by the Bellingham and Whatcom District Department of Public Health (Bellingham and Whatcom District Department of Public Health, August 8, 1979, personal communication).

ENERGY

Energy services in the Sub Area are provided by Puget Sound Power and Light Company and by Cascade Natural Gas Company.



Cherry Point-Ferndale Sub Area

Soils Subject to Ponding or Seasonally High Water Table

Source: Soil Conservation Service.

figure 23

Electrical service, provided by Puget Sound Power and Light Company, is generated along the Columbia River and in Canada. These sources transmit electricity through the Portal Way substation, the Custer substation and another Bonneville Power Authority substation in Bellingham. The transformer at the Portal Way substation is operating at a current load of approximately 200 megawatts and has a capacity of approximately 325 megawatts. Distribution facilities are located throughout the Sub Area and provide service to all land uses within it.

To provide adequate service to meet peak demand loads, two new thermal power generation plants are to be constructed near Point Whitehorn at the site of an existing 69 megawatt power generation plant. These two power plants, 75 megawatts each, are expected to provide service by the end of 1980 and will be used for approximately 1500 hours per year to meet peak load requirements in Whatcom County. To improve the power network serving the Bellingham and northwest Whatcom County areas, a new transmission line is to be constructed next year from the Enterprise Road area to Bellingham. This line will enable service to be provided in the northwest Whatcom County area, including the Sub Area, in the event of a power outage of the existing transmission line (Puget Sound Power and Light Company, Dennis Soleibe, Division Engineer, August 28, 1979, personal communication).

Natural gas service is provided to the Sub Area by Cascade Natural Gas Company through a 16-inch-diameter natural gas pipeline. This line provides service to Arco, Intalco and Mobil as well as service to Ferndale. The natural gas distribution system within Ferndale is supplied through a high pressure gas line along Slater Road.

Puget Sound Power and Light Company and Intalco are considering the possibility of generating power by using natural gas and have engaged Bechtel Corporation to study this possibility (Cascade Natural Gas Company, September 17, 1979, personal communication).

STORM DRAINAGE

Storm drainage facilities in the Sub Area are generally limited to roadway ditches and culverts for roadway crossings. At the present time, Whatcom County does not have a comprehensive drainage plan for this area. Although there are no formal ordinances relating to storm drainage control, it is an unwritten policy in Whatcom County that storm water runoff be limited to pre-development conditions in problem areas: i.e., those areas where uncontrolled runoff is likely to cause such problems as erosion, slope instability, sedimentation, flooding, general water quality degradation or the possible elimination of fish and other life from streams.

SOLID WASTE DISPOSAL

Solid waste management in Whatcom County has been guided by the Whatcom County Comprehensive Solid Waste Management Plan adopted in 1973. This plan discusses the existing (1973) conditions and proposed solutions to solid waste management concerns, but is now becoming out of date, expecially as a guide for solid waste management within the Sub Area.

Solid waste disposal sites serving the Sub Area are approaching capacity and, by late 1980, new disposal sites will need to be identified. The incinerator on Slater Road, just west of the freeway is currently disposing of wastes from Bellingham and the Sub Area, including some solid waste generated in the industrial area. It is designated to accommodate 100 tons per day but has been operating at approximately 140 tons per day.

The Ferndale dump is approaching capacity and is to be closed, and the disposal site on the Birch Bay - Lynden Road will reach its capacity in approximately one year (Whatcom County Engineering Department, August 7, 1979, personal communication). The County is now considering transfer station possibilities to accommodate solid waste disposal in this area.

COMMUNITY FACILITIES

Community facilities and services are generally provided as public efforts, complemented in certain areas by private undertakings to promote the public health, safety and well-being of citizens. These facilities and services, which include schools, parks and recreation, police and fire protection, health and other human services, significantly influence the quality of life for citizens of a given area.

The following sections describe the existing facilities and services serving the Cherry Point-Ferndale Sub Area. Valuable background information on economic and population trends within the region and Sub Area is found in Appendix B, Economic and Population Trends.

Primary and Secondary Education

Primary and secondary educational services in the Cherry Point-Ferndale Sub Area of Whatcom County are provided by the Ferndale, Blaine and Meridian School Districts. The Ferndale School District, which is the largest of the three, encompasses the major portion of the Sub Area. The Ferndale School District covers approximately 100 square miles, including Lummi Island and the Lummi Indian Reservation to the south, extending roughly to Kickerville Road to the west, "N" Street to the north and Aldrich Road to the east. The Meridian School District serves the remaining western portion of the Sub Area and the Blaine School District the remaining eastern section. The boundaries of these three districts within the Cherry Point-Ferndale Sub Area are shown in Figure 24, Schools.

At present, the Ferndale School District has five elementary schools, a middle school and a high school and also maintains an administration building. The Meridian School District maintains a primary school, a middle school and a high school. The Blaine School District

also has an elementary, middle and high school. The name, address and grade levels of each of these schools are shown on the following Table, Primary and Secondary Schools of School Districts Serving Cherry Point Subarea). Locations of these schools are shown in Figure 24.

There are no non-public primary or secondary schools within the Cherry Point-Ferndale Sub Area. The nearest such schools for children residing in the Sub Area are the Lynden Christian School, and the Bellingham Christian School, Bellingham Cooperative School, Rosemary Harris School and Seventh Day Adventist School, all in Bellingham.

Current enrollment figures, by school, in the school districts serving the Sub Area are shown in Table VI. Present primary and secondary enrollment in the Ferndale School is approximately 3,700. Enrollment in both the Blaine and Meridian School Districts is close to 1,100. Average annual full-time equivalent enrollment figures by grade for each of the three school districts are shown in Table VII.

The Ferndale District experienced large enrollment increases in the middle and late 1960's as a result of the population influx which accompanied the opening of the Intalco Aluminum facility in the area. In recent years, an approximate three percent increase per year has occurred in the District.

The major problem currently facing the Ferndale School District is that a number of the existing schools are accomodating many more students than their intended capacity. The most severe overcrowding conditions are at the Vista Middle school, which was built to accommodate 500 students and now has an enrollment of over 700, and the North Bellingham Elementary School, where 5 portable classrooms are now being used to accommodate the current enrollment. The Custer Elementary School is operating at capacity while the Central Elementary School is one of the only facilities not overly crowded.

TABLE VI

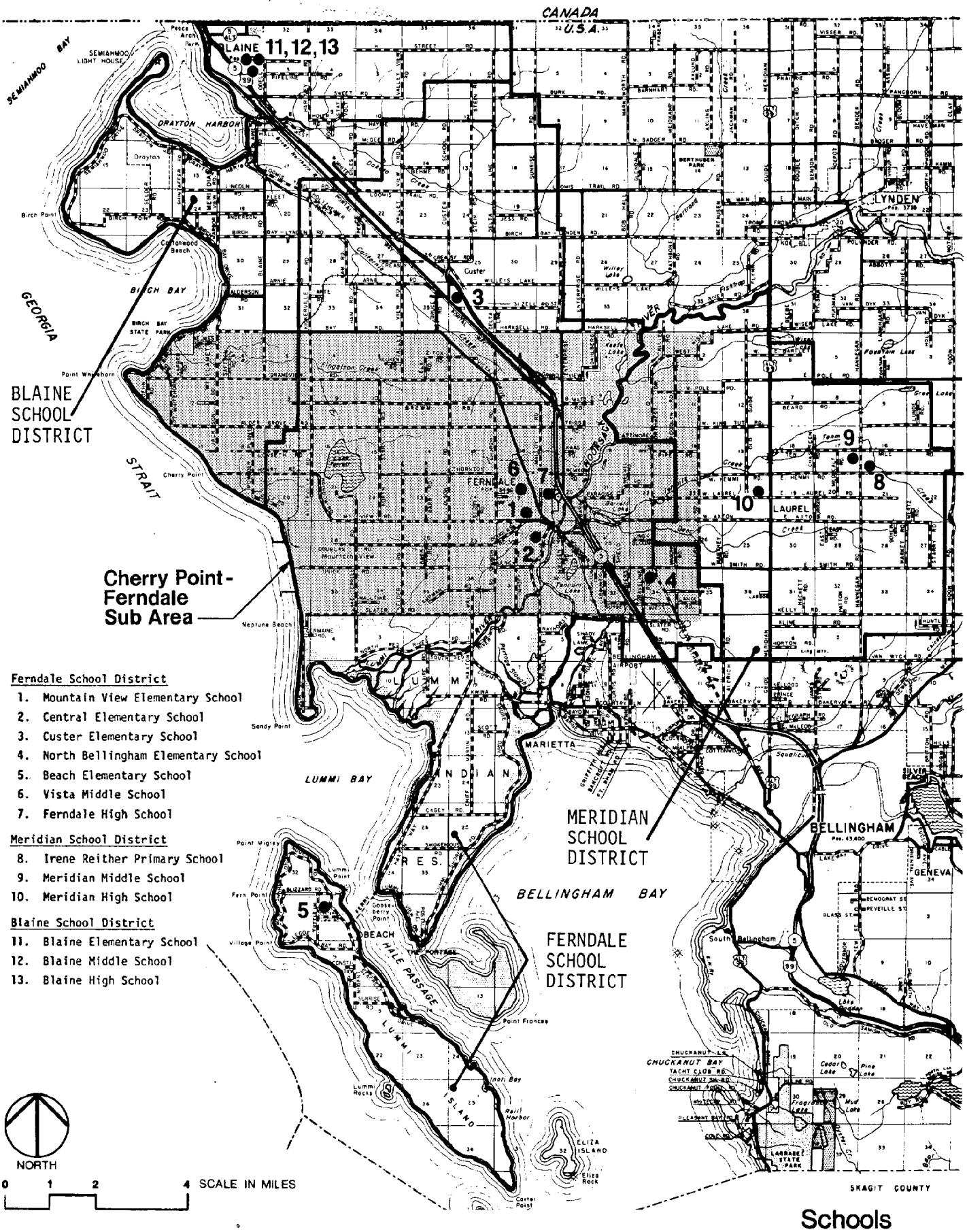
Primary and Secondary School of School Districts

Serving Cherry Point - Ferndale Sub Area

FACILITY	LOCATION	GRADES	ENROLLMENT[a]
Ferndale School District			
Mountain View Elementary	Henderson Road, Ferndale	K-5	695
Central Elementary	Second & Alder, Ferndale	K-5	393
Custer Elementary	Custer School Road, Custer	K-6	414
North Bellingham Elementary	Northwest Road, Bellingham	K-6	450
Beach Elementary	Centerview Road, Lummi Island, Ferndale	K-6	29
Vista Middle School	Vista Drive, Ferndale	6-8	725
Ferndale High School	Golden Eagle Drive, Ferndale	9-12	1,018
TOTAL			3,724
Meridian School District			
Irene Reither Primary	Everson	K-4	446
Meridian Middle School	Ten Mile Road, Lynden	5-8	300
Meridian High School	W. Laurel Road, Bellingham	9-12	350
TOTAL			1,096
Blaine School District			
Blaine Elementary	Mitchell Street, Blaine	K-4	401
Blaine Middle School	H Street, Blaine	5-8	326
Blaine High School	H Street, Blaine	9-12	342
TOTAL			1,069

[a]Enrollment figures are for June, 1979, for the Blaine and Meridian School Districts and for May, 1979, for the Ferndale School District.

Source: Ferndale, Meridian and Blaine School Districts, 1979.



Schools

Sources: Washington State Superintendent of Public Instruction, Ferndale, Blaine and Meridian School Districts.

figure 24

Table VII

Cherry Point-Ferndale Sub Area School District Enrollment, by Grade Level

1978-79 AVERAGE ANNUAL Full Time Equivalent (FTE) Students

	Grade Level				
District	K	1-6	7-8	9-12	Total
Ferndale	136.67	1,853.88	565.23	1,032.95	3,588.73
Blaine	39.00	483.45	169.78	352.03	1,044.26
Meridian	43.39	523.11	158.44	362.76	1,087.70

Cherry Point-Ferndale Table VIII Sub Area School District Projections, 1979-1986

COHORT PROJECTIONS - Individual Students

		Grade Level				
District	Year	K	1-6	7-9	10-12	Total
Ferndale	1979	279	1,900	862	804	3,845
	1980	281	1,957	892	777	3,907
	1981	283	1,993	949	795	4,020
	1982	285	2,040	1,033	761	4,119
	1983	287	2,111	1,073	790	4,262
	1984	289	2,215	1,063	845	4,412
	1985	291	2,325	1,060	916	4,592
	1986	293	2,441	1,080	948	4,762
Blaine	1979	84	493	252	276	1,105
	1980	91	512	234	257	1,094
	1981	99	504	248	258	1,109
	1982	107	496	262	246	1,111
	1983	116	503	275	228	1,122
	1984	126	503	267	242	1,138
	1985	137	503	258	258	1,156
	1986	149	503	265	267	1,184
Meridian	1979	97	527	242	273	1,139
	1980	106	550	229	269	1,154
	1981	115	561	247	228	1,151
	1982	125	565	266	223	1,179
	1983	136	579	298	210	1,223
	1984	148	621	292	228	1,289
	1985	161	666	277	247	1,351
	1986	175	715	269	275	1,434

Source: Washington State Superintendent of Public Instruction, Research and Development Division, 1979.

A construction program has been undertaken by the Ferndale District which will provide a new elementary school and additions and improvements to several existing schools. The new elementary school, which will be located at the corner of Thornton and Vista Roads, will accommodate 500 students and is due for completion by September, 1980. Other improvements to be completed in 1980 include additional classroom space and extensive remodelling of the North Bellingham Elementary School, major remodelling and new construction at the Custer school site, and addition and remodelling of some facilities at the Vista and Mountain View Schools. The Custer site project involves remodelling of the existing elementary school, demolition of the old gym and former middle school building and replacement with new classroom space. An additional project, remodelling and expansion of the Central School library and covered play area may also be undertaken during 1980. Improvements to North Bellingham Elementary School involve remodeling of the existing gym into a library, construction of new gym, and construction of five new classrooms to replace the portables now being used. The Mountain View School improvements include the expansion of its kitchen area. The planned improvements for the Vista School are a remodelling and expansion of its industrial arts facility. Some additional recreational facilities that are desired for competitive inter-school sports events may also be undertaken by the school district.

The inventory of school facilities prepared for the State Superintendent of Public Instruction for the 1977-1978 school year rated the condition of the Ferndale District's schools as follows: all of the total square footage of the Beach Elementary were categorized as being in "poor" condition; the entire square footage of the North Bellingham Elementary School was classified as "good"; approximately one-fifth of the Custer Elementary School's space was classified as good and the rest poor; roughly two-thirds of Central Elementary School's space was categorized as good and the rest poor; the entire Vista Middle School was listed as good; and 79 percent of Ferndale High School was classified as good, 13 percent as fair, and the remaining 8 percent as poor.

The main result of the improvement projects now underway or planned and funded for the Ferndale School District will be to eliminate the current overcrowded conditions and to provide an enrollment load appropriate for the intended capacity of each facility. These projects will also improve some of the facility space which is currently in poor or inadequate condition (such as the portable North Bellingham Elementary classrooms). Upon completion of these improvements in 1980-81, the District's facilities are expected to be suitably equipped to handle the anticipated enrollment. At that time, all of the elementary schools will handle grades K-6, the Middle School grades 7-8, and the High School 9-12.

Enrollment projections for the Ferndale District for the next 5 years indicate a continued annual growth of about 3 percent. The fastest growing enrollment areas within the District are expected to be the North Bellingham area, the Laurel area around Smith Road and Northwest Drive, and the area north and east along Portal Way currently considered for annexation to the City of Ferndale. Additional expansion or new facilities will be necessary to accommodate further growth that occurs in the District after 1980. Because the School District now has no sites other than the existing facility and new elementary school property, a site selection committee has been formed to determine when and where new sites should be acquired. A preliminary report has been prepared but no decisions have yet been made comcerning specific sites or types of facilities required for the future.

Total enrollment in both the Meridian and Blaine Districts has been fairly stable in recent years. One change which did occur was a drop of about 40 students in the Blaine District last year after the Blaine Air Force Base closed. The Blaine School District facilities have a current physical capacity which could accommodate up to 150 additional students evenly distributed among grade levels. The Meridian District's facilities are currently thought to be operating near capacity. Recent overcrowding at the Primary School necessitated the transfer of several classes to the Middle School which had some additional capacity.

The inventory of school facilities prepared for the State Superintendent of Public Instruction for the 1977-78 school year rated all of the Blaine School facilities as being in good condition. In the Meridian School District, the Primary School (the District's newest facility) was rated in good condition while 40 percent of the Middle School space was classified as good and 60 percent as fair, and 43 percent of the High School space was classified as good, 24 percent as fair and 33 percent as poor. Part of the Meridian High School facilities are old and present some problems such as difficulty in heating. Another concern of the Meridian School District is a shortage of physical education space (part of it is classified as substandard).

Improvement projects planned for the Blaine School District include additions to the Middle School kitchen/cafeteria, stage area and band facility; addition of a new wrestling area and expanded locker area to the Ken Waters High School gym; and a small addition plus extensive remodelling and update of the old gym (used primarily by the elementary and middle schools).

Beyond some minor repair and remodelling, no specific improvement projects are currently planned for facilities in the Blaine or the Meridian School Districts.

Enrollment projections for 1979-1986 for the Ferndale, Blaine and Meridian School Districts prepared by the State Superintendent of Public Instruction are shown in Table VIII. These projections show a 24 percent increase in the Ferndale District, a 7 percent increase in the Blaine, and a 26 percent increase in the Meridian District. It should be noted that these projections, which were developed using cohort survival techniques, are subject to greater potential forecasting error for small school districts such as those in the Cherry Point-Ferndale Sub Area. The impact of any major industrial expansion will significantly alter enrollment in the Sub Area districts.

College, Vocational and Technical Education

The principal colleges, vocational and technical institutions serving the Cherry Point-Ferndale Sub Area are Bellingham Vocational Technical Institute, Whatcom Community College and Western Washington University.

Bellingham Vocational/Technical Institute is one of five publicly funded vocational institutes in the state. Established under state authority, it is administratively tied to the Bellingham Public School District. Although the majority of its students reside within its state-designated service area, Whatcom County, students from other counties can and do attend. The Institute provides vocational skills training, adult basic education and other special programs to a current annual enrollment of approximately 11,000 (including about 1,000 day-time students plus part-time continuing education and part-time day students). The vocational programs are oriented to trade and industries, office and health professions and cover 22 trade and para-professional areas. Among these are: pre-apprenticeship training in the carpentry, electronics, general electrician, avionics, horticulture and automobile mechanic professions, programs geared to general secretarial/clerical, bookkeeping/accounting, data processing as well as programs preparatory to practical nursing, aide or orderly, physical therapy, pharmacy or dental assistant positions. The Institute also periodically conducts special vocational training programs designed in conjunction with specific requirements of individual unions or employers or special population groups (such as the Nooksack and Lummi Tribes). Most classes offered by the Institute are given at its main facility (which is on Lindbergh Avenue in Northwest Bellingham) although certain classes are offered at alternate locations throughout the County.

Whatcom Community College is a two-year community college which has a current enrollment of 2,500 full and part-time students (the equivalent of 1,000 full-time students). The college has no formal central campus but instead has several instructional centers or sites, including

three sites in Bellingham and ones in Ferndale, Blaine and Lynden. Locations in Bellingham include the services and administration offices at 5217 Northwest Road in north Bellingham as well as facilities at Mid-Town and at Marine Drive High School. Facilities elsewhere in the County are also utilized for some of the College's programs.

The Whatcom Community College offers a variety of Associate Degrees as well as one-year certificates and non-degree continuing education programs. In addition to a traditional arts and services program, the college has special courses and programs covering a variety of areas such as: business management, real estate and banking, health services, early childhood education as well as adult basic education and assorted enrichment areas. The College has also developed in-service training programs in conjunction with specific industries (e.g., Mobil, Intalco and Arco) and programs for specific population groups (e.g., agriculture for the Lummi Indians).

Western Washington University is the largest higher educational institution and major university located near the Cherry Point-Ferndale Sub Area. Western Washington University now encompasses seven separate colleges: the Colleges of Arts and Science, Fine and Performing Arts, Education, Business and Economics, plus Huxley College (offering upper-level two year environmental programs) and Fairhaven College (offering independent interdisciplinary study). The University offers B.A., B.S., Bachelor of Music as well as many Master's degree programs in its different colleges. The University's enrollment now includes approximately 9,600 full and part-time students drawn primarily, although not entirely, from Washington State. In addition to its main campus, which is located in Bellingham, the University has continuing education centers in Blaine and Ferndale where special courses are offered.

PARKS AND RECREATION

The Cherry Point-Ferndale Sub Area seems abundantly provided with State, County and municipal park and recreation spaces both within and without the Study Area, as can be seen in Tables IX and X, and Figure 25.

TABLE IX

Cherry Point - Ferndale Sub Area Park and Recreational Facilities

	TOTAL ACRES	DEVELOPED ACRES	FRESHWATER SHORE	MARINE SHORE	SPECIAL FACILITIES
Washington State Parks					
Birch Bay State Park	198	130		7,000	Swimming; picnicking; Camping and tent sites; R.V. sites.
State Game Department					
Nooksack River (Smith Farm)	4.3	0	7,360		
Nooksack River Acreage	1	0	2,500		
Nooksack River Acreage (Ferndale Road)	2.1	0	3,600		
Lake Terrell Game Range	1,153	12	249,600		Picnicking; dock; Two-mile trail.
County Parks					
Hovander Homestead	348	35	10,500		Picnicking; 2 athletic fields; fishing; historical attractions.
Tennant Lake	248				Boating; fishing; hiking archery; shooting; historical significance; beach; picnicking.
Ferndale Municipal Parks					
Pioneer Park	21	15			Historic buildings; 3 athletic fields; rolle rink; picnic areas.
Flair Property	0.5	0			Neighborhood play area.
Public Libraries					
Mountain View Library					Branch County Library.
Whatcom Community College					
Ferndale Instructional Center					900-square-foot meeting/ classroom center.
Senior Service Centers					
Ferndale Senior Center (County)					4,500 square feet of meeting rooms, lounges, etc.

TABLE IX , Continued

	TOTAL ACRES	DEVELOPED ACRES	FRESHWATER SHORE	MARINE SHORE	SPECIAL FACILITIES
Granges or Township Halls					
North Bellingham Grange (Ferndale School District)					3,200 square feet of meeting space
Ferndale School District					
Mountain View Elementary	15	10			
Central Elementary	3.7	3.7			
Vista Middle School	40	20			Classroom space plus gyms, auditoriums, shops, football/soccer/baseball and multipurpose courts and play equipment.
Ferndale High School	54.5	44.5			
North Bellingham Elemen.	19.7	4			
Commercial Facilities					
United Campground	21.8	5			Picnicking; R.V. & tent camping facilities.
Scottish Lodge	2.3	2.3			Motel; pool; sauna
Shady Rest Mobile Village	11	5.5			Picnicking; R.V. camping.
Cherry Point Recreational Park	55	2			R.V. & Tent camping.
Riverside Golf Course	74	74			Picnic facilities; 9-hole golf course.
Grandview Golf Course	114	114			Picnic facilities; 18-hole golf course.
Sandy Point Golf and Country Club and Marina					Picnic facilities; 9-hole golf course; pool; tennis courts; boat launch.

Source: Whatcom County Parks Department, July, 1977 and 1979.

TABLE X

ADDITIONAL REGIONAL RECREATIONAL FACILITIES AVAILABLE TO CHERRY POINT SUB AREA RESIDENTS[a]

U.S. FOREST SERVICE

- Mt. Baker Recreation Area: Mt. Baker-Snoqualmie National Forest--Heather Meadows Visitor Area, the Mt. Baker Ski Area, ATV, horse and hiking trails, camping, hunting, trailheads, backcountry roads, and the Baker Lake water-recreation area.
- Ross Lake National Recreation Area and North Cascades Highway.

SEATTLE CITY LIGHT

- Newhalen Park Area: Tours from Newhalen, including a boat trip, an incline lift and an inspection of the hydropower installations; boat launch facilities, nature trails, gardens and picnic areas.

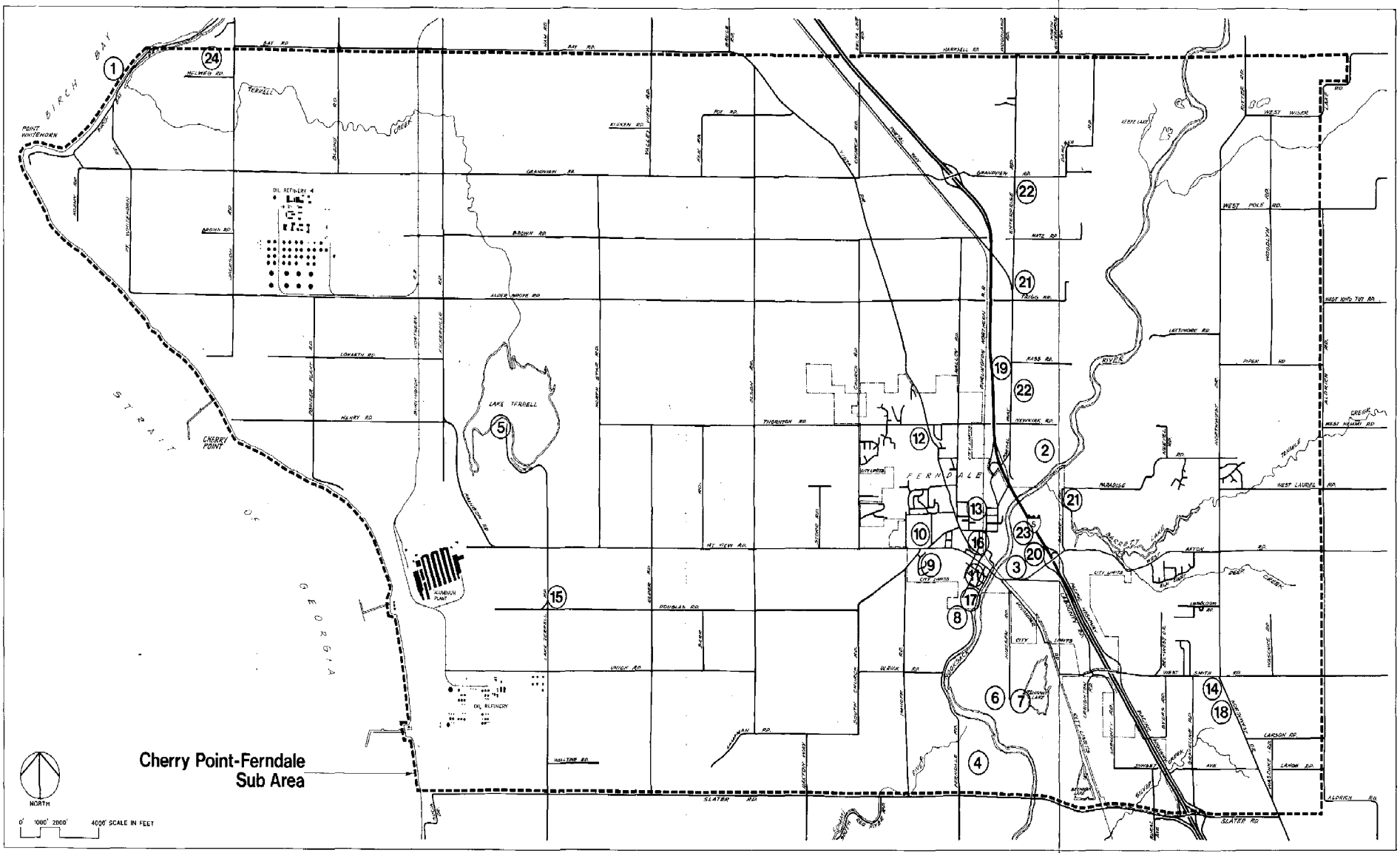
STATE PARKS COMMISSION

- Larrabee State Park: Chuckanut Mountain--beach, camping and picnicking areas, marine shoreline access, upland hiking.
- Peace Arch: U.S. Canadian Border--

COUNTY PARK BOARD

- Samish State Park: North Samish Drive, Bellingham--39 acres and 1,500 feet of shoreline on Lake Samish provide swimming, boating, picnicking, fishing and meeting/refreshment building.
- Silver Lake Park: Silver Lake Road, Maple Falls--411 acres and 4,800 acres of Silver Lake, providing fishing, swimming, picnicking, boating, horse and hiking trails, tent and horse campsites, cabins and historical museum displays.
- Pine and Cedar Lakes Park: Chuckanut Mountain, near Bellingham--300 acres of trails and semi-wilderness and 5,000 feet of water frontage for hiking, camping and fishing.
- Plantation Rifle and Archery Range: Samish Highway, Bellingham--25 acres, providing outdoor and indoor rifle and archery ranges, safety courses and competitive matches.
- Lighthouse Marine Park: Marine Drive, Point Roberts--22 acres and 2,500 feet of saltwater beach with boardwalks, picnic, boat launch facilities, fishing access, annual arts and crafts fair.
- Roeder Home: Sunset Drive, Bellingham--early 1900s home used for cultural arts programs, arts and crafts classes and social events.
- Lummi Marine Park, Lummi Island--29-acre, 450-foot shorefront with boat ramps, swimming and picnicking facilities.
- Seven Senior Activity Centers: Bellingham, Lynden, Point Roberts, Blaine, Sumas, Deming, Everson and Lummi Indian Reservation--information centers, referral services, education and art and craft classes, music, dance, exercise, hiking groups and assorted outings.
- Pleasant Valley School Property, Kickerville and Bay Road--3 acres of undeveloped park site.
- Cottonwood Beach Birch Bay access--15 acres with 1,200 feet of shorefront which is used but not developed.

[a] Outside actual Cherry Point Sub Area



WASHINGTON STATE PARKS
1 Birch Bay State Park

STATE GAME DEPARTMENT
2 Nooksack River (Smith Farm)
3 Nooksack River Acreage
4 Nooksack River Acreage (Ferndale Road)
5 Lake Terrell Game Range

COUNTY PARKS
6 Hovander Homestead
7 Tennant Lake

FERNDALE MUNICIPAL PARKS
8 Pioneer Park
9 Flair Property

FERNDALE SCHOOL DISTRICT
10 Mountain View Elementary
11 Central Elementary
12 Vista Middle School
13 Ferndale High School
14 North Bellingham Elementary

PUBLIC LIBRARIES
15 Mountain View Library

WHATCOM COMMUNITY COLLEGE
16 Ferndale Instructional Center

SENIOR SERVICE CENTERS
17 Ferndale Senior Center (County)

GRANGES OR TOWNSHIP HALLS
18 North Bellingham Grange

COMMERICAL FACILITIES
19 United Campground
20 Scottish Lodge
21 Portal Way Mobile Village
22 Evergreen Manor Recreational Park
23 Riverside Golf Course
24 Leisure Bay Resort

Sources: Whatcom County Department of Parks & Recreation and Miscellaneous other Sources.

Parks and Recreational Facilities

figure **25**

In addition to the areas listed in the two Tables, there are several other facilities that are worthy of note. Intalco has a private recreation space that provides a clubhouse, a baseball field, a horseshoe diamond and tennis courts.

The Mountain View Library, located on Lake Terrell Road near Douglas Road, is one of eleven branch libraries operated by the Whatcom County library system in addition to the main library on Northwest Road in Bellingham. Other branch libraries in the County are in Blaine, Deming, Everson, Glacier, Lynden, Newhalen, Point Roberts and at the Sudden Valley development and Diablo Dam.

The Ferndale Instructional Center, operated by Whatcom Community College, on Third Avenue in Ferndale, provides a variety of recreation, crafts and education courses. Other community college instructional centers are located in Blaine (on Portal Way), Lynden (6th and Grover) and Bellingham (Northwest Road near Smith, Marine Drive and Midtown on Commercial). Other educational and enrichment opportunities offered by higher educational facilities in the County are discussed in the Education Section earlier in this report.

The City of Ferndale requires new housing developments to retain a minimum area as park space for residents or to pay a fee in lieu and has thus acquired a number of small play area/open space parcels. The Flair property is one such park; it has been cleared by residents and is used as a play area. Another small (1-1/2 acre) park, located at the Northwest corner of Thornton and Mallory Roads, has recently been dedicated in connection with another subdivision. A third small park is in the process of being developed by joint City/resident efforts on 3 acres located at Aquarius Way.

In addition to those school facilities listed in Table VI, actually located within the Cherry Point-Ferndale Sub Area, other facilities of the Ferndale, Blaine and Meridian School Districts are near enough to be utilized by Sub Area residents for recreational purposes.

The Whatcom County YMCA also provides recreational facilities accessible to Sub Area residents. The YMCA has an indoor facility in Bellingham that has a swimming pool, gymnasium, handball and squash courts and multi-purpose rooms. A number of youth and church groups, as well as the Ferndale School District, use the pool for instruction and competition.

An additional property on Thornton Road is planned for park development by the City of Ferndale at some future date. This is a 5-acre site 1/2 mile west of Church Road, acquired by the City for a water facility. It is intended that the water facility will occupy 1/2-acre and the remainder will be developed as a park.

A citizen's group, the Ferndale Recreational Association, has been formed with the intention of formulating a recreation plan and capital improvement program for the City. It is possible that a bond issue proposal for a park, pool and library facility may be forthcoming within a year or two (Ferndale Parks Board, July 31, 1979, Personal Communication).

FIRE PROTECTION

Fire protection services in the Cherry Point-Ferndale Sub Area are provided by the Ferndale Fire Department which serves Fire District No. 7. The boundaries of Fire District No. 7 are roughly identical to those of the Sub Area, extending approximately to Aldrich Road on the east, Bay (Harksell) Road on the north, Slater Road on the south and to the water on the west.

The Ferndale Fire Department maintains three fire stations: Fire Station #1, located at the intersection of Washington Avenue and 3rd Street in Ferndale; Fire Station #2, currently located in a leased facility on the Arco refinery site; and Fire Station #3, located on Northwest Drive near the intersection with Smith Road. Construction on a new replacement facility for Fire Station #2 has begun at a site near the

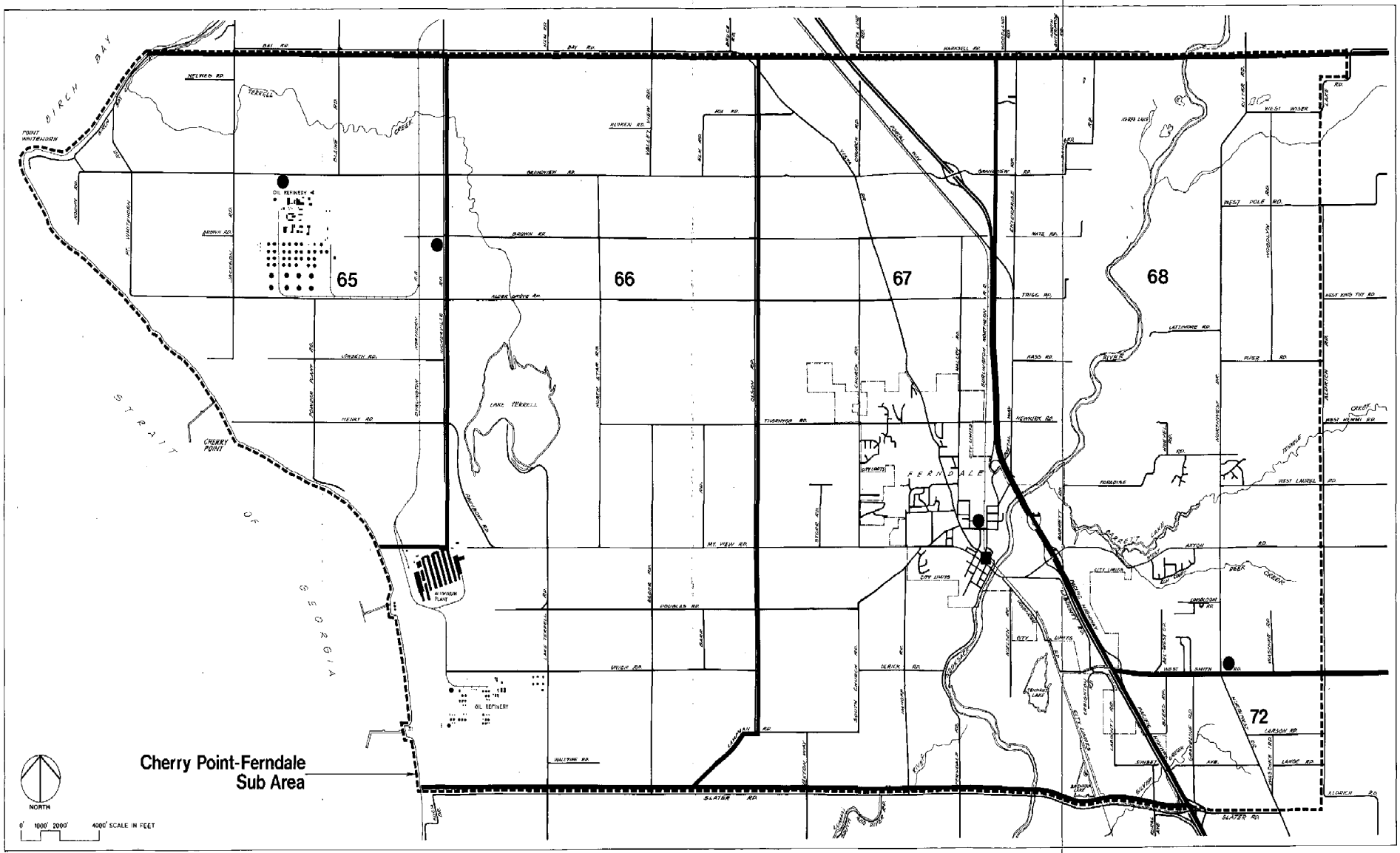
intersection of Kickerville and Brown Roads. The new Fire Station #2 is expected to be in use within 3 months. Stations #1 and #3 are both less than 5 years old. Locations of Stations #1, #3 and the new #2, now under construction, are shown on Figure 26, Police and Fire Protection Facilities.

The Ferndale Fire Department is a volunteer force consisting of 70 volunteers and a full-time, paid fire chief. Current equipment of the Department includes four pumpers (two 1,500-gallon, one 750-gallon, and one 500-gallon), three 300-gallon mini-pumpers, and two tanker/pumpers (one 2,200-gallon tanker with a 500-gallon pumper, and one 1,000-gallon tanker with a 500-gallon pumper). One new 1,500-gallon pumper has been ordered and will be delivered in November, 1979.

Specifications are now being prepared by the Department to order two new mini-pumpers and a new 2,500-gallon tanker with a 1,000-gallon, or larger, pumper. These additional mini-pumpers and tanker/pumpers will not be obtained until 1981. It is conceivable, should the need arise, that the Department might eventually consider maintaining part of its firefighting force on a paid basis. The location of current manpower and equipment, by station, is shown in Table XI, Fire Protection Facilities in Cherry Point-Ferndale Sub Area.

Each of the mini-pumpers currently utilized by the Ferndale Fire Department is equipped and used as a rescue and aid vehicle. Twenty-two of the Department's volunteer firefighters have been trained as emergency medical technicians.

The Ferndale Fire Department's services that are provided to the three major industrial facilities (the Mobil and Arco refineries, and Intalco Aluminum), are, in some cases, supplemented by these company's own fire-fighting capabilities. Both Arco and Mobil have their own fire-fighting crews and equipment. However, while Arco has an arrangement to receive backup services from the Ferndale Department and shares in the financial support of the District, Mobil presently has no such



Police and Fire Protection Facilities

Sources: Whatcom County Sheriffs Department,
Ferndale Police Department,
Ferndale Fire Department.

figure 26

TABLE XI

Fire Protection Facilities in Cherry Point Sub Area

Fire District No. 7

STATIONS/LOCATION	FIREFIGHTERS	EQUIPMENT
Fire Station #1 Washington Avenue & 3rd Street	30 Volunteers 1 Full-time Chief	1 1500-gallon pumper 1 750-gallon pumper 1 2,200-gallon tanker with 500-gallon pumper 1 300-gallon mini-pumper[b]
Fire Station #2 (under construction)[a] Kickerville & Brown Roads	20 Volunteers	1 500-gallon pumper 1 300-gallon mini-pumper[b] 1 1,500-gallon pumper (expected Nov., 1979)
Fire Station #3 Northwest Drive & Smith Road	20 Volunteers	1 1,500-gallon pumper 1 300-gallon mini-pumper[b] 1 1,000-gallon tanker with 500-gallon pumper

[a]Present Station No. 2 is located in leased facility on ARCO property.

[b]Each mini-pumper is also equipped as an aid-rescue vehicle.

Source: Ferndale Fire Department, July, 1979.

arrangement, is technically outside the Fire District and does not specifically contribute funds to its support. Mobil is now requesting the establishment of a formal mutual aid agreement with the Ferndale Fire Department.

Although Intalco Aluminum has some firefighting capabilities, their service is basically limited to the special training of some of its security personnel and possession of hose line on its premises. Intalco's facilities, therefore, rely primarily on the Ferndale Fire Department for their fire protection resources.

Current fire protection facilities and services in the Cherry Point area (including the new station) are thought adequate. The fire insurance rating for the City of Ferndale is 6 on a scale of 10 (where 10 means no fire protection at all). The rating assigned the outlying areas is 8 or 9, depending on the distance from fire hydrants and other factors.

Though not served by water mains and hydrants, there are, in general, no problems serving outlying areas. It is estimated that a fire anywhere within the district can be responded to within 5 minutes time. Existing equipment can carry enough water to handle residential fires, though there is some question regarding carrying enough to deal with fires in larger structures such as barns. There is, however, a mutual aid pact among all the fire departments within Whatcom County. Should it be necessary, the Ferndale Department could call on any other county department for assistance.

The volume of calls in the Ferndale Fire District currently averages about 1½ calls per day. Approximately 40-50 percent of these calls are aid and rescue calls; the remainder are primarily residential or barn fires. The only major industrial fire in recent years was a refinery fire at Arco that occurred about 1½ years ago.

POLICE

Police services within the Cherry Point-Ferndale Sub Area are provided for the City of Ferndale by the Ferndale Police Department and for the rest of the Sub Area by the Whatcom County Sheriff's Department. Although the Departments have separate funding and separate primary jurisdictions, they share a common dispatch system and provide mutual support to assure immediate responses to calls.

The Ferndale Police Department, which consists of 6 full-time officers, including the Police Chief, and two clerical support staff, is headquartered at 2nd Street and Vista Drive in Ferndale. The Department has 3 patrol cars. The locations of police facilities are shown in Figure 26.

The Whatcom County Sheriff's Department, which consists of 16 sworn deputies, 5 supervisors and 29 support staff, has administrative offices in the Bellingham Court House. In addition to the patrol officers based in Bellingham, the County has three deputies who are based in towns in the area, 2 in Pt. Roberts and 1 in Newhalen.

The Cherry Point-Ferndale Sub Area is not a high crime area; it does not generate a large number of calls.

Information on response times and calls is maintained by the Sheriff's Department on a county-wide grid system. These grids are shown in Figure 26. Their information for the month of June, 1979, is summarized in the Table below.

Grid Section	Total Number of Calls	Total Time Spent On Each Call	Average Response Time
65	20	40	13
66	5	46	22
67	46	39	14
68	62	41	22

Source: Whatcom County Sheriff's Department, July, 1979.

For July, 1979, the average response time ranges from 13-22 minutes.

The Sheriff's Department has indicated that a need for 10 additional officers to effectively serve the area. An immediate addition of 4 officers has been requested and it is hoped that several more will be added in each of the coming years.

HEALTH CARE

Most of the information in this section was obtained from the North Puget Sound Health Council, a subdivision of the 10-County Puget Sound Health Systems Agency, which is responsible for health planning in Whatcom County.

Hospitals

Serving Whatcom County, there are two non-federal hospitals in Bellingham:

- St. Joseph Hospital, a 103-bed hospital operated by the Sisters of St. Joseph of Peace, Health and Hospitals Services, a non-profit corporation. Most obstetric and pediatric patients are treated here.

- St. Luke's Hospital, a 112-bed facility, operated by another non-profit corporation.

Most general hospital services are available to area residents and seem to be adequate for the area population. For such specialized services as coronary care, hemodialysis and radiation therapy, residents usually travel to Seattle.

Two separate studies of Whatcom County's hospitals, one by the North Puget Sound Health Council and one by the Whatcom County Citizens Task Force for Medical Care Facilities, reported that Whatcom County's hospitals are overly sufficient for both current and 1990-projected hospital needs. The Task Force recommended consolidating St. Joseph and St.

Luke's into a single location to save money and to create a more efficient operation.

Clinics

In addition to using the County's hospitals, Cherry Point-Ferndale Sub Area residents receive primary health and medical care services through several community clinics. Community clinics located in Whatcom County are listed in Table XII. These clinics provide a variety of acute and chronic care services (including emergency, screening, diagnosis and treatment) as well as prevention and health education services. They are thought adequate to area's needs. Located within the Sub Area itself, the Ferndale Medical Clinic provides facilities for general health care and minor emergencies, and is currently staffed by 2 physicans and 3 medical assistants. The Whatcom County Health Department also brings health care services (such as screening and immunization) to areas that need them via mobile units.

Physicians

In keeping with the general adequacy of health care in the area, there appear to be a sufficient number of physicians and other licensed health care professionals, according to a 1978 report by the North Puget Sound Health Council. This report does indicate that the physician distribution may be skewed so that particular primary care needs may not be met in certain areas. Table XIII summarizes physician and other professional services available to Whatcom County residents.

Emergency Medical Services

Hospital-based emergency medical services are provided to residents in the Cherry Point-Ferndale Sub Area by St. Joseph and St. Luke's hospitals, which together, provide 24-hour coverage as well as lab, x-ray, helipad and EMT and Paramedic-staffed ambulance services. Within the Cherry Point-Ferndale Sub Area, these are supplemented by the aid/

Table XII

LIST OF COMMUNITY CLINICS

1. Bellingham-Whatcom Department of Public Health
   Bellingham
2. Children's Clinic
   Whatcom County Orthopedic Association
   Bellingham
3. Countywide Ambulance Service
   Bellingham
4. Free Dental Clinic
   Bellingham
5. Inter-Island Medical Center
   Friday Harbor
6. Island County Health Department
   A. Coupeville
   B. Camano Mini Courthouse
7. Island County Home Health Services
   Langley
8. Island Hospital
   Emergency Medical Services
   Anacortes
9. Lummi Indian Health Center
   Bellingham
10. Ferndale Medical Clinic
    Ferndale
11. Orcas Island Medical Center
    Eastsound
12. Planned Parenthood of Whatcom County
    Bellingham
13. St. Joseph's Hospital
    Emergency Services
    Bellingham
14. St. Luke's Hospital
    Emergency Room
    Bellingham
15. St. Luke's Hypertension Clinic
    Bellingham
16. San Juan County
    Health Department
    Friday Harbor
17. Skagit County Health Department
    A. Mt. Vernon
    B. Anacortes
    C. Sedro Woolley
18. Skagit Valley Hospital
    Emergency Room
    Mt. Vernon
19. United General Hospital
    Emergency Room
    Sedro Woolley
20. Visiting Nurse Home Health Care
    Agency of Whatcom County
    Bellingham
21. Wellspring Women's Clinic
    Langley
22. Western Washington State College
    Student Health Service
    Bellingham
23. Whatcom-Skagit Rural Opportunity
    Council Health Clinic
    A. Mt. Vernon
    B. Lynden
24. Whidbey General Hospital
    Emergency Room
    Coupeville

TABLE XIII

LICENSED HEALTH PROFESSIONALS
Northwest Washington, By County Of Mailing Address
October 1978

	Dentists	Dental Hygienists	Podiatrists	Chiro-practors	Physicians MDs	Physicians Osteopaths	Physician's Assistants	Licensed Practical Nurses	Registered Nurses[1]	Optometrists
STATE	2,798	1,311	102	606	6,744	222	183	12,419	30,001	483
NORTHWEST HSA	1,956	889	67	388	4,848	160	86	7,053	19,399	282
King	1,263	638	37	144	3,354	118	59	2,723	11,574	152
Kitsap	66	26	2	23	197	8	0	371	847	16
North Olympic	39	13	2	12	74	1	2	237	420	16
Clallam	32	10	2	9	59	0	1	207	343	14
Jefferson	7	3	0	3	15	1	1	30	77	2
North Puget Sound	135	50	6	41	311	5	7	973	1,461	29
Island	20	10	0	6	39	0	1	103	259	5
San Juan	6	2	1	0	22	0	0	12	52	1
Skagit	44	12	2	17	109	3	6	445	516	7
Whatcom	65	26	3	18	141	2	0	413	634	16
Pierce	284	107	14	98	634	15	11	1,981	2,959	41
Snohomish	169	55	6	70	278	13	7	768	2,138	28

[1] Includes nurse practitioners.

[2] Includes individuals with Washington State mailing addresses only.

rescue equipped mini- pumpers and EMT staff maintained by the Ferndale Fire Department.

Long Term Care Facilities

There are twelve such facilities serving the Sub Area, as listed in Table XIV. Pioneer Ridge Healthcare is in Ferndale and provides for 50 skilled nursing care patients and 12 intermediate care patients. It has a staff of 7 R.N., 3 L.P.N., 21 aide/orderly and 2 administrative personnel.

Mental Health Services

Mental health services are provided by the following facilities.

- St. Joseph and St. Luke's: Short-term psychiatric hospitalization by agreement with the Whatcom Counselling and Psychiatric Clinic.

- Whatcom Counselling and Psychiatric Clinic: Outpatient services--therapy sessions, crafts, activities, work opportunities and a special program for older clients.

- Blue Canyon Facility: Long-term and transitional psychiatric care, crafts, outdoor recreation and social activities.

- Sun Halfway House: Transitional psychiatric care, weekly meetings with clients, weekend social and recreational activities.

- Larrabee House (run by the YWCA): Transitional psychiatric care.

- Sun Crisis Center: 24-hour emergency telephone crisis intervention services and coordination of squad teams that provide direct mental health emergency services on site.

- Catholic Family and Children's Services: Various outpatient services.

In addition to these nine agencies, there are six psychiatrists in private practice in the County (North Puget Sound Health Council, November, 1977). The Bellingham-Whatcom County Public Health Department and the Northwest Center for human development in Bellingham also provide mental health therapy services. All of these health care services appear adequate for current and 1990-projected populations.

Several other organizations provide a variety of social and human services which supplement those described above. The Whatcom County Opportunity Council, based in Bellingham, provider health information and referral, homemaker and home health aide as well as outreach, educational programs, employment referral, advocacy, transportation and household repair services to disadvantaged individuals. Project Concern, located in Ferndale, also provides home nursing/health aide, chore services, visitation, information and referral, transportation and household repair services for poor and/or elderly individuals free of charge. In addition, these types of services, as well as social casework and monetary assistance, are available through the State Department of Social and Health Services to those meeting the financial eligibility requirements. Other groups and organizations such as the Red Cross, the ight House Mission, Salvation Army and Veterans Services in Bellingham and Project Hope, in Lynden, provide additional assistance, counseling, and outreach programs. Information, referral, outreach and recreation programs as well as actual treatment are provided for alcoholism by the Whatcom County Alcoholism services in Bellingham.

Table XIV Whatcom County Long - Term Care Facilities

1. Alderwood Park Convalescent and Retirement Center
   2726 Alderwood Avenue
   Bellingham, WA 98225
   733-2322 (Walbert Peterson, Administrator)

2. Bellingham Villa Care Center
   1200 Birchwood Avenue
   Bellingham, WA 98225
   734-9295 (Shirley Hanson, Administrator)

3. Christian Rest Home
   205 South B.C. Avenue
   Lynden, WA 98264
   354-4434 (A.L. Plagerman, Administrator

4. Highland Convalescent Center
   2400 Samish Way
   Bellingham, WA 98225
   734-4800 (Walbert Peterson, Administrator)

5. Icelandic Old Folks Home
   Fourth and D Streets
   Blaine, WA 98230
   332-8733 (Marjorie Hurd, Administrator)

6. Needham's Nursing Home
   1509 East Victor Street
   Bellingham, WA 98225
   733-3140, 733-3141 (J.F. Wiley, Administrator)

7. O'Cains Nursing Home
   1817 Knox Avenue
   Bellingham, WA 98225
   733-4870

8. Pioneer Ridge Healthcare
   567 East Seamount Drive
   Ferndale, WA 98248
   384-1277 (Nancy Gullikson, Administrator)

9. St. Francis Convalescent Home
   2315 Williams Street
   Bellingham, WA 98225
   734-6760 (James Hall, Administrator)

10. Sehome Convalescent and Retirement Center
    700 32nd Street
    Bellingham, WA 98225
    734-9330 (Gordon DenAdel, Administrator)

Table XIV
Page 2

11. Shuksan Convalescent Center
1530 James Street
Bellingham, WA 98225
733-9161 (Nonabelle Marten, Administrator)

12. Whatcom County Infirmary
5280 Northwest Road
Bellingham, WA 98225
734-4181 (Joseph L. Clark, Administrator)

Source: North Puget Sound Health Council, September 9, 1976 and May, 1979.

ISSUES AND CONCERNS

ISSUES AND CONCERNS

LAND USE

General Issues and Concerns

From the foregoing discussion of existing land use and the identification of land use trends within the Sub Area and the County, several considerations are apparent. These are:

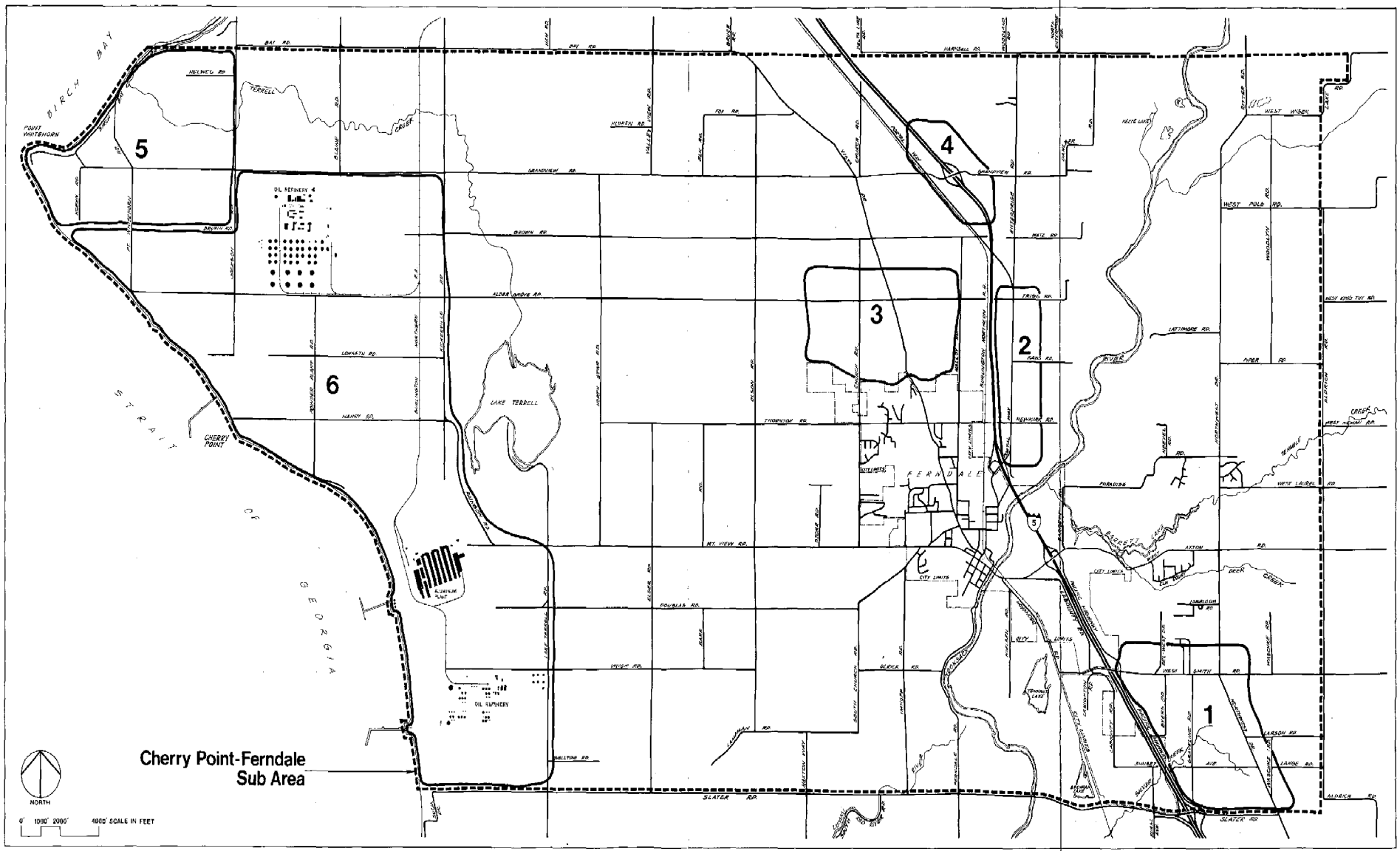
- The potential for conflicting land uses to locate near each other
- The Ferndale - Whatcom County interface
- The conservation/protection of environmentally sensitive areas
- The location and the density of future residential uses
- The retention of economically viable land uses
- The maintenance of flexibility in future land use decision making
- The consistent enforcement of comprehensive plan goals and zoning ordinance regulations.

Area-Specific Issues and Concerns

These considerations are, to one degree or another, relevant to much of the Sub Area. But, in order to illustrate the nature of these existing and potential problems in more concrete terms, six case study areas are described. The areas are shown in Figure 27, and for convenience, are named West Smith Road-Northwest Drive Area, Portal Way-Kass Road Area, North Ferndale Area, Interstate 5-Grandview Road Area, Point Whitehorn-Birch Bay Area, and Cherry Point Area. The series of photographs in Figure 28 illustrate some of the concerns present in these areas.

1. West Smith Road - Northwest Drive Area

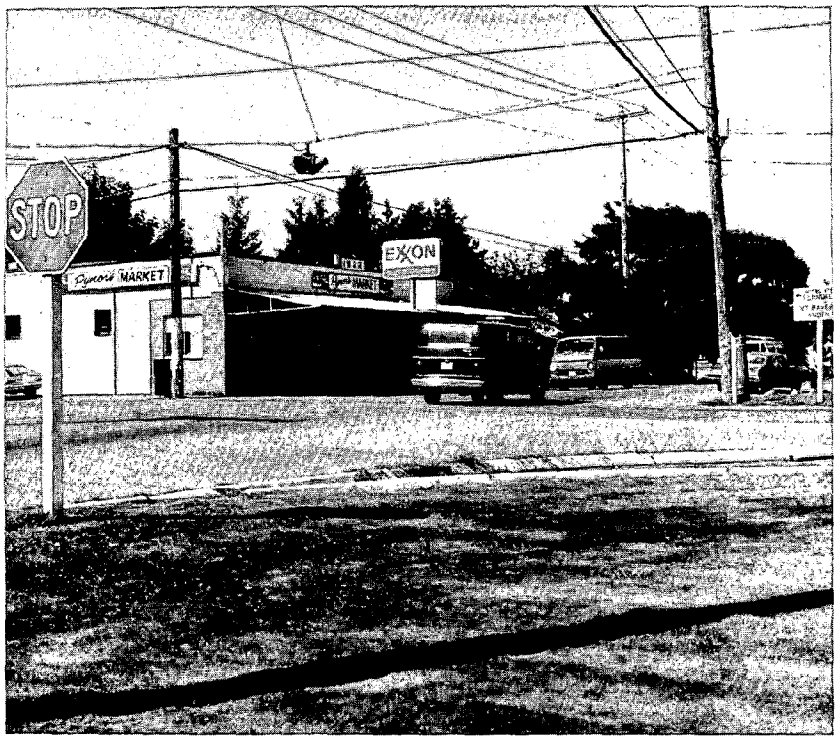
This area encompasses North Bellingham and is the most "urban" of any area in the Sub Area outside the City of Ferndale.



1 West Smith Road-Northwest Drive Area
2 Portal Way-Kass Road Area
3 North Ferndale Area
4 Grandview Road-Interstate 5 Area
5 Point Whitehorn-Birch Bay Area
6 Cherry Point Area

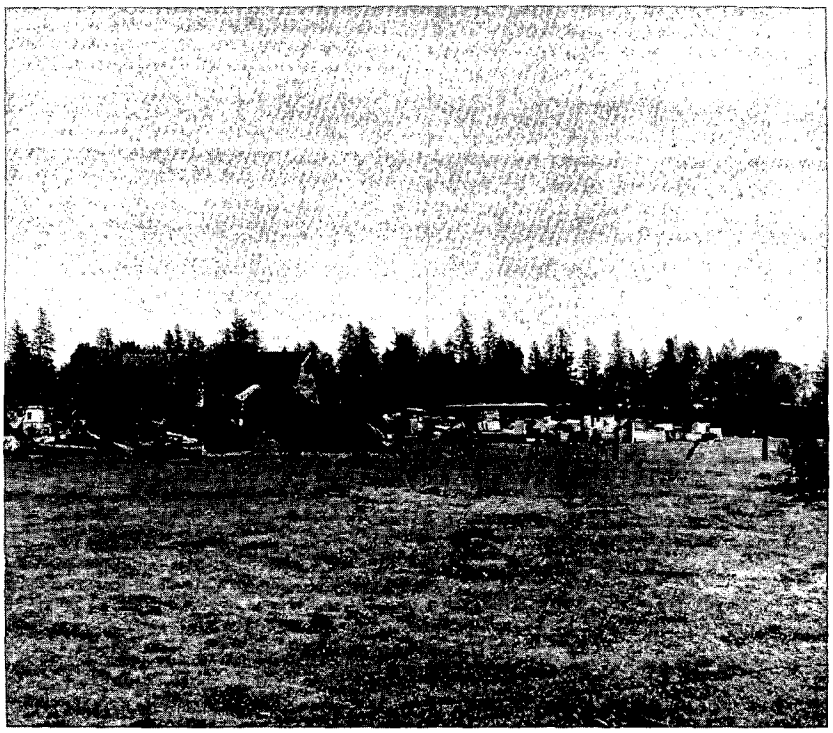
Land Use Issue Case Study Areas

figure 27



The intersection of West Smith Road and Northwest Drive is the commercial and institutional hub of North Bellingham. Continued growth in the area under existing General Protection zoning will be difficult to manage.

A

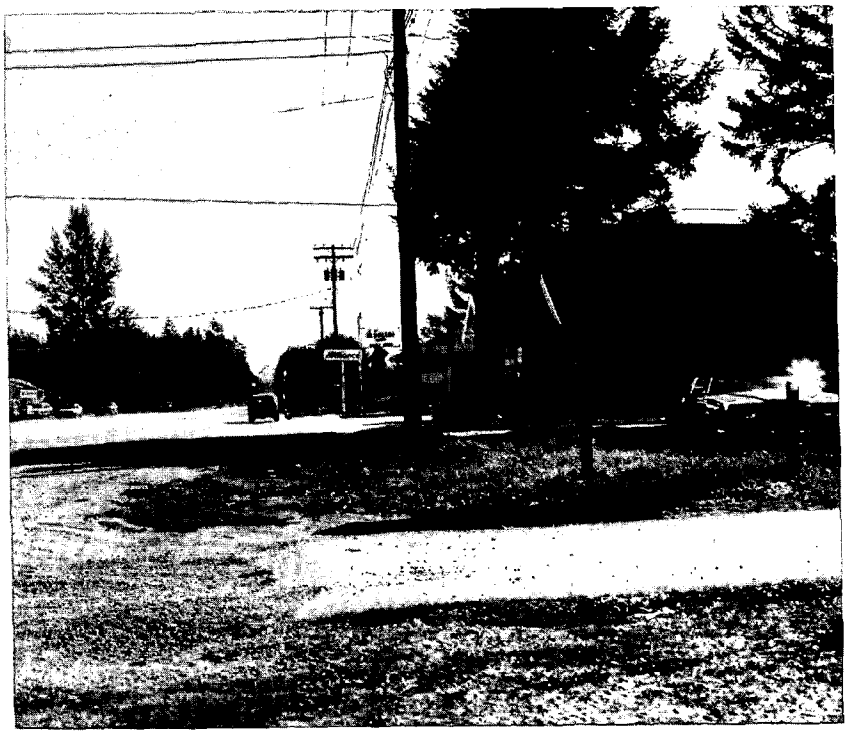


Conflicting land uses are beginning to locate near each other in some parts of the Sub Area. Here on West Axton Road a junk yard, pasture and residential subdivision are close together.

B

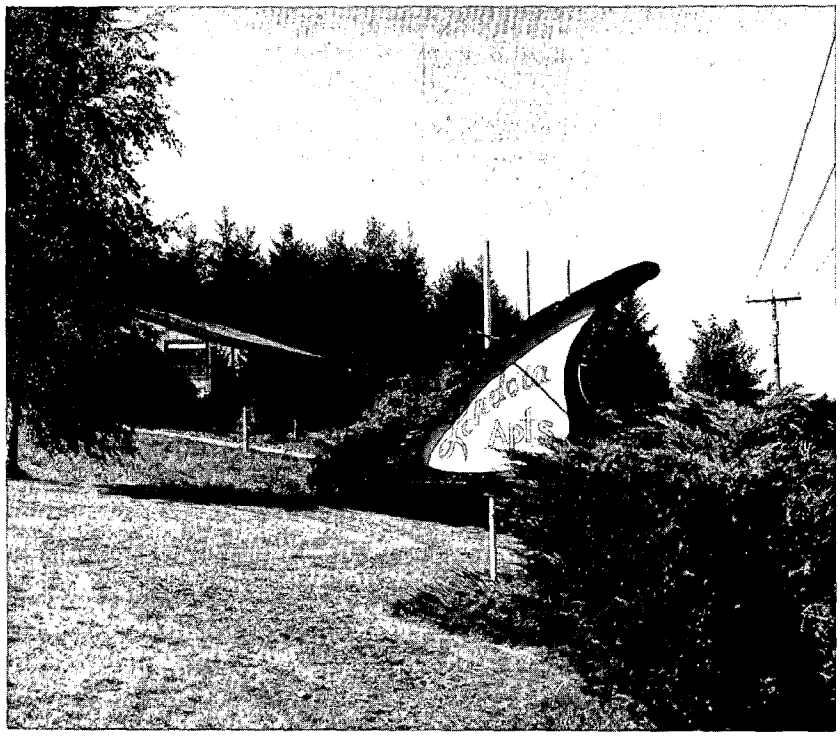
Representative Land Use Issues

The excellent access provided by Pacific Highway is attractive to developers but current management tools may not control the potential for strip development. **C**



Businesses along Portal Way presently serve a relatively small population but future population growth may foster strip commercial development. **D**

Mobile home parks are prevalent along Portal Way and represent an important housing alternative. Aesthetics has not been an important design element, however. **E**



The location of multifamily housing has not been well controlled in the past. Apartments will increase in significance in the future as a viable housing alternative. **F**

The area is zoned for general use under the General Protection (GP) zoning classification and is within commuting distance from Bellingham, Ferndale and Cherry Point. Both of these factors have contributed to a fragmentation of land use characterized by sprawling and uncoordinated growth. The GP zone allows for a broad range of land uses with no accounting for the potential of incompatible uses to locate near each other. To date the problem has been minimized. The area has an overall low density with one to several vacant lots intervening between occupied parcels. However, because of the location of the district within commuting distance of major employment centers, pressure will probably increase to infill and subdivide the remaining vacant land. With increasing population, retail and commercial service functions will attempt entry and the potential for incompatible uses locating next to each other may become a reality.

2. Portal Way - Kass Road Area

Portal Way provides excellent access to the area east of Interstate 5 and west of the Nooksack River. The area is isolated from Ferndale by the freeway and from the rest of the Sub Area to the east by the Nooksack River. The good access provided by Portal Way and the constraints to east-west growth by the freeway and river naturally promote strip development. Currently, the area is occupied by several mobile home and recreational vehicle parks and a scattering of commercial-retail establishments near the access to Interstate 5.

Several existing and potential land use problems are illustrated in this district. The narrowness of the district and limited access to it promote "strip" development which is not functional, aesthetic or the best use of natural resources and energy. Although Interstate 5 is a barrier to direct linkage with the City of Ferndale, the area is within a logical service area of the City. Land use planning for the area should be done with the City to foster unified answers to questions of future land use. Because Portal Way does provide good access to Ferndale and

Interstate 5, an issue that is likely to recur is that the access dependent functions of retail, commercial, multifamily and mobile home parks will increase in number but possibly with little reference to the location of other functions. The area is currently zoned for General Business (GB) and Suburban Residential (S3), but proposed multifamily use is also shown on existing zoning maps.

The potential exists to overbuild for any one function especially if growth is not coordinated between the County and the City of Ferndale.

3. North Ferndale Area

Land use issues and concerns in the North Ferndale Area seem to be related mainly to problems that could occur if development continues in the pattern established to date. Under current zoning, the area is divided between Suburban Farm (five acre minimum size) and General Protection (GP). North Ferndale has historically been a farming area, but, because the area contains view and topographic amenities, the area is also very desirable for residential use. Single family subdivisions are located up to the Ferndale city limit while actively farmed land predominates on the County side. Single family homes on five acre or larger parcels are common along Vista Drive.

The general issues identified at the beginning of this section are especially evident here. Conflicts between an expanding demand for single family housing and the desirability of retaining viable farm land could arise. Current Suburban Farm zoning implicitly promotes small farms that are, in effect, "hobby" or "weekend" farms. Small farms are not "productive" in the same way that larger farms are with the result that otherwise productive farm land is removed. In addition, there is the practical matter that conflicts clearly exist between the usual farm activities and residential uses, even at low density. Movement of farm machinery interrupts or slows traffic and the range of rich farm smells does not seem compatible with residential life to most people.

Second, Suburban Farm Zoning can promote low density development to the point that local utilities and road maintenance abilities are taxed. It costs more to provide services to a dispersed population than to a more concentrated one.

Finally, an historic problem in developing the North Ferndale area has been that the differences between the design specifications for subdivisions of the City of Ferndale and those of Whatcom County have led to problems upon annexation. Because Ferndale's specifications for curbs, gutters and stormwater are tighter, the difference has set up a variety of practical problems for residents and Ferndale officials after the subdivisions have been annexed to the City. Residents of newly annexed subdivisions have asked Ferndale officials to either add curbs and gutters or to assist in stormwater control and the City is fiscally unable to do so.

Another lesser concern is apparent in this area. Because the topography of the area offers panoramic views to the east and south, and because the terrain of the area is hummocky, development within the area is or may become visible from along streets. Much of the eastern flank of the area is visible from Interstate 5. The views from residences present highly desirable amenities but bare views into subdivisions are not as aesthetically pleasing as hillsides scattered with uncoordinated housing developments.

4. Interstate 5 - Grandview Area

The area surrounding the intersection of Interstate 5 and Grandview Road is one of the most accessible in the Sub Area. Interstate 5 provides access to Ferndale and Bellingham and north to Canada. Portal Way and Grandview Road both provide access to parcels on the west of the freeway. Grandview Road also provides access to the Cherry Point industrial area. In addition to these roadway routes, there is a railroad which connects the area to Cherry Point and points south. This combination makes this intersection a potentially critical hub for a wide range of commercial- industrial uses.

The basic issue in this area is how to balance development and at the same time maintain the accessibility that is, in a sense, a nonrenewable resource. Once access is disrupted, it is very difficult to restore. There are, currently, no plans for this area that guarantee a use that takes advantage of its accessibility. Current zoning is a mixture of Single Family, one acre minimum lot size, General Protection; Suburban Farm, five acre minimum size; and Contract Zone. (The Contract Zone is a classification that allows flexible land use decision-making by requiring all plans to be justified and enforced through contractual agreements between the developer and the County.)

5. Point Whitehorn - Birch Bay Area

At present, land use conflicts are minimal in the Point Whitehorn area despite the fact that six different land use zones are present: recreational open space (ROS); single-family, 4 lots per acre (S4); neighborhood business (NB); rural farming (RF); light impact industry (LII); and heavy impact industry (HII). Land in any one zone is not completely developed. Because of this, land use conflicts are not now significant. Further, the combination of zones is not unreasonable considering long standing recreational and residential uses around Birch Bay, Point Whitehorn and industry on Cherry Point.

Several potential land use conflicts are possible, however, if and when any one land use expands. Expansion or intensified activity in any one zone will exert pressure on uses in surrounding zones. The conflicts that are most probable in the future are between: (1) residential (S4) and recreational uses (ROS) because of trespassing problems or because of the desire to rezone recreational land for residential use; and (2) residential (S4) and light industry because of the potential for air degradation and transportation conflicts.

6. Cherry Point Area

The Cherry Point Area at present does not exhibit major land use conflicts because, like the Point Whitehorn Area, the land is not com-

pletely developed and industries present are buffered from each other and surrounding uses by large parcels in vacant, forested or pasture use.

Three problems exist concerning future development, however. Cherry Point represents a regional and national resource as the only virtually undeveloped deep water port in the United States. Port and shipping technology is changing at a rapid rate and the issue of maintaining flexibility in adequately meeting technological change is paramount. Shoreland zoning and upland zoning are inconsistent, however, and may stand in the way of effective industrial development. The shoreland is under General Protection (GP) zoning while the uplands are designated for High Impact Industrial (HII). The purpose of General Protection zoning is to keep restrictions of industrial, business and concentrated residential development to a necessary minimum. More specific zoning would be helpful in guiding industrial development. Likewise, the present conservancy classification of the shoreline by the Washington State Department of Ecology does not allow industrial development of the shoreline to the same high degree that the Heavy Impact Industrial zone allows on the upland.

ISSUES AND CONCERNS RELATED TO THE WHATCOM COUNTY COMPREHENSIVE PLAN AND INTERIM ZONING ORDINANCE

Whatcom County Comprehensive Plan

The county comprehensive plan, as it currently exists, is not an effective document to guide planning for the future of the County. It does contain the generalized goals that are applicable to present problems but it lacks an adequate baseline of current physical and socio-economic information relevant to the planning process now employed. It also is based on assumptions regarding population and economic growth that are outdated. It also is unclear about controlling the timing of development. This is a new county-wide challenge. Policies are written

in too broad a manner, some can often be interrupted in different ways and are thus difficult to enforce consistently or to defend. For example, the location and development of new business is encouraged to adjoin existing businesses on the same side of the street to curtail the indiscriminent location of business along arterials (p. 39-40). The plan goes on to suggest that new business be restricted to arterial road an highway locations (p. 40). The intent may be clear, that is, to cluster business activity, but the detail of the language is open to interpretation. In a rural-urban fringe area, isolated business locations on arterials may seem to make sense until it is realized that it is difficult to draw the line between one more business and the effect of fostering a diffused commercial strip development as is apparent along Axton Way.

. Whatcom County Interim Zoning Ordinance

The Whatcom County interim zoning ordinance, in general, provides a clear discussion of land use regulations for the County. Readers may, however, find that the wording makes it difficult to distinguish between similar zoning classifications. For example, the Suburban District, Suburban Residential District, Residential District, Rural Residential District and Rural Suburban District all allow three families per acre and, yet, are different from each other.

In addition to these wording problems, the zoning code fosters comparatively low density residential development. Only 2 of the 13 zones for residential use regulate multi- family use and the highest density use is 7 families per acre. Low density residential uses is a major characteristic of the Sub Area and County as a whole, but provisions need to be made for the selective development of higher residential density areas.

While the zoning code provides very specific discussions of residential use, it is vague regarding the contract zone which reads:

2.24.530 CZ CONTRACT ZONE DISTRICT

.010 PURPOSE

The purpose and intent of this classification is to provide a use designation that is sufficiently broad to enable the county to utilize an agreement relating to permitted uses or other similar method as a means of flexible planning.

.050 PERMITTED USES

All uses shall be prohibited except those uses which are expressly designated in a written agreement between the County and the person or persons who own land affected by this zone. Upon termination of the concomitant agreement all uses designated in such agreement shall become conditionally permitted and all other uses shall remain prohibited.

(CZ District adopted 4-4-77)

The contract rezone can be an effective tool in regulating land use but should be applied to a specific land use zone or should be used as an option in any zone to enhance development.

The Zoning Ordinance also does not provide specific guidelines for residential subdivisions, for mobile home development, for the problems accompanying adjacent development with two different zoning classifications, for Planned Unit Developments for industrial, commercial, office or residential use, or for other more innovative approaches to fostering effective and aesthetic higher density development.

For the Cherry Point-Ferndale Sub Area specifically, zoning issues are related to the potential incompatibility between the General Protection (GP) classification of the Shoreline and the High Impact Industrial (HII) designation of the uplands, and the application of the General Protection zone to rapidly urbanizing areas. The issue of the shoreline-upland conflict was discussed earlier. General Protection classifications along any major arterial near Interstate 5 raise the issue of potentially uncoordinated growth where conversion of agricultural land to commercial or residential functions may conflict with each other.

PHYSICAL ENVIRONMENT

Physical environmental information is one of several considerations in the planning policy development process. This information was provided in the Existing Conditions section. An analysis of these elements will identify areas suitable for intensive human use or structural development while minimizing the excessive cost or risk associated with its inherent and fixed qualities. It is the purpose of this section to identify those physical factors within the Cherry Point-Ferndale Sub Area that are relevant to development and to delineate those environments that could pose constraints or could be adversely affected by development. Photos in Figure 29 illustrate some of the physical environmental constraints in the Sub Area.

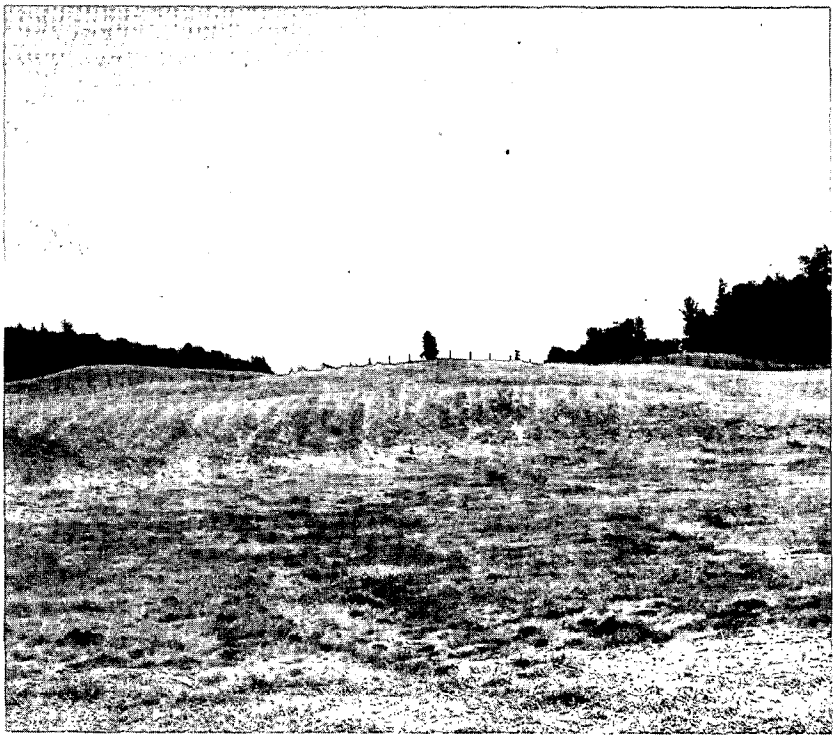
GENERAL ISSUES AND CONCERNS

. Unstable Slopes

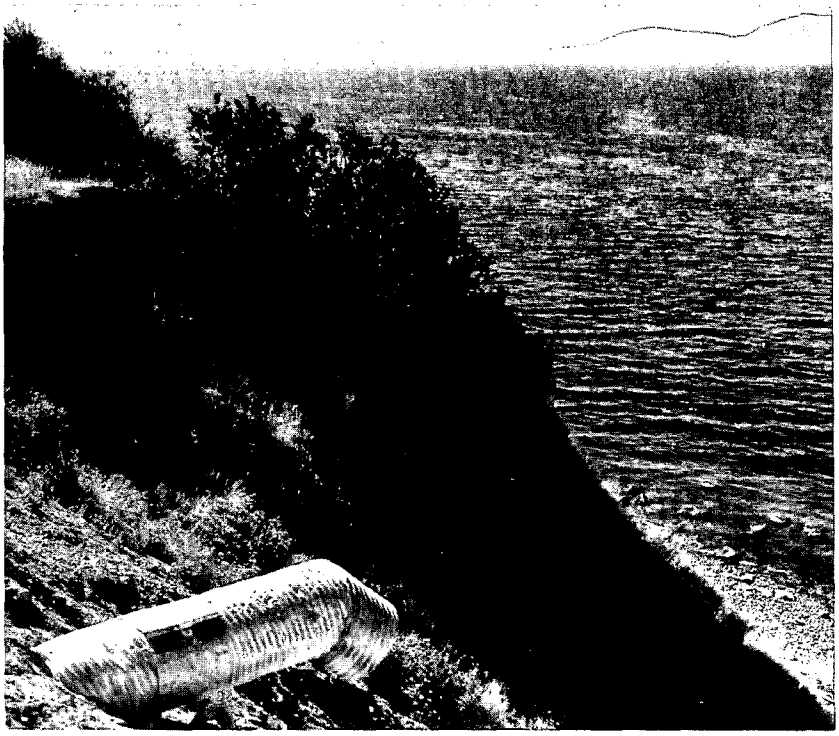
Slopes over 15 percent and underlain by materials that foster mud or debris flows were mapped. These slopes are present along the sea cliffs at Cherry Point and Point Whitehorn and in isolated areas in the eastern half of the Sub Area. The primary issue is that future development be sensitive to these slopes and not increase slippage potential.

. Prime Farmlands

Farmlands designated as prime farmlands by the Soil Conservation Service and the Cooperative Extension Service are shown in Figure 30. Because productive agricultural land is a diminishing resource, and because agriculture, while an active land use, has aspects that enhance the physical and human environment, agricultural land should be conserved.

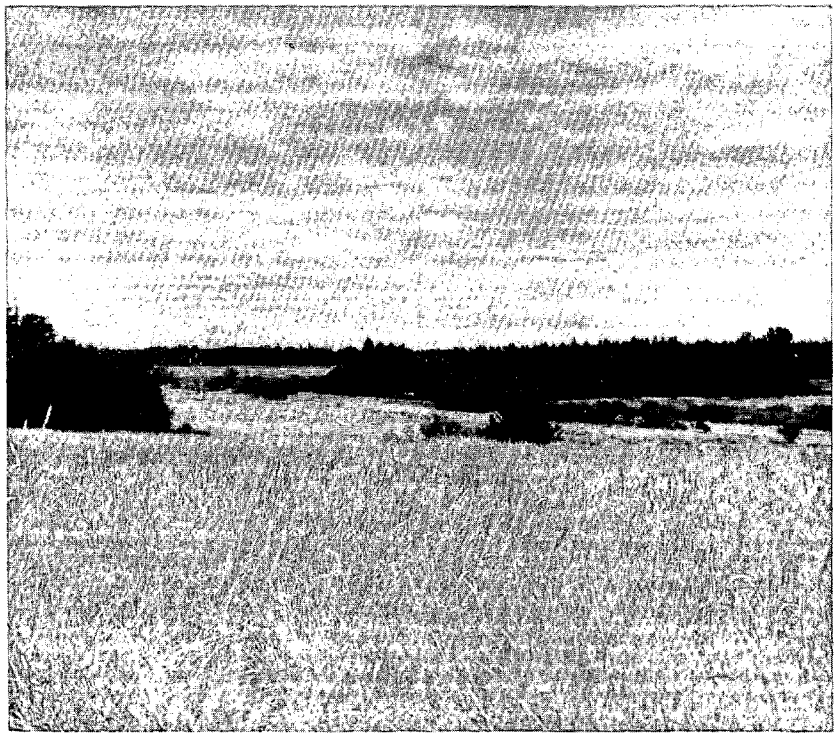


The North Ferndale hills are hummocky and in places contain unstable slopes. Both features are the result of glacial processes. **A**

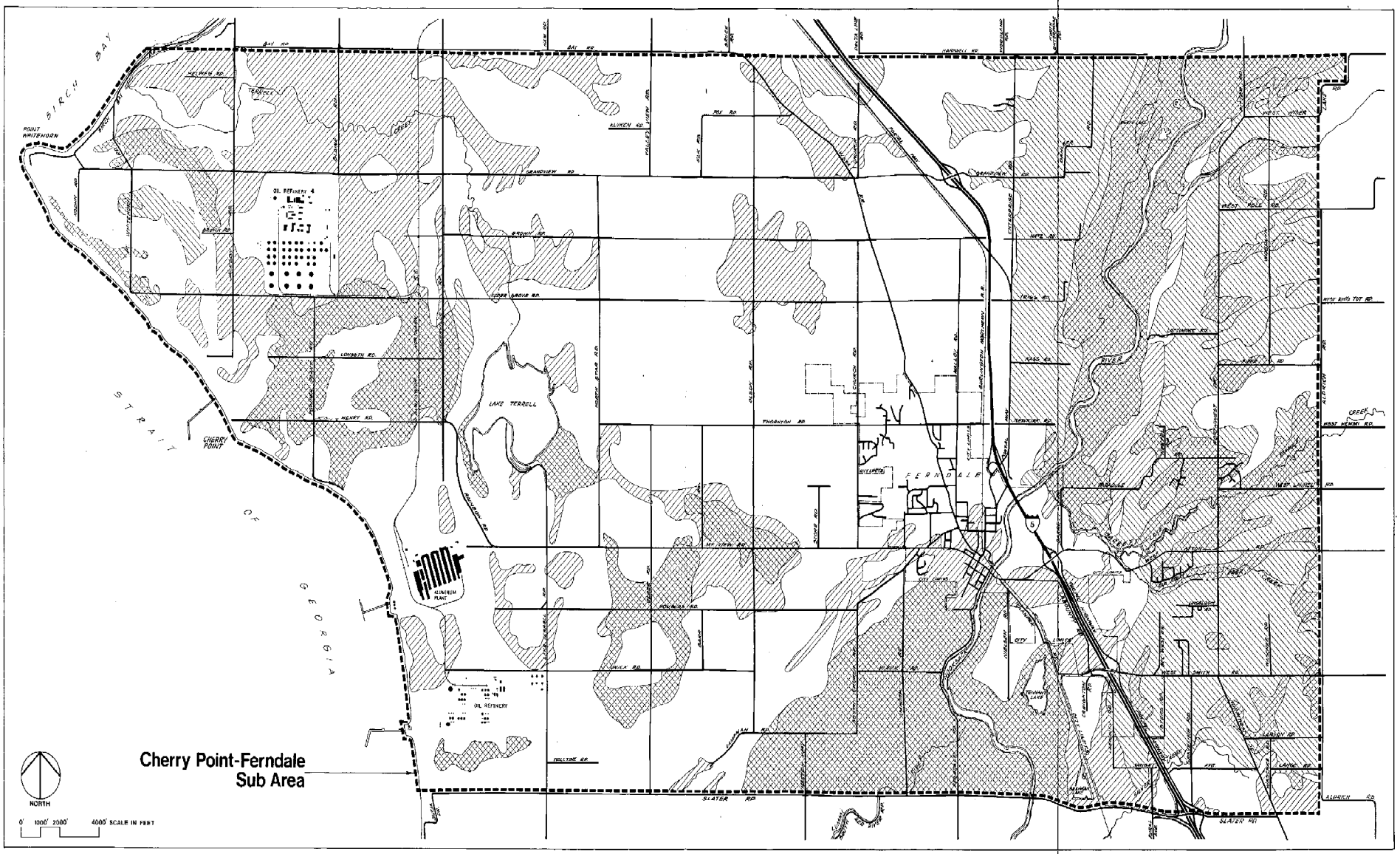


Steep unstable coastal cliffs, a conservancy zoned shoreline and sensitive beach processes make coastal development difficult. **B**

The Nooksack River and its .75 to 3.0 mile wide 100 Year Flood Plain are important physical, environmental and land use factors. **C**



The Lake Terrell State Game Range is one of the three State designated Critical Wildlife Habitats in the Sub Area. **D**



Prime Farmlands (Soil Conservation Service)
Prime Farmlands (Cooperative Extension Service)
Prime Farmlands (Soil Conservation Service and Cooperative Extension Service)

Prime Farmlands

figure 30

. Soils Subject to Ponding or Fluctuating Water Tables

Large areas of the Sub Area are vulunerable to ponding or to seasonal fluctuations in the water table due to such factors as the presence of impermeable "hard pan" immediately below the surface. These are mapped in Figure 23. Issues related to this are that development requiring septic tanks and drain fields or wells can healthfully develop only with difficulty. With increased pressure to develop in these areas, utility services not now available may be required. At the same time, extension of water and sewer service significantly affects the rate and direction of growth of all types. General engineering properties of geological units are summarized in Figure 31.

. Vegetation

Vegetation is a critical element for wildlife habitats. The primary issue associated with vegetation is its conservation in its varied forms throughout the Sub Area. Wooded areas, open space and silt marshes are equally important.

. Wildlife Habitat

All major wildlife habitats in the Sub Area face the potential for disruption or for a reduction in size. At present, residential and commercial land uses are beginning to encroach on Lake Tennant and water quality in the lower Nooksack is not enhancing Salmon runs. Saltwater marsh areas adjacent to Gulf Road and Terrell Creek are being pressured by competing uses.

. Groundwater Quality

See the Section titled Soils Subject to Ponding and Fluctuating Water Tables above.

Geologic Unit	Composition	Drainage	Groundwater	Response to Seismic Shaking	Slope Stability	Foundation Stability	Ease of Excavation
Alluvium	Sand & gravel	Good	High permeability, yields large amounts of groundwater. Water table may be near the surface.	High	Natural slopes 5% are stable	Good to poor, subject to sinking under heavy structures	Easy to excavate
Alluvium	Silt & clay	Moderate to poor	Moderate permeability, yields moderate amounts of groundwater	High	Natural slopes 5% are stable	Good to poor, subject to sinking under heavy structures	Easy to excavate
Peat	Organic matter	Generally poor	Water table near surface, water unsuitable for domestic consumption	High	Natural slopes 5% are stable	Poor due to settling potential	Easy to excavate
Sumas Outwash	Sand & gravel	Good	Moderate permeability & groundwater amounts. Water table may be near surface.	High	Natural slopes 5% are stable	Good	Easy to excavate with hand or power tools
Sumas Outwash	Clay & silt	Moderate to poor	Moderate permeability & groundwater amounts	High	Natural slopes 5% are stable	Fair to poor; subject to settling under heavy structures	Easy to excavate with hand or power tools
Bellingham Glaciomarine Drift	Pebbly silt & clay	Poor	Very low permeability, yields little groundwater. Acts as a barrier to vertical movement.	High	Good when dry, sliding possible when saturated	Poor to fair; low when saturated	Some difficulty in excavation with hand or power tools
Deming Sand	Mostly sand, some gravel	Good	Moderate to high permeability, yields moderate groundwater	Moderate	Natural slopes 5% are stable	Good	Easy to excavate with hand or power tools
Kulshan Glaciomarine Drift	Pebbly silt & clay	Poor	Very low permeability, yields little groundwater	High	Good when dry, subject to sliding when saturated	Poor to fair; low when saturated	Some difficulty in excavation with hand or power tools
Vashon Till	Compact till, poorly sorted mixture of clay, silt, sand, pebbles, cobbles	Very poor	Low permeability, yields little groundwater. Acts as a barrier to vertical movement of groundwater.	Moderate	Good in natural slopes of 5%, poor where exposed in sea cliffs	Good	Known as "hardpan"; difficult excavation
Esperance Sand Member	Mostly sand, small amounts of gravel	Good	Moderate to high permeability, moderate groundwater	Moderate	Poor due to exposure in sea cliffs	Not applicable	Not applicable
Cherry Point Silt	Silt, clay, sand	Poor	Low permeability, yields little groundwater	Moderate	Poor due to exposure in sea cliffs	Not applicable	Not applicable
Chuckanut Formation	Sandstone, shale, conglomerate	Very poor	Very low permeability, meager groundwater found in some bedding & fracture zones	Low	Unexposed	Not applicabel	Not applicable

Source: Modification of Table in
Environmental Geology of Western Whatcom County
Don J. Easterbrook, 1973.

Engineering Properties of Geological Units Within the Cherry Point-Ferndale Sub Area

figure 31

. 100 Year Flood Plains

Current uses and regulations are generally adequate.

. Shoreline Management Areas

Present regulations are generally satisfactory and consistent with current uses.

. Marine Shorelines

There are now few marine shoreline issues. These issues will arise with potential development on the uplands and with any possible requirements for the use of shoreline areas for indsutrial activities. Their designation as Conservancy does not appear at present to interfere with current industrial use on the uplands.

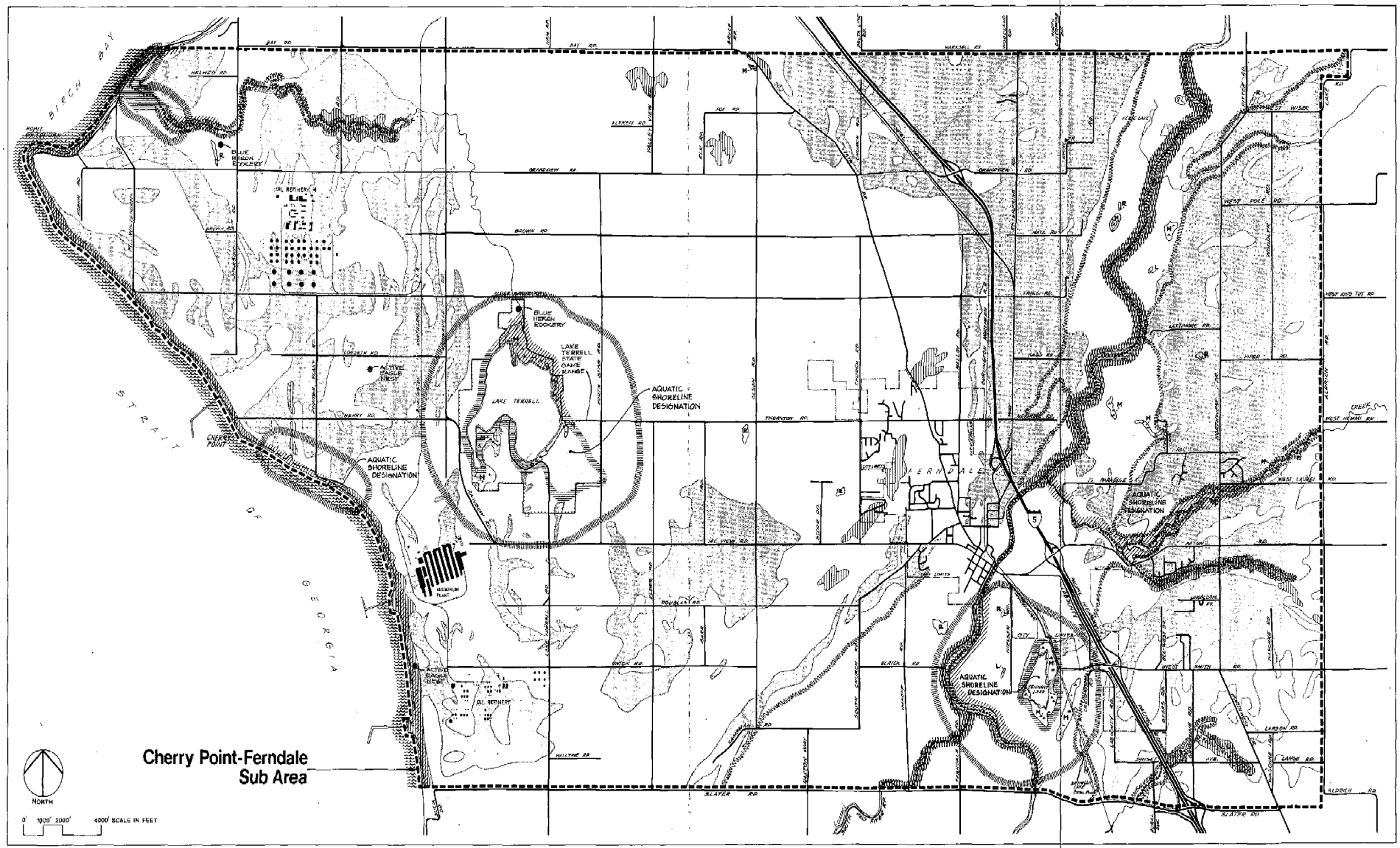
. Aquatic Shorelines

The primary issue regarding aquatic shorelines is water quality degradation caused by agricultural pollutants, principally animal waste and fertilizers. High concentrations of pollutants in the lower Nooksack River areas do not promote or enhance salmon spawning.

AREA SPECIFIC ISSUES AND CONCERNS

Figure 32 is a composite map that shows the relative locations of physical environmental factors that are constraints to development. Approximately one third of the Sub Area is covered in soils which are subject to ponding or to a fluctuating water table. The 100 year flood plain covers approximately 20 percent of the Sub Area.

In terms of the environmental considerations shown, the Sub Area can be divided roughly into three zones that each occupy about one-third



- State Designated Critical Wildlife Habitat
  - * Active Eagle Nest
  - ● Blue Heron Rookery
- Salmon Spawning & Migration Area
- (L) Lake
- (R) Reservoir
- (M) Marsh (Wetlands)
- 100 Year River Flood Plain
- 100 Year Coastal Flood Plain
- Waters of Statewide Significance
- Soils Which May Subject Groundwater to Contamination.

Whatcom County Shoreline Designation Areas

- Aquatic (Noted on Map)
- Natural
- Conservancy
- Rural

Unstable Slopes - Slopes Greater than 15%, Underlain by Unconsolidated Clayey Material Subject to Slumps or Debris Flows

Sources: Whatcom County Planning Department,
Washington State Department of Game,
Federal Insurance Administration,
U.S. Geological Survey,
Don J. Easterbrook - Environmental Geology of Western Whatcom County, Washington, 1973 and Soil Conservation Service

Development Constraint Areas

figure 32

of the Sub Area. For coconvenience these are titled western, central and eastern. Of these, the western and eastern are most constraining to development and the central one appears more favorable to development.

. Western

The bluff and shoreline facing the Georgia Strait is the most constraining to development in the Sub Area. Waters there are classed as of statewide significance. Shoreline processes are sensitive to disruption. Slopes are unstable and sections contain critical wildlife habitat. Inland large areas experience ponding or a fluctuating water table. There are two Blue Heron rookeries and two Bald Eagle nests. The largest area of constraint is within the zone around Lake Terrell, designated by the State as a Critical Wildlife Habitat. Some areas adjacent to the Terrell Creek are also classed as critical wildlife habitat.

It should be noted, however, that despite development constraints, development need not come to a halt. Industrial developments in the area treat their own sewage. Existing industries, while intense, are low in overall density and well buffered from each other by large parcels of wooded or open space.

The superimposition of constraining factors does illustrate the issue that remaining vacant, unconstrained industrial land is limited. Additionally, expansion of industrial activity north or east of existing industrially zoned land will be constrained by flood plain and critical wildlife habitat.

. Central

In contrast to either the western or eastern thirds of the Sub Area, the Central third is relatively unconstrained by the presence of critical wildlife habitats or by the presences of soils that are subject to fluctuating water tables. It does contain pockets of unstable slopes north of Grandview Road between Valley View and Elk Roads and a band of

unstable soil through Ferndale. The area is cut off to the south by the 100 year Flood Plain of the Nooksack River. Not shown on this composite map are large blocks of forest land and agriculture. Both these uses are important to regional wildlife habitats. Environmental issues are centered around the destruction or disruption of the habitat that might occur by removing the cover and by increasing the overall population density with new housing.

. Eastern

Much of the Eastern third of the Sub Area is occupied by the 100 Year Flood Plain of the Nooksack River. The flood plain takes up a Northeast to Southwest band in the Sub Area that expands from a width of approximately one mile to three miles downstream. Fingers of the flood plain project eastward around Ten Mile Creek and Deer Creek. Within the flood plain lies Tennant Lake which is surrounded by a Critical Wildlife Habitat.

As important an issue as the flood plain is (because the development of permanent buildings is unwise because of chance of flooding) perhaps a larger environmental consideration is the significant area shown to be subject to ponding and fluctuating water tables. The flood plain is well known and potential development hazards generally known. In contrast, soil characteristics are "hidden" and development constraints less apparent. Most of the area in this third of the Sub Area is unsewered and development to date has used septic tanks as the means of sewage disposal. Continued development using septic tanks has built-in limitations given the soils characteristics. The environmental issues of groundwater contamination accompanying the failure of septic systems then becomes a land use and utilities issue.

TRANSPORTATION/CIRCULATION

From the identification of existing conditions discussed in the previous section, issues and concerns about traffic movement have been identified that either now or potentially may interfere with the safe and efficient transportation of people and goods in the Sub Area. These issues and concerns are discussed in this section to provide a direction for the planning of an efficient and safe transportation system for the residents, merchants and industries of the Sub Area.

General concerns for the improvement of the transportation/circulation system in the Cherry Point-Ferndale Sub Area include reducing traffic accidents, increasing roadway capacities, improving roadway conditions, creating convenient access and circulation within the Sub Area, and establishing a public transit service and trail systems.

As shown in Figure 17, traffic accidents for the years 1974 through 1978 occurred primarily along the major arterials and intersections in the Sub Area. The majority of accidents occurred on Bay Road, Grandview Road, Mountain View Road, Slater Road, Vista Drive, Portal Way - Enterprise Road, West Axton Road and West Smith Road. Intersections at which a significant number of accidents occurred are Alder Grove Road and Vista Drive, South Church Road and Lampman Road, Slater Road and Haxton Way, Northweste Drive and West Smith Road and Northwest Drive and West Axton Road.

Roadway capacity is generally adequate at the present time to accommodate traffic flows in the Sub Area. There are, however, several roadways on which peak volumes of traffic are becoming a concern. These roadways include Mt. View Road from Church Road to Ferndale and Portal Way from Ferndale to Enterprise Road. Other roads on which capacity is also a concern include: Mt. View from Olson to Church Road, Enterprise Road north of its intersection with Portal Way, Northwest Drive from West Smith to Axton Road and West Axton Road from Ferndale to Aldrich Road.

As shown in Table XV, roadway capacity greatly exceeds estimated peak hour volumes on most arterial roadways in the Sub Area. The capacity indicated in the Table, however, represents the maximum traffic volume that can be accommodated on these roadways and generally represents operation at roadway speeds of 30-35 miles per hour and general traffic conditions that the public considers a poor level of service. Practical capacity could be approximately half the capacity figures shown in the Table and indicates that the roads identified above are approaching their realistic, practical capacities.

Capacities on the streets within Ferndale limit traffic flows through the city present inconveniences to drivers and hamper traffic circulation within the Sub Area as a whole. The principal east-west route through Ferndale (Main Street) is now being improved but traffic flows will continue to be impeded through the city due to the congested traffic conditions existing there. Planning efficient roadway links through Ferndale to provide improved circulation for Sub Area motorists should be coordinated between Whatcom County and the City of Ferndale.

As discussed in the Transportation/Circulation Section of Existing Conditions, roadway conditions on many of the arterials within the Sub Area do not meet currently accepted standards of roadway and shoulder widths. Also, because of roadway subgrade characteristics, many roads are not suitable for travel by trucks during freeze-thaw weather conditions.

Whatcom County Engineering Department standards call for a minimum 22-foot paved roadway with 4-foot wide shoulders. If this standard is applied to the existing arterials listed in Table XVI, the following roadways have substandard roadway and/or shoulder widths: Northwest Drive between Slater and West Smith Road, West Smith Road from Northwest Drive to Aldrich Road, the portion of West Smith Road from Interstate-5 and Northwest Drive between Byers and Graveline Road (not listed in the table), Portal Way from Enterprise Road northwest to the Sub Area boundary to Custer, Portal Way from Enterprise Road to Ferndale, Grandview

TABLE XV

TRAFFIC VOLUME AND CAPACITY

	ROADWAY	LIMITS	ARTERIAL CLASS.	VOLUME 1970 ADT	VOLUME 1978 ADT	ESTIMATED PEAK HOUR VOLUME	CAPACITY (VEHICLES PER HOUR)
1	Slater Rd	I-5 to Haxton Way	St Hwy		3500	420	1302
2	Slater Rd	Haxton Way to Lk Terrell Rd	Major	1750	1900	228	1391
3	Northwest Dr	Slater Rd to W Smith Rd	"	2550	2935	352	1198
4	Northwest Dr	W Smith Rd to W Axton Rd	"	1600	2275	273	1391
5	W Smith Rd	I-5 to Northwest Dr	"	1700	2160	259	1228
6	W Smith Rd	Northwest Dr to Aldrich Rd	"	1800	2355	283	991
7	W Axton Rd	Ferndale CL to Northwest Dr	"	1550	3040	365	1391
8	Portal Way	Custer to Enterprise Rd	"	1250	2020	242	917
9	Portal Way	Enterprise Rd to Ferndale	"	3100	4860	583	1198
10	Grandview Rd	Portal Way to Vista Dr	"	1750	2395	287	1110
11	Grandview Rd	Vista Dr to Olson Rd	"	940	1695	203	1309
12	Grandview Rd	Olson Rd to Kickerville Rd	"	880	1395	167	1302
13	Grandview Rd	Kickerville Rd to Jackson	"	570	1005	121	1391
14	Kickerville Rd	Grandview Rd to Rainbow Rd	"	960	755	91	973
15	Rainbow Rd	Kickerville Rd to Mt View Rd	"	1100	900	108	1113
16	Mt View Rd	Rainbow Rd to Lake Terrell Rd	"	2150	2105	253	1124
17	Mt View Rd	Lake Terrell Rd to Olson Rd	"	2200	2005	241	1124
18	Mt View Rd	Olson Rd to Church Rd	"	2500	2500	300	1073
19	Mt View Rd	Church Rd to Ferndale	"	2850	3430	412	917

TRAFFIC VOLUME AND CAPACITY T A B L E XV

	ROADWAY	LIMITS	ARTERIAL CLASS.	VOLUME 1970 ADT	VOLUME 1978 ADT	ESTIMATED PEAK HOUR VOLUME	CAPACITY (VEHICLES PER HOUR)
20	Bay Rd	Jackson Rd to Blaine Rd	Secondary	360	315	38	858
21	Bay Rd	Blaine Rd to Vista Dr	"	980	1130	136	917
22	Vista Dr	Bay Rd to Grandview Rd	"	680	1000	120	954
23	Vista Dr	Grandview Rd to Alder Grove Rd	"	940	1225	147	917
24	Vista Dr	Alder Grove Rd to Ferndale	"	780	1475	177	917
25	Blaine Rd	Grandview Rd to Bay Rd	"	290	400	48	858
26	Grandview Rd	Jackson Rd to Pt Whitehorn Rd	"	380	325	39	910
27	Lk Terrell Rd	Mt View Rd to Unick Rd	"	2050	1240	149	1135
28	Lk Terrell Rd	Unick Rd to Slater Rd	"	1450	1310	157	1021
29	Ferndale Rd	Slater Rd to Ferndale	"	1050	650	78	858
30	W Axton Rd	Northwest Dr to Aldrich Rd	"	980	2550	306	888
31	Northwest Dr	W Axton Rd to Paradise Rd	"	860	2125	255	939
32	Northwest Dr	Paradise Rd to Lattimore Rd	"	550	1260	151	917
33	Northwest Dr	Lattimore Rd to W Wiser Lk Rd	"	370	850	102	888
34	W Wiser Lk Rd	Ritter Rd to Woodlyn Rd	"	-	-	-	858
35	W Pole Rd	Northwest Dr to Aldrich Rd	"	200	510	61	828
36	W Laurel Rd	Northwest Dr to Aldrich Rd	Collector	-	650	78	888
37	Slater Rd	I-5 to Northwest Dr	"	180	700	84	828
38	Hovander/ W Smith Rd	I-5 to Ferndale	"	-	-	-	828
39	Church Rd	Alder Grove Rd to Mt View Rd	"	430	1090	131	858
40	Alder Grove Rd	Jackson Rd to Vista Dr	"	140	260	31	888
41	Jackson Rd	Alder Grove Rd to Bay Rd	"	300	480	58	858

T A B L E XVI

ARTERIAL ROADWAY DATA

	ROADWAY	LIMITS	ARTERIAL CLASS.	RIGHT-OF-WAY WIDTH (FT)	ROADWAY WIDTH (FT)	SHOULDER WIDTH (FT)	EXISTING VOL (ADT)	SPEED LIMIT
1	Slater Rd	I-5 to Haxton Way	St Hwy	80	22	6	3500	55
2	Slater Rd	Haxton Way to Lk Terrell Rd	Major	80	24	4	1900	50
3	Northwest Dr	Slater Rd to W Smith Rd	"	60	20	6	2935	45
4	Northwest Dr	W Smith Rd to W Axton Rd	"	33	24	4	2275	45
5	W Smith Rd	I-5 to Northwest Dr	"	60	22	4	2160	40
6	W Smith Rd	Northwest Dr to Aldrich Rd	"	60	22	0	2355	50
7	W Axton Rd	Ferndale CL to Northwest Dr	"	60	24	4	3040	40
8	Portal Way	Custer to Enterprise Rd	"	90	20	0	2020	50
9	Portal Way	Enterprise Rd to Ferndale	"	80	20	8	4860	35
10	Grandview Rd	Portal Way to Vista Dr	"	60	22	2	2395	45
11	Grandview Rd	Vista Dr to Olson Rd	"	60	23	4	1695	50
12	Grandview Rd	Olson Rd to Kickerville Rd	"	60	22	6-8	1395	50
13	Grandview Rd	Kickerville Rd to Jackson	"	40-60	23	6	1005	45
14	Kickerville Rd	Grandview Rd to Rainbow Rd	"	60	21-22	0	755	40
15	Rainbow Rd	Kickerville Rd to Mt View Rd	"	60	21	3	900	35
16	Mt View Rd	Rainbow Rd to Lake Terrell Rd	"	60	20	4	2105	50
17	Mt View Rd	Lake Terrell Rd to Olson Rd	"	60	20	4	2005	50
18	Mt View Rd	Olson Rd to Church Rd	"	60	20	3	2500	50
19	Mt View Rd	Church Rd to Ferndale	"	40	20	0	3430	35

T A B L E XVI

ARTERIAL ROADWAY DATA

	ROADWAY	LIMITS	ARTERIAL CLASS.	RIGHT-OF-WAY WIDTH (FT)	ROADWAY WIDTH (FT)	SHOULDER WIDTH (FT)	EXISTING VOL (ADT)	SPEED LIMIT
20	Bay Rd	Jackson Rd to Blaine Rd	Secondary	60	18	0	400	40
21	Bay Rd	Blaine Rd to Vista Dr	"	60	20	0	1130	50
22	Vista Dr	Bay Rd to Grandview Rd	"	60	21	0	1000	45
23	Vista Dr	Grandview Rd to Alder Grove Rd	"	60	20	0	1225	45
24	Vista Dr	Alder Grove Rd to Ferndale	"	60	20	0	1475	45
25	Blaine Rd	Grandview Rd to Bay Rd	"	60	18	0	400	35
26	Grandview Rd	Jackson Rd to Pt Whitehorn Rd	"	60	18	0-2	325	45
27	Lk Terrell Rd	Mt View Rd to Unick Rd	"	60	20	3-6	1240	35
28	Lk Terrell Rd	Unick Rd to Slater Rd	"	60	20	2	1310	35
29	Ferndale Rd	Slater Rd to Ferndale	"	60	18	0	650	35
30	W Axton Rd	Northwest Dr to Aldrich Rd	"	40	19	0	2550	35
31	Northwest Dr	W Axton Rd to Paradise Rd	"	33	19	0-2	2125	35
32	Northwest Dr	Paradise Rd to Lattimore Rd	"	33	20	0	1260	35
33	Northwest Dr	Lattimore Rd to W Wiser Lk Rd	"	33	19	0	850	35
34	W Wiser Lk Rd	Ritter Rd to Woodlyn Rd	"	33	18	0	-	-
35	W Pole Rd	Northwest Dr to Aldrich Rd	"	40	17	0	510	35
36	W Laurel Rd	Northwest Dr to Aldrich Rd	Collector	40	19	0	650	35
37	Slater Rd	I-5 to Northwest Dr	"	40	17	0	700	35
38	Hovander/ W Smith Rd	I-5 to Ferndale	"	40	17	0	-	-
39	Church Rd	Alder Grove Rd to Mt View Rd	"	40	18	0	1090	35
40	Alder Grove Rd	Jackson Rd to Vista Dr	"	60	19	0	260	35
41	Jackson Rd	Alder Grove Rd to Bay Rd	"	40-50	18	0	480	40

Road from Portal Way to Vista Drive (this section, as well as having inadequate shoulder widths, also has poor surface conditions), Kickerville Road from Grandview to Rainbow Road, Rainbow Road from Kickerville to Mt. View Road, Mt. View Road from Rainbow Road to Ferndale.

The roadways listed above are the designated major arterials within the Sub Area and, as such, should be considered for improvements to provide a safe network of major roadways. The secondary and collector arterials listed in Table IV are all substandard if the previously mentioned standard is applied. However, except for a few roadways with relatively high traffic volumes, such as West Axton Road between Northwest Drive and Aldrich Road, Northwest Drive north of West Axton Road, Lake Terrell Road from Mt. View to Slater Road and Vista Drive north of Ferndale, these roadways are adequate to accommodate existing traffic volumes. The shoulders of these roads are generally inadequate but, in many cases, could be improved without extensive grading.

At some times of the year when freeze-thaw weather conditions prevail, many Sub Area roads are closed to truck traffic because their weight can damage the road bed. During such periods, access routes from Interstate-5 to the industrial areas near Cherry Point are available for truck traffic. However, on Grandview Road, Slater Road, Bay Road and Lake Terrell Road east of Interstate-5 there are no all-weather routes except for a portion of Portal Way and Enterprise Road. Roadway travel by truck traffic is then, curtailed in the eastern portion of the Sub Area during freeze-thaw conditions. Driving without damaging roadways during such weather conditions is dependent upon an adequate roadway subgrade such as that indicated in Figure 19. With good subgrade and surfacing conditions and with adequate drainage facilities along the roadways, the potential for damage to roadways due to use during certain weather conditions is greatly reduced.

Two other roadway condition concerns include railroad crossings and roadway striping. Railroad crossings at Bay, Grandview, Brown, Alder Grove, Lonseth, Henry and Unick Roads are marked only by crossboards, as

are those crossings of the mainline tracts at Hovander, Thornton, Alder Grove, Brown and Grandview Road. Several of these at-grade crossings occur on some of the more heavily traveled Sub Area roads, including Bay Road and Grandview Road. The at-grade crossing along Hovander Road is poor due to limited sight distance and roadway grade and surfacing conditions near the crossing. The only adequately marked railroad crossing in the Sub Area is at the railroad intersection with Slater Road. This crossing is marked by signs and flashing lights.

Roadway centerline striping is not provided on Kickerville Road just north of Henry Road or on Slater Road between Lake Terrell Road and Haxton Way. Use of painted striped on these roadways could be used to better identify driving lanes.

Major issues associated with improvements in circulation throughout the Sub Area include possible needs for additional east-west routes, alternate routes through Ferndale to alleviate congestion in the Ferndale area (the solution to this issue may involve another bridge crossing of the Nooksack River), additional freeway overcrossing(s) to provide improved east-west access and circulation and roadway improvements needed to increase roadway capacities as discussed earlier in this section.

Other concerns include the expansion of transit service to accommodate growth in the Sub Area and the implementation of existing plans for construction of trail systems for hiking, bicycling and horseback riding. Construction of these trails should be planned when roadway improvements are planned to ensure that other transportation modes can be accommodated within existing public rights-of-way. To provide suitable separation of various transportation modes, adequate right-of-way width is needed. The comparison of existing right-of-way widths shown in Table XV, along with those recommended in Figure 20 indicate that acquisition of right-of-way should be considered along several roadways, especially those that are planned to accommodate trail uses.

UTILITIES

Based upon the identification of existing utility service conditions within the Cherry Point-Ferndale Sub Area, issues have been identified that should be addressed.

An important issue concerning the expansion of utility services revolves around the growth-inducing impact of such expansions. Because utility services are so closely linked with land use, utility service and land use planning efforts should be considered jointly. By considering both utility service and land use, the planned land use density and timing of development can be supported by the suitable level of utility service.

Planning for land use density and development timing should be coordinated between all relevant agencies within Whatcom County, the City of Ferndale and local utility service associations.

Waste water disposal and water service are two of the most important utility services that influence land use and development. Waste water disposal in the Sub Area presents issues for both types of waste water disposal -- individual on-site disposal systems with septic tanks and drainfields and sanitary sewer systems with centralized treatment facilities.

As the use of septic tanks and septic system failures become more of a concern, increased pressure for sanitary sewer development will become apparent. This demand for an extension of sewers into areas previously using septic tanks and drainfields for waste water disposal will undermine efforts to retain rural areas. Improved on-site disposal methods could eliminate the need for sewer extensions to such areas. Specific regulations governing septic tank and drainfield construction should be established and enforced to ensure the design and maintenance of on-site disposal systems. Other concerns for areas of septic tank use

are soil characteristics and health standards, because, without proper soil conditions use of septic tank and drainfield systems may pose health problems as waste water effluents will not be properly treated.

Sanitary sewer service with centralized treatment facilities is provided only near Ferndale. The existing treatment plant is sized to accommodate flows from areas within Ferndale only. By expanding the treatment facilities, service could be provided to other portions of the Sub Area. Such expansion of this treatment plant, then, has a major influence on expansions of sewer service and should be planned in accordance with comprehensive planning efforts for the Sub Area.

The availability of water service can also influence where and when development will occur and therefore will influence any proposed land use planning. Expansion of water service tends to support development at higher densities, and development is hindered where such service is not available. Without a County-approved water source, septic tank and drainfield system permits and, ultimately, building permits are not issued. Water service expansion also influences the level of fire protection for residents of the area and is a further indication of health, welfare and land use issues.

Other issues include the development of adequate water sources, water quality, use of existing water association service lines, expansion of service to water associations, use of developer extension agreements to provide water system expansions and water storage capacity.

COMMUNITY FACILITIES

The analysis of existing community facilities, their service area and service capacities, proposed expansion and improvement, anticiapted demographic trends and possible future growth and land use changes in the Cherry Point-Ferndale Sub Area indicate a number of existing and potential problems and concerns. Several of these relate to general growth and land use issues, while others deal with specific community facility service concerns.

New growth and development within the Cherry Point-Ferndale Sub Area will significantly alter the area's economic base, employment and land use. Industrial expansion at Cherry Point as well as overall growth within Whatcom County will produce additional "spinoff" growth. The resulting population influx of new workers and their families, their sociodemographic characteristics, and their geographic distribution within the Sub Area, will have profound implications upon the need for and delivery of community facilities and services.

Increased growth and more rapid urbanization will create their own special service demands. New service demands which will be presented by Cherry Point industrial growth will be substantial. Services and facilities must be provided in a timely fashon to accommodate new growth but with sufficient flexibility to accommodate the moderate to rapid range of growth possible. Advance planning and necessary front-end financing for such facility provision will present a major challenge.

The key issues and considerations identified in connection with community facilities and services are discussed briefly in the following paragraphs. Several current service delivery concerns are first outlined. These are then followed by a description of concerns associated with expectations for future economic and population growth in the Sub Area.

There is present overcrowding in the Ferndale School District while simultaneous excess capacity exists in the adjacent Blaine School District. A small number of additional students could be accommodated in the Meridian School District. Although planned additions and improvements to facilities in the Ferndale District will accommodate enrollment levels anticipated through 1980-81, there will be a need for additional school sites and facilities to serve future population growth.

State enrollment projections forecast an increase of over 900 students in the Ferndale School District from 1979-86, and approximately 80 in the Blaine, and 300 in the Meridian School District over this period. With completion of the improvements and additions to the Ferndale Schools currently underway, the District could accommodate an estimated 250 students evenly distributed. The Blaine District could accommodate an estimated 150 students, while the Meridian District could absorb no more than 50 pupils. Population projections discussed earlier underscore the broad range of population growth (3,000-12,000) that may occur in the Sub Area as a result of continued overall Whatcom County growth trends and the extent of future industrial development at Cherry Point. The expansion in enrollment produced by Cherry Point employment alone could range from an estimated 500 to more than 3,000 new children.

Major areas of possible population and enrollment growth within the Sub Area are expected to be the North Bellingham area, the area around West Smith Road and Northwest Drive, the Laurel area, and the area north and east along Portal Way. The specific location and extent of new enrollment growth within the Sub Area will be, however, substantially affected by major industrial expansion.

Expansion programs will thus have to be flexible enough to accommodate the wide range of future possible demand upon the educational system. The sharing of facilities and resources among school districts on a short-term basis may be required to even-out demand/capacity and effectively utilize existing facilities. New sites will have to be acquired, however, to accommodate new permanent facilities which may be required.

Other current concerns include the need for a number of specialized education, athletic and other facilities in addition to regular classroom space and eventual replacement of several older structures to serve the current population regardless of the extent of additional demands created by new growth. Some of these additional needs relate to expanded state education requirements and increasing importance of a number of specialized programs within the educational system.

There is a current, and will be an increased future need for additional neighborhood parks and athletic facilities within the Cherry Point-Ferndale Sub Area. Major regional parks and sub-regional community parks containing unique natural and historical resources do provide substantial recreation activities for Sub Area residents. However, neighborhood parks and playgrounds and community playfields, providing recreation facilities such as picnic areas, playgrounds, play equipment, athletic fields, swimming, tennis and track facilities are in short supply within the Sub Area. An additional concern is the need for effective mechanisms for protecting open space as future industrial growth and accompanying development pressures occur.

The 1976 Whatcom County Interagency Park, Recreation and Open Space Study also reported an expressed need by Whatcom County residents for easily accessible, community-based recreational facilities; for additional indoor recreational facilities and year-round recreational opportunities; additional facilities for non-profit groups to expand their recreational, cultural and human service programs; and a strong desire for improved active use facilities such as small parks, trails, swimming facilities and tennis courts. This study also reported that not all existing recreational facilities were efficiently used; that the recreational use of school property, for example, could be expanded, and that there was a general need for interagency coordination; public and private non-profit sharing of facilities and cooperatively-run programs. Among its recommendations, the study suggested that improved sports fields be sought by local agencies and that a cooperative local agency/ county-wide bond issue be undertaken for construction of indoor recrea-

tional facilities, with indoor swimming pools a top priority. It recommended that school and recreation agencies maximize the public use of their facilities through mutual agreements and the coordination of public use and that public recreational facilities be suitably designed for use by non-profit recreation groups as well as the general public.

The 1976 study emphasized the importance of watercourses and wetlands as an important base of the County's open space program. The following potential open space corridors based on watercourses were identified within the Cherry Point-Ferndale Sub Area: 1) Terrell Creek, from Lake Terrell to Birch Bay, a trail corridor and wildlife preserve connecting Birch Bay State Park with the Lake Terrell State Game Range; 2) Nooksack River Floodplain, an agriculture, open space, trail cooridor connecting river parks and linking Ferndale, Lynden, Everson and foothills; and 3) Tenmile Creek Corridor, an agricultural open space corridor, connecting wildlife habitats (including Barrett Lake to Green Lake. The study also cited the potential for public-use development for freshwater swimming, fishing or general shoreline uses of Terrell Lake, in the Lake Terrell Game Reserve. The study identified a need for additional coastal waterfront access parks to accommodate potential population growth. Trailhead access points recommended for development are futher discussed under "Trails" in the Transportation Section of this report). Recommended trails include: a 15-mile Ferndale to Everson bicycle trail, following the Nooksack River dikes; a 4-mile foot trail around Lake Terrell; a 3-mile foot trail from Birch Bay State Park to Kickerville Road, and possibly liking to Terrell Lake; and eventual trails and footbridge links between Tennant Lake and Pioneer Park.

Concerning the public desire for a county-wide pool program, the 1976 study recommended that pools could be provided as part of a joint park/school combination and that the existing outdoor pool in Ferndale might be renovated and covered as a joint City/County effort. Also, suggested was that multipurpose community centers should be provided in each community area, if public support were sufficient. It was suggested, as a means of providing community parks to the County's unin-

corporated areas that the County Park Board formally contract with school districts and possibly purchase school recreation grounds to promote the expanded recreational use of school property, and that local Grange Halls, as well as schools, might also be a focus for park development. Potential community park development at Mountain View Elementary and expanded suggestions for expanded recreational use of school property in the Sub Area. It was also recommended that schools continue to be utilized as multi-use community centers serving all age groups during non-school hours.

Another current problem is understaffing of police manpower at the County level to adequately serve areas outside Ferndale within the Sub Area. These shortages will be sharpened with anticipated future growth. To maintain the County's desired level of patrol personnel to population, it would have to add between 1 and 4 new officers if population growth of 3,000 - 12,000 occurs in the Sub Area. If all of this new population is served by the Ferndale Police Department, it would have to add from 5 - 20 officers to maintain its current staffing/population ratio. At the present ratio of volunteers to population served, the Ferndale Fire Department would have to add between 60 and 200 fire fighters to serve the new population. Additional equipment and facilities requirements will also be necessary to expand this service.

There will be a need to develop an appropriate private/public interface in providing additional police and fire protection services that major industrial growth will require. Changing service areas, for example, an extension of Ferndale's police and service provision responsibilities to larger surrounding areas, and new forms of service delivery (e.g., eventual shift to paid professional fire department(s)) may be required.

Among the additional public facility and service concerns that relate to future growth in the Sub Area are the following:

- The appropriate siting of public facilities of to serve future population and economic growth and provide those additional services that will be required.

- Use of public facilities expansion and improvement as a growth management tool, reinforcing land use and other policies intended to direct future growth in the Sub Area.

- Capability to accommodate short-term (e.g., construction phase impacts of major growth-inducing projects with existing permanent, single-use facilities.

Though future development of Cherry Point industrial areas will occur over extended periods and their lag in impacts will allow some advance time for pre-planning the appropriate community facilities response, specific demands during different phases of industrial development will vary significantly. Construction-related impacts will place special short-term demands on community facilities and services. Innovation will be necessary to appropriately accommodate special short-term demands without making unnecessary permanent commitment of resources.

An anticipated problem is obtaining the financial resources to provide community facilities in time for expected new growth prior to the realization of associated tax base growth. Present residents may feel unfairly burdened if asked to contribute tax revenues to provide for needs of future residents. General equity questions (who benefits - who pays) may prompt development of more palatable taxing and funding alternatives.

If more substantial industrial expansion at Cherry Point occurs, resulting population growth will create new community service demands. The average annual rate of population growth that will result from expected overall Whatcom County growth and from assumed industrial development at Cherry Point creating 2,000 new jobs, may approach 10 percent, and produce an 8,000 - 9,000 population increase in the Sub Area by

1995. This increased rate of growth will heighten current community facility limitations and will present a whole new set of growth-related problems.

The new population areas and commercial centers, as well as expanded industrial uses will require expanded police and fire services. New growth will also bring new crime and social problems. Population and economic growth will affect usage of recreational facilities and the accompanying physical changes may reduce recreational opportunities and enjoyment. School capacities in some locations will be strained, either temporarily or over a prolonged period. Over-crowding will require either short-term solutions such as rescheduling by shifts, busing to surrounding districts, use of portable classrooms, or permanent improvement and expansion of facilities.

Certain components of the community service system like hospital services, may be better able to absorb additional demands. The existing supply of hospital beds should continue to suffice for the expected 1990 and 1995 population in light of the current excess bed capacity. Still other sectors of the community service system will face new challenges. Rapid growth may bring many side effects for certain population subgroups. Inflation of housing prices as a result of rapid growth, for example, may result in the displacement of a number of long-time low and moderate income residents many of whom will be elderly.

Low and moderate income individuals may require some form of property tax breaks or direct housing assistance to enable them to remain in their existing housing. Rapid growth can add newcomers to the area faster than municipal facilities and services can be increased. To avoid this situation and the resulting risk of overloads of existing capacities that cause a decline in the quality of services, future growth in the Sub Area must be managed and carefully coordinated with future public facilities and services expansion. Since community facility and service costs are strongly affected by the sequence in which different areas of a municipality are developed, the control of growth in an orderly fashion

also has implications for efficiency in providing police and fire protection, schools and other important facilities. Thus control of the timing of urban development also is a mechanism for economizing on the costs of community facilities and services.

Additional growth associated with more intensive industrial development of Cherry Point would have more serious implications for future community facility and services in the Cherry Point-Ferndale Sub Area. Higher intensity industrial development and employment growth of 3,000 at the Cherry Point industrial area, together with overall county growth trend spinoffs, would produce an estimated population increase of 11,000 - 12,000 people in the Sub Area by 1995. This additional development pressure would heighten the overall risk of uncontrolled growth and resulting deteriorating levels of education, recreation and other public services. These earlier discussed issues and concerns would thus be magnified under this senario. The task of ensuring adequate community facilities and services will be an even greater challenge as under these circumstances.

In summary, the key community facilities issues for the Cherry Point-Ferndale Sub Area include the following:

- Overcrowding and simultaneous excess among area school facilities; need for modernization and expansion of special education and athletic facilities.

- Provision of additional neighborhood park and recreational facilities; especially playfields, an indoor pool, and tennis facilities.

- Preservation of recreation-valued open space (for example, publicly accessible river frontage, Barrett Lake, and the Tenmile Creek Corridor.

- Definition of County/Ferndale urban service areas to cope with shortage of police manpower to serve areas outside Ferndale and eventual shift to paid professional fire department personnel.

- Public/private interface in providing industrial-related fire and police services.

- Siting of private facilities and provision of new services required by future growth, including significant variation in short-term demands related to industrial expansion.

- Financing and equity (who benefits - who pays) problems of undertaking facility expansion and improvements needed for future growth.

PLANNING RECOMMENDATIONS AND IMPLEMENTATION STRATEGIES

PLANNING RECOMMENDATIONS AND IMPLEMENTATION STRATEGIES

INTRODUCTION

The purpose of this section is to outline recommendations and policies regarding land use, physical environment, transportation, utilities and community facilities that address the existing and potential problems of growth identified for this Sub Area. The consultant team developed these policies to be both effective and practical. They are, however, preliminary and are meant to provide a basis for discussion in the public review and plan adoption process.

ASSUMPTIONS USED IN FORMULATING THE RECOMMENDATIONS

Several assumptions were used in developing the recommendations for the Sub Area. These assumptions are based on an analysis of existing conditions within the Sub Area and a review of county-wide growth trends.

1. The Cherry Point-Ferndale Sub Area will be affected by economic growth within the County as a whole and by its changing socio-economic makeup. Specifically, the following factors are assumed to take place over the next 15 years:

    - The Whatcom County economy will experience an expansion of resource-based and other manufacturing activities.
    - Trade will expand with regional and international markets.
    - The County economy will further diversify and grow in service and non-manufacturing sectors.
    - The County population will grow because of economic expansion, regional amenities and recreational attractions.
    - Throughout the County, household size will decline, incomes will rise and the average age of the population will rise.

2. Conditions in the Cherry Point-Ferndale Sub Area will be primarily influenced by future industrial development within industrially zoned land on Cherry Point. Industrial development there will fundamentally alter the number of people employed within the Sub Area, in-migration, community facility requirements, and demands on traffic and utility systems.

3. Land use changes will be affected by basic land use requirements for residential, commercial and industrial uses. Among these are:

   - Medium and high density residential developments are most successful when located close to employment centers, shopping facilities, service facilities and on collector or arterial streets.
   - Commercial-retail centers are most profitable when located on highly accessible parcels, central to an adequate market area.
   - Industrial activities require flat expansive areas for the manufacturing and assembly of goods and require networks of several transportation modes to provide movement of goods to and from their facilities.

4. Land development will be affected by environmental constraints. Some of these constraints are apparent in:

   - The undesirablity of developing within areas that are vulnerable to flooding;
   - The expense involved in constructing buildings in areas where the water table is near the surface, where soils are unstable and where slopes are over 20 percent.

5. The City of Ferndale will continue to be the hub of commercial, service and residential activity for the Sub Area.

6. Future large-scale industrial development will occur over long periods of time from design to project completion. This period could last 2 to 5 years.

SUB AREA FORECAST

Given the current world and regional economic climate and the rapid rate of technological development, it is difficult to say with certainty what specific directions industrial development will take on Cherry Point or within the Sub Area. For this reason, growth scenarios are presented that are based on the probable ranges of employee numbers that might come into the area with different levels of industrial expansion. These scenarios are:

1. Employment increases of approximately 500 persons. This would accompany no or only small scale industrial development within the current Heavy Impact or Light Impact Industrial Zones around Cherry Point.

2. Employment increases of approximately 2,000 additional persons. This would accompany moderate industrial expansion on Cherry Point.

3. Employment increases of approximately 3,000 persons. This would accompany full industrial expansion on Cherry Point.

The following are ranges of impact on the Sub Area that would be associated with each one of the three growth possibilities. Together, these scenarios illustrate in more tangible terms the kinds of growth and requirements for space that can be expected to occur over the next 15 years.

Growth Scenario I

Assumptions:

1. Little or no industrial expansion on Cherry Point.

2. The Sub Area and the City of Ferndale will be most affected by County-wide growth trends.

3. Cherry Point industry would increase its work force by up to 500 persons.

4. Population growth averaging approximately 4 percent a year over the next 15-year period and a total population increase of 3,000 - 4,000 in the Cherry Point/Ferndale Sub Area by 1995.

Given these assumptions about growth, several population projections can be made. New jobs totaling 500 at Cherry Point could be expected to account for a population increase of approximately 1,640 in the Sub Area. Population increase expected as a part of overall Whatcom County growth would be 1,800 for a total projected population increase of approximately 3,440 in the Sub Area.

From these population projections, projections for types of land use can be made. Approximately 172,000 square feet of additional retail space would be needed. Assuming 33 percent lot coverage, this number of square feet would require approximately 12 acres. For industrial/commercial space approximately 400,000 square feet would be required that would take up some 28 acres.

Assuming 2.6 persons per dwelling unit, approximately 1,322 units would be needed. If on an average 4 dwelling units are built to the acre, some 330 acres would be needed. The number of acres actually used could vary considerably due to the range of residential densities possible.

Growth Scenario II

Assumptions:

1. Moderate industrial expansion on Cherry Point that will employ approximately 2,000 persons more than currently employed.

2. Incremental growth of Ferndale and the Sub Area due to County-wide influences are already taking place as described in Growth Scenario I.

3. Average annual population growth approaching 10 percent a year over the next 15-year period and a total population increase of 8,000 - 9,000 in the Sub Area by 1995.

Employment increases at Cherry Point of 2,000 would increase the Sub Area population by approximately 6,550. Population increase due to County-wide growth would be approximately 1,800 for a total population growth of approximately 8,350.

These employment and population statistics would be reflected in the need for approximately 418,000 square feet of retail space that could be expected to take up some 29 acres. A demand for 1.6 million square feet of industrial/commercial space could be expected which would take up about 110 acres. Approximately 3,200 more dwelling units would be needed, which at an average of four per acre, would take up about 800 acres.

Growth Scenario III

Assumptions:

1. Full industrial development of industrially zoned land on Cherry Point that will employ approximately 3,000 persons more than currently employed.

2. Growth as described in Growth Scenario I and II is taking place concurrently.

3. Average annual population growth of over 13 percent in Sub Area over next 15 years and a total population increase of 11,000 - 12,000 in the Sub Area by 1995.

An employment increase of 3,000 persons at Cherry Point would account for an overall population increase in the Sub Area of approximately 9,830. Overall County-wide growth would bring in approximately 1,800 additional persons for a total population increase of about 11,630 persons.

Following this scenario, a demand for approximately 581,000 square feet of retail space would arise that would take up some 40 acres. Approximately 2.4 million square feet of industrial/commercial space on about 165 acres would be needed. Demand for 4,470 new dwelling units could be expected. At an average of four units per acre, this number of dwelling units would take up approximately 1,120 acres.

GENERAL POLICY RECOMMENDATIONS

The purpose of this section is to assemble the general objectives and policies that will assist the development of a comprehensive land use map for the Sub Area and provide the basis for area-specific recommendations. This section will be followed by area-specific recommendations that will provide an implementation strategy to facilitate the realization of Sub Area objectives.

Land Use

Objective 1: To reduce the potential for conflicting land uses to locate near each other and preserve the rural character of the Sub Area as a whole.

Policy A: A mutually agreeable Urban Services Area around Ferndale should be developed between agencies of the City of Ferndale and Whatcom County to promote efficient and respon-

sive expansion of urban services. A means of revising that line should also be formulated.

Policy B: Future urban development should occur within the Urban Services Area established by the City of Ferndale and Whatcom County.

Policy C: Heavy Impact industrial development should locate in existing industrially zoned land within the Sub Area.

Policy D: Agriculture should be promoted as the primary land use outside of the Urban Services Area and Industrially zoned areas.

Objective 2: To improve the working relationship between the County and City of Ferndale regarding matters of mutual concern.

Policy A: A mutually agreeable Sphere of Influence around the City of Ferndale should be delineated in which planning concerns will be addressed on a cooperative basis.

Objective 3: To provide for adequate amounts of higher density housing than allowed under the zoning ordinance and to encourage innovative development design that is sensitive to physical constraints and promotes the inclusion of open space in site planning.

Policy A: Develop new zoning classifications that incorporate incentives for good site planning such as planned unit developments.

Objective 4: To coordinate and facilitate development procedures between all affected county departments to assure consistent and responsive interaction with land developers.

Policy A: Establish a Technical Review Committee made up of representatives of each affected department to review and make binding recommendations regarding development plans.

Objective 5: To safeguard the visual qualities of the Sub Area.

Policy A: Analyze visual impacts of all major developments in the plan review process.

Policy B: Develop ordinances that enforce requirements to buffer visual impacts of major developments from surrounding vantage points.

Policy C: Develop an ordinance that establishes standards for development near the boundaries between land use zones so that development will be visually compatible with land uses in adjacent zoning.

Physical Environment

Objective 1: To reduce any adverse environmental impacts of development.

Policy A: Consistently enforce the State Environmental Policy Act in relationship to "threshold determination" and requirements for Environmental Impact Statements.

Policy B: Encourage effective mitigating measures for adverse impacts identified in Environmental Impact Statements.

Policy C: Enforce Federal and State ambient air quality standards.

Objective 2: To maintain the wildlife habitat and to enhance its quality.

Policy A: Encourage the conservation of wooded areas by encouraging use of existing tax incentives.

Policy B: Encourage the conservation of open space and the incorporation of greenbelts in developments, especially on steep slopes.

Policy C: Discourage high impact development from locating adjacent to sensitive wildlife habitat without effective mitigating measures.

Objective 3: To improve freshwater quality in lakes, streams and rivers.

Policy A: Develop and adopt stormwater control ordinances.

Policy B: Develop and adopt temporary erosion control ordinances to be followed during construction.

Policy C: Explore management plans for the disposal of farm animal waste in areas that directly affect surface water quality.

Objective 4: To reduce the potential for groundwater quality degradation.

Policy A: Control development density in areas where soil is subject to ponding and to seasonal water table fluctuation.

Policy B: Encourage investigation of practical and effective alternate sewage treatment systems.

Objective 5: To minimize development-related disruption of marine shoreline processes.

Policy A: Require thorough analysis of potential development impacts and posting of bonds to assure performance of mitigating measures.

Transportation Circulation

Objective 1: Establish an efficient, safe and well-designed circulation system that promotes desired development patterns in this Sub Area.

Policy A: Encourage the designation of specific truck routes into commercial and industrial areas and minimize the conflict between truck and automobile traffic.

Policy B: Dedicate adequate and acceptable public rights-of-way in all subdivisions.

Policy C: Encourage effective construction techniques, quality materials, and timely maintenance on all roads and highways.

Policy D: Discourage single-purpose road construction and improvement projects (except for routine maintenance) by coordinating street improvements with those of sidewalks, bikeways, underground utilities and landscaping as the need warrants.

Policy E: Good design principles should be followed in the maintenance of existing streets or the construction of new streets.

Policy F: Each road should be classified and standards for design should be consistently applied to each class of roadway.

Policy G: Promote the consolidation of access points to frontage properties along major arterials.

Policy H: Encourage the construction of safe internal access roads in developments and other private easement roads.

Policy I: Encourage the use of noise buffers between major transportation routes and residential areas.

Policy J: Minimize the adverse environmental impacts of existing and future roadways on the natural environment.

Objective 2: Encourage a railway system which provides for the efficient, safe, and economic movement of goods and people with minimum adverse impact to motorists, pedestrians, and adjacent land use in the Sub Area.

Policy A: Railroad lines and spurs should be functionally related to the areas through which they pass and should promote desired industrial development patterns.

Policy B: Use and operation of localized rail lines should coincide with periods of low traffic flow on crossing streets.

Policy C: Encourage the elimination of at-grade crossings on main line tracks.

Policy D: Additional rail lines should be located in corridors in order to reduce the number of grade crossings and to reduce access and usability problems of the land located between such lines.

Policy E: Where there is serious conflict between existing railroad lines and adjoining land use, steps should be taken, by designing subdivision screening or other methods, to minimize the adverse impacts.

Objective 3: Promote an effective and viable mass transit or ride pool system which ties the Cherry Point Sub Area to the region.

Policy A: Support efforts to increase the availability of transit use as demands increase.

Policy B: Promote the development of more cost-effective methods of transportation to areas of high employment.

Objective 5: Create a functional, safe, and convenient sidewalk or pathway system in the Sub Area.

Policy A: Create a sidewalk or pathway system where every link is a part of an integrated network.

Policy B: Integrate bicycle, pedestrian, bus and street systems and develop accommodating and safe mechanisms of transferring from one mode of transportation to another.

Policy C: Design a sidewalk or pathway system to tie residential areas to likely destinations such as schools, recreation areas, commercial areas, and so forth.

Policy D: Design the sidewalk or pathway system to allow use by the elderly and handicapped.

Policy E: Encourage the location, design, and maintenance of pedestrian sidewalk or pathway systems to provide security for abutting property owners.

Policy F: Provisions should be made in each sidewalk or pathway constructed to provide for the safety of the user.

Utilities

Objective 1: Provide water utility systems which promote planned land use development patterns.

Policy A: Establish an Urban Services Area around the City of Ferndale that incorporates the area most appropriate for future urban development.

Objective 2: Provide an efficient and adequate water supply to the residents and businesses of the Cherry Point-Ferndale Sub Area.

Policy A: Gauge the size of new water utility systems to the expected requirements of the area's planned land use.

Policy B: Design new water systems to allow for their extension into potential service areas.

Policy C: Discourage dead-end water systems when constructing new systems.

Objective 3: Provide sanitary sewer service which promotes planned land use development patterns.

Policy A: Establish an Urban Services Area around the City of Ferndale that incorporates the area most appropriate for future urban development.

Policy B: Design the size of new sanitary sewage systems in the Sub Area to be large enough for the expected requirements of the area's planned land use.

Policy C: Design new sanitary sewer systems to allow for their extension into potential service areas.

Objective 4: Provide an adequate and cost-effective method of preventing property damage from local storm water.

Policy A: Design storm water systems to handle the flow of peak runoff.

Policy B: Where beneficial to downstream properties, control peak flow runoff from the source at a rate similar to natural conditions.

Objective 7: Encourage the undergrounding of existing and new overhead electrical or communications systems where practicable.

Policy A: A program should be established and followed providing for the orderly undergrounding of all existing overhead facilities.

Policy B: Ordinances should be developed that set forth undergrounding requirements of all new facilities and connections.

Policy C: Encourage all undergrounding to occur in existing easement or rights-of-way whenever feasible.

Policy D: Vaults associated with undergrounding should be sited unobtrusively where they do not interfere with the safety of adjacent roadways.

Policy E: Promote the use of one trench in a corridor to accommodate all electrical and communication utilities.

Policy F: The County should establish procedures to encourage underground connections to facilities served by underground utilities.

Policy G: Encourage a minimum of disruption to areas affected by the installation of underground utilities.

Community Facilities

Objective 1: Encourage establishment of public and private community facilities and services that are adequate to meet current and projected needs and enhance the quality of life in the Sub Area.

Policy A: Review proposed projects at an early stage to identify any significant potential public service impacts.

Policy B: Explore creation of special service districts or alteration of existing service district boundaries (e.g., fire, police, schools) to improve service delivery and accommodate new demands.

Policy C: Scale services and facilities to accommodate special service demands of different population subgroups and geographic areas.

Objective 2: Ensure equitable and cost-effective financing of facility and service costs.

Policy A: Explore funding mechanisms to provide more equitable means of providing needed service expansion.

Policy B: Utilize innovative approaches to deal with short-term and temporary service demand variations (e.g., temporary classroom space which could later be converted to other uses; sharing of larger regional facilities; or temporary service provision arrangements).

Policy C: Coordinate service improvements with the various providers (e.g., public, private schools, churches and other institutions.

Policy D: Encourage the development and use of existing facilities rather than construction of new facilities where possible.

Policy E: Encourage multiple program and group usage of facilities.

Policy F: Encourage the multiple use of school property for park and recreational needs.

Policy G: Prepare long-term community facilities capital improvement program for Sub Area, that delineates projected needs, priorities, cost estimates, revenue sources and a practical expansion program.

Policy H: Annually update the community facilities program to ensure its value as an effective planning and programming mechanism.

Objective 3: Provide community facilities and services as a means to channel anticipated growth into desired directions.

Policy A: Coordinate public facility expansion and service provision to reinforce land use policy and influence desired land use objectives.

Policy B: Identify and secure appropriate sites for new school and park facilities that meet other land use objectives.

Policy C: Encourage the development of special human and social services for residents, where needed, such as transportation, mental health, nutrition, housing, medical/dental screening and care services.

Policy D: Encourage location of community facility and service programs in areas readily accessible to those persons served, or ensure provision of adequate transportation to these services.

PLANNING AREA RECOMMENDATIONS

The consultant team divided the Sub Area into eight areas that appeared to warrant specific policy recommendations. These areas are shown in Figure 33, Planning Areas:

1. Greater North Bellingham Area.
2. 100 Year Flood Plain Area
3. Portal Way - Enterprise Road Area
4. Grandview Road and Interstate 5 Area
5. North Ferndale Area
6. Central Sub Area
7. Cherry Point Industrial Area
8. Point Whitehorn - Birch Bay Area.

Greater North Bellingham Area

Land Use

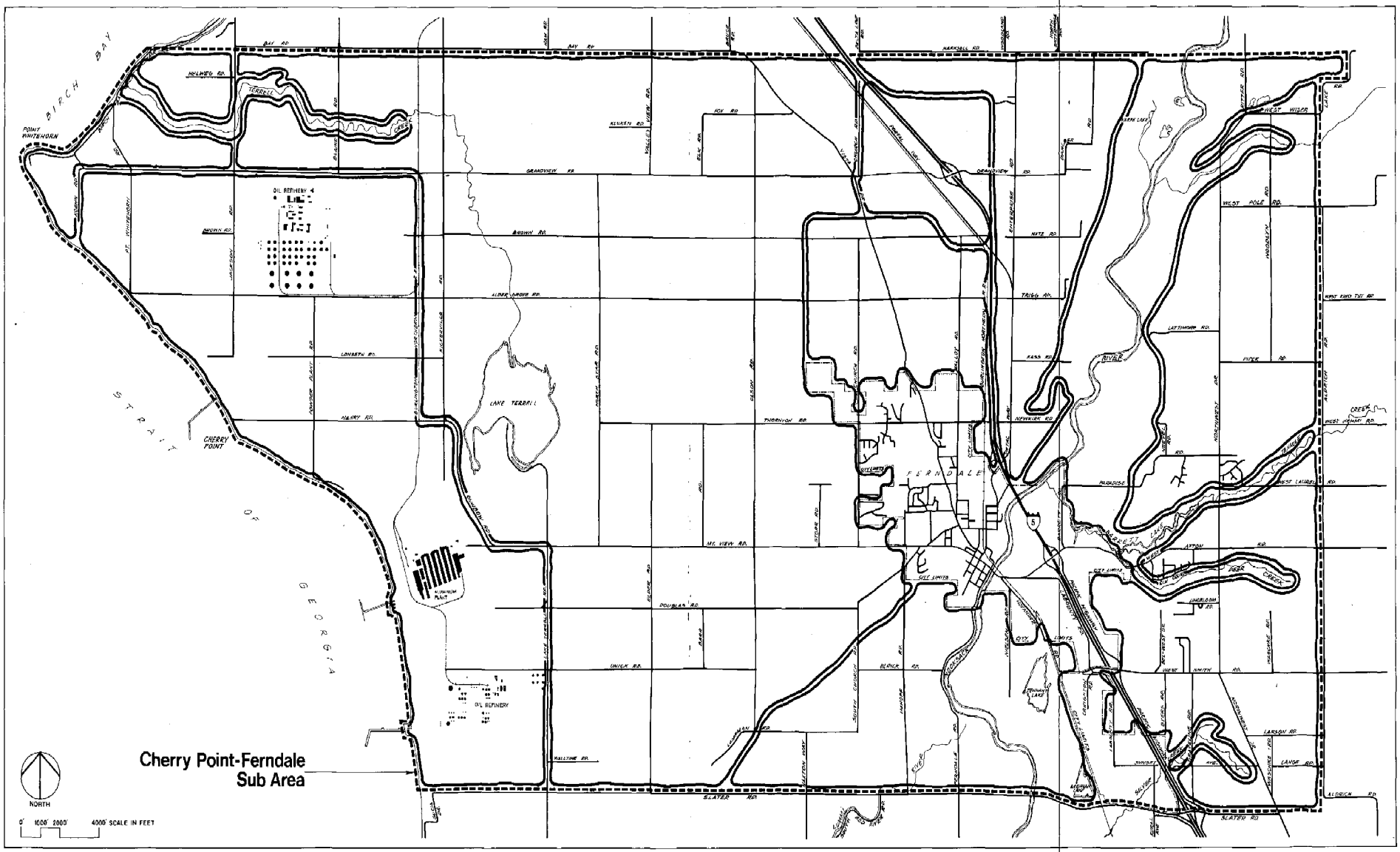
1. Coordinate all land development with sewer system.

2. Coordinate development in th Urban Services Area of Ferndale with comprehensive sewer planning for the area.

3. Rezone areas east of Pacific Highway and north of Barrett Lake from General Protection to rural residential classifications that match existing density.

4. Coordinate land use decisions between County and Ferndale regarding property adjacent to Ferndale boundary and along Interstate 5.

5. Discourage further commercial development on West Axton Road, West Smith Road, Northwest Drive and Slater Road.



1 Greater North Bellingham Area
2 100 Year Flood Plain Area
3 Portal Way - Enterprise Road Area
4 Grandview Road and Interstate 5 Area
5 North Ferndale Area
6 Central Sub Area
7 Cherry Point Industrial Area
8 Point Whitehorn - Birch Bay Area

Planning Areas

figure 33

6. Discourage strip commercial development along county lands adjacent to Interstate 5 by encouraging planned developments and coordinated site planning.

7. Limit the location of future retail-service activities to existing neighborhood shopping areas.

8. Rezone county land adjacent to Interstate 5 for commercial-light industrial use.

9. Require existing and future establishments that need open storage to buffer views into storage areas with vegetation or appropriate fencing.

10. Prohibit establishments that require open storage from locating in the North Bellingham area except along Interstate 5.

11. Promote agricultural uses in the North Bellingham Sub Area area as a means of retaining rural character by encouraging use of existing tax incentives.

12. Encourage retention of wooded areas as means of retaining rural character by encouraging use of existing tax incentives, such as keeping wooded property undeveloped in exchange for a lower tax rate.

13. Encourage incorporation of open space and existing tree cover in site planning.

14. Utilize a Technical Review Committee to review plans and assist developers in meeting community goals and objectives.

Physical Environment

1. See land use policy recommendations 1, 2, 12 and 13.

2. Preserve wildlife habitat and water quality of Barrett Lake, Ten-mile Creek and Deer Creek by limiting development around them and requiring stormwater management practices that limit siltation and control peak volumes.

3. Enforce Shoreline Management Program for relevant water bodies.

Transportation

1. Plan and implement roadway improvements on the following roads to bring them up to Whatcom County Engineering Department standards of 22-foot paved roadway with 4-foot wide shoulders: Northwest Drive between Slater and West Smith Road, West Smith Road from Northwest Drive to Aldrich Road, the portion of West Smith Road from Interstate 5 and Northwest Drive between Byers and Graveline Road.

2. Improve at-grade crossing of railroad on Hovander Road by increasing distance, reducing roadway grade and improving roadway surface conditions near crossing.

3. Investigate demand for upgrading intersection of West Smith Road and Interstate 5 to full interchange with on and off ramps.

4. Implement trail system plans within area.

5. Include potential transportation impacts in all site plan reviews, especially for commercial developments adjacent to Interstate 5 and all subdivisions in the area.

6. Coordinate roadway improvements of shared streets and roads between participating county agencies and City of Ferndale officials.

7. Implement traffic safety improvements at key intersections to reduce traffic accidents.

8. Evaluate intersection of West Smith Road and Northwest Drive for signalization or turning lane needs.

Utilities

1. Coordinate all utility improvements and expansions within the context of the Urban Services Area so that improvements and expansions are consistent with overall goals and objectives.

2. Discourage future development within areas where soils are inadequate for septic systems unless adequate water and sewer service is provided.

3. When water and sewer service is expanded, design systems to meet long term growth projections for the area.

Community Facilities

1. Select and acquire adequate school sites.

2. Explore means of acquiring neighborhood and community park sites.

3. Explore means of using school playgrounds as community and neighborhood recreation facilities.

4. Encourage incorporation of active and passive recreational space within individual residential developments.

5. Add police personnel as necessary to meet Whatcom County goal for ratio of police personnel to residential population.

6. Upgrade fire protection by increasing personnel or equipment or improving facilities as necessary to keep up with residential and commercial developments.

7. Coordinate police and fire service areas and personnel requirements between City of Ferndale and County agencies.

100 Year Flood Plains Area

Land Use

1. Discourage any new development from locating within any 100 Year Flood Plain area.

2. Encourage agricultural or open space uses as primary activities in all flood plains.

3. Develop and apply Flood Plain Zoning classification to guide future uses of Flood Plain.

4. Enforce Shoreline Management guidelines for uses within flood plains.

5. Regularly maintain all levees and dikes on Nooksack River to protect existing development.

Physical Environment

1. See Land Use policies above.

Transportation

1. Limit the expansion of roadway networks in flood plain areas.

Utilities

1. Discourage the expansion of utility systems in flood plain areas.

Community Facilities

1. Allow open space as an alternative use in flood plain areas.

2. Implement river trail system along Nooksack River.

Portal Way - Enterprise Road Area

Land Use

1. Coordinate all development with Urban Service Area concept.

2. Assure development is consistent with Urban Services capacity by reviewing development concept early in design process.

3. Coordinate delineation of Urban Service Area of Ferndale with sewer planning for area.

4. Evaluate the rezoning of properties along Portal Way between Kass Road and Newkirk Road to multifamily use.

5. Discourage development of more mobile home and recreational vehicle parks by requiring a special permit or a conditional use permit for their development.

6. Encourage incorporation of open space and existing tree cover in site planning.

7. Discourage strip commercial development on Portal Way by limiting future commercial development to existing General Business zoned land.

8. Require existing and future establishments that require open storage to buffer views into storage areas with vegetation or appropriate fencing.

9. Retain agriculturally zoned land under that classification.

10. Retain rural character of land zoned General Protection north of Grandview Road by requiring future development to remain at existing developed density.

11. Utilize a Technical Review Committee to review plans and assist developers in meeting community goals and objectives.

Physical Environment

1. Require stormwater management and erosion control facilities for all new development to minimize adverse environmental affects on surrounding property and to help prevent degradation of regional water quality.

2. Encourage the incorporation of open space and existing trees into site design.

3. Coordinate all land development with sewer system planning in area.

Transportation

1. Upgrade Portal Way from Enterprise Road to Ferndale city limits to Whatcom County Engineering Department standards for a minimum 22-foot paved roadway with 4-foot wide shoulders.

2. Provide increased safety at the intersection of Portal Way and Enterprise Road by design and construction of a "T" intersection to provide safe turning movements for southbound traffic from Enterprise Road.

3. Include traffic impacts as a topic in design review process and require developer to design and construct safe entries and exists to his project.

4. Require commerical developments to include adequate off-street parking but also encourage innovative parking design by allowing developers flexibility in providing that space.

5. Provide adequate public transit along Portal Way and Enterprise Road by reviewing demand on a regular basis.

Utilities

1. Coordinate all utility improvements and expansions within the Urban Services Area.

2. Discourage future development within areas where soils are inadequate for septic systems unless adequate water and sewer service is provided.

3. When water and sewer service is expanded, design systems to meet long term growth projections for the area.

Community Facilities

1. Explore means of acquiring neighborhood and community park sites.

2. Encourage incorporation of active and passive recreational space within individual residential developments.

3. Add police personnel as necessary to meet Whatcom County goal for ratio of police personnel to residential population.

4. Upgrade fire protection by increasing personnel or equipment or improving facilities as necessary to keep up with residential and commercial developmentl.

5. Coordinate police and fire service areas and personnel requirements between City of Ferndale and County agencies.

Grandview Road and Interstate 5 Area

Land Use

1. Coordinate all land development with Urban Services Area concept.

2. Assure development is consistent with urban services capacity by reviewing design concepts early in development process.

3. Prohibit major development from occurring until urban services are near enough so that extending services would not produce a "leap frogging" effect.

4. Consider re-zoning parcels currently zoned Contract Zone (CZ) to a specific industrial classification that would encourage "clean" industries to locate there.

5. Consider rezoning parcels at the Grandview Road/I-5 interchange that are currently zoned Suburban Farm 1-acre minimum to non-residential uses such as for specific light industrial uses.

6. Encourage industries to locate in this area that would take advantage of the high accessibility of the locale.

7. Discourage strip industrial development along Portal Way by encouraging industrial development to concentrate into industrial parks in this area.

Physical Environment

1. Require stormwater management and erosion control facilities for all new development to minimize adverse environmental affects on surrounding property.

2. Encourage the incorporation of open space and existing trees into site design.

3. Coordinate all land development with sewer system planning.

Transportation

1. Upgrade Portal Way from Enterprise Road northwest past the Sub Area boundary to Custer to minimum Whatcom County Engineering Department standards for 22-foot paved roadway with 4-foot wide shoulders.

2. Improve railroad crossing at Grandview Road to include signs and flashing lights.

3. Monitor all development in area for traffic impacts and require transportation analysis of traffic impacts for significant industrial or commercial development.

Utilities

1. Coordinate all utility improvements and expansions within the the Urban Services Area.

2. When water and sewer service is expanded design systems to meet long term growth projections for the area.

Community Facilities

1. Coordinate fire requirements with County and City of Ferndale agencies early in development planning.

2. Coordinate security requirements with County and City of Ferndale agencies early in development planning.

North Ferndale Area

Land Use

1. Coordinate all land development with Urban Services Area concept.

2. Coordinate Urban Services Area of Ferndale with comprehensive sewer planning for area.

3. Coordinate land use decisions between the County and Ferndale regarding property adjacent to Ferndale boundary.

4. Consider rezoning land south of Alder Grove Road currently zoned Suburban Farm 5-acre minimum to allow residential density of 1-acre minimum lot size.

5. Evaluate Light Industrial zone south of Thornton Road to include specific industrial-commercial uses that will be compatible with residential development to west.

6. Require any rezone applications to consider primary and secondary impacts on Urban Services capabilities.

7. Discourage "leap frog" development patterns by controlling expansion of Urban Services Area.

8. Encourage retention of wooded areas as means of retaining rural character by encouraging use of existing tax incentives, such as keeping wooded property undeveloped in exchange for a lower tax rate.

9. Encourage incorporation of open space and existing trees into site design for all development as a means of buffering visual impacts of development.

10. Encourage innovative residential development that is sensitive to physical setting by offering incentives for good site design, such as allowing increased density.

Physical Environment

1. Discourage development on unstable slopes.

2. Require stormwater management and erosion control facilities for all new development to reduce adverse impacts on surrounding property and to help prevent degradation of regional water quality.

3. Encourage incorporation of open space and existing tree cover into site design.

4. Coordinate development with sewer planning and Urban Service Area of Ferndale.

Transportation

1. Improve Vista Drive to Whatcom County Engineering Department roadway standards.

2. Evaluate all industrial development proposals for traffic impacts on Thornton Road, City of Ferndale traffic patterns and linkages with rail service.

3. Upgrade intersections of at-grade roads with rail line to increase safety.

Utilities

1. Coordinate all utility improvements and expansions with in the Urban Services Area.

2. Building permits should not be approved until all development plans have been reviewed for utility impacts.

3. Develop clear mechanisms for expansion of Urban Services Area and consistently follow those guidelines.

Community Facilities

1. Explore means of acquiring neighborhood and community park sites.

2. Encourage incorporation of active and passive recreational space in residential developments for the use of residents.

3. Add police personnel as necessary to meet Whatcom County goal for ratio of police personnel to residential population.

4. Upgrade fire protection by increasing personnel or equipment or improving facilities, as necessary, to keep up with residential and commercial development.

5. Coordinate police and fire service areas and personnel requirements between City of Ferndale and county agencies.

Central Sub Area

Land Use

1. Maintain rural character of area.

2. Agricultural uses should remain as the primary land use for this area.

3. Consider rezoning prime farm land areas in General Protection Zoning to an Agricultural Conservancy designation that allows rural residential densities.

4. Encourage retention of open space and forest cover by encouraging use of existing tax incentives, such as keeping wooded property undeveloped in exchange for a lower tax rate.

Physical Environment

1. Retain agricultural character of area.

2. Discourage development on unstable slopes.

3. Discourage growth within Critical Wildlife Habitats.

4. Encourage rural residential development to occur in areas not subject to seasonally high water tables.

Transportation

1. Upgrade the following roads to minimum Whatcom County Engineering Department standards: Kickerville Road from Grandview Road to Rainbow Road; Rainbow Road from Kickerville Road to Mt. View Road; Mt. View Road from Rainbow Road to Ferndale city limit.

2. Improve shoulders of Lake Terrell Road from Mt. View to Slater Road.

3. Provide roadway center striping on Kickerville Road north of Henry Road and on Slater Road between Lake Terrell Road and Haxton Way.

4. Promote ride pooling or van pooling for employees in Cherry Point industries to reduce traffic on area roads.

5. Encourage use of Slater Road or Grandview Road as primary access routes to Cherry Point to reduce traffic impacts on Ferndale.

Utilities

1. Discourage extension of utilities into this area to encourage growth to locate in Urban Services Area.

Community Facilities

1. Limit community facility expansion in this area to encourage growth to locate in Urban Services Area.

Cherry Point Industrial Area

Land Use

1. Re-evaluate eastern boundary of Heavy Impact Industrial zone and consider moving boundary to Kickerville Road.

2. If eastern boundary is moved to Kickerville Road, property along Kickerville Road should be developed to be visually compatible with more rural uses to east.

3. Prohibit industrial expansion outside of area, with exception of band between Burlington Northern Railroad right-of-way and Kickerville Road.

4. Require future industrial expansion to be visually buffered from views from roadways.

5. Encourage retention of existing wooded areas and agricultural uses as interim uses until industrial development occurs.

6. Re-evaluate Light Industrial Zoning as a "buffer" Zone in northwest and southwest corner of area and consider upzoning to Heavy Impact Industrial with specific performance and buffering requirements for parcels adjacent to non-industrial designated parcels.

7. Re-evaluate General Protection Zoning classification of shorelands and consider means of making the designation more consistent with upland industrial zoning.

Physical Environment

1. Require all development plans for projects proposed in critical wildlife habitat areas or that will impact shorelines to complete an environmental impact statement.

2. Develop specific guidelines for future industrial expansion to promote the desired type and character of land use.

3. Allow proponents of industrial developments the flexibility to meet physical environmental constraints in innovative ways if they can be shown to be an effective means of mitigating adverse environmental impacts.

4. Enforce all relevant Shoreline Management guidelines and Washington State Department of Ecology regulations.

Transportation

1. Encourage use of Slater Road and Grandview Road as primary access routes to Cherry Point industrial area.

2. Require all new pier facilities to be multipurpose to limit their number, economize on costs and minimize shoreline impacts of use and construction.

3. Upgrade Kickerville Road from Grandview Road to Rainbow Road and Rainbow Road from Kickerville Road to Mt. View Road to Whatcom County Engineering Department standards.

4. Provide public trail access to beach areas.

Utilities

1. Provide mechanism for the coordinated early review of utility impacts of industrial development proposals by agencies and districts with jurisdiction so that effects and solutions can be identified and solved effectively.

2. Once an industrial proposal is approved, establish a County-City of Ferndale technical committee to facilitate development and final plan development.

Community Facilities

1. Encourage new industrial developments to incorporate recreational facilities for their employees.

2. Coordinate all security requirements for industrial developments with Whatcom County Police Department.

3. Coordinate fire protection provisions for industrial developments with City of Ferndale and Whatcom County districts.

4. Implement shoreline trail system.

5. Explore means of acquiring public access to shoreline at Powder Plant Road.

Point Whitehorn - Birch Bay Area

Land Use

1. Limit future residential development to land zoned for multifamily (7 units per acre) and single family residential (4 units per acre).

2. Coordinate all land development with Water and Sewer District No. 8 capacities and comprehensive plan.

3. Limit future commercial development to land currently zoned for neighborhood business.

4. Consider rezoning shoreline from General Protection to Recreational Open Space.

5. Encourage incorporation of open space and existing tree cover into site design.

Physical Environment

1. Discourage any development within critical wildlife habitat areas.

2. Discourage development in areas susceptible to seasonally high groundwater levels.

3. Encourage new residential development in cliff areas to be sensitive to landslide hazards and plan accordingly.

4. Encourage retention of wooded areas and incorporation of existing tree cover into site design.

5. Require developers to manage stormwater by on-site detention.

6. Retain viability of Blue Haron Rookery.

Transportation

1. Upgrade all roads to Whatcom County Engineering Department standards.

2. Approve new roads only if designed to meet Whatcom County standards.

Utilities

1. Coordinate all utility improvements and expansions with offices of Water and Sewer District 8.

2. Discourage future development within areas where soils are inadequate for septic systems unless adequate water and sewer service is provided.

Community Facilities

1. Explore mechanisms for inclusion of active and passive recreational space in new residential developments.

2. Consider means of providing emergency health care during peak visitor periods.

APPENDICES

APPENDIX A

PHYSICAL ENVIRONMENTAL BACKGROUND INFORMATION AND ISSUE DISCUSSION

Due to the characteristics of geological units, factors affecting potential development may be assessed. These factors pertain to drainage, ground water availability, slope stability and response to seismic shaking.

Permeability, the rate at which water will pass through a material, is affected by grain size, surface slope, degree of stratification and the characteristics of underlying geological units. Permeability affects both surface drainage and ground water availability. If moderately rapid, due to well-sorted and non-compact sands and pebbles, the permeability rate can augment production of varying amounts of ground water. Septic tank filter fields located on these units can cause potential ground water loading from septic effluent. If a highly permeable material is underlaid by a compact unit, such as Vashon Till, downward ground water movement may be restricted and potential aquifer materials beneath this area will have to be laterally rather than vertically recharged. This situation can also limit proper function of septic tank filter fields.

Slope stability is related to the angle of slope, composition of the geological unit and underlying units. A slope composed of sands and gravels will be less stable than one containing some clay or silt, which act as cement. A slope composed entirely of clays or silts will be less stable than one containing some sands or gravels, which act as angular building blocks. A slope of less than 15%, depending upon composition, may become unstable if the toe or base of the slope is reduced in holding power, such as in excavation for road cuts.

The Cherry Point-Ferndale Sub Area has no active faults, but the Puget Sound Basin is subject to frequent seismic shaking of varying intensity. Seismic shaking response is related to the composition of geological units. Those that are compact exhibit less response than units that are loosely consolidated or are of clay and silt composition.

Foundation stability and ease of excavation are inversely related; that is, compact materials provide strong foundations but may be difficult to excavate. Silt and clay units may be easy to excavate but are subject to settling. The properties of Vashon Till warrant attention regarding development. It acts as a barrier to ground water movement and is difficult to excavate, although it gives strong support for building foundations.

Figure 13 summarizes the geological properties with respect to development potential within the Cherry Point Sub-Area.

The geological formations within the Cherry Point-Ferndale Sub Area contain inherent potential and limitations for all types of biological activity which occur upon them. Constraint areas are those concerned with potential slope failure or ground water loading.

Slope failure often occurs on slopes of greater than 15 percent. When saturated, units composed of unconsolidated or poorly sorted materials may have the potential for increased slope failure. Areas of occurrence are predominantly sea cliffs, marine terraces or slopes caused by active stream cutting. Engineering measures may minimize the associated hazard: for example, bulkheading at the base of the slope, reduction of slope angle or drainage improvement. These are general recommendations, the applicability of which can only be determined through site-specific investigation. Areas prone to land slippage are located on the map of constraint areas.

Since many geological units that could precipitate ground water loading are sub-surface, they are not illustrated on the map of constraint areas. Only site-specific investigations can determine the potential for this hazard.

SOILS/DEVELOPMENT MATRIX

Soil is a dynamic, natural resource that is non-renewable during an average human lifespan. Viewing soils as a non-renewable resource is

especially critical when defining areas to be used as prime farmlands. Alteration of these soils for other uses can only diminish an already limited resource.

In order to characterize the properties of the Cherry Point Sub Area soil and its uses for development and agriculture, a soils matrix has been prepared. Data presented has been supplied by the Soil Conservation Service, Cooperative Extension Service, and Whatcom County's Environmental Resource Data Book. Because these sources provided only general information, on-site investigation for specific developments is still required. The following text delineates the implications for each soil category.

GENERAL CHARACTERISTICS

Terrain: Terrain refers to the general topography which the soil covers. Terrain is an important factor relating to both the parent material and the on-going natural processes which affect a soil's continuing formation. The terrain types within the Cherry Point Sub Area include alluvial fans and flood plains, flood plain depressions, coastal tidal areas, terraces (as in geological marine terraces), terrace depressions, uplands (such as the area west of Ferndale), and upland depressions.

Depth to Seasonal Water Table: This measurement indicates the minimum distance from the land surface to the water table when maximum precipitation occurs. It is affected by the proximity of the soil to a river drainage, as in a flood plain, and by the occurrence of impervious materials underlying the soil.

Depth to Impervious Layer: This depth is the distance from the land surface to any geological materials which restrict the downward flow of water. Since bedrock is not exposed within the Cherry Point Sub Area, it is not a concern; however, compact glacial till and dense clays are.

Permeability: A soil's permeability is defined by its texture, structure, porosity (space between individual soil particles), and density. These combined factors affect the rate of downward water flow. The categorical determination is based on the upper twelve inches of soil but variation in permeability can occur at lower depths depending upon soil structure.

Hydrological Group: A soil's classification in a hydrological group depends on its run-off potential when it lacks vegetative cover. Run-off potential contains implications for the occurrence of standing water. The categories are as follows:

"A" Soils with rapid permeability rates that actively allow infiltration (downward entry of water into the soil). Run-off potential is minimal in soils which are usually composed of deep sand with little silt or clay.

"B" Soils with moderate permeability and infiltration rates. Run-off and potential standing water occurrence are moderate in these soils composed of shallow sands with some clay and silt.

"C" Soil permeability and infiltration rates are reduced because of the presence of silt and clay colloids. Depending upon the proportionate occurrence of these materials, run-off and standing water potentials are moderate to severe.

"D" Soils where run-off and standing water potentials are at maximum. These soils, of high clay content, are often saturated restricting further absorption.

Physical Constraints

Slope: A soil's slope is its grade, measured as a percentage from a horizontal plane. Excessive slopes, defined as slopes greater than 15%, may create utility installation, septic tank, dwelling and vehicular movement problems for urban developments. Due to increased erosion potential, excessive slopes may also create problems for agricultural activity.

Shrink-Swell Potential: The amount of clay or organic material in a soil and changes in its moisture content constitute a soil's shrink-swell potential. For example, when saturated soils of severe shrink-swell potential lose moisture, their volume is reduced. When this happens, dwellings and roads may experience sagging or settling.

Frost Action Potential: The frost action potential of a soil measures the expansion in a soil's volume when contained moisture freezes. Sandy soils with some clay content are especially subject to this expansion. A soil's frost action potential is an important determinant of frost heaving in roads and run ways; it may also affect structures.

Erosion Potential: The amount of soil which may be lost due to natural weathering processes when vegetation is removed is a soil's erosion potential.

Slippage Potential: Slippage potential refers to the possibility of earth masses moving down a slope. Since fine-to-medium-textured soils are the most vulnerable to slippage, excavations at any point on a slope having such soils should be carefully studied.

Ponding Potential: Ponding potential refers to a soil's propensity to allow standing water, either from a rise in the seasonal water table or from inundation by flooding. Soil with a high ponding potential is usually close to flood plains or has impervious materials located beneath the ground surface.

SOIL CHARACTERISTICS RELATED TO BUILDING CONSTRAINTS

Dwellings: These constraints pertain to single-family residences or similar structures which lack basements. The constraints are based upon data concerning bearing capacity, soil slope and slippage potential, settling due to shrink-swell potential, frost action potential and susceptibility to ponding or flooding.

Septic Tank Filter Fields: This is a major concern for rural residences not served by a municipal water supply. The degree of limitation is based on the soil's ability to absorb and disperse septic filter field effluent. It is based upon soil permeability, depth to impervious layer, susceptibility to ponding, flooding or the occurrence of a seasonally high water table, and local experience concerning the performance of other septic filter fields. A soil of moderate permeability, having a seasonal water table of greater than five feet, is the most desirable. A soil with rapid permeability may subject ground water to loading by septic effluent. Soils with this potential have been identified on the map of constraint areas.

Shallow Excavations: This constraint is relevant to excavation for basements, underground utilities, cemeteries and open ditches. A soil favorable to excavation is one that offers good workability, moderate resistance to sloughing, a gentle slope and is not susceptible to ponding or flooding.

Roads & Streets: This refers to potential all-weather surfaced and improved roadways. The categorical rating is based upon data concerning bearing capacity, soil drainage, slope, shrink-swell (shrinkage) and frost action (heaving) potentials. Susceptibility to ponding or flooding is also considered.

AGRICULTURAL CAPABILITIES

The Soil Conservation Service has established soil classes, farmlands of statewide significance, and prime farmlands based on a soil's farmability. The Cooperative Extension Service has designated soil types associated with prime farmlands. These soils criteria are summarized in the following section.

Soil Class: Soils are rated in capability classes from I (the best) to VIII by the Soil Conservation Service. These ratings categorize a soil's potential for agricultural uses based upon climate, erosion haz-

ard, soil moisture and response to common management practices. These categories do not pertain to soils which have experienced major alterations due to human developments.

Prime Farmlands (SCS): The Soil Conservation Service decides lands are prime farmlands based on the soil quality, the growing season and the moisture supply needed to produce sustained high yields of crops economically according to modern farming methods. It also considers the average soil temperature in the root zone, soil pH, water table depth during the growing season, erosion potential, permeability rate, and the number of coarse rock fragments.

In the Cherry Point-Ferndale Sub Area there are several soils which are classified as prime farmlands. Currently, they are subjected to competition by other uses. Since they are a limited resource, they can be considered a potential constraint to development and their distribution is located on the map of constraint areas.

Farmlands of Statewide Importance: The Soil Conservation Service based this determination upon lands which have a capability class of IV or better.

Prime Farmlands (CES): The Cooperative Extension Service has based its determination of prime farmlands on the sustained high yield of various agriculture crops when current, applied farming technologies are used. Crops included in this designation are hay, pasture, corn silage, strawberries, raspberries, sweet corn, peas, bush beans, potatoes and seed potatoes.

It should be noted that Whatcom County in 1974 produced 30% of all the milk in the Puget Sound milk-marketing area, in 1973 produced approximately 65% of the snap beans in Washington State, and in 1970 produced approximately 90% of the certified seed potatoes in Washington State. This type of major agricultural production is a resource, and the soils which relate to it have been located on the map of constraint areas.

Forest Lands: Since much of the land within the Cherry Point Sub Area is devoted to human developments or agricultural usage, little forest land remains. It occurs primarily as woodlots, State School Lands or Game Ranges and parks. Their use for commercial forest practice is limited due to their size and due to competing uses. Consequently, this category has been omitted in the soils matrix. Where woodlots provide habitats for wildlife species, they have been located on the map of constraints areas.

VEGETATION

Constraint areas: These include woodlots, salt water marsh and fresh water wetlands. Woodlots provide the location for natural vegetation, as well as dependent wildlife species. Studies are currently underway to evaluate potential damage caused to this natural vegetation by industrial sources.

There are few salt water marsh areas within the Cherry Point Sub Area. This habitat provides an environment for a variety of shorebirds. Fresh water marshes provide habitat for an extensive variety of resident, migratory, game and wild birds. In the Lake Tennant area, there is a Lowland Fawn Lily which is considered critical, that is, its continued survival may be hampered.

A major conflict has been occurring during the past years between intensive use agricultural land and human development. Well-drained, sandy loam soils, used for berry and carrot production, are in demand for residential developments dependent upon septic tank filter fields.

WILDLIFE

Constraint Areas: The key issue with reference to wildlife is the maintenance of habitat. Woodlot loss to competing uses could impact wildlife population size, distribution and variety. Flooding, flood control structures, poor water quality and low flows negatively affect fish populations.

No known rare, endangered or threatened furbearers are known to exist within the Cherry Point-Ferndale Sub Area.

Birds of sensitive status within the Cherry Point-Ferndale Sub Area include the Northern Bald Eagle and Great Blue Heron. The Northern Bald Eagle is classified by the U.S. Fish and Wildlife Service as threatened. Two known nesting sites exist. Two blue heron rookery locations are known, also. These are located on the map of constraint areas.

The National Audobon Society has developed a supplimental, unofficial list of Blue-Listed species, "species more common and often more widespread which for any number of reasons known or unknown appear to be suffering in all or part of their range from non-cyclical decline" (Army Corps of Engineers, Washington Environmental Atlas page 40). Blue-listed species occurring within the Cherry Point-Ferndale Sub Area are the Red-throated Loon, Western Grebe, Double-crested Cormorant, Great Blue Heron, Sharp-skinned Hawk, Cooper's Hawk, Barn Owl, Bewick's Wren, Marsh Hawk and Osprey.

The Coastal Zone Atlas for Whatcom County has defined critical habit. These are geographical locations which, "because of unique oceanographic or environmental conditions, provide major sources of recruitment for adjacent populations;" or locations where "breeding, nursery, feeding and resting areas occur" (State of Washington, Introduction). These criteria have been used to identify habitats on the constraint area map.

Significant aquatic habitat, that is, migratory and spawning areas for fish, include the Nooksack and Lummi Rivers, and portions of Terrel, Tenmile, Deer and Silver Creeks. These have been located on the map of constraint areas. The Coastal Zone Atlas for Whatcom County considers the entire Strait of Georgia coastal area, occurring within the Cherry Point Sub Area, to be a critical habitat for Pacific Herring.

SHORELINE MANAGEMENT AREAS

Approval of Initiative 43B in the 1972 General Election ratified the Shoreline Management Act of 1971 (RCW 90.58). This act granted city and county governments the responsibility of preparing shoreline management programs for their jurisdictions. It is from this foundation that the Shoreline Management Program of Whatcom County was developed. It is the purpose of this section to identify shoreline areas in the Cherry Point-Ferndale Sub Area that are subject to the Shoreline Management Act and to identify regulations concerning various uses. Shorelines of state-wide significance will also be identified.

Shorelines of state-wide significance, as defined in RCW 90.58.030 and pertinent to the Cherry Point-Ferndale Sub Area are: 1) those areas of Puget Sound and adjacent salt waters north to the Canadian line and lying seaward from the line of extreme low tide, 2) those natural rivers or segments there of downstream from a point where the mean annual flow is measured at one thousand cubic feet per second or more, and 3) the waters between the ordinary high and extreme low tide of Birch Bay from Point Whitehorn to Birch Point.

In the Cherry Point-Ferndale Sub Area, this definition would include Strait of Georgia waters seaward of extreme low tide, Birch Bay, the mainstream of the Nooksack River, and any adjacent wetlands. Wetlands are defined as marshes, bogs, swamps, floodways and flood plains associated with marine or river water bodies for 200 feet landward from the ordinary high water mark (RCW 98.58.030).

General policies adopted for Shorelines of state-wide significance are, in order of priority:

1) The statewide interest should be recognized and protected over a local interest.

2) The natural character of shorelines should be preserved.

3) Uses of shorelines should result in long-term benefits to the people of the state.

4) Resources and ecological systems of shorelines should be protected.

5) Public access to publicly owned areas of shorelines should be increased.

6) Recreational opportunities for the public should be increased on shorelines.

Preferred developments, which should be integrated into the natural surroundings, should provide for pollution control and prevention of damage to the natural environment.

The Shoreline Management Act of 1971 also addresses shorelines of the state. Shorelines are defined as: all the water areas of the state, including reservoirs, and their associated wetlands, together with lands underlying them (RCW 90.58.030).

For western Washington, this definition includes shorelines on stream segments where the mean annual flow is between 20 to 999 cubic feet per second and shorelines on lakes having a surface area of between 20 to 999 acres. The Shoreline Management Plan of Whatcom County primarily concerns these areas.

Within the Cherry Point-Ferndale Sub Area, four general shoreline areas are protected by the Shoreline Management Program--rural, conservancy, natural and aquatic. These designations affect Strait of Georgia and Birch Bay waters seaward of the ordinary high water level; waters of Lake Terrell, Barrett Lake and Tennant Lake; and shorelands adjacent to the Strait of Georgia, Birch Bay, Lake Terrell, Barrett Lake, Tennant Lake, Nooksack River, Lummi River and segments of Tenmile Creek and Terrell Creek. Since potential developments adjacent to or within these areas should be carefully considered, these areas have been located on the map of constraint areas.

The Shoreline Management Program establishes the general purposes of the shoreline designation areas. Those purposes pertinent to the Cherry Point-Ferndale Sub Area are as follows:

RURAL - To ensure that uses are compatible with area physical capabilities and limitations, natural resources and other low density development. Such low to moderate density uses include, but are not limited to, residences, agriculture and outdoor recreation developments.

CONSERVANCY - To obtain long-term, wise use of its natural resources, including multiple use whenever practical, and to prevent forms of development which would be unsafe or incompatible with more appropriate uses. This policy should be furthered by keeping overall intensity of development or use low, and maintaining most of the area's natural character.

NATURAL - To ensure long-term preservation of those resources which yield optimum benefits to the community or region, in their natural condition.

AQUATIC - To encourage and protect appropriate multiple uses, or dominant uses in limited areas, of navigatible or open waters; to preserve the limited water surfaces, tidelands and shorelands from encroachment; and to preserve and ensure wise use of the area's natural features and resources which are substantially different in character from those of adjoining uplands and backshores.

To ensure proper enactment of these policies, several regulations have been established. In the following table, several uses with general reference to policy regulations, are given. References to specific use regulations are available in the Shoreline Management Program and inquiries concerning site-specific applications should be directed to the Whatcom County Buildings and Code Administration.

GROUNDWATER

Future residential developments occurring outside the Ferndale municipal water supply area may need to rely on aquifers for their

domestic water needs until a water utility can be provided. Since information concerning aquifer potential in the Mountain View uplands area is limited, more ground water investigation should be undertaken. Other alternatives include surface water storage for run-off and precipitation, such as in reservoirs, or expansion of municipal water supply.

To prevent contamination of well water, new shallow public and private wells are required to have a double casing and concrete grout to a depth of 20 feet. Although more research is needed, the recommended separation of 50 to 70 feet between the well and any pollution source may be insufficient for shallow sand and gravel water sources. Many wells occur in septic tank usage areas. Soils which may contribute to ground water contamination due to high permeability rate, underlying materials or seasonally high water tables are located on the map of constraint areas.

100-YEAR FLOOD PLAINS

The floodway of a flood plain is the area of the flood plain subject to inundation, which must be kept free of encroachments, such as artificial fill. Encroachments may increase flood water heights within their boundaries and subject downstream unprotected areas to increased velocities and volumes. The Federal Insurance Administration considers an encroachment to be any structure that could cause flood water heights to increase by more than one foot over unconfined levels.

The flood fringe is considered to be the area within the flood plain which may be subject to inundation. Encroachments or obstructions within this area will not increase flood water heights by more than one foot.

Coastal areas are also subject to inundation. The Federal Insurance Administration considers 100-year flood plains to be those areas located within twelve foot elevation of the high water level. Coastal flooding is generally the result of a combination of high spring tides

and strong winds from winter storms. The ten-mile sourtherly fetch, deep near shore waters and high energy setting of the Cherry Point Sub Area coastline, cause low elevation areas between high bluffs to be particularly vulnerable.

Structural flood protection measures consist of levees, bank stabilization, flood control dams and flood proofing of buildings. The effectiveness of levees varies with its height, the height of adjacent systems or river banks, susceptibility to erosion during high water periods and maintenance. For example, a low-height levee downstream from one of greater height may be rendered ineffective due to increased flood surface level caused by the higher levee. Bank stabilization causes natural river meanderings to become fixed and during flood periods may increase water velocity and volume due to the river's inability to spread waters over a larger area. Flood dams may mitigate a flood's intensity by gradually releasing impounded waters, thus reducing volume and velocity. Flood proofing of structures, such as increased foundation heights and building orientation, can also reduce potential damage.

Nonstructural methods, such as flood plain warning systems, flood plain zoning or other land use regulations may be less costly methods of protection.

In 1975, the U.S. Army Corps of Engineers recorded a flood considered to be a 10-year or 10 percent change of occurrence. This flood rendered existing flood protection measures ineffective, by breaching levees and causing flood water impoundment behind them.

The National Flood Insurance Act of 1968 created a federally subsidized insurance program whereby responsibility is placed on individual land owners for purchase of flood insurance. Lending institutions chartered or regulated by the federal government are not permitted to grant loans to individuals who wish to build within the flood plain, unless that individual purchases flood insurance. Flood insurance is only available to governmental jurisdictions in which land use controls, con-

forming to federal requirements, have been developed. These requirements stress that land use control is less costly than structural flood control, because these structures may be quite large and 100-year flood protection insurance is expensive.

Since Cherry Point's 100-year flood plain can be considered an area of environmental constraint, it has been located on the constraint area map. The Flood Insurance Study of 1977 did not include consideration of incorporated areas, such as Ferndale, or public lands, such as the Lake Terrell State Game Range and Birch Bay State Park. Consequently, potential flooding pertaining to these areas is not illustrated.

Class I accretion beaches described in The Physical Environment, Existing Conditions section especially in natural conditions, are rare within the Cherry Point-Ferndale Sub Area, as well as within Puget Sound. For these reasons, Bauer considers Class I beaches to be an endangered shore "species" and, consequently, are included on the map of constraint areas.

Direction of long shore drift is a concern regarding developments which may interfere with shore processes. Conclusive studies have yet to be made, but available studies by Bauer and Schwartz, et al., indicate active drift shuttling throughout the shoreline with net movement southeasterly from Point Whitehorn towards Sandy Point. A northeasterly net movement occurs from Point Whitehorn into Birch Bay. Active two-way drift and eddying occurs near Point Whitehorn. Existing industrial piers appear to be interferring with long shore transport to varying degrees and only further studies can determine the extent. Bauer suggests that these piers place a limit on long shore transport sectors near the shoreline and that interruptions to ongoing shore processes should be minimized.

Areas of constraint concern the maintenance of accretion beaches due to their uniqueness, shore access, biological productivity and location for waterfowl habitat. Bluff erosion and slippage potential have

been considered within the geology section. Coastal flooding has been considered within the 100-year flood section. Whatcom County Shoreline Management Program designations are discussed in the Management Program section. It is evident that further studies to determine long shore transport direction and the impact of artificial barriers to movement should be initiated.

APPENDIX B
ECONOMIC AND POPULATION TRENDS

This section describes regional, national and international economic and demographic trends as they relate to these trends within the Cherry Point-Ferndale Sub Area.

STATE AND REGIONAL TRENDS

The Pacific Northwest is one of the fastest-growing areas in the United States. Its growth rates, future employment and income gains are expected to exceed the U.S. average. Construction spending and housing starts have all exceeded the national average and reflect both the general strength of the regional economy and strong gains in the forest products, agriculture and aerospace industries. Recent population growth has also been larger than for the U.S. as a whole, influenced by the region's amenities as well as its favorable economic trends.

Washington State's economy, traditionally based in transportation and trade, chiefly produces aircraft, railcars, trucks, ships, lumber, paper goods and aluminum. Its location provides easy shipping access to Japan and Asia, Alaska, British Columbia and the Pacific Northwest. In recent years, Washington has substantially expanded its trade of cargo and other shipping activities with all of these markets.

Although manufacturing is still important to the economy, Washington State's major employers since the 1969-71 Boeing recession have been in wholesale and retail trades, services, finance and construction.

Future economic growth is expected to be based in resource-based manufacturing industries, trade with the expanding regional and international markets, diversified expansion of industries locating in the area, and growth in aerospace employment. The swelling orders for Boeing's existing jetliners and its new generation of aircraft underlie the strong outlook for aerospace employment for the next several years.

Forecasts at the state level predict a total employment growth from 1979-81 of 234,500 people and wage and salary gains of $133,000, with larger gains expected in non-manufacturing industries (see Table BI). Combined gains of 68,400 (51 percent of total annual employment growth) are expected at the state level for the trade and services industries over this period. Statewide, personal income is expected to grow by 14.2 percent in 1979 and by 40.7 percent from 1979-81 (State of Washington, Office of Financial Management, Population, Enrollment and Economic Studies Division, May, 1979).

The most recent three-year state forecasts predict that employment growth for durable manufacturers will slow in 1980 as national demand weakens and as Boeing's expansion stabilizes, and will return to stronger growth rates in 1981 as the economy picks up.

The forecast for nondurable manufacturing predicts relatively slow growth in food processing, printing and pulp and paper employment during the 1980-81 period, following a swelling of pulp and paper employment in 1979 caused by the return of workers from a six-month strike. Nonmanufacturing employment is expected to grow by about 7 percent during 1979 and to slow to approximately 4 percent during 1980-81. Construction is expected to slow significantly before picking up again in 1980 and 1981 (Washington State Office of Financial Management, May, 1979).

WHATCOM COUNTY AND CHERRY POINT-FERNDALE SUB AREA

The traditional bases of Whatcom County's economy have been fishing, forestry, mining and agriculture, sustained by the area's deep water port, hydroelectric power, timber and fisheries resources. The completion of Interstate 5, construction of the ARCO Refinery and the Intalco Aluminum Plant, growth of Western Washington University, influx of Canadian spending into the County and enactment of the 200-mile fishing limit have diversified and expanded these traditional industries.

TABLE BI

STATE OF WASHINGTON EMPLOYMENT FORECAST, 1979-1981 (THOUSANDS)

	1979	1980	1981	1979-81 CHANGE	1979-81 PERCENTAGE CHANGE
Total Wage & Salary Employment	1,598.8	1,658.4	1,731.8	133.0	8.3%
Manufacturing	306.5	314.8	327.9	21.4	7.0
Nondurables:	87.2	89.1	91.5	4.3	4.9
Food & Kindred Products	33.2	33.3	34.0	.8	2.4
Pulp & Paper	15.6	16.7	16.8	1.2	7.7
Apparel	7.2	7.5	8.2	1.0	13.9
Printing	15.7	16.1	16.6	.9	5.7
Chemicals	8.3	8.1	8.0	-.3	- 3.6
Petroleum	2.1	2.1	2.1	---	---
Other Nondurables	5.1	5.4	5.8	.7	13.7
Durables:	219.3	225.7	236.5	17.2	7.8
Lumber & Wood	55.3	55.2	58.5	3.2	5.8
Furniture	3.2	3.2	3.3	0.1	3.1
Stone/Clay/Glass	7.5	7.8	8.1	0.6	8.0
Ferrous & Fabricated Metals	15.3	15.6	16.1	.8	5.3
Nonferrous Metals	13.4	13.1	13.3	-.1	-.7
Machinery	22.8	23.4	24.9	2.7	9.2
Transportation Equipment	92.9	98.1	102.0	9.1	9.8
Other Durables	8.9	9.4	10.3	1.4	15.7
Nonmanufacturing	1,292.4	1,343.6	1,403.8	111.4	8.6
Mining	3.1	3.1	3.2	0.1	3.2
Construction	104.1	109.3	114.8	10.7	10.3
Transportation	61.2	62.5	64.3	3.1	5.1
Communication & Utilities	32.2	33.7	35.7	3.5	10.9
Wholesale/Retail Trade	390.3	403.4	420.9	30.6	7.8
Finance/Insurance/Real Estate	91.0	95.7	100.1	9.1	10.0
Services	299.2	316.9	337.0	37.8	12.6
Government	311.2	318.9	327.7	16.5	5.3

Source: Washington State Office of Financial Management, May, 1979.

Bellingham, Whatcom County's largest town is the focus of trade and commerce between Seattle and Vancouver, B.C. Bellingham's population, now an estimated 44,400 (according to the State's April, 1979 population estimates), has grown by 12.8 percent since 1970 (see Table BII). Downtown Bellingham, with an expanding economic base, retail trade and tourism, and its waterfront, with the commercial fishing fleet, expansion of marine-oriented commercial and recreational facilities and marina facilities, restaurants, retail shops and marine-related stores, appears healthy. Activities at the Port of Bellingham's South Terminal at Fairhaven have grown considerably, particularly the fish processing operation since adoption of the 200-mile fishing limit.

The County's summertime population swells to close to 400,000, roughly 4 times its year-round population (Thumin, 1977). The Birch Bay-Blaine area has grown to become the County's predominant resort complex, attracting substantial numbers of weekend and summer visitors, including a large proportion of Canadians from the Vancouver, B.C. area.

Whatcom County's population, which according to State estimates, increased to 99,800 in 1979, grew by 21.7 percent over the 1970-1979 period. This compares with a state population increase of 14.6 percent over this same period (Table BII). Population in the County's unincorporated areas, which had climbed to 43,401 by 1979 (a 27.6 increase from 1970- 1979) grew faster than that of the incorporated areas, which had reached 56,399 by 1979 (a 17.5 percent increase from 1970-1979). The populations of Nooksack, Everson and Sumas have increased only minimally in recent years and these towns remain relatively small.

The population of Ferndale, the principal population center and the only incorporated municipality within the Cherry Point-Ferndale Sub Area, is estimated to have grown to 3,440 by 1979, a 69.1 percent increase over its 1970 population. This substantial growth rate was influenced largely by the growth in employment at Cherry Point, although annexation of surrounding unincorporated areas was also a factor.

TABLE BII POPULATION FOR THE
STATE OF WASHINGTON AND WHATCOM COUNTY
1970-1978

Municipality by County	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979
WHATCOM	81,983	83,800	85,000	85,000	85,200	86,200	90,000	93,600	96,600	99,800
Unincorp.	34,004	35,004	35,110	35,295	34,557	34,658	37,156	39,367	41,681	43,401
Incorp.	47,979	48,796	49,890	49,705	50,643	51,542	52,844	54,233	54,919	56,399
Bellingham	39,375	39,700	40,500	40,200	40,500	41,000	42,100	43,160	43,400	44,400
Blaine	1,955	2,000	2,000	2,050	2,120	2,240	2,265	2,360	2,410	2,500
Everson	633	670[a]	675	680	690	700	730	755	805	820
Ferndale	2,164	2,500	2,740	2,800	2,927[a]	3,030	3,100	3,180	3,440	3,660
Lynden	2,808	2,850	2,900	2,950	3,360	3,525	3,540	3,655	3,735	3,850
Nooksack	322	352[a]	352	352	352	353	413[a]	415	415	435
Sumas	722	724[a]	723[a]	673[a]	694[a]	694[a]	696[a]	708[a]	714[a]	734[a]
STATE TOTAL	3,413,250	3,430,100	3,418,800	3,424,300	3,448,100	3,493,990	3,571,591	3,661,975	3,774,300	3,911,200

[a]Actual Census

Source: Washington State Office of Financial Management, September, 1979.

The population of Lynden, the other Whatcom County municipality similar in size to Ferndale, has had a population increase comparable to Ferndale in the last three years.

73.6 percent of the County's 1970-79 population increase is attributable to people moving to the area and only 26.4 percent to natural increases (births minus deaths). In the state as a whole 57.7 percent of the population growth was attributable to net migration and 42.3 percent to natural increase (Washington State Office of Financial Management, August, 1979).

Whatcom County's population is predominantly white (see Table BIII, Whatcom County Population Characteristics). Native Americans are the largest racial subgroup in Whatcom County accounting for 2.6 percent of the population. Many of these Native Americans live on the Lummi Reservation, south of the Cherry Point-Ferndale Sub Area. Though racial minorities are a very small part of Whatcom County's total population, their population grew faster over the 1970-79 period than did the white population. Residents aged 65 and over constitute 11.2 percent of the total population, a slightly higher proportion than the 10.5 percent of the State population.

Per capita income estimates updated to 1976 indicate lower income levels in Whatcom County than the state as a whole. Whatcom County's reported per capita personal income was approximately 89.6 percent of the state average (Washington State Department of Revenue, September, 1978).

Wood products, oil refining, aluminum smelting and boat-building are large employers in the County (see Tables BIV, BV, and BVI). Much of the region's economic activity is highly seasonal and is therefore susceptible to seasonal employment fluctuations. Quarterly employment figures indicate that employment in construction, fishing, agriculture, mining, food and kindred products is typically lowest during the first quarter and highest during the third quarter of the year, while the

TABLE BIII
WHATCOM COUNTY POPULATION CHARACTERISTICS

	1970	1979	1970-1979 Percent Change
Total Population	81,983	99,800	21.7%
White (Excluding Spanish Surname)	78,334	94,855	21.1%
Ethnic Categories			
Spanish Surname	956	1,150	20.3%
Black	201	400	99.0%
Indian	1,949	2,600	33.4%
Asian	310	555	79.0%
Other	233	240	3.0%
Population 65 Years and Over	9,564	11,210	17.2%

Source: Washington State Office of Financial Management, August, 1979, and 1970 Census of Population.

TABLE BIV

MAJOR EMPLOYERS IN WHATCOM COUNTY

NAME	ADDRESS	PRODUCTS	EMPLOYEES
Atlantic Richfield Co.	Grandview Road Ferndale	Coke, fuel, jet fuel	350
Builders Concrete, Inc.	C. & W. Maple	Tru-mix concrete, sand & gravel, pipe, concrete floats	150
Columbia Cement Co.	Marietta Road	Cement & Quarry	155
Ershigs, Inc.	742 Marine Drive	Industrial fiber, glass, sheet metal	250+
Georgia Pacific Corp.	300 Laurel	Pulp, paper, chemicals	1,116
Haskell Corporation	1011 Meador Avenue	Plumbing & heating	150
Intalco	Ferndale, WA	Aluminum	1,190
Mobile Oil Corporation	Ferndale, WA	Petroleum refinery	300
Puget Sound Power & Light	N. State & Magnolia	Utility Company	155
Uniflite, Inc.	9th & Harris	Fiberglass boats & yachts	504
Bellingham Herald	1155 N. State	Daily newspaper	130

Source: Whatcom County Industrial Development Council, 1979.

TABLE BV
WHATCOM COUNTY MANUFACTURING EMPLOYMENT
1970-1978 ANNUAL AVERAGE

Year	Total Manufac-turing	Lumber & Wood Prod.	Transpor-tation Equip.	Primary Metals	Stone, Clay & Glass	Other Durable	Food & Kindred Prod.	Printing & Pub-lishing	Petroleum Refining	Other Non-Durable
1970	5,700	790	310	1,340	250	190	1,000	210	300	1,330
1971	5,910	710	450	1,310	230	250	930	210	520	1,310
1972	6,110	730	500	1,260	210	250	960	200	600	1,390
1973	6,350	810	590	1,220	230	240	1,110	210	630	1,320
1974	6,570	720	550	1,250	240	300	1,190	200	700	1,440
1975	6,460	610	540	1,280	240	330	1,140	200	700	1,380
1976	6,630	670	na	na	na	2,470	1,110	na	na	2,580
1977	6,740	700	na	na	na	2,420	1,120	na	na	2,500
1978	6,810	780	na	na	na	2,690	1,180	na	na	2,160

Source: Data 1970-1975 from Canadian Impact Study, Whatcom Council of Governments, 1978.

Washington Dept. of Employment Security data for 1976-1978 does not show brekadown of Other Durable and Other NonDurable catagories.

As reported by the Whatcom County Real Estate Research Committee, 1979.

government employment is usually lowest during the summer when Western Washington University and other schools are closed. Overall unemployment rates in Whatcom County are approximately 2 percent above that of the State (see Table BVII).

Local businesses are affected by such outside factors as the Canadian exchange rate. Its fluctuations significantly affect retail sales in Bellingham. Within the last year, the local economy was also significantly affected by a labor dispute at Georgia-Pacific Corporation's Bellingham plant that lasted from mid 1978 to early 1979. In addition, the Blaine Air Force base was closed in 1978, eliminating 120 military jobs. Building activity also slowed in 1978 and early 1979 from higher levels in the early and mid-1970's (Whatcom County Real Estate Research Committee, 1979).

Despite the short-term easing of growth rates, long-range predictions are for substantial growth in the economic and industrial base in Whatcom County and the Cherry Point-Ferndale Sub Area (and nearby Bellingham). The key factors in this growth are: development of industrial port facilities stimulated by an upswing in waterborne trade between the Pacific Northwest and the Pacific Basin nations, as well as Alaska; expansion of tourism in the area; increased Canadian retail purchases, residents and recreation; effect of the 200-mile fishing limit on the fishing and seafood processing industry and several proposals for establishing major new industrial facilities at Cherry Point.

Anticipated development of Cherry Point will be the major factor influencing future Cherry Point-Ferndale Sub Area growth. Cherry Point's physical features make it the most desirable deep-water port site still available for development on the west coast. These features include an approximate 100 feet of shallow shoreline which drops abruptly to a 90-foot depth, plus sufficient upland acreage for shipping terminal development, Burlington Northern rail connection and convenient nearby airport facilities. Cherry Point's physical features plus the favorable opportunities presented by increasing Pacific Rim trade and

TABLE BVI WHATCOM COUNTY

EMPLOYMENT IN NONMANUFACTURING INDUSTRIES

1970-1978 ANNUAL AVERAGE

Year	Trans., Comm. & Util.	Finance, Ins. & Real Est.	Wholesale & Retail Trade	Services	Government			Self-Employed
					Total	Education	Other Govt.	
1970	1,590	690	5,400	3,190	5,380	3,540	1,840	4,420
1971	1,550	750	5,730	3,610	5,570	3,600	1,970	4,280
1972	1,680	800	5,810	3,980	5,710	3,670	2,040	4,800
1973	1,770	990	5,910	4,230	5,730	3,700	2,030	4,910
1974	1,860	1,030	6,290	4,630	5,790	3,740	2,050	5,040
1975	1,930	1,060	6,620	4,950	6,330	3,980	2,350	5,180
1976	1,740	1,170	7,890	5,430	6,500	4,090	2,410	na
1977	1,820	1,340	8,620	5,830	6,710	4,210	2,500	na
1978	2,202	1,520	9,190	6,410	6.910	4,250	2,660	na

Source: Canadian Impact Study, Whatcom Council of Governments, 1978. WCOG also provided update. As reported by the Whatcom County Real Estate Research Committee, 1979.

TABLE BVII
WHATCOM COUNTY
CIVILIAN LABOR FORCE--UNEMPLOYMENT AND TOTAL EMPLOYMENT
1966-1978 (AVERAGE ANNUAL)

Year	Civilian Labor Force	Unemployment	Unemployment Rate	Total Employment
1966	29,500	1,640	5.6%	27,860
1967	29,940	1,730	5.8%	28,220
1968	31,630	1,710	5.4%	29,920
1969	32,780	1,920	5.9%	30,850
1970	35,350	2,700	7.6%	32,650
1971	39,940	3,690	9.2%	36,250
1972	37,960	3,850	10.1%	34,110
1973	38,990	3,410	8.9%	35,580
1974	38,930	3,640	9.4%	38,930
1975	40,660	4,440	10.9%	36,220
1976	42,180	4,230	10.0%	37,950
1977	43,830	4,400	10.0%	39,430
1978	45,920	3,660	8.0%	42,260

TABLE BVIII
WHATCOM COUNTY COVERED EMPLOYMENT AND EARNINGS
1966-1977

Year	Covered Employment[a]	Total Wages Paid Current $
1966	14,757	83,810,433
1967	15,095	87,277,422
1968	15,980	99,943,940
1969	16,725	110,312,270
1970	17,723	125,596,830
1971	22,475	183,853,912
1972	22,174	179,133,771
1973	22,898	196,237,596
1974	23,956	216,452,910
1975	25,318	249,630,371
1976	27,056	283,089,614
1977	28,874	327,009,856

Source: Canadian Impact Study, Whatcom Council of Governments, 1978

[a]Workers covered by unemployment compensation as reported by the Whatcom County Real Estate Research Committee, 1979.

energy-related developments for shipping facilities and industrial activities crease envimous potential for the area.

Current industrial development at Cherry Point includes Arco, Cal-Gas, Intalco, Mobil and Puget Power Sound and Light. Major proposals which have been made for future development of Cherry Point include a bulk cargo terminal and facility for the fabrication and assembly of large off-shore and on-shore marine structures and components used for raw material processing and energy development. The cargo terminal, which has been proposed by a major Japanese firm in conjunction with the Port of Bellingham, would be an embarkation point for shipping coal and other bulk commodities to Pacific Rim countries. The marine fabrication facility proposed by Snelson-Anvil, a subsidary of Chicago Bridge and Iron, and is projected to have a potential average employment of 1,000.

One other major consideration for future Cherry Point development is the opportunity for container shipping terminal facilities. The off-shore depths and upland acreage at Cherry Point would provide a prime location for development such facilities by the Port of Bellingham.

Employment projections for Whatcom County, by 5-year intervals through the year 2000, have been prepared by the Whatcom County Council of governments (in conjunction with a 1978 Canadian Impact Study). The so-called baseline forecast, shown in Table BVIII, predicts a 1980-1990 growth in total employment of approximately 15 percent for the County as a whole (see Table BIX). The major portion (68 percent) of this predicted 1980-1990 growth will be concentrated in trade, services and government, while manufacturing is expected to account for only 9 percent. The trends projected in this forecast indicate a decline in manufacturing's share of total employment and a shift from a resource- based, industrial economy to a more diversified trade and services-based economy. These forecasts were developed on the basis of historical 1966-75 employment growth, interviews with major company representatives concerning their plans, for future expansion, and specific assumptions with respect to future events which would affect these industries. However, the future

TABLE BIX
Whatcom County
BASELINE EMPLOYMENT FORECAST

	1966	1975	1975 % of Total Emp.	1980	1985	1990	1995	2000	2000 % of Total Emp.
Civilian Labor Force	29,500	41,980	-	51,330	59,340	68,000	77,020	88,250	-
Unemployment/Unemployment Rate	1,640/5.6	4,350/10.4	-	5,040/9.9	6,130/10.4	7,390/10.9	8,170/10.7	9,610/10.9	-
Total Employment	27,860	37,630	100.0	46,290	53,210	60,610	68,850	78,640	100.0
Agriculture	3,880	3,300	8.8	3,140	3,060	2,980	2,970	2,950	3.8
Self-employed Unpaid	4,110	5,180	13.6	6,070	6,890	7,750	8,730	9,900	12.6
Manufacturing	4,610	6,460	17.2	7,710	8,330	9,060	9,670	10,340	13.1
Lumber and Wood	940	610	1.6	820	780	740	760	780	1.0
Stone, Clay and Glass	220	240	0.6	260	270	280	300	310	0.4
Primary Metals	560	1,280	3.4	1,351	1,430	1,510	1,590	1,680	2.1
Transportation Equipment	300	540	1.4	1,070	1,370	1,750	1,930	2,130	2.7
Other Durable	150	330	0.9	310	320	330	340	360	0.5
Food and Kindred Products	990	1,140	3.0	1,290	1,430	1,580	1,740	1,920	2.4
Printing and Publishing	180	200	0.5	210	220	220	230	230	2.9
Petroleum Refining	300	700	1.9	740	770	810	850	900	1.1
Other Non-Durable	910	1,380	3.7	1,660	1,750	1,840	1,930	2,030	2.6
Mining	290	350	0.9	360	380	390	400	410	0.5
Construction	1,780	1,450	3.2	2,450	2,580	2,710	2,850	2,990	3.8
Trans., Comm., Utilities	1,440	1,950	5.1	2,330	2,750	3,180	3,670	4,270	5.4
Wholesale and Retail Trade	4,330	6,620	17.6	9,120	11,410	13,820	16,550	19,870	25.3
Finance, Insurance, Real Estate	600	1,060	2.8	1,310	1,580	1,850	2,160	2,540	3.2
Services	2,590	4,950	13.2	6,260	7,660	9,130	10,780	12,780	16.3
Government	4,230	6,330	16.8	7,530	8,590	9,750	11,060	12,590	16.0
Educational Services	2,560	3,980	10.6	4,870	5,510	6,240	7,060	7,980	10.1
All Other Government	1 670	2,350	6.2	2,660	3,076	3,510	4,010	4,610	5.9

Source: Whatcom County Council of Governments, November, 1978.

impact of several projects such as the proposed CBI/Snelson-Anvil development at Cherry Point (which itself would directly create some 1,000 new manufacturing jobs) may be underestimated by this forecast.

Population projections were also prepared by the Whatcom County Council of Governments in conjunction with the Canadian Impact study. These forecasts, shown in Table BIX, were made according to the same assumptions underlying the employment forecasts. These projections forecast growth of Whatcom County's population to 184,910 by the year 2000, an average annual growth rate of 3.1 percent between 1975 and 2000. The income projections indicate an average annual growth rate of 4.7 percent over this period. Retail sales growth projections, which assume continued substantial increases in nonresident expenditures, forecast a doubling of sales between 1975 and 2000.

Two other sources of population projections for Whatcom County include the Washington State Office of Financial Management (June, 1978) and the Bonneville Power Administration (July, 1979). These projections, which forecast a 33-38 percent increase in the total population for the County from 1980 through 2000, are shown in Table BX. The Bonneville Power Administration has also prepared employment projections for the County through the year 2000. These projections, which are reproduced in Table BXI and BXII, forecast an approximate doubling of employment in the County from 1975 to 2000.

A continuing decline in household size, characteristic of similar state and national trends, is forecast by both the state and the Bonneville Power Administration. The average number of people per household in Whatcom County is forecast by the B.P.A. to decrease from 3.07 in 1970 to 2.7 by 1980, and to further decrease to 2.36 by 2000 (B.P.A. July, 1979).

According to the April, 1979 State estimates of population and housing, current household size (total population divided by the total number of housing units) in Ferndale is 2.38. Using the 2.4 percent

TABLE BX CHANGES IN WHATCOM COUNTY COUNTY EMPLOYMENT: 1980-1990 (BASELINE PROJECTION)

	1980	1990	Increase or Decrease
TOTAL EMPLOYMENT	46,290	60,610	14,320
Agriculture	3,140	2,980	-160
Self employed unpaid	6,070	7,750	1,680
Manufacturing (total)	7,710	9,060	1,350
Lumber and Wood	820	740	-80
Stone, Clay, and Glass	260	280	20
Primary Metals	1,351	1,510	159
Transportation Equipment	1,070	1,750	680
Other Durable Goods	310	330	20
Food and Kindred Products	1,290	1,580	290
Printing and Publishing	210	220	10
Petroleum Refining	740	810	70
Other Non-Durable Goods	1,660	1,840	180
Mining	360	390	30
Construction	2,450	2,710	260
Transportation, Communication, Utilities	2,330	3,180	850
Wholesale and Retail Trade	9,120	11,410	4,700
Finance, Insurance, Real Estate	1,310	1,850	590
Services	6,260	9,130	2,870
Government (total)	7,530	9,750	2,220
Educational Services	4,870	6,240	1,370
All Other Government	2,660	3,510	850

Source: Whatcom County Council of Governments, November 1978, as reported by the Bellingham Department of Planning and Community Development, 1979.

TABLE BXI
WHATCOM COUNTY POPULATION PROJECTIONS
1980-2000 (In Thousands)

	Washington State[a] Office of Financial Management	Bonneville[b] Power Administration
1980	100.3	102.4
1985	110.0	113.6
1990	119.8	123.9
1995	128.7	132.8
2000	133.6	141.4

Sources: [a]Washington State Office of Financial Management, June, 1978.

[b]U.S. Department of Energy, Bonneville Power Administration, July, 1979.

Table BXII
Bonneville Power Administration Employment Projections

for Whatcom County

	1975	1980	1985	1990	1995	2000
Total Employment (Household)	35,600	44,400	52,000	58,600	65,000	71,000
Total Employment (Establishment)	37,100	45,900	53,900	60,900	67,700	74,200
Agriculture	3,075	2,800	2,650	2,550	2,475	2,400
Non-Agricultural Self-Employment	4,625	5,300	5,900	6,400	6,875	7,300
Total Non-Agricultural Employment	29,400	37,800	45,350	51,950	58,350	64,500
Mining	50	75	100	100	125	125
Construction	1,850	2,475	2,950	3,400	3,825	4,225
Manufacturing	6,425	7,200	7,750	8,275	8,675	9,025
Food and Kindred Products	(1,150)	(1,125)	(1,175)	(1,250)	(1,300)	(1,325)
Lumber and Wood Products	(600)	(775)	(725)	(675)	(625)	(600)
Paper and Allied Products	(1,200)	(1,350)	(1,350)	(1,350)	(1,350)	(1,350)
Primary Metals	(1,275)	(1,275)	(1,325)	(1,400)	(1,425)	(1,425)
Transportation Equipment	(525)	(650)	(725)	(775)	(825)	(875)
Other Manufacturing	(1,675)	(2,025)	(2,450)	(2,825)	(3,150)	(3,450)
Transportation and Public Utilities	1,775	1,875	2,050	2,225	2,375	2,475
Wholesale and Retail Trade	7,025	10,750	14,150	17,075	20,000	22,900
Finance, Insurance, and Real Estate	1,075	1,500	1,900	2,300	2,700	3,075
Services	5,050	6,925	8,625	9,925	11,225	12,525
Government	6,150	7,000	7,825	8,650	9,425	10,150

Source: U.S. Department of Energy, Bonneville Power Administration, July, 1979.

vacancy rate reported by the March, 1979 Federal Home Loan Bank Board vacancy survey for the Bellingham and Lynden postal delivery areas, an adjusted household size of 2.44 is obtained.

This trend of declining household sizes at the county, regional and national level is related to several factors, the most significant of which is the declining birth rate. The pattern of decrease in household size has also been influenced by an increase in the divorce and separation rates and by an increase in one-person households.

Both State and B.P.A. forecasts also predict a continued "aging" of the population. State forecasts predict an increase in the median age of the Whatcom County population from 26.7 in 1970 to 28.5 by 1980, and 35.4 and a slight increase (to 11.3 percent) in the proportion of the population aged 65 and over by the year 2000 (Washington State Office of Financial Management, June, 1978).

Current forecasts predict further state and national declines in household size over the next decade as the population continues to age (with a growth in the number of older couples whose children have grown and left home, and with the greater longevity of women) and as an increasing number of the young "baby-boom" adults leave home to establish their own households. Many of these adults leave home late, postpone their first births, and have smaller families (Washington State Office of Financial Management, August, 1979).

APPENDIX C

WHATCOM COUNTY COMPREHENSIVE PLAN - GOAL STATEMENTS

(SECOND DRAFT)

I. REGIONAL DESIGN GOALS

A. Future urban development should occur within or immediately adjacent to existing urban areas in order to eliminate sprawl and strip development, assure the provision of an adequate range of urban services, conserve agricultural and forestry lands, optimize investments in public services and conserve energy resources.

B. Future development in rural areas should be low density, compliment existing rural character, contribute to the conservation of agricultural and forest land and not result in demands for urban-level services.

II. GROWTH MANAGEMENT GOALS

A. To promote a conscientious program designed to plan, guide and influence the appropriate location, timing, intensity, type and servicing of diverse land use patterns.

B. To determine the required amounts of land anticipated to be utilized within the planning period (15 years) while retaining options for future land use decisions beyond the planning period.

C. To encourage a predictable pattern of urban and rural development which utilizes previously committed land areas and existing facility investments before committing new areas for development.

D. To ensure that a beneficial balance exists between the supply and demand for public services. To encourage the cooperation

among municipalities, special districts and associations in the planning and provision of public services. To discourage the proliferation of unnecessary special purpose districts.

E. To develop a concise, equitable and practical set of land use regulations intended to implement the goals, policies and proposals of the County Comprehensive Plan in a timely and orderly fashion.

III. LAND USE GOALS

A. To conserve the agricultural and forest lands of Whatcom County for the continued production of food, forage and timber crops while promoting the expansion and stability of the county's agricultural and forestry economies.

B. Urban residential development should be planned in areas that can be economically and efficiently served with existing or planned services, optimize energy use, function as integral neighborhood units, and can environmentally support intensive land uses.

C. Adequate community and neighborhood commercial facilities should be encouraged in appropriate locations while avoiding incompatible land uses and the proliferation of unnecessary new commercial areas.

D. To encourage a balanced and diversified economy in order to assure desirable local employment opportunities and to strengthen and stabilize the tax base. To accommodate anticipated economic development in an environmentally responsible manner with due consideration for public cost, energy availability, land use compatibility and transportation accessibility.

E. To promote the availability of economical and attractive housing for all income, age and ethnic groups, while also enhancing the integrity and identity of existing communities.

F. To promote a functional, coordinated and multimode transportation system which provides for the safe and efficient movement of people and goods, avoids undesirable environmental impacts, and optimizes public investments and the conservation of energy resources.

G. Adequate facilities and services which provide diverse education, recreation, cultural and social opportunities should be encouraged.

IV. CULTURAL AND NATURAL RESOURCES

A. To identify and manage environmentally sensitive areas in such a manner to prevent destruction of the resource base and reduce potential losses to property and human life.

B. To continue the identification of cultural and natural resources and formulate viable methods to preserve and conserve such resources in recognition of their irreplaceable character.

C. To promote a park and recreation system which is integrated with existing and planned land use patterns and is diverse, abundant and assures maximum public access and usage.

V. CITIZEN INVOLVEMENT AND INTERGOVERNMENTAL COORDINATION

A. To assure opportunity for citizens to be involved in the formulation of land use goals, policies and proposals and to provide a structure for citizen participation in the planning programs of federal, state, regional and local agencies.

B. To participate in intergovernmental coordination with federal, state, provincial, regional and local agencies, to develop a coordinated approach to problems which transcend local government bodies and to create an environment for the exchange of information and technical assistance.

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