SHAW HILL-DEEP BAY

TECHNICAL REPORT

Regional District of Nanaimo
Planning Department

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TECHNICAL BACKGROUND REPORT

1. INTRODUCTION

1.1 Terms of Reference

The Shaw Hill-Deep Bay Technical Report is a companion document to the Shaw Hill-Deep Bay Official Community Plan. Whereas the Official Community Plan provides a summary of information and policies and objectives relating to the development of Shaw Hill-Deep Bay, this report provides detailed background information on natural resources, resource management, economic activities, population, land use trends and infrastructure. Information contained herein will be of interest to consultants and persons requiring statistical material on the area.

This report replaces the Shaw Hill-Deep Bay Technical Background Report (1981) and was compiled by Ruth Hardy, working under contract for the Regional District of Nanaimo.

Any one having comments or suggestions with respect to this document please contact the Planning Department of the Regional District.

1.2 Administrative and Political Framework

The Community Plan provides an overall frame of reference to guide the establishment of settled areas, enhance resource activities, ensure livability and reduce uncertainty. The plan outlines local, regional and provincial policies and objectives, indicates local aspirations, provides a basis for estimating public expenditures and identifies the future role of an unorganized area and a preferred pattern of land use. While the technical report provides the background information for the plan, the plan in turn is the basis for, and is implemented by the land use regulating bylaw, Bylaw No. 500.

The Regional District has the mandate to adopt community plans and land use and subdivision bylaws in unorganized areas through the provincial **Municipal Act**. The Regional District is required to take into consideration provincial policies that may be applicable to the area, such as Agricultural Land Reserves, road network plans prepared by the Ministry of Transportation and Highways, provincial parks and park reserves, policies with regard to use of forest lands, and environmental standards.

The sequence of planning in the study area begins with the District 69 Regional Plan in 1975, which covered the area of School District No. 69 and set the role for various areas including Qualicum Beach and Parksville, as well as unorganized areas such as Shaw Hill-Deep Bay. The District 69 Plan was repealed under changes to the **Municipal Act** in 1984, which removed the regional planning mandate of Regional District. In the early 1980's it became evident that specific policies were required in the Shaw Hill-Deep Bay area as growth rates and population climbed. Studies were initiated and a draft settlement plan and background report were prepared by consultants for the Regional District of Nanaimo. The first community plan, termed a settlement plan under past legislation, was adopted in July 1983, and amended in May 1986. It was reviewed in 1988, and the updated plan was adopted as Bylaw No. 747 in the fall of 1988.

Zoning bylaws have also followed a sequence related to the adoption of plans and changes in the **Municipal Act**. Subdivision and Zoning Bylaw No. 203 came into effect in 1985 for Electoral Area 'H', followed by Zoning Bylaw No. 395 in 1982 for Electoral Area 'G'. Since 1984, Land Use and Subdivision Bylaw No. 500 has been in effect in the area; this is a comprehensive regulatory bylaw.

2. NATURAL ENVIRONMENT

The Shaw Hill-Deep Bay Planning Area encompasses an area of land stretching along the Straits of Georgia from the western boundary of the Village of Qualicum Beach to the community of Deep Bay. It also covers an area inland to the ridges of the Vancouver Island Range. The Plan Area lies approximately midway between the cities of Nanaimo and Courtenay, and is the largest single planning unit within the Regional District of Nanaimo.

Politically, Shaw Hill-Deep Bay comprises all of Electoral Area 'H', while the area adjacent to Qualicum Beach is part of Electoral Area 'G'. Shaw Hill-Deep Bay is formed by a number of smaller communities, each with distinctive physical and social characteristics. These are listed in Table 3.11, and further illustrated in Appendix B.

2.1 Climate

The Plan Area has a maritime climate which is strongly influenced by its position in the rain shadow of the Vancouver Island Mountains. The result along the coastal strip is a temperate climate, which is relatively dry for its maritime location, with gradual seasonal changes from mild, wet winters to warm, dry summers. Further inland, as the elevation and proximity to the Island Mountains increase, the climate is cooler and wetter.

The climate normals from several weather stations are presented in Table 2.1 to give a general picture of the coastal regime. No single station within the area has long term records of all parameters, nor are there available statistics for inland areas.

For coastal areas, the warm season usually starts at the end of April, when daily maximum temperatures are over 18°C, and extends into October, providing a long growing season and a long outdoor activity season. A typical summer day will reach temperatures over 23°C. During occasional hot spells, 30°C temperatures are reached. Rainfall is usually less than 4.5 cm per month in the summer.

Winter conditions are mild by most Canadian standards. Mean daily temperatures are a few degrees above zero, and the majority of total precipitation is rain, with some cold spells and snow likely in December, January and February.

The total annual precipitation at coastal elevations is probably similar to the Parksville value of 963 mm. Comparison values are 901 mm in Nanaimo at Departure Bay and 945 mm at Nanaimo CHUB; 1200 to 1350 mm in the Dunbar and Kitsilano areas of Vancouver; and 1854 mm at the Port Alberni airport.

The annual regime of 1811 hours of sunshine at the closest station, the Nanaimo airport, is comparable to Cowichan Bay (1817), but not as high as the Victoria/Saanich area at 2059 to 2191 hours.

TABLE 2.1
CLIMATE NORMALS
(1951 to 1980)

Month	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Mean Daily Temp (^{o}C)													
Denman Island	2.1	3.8	5.0	8.0	11.8	14.6	17.3	17.1	13.7	9.2	5.1	3.3	9.3
Qualicum River	2.3	4.1	5.0	8.0	11.6	14.5	16.7	16.4	13.4	9.3	5.4	3.7	9.2
Parksville	1.6	3.6	4.8	7.7	11.2	14.3	16.7	16.4	13.5	8.9	4.6	2.8	8.8
Total Precipitation (mm)													
Denman Island	210.3	158.7	129.1	72.5	36.8	38.8	26.0	39.6	46.8	145.9	215.1	251.9	1371.5
Qualicum River	204.5	151.8	116.9	61.7	44.5	39.3	26.3	41.5	58.6	137.9	204.4	229.8	1317.2
Parksville	146.9	97.0	82.8	51.3	40.2	38.3	23.1	43.6	45.2	97.5	132.2	165.8	963.9
Cameron Lake	233.6	179.7	142.0	83.7	49.9	35.4	30.0	44.6	70.8	181.8	237.0	268.5	1557.0
Snowfall (cm)													
Denman Island	38.8	13.2	10.8	0.4	0.0	0.0	0.0	0.0	0.0	0.1	6.8	22.6	92.7
Qualicum River	24.4	6.3	2.2	0.4	0.0	0.0	0.0	0.0	0.0	0.0	2.0	12.1	47.4
Parksville	25.4	10.7	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	18.8	66.1
Days with Precipitation													
Denman Island	16.0	13.0	12.0	10.0	9.0	9.0	6.0	7.0	7.0	13.0	16.0	16.0	134.0
Qualicum River	19.0	16.0	16.0	12.0	10.0	9.0	6.0	8.0	10.0	15.0	18.0	20.0	159.0
Parksville	20.0	17.0	17.0	14.0	15.0	11.0	7.0	10.0	11.0	16.0	20.0	22.0	180.0
Hours of Bright Sunshine													
Nanaimo Airport	50.3	78.7	125.9	166.3	231.7	218.6	287.4	244.6	177.1	122.0	65.1	43.4	1811.1

2.2 Physical Features

This section describes the geologic processes and physical conditions of the Plan Area and provides a brief description of the origins of the landforms.

2.2.1 Terrestrial

Physiographically, the most accessible and developed part of the Plan Area is part of the Nanaimo Coastal Lowland which extends along the east side of Vancouver Island from Jordan River to Sayward. To the east lies the Strait of Georgia and to the west, approximately at the 212 m contour, lies the eastern flank of the Beaufort Range, part of the Vancouver Island Mountains. The Lowland is underlain by sedimentary rock surfaces which were stripped of weathered material and shaped by several episodes of glaciation during the Pleistocene period. The overriding sheets of ice further reduced the low relief by the deposition of a mantle of glacial and fluvio-glacial materials varying between 10 m and 90 m in depth. The weight of the ice also depressed the land below sea level which resulted in some deposition of marine-modified materials as well. When the glaciers began to recede over 12,000 years ago the land surface rebounded leaving marine and shoreline features, such as beach deposits, at considerable distances from existing sea level. Watercourses were also rejuvenated resulting in the cutting of steep narrow-sided valleys along the courses of streams and the Big and Little Qualicum Rivers.

Further inland, the part of the Plan Area above the 240 m contour is composed of sedimentary, volcanic and granitic rock surfaces which have been maturely dissected by valley glaciers and streams. These form a broad highland reaching a maximum height of 1548 m at Mount Joan, although general summit levels are more commonly at the 910 m to 1060 m level. The mountains are actually high points on ridge crests or the upper part of broad topped ridges, with the encroachment by former cirques and river valleys carving some steep slopes and peaks. The valleys are typically narrow, steep-walled troughs shaped by glacial erosion while the steeper tributary valleys are V-shaped. The valley occupied by Horne Lake is part of a larger structural depression although it also owes its form to ice movement.

The present topography of the coastal lowland band, 5-13 km wide, is characterized by a gently undulating surface with local relief generally less than 30 m. The major topographic variations occur in the river and stream valleys where water has eroded the thick mantle of overburden into valleys which become progressively shallower as they near the sea. There are several low lying areas such as the headwaters marsh of Fletcher Creek.

An intriguing geological feature that occurs in the mountainous part of the Plan Area is the limestone solution caves that are contained within Horne Lake Caves Provincial Park. These types of caverns and other features of Karst topography are found in several places on Vancouver island (e.g. west of Campbell River, Gold River area) that have limestone as the bedrock.

The recent geological history described above has resulted in a complex of soils developed on glacial, fluvio-glacial and marine parent materials. The fine textured marine soils can be found up to the 136 m contour, the approximate limit of the marine inundation. Above the marine soils in elevation, and also underlying the marine deposits are the glacial deposits. Fluvial and fluvial-glacial deposits, associated with the river systems and often overlying both the marine and glacial deposits, are generally coarser textured and better drained. Minor areas of organic soils have developed in low lying areas with restricted drainage.

Additional information on soils in the coastal lowland can be obtained from the mapping completed by the Agricultural Land Commission as part of their ALR Fine Tuning Program for eastern Vancouver Island. Several interpretations for development suitability based on this mapping are presented under Section 2.7.

2.2.2 Marine

While inland physiography is generally viewed as essentially static, the coastal zone in contrast is an area of constant, dynamic visible change where physical and biological processes are powered by lunar, solar and gravitational energies. Waves, tides, currents and inflowing rivers alter the water-land interaction zone through the processes of erosion, transport and deposition.

The shoreline of the Plan Area is part of a beach belt that stretches 203 km from Madrona Point (Nanoose) north to Duncan Bay. There are no outcrops of bedrock as there are along the coast south of Madrona Point. It is a long shore drift belt in which the currents flow from the southeast to the northwest. It is broken into three drift sectors, each comprised of interdependent areas of erosion, intermediate accretion and terminal accretion shoreforms. The mouth of the Little Qualicum River is at the western end of a drift sector which starts at Craig Bay. The strong westward drift of beach material has deflected the course of the river at its mouth parallel to the shoreline. The depositional forces have combined to form a barrier spit modified by deltaic deposits and estuarine processes. There are flood hazards in the delta and along the river bottom (floodplain). Limitations include poor drainage and a high water table in the old alluvial terraces, fans and morainal deposits. There is some shoreline erosion west of the spit tip.

The shoreline from the mouth of the Little Qualicum to the Big Qualicum River comprises another drift sector composed largely of intermediate accretion beach shores of gravel and sand. The beach berms along a broad area of D.L. 89 and adjacent D.L. 80 and 81 are backed by 18 to 30 m high gullied banks of sandy fluvio-glacial terrace and gravelly banks and bluffs that are erosion prone. At the accretion terminal, near Qualicum River, the beach becomes broader and sandier.

The mouth of the Qualicum River cuts through the confines of the heavy gravel accretion berms of the drift sector to the east. The channel gradient and heavy gravel bed load has prevented the development of estuarine marshes and the formation of a more physically and biologically complex estuary. The delta area and the floodplain along the river may be prone to flooding at occurrences of storm tides and high river floods. High water table problems occur during winter months on adjacent alluvial terraces and old fans.

The coast from the Qualicum River to the tip of the Mapleguard Point forms a single, lengthy (12.2 km) drift sector. The shore material of this sector is high in coarse gravels, cobbles and boulders although sandier sections are present near Nile Creek. Nile and Thames Creeks are too small to create significant drift barriers. Their mouths can be temporarily blocked during extreme high tide and storm wave occurrences. Gullying along the creek banks, seepage and possible flooding are limitations around the creek mouths. There are several areas where foreshore trenches have been dug to create boat access in front of private residences and beach protection works (bulkheading) have also been attempted in several places. These measures are meant to impede the slow intermediate accretion/erosion process and will likely initiate localized beach disturbances that will lead to further erosion problems. Some areas of the backshore in D.L. 36, 40 and 85 are composed of actively gullying morainal bluffs.

The hooked spit of Mapleguard Point forms the accretion terminal of the drift sector that begins at the Qualicum River. The spit was formed from deposition by the long shore currents, east winds and waves as they funnel into the passage between Denman Island. The spit is dependent on the sediment sources to the southeast for its continued existence. There is already a major residential development on the spit and care must be taken not to upset the stability of the berm or the deposition processes if the physical integrity of the spit is to be maintained.

The spit has formed a small lagoon which is part of Deep Bay and its system of tidal and sub-tidal flats are protected from wave action. A number of small creeks and water table seepage across a shallow foreshore combined with good tidal mixing have contributed to the formation of extensive foreshore marshes and semi-estuarine conditions.

2.3 Hydrology

The Plan Area has two major rivers, the Big and Little Qualicum Rivers. Part of the Little Qualicum River (10.2 km) and its two major downstream tributaries, Whiskey and Kincade Creeks, drain the southeastern part of the Plan Area. All of the Big Qualicum River is within the Plan Area, draining much of the mountains and the central part of the coastal lowlands. Together with its tributaries and Horne Lake, the river forms the largest watershed in the Plan Area. Other permanent watercourses draining the lowland are Nile (11km) and Thames (8 km) Creeks with source areas in the highlands, Fletcher Creek with its source in a large marsh and Cook (Chef) Creek which drains into Deep Bay. All other streams are intermittent.

Maximum stream flows occur during winter and spring with many of the smaller creeks (e.g. Thames) experiencing low summer flows due to the small local rainfall. Basal flows are often dependent on groundwater or on run-off from the precipitation of the highlands. The Big Qualicum has outflow controls on Horne Lake in order to regulate water volumes and temperatures for the large hatchery facility downstream. Available information on streamflow is summarized in Table 2.2. Watershed catchment areas are shown on Map No. 7.

Spider and Illusion Lakes are part of an enclosed drainage system with no surface outflow streams. Groundwater flows are the major source of water exchanges in the small shallow lakes. They are very sensitive to contamination and pollution which would cause accelerated eutrophication (the natural aging process of lakes which results in high levels of aquatic vegetation) and loss of their recreational capability and appeal.

Table 2.2
Hydrological Characteristics

Water Course	Water Source	Watershed Area Square Miles	Flow Type	Mean Annual Discharge (cfs) Range	Mean Annual Discharge (cfs) Average	Daily Discharge (cfs) Minimum Range	Daily Discharge (cfs) Maximum Range	Number of Water Licenses	Total Licenced Withdrawal (cfs)
Nile Creek (for regulated period)	Surface	6.9	Regulated Since 1969	24.6 - 51	36.5	6.1-7.7 (2.3 in 1961)	303-1180	2	0.281
Little Qualicum	Surface Partly Spring Fed	96.0	Natural	371-614	441	26.0-94.4	1310-11,200	7	0.382 0.45 irrigation
Qualicum River	Surface	58.0	Regulated @ Horne Lake	161-407	258	13.7-124	504-12,000	2	Non-consumptive
Chef Creek	Possibly Spring Fed	2.7	Natural						
Cook Creek	Possibly Spring Fed	7.3	Natural						

Groundwater resources sufficient for community water supplies are known to exist in the Quadra sands. Other materials of direct or indirect glacial origin also have some capabilities, although they are largely unknown at present. Fractured rock in the upper elevations also offers some opportunities for domestic water supply.

2.4 Terrestrial Resources

The Plan Area is part of a highly productive biotic region that extends along the eastern Vancouver Island Coastal Lowland. The mild climate, especially the long, warm dry summers has enabled the development of the dry Douglas-fir sub-zone near the coast while most of the inland portions are part of the Coastal Douglas-fir biogeo-climatic zone (CDF). The dominant association below the 485 m elevation is Douglas-fir with salal and oregon grape in the under-story. Above this elevation the Coastal Western Hemlock biogeo-climatic zone (WH) dominates, often in association with amabilis fir. Western red cedar is common on wetter sites. The coniferous associations are quite dense being largely composed of second growth forests with a thick shrub layer as large areas along the coast were logged within the last 50 years. Major logging operations, part of long range forest management programs, are still being carried on further inland as the forests are among the most productive in B.C.

This part of the east coast of Vancouver Island is also a high capability deer habitat (C.L.I. Class 3 for ungulates). The cut areas can support large deer populations due to ample browse although adequate cover is often a limiting factor in large clear cuts. The intermediate slopes between the 750 m and 150 m elevations, and especially the south-facing slopes with well established forest cover, are the preferred winter ranges (C.L.I. Class 2 and 3). Intensive forest management practices, e.g., stand thinning, often produce very good results in terms of deer habitat, thus wildlife management activity and forest management will likely take place in similar areas. The east central part of the Island provided excellent deer range and was popular with hunters until logging occurred in the late 1960's and early 1970's. The objective of provincial wildlife biologists is to increase the number of deer hunting opportunities in the region to 1960's levels using intensive forest management activities throughout the area. The appearance of deer in settled areas is not uncommon with gardeners regularly resorting to use of deer fences.

A variety of other animals and birds are also found throughout the inland area, e.g., black bear, cougar, wolf and small furbearers although they are seen relatively infrequently. Little background data or management information is available for these species although it has been noted that wolves are becoming more numerous in the northern and central portions of the Island.

2.5 Coastal Resources

As part of a dynamic and diverse shore-process corridor, the Plan Area's physical elements are matched by equally diverse biological components. The long drift sectors, the erosion and accretion forms, estuaries and marshes support a wide variety of marine life forms including those that use the land and water transition zones. The more prominent and visible members of the coastal biotic community are discussed below.

The entire offshore habitat of the Plan Area is extensively used by overwintering and migratory waterfowl (C.L.I. Class 3m). Certain small productive areas such as estuaries and marshes are very important for feeding and resting, e.g., Deep Bay, Big and Little Qualicum estuaries, and the Fanny Creek marsh. The Little Qualicum is an extremely diverse habitat representative of a typical small delta/estuary complex. The Canadian Wildlife Service has established the Marshall-Stevenson Unit, part of the Qualicum National Wildlife Area, on a 54 ha section of the north part of the Big

Qualicum estuary spit. Geese and diving ducks are present year round with dabbling ducks and a few trumpeter swans present during the winter.

At the north end of the Plan Area, Deep Bay supports several species of dabbling and diving ducks, divers and gulls and trumpeter swans. Dabbling and diving ducks and divers utilize the lengthy intervening coastal area. Normally species include: dabbling ducks - mallards, pintail, widgeon, teal; diving ducks - scaup, golden eye, buffle head, harlequin; and divers - loons, grebes, mergansers. Shorebirds (sandpipers, plovers, dowitchers), herons and raptors such as the bald eagle and osprey are also frequently seen in the area.

The inter-tidal and sub-tidal areas of the coast support a variety of shellfish, such as clams, oysters and crabs. There are considerable variations in the availability of shellfish along the coast between the Little Qualicum estuary and Mapleguard Point as most of the nearshore portions of this long drift sector are intermediate erosion/accretion forms, not all of which are suited to abundant shellfish growth. Qualicum Bay is a reasonably productive and popular recreational shellfish area; the Nile and Thames Creek areas are also relatively productive with smaller pockets of shellfish beds occurring along the coast. Little detailed survey work has yet been done. In contrast, the Deep Bay area is highly productive for shellfish because of the sheltered waters and abundant nutrients.

The offshore areas are frequented by both harbour seals, especially around Deep Bay, and overwintering sea lions. Some productive herring spawning areas lie about 1 km offshore. This is part of a long, almost continuous bed of eelgrass that extends from Northwest Bay into Baynes Sound. It is an extremely important habitat area for the commercial herring fishery even though the use varies by year and by location along the coast.

The coastal waters also provide habitat for one of the most significant resources of the east coast of the Island - anadromous fishes. As well as the important estuary habitats described below, it has been shown that the nearshore areas of the coast are critical for juvenile migrating salmon because of the food, cover and protection from predators afforded by the relatively more productive near-shore waters.

Five species of salmon and steelhead produced in the Plan Area's rivers and streams spend most of their adult lives in the Strait of Georgia where they provide the livelihoods for commercial fishermen and tourist operators through commercial and sport fishery. Salmon fishing has long been one of the major recreational activities of both visitors and residents and is one of the aspects that contributes to the quality of life in the Plan Area.

2.6 Aquatic Resources

In terms of aquatic environments, the Plan Area is part of the eastern Vancouver Island stream and river system that is highly valued for its salmonid production capability. Compared to most other coastal areas of British Columbia where watersheds are in igneous rock zones that have low biological productivity, the eastern Island has streams that are productive and cumulatively very important for the commercial and recreational catch of salmon. The Regional District of Nanaimo contains some of the most productive anadromous fish streams in the province where virtually every permanent stream draining into the Strait of Georgia contains populations of one or more sea run fish. Of these streams, the Big and Little Qualicum Rivers are among the most highly valued for production of steelhead, coho, chinook, chum and pink salmon. The federal Department of Fisheries and Oceans have developed substantial hatchery facilities on the Big and Little Qualicum Rivers as part of the Salmonid Enhancement Program, designed to restore salmon and steelhead stocks to their historic (pre-1900) levels.

Both the Big and Little Qualicum Rivers have significant investments in hatcheries through the Salmonid Enhancement Program. The Big Qualicum hatchery offers a controlled river environment including flow volumes and temperatures, engineered rearing pools and settling basins, semi-natural rearing channels, artificial spawning channels, hatchery facilities and marking facilities. Little Qualicum has a spawning channel for chum and spawning and rearing facilities (recently doubled in size) for chinook. Tables 2.3 and 2.4 present recent statistics for these rivers. Little Qualicum raises some incidental coho in addition to the chum and chinook listed in Table 2.4, and has a natural fishery outside of the hatchery which includes sockeye, coho, chum and chinook.

All of the smaller streams with permanent flows also support anadromous fishes, e.g., Fletcher Creek - coho and cutthroat trout; and, Nile Creek - coho, chum, steelhead and cutthroat trout. Most of these streams have problems with minimum flows due to the low summer rainfall. Numbers of fish returning to spawn are typically low, usually between 0 and 100 coho and chum. Some stream improvements such as fry plantings and incubation boxes could improve fish numbers, however, there are no programs at present for these streams (B. Allen, Fisheries and Oceans, Comox). Horne Lake is one of the more significant fishery lakes on the east coast of the Island. As the main water source for the Big Qualicum hatchery, retention of the shoreline in a relatively undeveloped state is preferable in order to maintain the high water quality required by the downstream hatchery facilities. The lake is also an important fish habitat in its own right supporting rainbow trout (15,000 planted 1978, 41,000 planted 1980) and natural populations of cutthroat trout and kokanee. The smaller, warm lakes in the Plan Area, Illusion and Spider, offer a different kind of sport fishing opportunity, namely smallmouth bass.

Table 2.3
Big Qualicum River Hatchery 1983-1988

	CHINOOK			COHO			CHUM	
Returns Year	Adults	Jacks	Reared Smolts Released	Adults	Jacks	Reared Smolts Released	Adults	Fry Released
1983	2861	2124		30466	33284		141666	
1984	5710	1915	3163676	44777	7803	1254697	101158	57337044
1985	9096	1307	3810080	20279	6524	3522034	168553	24012670
1986	9271	248	6506864	19950	4006	280550	166970	25676126
1987	7190	444	7021836	7779	9862	1390247	73043	44701736
1988			6045914			1008692		50448175

In addition, an average of approximately 95,000 chinook fry and smolts and approximately 500,000 coho fry and smolts leave the system each year as non-reared fish (the adults spawned naturally in the river).

Table 2.4
Little Qualicum River Hatchery
Returns and Releases

	CHUM			CHINOOK	
Year	Returns	Releases	Return Adults	Reared Releases	Natural
1980	6500		0		
1981	4170	7627000	259	1178000	
1982	28700	4219000	1110	1411000	
1983	31150	25620000	2540	1362000	
1984	43400	21725000	1828	1400000	1250000
1985	67500	24296000	5000	1140000	69000
1986	47000	9573000	2800	1587000	446000
1987	50200	44068000	1760	1717000	810000
1988		39425000		4367000	38000

Source: J. Hargrove, Manager, Little Qualicum Hatchery

2.7 Natural Hazards and Limitations to Development

Natural hazards, defined as conditions or processes which present serious risk to life and property that may be infeasible to prevent (such as flooding) and limitations to development, defined as conditions that can generally be overcome by economic or technological means (i.e. steep slopes) are considered in this section. Concerns for ecologically sensitive environments, which may also lead to limitations to development, are considered in Section 2.8.

Information on hazards and limitations in the lowland areas is drawn from a series of 1:20,000 maps available from Maps B.C., prepared as part of the Agricultural Land Commission's Fine Tuning Program for the east coast of Vancouver Island. Other information is drawn from maps prepared for the 1981 Technical Report. Map No. 3 of the Official Community Plan illustrates the natural hazard areas.

2.7.1 Natural Hazards

Natural hazard areas include mapping units prone to flooding and steep slopes subject to mass movement. Mapping units in which more than 50% of the unit is subject to frequent (1 to 3 year return interval) and occasional (greater than 3 year return period) flooding are noted. Slopes greater than 45% (soil units SS1 and SS2) are also noted.[1]

There are two coastal areas near Bowser and Dashwood with steep wave-cut bluffs (30% to 60% slopes) composed of unconsolidated sand. The combination of terrestrial landform and marine erosion processes has created zones that are prone to erosion and sudden mass movement.

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[1] Mapsheets entitled "Soils Affected by Flooding and/or Watertable" and "Soils" (for slope classes)

The river mouths and estuaries of all the major rivers and creeks flowing into the Strait of Georgia are prone to flooding. A combination of high incoming tides and heavy run-off would cause flooding of the adjacent low lying shoreline and the delta areas. In addition, the valley bottom of the Little Qualicum River is also an area of flood hazard as is the upper Big Qualicum River delta at the west end of Horne Lake.

Further inland two areas on the Big Qualicum River and Nile Creek are considered hazardous due to the steepness of the slopes (up to 60%) cut into unconsolidated sand by the water courses. Gullies are evident and the slopes and brow are prone to erosion and sudden mass movement.

The highlands and mountains also have numerous areas with potential hazards. The steep slopes and the veneer of colluvial material over bedrock makes these areas sources of rockfall and avalanches. There is an example of such an occurrence clearly visible at the west end of Horne Lake adjacent to the delta of the upper Qualicum River.

Since the mountains are forested and unlikely to be the focus of permanent human settlement, they are not dealt with in this report. Caution should be exercised, especially at the northwest end of Horne Lake where seasonal residences may be in danger from avalanches.

There is some hazard in the Plan Area due to seismic activity, all of Vancouver Island being in Zone 3 of the Seismic Zoning Map indicating the greatest risk of earthquake in Canada. The June 23, 1946 quake, which was the most damaging in the history of Western Canada with a magnitude of 7.3 on the Richter scale, had its epicentre in the vicinity of Comox, about 70 km from Qualicum Beach. An event of this magnitude has a calculated return period greater than 300 years.

Estimates of earthquake probability are based on a statistical analysis of the historical earthquake data (1899 to the present). An accurate prediction of tectonic activity is not possible with such a short period of record. Therefore, the data has been processed to estimate possible levels of seismic activity in the near future assuming a continuation of the statistical pattern of past years. Based on an empirical relationship between intensity and ground acceleration, an intensity VIII earthquake is derived for the Plan Area. That is, an earthquake of about 6.2 on the Richter scale has a probable return period of 200 years. Even higher intensities may be anticipated on ground that is somewhat unstable. The 100 year return period earthquake has an acceleration amplitude of 9%, thus possibility of a moderate to a strong earthquake should be considered.

The Provincial Building Code provides minimum standards which assure an acceptable level of public safety by designing buildings to prevent major failure and loss of life. Structures designed in accordance with the earth quake load provisions of the code should resist moderate earthquakes without significant damage and major earthquakes without collapse, although there may be some structural damage. However, this code is not enforced within Electoral Area 'H'.

2.7.2 Limitations to Development

The major limitation to development occurs in locations where a combination of soil features, such as poor drainage and fine texture, lead to low suitability for septic tanks. Areas within the lowlands

with a low suitability for septic tanks[1] are noted in Map No. 1. Specific mapping for the highland areas is not available, but excessive slope and shallow soils over bedrock generally result in low suitabilities.

Slopes greater than 15% are also generally considered to be a limitation or a cost to development. Mapping units with greater than 50% of their area with 15% or greater slopes are noted.

Additional information on soil characteristics which may affect suitability for development is available in the map series noted earlier (from Maps B.C.). Soil drainage, watertable levels and soil surface erosion potential are included.

The open coast and the dynamic balance of the erosion and deposition processes of the drift sectors in the marine environment also pose limitations to major developments such as large scale marinas between Qualicum Beach and Mapleguard Point. Beaches and raised beaches are noted on Map No. 3 of the Official Community Plan as they are natural hazard areas.

2.8 Environmentally Sensitive Areas

An area in which a human activity (such as disposal of water, construction) can detrimentally alter a habitat which is significant or critical to particular flora or fauna, is considered environmentally sensitive. In some environments careful development and management policies can mitigate or minimize impacts of development, however, in other cases any human interference can result in significant alteration of the environment. Several sensitive habitats within the Plan Area have been noted on Map No. 1. Also, Map No. 3 of Schedule 'A' of the Official Community Plan designates these areas as environmentally sensitive.

The most critical areas are those which are non-replaceable habitat for a component of a species' lifecycle. Included in this category are estuarine and wetland areas for their productivity and their importance as overwintering areas for waterfowl. The estuarine areas are particularly important for their role in anadromous fish lifecycles (rearing and transportation route to spawning areas). Ramifications from loss of habitat would effect commercial and sport fishing activities.

In the marine environment, the subtidal zone and in particular, areas of marine vegetation and salt marshes (in addition to estuarine habitats noted above) are considered sensitive and usually require specific management practices to maintain their viability.

On the landward side, stream protection areas have been delineated to indicate zones in which attention must be paid to water quality concerns and protection of fish habitat. A broad zone has been defined based on the extent of flood prone soils and bluffs paralleling the watercourses.

Guidelines for management of natural hazard areas and sensitive environments have been developed by several government agencies. They include strategies such as setbacks of buildings and septic tank fields from bluffs and watercourses.

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[1] Mapsheet entitled "Soil Suitability for Septic Tank Effluent Absorption"

In many cases management policies must be designed for the specific characteristics of the environment and demands of a proposed development. The manuals include:

- Guidelines for Watershed Management of Crown Lands used as Community Water Supplies, B.C. Ministry of Environment;
- A Handbook for Forest and Roadside Erosion Control in British Columbia, B.C. Ministry of Forestry, Land Management Report No. 4;
- Guidelines for Land Development and Protection of the Aquatic Environment, Fisheries and Oceans Canada.

3. RESIDENTIAL GROWTH AND DEVELOPMENT

3.1 Overview of Local History

The first white settlers arrived in the Plan Area in 1886 and settled along the coast near the mouths of rivers. They were typically from Nanaimo and Victoria searching for farmsteads or employment in the forest industry. Two logging camps, the Olympic Logging Camp and the Thompson Clark Logging Camp, operated on the banks of the Big Qualicum River and other inland sites. The completion of the E. & N. Railroad through to Courtenay from Nanaimo in 1908 benefitted both forestry and agricultural activities.

Around 1936, a fish processing (reduction) plant was built on the Deep Bay spit, accompanied by houses for approximately seventy-five families. The plant was torn down in 1951 when the lease held by B.C. Packers expired. However, the natural harbour of Deep Bay encouraged the development of the local fishing industry and fishing has continued in importance with the establishment of a government wharf. The wharf, soon to be improved, provides moorage and loading facilities to an active fishing fleet.

Since the 1950's tourism has become a strong component of the economy. The natural features and mild climate have also attracted significant numbers of retired persons.

3.2 Population Characteristics and Growth

The rapid population growth and its concomitant stress on housing markets which characterized the 1970's and up to 1981, slowed dramatically for the 1981 to 1986 time period. Annual growth rates of 6.4% decreased to 1.6%, a reflection of the slow economic climate in the Regional District and the province. Based on Census Canada enumeration areas which most closely fit the Plan Area, population grew from 2375 persons in 1981 to 2575 persons in 1986. Adjusting for the enumeration area boundaries, approximately 2510 persons resided in the Plan Area in 1986. (See Table 3.1.)

A breakdown of the Plan Area into smaller components shows that Bowser-Deep Bay continued to be the fastest growth area from 1981 to 1986 (3.0%) although it was a significant decrease from 10.1% for 1976-1981 period. The Little Qualicum area (to the south of the Little Qualicum River) apparently grew at a similar rate (2.9%), however, the small population numbers may have resulted in some errors as the calculated rate for 1976-1981 was an unexpected -1.2% while the rest of the region grew fairly rapidly.

The November 1988 population is estimated between 2600 and 2750, based on different growth rate assumptions as shown in Table 3.2. Simple projections of past rates result in populations of 2700 to 3000 by 1991 and 2900 to 3500 by 1996.

A review of the population subdivided by age group (Table 3.3) illustrates the continuing trend towards a higher than average percentage of the population in the oldest age group compared to both the Regional District and the province. At the opposite end of the age scale, the 0-4 years group has increased to 7%, a value comparable to the Regional District (6.8%) and the province (7.1%) and probably a reflection of the secondary baby boom evident nationally. The proportionate decrease in the 15 to 24 and 25 to 34 age groups in the Plan Area may reflect an outflow from the province during a slow economic growth period, to regions of higher employment. It appears that the Plan Area is continuing and possibly growing as a retirement area, at the same time as families with younger children are increasing.

The average household size has declined from 2.8 persons in 1971 to 2.5 persons in 1986. (See Table 3.4.) While this rate has not declined to the estimated 2.4 persons per household in 1981 (Marshall, Macklin, Monaghan 1981), it remains lower than the regional average size of 2.5 and provincial size of 2.6. Furthermore, the variation within the Plan Area is large, ranging from 2.2 to 2.6 in 1980 to 2.1 to 2.7 in 1986. The larger household sizes were in the Little Qualicum River area and the lowest near Qualicum Bay. Decreasing household size is a national trend resulting from changes in family composition such as fewer children and longer lifespans, leading to more households with children no longer at home. A particularly low size is evidence of a major retirement component in the population, also indicated by the high percentage of the population in the 65+ age group. However, a size higher than the 1981 survey estimate noted earlier indicates that families may also be moving to the area.

Evidence of at least a stabilizing number of families is contained in Table 3.5 which presents households by number of persons. Larger households (4 or more) have increased slightly from 1981 (16.9%) to 1986 (18.5%) although still down from 30.9% in 1971. The largest portion of households are two person, changing slightly from 47.5% in 1981 to 46.8% in 1986. Nearly 67% of the households are small with only one or two persons, again reflecting a retirement component in the population.

Table 3.1
Population and Annual Growth Rates 1971-1986

	1971	1976		1981		1986	
	No.	No.	% Growth	No.	% Growth	No.	% Growth
Plan Area[5]	1055	1740	10.5	2375	6.4	2575	1.6
Bowser Deep Bay[1]	220	350	9.7	565	10.1	655	3.0
Horne Lake, Dunsmuir Qualicum Bay[2]	455	765	10.9	1055	6.6	1105	0.9
Dashwood[3]	380	380	0.0	525	6.7	550	0.9
Little Qualicum[4]	n/a	245	n/a	230	-1.2	265	2.9
R.D.N.	48,010	61,880	5.2	77,101	4.5	82,180	1.3
B.C.	2,184,620	2,466,610	2.5	2,744,467	2.1	2,883,367	1.0

Table 3.1 - Continued

Census Canada Enumeration Areas:		1971	1976	1981, 1986
1.	Bowser-Deep Bay	155	116	262
2.	Horne Lake, Dunsmuir, Qualicum Bay	154	114, 115	260, 261
3.	Dashwood	153	113	259
4.	Little Qualicum (includes a portion outside of O.C.P.)	n/a	509	256
5.	Plan Area - Sum of Areas 1 to 4.			

Table 3.2
Population Estimates and Projected Growth

Annual Growth Rate Assumption (June 1986:2510)		Population Estimate	Projected Population	
		November 1988	1991	1996
1.	1981-1986 Census 1.6%	2608	2727	2942
2.	1976-1986 Census 4.0%	2759	3054	3715
3.	May 1986-Oct. 1988 House Count 2.1%	2639	2785	3090
4.	Dec. 1986-Aug. 1988 B.C. Hydro Res/Accts Nanoose/Deep Bay 3.5%	2727	2981	3540

Sources: Census Canada; Regional District of Nanaimo; B.C. Hydro - Nanaimo office

TABLE 3.3 Population by Age Group

Age Group (%)		0-4	%	5-14	%	15-24	%	25-34	%	35-44	%	45-54	%	55-64	%	65+	%	Total
[1]Plan Area	1976	100	5.7	220	12.6	270	15.4	180	10.3	150	8.6	215	12.3	305	17.4	310	17.7	1,750
	1981	145	6.1	240	10.1	310	13.1	365	15.4	215	9.1	235	9.9	375	15.8	495	20.8	2,375
	1986	180	7.0	300	11.7	205	8.0	345	13.3	295	11.5	230	8.9	410	15.9	565	21.9	2,575
RDN	1976		6.6		16.4		18.1		14.4		10.4		11.4		11.5		11.2	
	1981	5,355	6.9	10,825	14.0	12,875	16.7	13,065	16.9	9,060	11.8	7,710	10.0	8,740	11.3	9,485	12.3	77,100
	1986	5,640	6.8	11,100	13.5	10,965	13.3	12,460	15.2	11,750	14.3	8,020	9.8	9,615	11.7	12,635	15.4	82,180
Province of British Columbia	1976		8.0		19.9		17.7		13.4		11.7		11.1		8.8		9.4	
	1981	191,205	6.9	397,100	14.5	490,610	17.8	489,890	17.9	341,200	12.4	279,435	10.2	256,845	9.4	298,175	10.9	2,744,465
	1986	204,755	7.1	385,840	13.4	438,175	15.2	506,595	17.5	429,245	14.9	293,295	10.2	275,980	9.6	349,490	12.1	2,883,370

1. Enumeration Areas: 1976: 509, 113-116
1981, 1986: 256, 259-262

Source: 1976, 1981 and 1986 Census, Statistics Canada

Table 3.4
Average Household Size

	1971	1976	1981	1986
Plan Area[1]	2.8	2.6	2.6 (2.2 to 2.6 Range)	2.5 (2.1 to 2.7 Range)
R.D.N.	3.1	2.8	2.6	2.5
Province of B.C.	3.2	2.9	2.7	2.6

1. Enumeration Areas: 1971: 153-155
1976: 509, 113-116
1981 and 1986: 256, 259-262

Table 3.5
Households By Number of Persons

Number of Persons Per Household

	1		2		3		4+			
Year	No.	%	No.	%	No.	%	No.	%	Total[2]	
1971	75	17.9	155	36.9	60	14.3	130	30.9	(375)	420
1976	105	16.3	300	46.5	95	14.7	145	22.5	(645)	645
1981	180	19.7	435	47.5	120	13.1	155	16.9	(890)	915
1986	200	19.5	480	46.8	145	14.1	190	18.5	(1015)	1025

1. Enumeration Areas: 1971: 153-155
1976: 509, 113-116
1981 and 1986: 256, 259-262

2. Sum of components (bracketed) is different due to random rounding by Statistics Canada.

3.3 Housing

Because of both a permanent residential and strong seasonal component in the housing stock, estimates of the actual number of dwelling units and changes over time are difficult. Census Canada data measures predominantly permanent dwelling units, but may include an unknown number of seasonal units. The only other available estimate of units[1] is through a summary of the house numbering system used by the Regional District of Nanaimo, which will include seasonal and permanent residences.

Census Canada notes 1,015 occupied dwelling units in 1986, up from 910 in 1981 (see Table 3.6). At the initiation of the Regional District of Nanaimo house numbering program in May of 1986, there were 1,255 units[2] including 38 mobile home bays, a discrepancy of approximately 240 units, which may be seasonal.

Several estimates of the current permanent housing stock are possible. The first assumes that the number of seasonal units estimated above remains approximately the same. The number of units is the present number of houses on the house numbering system (1,336[3]) minus seasonal homes, or approximately 1,096. The second estimate applies the 1981 to 1986 rate of growth in housing stock (12.2%) to the Census Canada data, resulting in an estimate of 1,070 units. The second estimate is probably low as the housing market has improved considerably since its low in the early 1980's. Applying the 1986-1988 growth rate of 2.5% calculated from the house numbering data results in 1,077 units.

The growth in housing stock measured by Census Canada data has been slightly higher than population growth (7.5% compared to 6.4% - 1976 to 1981; 2.2% compared to 1.6% - 1981 to 1986), consistent with a slowly decreasing household size.

The major type of housing in the Plan Area has remained single family on an individual lot. Over 90% of the housing stock was single detached in 1986, up from 1981 and 1976 where "moveable" dwellings (including mobile homes) were more significant. The Plan Area includes a few multiple family residences (included in "other" category in Table 3.7), but no large apartment blocks. By contrast, the Regional District as a whole has a higher percentage in "other" category due to its concentration of multiple family structures in the urban cores.

Within the Plan Area, the percentage of owned versus rented dwelling units has remained fairly constant at 81 to 83% since 1971. This compares to a lesser and slowly decreasing percentage of owned units in the Regional District of Nanaimo (75% in 1971 to 71% in 1986), a reflection of the greater numbers of multiple household units which are less likely to be privately owned.

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[1] There is no building inspection, hence no building permits issued.

[2] 1,147 notices in Areas 8 & 9, plus 38 mobile home bays, plus 70 units in Area 8

[3] 1,209 units in Areas 8 & 9, 89 units in Area 7, 38 mobile homes

Table 3.6
Dwelling Units

Occupied Dwelling Units

	Year	Total No.	Single Detached No.	%	Moveable No.	%	Other[1] No.	%
Plan Area	1971	370	335	89.3	25	6.7	15	4.0
	1976	635	495	76.7	100	15.5	50	7.8
	1981	910	690	75.8	190	20.9	35	3.8
	1986	1015	930	91.6	55	5.4	30	2.9
Regional District of Nanaimo								
	1971			79.7		3.8		16.4
	1976			71.6		9.0		19.4
	1981	28,830	20,485	71.1			5705	19.7
	1986	32,435	25,260	77.9	740	2.3	6435	19.8

[1]Double house, attached, row house, duplex, apartment

Enumeration Areas:

1971: 153-155
1976: 509, 113-116
1981 & 1986: 256, 259-262

Source: 1971-1986 Census Data, Statistics Canada

Table 3.7
Dwelling Units by Tenure (Percentages)

Year	Plan Area		R. D. N.		Province of B.C.[1]	
	Owned	Rented	Owned	Rented	Owned	Rented
1971	81	19	75	25	63	37
1976	83	17	75	25	65	35
1981	82	18	72	28	64	36
1986	83	18	71	29	62	37

[1] Excluding Tenure classified as "On reserve".

Source: 1971-1986 Census Data, Statistics Canada

3.4 Land Use and Ownership

3.4.1 Land Use Patterns

The Plan Area is characterized by a strip of residential development concentrated along the Island Highway and the coastline, with extensive managed forested lands in the inland areas. There are a few active agricultural areas scattered throughout the eastern interior portion, namely near Horne Lake Road, in the vicinity of Boorman Road, and south of Qualicum Beach Village.

While land use development is virtually continuous along the Island Highway, several district communities can be identified. Development has also extended inland along several roads (i.e., Baylis, Horne Lake). The major communities are at Dashwood, in the eastern portion of the Plan Area; in the vicinity of Horne Lake Road at the Island Highway; in Qualicum Bay; in Bowser, northwest of Qualicum Bay; and in Deep Bay. Several large lot subdivisions have occurred inland along Horne Lake Road near Spider Lake, and along Corcan Road.

Tourist commercial development has kept mainly to the coastline, concentrating near the Little Qualicum River, the strip of coastline from Fletcher Creek to Thames Creek (including Qualicum Bay) and in Deep Bay.

3.4.2 Land Use Schedule

The Plan Area contains approximately 30,600 hectares of land. Table 3.8 shows a break down of lands devoted to various uses. Forestry accounts for 59% of the land base, while nearly 34% was noted as vacant. Residential uses accounted for 2.2% of the land area. Recent household numbering information indicates that the number of occupied residential lots has increased from approximately 937 in 1981 to 1,336 in November 1988. Map No. 1 of Schedule 'A' of the Official Community Plan designates the land uses for the Plan Area.

Table 3.8
Land Use Schedule 1988

Land Use	Hectares	Acres	% of Total Land Area	No. of Lots/ Parcels	Average Lot/ Parcel Size Hectares	Acres
Agriculture	145.8	360.4	.48	26	6.08	15.0
Commercial and Tourism	63.0	155.7	.21	51	1.66	4.1
Fish & Wildlife Management	208.6	515.6	.68	5	41.72	103.1
Forestry	18,053.0	44,619.4	59.0	85	212.4	525.0
Industrial	4.0	9.9	.01	8	1.3	3.3
Institutional	3.5	8.7	.01	7	0.5	1.2
Park & Recreation	117.5	290.4	0.38	23	14.7	36.3
Residential	674.0	1,665.8	2.20	1336	0.72	1.8
Resource Ext.	2.2	5.4	0.01	1	2.2	5.4
Utilities	253.0	625.4	0.83	12	42.2	104.2
Lakes	780.0	1,927.8	2.55	-	-	-
Vacant	10,285.4	25,421.2	3.63	364	20.9	51.6
TOTAL	30,590	75,605.6	-	1857	-	-

Source: Derived from land use survey commenced by Regional District of Nanaimo, August 1980 and completed by Marshall Macklin Monaghan, November 1980, and B.C. Assessment Authority 1988.

3.4.3 Zoning

Land Use and Subdivision Bylaw No. 500 replaced Bylaw No. 203 in the Plan Area in October of 1984. The majority of the inland areas which correspond to lands owned or managed by forest companies are zoned Resource Management (RM). Closer to the coast on smaller privately held holdings the zoning is usually Rural (RU) and along the coast much of the area is zoned Residential (RS 1 or 2).

3.4.4 Ownership

The Plan Area is characterized by extensive public and private forest company holdings with the majority of smaller private ownerships along the coast. (See Map No. 3.) The largest land holders in the area are MacMillan Bloedel Ltd. and Pacific Logging Co. Ltd. whose holdings encompass tree farms, tree farm licence areas and private land holdings. Frequently, two or three types of tenure are adjacent. Some of the larger holdings of MacMillan Bloedel include Blocks 1328, 1327, 188, 381, 189 and 370. The company also has holdings along the Little Qualicum River, Whiskey Creek and south of the Watershed Reserve. In turn, Canadian Pacific Forest Products Ltd. controls Blocks 1368, 1369, 1366, 1367, 1345, 1349 and 1372. Several smaller parcels in the Dashwood and Dunsmuir areas are also under Canadian Pacific Forest Products Ltd. The third largest ownership is that vested in the Province. Provincial Forest Reserves cover large tracts south of the Little Qualicum Spawning Channel system. Other Crown Lands include parcels reserved for forest service timber sale, watershed, Pacific Rim National Park land exchange, gravel, UREPs, (unspecified reserves for the enjoyment of the public) planning and highway uses. Many of the provincial holdings are relatively near to the Island Highway (No. 19) on the Esquimalt and Nanaimo rail line. There are also two Provincial parks around Spider and Horne Lakes. One very large holding is the Highways Reserve south of Qualicum Bay which is being reviewed in the assessment of the Qualicum By Pass Highway. Other important Provincial lands are the road rights of way, especially for the Island Highway and B.C. Hydro's transmission rights of way. Government holdings are listed in Appendix A.

Slightly smaller are the holdings of Texada Logging Ltd. which controls Blocks 356, 251, 40 and 251A which virtually surround most of Horne Lake. Much of the access to Horne Lake Park is through this private land. Horne Lake Caves Provincial Park was recently expanded through a land swap with Texada Logging. Other private forest holdings include Sublots 1, 2, 3, 5 and 10 south of Dunsmuir and east of the Qualicum River. In addition to the vacant forestry holdings, there are several large private holdings, some of which have been subject to development proposals for various sizes of residential subdivisions.

Several other special ownerships include those of the Federal Government along the Qualicum River, Horne Lake and the Little Qualicum River. Each of these parcels is related to salmonid enhancement. Close to the Village of Qualicum Beach is the Marshall Stevenson Wildlife Sanctuary, also under Federal control. At the mouth of the Qualicum River is the Qualicum Indian Reserve.

Significant amounts of land within the Plan Area are not subject to the provisions of the Plan because of ownership. These include all tree farms and tree farm licence areas, Federal sites and Indian Reserves. Other areas such as the Federal Crown Lands, Provincial parks, Provincial forest reserves, and private forest company holdings, are also not likely to be open for consideration of major change during the life of the Plan.

3.5 Development Activity

Shaw Hill-Deep Bay has not received the same pressures for residential and intensive tourism development as areas closer to the urban centres of Nanaimo and Courtenay. However, the growth of the Qualicum Beach/Parksville area, particularly for retirement purposes, and the high value placed on coastal property and a pleasant climate have led to a slow, but consistent growth rate. Numerous proposals were put forth for discussion in the growth atmosphere of 1980; the 1980 Background report notes subdivision applications for 230 parcels (not all approved) plus 8 informal proposals (Table 16, p. 54)

Since 1980 activity has slowed, as indicated by the subdivision and rezoning applications (Tables 3.9 and 3.10). From 1981 to 1988, 177 parcels have been created, 92 of which are large rural parcels of 8 to 20 hectares in size in the Horne Lake, Spider Lake and Corcan Road areas. Most of the other subdivisions are in strips along the coastline and Highway 19 from Horne Lake Road to Deep Bay. Examples are the development on Faye Road (12 lots greater than 4000 m^2); and Bovanis Road and Islewood Drive (33 lots less than 4000 m^2 near Nile Creek).

Table 3.9
Summary of Subdivision Activity

YEARS(S)	NUMBER OF SUBDIVISIONS	NUMBER OF LOTS CREATED
1981 to 1988	20	177
1988	1	2
1987	1	6
1986	1	7
1985	2	5
1984	3	44
1983	2	9
1982	3	53
1981	7	51
1980	8	61
1976 to 1979	7	227

Sources: 1981 to 1988 - Regional District of Nanaimo
1976 to 1980 - Marshall Macklin Monaghan Report

Table 3.10
Summary of Rezoning Activity

YEARS(S)	NUMBER APPROVED	NEW ZONE(S)
1988	2	RS4, CM2
1987	0	
1986	2	RS3, CM5
1985	0	
1984	0	
1983	0	
1982	1	Suburban Residential
1981	2	CM1, RS2
1980	0	
1976 to 1979	4	n/a

Sources: 1981 to 1988 - Regional District of Nanaimo
1976 to 1980 - Marshall Macklin Monaghan Report

Future development activity is not expected to intensify for a number of reasons. First, the areas further south, where abundant serviced or partially serviced land is available are being developed quite rapidly. Second, due to the areas relatively distant location from the urban cores, a smaller market exists for the larger, rural lot sizes associated with much of the area. Third, and perhaps most importantly, a large number of vacant lots currently exist providing an extensive and varied supply for residential construction.

An element that may alter the future growth patterns of the Plan Area is the proposed Island Highway By Pass. Although specific corridors are not yet fully determined, it is known that accessability to the Plan Area will be increased from the urban centres of the south. This may result in development pressures in or around constructed interchanges of the by pass.

A summary of existing vacant lots is shown in Table 3.11. Each area is illustrated in Appendix B. This data can be utilized to calculate an absorption rate of existing lots over time. By using a parcel development rate of 2% per year (or approximately 30 parcels) the supply is adequate for approximately 15 years.

There are limitations to this calculation. First, it does not differentiate between the lot size or location. For example, properties along the waterfront are in higher demand, and would have a shorter supply period than larger parcels further away. Second the assumption is made that vacant parcels are available for development. The properties may have been purchased for holding or retirement purposes. Third, the calculations do not account for the subdivision of existing lands under the current Zoning and Subdivision Bylaw.

In conclusion, therefore, although a large and various number of vacant parcels exist for future development, proposals for future development must still be reviewed.

Table 3.11
Inventory of Vacant Lots

	Vacant Lots %	No. of Lots	Comments
Area #1 Deep Bay	17	31	does not include large unsubdivided vacant lots
Area #2 South Deep Bay	52	51	does not include large unsubdivided vacant lots
Area #3 North Bowser N/E of Hwy	42	117	within Plans 31044, 20505, 15818, 16121, 21776
Area #4 North Bowser S/W of Hwy	43	27	18 lots are greater than 1 ha
Area #5 Bowser	17	9	extreme land patterns mixed with many commercial uses
Area #6 North Qualicum Bay	47	55	
Area #7 Qualicum Bay	8	7	longer rectangular parcels
Area #8 South Qualicum Bay	23	48	includes 6 large Olympic Road properties
Area #9 Warder Cres. Subdivision	73	39	surrounded by large lots (secluded from other developments)
Area #10 Baylis-Boorman Road Subdivision	26	19	range from 1.5 to +3 acres in size rural subdivision
Area #11 Dashwood & Vicinity	16	34	smaller serviced (water)lots just west of Qualicum Beach
	TOTAL	437	

Source: Regional District of Nanaimo House Numbering Maps

4. NATURAL RESOURCE MANAGEMENT

4.1 Fisheries

Management of sport and commercial fisheries is carried out by federal (Fisheries and Oceans Canada) and provincial (Ministry of Environment, Fish & Wildlife Branch) agencies. The federal government regulates the number of licences for fishing vessels and determines catch limits and/or permitted fishing days. It also funds the Salmonid Enhancement Program, which is a major investment designed to increase anadromous fish stocks to historic levels. The two major hatcheries within the Plan Area on the Big Qualicum and Little Qualicum Rivers are a part of this strategem. Statistics on fish reared at these facilities are presented in Section 2.6.

The government wharf in Deep Bay, located in the only natural harbour in the Plan Area, offers moorage to both sport and commercial fishing vessels. However, moorage facilities are inadequate to meet demands in the spring herring season and periodically in the fall, with excess vessels anchoring in the bay. Approximately 60 vessels may overwinter at the wharf. Public Works is developing plans to improve parking facilities, possibly as part of a dredge and fill program, and to expand the wharf head with a view toward improving existing access and use of the facilities. At present, the draft is too shallow at zero tide to unload vessels. To this end $400,000.00 has been allocated by the federal government. Approvals are expected by the end of 1989.

It is difficult to estimate the value of the resource to the economy of the Plan Area. Both catch numbers and the value of the catch vary yearly, and specific numbers attributable to the Plan Area only are not available.

The best indication of the catch for salmon and other fish is from information for Statistical Area 14 of Fisheries and Oceans. The Plan Area is approximately 20% of this statistical area, which extends from north of Nanoose almost to Campbell River. In 1987 there were 2,146 tonnes of salmon landed in this area, with a commercial fishing effort of 6,954 days, mainly in July, August and September. Herring and groundfish landings totalled 2,629.8 tonnes. Shellfish and other fish landings (excluding oyster leases) totalled 1,688.9 tonnes, of which the main components were clams, shrimp and sea urchin. It should be noted that Area 14 had the fifth largest catch for chum salmon in 1986.

With regard to the sport fishery, the area is behind only Victoria (Area 19) and Campbell River (Area 13) in terms of sport fishing effort measured by angler days. Between 147,000 and 262,000 salmon per year were caught by sport fishermen in 264,000 to 293,000 angler days per year from 1983 to 1986.

4.2 Aquaculture

For the majority of the Plan Area, the coastline is too exposed to the Strait of Georgia to permit aquaculture operations. The exception is Deep Bay, where several water lot leases for oyster culture are located. Deep Bay is the southern end of a productive area extending the length of Baynes Sound.

A water lot lease for aquaculture must be obtained from the provincial Ministry of Crown Lands with the approval of the Marine Resources Branch of Agriculture and Fisheries. There are 9 licences or leases for aquacultural purposes in the Plan Area, 8 of which (approximately 47 ha) are in Deep Bay and one near Qualicum River. There are also 2 applications under consideration, one in Deep Bay and one near Dashwood. The water lots are both privately leased and leased by companies with processing plants. The leases are for intertidal areas with the exception of one long

companies with processing plants. The leases are for intertidal areas with the exception of one long line lease in deeper water. Production levels vary depending on the success of the seeding operation and the characteristics of the water lot. The provincial Lands Branch, which manages the leases, expects a minimum production of 50 gallons per acre per year, up to about 250 gallons per acre. The minimum figure would yield 5,807 gallons if the total lease area is utilized, which would be worth $69,681 at $12/gallon[1]. Also the Ministry of Environment holds a map reserve in Deep Bay for aquaculture experiments.

It is not likely that the operations will expand in area as space is limited in Deep Bay and other sections of the coastline are not suitable. In addition, there are conflicts with commercial clam diggers (digging in oyster leases is destructive) which have led to restrictions both on new leases and clam diggers. At present commercial clam digging licences are not being issued by Fisheries and Oceans due to excessive harvesting.

4.3 Agriculture

While agriculture has been an important activity on the east coast of Vancouver Island, it has not played a dominant role in Shaw Hill-Deep Bay. Most farm holdings are small, partly because of the scattered distribution of productive soils in the coastal lowlands and the trend toward smaller holdings more suitable for retirement and hobby farming. In 1980 only 146 ha were utilized for agriculture.

Most lands with high capability for agricultural use have been designated Agricultural Land Reserve (A.L.R.). They are subject to the provisions of the **Agricultural Land Commission Act** which is regulated by the Agricultural Land Commission. The Commission is the principal agency responsible for regulating both the use and subdivision of A.L.R. lands. The recent Fine Tuning Program of the Land Commission reassessed land capability for agriculture within the coastal lowlands according to the Canada Land Inventory system and revised the A.L.R. boundaries on the basis of this information, plus input from other government agencies and the public. In Shaw Hill-Deep Bay 471 ha were included in the A.L.R. (out of 865 ha applied for by the Commission) and 1,410 ha were excluded. There was a decrease in the number of applications to the Commission to exclude land, subdivide or permit additional residences on property as a result of the program. Applications have dropped from a high of 11 in 1981 (which also coincides with a development boom) to zero for 1987 and 1988. (See Table 4.1.)

The distribution of the higher capability lands is shown on Map No. 4, as are the A.L.R. boundaries. The soils developed on marine parent materials or the finer textured fluvial and fluvial-glacial materials have the highest improved capability ratings. Many of the fluvial and fluvial-glacial soils are too coarse textured for extensive agricultural use. While areas of high capability (C.L.I. Classes 1 and 2) are not common, there are large areas with improved ratings of Classes 3 and 4. Classes improvable to 1 to 4 are generally included within the A.L.R.; Classes 5 to 7 have too many limitations to sustain most agricultural uses. The major blocks of A.L.R. lands are in the southeastern part of the lowlands, between the Little and Big Qualicum Rivers. Three other large blocks are located in Qualicum, Bowser and Deep Bay. Much of the land in the A.L.R and

[1] Personal Communication - Ken Albrecht, Agriculture and Fisheries, Nanaimo, B.C.

other lands with capability for agriculture are located within Provincial Forest Reserves or parcels privately held by major logging companies. This overlapping of forestry uses on lands with agricultural potential partially accounts for the relatively low acreage in actual agricultural use and the restricted use of the A.L.R. designation in marginal lands (i.e., Class 5 improvable to Class 4).

4.4 Forestry

The major portion of the land base in the Plan Area is managed for forestry purposes as shown on Map No. 5. These lands have a high capability for forestry and are particularly valuable because they support the more desirable tree species (Douglas-fir, Cedar, Hemlock). Extensive logging has occurred and the area is now characterized by 20-30 year old second growth forests.

A legacy of the E. & N. Railroad land grant is the high proportion of privately held forest lands compared to Crown lands under Forest Reserve, which had to be reacquired by the Crown. Under Section 943(2) of the **Municipal Act** a local government cannot enact any policies which would restrict forestry management and harvesting activities on land classified as tree farm land under the **Assessment Act** or land located in a license area under the **Forest Act** so long as the land continues to be used only for forestry purposes.

Table 4.1
Agricultural Land Commission Applications 1981-1988

Year	Number of Applications	Exclusion[1]		Subdivision or Additional Building[2]		Area Excluded (ha)
		Total	Allowed	Total	Allowed	
1981	11	7	3	4	1	9.3
1982	8	3	1	5	3	3.6
1983	3	1	1	2	1	1.5
1984	2	0	0	2	1	
1985	1	0	0	1	1	
1986	3	0	0	3	2	
1987	0					
1988	1	0	0	1	0	

[1] Section 12(2)
[2] B.C. Regulation 313/78 and Section 20(1)

As with fisheries it is difficult to estimate the value of forestry directly attributable to the Plan Area. Several major companies operate within the Plan Area, including B.C. Forest Products, Texada,

Pacific Forest Products and MacMillan Bloedel. There are no processing facilities within the Plan Area. Most wood is trucked either to Northwest Bay (MacMillan Bloedel) or to Nanaimo.

4.5 Aggregate and Mineral Resources

Gravel and sand suitable for concrete aggregate and road building are abundant in many parts of the Plan Area. Substantial areas of moderate to high potential have been identified in reconnaissance scale mapping (1:50,000). (See Map No. 2.) Generally, the locations are from Cameron Lake along Little Qualicum River, from the eastern end of Horne Lake to the area surrounding Spider and Illusion Lakes; scattered deposits in the uplands along the Big Qualicum and large deposits between the 90 and 150 m contours north of Thames Creek. Developed gravel extraction areas are also shown on Map No. 3.

The Plan Area has several potential geological resources. Most of the mineral prospects occur adjacent to and south of Horne Lake within an area recognized as having moderately good mineral potential with the possibility of small deposits. Although it is unlikely that any of the prospects now known will become commercially viable in the near future, continued exploration and an increase in demand and prices for these minerals may improve their viability. Information on mineral claims is available from the Gold Inspector, Ministry of Energy, Mines and Petroleum Resources, Nanaimo office.

Limestone and clay deposits are also found within the Plan Area. Limestone deposits are concentrated north and west of Horne Lake and appear to be large enough to provide efficient reserves for a cement plant. While there is no indication of development plans at present, a re-evaluation of the potential should be made in the future as development pressures occur.

Clay deposits are found between Bowser and Union Bay in several poorly documented patches. Physical properties limit use for ceramics; however, there may be some potential for tile.

Coal-bearing formations extend along considerable lengths of the east coast of the Island from Duncan to Campbell River. Coal fields mined extensively from the Nanaimo area between 1852 to 1968 are now virtually mined out, although several companies still hold licenses in this area and other parts of the east coast. There were no licenses noted in the Plan Area in November 1988 (Ministry of Energy, Mines and Petroleum Resources, Vancouver Island Coal Properties Map).

4.6 Parks and Recreation

The appeal of the area for outdoor recreation is largely based upon its capabilities to support water activities such as bathing, beach combing, shellfishing and camping beside the ocean, as well as fishing in Horne, Spider and Illusion Lakes. The rolling terrain, open and closed forests along streams and rivers also contribute to the attractiveness for strolling, hiking and horseback riding, and the rugged highlands and mountains accessible by logging roads are well suited to back-country recreation. The array of avian, marine and aquatic wildlife provide opportunities for nature interpretation and there are deer, waterfowl and game birds for hunting.

The special fish and wildlife habitat areas also require protection for their active and passive recreational values as well as their biological importance (as noted in Section 2.8). Some measure of protection has already been given to the Marshall Stevenson Unit of the Qualicum National Wildlife Area on the Little Qualicum estuary and to the hatchery and spawning channel facilities on the Big and Little Qualicum Rivers. Both hatcheries have visitor programs. The Little Qualicum had approximately 2,400 visitors between July and November of 1988. No visitation

records are kept at the Big Qualicum hatchery, however, a steady number of visitors view through the summer months and a larger number in the fall when the salmon are running.

The Ministry of Parks, Recreation and Culture has two parks located within the Plan Area, namely Horne Lake Caves Provincial Park and Spider Lake Provincial Park. Horne Lake Caves Provincial Park was established to protect interesting limestone solution caves and speleotherms. A recent (1988) 100 ha addition to the original 29 ha park was purchased from Texada Logging. It includes a corridor of land from the west end of the lake and other areas to the north and south where above ground activities could conceivably have impact on the caves beneath. An approved master plan by the Ministry is expected to be phased over a long period. At present access to the caves is restricted by a gate, however, a key may be obtained through the offices at Rathtrevor Beach Provincial Park.

Spider Lake Provincial Park is located on the southwest shoreline of Spider Lake. The 61.5 ha park has day-use facilities consisting of 60 parking stalls, 250 m of developed beach, a hand pump water system and a 1 km trail. Small boats have water access.

There are no plans for additional provincial parks within the Plan Area, although there are some plans for marine parks to the south on several small islands, and some areas designated as U.R.E.P.'s adjacent planning areas.

Over 60 public coastal beach access points have been identified. These are primarily unopened road allowances which terminate directly on the shore. Most were designated as part of the subdivision process, which requires 20 m wide roads at distances not greater than 200 m between centre lines if the parcels created are less than 0.5 ha (Section 75, Land Title Act). Many of the access points have no signage or facility development.

There are also a small number of local parks, or land dedicated back to the Crown as part of the subdivision process. Similar to the beach access points, they have not generally been developed. A review is being undertaken to create a data base for all of these parks. As a parks function has been obtained by the Region, an overall parks plan is intended to be developed to provide direction for existing smaller undeveloped parks..

The North End Recreation Commission has a sports field on McColl Road, although currently under-utilized and an undeveloped 5 acre park in Dunsmuir (Olympic Regional Park). The new Lighthouse Community Centre, operated by the Lions Club, includes a sports field. The schools also have playing fields available for sports activities.

The 1981 Background Report mentioned several areas noted by the residents as desirable locations for parks, such as the Nile Creek waterfall (Blk 1368), the entire Illusion and Spider Lake area, a linear park along Thames Creek, and a public boat launch and camping facility at Horne Lake. None have come to fruition, although there is now a private camping facility at Horne Lake (see Section 5.2 Tourism).

5. ECONOMIC DEVELOPMENT

5.1 General

Economic activity in the Plan Area focuses around primary resources (forestry, fishing), tourism and support services for the population. Tourism and support services appear to be playing a larger role than in the past, with the number of persons reliant on forestry and the commercial fisheries

for employment remaining constant and the number of persons employed in the service industry rising. The high proportion of retirement age persons has a strong influence on the development of the economy. Although not active in the labour force[1], and therefore not dependent on employment in the region, they provide a strong economic drive to the development of the community through their retirement incomes and also influence the types of services which develop.

A review of the labour force (see Table 5.1) illustrates that the primary sector is no longer the dominant employer. In 1981, 37% of the labour force was in the commercial business and personal service category. The other growing employer is construction; 21% of the labour force were in construction in 1981 compared to 8% in 1971. By 1986, growth in the total labour force had slowed considerably, reflecting the economic recession of the early 1980's. The percentage of the labour force in primary industries remained approximately the same as 1981. The service category remained the dominant employer, although both it and construction were lower than 1981.

Estimations of the number of jobs within the Plan Area and the value of local economic activities are not easy to obtain. The 1981 survey (Marshall, Macklin, Monaghan) suggested that approximately one half of the labour force commuted, mainly to Parksville, Qualicum Beach, Port Alberni and Nanaimo, leaving about 420 jobs within the Plan Area. The major contributors to the local economy are the resource based industries (see section 4) and tourism, as discussed below. Major economic activities in the Plan Area are summarized in Table 5.2.

5.2 Tourism

The outdoor resources and accessibility to fishing areas contribute to the appeal of the Plan Area as a tourism and outdoor recreation destination for non-residents. The tourism draws include the provincial parks, fish hatcheries, beach access points (see Section 4.6), government wharf in Deep Bay and extensive forested areas.

The type of tourist accommodation generally offered consists of campsites, RV units and small motels. Most developments are dependent on their seaside or riverside location with beach activities, boat launches, boat rentals, fishing or charter boating available to the guests.

While several of the tent and trailer parks are quite large (maximum of 85 sites) the resorts or motels are very small, usually offering less than 10 units. Few offer the combination of amenities (pools, bars, restaurants, etc.) of larger resorts.

Most of the resorts and campgrounds are long established destination areas. The Ministry of Tourism, Recreation and Culture's accommodation guide lists 18 establishments for 1988 (See Table 5.3.) This is the same number as listed in 1981 (as illustrated in the 1981 Technical Background Report). The number of campsites offered by each establishment has declined with a total number of 546 in 1981 decreasing to 476 in 1988. The total number of motel/hotel units has not changed, although individual establishments may be offering a few more or less units than in 1981. Also one establishment noted in 1981 is now devoted to permanent mobile home units rather than short term visitor accommodation (Chinook Trailer Park). An additional campsite is operated by a contractor to Texada Logging Company at the western end of Horne Lake, at the mouth of the Big Qualicum River. A maximum of 100 campers can be accommodated. Outhouses and firewood are provided in a rustic setting. Road access may be limiting in fall and winter months.

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[1] In a 1980 survey, 30% of the potential labour force was retired.

Table 5.1
Labour Force by Industry

	1971		1981		1986	
	Number	%	Number	%	Number	%
Total	445		845		870	
Agriculture			5	.6	20	2
Forests	125	28	60	7	50	7
Fishing and Trapping			60	7	60	16
Mines			0		10	1
Manufacturing	20	4	85	10	60	7
Construction	35	8	175	21	125	14
Transportation & Communication[1]	20	4	25	3	50	6
Trade[2]	70	16	75	9	110	13
Finance			15	2	10	1
Commercial, Business & Personal Service[3]	85	19	315	37	285	30
Public Administration[4]	25	6	25	3	30	3
Other	65	15				

Source: Statistics Canada 1971, 1981, 1986

Note: Categories do not completely correspond between 1971, 1981 and 1986.

1. Transportation and Storage and Commercial and Other Utility Industries, 1986
2. Wholesale and Retail Trade, 1986
3. Includes Real Estate and Insurance Agents, Business Service, Education Service, Health and Social Industries and Acc. Food and Beverage, and Other Services, 1986
4. Public Administration and Defense, 1981; Government Service, 1986

The decrease in campsites is a reflection of decreasing numbers of out-of-province tourists to B.C. since a high point in 1976-1978, and the economic depression from 1981-1983. The number of campers has increased on the Lower Mainland and Vancouver Island since 1986, however, not to the previous highs (from B.C. Motel, Campgrounds and Resorts Association). Establishments are fairly optimistic regarding the industry for the next few years, with several new motel units recently completed or under construction.

Outside of the rental accommodation for tourists there are a large number of privately owned seasonal residences, whose owners may be demanding some of the same outdoor recreational facilities and areas as the tourists. There are an estimated 240 seasonal units in the developed strip following the coastline (see Section 3.3), and another 245 lots at Horne Lake (RDN Jan. 1989 Memo; 117 cabins).

In addition to accommodation, there are several restaurants and combined cafe, grocery and service stations which serve both residents and tourists. Several handicraft and souvenir outlets also serve both markets.

Table 5.2
Major Economic Activities in the Plan Area

1. Forestry companies (e.g. MacMillan Bloedel) and contractors
2. Tourist accommodations and resorts
3. Small construction companies and construction supply
4. Services (restaurant, realty, office, automotive)
5. Stores (grocery, craft, electric)
6. Small industries (Thames Boat Works)
7. Commercial fishing
8. Oyster leases
9. Fish hatcheries
10. Utilities (i.e., waterworks operations)
11. Qualicum Indian Band Fish Processing Plant

Table 5.3
Tourist Accommodation

	Name of Accommodation	Location	Units	Trailer & Campground	Total
1.	Qualicum Beach Trailer Park	Dashwood		23	23
2.	Ocean Beach Resort	Dashwood	5	15	20
3.	Riverside Resort	Dashwood	21	50	71
4.	Cedar Grove Tent and Trailer Park	Dashwood		85	85
5.	Costa Lotta Campground	Costa Lotta		70	70
6.	Green Gables	Qualicum Bay	6		6
7.	Lighthouse Motel	Bowser	4		4
8.	Avorado Trailer Park	Qualicum Bay		66	66
9.	Casa Del Mar Motel	Qualicum Bay	4	9	13
10.	Wavecrest Cottages	Qualicum Bay	2		2
11.	Sea Flame Beach Resort	Qualicum Bay	3		3
12.	Shady Shores Fishing Resort	S/Bowser	5		5
13.	La Bella Vista	Bowser	10	16	26
14.	Bowser Bill's	Bowser	4	68	72
15.	Seacroft Resort	Bowser	14	10	24
16.	Mapleguard Resort Motel	Deep Bay	6		6
17.	Deep Bay Fishing Resort	Deep Bay	8	50	58
18.	Ship & Shore Marine Campground	Deep Bay		14	14
	TOTAL		92	476	568

5.3 Industrial

Light industrial development occurs in a limited fashion in the Plan Area. Extensive industrial uses are more appropriately located on serviced land adjacent to larger market areas such as Parksville and Nanaimo. Some gravel extraction activities for forestry and highway road maintenance occur inland from the Island Highway (see Map No. 3).

5.4 Institutional

The major institutional uses in the Plan Area are the two community halls, two churches, school properties, firehalls and miscellaneous areas associated with the community water works (i.e., well locations). Federal and provincial regional ministry offices and hospital services are located in the more urban areas such as Nanaimo, Parksville, Qualicum Beach and Comox, with the exception of the two federally owned fish hatcheries. There is also a lodge providing care for the elderly (Arranglen). Several duplexes near Lighthouse Country Community Centre are managed by the Qualicum Bay Lions Club for the elderly. Additional units are anticipated.

6. SOCIAL SERVICES AND PROTECTION

6.1 Social Services

As in many rural areas, residents are largely dependent on social services based in adjacent urban areas, although there is an active network of community groups and clubs which provides for social activities. For example, the June 1987 telephone directory for Lighthouse Country published by the Lighthouse Country Business Association, lists 22 clubs and organizations, including the Qualicum Bay Lions Club which is responsible for the ongoing development of the Lighthouse Country Community Centre in Qualicum Bay. A summary of the social services and their location is presented in Table 6.1.

Table 6.1
Summary of Services and Protection

Service	Name	Location
Community Hall	Royal Canadian Legion	Bowser
	Lighthouse Community Centre	Qualicum Bay
Churches	Wildwood Community Church	Bowser
	Island Gospel Centre	Bowser
Library	Vancouver Island Regional Library	Qualicum Beach
		Union Bay
Education	Bowser Elementary	Bowser
	Woodwinds Alternate	Dashwood
	Qualicum Beach Elementary	Qualicum Beach
	Qualicum Beach Middle School	Qualicum Beach
	Qualicum Beach Secondary	Qualicum Beach
Health Care: Medical Clinic	None in Plan Area	Courtenay
		Cumberland
		Qualicum Beach
		Parksville
Hospitals	St. Josephs General	Courtenay
	Nanaimo Regional General	Nanaimo
Extension Health	Central Vancouver Island Health Unit	Parksville
Ambulance	Station at Qualicum Bay Fire Hall	Qualicum Bay
Elderly Care and Housing	Arranglen Lodge	Bowser
	Arrowsmith	Parksville
	Trillium	Parksville
	Lions Club; 5 duplexes	Qualicum Bay
Poison Control Centre		Nanaimo

Table 6.1 **Summary of Services and Protection** (Continued)

Service	Name	Location
Transportation	Vancouver Island Coachlines	Island Highway
	Proposed mini-bus for Lions Club	Qualicum Bay
	Mini-bus from Arranglen	
	VIA Rail daily	
Recreation	North End Recreation Commission	
	McColl Road sportfield	Qualicum Bay
	Olympic Regional Park (undeveloped)	Qualicum
	Arena - Regional District 69	Parksville
	Lighthouse Community Centre - field	Bowser
	Bowser Elementary - field	Bowser
Other Social Services	District 69 Society of Organized Services	Parksville
	Ministry of Social Services and Housing	Parksville
B.C. Hydro		Qualicum
B.C. Telephone		Nanaimo
Canada Post		Bowser
Banks and Credit Unions	None in Plan Area	Qualicum Beach

6.2 Education

School District No. 69, extending from Nanoose Bay to Deep Bay, is responsible for the coordination and provision of educational facilities. The new Bowser Elementary School is the only one operated by the District in the Plan Area. Woodwinds Alternate in Dashwood can accommodate up to 15 children requiring specialized instruction.. Horne Lake Elementary, which served only grades 1 and 2, has been closed.

Children from the study area also attend elementary, middle, and secondary (new) schools in Qualicum Beach, as noted in Table 6.2. The new secondary school replaces Ballenas Secondary in Parksville.

Malaspina College in Nanaimo and North Island College in Comox and Courtenay offer post-secondary education. Some classes are available locally during the winter.

Table 6.2
School Enrollment From Plan Area

	1980	1988
Bowser Elementary (K to 5)	84	127
Horne Lake (1 & 2)	19	Closed
Qualicum Beach Elementary	48	61
Qualicum Beach Middle School (6 - 9)	80	95
Ballenas Secondary	60	1
Qualicum Beach Secondary	--	106
Woodwinds Alternate School		13
Total	291	409

6.3 Protection

Fire protection services have increased significantly since 1981, when only the Qualicum Bay area was protected. The entire coastal developed band is now covered by three volunteer departments. In 1982 the Deep Bay Waterworks District acquired a fire protection function, and now has a firehall with one truck and a training room in conjunction with the waterworks offices. The Bow Horn Bay Fire Protection District has a new firehall with three trucks located in the Lighthouse Country Community Centre complex in Qualicum Bay. The Dashwood Fire Protection Specified Area was created by bylaw in the early 1980's. The firehall, completed in 1985, with one truck, is located on Hobbs Road.

Police protection is provided by the Parksville R.C.M.P. during office hours. After hours the service is provided by the Comox R.C.M.P.

7. UTILITIES

7.1 Water Systems

There are six separate water systems which serve the developed coastal area. Four are improvement districts with their own Board of Trustees; one is a specified area run by the Regional District; and the sixth is a local communal system (see Table 7.1).

Water supplies are the Little Qualicum River, Nile Creek and groundwater. Groundwater resources were assessed by Pacific Hydrology Consultants in 1982 as part of the review and update of a 1972 Nanaimo Regional Water Study. Their analysis indicated that groundwater resources, mainly from the Quadra Sands aquifer, are adequate to meet the needs of the area in the near future. Water quality was good and is expected to remain so if normal precautions are taken to protect the aquifer.

A 1982 report by Associated Engineering Services dealt in greater detail with the water supply systems in the Regional District and identified present and future short comings, based on population projections. Their short-term assessment for Shaw Hill-Deep Bay identified a water supply shortage for Qualicum Bay-Horne Lake, and insufficient storage capacities for fire fighting in all the systems. It was also noted that Little Qualicum and Qualicum Bay-Horne Lake regularly exceed their water licences during peak periods. In the long term, it was suggested that the reliance on groundwater continue, possibly with the Nile Creek source abandoned or augmented by groundwater. Interconnection of the four western systems would enhance fire fighting capabilities. It was also suggested that Little Qualicum and Qualicum Marine Properties (now Surfside Specified Area) could connect to the Qualicum Beach water system.

Several improvements have been completed since 1982. Little Qualicum Waterworks has an additional pump. The water licence for Nile Creek has been increased from 455 to 682 m^3/day. Deep Bay now has 5 wells, up from 4, with an increase in capacity from 1775 to 2488 m^3/day. Bowser Waterworks took over a portion of Qualicum Bay-Horne Lake Waterworks, resulting in a connection between the two systems.

In general the water systems are holding their own, although stress points can be identified. The Little Qualicum is at capacity for the existing number of parcels in its area - it does not meet fire requirements and it exceeds its water licence regularly. Bowser noted that its main line is 25 years old and may need replacement. Qualicum Bay-Horne Lake and Deep Bay reportedly have no problems at present. There are no plans for major capital expenditures in any of the systems. Map No. 4 illustrates the various water systems and their jurisdictions.

Table 7.1
Water Supply Systems

Water System	Water Source	Number of Connections			Water Licence/ Pumping Capacity (m^3/day)	Storage Capacity (m^3)
		Existing	Potential	Total		
Little Qualicum Waterworks District	Little Qualicum River	243	75	318	454 licence 770 capacity	95.5
Qualicum Bay-Horne Lake Waterworks District	Nile Creek, Olympic Springs	272	33	305	955 licence 1472 capacity	228
Bowser Waterworks District	2 artesian wells	154	66	220	655 from wells 637 capacity	431.9
Deep Bay Waterworks District	5 wells	321	176	497	2487.6	546
Surfside Specified Area	1 well	31	0	31	392 (was 90)	0
Olympic Water Users Community	spring	8	3	11	25 licence 65 capacity (approx.)	750 gal

Sources: Associated Engineering Services 1982 Regional Water Study
Update, Regional District of Nanaimo
Regional District of Nanaimo
Waterworks Districts

The fee schedule for the water systems is presented in Table 7.2. With the exceptions of Qualicum Bay-Horne Lake and commercial establishments in Deep Bay, individual connections are not monitored.

Table 7.2
Water Charges 1988

Water System	Parcel Tax ($)	Basic Residential Rate ($/mo)
Little Qualicum	36	10
Qualicum Bay-Horne Lake	45	9
Bowser	12	6
Deep Bay	48	6
Surfside	230	4.16
Olympic Water Users		

7.2 Wastewater

All development in the Plan Area is presently serviced by private sewage disposal systems (tile fields). No new public sewage treatment systems are anticipated, nor any connections to existing public systems. Furthermore, Regional District policy discourages the construction of independent sewage treatment plants due to management difficulties and high maintenance costs.

The area is expected to remain reliant on tile fields, with development constrained by the soil suitability for septic tanks, or, its ability to absorb sewerage with no hazards to health or to the environment. Poor drainage and high water tables are limiting features in many of the soils of the Plan Area, as discussed earlier in Section 2.7 under Limitations to Development. Sewage Disposal Regulations pursuant to the **Health Act**, detail the design and construction of septic tanks and soil absorption fields based on soil characteristics.

7.3 Solid Waste

At present there are no public facilities for solid waste disposal. All waste collection is individually arranged with a private trucking company, which transports the waste to the Qualicum landfill site. However, the Regional District is centralizing waste disposal with the introduction of a new treatment and disposal system (Brini). Upon completion, waste will be collected and taken to a transfer site for transport to the treatment plant. The Qualicum landfill site will be closed.

7.4 Street Lighting

There are no specified areas for street lighting in the Plan Area. The only street lighting is provided by the Ministry of Transportation and Highways, generally at strategic intersections and lengths of the Island Highway.

7.5 Natural Gas

A main line for the distribution of natural gas to Vancouver Island is planned for completion in the late fall of 1990. It will be constructed by Pacific Coast Energy Corporation, backed by Westcoast Energy and Chieftain Development Company. Local distribution companies will then be able to connect to the main line at specified metre stations. The route of the line follows approximately the inland B.C. Hydro right of way, and will require an additional 33 to 60 feet of parallel right of way.

Availability of natural gas to Plan Area residents will not follow immediately, as there is no internal distribution system in place such as Nanaimo already has. A private distribution company would have to connect to the main line at a metre station (one is planned in the vicinity of Coombs and Hilliers) and then construct a local distribution network.

8. TRANSPORTATION

8.1 Road

The Plan Area road network includes the Island Highway and a series of local roads. The Island Highway (Provincial Highway 19) offers easy accessibility to the populated centres on Vancouver Island - Courtenay, Campbell River and Port Hardy to the north and Nanaimo and Victoria to the south. The connection to Port Alberni on Highway No. 7A is just south of the Plan Area in Qualicum Beach.

The only through road along the length of the Plan Area, the Highway is presently a two lane roadway with several sections upgraded to four lanes for passing. It is characterized by curvilinear alignments, accommodations for railroad crossings, and no provision for pedestrians.

The provincial Ministry of Transportation and Highways announced an Inland Island Highway By Pass. The final routing has not been determined. The new route would relieve the highway of high-speed through traffic and improve its service and safety for local users.

Most of the local paved and gravel roads do not interconnect, but act as collectors from residential areas to the Island Highway. Baylis, Boorman, Horne Lake, Crosley, Jameson and Gainsburg Roads act in this capacity. Horne Lake Road also acts as a logging road and a route to recreational activities on Horne Lake.

Map No. 2 of Schedule 'A' of the Official Community Plan illustrates the Highways Plan.

8.2 Rail

The Esquimalt and Nanaimo Railway now owned by Canadian Pacific runs through the Plan Area on its route from Victoria to Courtenay. The line is a single track with at-grade crossings with the Island Highway in three locations and with several at-grade crossings with the local roads. Usage of the line is limited to a daily round trip operated by VIA Rail and a weekly (usually Tuesday) freight train. Passenger service is available through pre-arranged flag stops in Dunsmuir (Horne Lake Road) and Deep Bay. There are no plans to increase service or add siding or spurs in the Plan Area.

8.3 Air

The nearest local commercial and private airport facilities are at the Qualicum Beach and Courtenay airports. Major (international) airports are located in Victoria and Vancouver. No facilities are anticipated within the Plan Area.

8.4 Marine

The waters off the Plan Area in the Strait of Georgia are very active sports and commercial fishing and recreational boating areas, catered to by the government wharf in Deep Bay, private launching facilities operated by individuals and resorts, and facilities in adjacent areas such as French Creek. Upgrading and possibly expansion of the Deep Bay wharf is planned (see Section 4.1). There are no major port facilities in the area and none are foreseen.

SHAW HILL-DEEP BAY TECHNICAL REPORT
Government Land Holdings
Appendix A

CROWN PROVINCIAL

Folio No.	Legal	Size (Acres)	Use	Location
14870.125	DL 82 Newcastle	3	Vacant	N/W of Bowser adjacent to E & N Railway
14870.115	Plan 31044 DL 82 Newcastle	2	Vacant	West of Jamieson Rd running from E & N Railway north to water
14900.500	Plan 1871 DL 84 Newcastle	1029.77	Vacant	West of Qualicum Bay
14900.400	Plan 513R/W DL 84 Newcastle			West of Qualicum Beach near Dashwood
14965.500	DL 86 Newcastle	1383.7	Vacant	South side Island Highway; south of Mapleguard Point
14964.950	DL 85 Newcastle	1384.8	Vacant	East side of DL 86, south side of Bowser
14800.000	DL 72 Newcastle	irregular	Vacant	South of Deep Bay; borders Comox-Strathcona Regional District
14034.500	DL 28 Newcastle; part lying s/w of Plan 815R/W	10.41	Vacant	South Side E & N Railway immediately south of Bowser
14110.070	DL 32 Newcastle, Exc Plans 30108, 42674, 45847	135.58	Vacant	South of Qualicum; north boundary of Alberni Land District
14263.900	Lot 9 Plan 2459 DL 33 Newcastle	29.02	Vacant	Adjacent to E & N Railway; west of Qualicum Bay
14338.000	Plan 2076 DL 36 Newcastle Parts 1&2 in red on Plan 1104R	2.86	Hwys R/W	Bowser - south end
14349.010	R/W 3210 Newcastle Parts of Lots 1,2&3 DL 36 Plan 1820	3.76	Hwys R/W	Bowser - south end
14365.000	Pcl A Lot 9 DD18042-N DL 36 Newcastle Plan 1820	irregular	Vacant	Bowser - south end
11779.001	Lot 6 Plan 2619 DL 76 Newcastle	13.36	Vacant	Lies end of Ganske Rd west of Qualicum Beach Boundary
12112.901	Lot 4 Plan 1969 DL 80 Newcastle	57	Vacant	Northwest of Little Qualicum River; split by Island Highway
12133.001	Lot 20 Plan 1969 DL 80 Newcastle Exc Plan 41282	11.27	Vacant	Lies between Old Island Highway and E & N Railway north of Little Qualicum River
12170.501	Lot 34 Plan 1967 DL 81 Newcastle	40.46	Vacant	Southeast of Qualicum Bay
12171.401	Lot 36 Plan 1967 DL 81 Newcastle	50.46	Vacant	Split by Fletcher Creek south of E & N Railway

Folio No.	Legal	Size (Acres)	Use	Location
12213.001	Lot 13 Plan 1884 DL 89 Newcastle	12.83	Vacant	South of Widgeon Rd/north side Island Highway
12213.002	Lot 14 Plan 1884 DL 89 Newcastle	14.50	Vacant	South of Widgeon Rd/north side Island Highway
12217.501	Lot 19 Plan 1884 DL 89 Newcastle	19.97	Vacant	South of Widgeon Rd/south side Island Highway
12220.121	Lots 38-40 Plan 1884 DL 89 Newcastle	71.12	Vacant	Southwest intersection of Dorman Road and Larkdowne Road
12220.101	Rem Lot 31 Plan 1884 DL 89 Newcastle	16.40	Vacant	North side of Dorman Road
12219.001	Lots 22-24 Plan 1884 DL 89 Newcastle	37.64	Vacant	South side Island Highway adjacent to Larkdown Road
12220.141	Lots 44-46 Plan 1884 DL 89 Newcastle	67.09	Vacant	Lying along the west side of Larkdowne Road
1220.131	Lots 41-43 Plan 1884 DL 89 Newcastle	78.04	Vacant	Lying along the west side of Larkdowne Road
12219.501	Lots 25-27 Plan 1884 DL 89 Newcastle	41.3	Vacant	Lying along the west side of Larkdowne Road
12220.111	Rem Lot 37 Plan 1884 Dl 89 Newcastle	7.77	Vacant	Lying along the west side of Larkdowne Road
12220.535	Lot 9 Plan 27236 DL 89 Newcastle	1.90	Vacant	South side Dorman Road west of Oakdowne Road
12220.530	Lot 8 Plan 27236 DL 89 Newcastle	1.90	Vacant	South side Dorman Road west of Oakdowne Road
12220.525	Lot 7 Plan 27236 DL 89 Newcastle	1.90	Vacant	Southeast intersection of Dorman Road and Corcan Road
12249.010	No Information Available			
12248.010	Lot A Plan 2323 DL 92 Newcastle	1271.5	Vacant	North of Little Qualicum Falls Provincial Park Boundary
12261.030	Block 197 Newcastle	360	Vacant	Intersected by Thames Creek, southwest of Bowser
12260.010	Block 179 Newcastle	764	Vacant	Intersected by Thames Creek, southwest of Bowser; northwest of Block 197
12261.050	Block 232 Newcastle	570	Vacant	Lies between Little Qualicum River and Whiskey Creek
12264.010	Block 300 Newcastle	480	Vacant	Lies between Thames Creek and Nile Creek
12264.020	Block 335 Newcastle	288	Vacant	Intersected by Nile Creek south of Block 300
12261.040	Block 199 Newcastle	259.50	Vacant	Intersected by Thames Creek south of Block 179
12260.500	Lot 1 Blk 184 Plan 34682 Newcastle	160	Vacant	Southwest side of Spider Lake - Spider Lake Park

Folio No.	Legal	Size (Acres)	Use	Location
12266.001	Pcl A Blk 359 Plan 182-R Newcastle DD 21980-N	130.30	Vacant	Little Qualicum Falls Park
12270.002	Block 447 Newcastle	100	Vacant	Southwest tributary of Rosewall Creek south of Roaring Creek
12270.001	Block 445 Newcastle	40	Vacant	South end of Rosewall Creek east of headwaters of Qualicum River
12267.600	Block 360 Newcastle	25.37	Vacant	North of Kinkade Creek
12270.003	Block 448 Newcastle	250	Vacant	Straddles Roaring Creek southeast of Mt. Cunan
12468.002	Block 941 Cameron	50	Vacant	Little Qualicum Falls Provincial Park
12468.001	Block 940 Cameron	92.80	Vacant	Little Qualicum Falls Provincial Park
12460.000	Block 591 Cameron	483	Vacant	North of Cameron Lake
12456.002	Block 400 Cameron	22.6	Vacant	Little Qualicum Falls Provincial Park
12272.200	No Information Available			
12272.201	Block 1367 Newcastle	1750	Vacant	Northwest of Horne Lake along RDN boundary
12456.001	Block 388 Cameron	50	Vacant	Little Qualicum Falls Provincial Park
12477.001	Plan 738-R Alberni	337	Vacant	MacMillan Provincial Park
12476.106	Block 306 Alberni	25	Vacant	East of Horne lake directly north of Mt. Wesley
12483.900	No Information Available			
12483.004	Lot 1 Blk 272 Plan 44513 Alberni	78.2	Vacant	West of Horne Lake - Horne Lake Caves Provincial Park
12486.050	Block 375 Alberni	70	Vacant	South side of Hunts Creek
12481.500	Block 185 Alberni	490	Vacant	Northwest of Horne Lake traversed by Qualicum River
12582.000	Block 1374 Newcastle	3222.8	Vacant	West of Kinkade Creek south of Spider Lake Provincial Park

CROWN FEDERAL

Folio No.	Legal	Size (Acres)	Use	Location
14980.000	Plan 1760 DL 49 Newcastle	.51	Docks & Warves	West of French Creek
11562.501	Lot B Plan 27752 Newcastle	72.73	Gov't Wildlife Reserve	Qualicum Beach southwest corner of McFeely and Kinkade Road
25422.000	DL 72 Newcastle	irregular	Gravel pit	Near Cook Creek
12263.500	Part Lot 1 Blks 37 & 255	176	Gov't Bldgs	Southwest of Qualicum Beach intersected by Little Qualicum River
12472.001	Pcl A DD 33934I Blk 251 Alberni	85.50	Gov't Bldgs (Fisheries)	West of Spider lake
12474.001	Blk 254 Plan 1753R Alberni	572.97	Gov't Research (Fisheries)	Adjacent to Qualicum Reserve
12471.401	Block 250 Alberni	21	Gov't Bldgs (Fisheries)	Fronting northeast side of Horne Lake west of Qualicum River
12476.101	Block 302 Alberni	1.51	Vacant	Island in Horne Lake
12481.001	Block 40 Plan 691N Alberni	3	Gov't Res. (Fisheries) Centre	Adjacent to Horne Lake - west side
12479.001	Block 39 Plan 691N Alberni	17	Vacant	Adjacent to Horne Lake at sluice gate
13000.000	Qualicum Indian Reservation	185.5	Reserve	Qualicum Reserve

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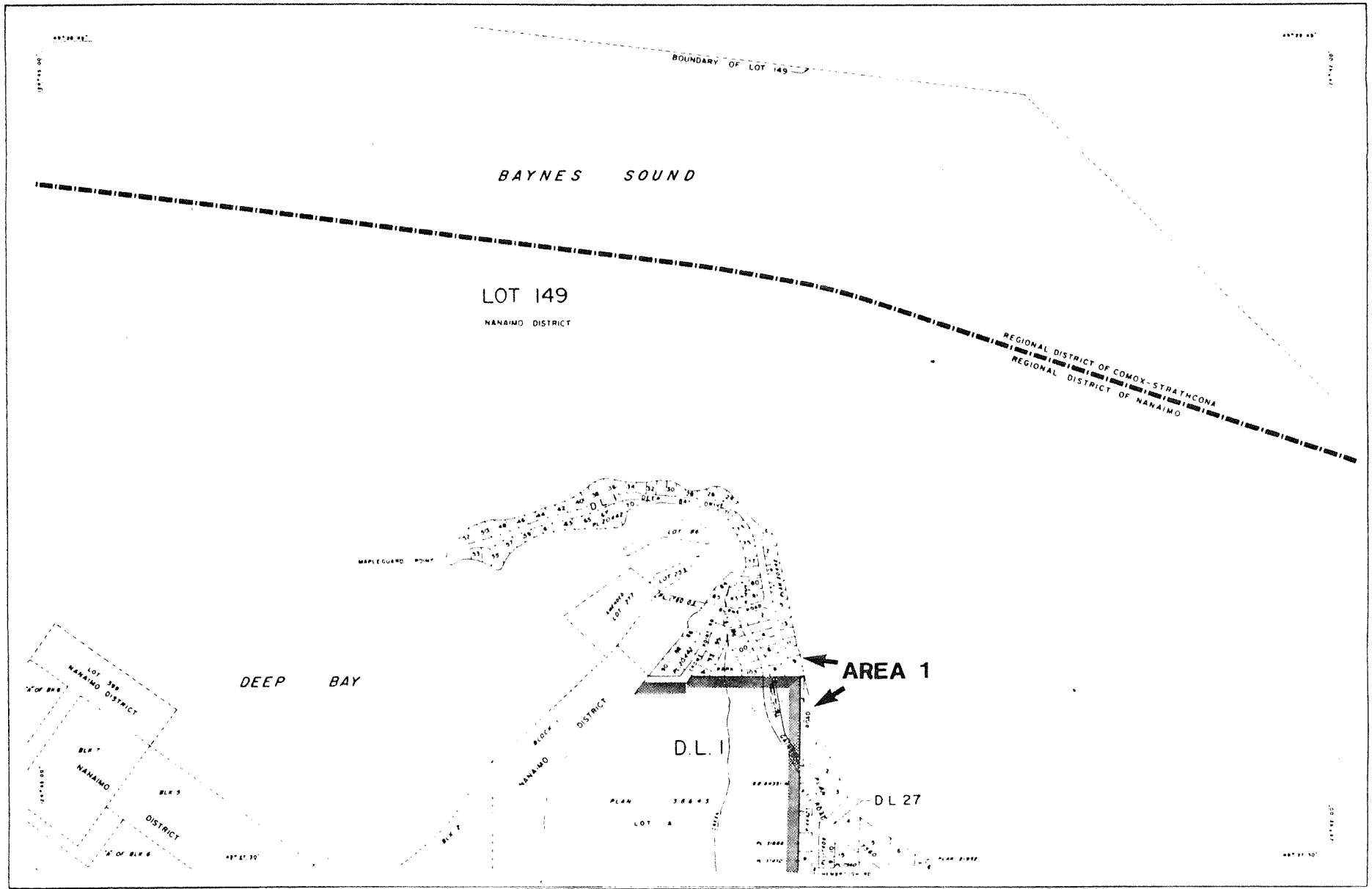
MAP REFERENCE FOR LOT INVENTORY

APPENDIX B



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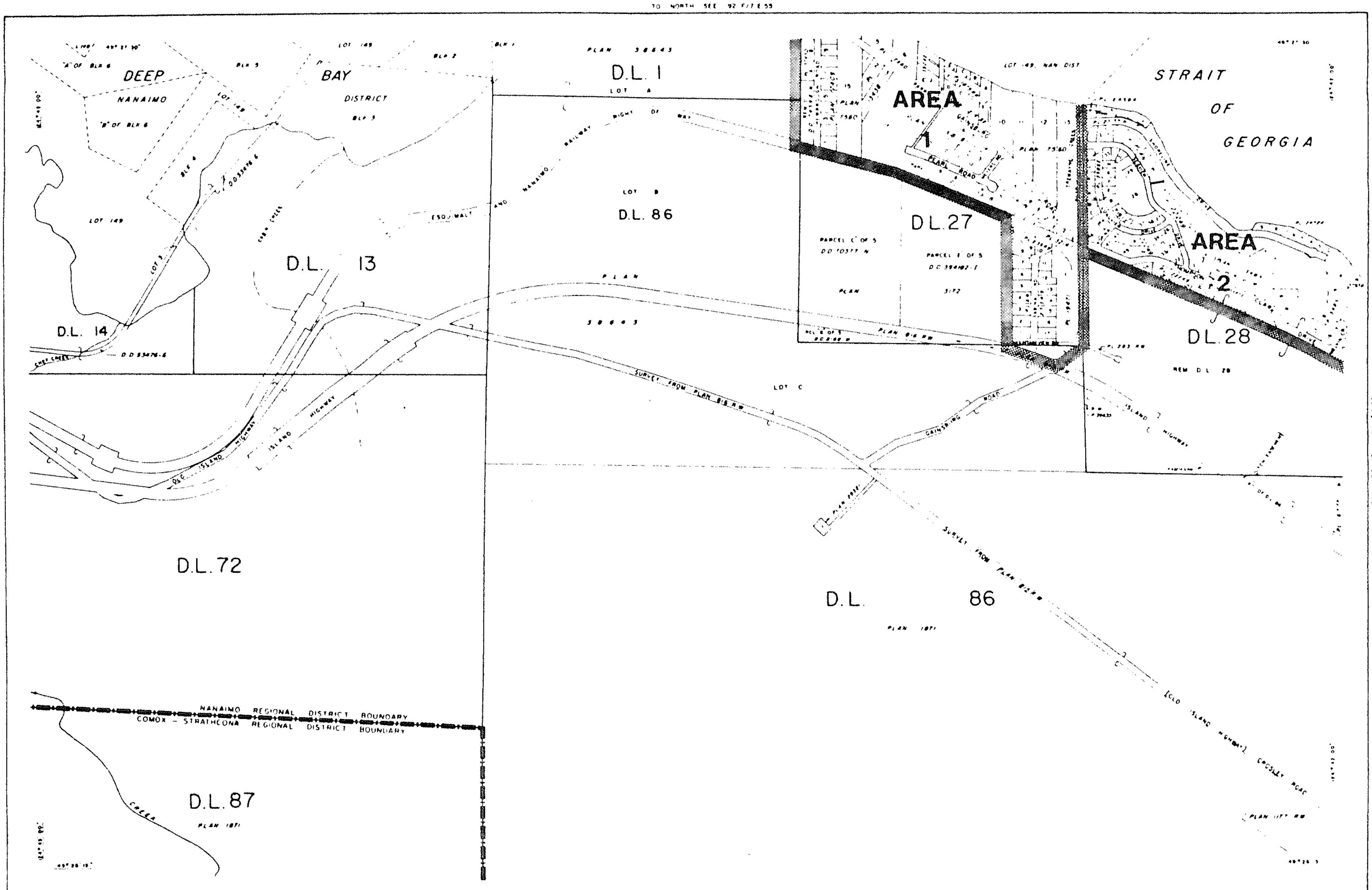

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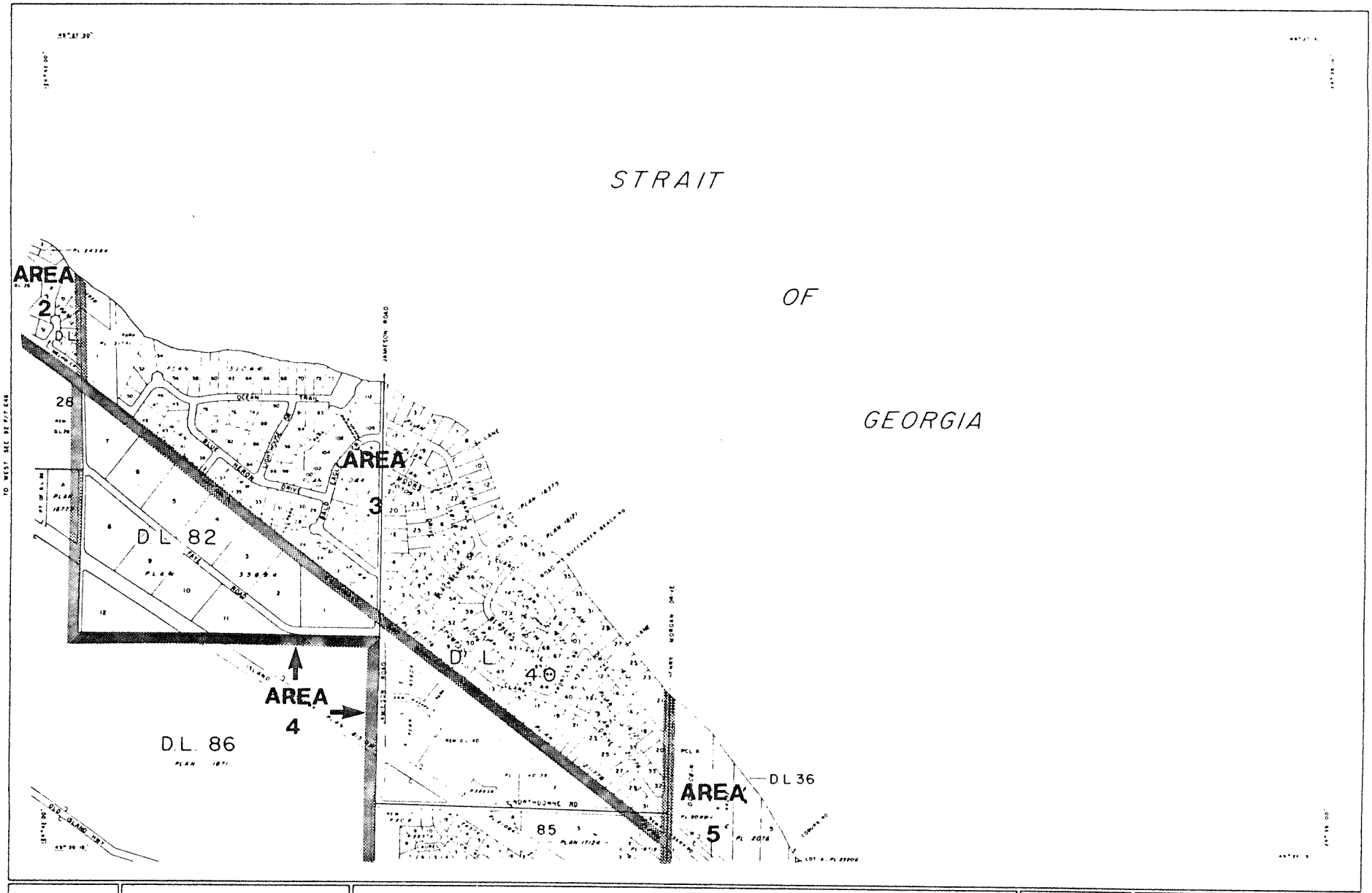

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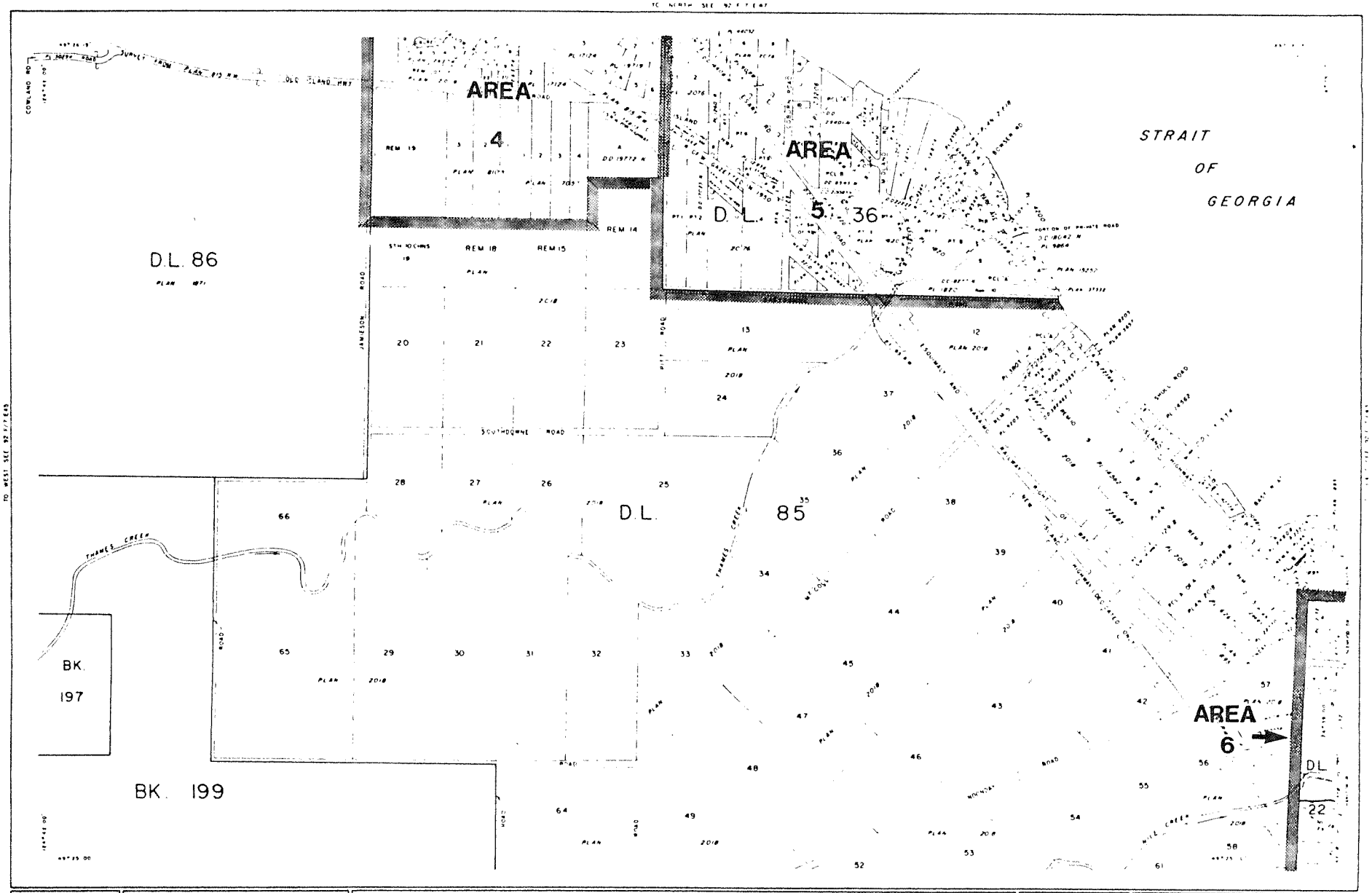

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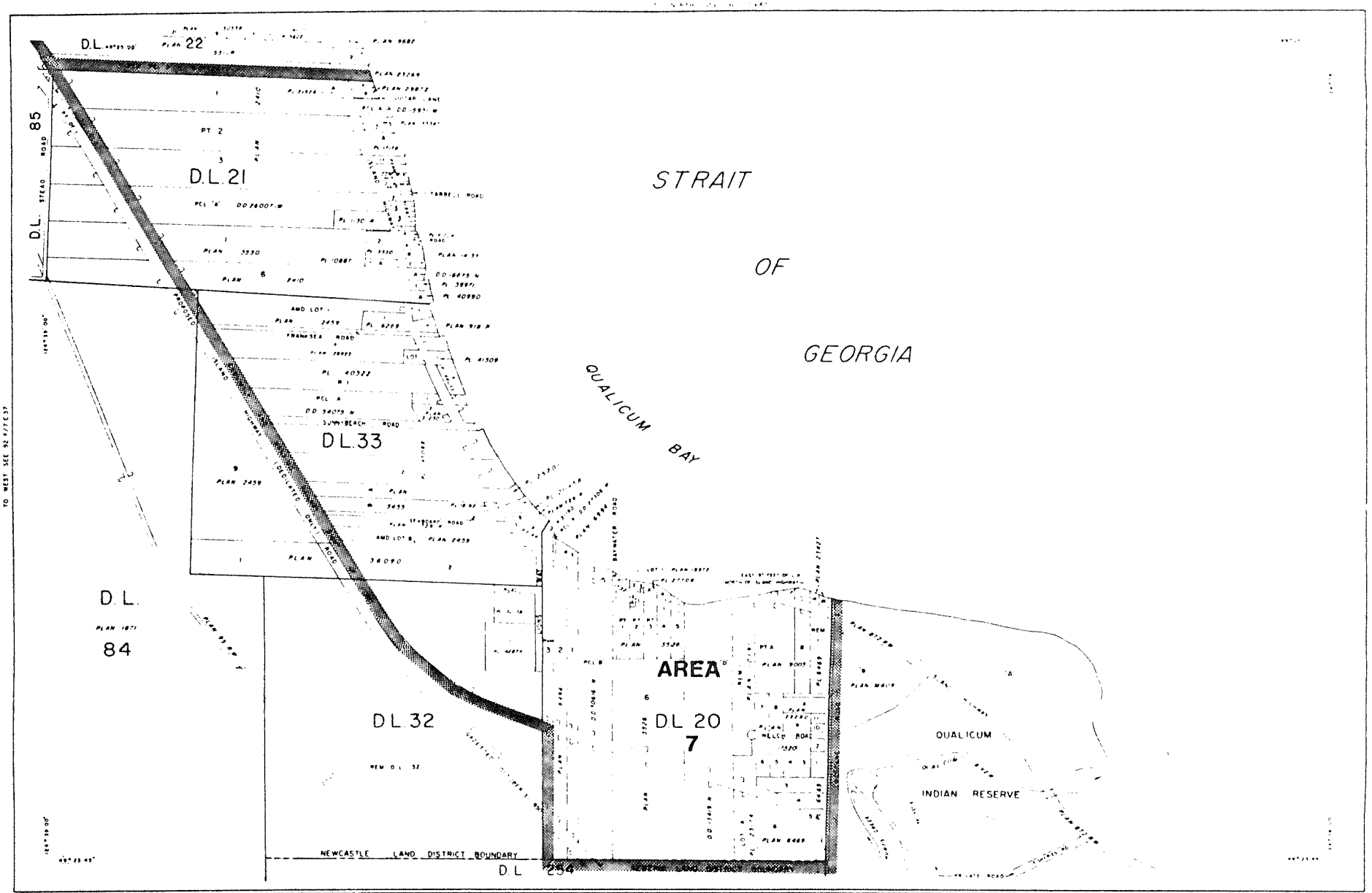

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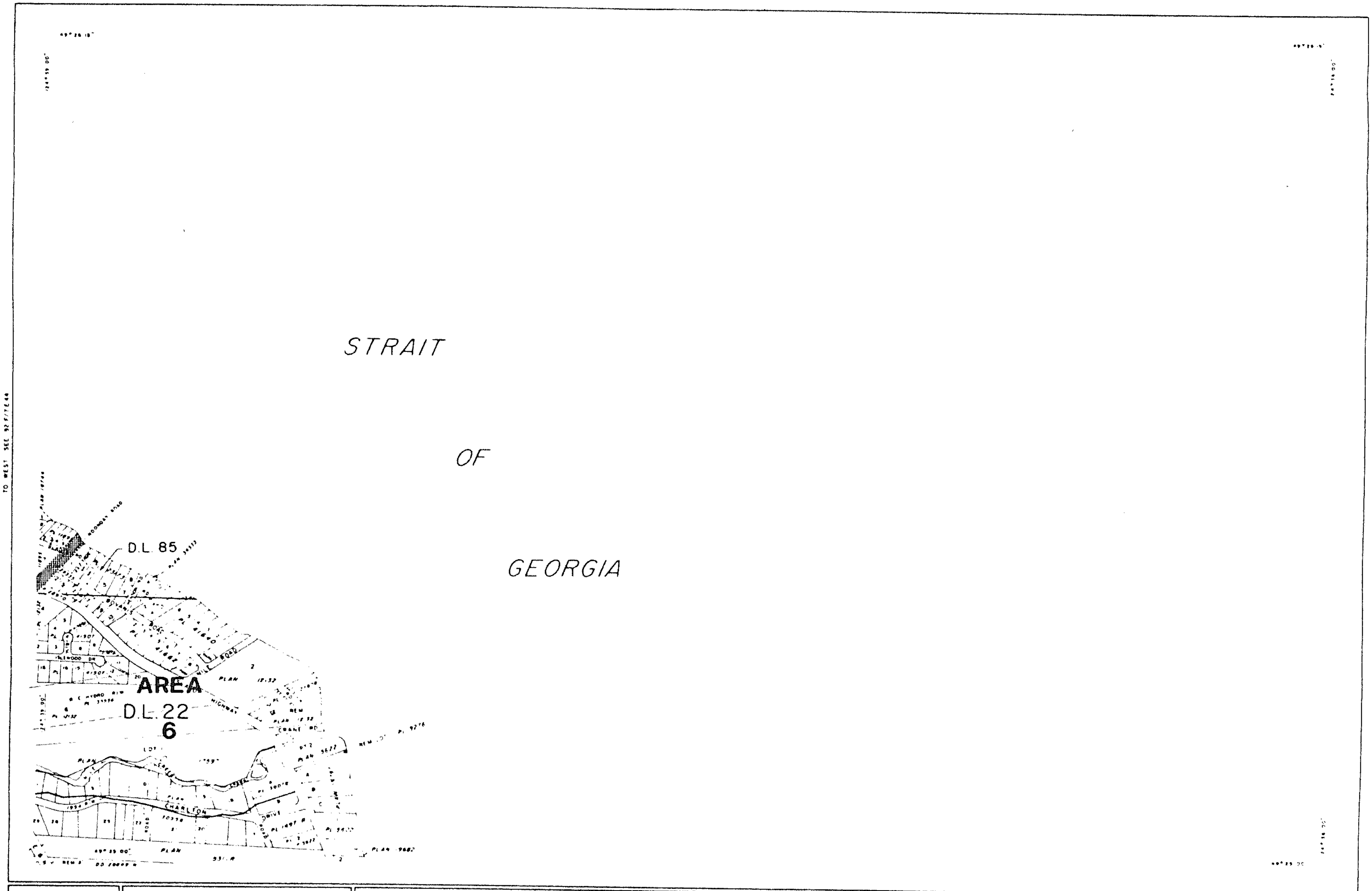

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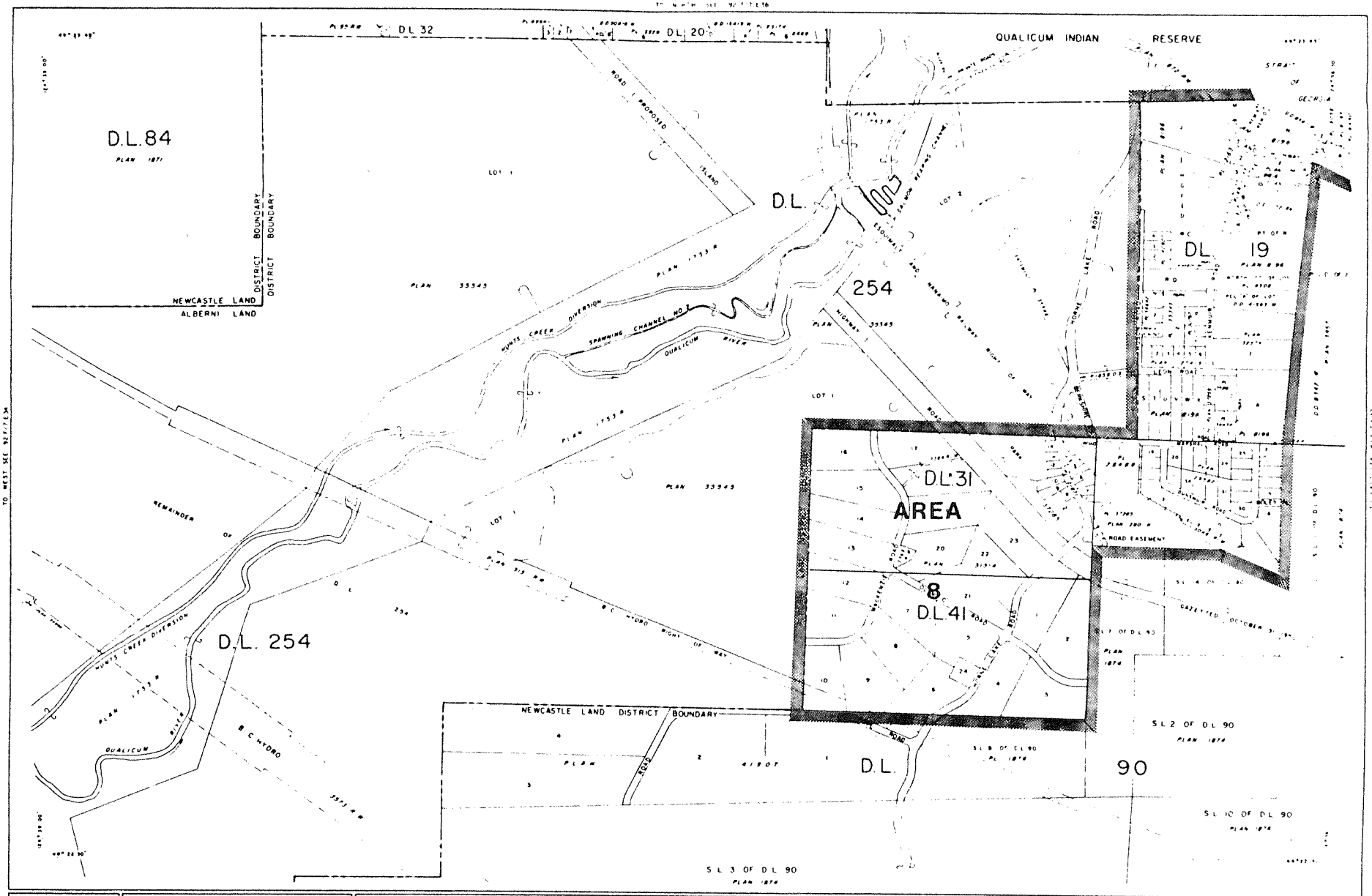

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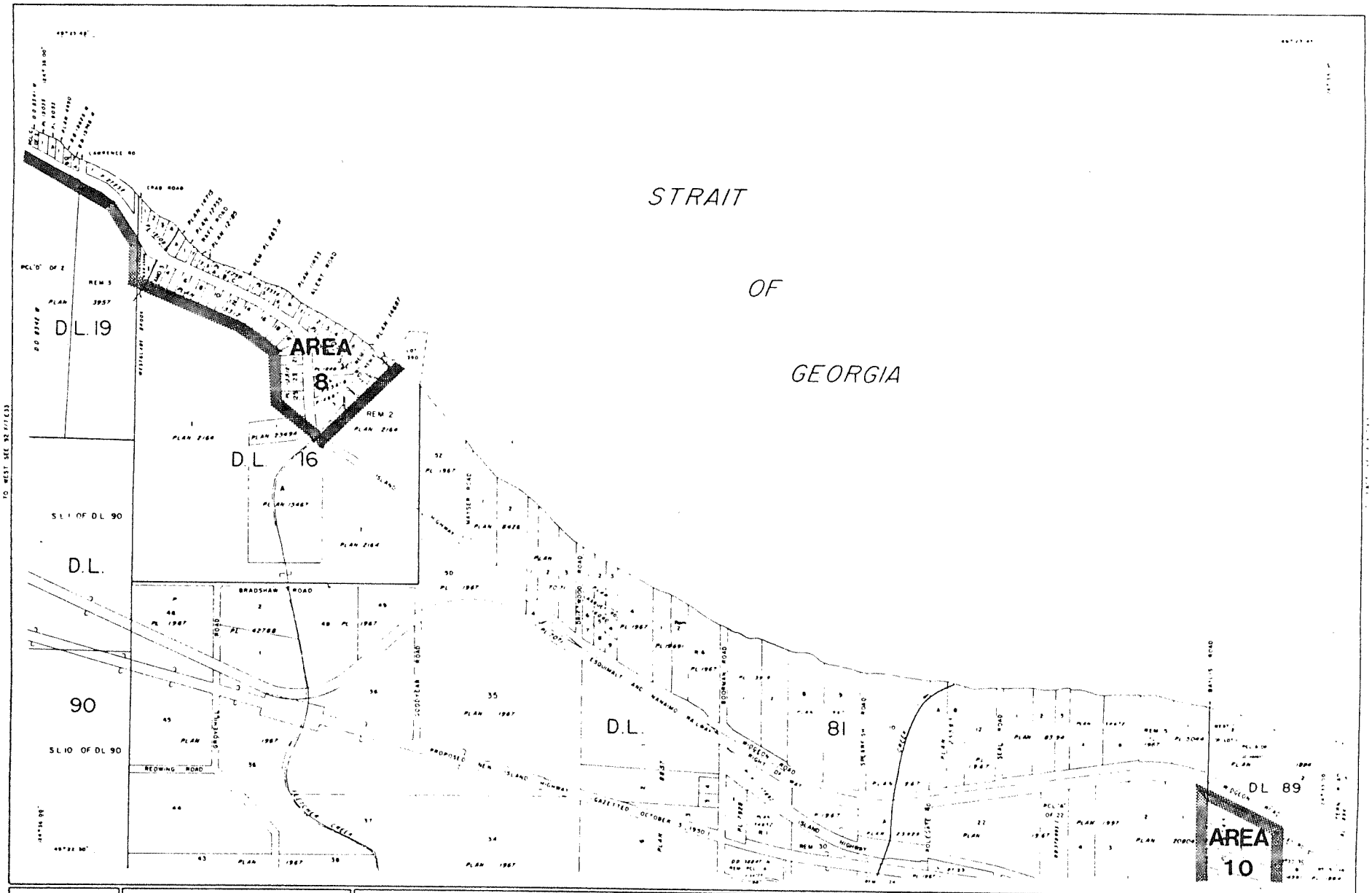

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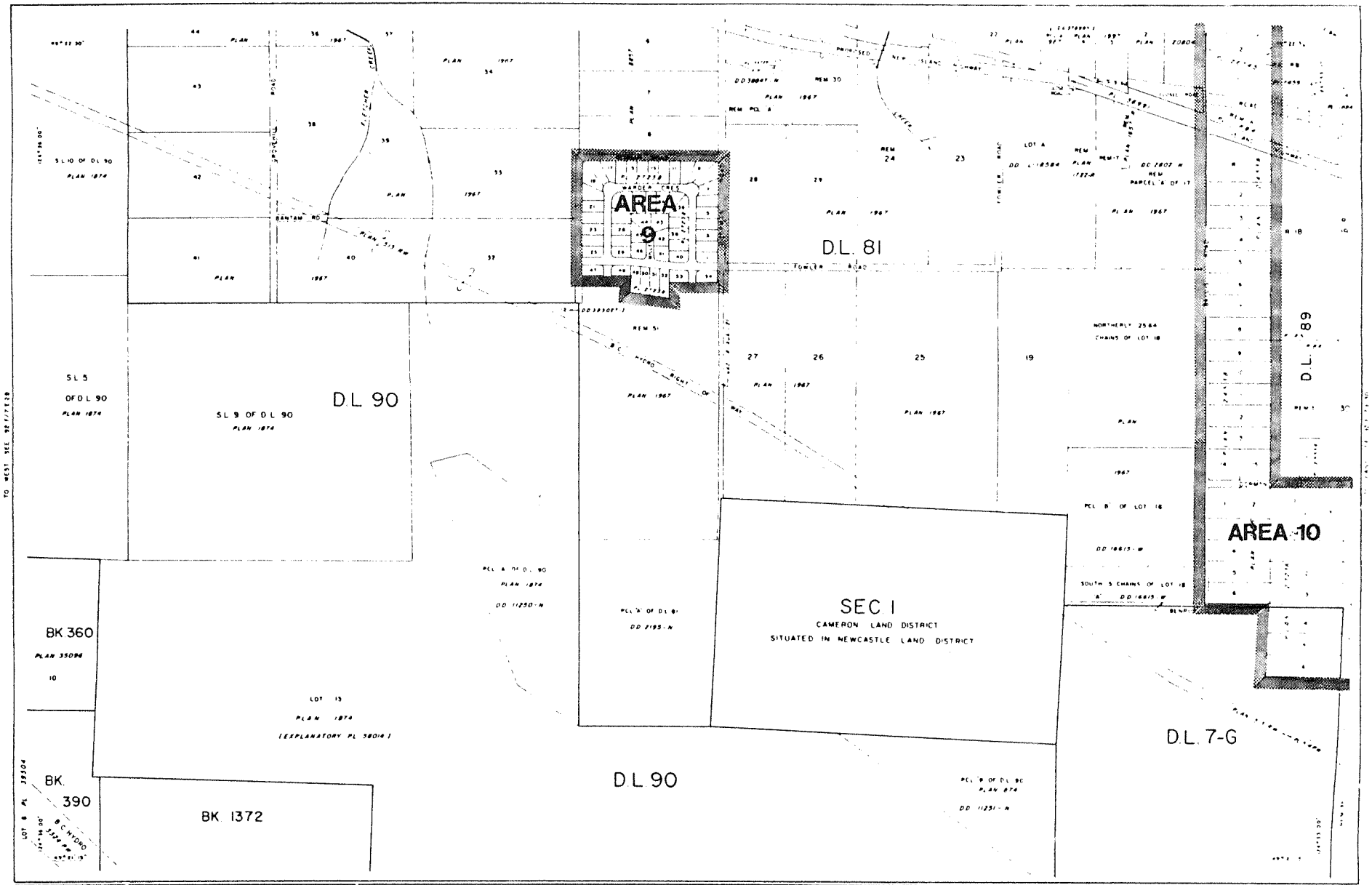

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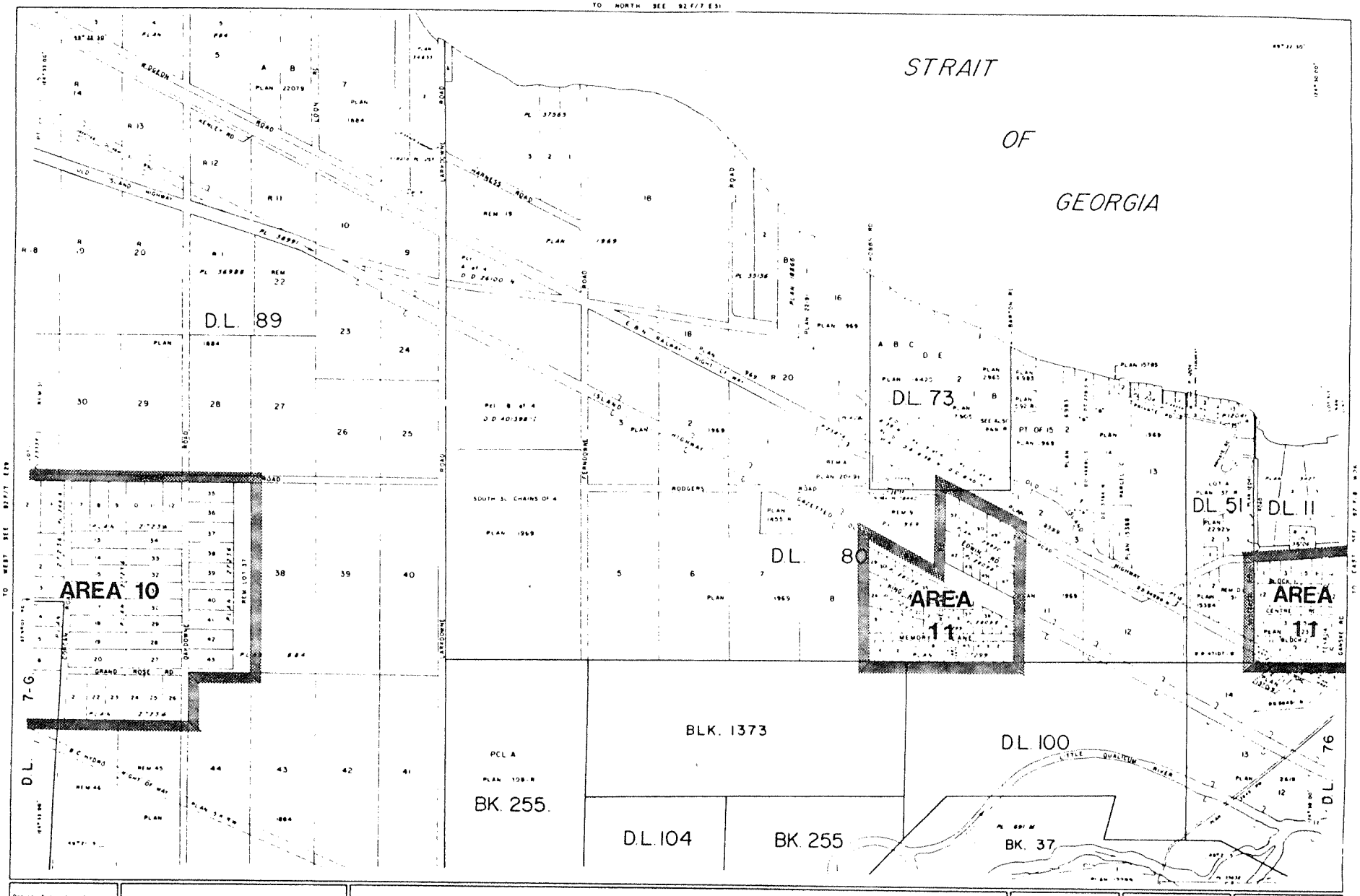

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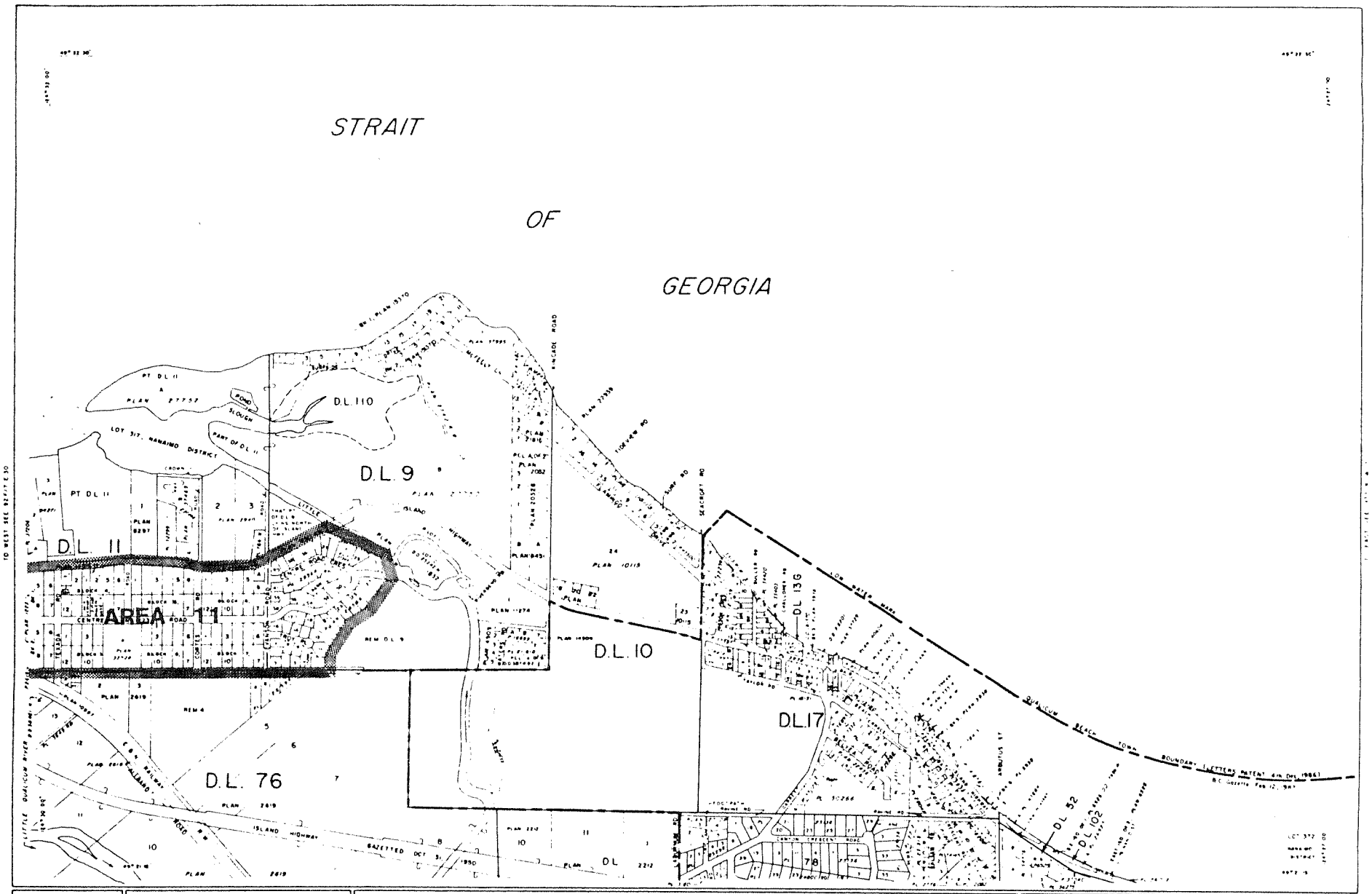

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