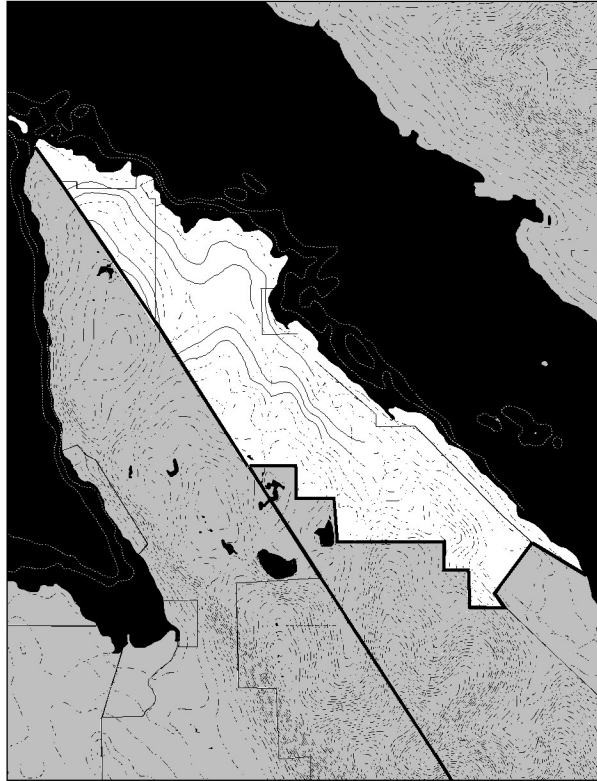




Gravina
Island Plan

North Gravina

Area



KETCHIKAN GATEWAY BOROUGH
Department of Planning & Community Development
2005

Looking north from the air, the gently sloping topography of the landscape is evident. The land cover consists of a complex of open muskegs surrounded by primarily scrub timbered forests—most with poor drainage and organic soils. The shoreline and creek drainages contain somewhat better lands for development. Rock Point is visible, jutting into Tongass Narrows and forming Rosa Reef. While it offers natural protection for marina development, breakwaters would likely be needed to the east and south.



Gravina
Island Plan
**North
Gravina**
Area

October, 2005

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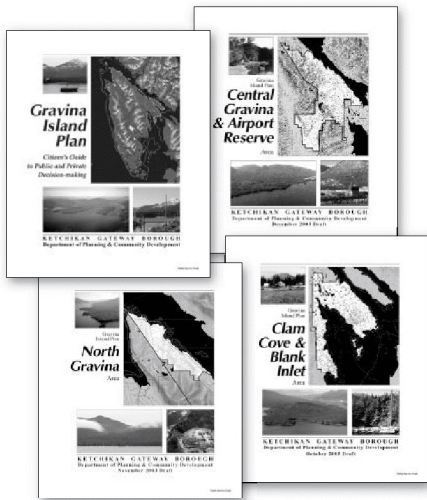
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Note: It is impossible to recognize individually all the assistance received from citizens throughout Ketchikan and from staffs of federal and state agencies, the City of Ketchikan, the City of Saxman and private firms and individuals.



This document is one of a set of four describing the Borough's long-term plans for Gravina Island. Island-wide policies and background are provided in the "Citizen's Guide." The eastern shoreline of Gravina has been divided into three area plans that address development issues and provide practical guidance at a detailed level. Copies of all four documents are available at the Ketchikan Gateway Borough Planning Department.

The North Gravina area is a focus of Borough economic development interest. It encompasses a large tract of developable Borough land as well as private land along Tongass Narrows north of the Airport Reserve, the southernmost portion of which has long been slated for water-related, light industrial uses. A road is now being built to extend from the airport to the Pacific Log & Lumber sawmill and further north. This will transform land use and set the stage for likely subdivision and sale of Borough lands and development of private land along the coast. This North Gravina Area Plan proposes economic development initiatives including an industrial park and a marina and recommends steps to protect and enhance recreational values enjoyed by many citizens.

The North Gravina Area Plan addresses the following:

- Which lands and resources have significant community value and how should they be developed or protected? (see pp 8-11)
- What are the key economic development opportunities for this area? (pp 6-7)
- When, how and where should road access and other infrastructure be extended into this area? (pp 14-15)
- Where should industrial development take place? (pp 16-17)
- How should the Borough manage its lands? (pp 14-23)
- What recommendations should be made to the State Mental Health Trust regarding its lands and resources? (pp 22-23)
- How should the shoreline and tidelands be used and protected? (pp 24-25)
- What areas should be set aside and developed to meet community recreation needs? (pp 8-11 and 22-23)
- How should current zoning be changed to reflect the development strategy outlined in this plan? (pp 12-13)
- How should additional lands be subdivided for residential development over the next twenty years? (pp 18-21)
- What strategies should the Borough and others follow to implement actions proposed in this plan? (pp 26-30)
- What are the expected public costs and benefits of implementing the plan recommendations? (pp 26-30)

Introduction and Issues To Be Addressed



Beach at Rock Point is one of the prime recreation attractions in the North Gravina area.

Part One: Context
1/The North Gravina Area

Ownership & Zoning

The North Gravina area includes

- 1459 acres (77%) Borough owned land, including 1.5 miles of waterfront;
- 195 acres (10%) Mental Health Trust lands (with 775 ft of shoreline); and
- 251 acres (13%) private land, mostly waterfront lots averaging 2 acres.

There are over 100 acres of patented (privately held) tidelands. Only 12 of the 78 shoreline lots have improvements recorded. Most of the uplands are currently zoned Future Development; ten properties (20 acres) adjacent to the Airport Reserve are zoned Heavy Industrial with Special Limitations, and the remaining waterfront properties are Residential/Cottage Industry.

Landscape & Natural Resources

The North Gravina landscape is made up of an extensive bench of moderately sloping lowlands bordered by the steep, mountainous topography of California Ridge. More than 60% of the area is below 300 feet elevation. The high mountains immediately to the south and west block winter light, making the area colder and darker than the rest of the island.

The shoreline is rocky, with some tideflats and reefs. There are a few sandy beaches, especially in the Rosa Reef/Rocky Point area. The northern portion includes a large shallow offshore shelf less than 60 feet deep, while the southern portion is deeper (180 feet less than 100 feet from shore). Much of the shoreline is relatively well-protected from north and south winds, especially the area south of Rosa Reef.

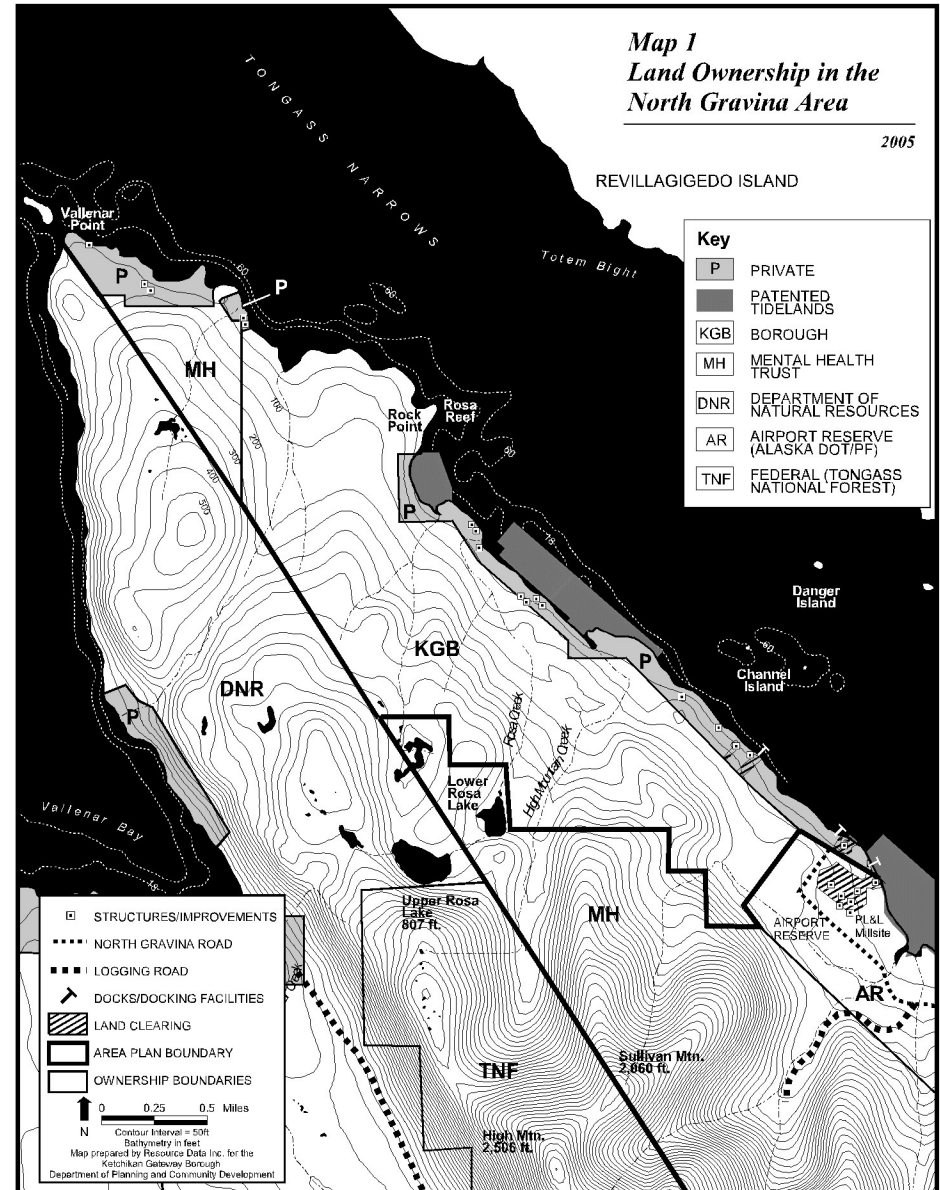
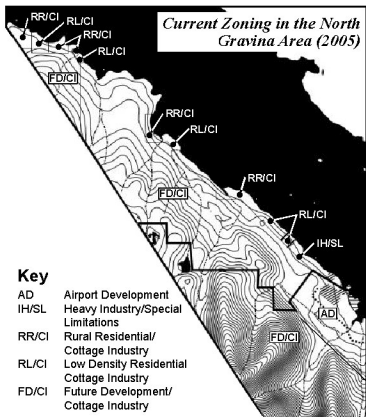
More than half of the area is classified as a "MF5" ecosystem, a combination of muskegs and scrub forest dominated by scattered pines and yellow cedar. Only a few small areas are classified as F1 or F2, the most productive forest soils in the Ketchikan area, and these are situated along the shoreline or within stream corridors. The recent timber inventory of Borough land prepared for this plan indicates that commercial timber consists of scattered individual trees near the shoreline or along drainages.

Four of the six un-named year-round streams within the area support populations of pink and silver salmon in their lower reaches. The northern coast from Rock Point to Vallenar Point is noted for herring spawning, and much of the forested shoreline is important winter habitat for deer.

North Gravina provides an attractive natural backdrop for views from some Ketchikan neighborhoods and from Totem Bight and Refuge Cove state parks.

Development Trends

Until recently, development in the area has consisted of a few waterfront cabins and residences. The last five years have seen a number of industrial uses establishing footholds within and near the Airport Reserve. Using individual docks for marine access, they have taken advantage of the area's gently sloping topography to locate industrial activities and storage on land as well as the water. Completion of the North Gravina Road to the PL&L sawmill is setting the stage for likely subdivision and sale of Borough lands and development of private lands along the coast, especially when access to Gravina is improved by implementing the planned bridge across Pennock Island to the Clam Cove area.



Part One: Context
2/Development Suitability

Some areas are better suited for development than others. A site with deep, well-drained mineral soil near a road and on gently sloping terrain away from flooding or landslide hazards would generally be considered suitable for conventional development. Another area, equally accessible but with muskeg soils and poor drainage would be considered less suitable. While development is possible, it would be costly and require less conventional building practices. There are some areas considered unsuitable due to natural hazards, uneconomical access, critical habitat values, proximity to airport noise and operations, and other reasons. These are usually best retained as open space reserves.

The North Gravina area contains—by Ketchikan standards—a relatively high percentage of lands suitable for development. Especially within those lands in Borough ownership, there are extensive areas with gentle slope, shallow muskeg soils and moderate drainage.

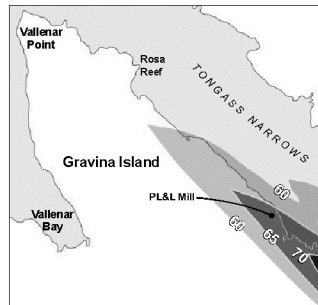
The facing map illustrates the results of a development suitability analysis for the North Gravina area. It provides the following findings:

- Only 4% of the area (73 acres) has no significant limitations to development. (These areas are “white” on the map, without any overlay patterns or shading.) Such areas are characterized by well-drained mineral soils and gently sloping topography.
- A significant part of the area (418 acres) is below 300 ft elevation, has slopes under 10 %, and could be accessed by extensions of the North Gravina Road. The main limitation is poor drainage and organic soils as indicated by the muskeg-scrub forest ecosystems (MF5, F5) found there.
- In addition to poor drainage, other limitations include moderate to steep slopes (10-30%), cold microclimates (north facing slopes), higher elevations (300 to 400 ft.), reduced accessibility (more than 1 mile from the North Gravina Road), and proximity to air traffic flight paths and noise.
- Approximately 27% of the area is considered not suitable for development due to the presence of one or more of the following characteristics: severe slopes (greater than 30%, v-notch drainages), high elevation (greater than 400 ft.), “prohibitive” wetlands (as classified by ADF&G), and salmon spawning stream corridors. Such areas are suitable for open space, recreation, wildlife, flood control, watershed protection, and visual quality.

Development within the poorly drained muskeg and scrub forest areas typically uses either an overlay technique (adding rock fill over the muskeg) or replacement (excavating the organic soils and replacing it with better draining and load bearing materials). These techniques are most successful when they:

- minimize re-grading and disturbance to drainage patterns;
- minimize land clearing/tree removal; and
- utilize public or community wastewater treatment systems.

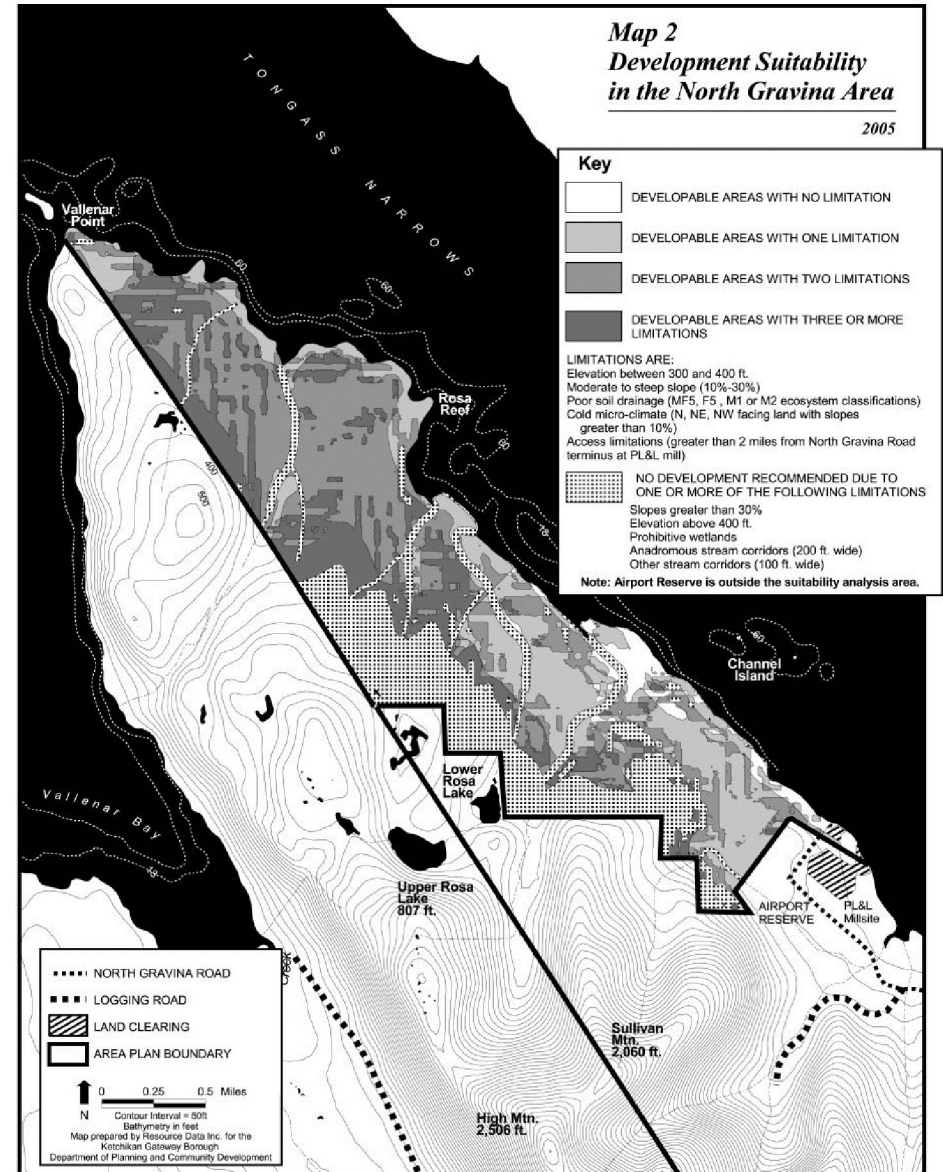
Aircraft Noise Exposure
 Numbers indicate day-night average sound levels in decibels (Ldn).



Airport noise levels are a factor in development suitability. The FAA considers an LDN (day/night average sound level) of 65 decibels as its threshold for “significant” noise affecting a neighborhood/community. The World Health Organization uses a lower measure of 55dB as “engendering serious annoyance and creating an unhealthy environment.” The map above shows the LDN’s of 65 dB would have impact in the proposed North Gravina Industrial Park (though many industrial uses could be compatible with airport operations and noise levels).

Map 2
Development Suitability
in the North Gravina Area

2005



Part One: Context
**3/Economic
 Development
 Opportunities**

Major projects which could stimulate investment and growth in the area include:

Industrial Development Large-scale heavy industrial development of the two mile section of shoreline and upland north of the Airport Reserve will provide land for this use not available elsewhere within Revilla's Tongass Highway corridor. The shoreline in this area is privately owned and partially developed. Inland tracts are Borough owned. The area's economic resources include proximity to Ketchikan International Airport (KIA) for access to inter-regional air services, air taxis, general aviation facilities and services, and air-freight service.

In the short run, industrial use will be limited by lack of infrastructure; by 2005 some access will be provided by a road being constructed from KIA to the PL&L leasehold. Pending further extension of this road, development of self-sufficient industrial sites, separately accessible by water, can occur. With the access road's extension and dedication as a public thoroughfare, industrial sites will benefit from use of the KIA ferry for access to/from Ketchikan and by more convenient access to the airport itself. More intensive development can occur when other infrastructure, including electricity, telephone, water and wastewater utilities are extended within the access road corridor.

Private lands in this area make up a narrow strip of shoreline. For industrial uses requiring larger acreage with shoreline access, the Borough's inland tracts can be planned as an adjunct to shoreline lands. Together, these areas can add 186 acres of shoreline-accessible industrial land to Ketchikan's economic base. This would require making Borough land available to private property owners by purchase or lease, enabling complementary development of the larger acreage. A conceptual layout of this industrial park is shown on page 17.

Small Boat Harbor Development A good small boat harbor location is situated inside Rosa Reef, offering the closest Ketchikan area access to Vallenar, Grindall and Cape Chacon sport fishing areas. Water traffic to/from this location would be minimally restricted by other Tongass Narrows traffic and wake-sensitive shoreline development. This site should provide at least ten acres of moorage in 18 feet of water, capable of accommodating 400 thirty-foot boats.

Natural weather and wake protection may be offered by the reef to the north; the southeast exposure in the lee of the shore can be protected from wakes by a short floating breakwater. This site, with the adjacent upland tract, can provide locations for harbor-related support services. Public development of this area can enhance the value of shoreline residential areas adjacent to the east.

Residential and Recreational Homesite Development The upland area adjacent to Rock Point/Rosa Reef is suitable for lodging and sport fishing related services. Proximity of the airport may provide a year-around market for overnight accommodations. The area can provide light commercial services for nearby residences and industrial sites and serve as an "anchor" for shoreline and alpine trailheads, accessing High Mountain, Bostwick Lake and Vallenar Bay.

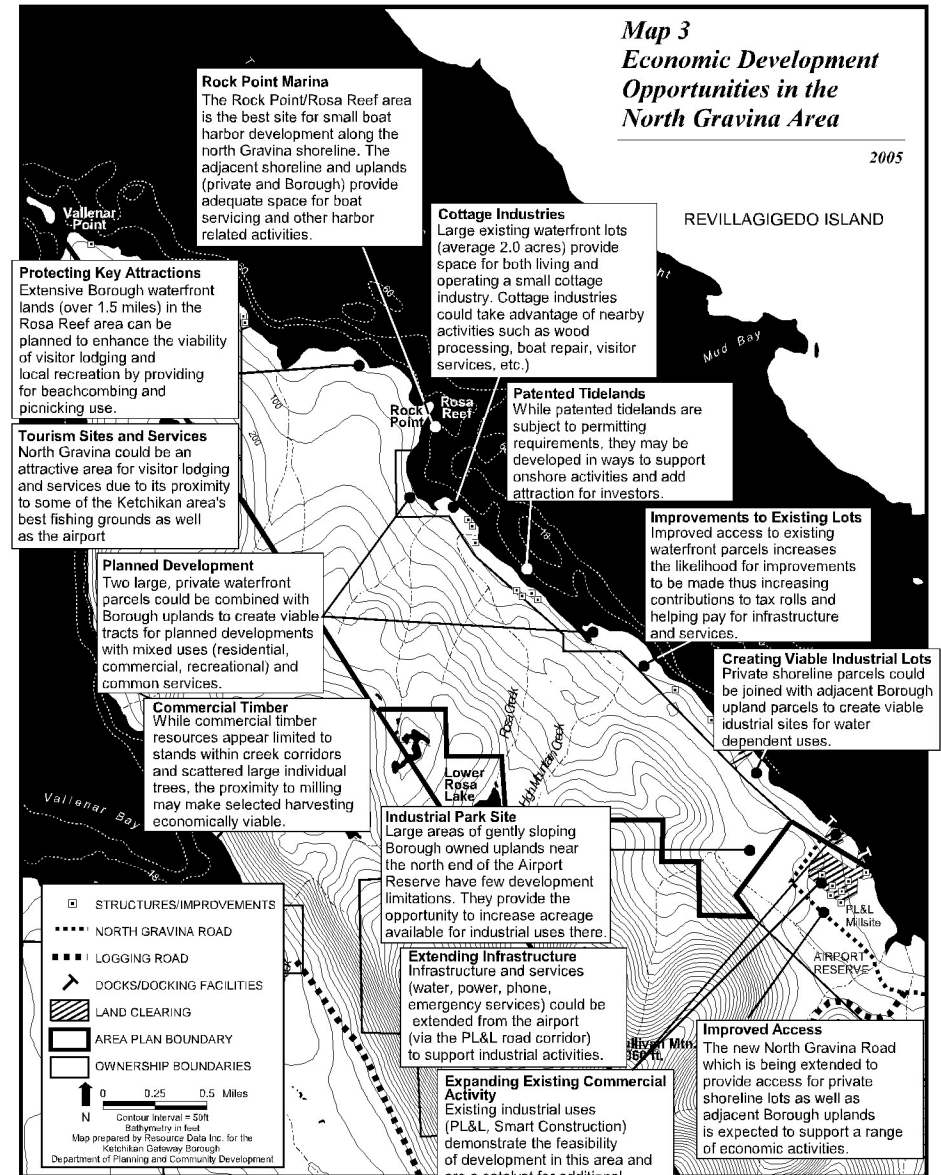
The existing residential waterfront lots south of this location will have excellent access to the proposed small boat harbor at Rock Point and its adjacent potential lodging and sport fishing-related center. With carefully planned and useful shoreline access, and attention to neighborhood and natural aesthetic values, this area could be a unique and valuable addition to Ketchikan's supply of real estate. See pp 19-21 for conceptual layouts of North Gravina residential developments.

In developing North Gravina lands for heavy industrial use, it is recognized that other economic values are affected:

- First, these lands are conspicuous sections of the Tongass Narrows shoreline, part of the Inside Passage, a heavily traveled and economically important corridor for visitors, requiring conservation of shoreline viewsheds.
- Second, the opposite shoreline from Gravina, the Revilla shore, is developed for high-quality residences, relying on views of the Narrows and opposite shore to sustain their value. This also requires viewshed conservation.
- Third, Tongass Narrows is a heavily trafficked maritime artery, one of the busiest in Alaska. Development of its shoreline must be compatible with the safe and expeditious transit of vessels in and out of Ketchikan harbor.
- Fourth, the North Gravina waterfront is part of a very limited resource for economical expansion of shoreline-accessible heavy industrial uses. This requires careful limitation of extraneous uses which do not absolutely require locating in this area and for which other siting is available.
- Fifth, observance of Uniform Building Code standards for improvements to land, such as for excavations, embankments, fills, foundations and drainages, are important in maintaining land value and the utility of developed areas.

**Map 3
 Economic Development
 Opportunities in the
 North Gravina Area**

2005



**Part Two: Plan Recommendations
4/Community Interest
Lands & Resources**

Due to proximity to the airport and road being constructed north of the airport, to the area's suitability for development and to the existence of lands already in private ownership along the waterfront, the North Gravina area is expected to receive the majority of Gravina's development over the near term. As this occurs, it is important to recognize that it is in the interest of the community to identify and set aside some of these lands and resources in order to:

- protect future economic development opportunities, especially the proposed industrial park, road corridors and marina;
- maintain community access to important resources, especially beaches now enjoyed by many residents; and
- maintain corridors to the waterfront to insure the viability of upland industrial or commercial sites dependent on waterfront access.

1. Industrial Reserve Lands

Description: approximately 186 acres of moderately sloping uplands within/adjacent to the Airport Reserve.

Community Interests/Values: helps meet future needs for large tracts of developable land suitable for water dependent industrial uses; may provide income to the community from sales/leases of Borough owned parcels; supports community economic growth.

Use/Development Considerations: maintain natural buffers and visual screens to reduce visual impacts; minimize site regrading to what is necessary; create parcel sizes that meet industrial requirements; identify site for water treatment facilities.

Recommended Actions: develop industrial reserve master site development plan; assess feasibility to upgrade North Gravina Road and extend basic infrastructure from the Airport (water, power); negotiate with waterfront owners regarding marine access options.

2. Shoreline Industrial Properties/Access to Uplands

Description: at least 21 waterfront parcels (46 acres) within and adjacent to the Airport Reserve.

Community Interests/Values: marine access needed to increase value and viability of adjacent uplands for industrial development; upland acreage may be necessary for viability of waterfront parcels.

Use/Development Considerations: while currently zoned Heavy Industrial with Special Limitations, the steep topography and limited size of most lots limit their potential for many activities; site clearing and regrading should be limited to that which is needed for specific uses, while providing for materials/equipment storage areas on the upland side of the parcel (or on adjacent Borough lands).

Recommended Actions: work with property owners to identify ways to join adjacent lots as well as link them with Borough owned upland parcels; include parcels in

industrial reserve master plan; identify opportunities for shared waterfront improvements serving multiple properties.

3. Waterfront Development Opportunity: KPC parcel

Description: private (KPC) parcel (25.7 acres with 900 feet of waterfront) and adjacent Borough uplands, including High Mountain Creek.

Community Interests/Values: opportunity for concentrated, mixed use, public/private investment; generation of tax and land sales revenues to Borough.

Use/Development Considerations: development should set back from small estuary, creek corridor and shoreline; provide public access to the shoreline.

Recommended Actions: do not subdivide KPC parcel; set aside adjacent Borough uplands (40-60 acres) for complementary development; promote planned development for waterfront and uplands (see p 19).

4. Waterfront & Uplands Development Opportunity: Rock Point/Rosa Reef area

Description: relatively large privately owned parcel (24.8 acres with 900 ft. of waterfront) and adjacent Borough shoreline, uplands, and potential marina site.

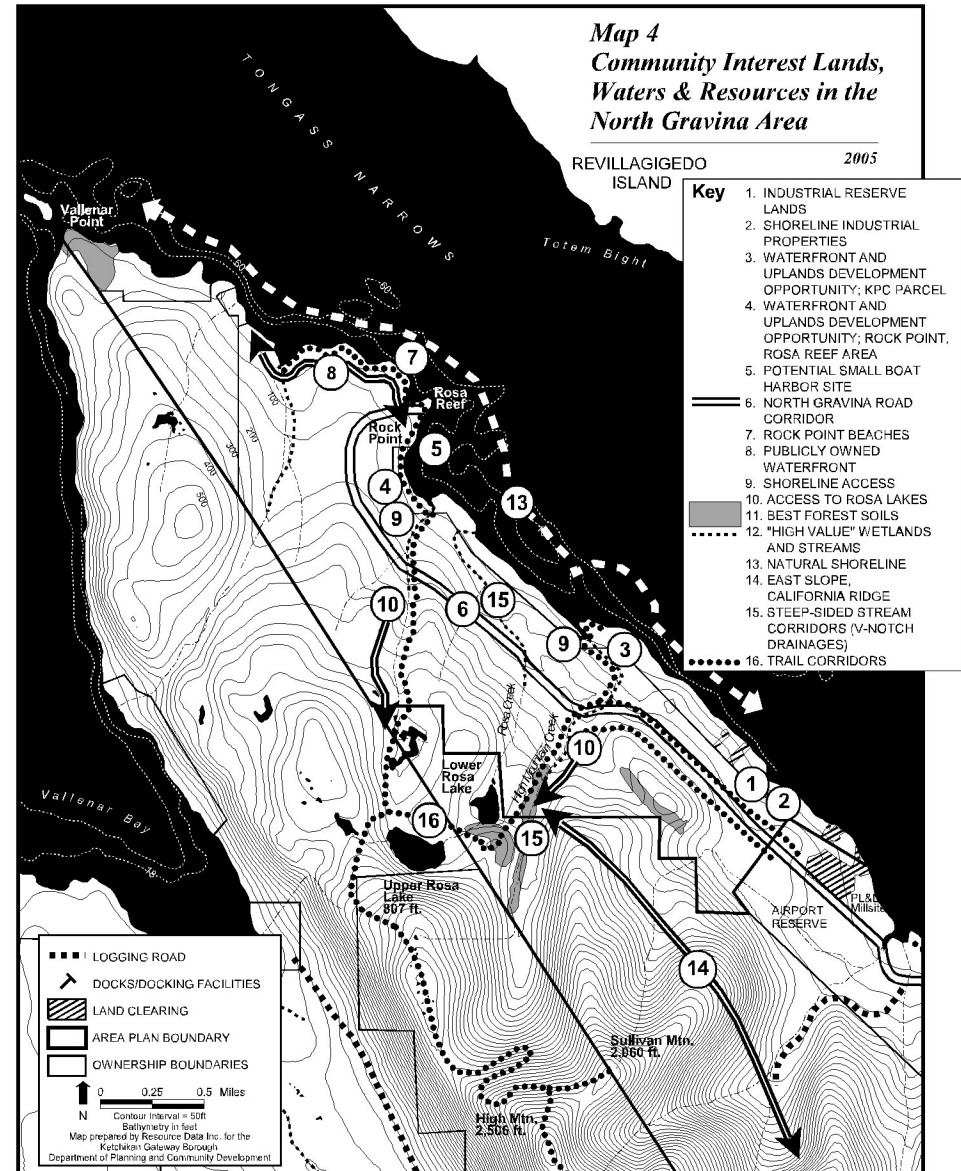
Community Interests/Values: opportunity for concentrated, mixed use, public/private investment; generation of tax and land sales revenues to Borough.

Use/Development Considerations: improvements should be set back from small estuary, creek corridor, and shoreline; moderate to steep slopes require careful building/road siting and site development practices; maintain public access to the beaches.

Recommended Actions: do not further subdivide private parcel; set aside adjacent Borough lands for complementary development; promote planned development for marina, waterfront and uplands (see p 21).

**Map 4
Community Interest Lands,
Waters & Resources in the
North Gravina Area**

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5. Potential Small Boat Harbor Site

Description: 10+ acres of moorage in 18+ ft. water depth with wake/weather protection provided by Rock Point.

Community Interests/Values: best location for small marina development on Gravina's east side north of Clam Cove; marina can be important community amenity, visitor industry asset, and focus for planned public/private development.

Use/Development Considerations: design breakwater to buffer wakes from vessels transiting Tongass Narrows.

Recommended Actions: promote planned development for marina, waterfront and uplands as described in number 4 above; complete marina development feasibility assessment; do not issue new tideland use permits which might interfere with future marina development; negotiate with existing tideland lease holder regarding marina development.

6. North Gravina Road Corridor

Description: approximately 3.7 mile, 120 ft. wide corridor from end of North Gravina Road (at PL&L sawmill) to Rock Point area; alignment roughly follows the 250 ft. contour (or below); provides primary access to serve the north Gravina area.

Community Interests/Values: reserves the best alignment for future road and infrastructure extensions when feasible and needed; reduces traffic and impacts on shoreline developments; provides access to uplands.

Use/Development Considerations: alignment may be initially used for recreational vehicle access; corridor should be wide enough to allow for adjacent trails and natural buffer; alignment to follow contours and minimize large cuts and fills.

Recommended Actions: complete engineering study of proposed alignment, survey/mark centerline, extend pioneer road into area incrementally as warranted.

7. Rock Point Beaches

Description: includes the longest protected beach area on North Gravina, as well as a number of smaller, more exposed "pocket" beaches.

Community Interests/Values: the most attractive shoreline type for recreational use; a resource of limited extent on Gravina.

Use/Development Considerations: part of the beach is private, part Borough; uplands could support many uses; marina development should protect beach areas.

Recommended Actions: retain ownership of Borough portion so as to provide continued marine recreational uses; prepare conceptual master plan for area (including marina) to promote/guide development.

8. Publicly Owned Waterfront

Description: approximately 1.6 miles of Borough owned shoreline near Rock Point.

Community Interests/Values: the longest stretch of publicly owned shoreline north of the Airport Reserve; significant potential for recreational and waterfront development; attractive small "pocket" beaches; helps protect visual integrity of extensive stretch of Gravina shoreline; trade potential for other waterfront parcels.

Use/Development Considerations: continued recreational use with access by boat or trail until road extended.

Recommended Actions: retain in Borough ownership, future development options should be considered as part of master plan for Rock Point/Rosa Reef area.

9. Shoreline Access

Description: beaches and shorelines free of obstructions and with water depth and shoreline characteristics to facilitate boat access and beach walking.

Community Interests/Values: provides the opportunity for continued public access by water; increases value and viability of non-waterfront properties by providing water access and mooring opportunities.

Use/Development Considerations: promote public and private shared docks to reduce costs and enhance development feasibility of non-waterfront parcels.

Recommended Actions: evaluate options for common waterfront access both for shoreline property owners as well as for non-waterfront lots on Borough land.

10. Rosa Lakes

Description: two scenic upland lakes situated in a low pass between Vallenar Bay and North Gravina areas.

Community Interests/Values: provide recreational opportunities and serve as an attraction for hikers, fishermen and hunters.

Use/Development Considerations: take visual impacts into account for any timber harvesting nearby.

Recommended Actions: include in Gravina Island Trail System Plan; field test possible routes and flag recommended one; identify best trailhead location(s); secure trail ROW with Mental Health Trust.

11. Best Forest Soils

Description: closed canopy forests with deep, well drained mineral soils found along shorelines and stream corridors; includes ecosystem type F1 and F2 and sites identified in Borough timber inventory.

Community Interests/Values: most productive sites for growing commercial grade timber (typically contains largest trees); of limited extent in this area.

Use/Development Considerations: sites are also some of the most suitable for conventional development.

Recommended Actions: manage on a selective harvest/sustained yield basis; encourage uses that support local value-added processing nearby; try to retain in long term timber production.

12. "High Value" Wetlands and Streams

Description: "high value" wetland types found in the North Gravina area include estuaries, tall sedge fens, scrub-shrub alder/willow and moss muskeg/sphagnum peat muskegs.

Community Interests/Values: provide important wildlife and fisheries habitat, contribute to shoreline and streambank maintenance; help regulate streamflow and maintain water quality.

Use/Development Considerations: use and impacts regulated by Federal Law; avoid disturbance and keep runoff out; establish natural buffers and setbacks.

Recommended Actions: promote private landowner/developer awareness of values and use restrictions; set aside within open space reserves.

13. Natural Shoreline

Description: forested beach fringe interrupted only by industrial activities around the airport.

Community Interests/Values: contributes to attractive views from Ketchikan and Tongass Narrows; provides critical deer winter range; helps soften impacts of development activity.

Use/Development Considerations: setback structures and minimize tree clearing and regrading; allow for walking along shoreline where topography permits.

Recommended Actions: promote public awareness and adoption of recommended practices (see pp 24-26); include shoreline protection measures in deeds prior to sale of Borough lands; establish shoreline walking trails where feasible.

14. East Slope California Ridge

Description: forested uplands (mostly under Mental Health Trust ownership).

Community Interests/Values: creates attractive natural visual backdrop for Ketchikan residents and visitors; small pockets of commercial timber along drainages.

Use/Development Considerations: higher elevations, difficult access, generally steep topography and forests of limited commercial value suggests that extensive modifications unlikely.

Recommended Actions: Use helicopter logging for any selective timber harvests; keep cut areas small.

15. Steep Sided Stream Corridors (V-notch drainages)

Description: approximately 1.2 miles of deeply incised lands along Rosa and High Mountain Creeks.

Community Interests/Values: unstable, erosion and landslide prone areas to be avoided.

Use/Development Considerations: not suitable for development or timber harvest; access difficult, disturbance can lead to erosion and downstream sedimentation and flooding; crossing by bridge rather than culverts recommended; keep development activities well back of the "influence zone."

Recommended Actions: retain in Borough ownership; manage as open space reserves and habitat; avoid crossing by road or trail.

16. Trail Corridors

Description: shoreline and California Ridge trails linked by connector trails along major creeks.

Community Interests/Values: ensures public access to recreation attractions; contributes to value and quality of residential areas served; avoids future costs of buying trail easements.

Use/Development Considerations: shoreline trails may be difficult in rocky areas or expensive where crossing private lands; ORV use should be guided to specific, appropriate areas (such as along future road corridors).

Recommended Actions: incorporate North Gravina trail recommendations in Gravina Island Trail System Plan; include trail easements in Borough land sales and Planned Developments; field test possible routes; establish provisional trailheads with signage at the end of any roads and along shoreline where mooring/docking improvements are made; secure trail ROW with Mental Health Trust.



North Gravina, looking south from high above Vallenar Point. While much of the area shown here is more costly to develop due to its distance from existing and proposed roads and services, waterfront parcels should continue to be valued for those seeking a rural lifestyle with boat access.

Part Two: Policies
5/Proposed Zoning

Zoning regulations protect the rights of individuals and the public. They affect the future of Gravina more than almost anything else that is done at the local level. Zoning will define the extent of the industrial reserve, locations where commercial development may occur, and development standards for residential areas, the shoreline and road corridors. The zoning ordinance consists of two parts: a text and a map. In the North Gravina area, there are two types of zoning recommendations:

- No changes to some existing zones (Airport Development, Rural Residential/Cottage Industry); and
- New zoning classifications for those areas and situations where existing Borough zone classifications may not satisfactorily guide development activities (e.g., Industrial Park, Development Reserve, Resource Management, etc.)

Below is a summary of recommended zoning actions. The page numbers in parentheses indicate where policies and additional information are to be found.

AD Airport Development (1,928 acres) (see pp 16-17 and Central Gravina & Airport Reserve Plan, pp 14-17)
Intended Uses: Commercial and industrial uses compatible with operation of the airport.
Development Considerations: 87 acres at the north end of the Reserve (including the PL&L sawmill lease) to be re-zoned Industrial Park; most airport-related development will continue to be concentrated around existing facility.

IP Industrial Park (186 acres) (see pp 16-17)
Intended Uses: light and heavy industrial activities; master plan needed to guide development.
Development Considerations/Uplands: tracts range from 5 to 20 acres; 10 acres to be reserved for wastewater treatment facilities; provide for access to waterfront.
Development Considerations/Waterfront: existing approximately 2-acre lots may be combined; activities subject to waterfront development recommended practices (land clearing, site grading, drainage, public access along shoreline, setbacks, etc., see pp 24-25).

PD Planned Development (324 acres) (see pp 18-21)
Intended Uses: mixed residential, commercial and recreational uses.
Development Considerations: development to be guided by approved Master Plan (showing roads, trails, utilities, lots, common areas, facilities, open space reserves); existing private parcels may be combined with Borough lands to create viable acreages.

RL Low Density Residential (14 acres) (see pp 18-21)
Intended Uses: single family residences--15,000+sf lots.
Development Considerations: Cottage industry overlay recommended for removal on waterfront lots subdivided to 15,000 sf; owners to consider waterfront development best practices (see pp 24-25).

DR Development Reserve (308 acres) (pp 18-21, 24-25)
Intended Uses: future residential, commercial and recreational uses.
Development Considerations/Uplands: dispersed recreational and resource management activities permitted (e.g. trails, primitive roads, selective timber harvest) until more intensive and permanent uses feasible.
Development Considerations/Waterfront: to continue to be used for trail and water accessible recreation until more intensive and permanent uses feasible; eventual activities to support proposed development within Rock Point/Rosa Reef area; maintain public access and use along shoreline.

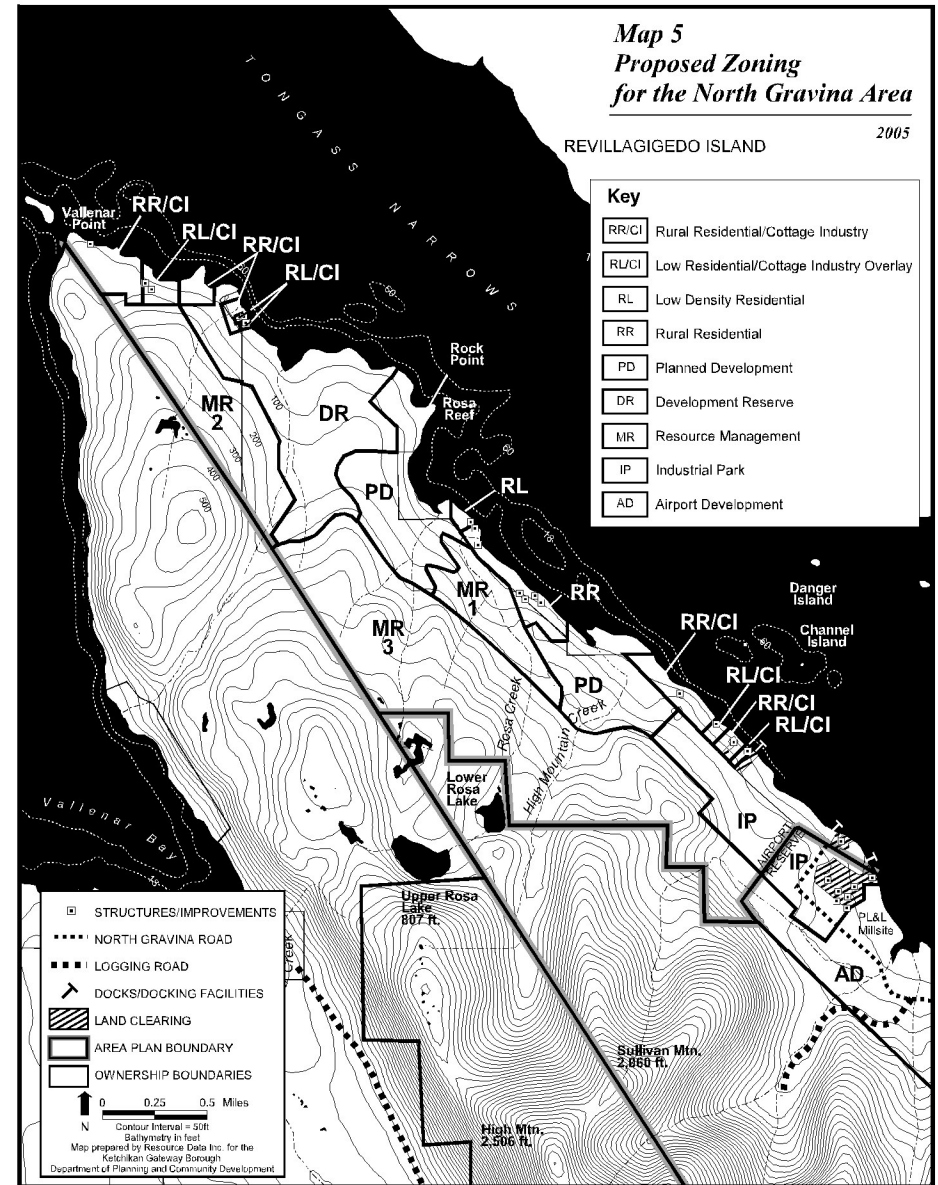
RR/CI Rural Residential/Cottage Industry (127 acres)
Intended Uses: water accessible rural residences with small-scale industrial activities permitted.
Development Considerations: no change to current zoning; cottage industry overlay to be reviewed.

MR Resource Management (1,087 acres) (see pp 22-23 for information on individual management units).
Intended Uses: upland areas managed for watershed, habitat and viewshed protection, while allowing for dispersed recreation as well as timber and other resource harvest activities.
Development Considerations: resource harvest activities require conditional use permit that addresses road layout and standards as well as watershed, visual and habitat mitigation measures.

PLI Public Lands & Institutions (50 acres) (pp 20-21)
Intended Uses: public recreation
Development Considerations: maintain public access and use along shoreline; preserve natural character of shoreline by minimizing land and vegetation disturbance.

Map 5
Proposed Zoning
for the North Gravina Area

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Part Two: Policies
**6/Road & Infrastructure
 Extensions**

Findings

The North Gravina Road connecting the PL&L sawmill to the airport terminal and ferry is now under construction. This 4-mile road segment is a critical piece of a network to serve the North Gravina area. The Borough is now developing the design, preliminary engineering and permitting for a road extension further north to the KPC tract (see segment C-D-F-G below).

While the terrain is relatively unchallenging, the costs of construction are formidable (the Forest Service estimates approximately \$1.25 million per mile for constructing a road that meets a 35 mph driving standard, with several bridges). Extending infrastructure is also expensive (see summary of infrastructure and road extension costs on page 26). The Borough is seeking financing from diverse sources including federal highway funds, federal/state public health programs, area property owners and direct Borough investment.

Projected traffic volumes suggest that a single main road providing access to shoreline properties will be adequate into the foreseeable future. An upland bypass route is to be reserved to provide better access to Borough uplands and an alternative to the shoreline route when traffic volumes deem it necessary.

Road & Infrastructure (R&I) Policies

R&I/1 Road development shall be guided by a Gravina Road System Master Plan to ensure a cost effective means of vehicular access. Initial investments will focus on access to the Industrial Park area. This road will be extended north to serve private shoreline properties and Borough lands as demand warrants.

R&I/2 The Road System Master Plan will support alternative means of movement, including bus, bicycles and pedestrians.

R&I/3 While a road system providing access to existing shoreline properties will be an early focus, an upland road corridor will be set aside to meet longer term access needs and for traffic reduction along the waterfront.

R&I/4 Pioneer roads, including timber harvest roads on Borough lands, must be consistent with the Road System Master Plan. Improvement and maintenance costs are to be borne by landowner(s). Unless designated for recreation use, such roads are to be gated/closed until meeting Borough standards.

R&I/5 Road improvements shall be consistent with Borough

standards and employ "Best Road Management Practices." They will provide viewpoints with scenic turnouts and reduce visual impacts through careful siting (minimizing cuts and fills) and minimal disturbance to natural vegetation.

R&I/6 Road corridors will provide access for infrastructure and community services. Extension of services will serve as an incentive and a means to guide development activities.

R&I/7 The Borough will support KPU plans to extend electric and telephone service to the PL&L site and terminal area and seek financing from landowners/beneficiaries to size the electrical service for industrial purposes and to extend both services north of the Airport Reserve.

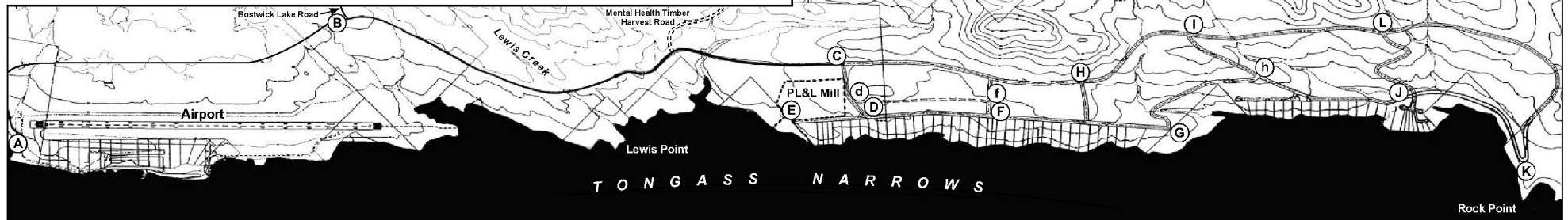
R&I/8 The Borough will work with industrial developers to install a common water and wastewater treatment system. Those industrial activities which require large amounts of water and generate large quantities of effluent may be encouraged to locate at sites where this infrastructure is available or less costly to develop (e.g., Ward Cove).

Summary of North Gravina Road System Options

Segment (see map)	Length (miles)	Recommended R.O.W. Width (feet)	Estimated max. grade (%)	Estimated cost - forest-tye standards: 2 lane, 35 mph, gravel surface @ \$ 1,000/lin.	Road Function	Expected construction period		
						0-5 Years	5-20 Years	>20 Years
A-B	North Gravina Road, from Airport to Bostwick Lake Road junction (see note 1)							
B-C	North Gravina Road, from Bostwick Lake Road junction to PL&L Millsite (see note 2)							
C-D	.25	60'	6%	\$ 250,000	Secondary road, industrial park access (under development) (see note 3)	●		
D-E	.30	40'	7%	300,000	Local access to industrial sites and common waterfront facilities	●		
D-F	.35	60'	5%	350,000	Pioneer road under development (see note 3)	●		
d-f	.35	60'	6%	350,000	Alternate route to D-F above (see note 4)	●		
F-G	.75	60'	7%	750,000	Pioneer road under development (see note 3)	●		
G-h	.60	60'	7%	900,000	Optional segment through difficult terrain and environmentally sensitive area (see note 5)		●	
C-H	1.0	120'	3%	1,000,000	Access to industrial park upland sites; future N. Gravina main collector road (shoreline bypass)	●		
H-I	.50	120'	12%	500,000	Main North Gravina collector and shoreline route bypass		●	
I-h-J	1.0	60'	10%	1,000,000	Secondary road, local access to waterfront lots and Rock Pt/Rosa Reef area beyond (note 6)		●	
J-K	.68	60'	3%	700,000	Optional secondary road providing access to Rock Pt/Rosa Reef marina, services (note 7)		●	
I-L-M	1.35	120'	8%	1,350,000	Main North Gravina collector and shoreline route bypass			●
K-M	.68	60'	12%	700,000	Secondary road linking Rosa Reef marina and Borough lands to main upland road			●

Notes

1. Approximately 1.5 mile segment initially developed as a controlled access one lane gravel road with turnouts.
2. Approximately 2.4 mile segment initially developed as a controlled access one lane gravel road with turnouts.
3. Serves as main collector until upland bypass constructed.
4. This alignment would facilitate expansion of waterfront sites into Borough uplands.
5. Segment H-h is the preferred routing.
6. Serves as main road until upland bypass segments completed (I-L)
7. Long term main vehicular access to Rock Point/Rosa Reef would be along upland segments H-I-L-M-K



**Map 6
 North Gravina Road
 System Options**
 2005

Part Two: Policies
7/Industrial Park Area

Industrial Park (IP) Policies

IP/1 An Industrial Park Master Plan will be prepared to guide Borough land sales and leases and infrastructure development. The plan will provide for varied parcel sizes, waterfront linkages and shared facilities as well as flexibility to meet changing needs.

IP/2 The Borough will work with industrial park users to improve road access and basic infrastructure for which the local match component of public investment is to be repaid by a combination of local property taxes, special assessments and user charges.

IP/3 Wastewater treatment facilities developed to service the industrial park will be designed to meet other North Gravina development needs.

IP/4 Borough lands will be sold or leased to support Industrial Park development. Borough land leases and sales may be used as incentives to developers.

IP/5 The Borough will use sale/lease of its lands to encourage compact and efficient growth. Parcels near existing activities (e.g., PL&L), would be used first, with more distant parcels reserved for future demand.

IP/6 Common waterfront facilities will be established to meet needs of upland parcels.

IP/7 Waterfront sites with difficult terrain will be encouraged to expand into upland parcels when additional space is needed, rather than severe clearing/regrading of nearshore areas.

IP/8 The Borough will work with existing owners of waterfront parcels to create viable sites, either by combining with adjacent lots or expanding into uplands.

IP/9 The Borough will support research and pilot projects for using overburden from site clearing (soils, brush, trees) in landscaping and restoration activities.

IP/10 The Borough will promote awareness and adoption of waterfront development best practices (see pages 24-25) within the Industrial Park.

IP/11 Materials site development within the Industrial Park will be done in a manner that leaves usable lands upon completion of quarrying activities and minimizes visual impacts.

Findings

North Gravina contains significant acreage that is well suited for water-dependent industrial purposes requiring upland acreage. This is especially true of the waterfront lands immediately north of the Airport Reserve where noise-tolerant (in the flight path) industrial uses could be appropriately located and where industry-supporting roads and infrastructure can be efficiently extended.

Extensive areas of developable, Borough-owned land north of the Airport Reserve are suitable for industrial development but isolated from saltwater access by earlier subdivisions along the coastline. Acquisition of saltwater access corridors is needed to assure that Borough land is accessible to future waterfront transportation facilities and is thereby more versatile and valuable for industrial development purposes.

Not all of the land appropriate for industrial purposes is presently zoned for this use. Residential zoning could interfere with industrial development objectives for the area immediately north of the existing industrial zone.

Many industrial zoned, privately held waterfront parcels in North Gravina are small and have steep slopes, limiting their development. At the same time there are opportunities to combine parcels as well as link waterfront sites to adjacent uplands with lesser slope limitations.

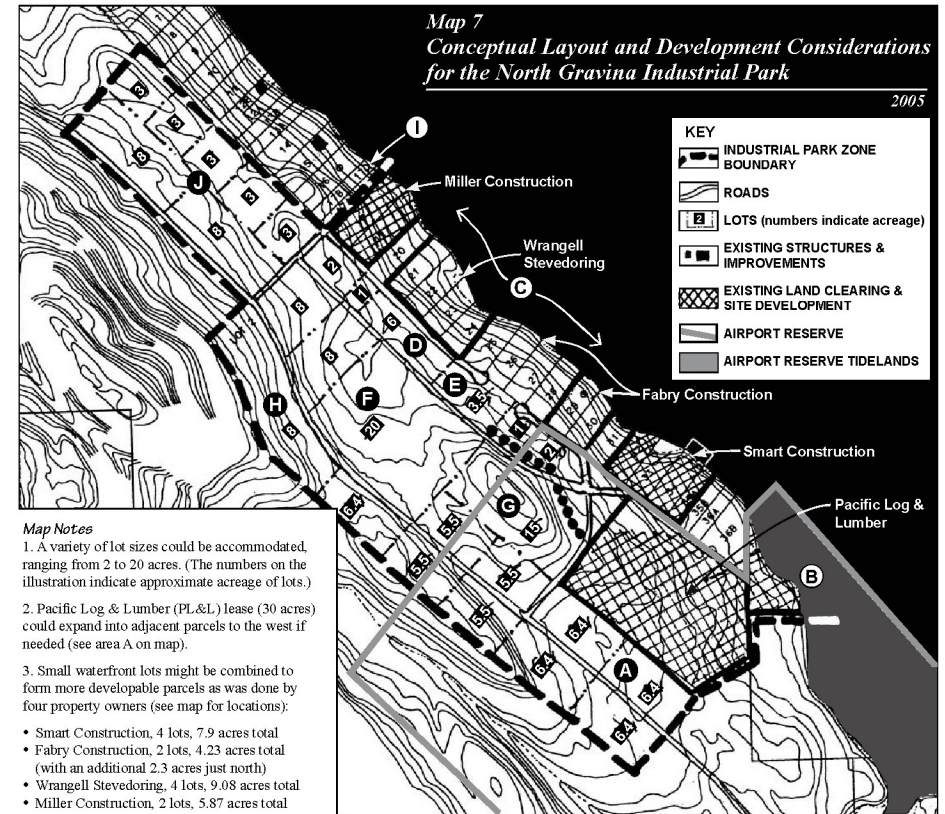
The waterfront area adjacent to the PL&L sawmill lease is to be shared by other nearby developments. A second shared waterfront access area should be identified at the other end of the proposed Industrial Park.

Industrial developments typically require extensive cleared areas, resulting in large quantities of organic waste materials or overburden. Research is needed on ways to process these materials for use in site reclamation and landscaping. The Borough may assist by identifying a site for overburden disposal.

Development on muskeg (organic) soils such as those found in North Gravina typically require rock overlay (for drainage and structural support). Rock may be obtained from the airport quarry site and/or from the small knoll just north of the PL&L lease, or from other suitable sites.

Industrial development will require some form of shared wastewater treatment facilities. An economic analysis is required to determine the feasibility of extending airport services (water, sewer) to the Industrial Park or developing them within the park itself.

Extension of telecommunications and electricity by KPU to the industrial park area by submarine cable from Revilla is now under study.



adjacent Borough lands (area E on map). The Borough is now seeking a Corps of Engineers permit for this road

8. One large site (20 acres) with convenient access to waterfront facilities reserved to attract a "keystone" activity (area F on map).

9. Small knoll to serve as possible site for quarrying rock materials needed for Industrial Park development. It could be reclaimed and used as the site for a wastewater treatment facility serving all Industrial Park properties (area G on map).

10. With careful site management and restoration, additional rock materials could be taken from parcels with steep topography, leaving them in a condition more suitable for materials uses (area H on map).

11. Very steep slopes to be kept in native

vegetation to help reduce visual impacts, such as the lower slopes of the proposed rock materials site (black dots adjacent to area G on map).

12. The Borough may negotiate with owners of undeveloped waterfront properties adjacent to proposed Industrial Park (area I) to secure them as buffer between industrial activities and residential uses to the north. Map shows location of two properties with improvements to the north, other lots are undeveloped.

13. Northernmost portion of the Park (32 acres, area J) could be reserved for less water dependent activities and upland expansion of waterfront properties with cottage industry uses.

14. One parcel (5 acres) could be dedicated to prototype facilities for processing organic waste materials from site clearing into materials for use in site re-vegetation and restoration.

Part Two: Policies
8/ Residential & Planned Development Areas

By "planned development" is meant larger scale site development (more than just several lots) guided by an overall master plan, usually undertaken by one or more investors (rather than individuals) and often with public sector participation. Planned development offers many advantages, including;

- maintains a desired density in areas of difficult terrain and other site conditions;
- makes smaller parcels more viable and profitable if combined;
- increases the attractiveness (and value) of individual properties within it and protects key amenities;
- permits a greater mix of development types, often incorporating single family detached residences with townhouses, condominiums, apartments and even commercial uses;
- maximizes the efficiency of infrastructure/services through more concentrated development and provides a greater amount of tax revenue to support them; and
- encourages shared or common improvements including trails, boat ramps, docks and moorings, and community centers.

Findings

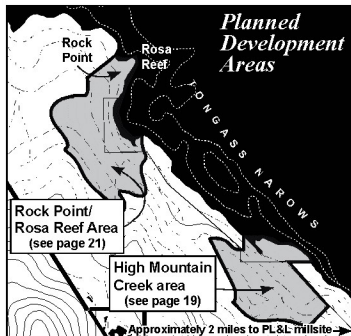
There is enough available residential land on Revilla to meet projected demand over the foreseeable future.

Of the 55 existing residential zoned properties in the North Gravina area, 10 have recorded improvements. With improved access, it is expected that the remaining parcels as well as new ones created from Borough holdings will be more attractive for residential development. The conceptual plans shown here provide for an additional 287 residential units to the community.

A considerable amount of land in the North Gravina area has limited development potential due to steep slopes (greater than 20%).

The North Gravina area has two large waterfront parcels (26 acre KPC site; 25 acre Webber Air Investments site) in private ownership which could be combined with adjacent Borough owned lands to create more viable tracts for planned development. The sketches on the following pages illustrate potential planned development scenarios for these two areas.

The Rock Point area has North Gravina's best beaches and potential for marina development, as well as 1.6 miles of Borough waterfront lands.

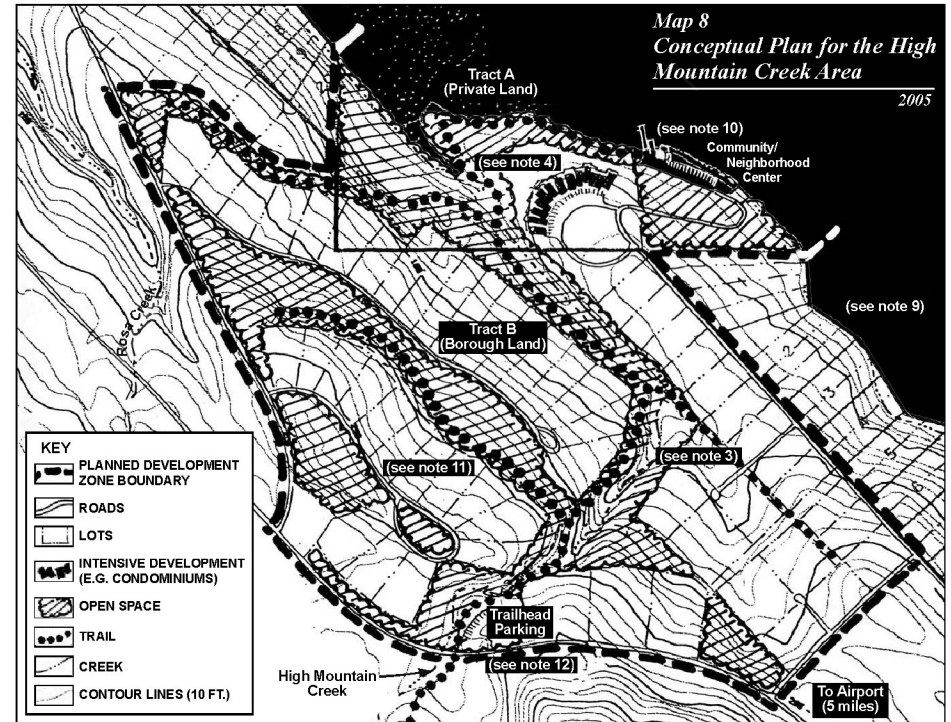


Residential and Planned Development (R&PD) Policies

R&PD/1 The North Gravina area is one of three planned residential development nodes on the island. Development should be concentrated to provide cost effective infrastructure and services.

R&PD/2 The North Gravina area shall provide a variety of residential options including large suburban lots (1-2 acres), more densely developed waterfront lots, multi-family sites, and remote residential parcels.

Policies continue on page 20



Notes

1. Plan illustrates integration of KPC (Tract A) and Borough (Tract B) lands.
2. Scheme provides 62 one-acre lots for single family residences, as well as 20 multi-family units. With existing waterfront lots, housing for 158 families could be provided.
3. Layout avoids difficult terrain and sensitive natural areas. The anadromous creek corridor forms part of the open space system. Wet soil conditions in much of the proposed development area would require rock overlay construction techniques.
4. Attractive prime waterfront site adjacent to High Mountain Creek estuary could be park serving upland residential areas (and the entire community) if acquired from KPC. Alternatively, a portion of the tract could be developed into high density housing (20 multifamily units) while reserving portions of the site for public open space.
5. Tract A and the adjoining tidelands provides for protection of the High Mountain Creek watershed, its viewsheds and the outwash flat at the mouth of the creek.
6. All properties are less than 2 mi from the proposed Rock Point/Rosa Reef marina area and less than 5 mi to the airport.
7. Road system minimizes thru traffic within neighborhoods.
8. Intensive development such as that shown here would require installing a neighborhood package sewage treatment plant or connecting to a wastewater treatment system such as may be developed for the adjacent North Gravina Industrial Park.
9. 31 of the existing waterfront parcels could be subdivided into two lots, yielding 76 rather than 45 shoreline properties. This would add to the availability of this valuable site amenity.
10. The Community/Neighborhood Center provides water access (boat ramp, docking, limited mooring) for upland properties. It could either be open to the general public, or owned and managed by a neighborhood association or service area.
11. All properties have direct access to an open space and trail network, linking Upper Rosa Lake and the California Ridge Trail system to the shoreline.
12. Parking and trailheads allow for public access to the trail system.
13. Borough-owned uplands enables maintaining a buffer zone between the industrial uses to the south and residential and commercial uses to the north, while protecting the natural watershed and the values of adjoining waterfront properties.

Residential and Planned Development Policies
continued from page 18

R&PD/3 The Borough will use its lands to support planned development adjacent to the two existing large private waterfront parcels (KPC site at mouth of High Mountain Creek and Webber Air property near Rock Point).

R&PD/4 Properties in the Vallenar Point area are to remain as water-accessible, remote residential parcels until road extensions to them are economically feasible.

R&PD/5 The Borough will inform and encourage shoreline residential property owners to incorporate waterfront development "Best Practices" (see pages 24-25) in design, construction and maintenance activities.

R&PD/6 Planned Development areas will be designed to meet local demand for residential properties and to support community and visitor needs for recreational services, sites and attractions.

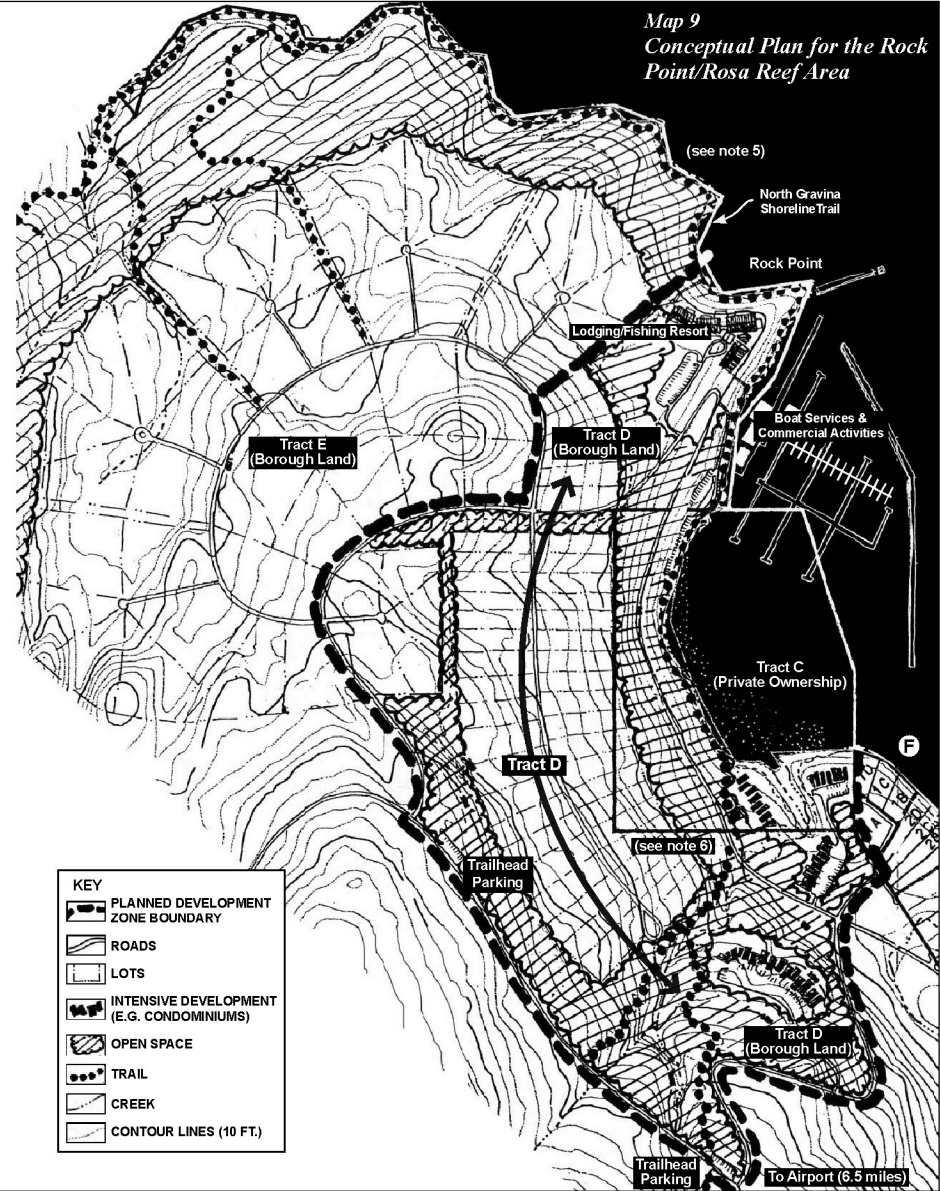
R&PD/7 Where terrain permits, public or community access along shorelines should be maintained.

R&PD/8 The Borough shall look for ways to provide and ensure access to the waterfront for upland properties as well as the general public.

R&PD/9 Docking and mooring improvements should be shared by multiple properties to reduce impacts and costs.

Notes

1. Plan illustrates integration of large private parcel (Tract C) with Borough lands (Tract D) with potential expansion into other Borough-owned parcels (Tract E).
2. A small boat harbor is proposed for the Rock Point-Rosa Reef area capable of accommodating up to 400 boats, averaging 36 feet in length, if the moorage is completely developed. Moorage and related facilities and services may be developed in stages, beginning with 40 boats, or fewer.
3. The small boat harbor would complement the industrial, commercial and residential land uses planned for the North Gravina area. For full development of the small boat harbor, road access and other infrastructure must be extended to the Rock Point-Rosa Reef area. The earliest stages of the small boat harbor could accompany an isolated development of fishing lodges and recreational residences in this area, without road access. Sanitation could be small-scale water systems with a "package-plant" or STEP sewer treatment system.
4. The scheme provides for 44 one acre lots, 47 two-plus acre lots, and 48 multi-family units, as well as a lodge site, marina, boat related services, and parking. This could provide homes for 139 families.
5. The proposed North Gravina Shoreline Trail provides resident and public access to over a mile and a half of shoreline with both large and small "pocket" beaches. Boat access to these beaches would continue. The shoreline and beach in Tract C is exceptional and should be protected for public access and recreational use.
6. Development avoids steep slopes as well as creek corridors. Wet, organic soil conditions in much of this development area would require rock overlay construction techniques.
7. All properties have direct access to the open space/trail system.
8. Much of the visual and ecological integrity of the shoreline is protected.
9. This area could be served by its own package sewage treatment system, or joined to the system for the High Mountain Creek neighborhood and/or Industrial Park to the south.
10. The 26 already-platted, private residential lots (see area F) and the adjacent lands to the west will have excellent access to the small boat harbor and sport fishing-related center.



Part Two: Policies
**9/Resource Management
 (Recreation, Timber,
 Fisheries, Sand &
 Gravel, Habitat
 & Views**

Findings

Approximately 27% of the North Gravina area has significant limitations for development (see pp 5) and is best kept in a natural state, managed for wildlife, watershed, visual, and dispersed recreational uses.

A recent timber cruise of Borough lands in the North Gravina area indicated commercial timber limited to a few small stands and occasional single trees along streambanks or near the shoreline. Harvest feasibility is dependent on costs associated with helicopter logging, as well as securing selective harvesting permits within anadromous creek corridors. While there are commercial timber stands on DNR and University lands in the Vallenar Bay area, it is expected that these resources would be accessed from the proposed Forest Service road system, or by helicopter techniques, and would not depend on a North Gravina road.

Road and other development on muskeg areas, such as those found over much of the North Gravina area, typically require significant amounts of rock. Some of this material could come from the existing quarry site by the airport; some could be extracted from a knoll within the proposed Industrial Park.

Recreational use of the area currently is light and concentrated along the shoreline due to difficult access. The projected roads are expected to increase the numbers of people using upland areas for hunting, off-road vehicle use, and hiking.

North Gravina presents an attractive natural backdrop for many Ketchikan residents and visitors. While many areas have an adequate "visual absorption capability" (the capacity to screen and soften the visual impact of development as determined by slope and density of landcover), the most sensitive are those along the shoreline and the steep upland mountain slopes. Minimizing visual impacts along the shoreline should be the priority at this time.

The North Gravina area has four catalogued anadromous streams, with natural blockages limiting fish movement upland.

Resource Management (MR) Policies

MR/1 Use North Gravina's commercial timber resources to support small, value added forest products industries located within the industrial park and cottage industry zones.

MR/2 Identify and dedicate sites where experimental timber management activities can be tested (e.g. hybrid poplars, spruce and cedar plantations, fuelwood lots).

MR/3 Coordinate timber management and harvest activities with Mental Health Trust to increase economic viability of resource base and minimize costs.

MR/4 Integrate North Gravina destinations and routes into a Gravina Island master trail plan. Establish parking and trailheads (with signage and maps) at the end of all road extensions.

MR/5 Direct off-road recreational vehicle activities along future road corridors as a means of separating this use from non-motorized activities.

MR/6 Protect stream corridors with development setbacks (100 ft. on either side of streambank; 200 ft. within portions where salmon spawning occurs; to the top of the slope on v-notch drainages).

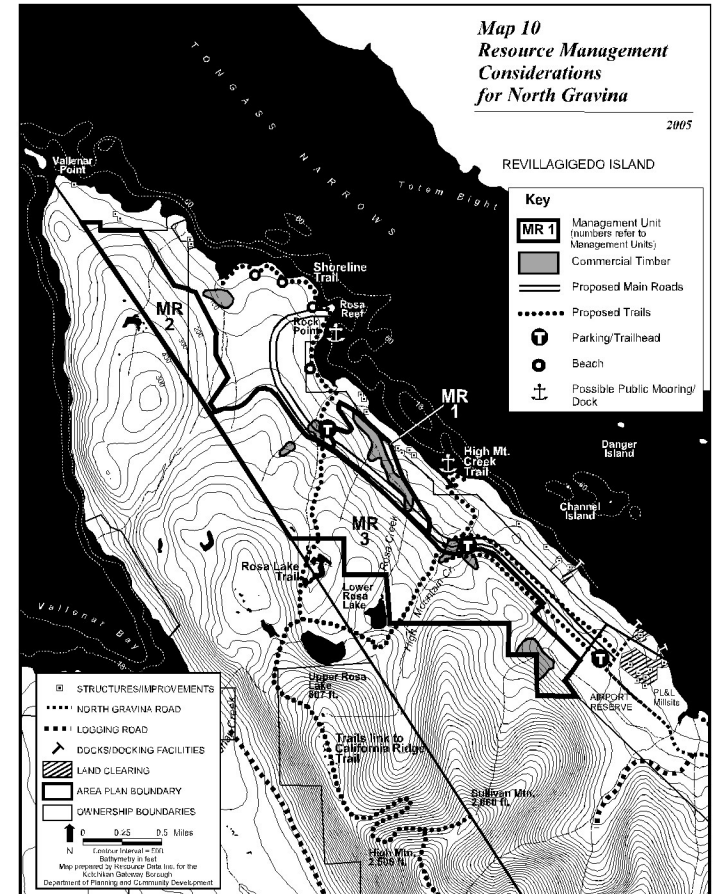
MR/7 In road development, provide for turnouts where scenic views are possible.

MR/8 Promote awareness and adoption of waterfront development best practices (see pp 24-25) to help protect visual resource values.

MR/9 Require master plans for materials and quarry site developments that include provision for screening, noise and dust control during operations as well as land restoration and re-use when mining activities are completed.

MR/10 Support research and pilot projects for using organic waste materials from site clearing (soils, brush, trees, etc.) in landscaping and land restoration activities.

MR/11 Incorporate critical habitat areas identified by ADF&G and USF&WS into open space reserves.



RESOURCE VALUES	Management Unit (see map)			Activities Key
	1	2	3	
Recreation	●	○	○	<p>● Generally allowed</p> <p>○ Allowed only in designated areas or by permit</p> <p>■ Not generally allowed</p>
Timber	○	○	○	
Fisheries	○	○	○	
Minerals	○	○	○	
Energy	○	○	○	
Habitat	○	○	○	
Air & Water Quality	○	○	○	
Hazard Avoidance	○	○	○	
Visual/Aesthetic	○	○	○	
Visitor Attractions	○	○	○	
Screens & Buffers	○	○	○	
Open Space	○	○	○	

ACTIVITIES	Mgmt Unit (see map)		
	1	2	3
Recreational hunting	●	●	●
Recreational fishing	○	○	○
Motorized recreation, ORVs	○	○	○
Personal fuelwood cutting	○	○	○
Structures (temporary)	○	○	○
Structures (permanent)	○	○	○
Materials site/quarry	○	○	○
Timber harvest	○	○	○
Commercial fishing	○	○	○
Roads (controlled access)	○	○	○
Roads (open access)	○	○	○
RV camping	○	○	○
Tent camping	○	○	○
Hiking	●	●	●
Wild food gathering	●	●	●

Part Two: Policies
10/Shoreline Development
"Best" Practices

The development of North Gravina will be largely expressed in changes to the shoreline. Most industrial activities are dependent on marine access and most residential uses will occur adjacent to the beach. Gravina's shoreline is important in many ways to Ketchikan residents: we admire its beauty, we fish along it, we walk along it (where possible), we enjoy or depend on the deer and other animals who rely on the shoreline for survival, and we benefit from the visitors who come to Ketchikan to, among other things, appreciate our beautiful waterfront setting.

The impacts of change that reduce our enjoyment of Gravina or our attractiveness as a visitor destination can be minimized by employing development practices that respect the important role the shoreline has in our lives. Regulations administered by the Borough, Corps of Engineers, Fish & Game and others address only some impacts; many can only be addressed through responsible individual initiative. The following "best" practices are to assist planning and siting of shoreline structures and protecting assets that citizens now enjoy. They are not meant as official rules, but rather as guidance to designing successful shoreline facilities and residences.

1. Give priority to water-dependent and water-related uses Waterfront land is scarce and expensive. It is important to use it carefully and not substitute it for uses that could function just as well on non-waterfront land. A water-dependent use is one that requires a waterfront location, like a dock, which can only be located on the water. A water-related use is one that benefits uniquely from its waterfront location, even though it is not strictly necessary for it to be on the water. A waterfront lodge at Rock Point is an example, as well as recreation and some residential uses. It is important to optimize water-dependent and water-related values, both because community interests will be well-served by the property's contribution to the local economy and because high property values will be developed and maintained.

2. Start with a site development plan An important first step is a site plan that identifies the best locations for structures, roads and other improvements, as well as areas to remain natural. In preparing such a plan it is important that the long-term development and use of the entire property and, when appropriate, neighboring properties be taken into account.

3. Minimize site re-grading People often respond to steep and irregular shoreline topography by filling in low areas and cutting away steep banks in order to have a flat building pad. This typically leads to extensive rock retaining structures. On narrow waterfront lots, this can easily impact most of the site. Often the best solution is to build on posts or pilings in order to make a lighter footprint. On lots where site re-grading may impact 50% of the site within 200 feet of the shoreline, professional design assistance should be sought prior to commencing work.

4. Maintain the natural flow of water through the property. Shoreline areas have numerous small creeks and drainage channels for directing Ketchikan's abundant rainfall and storm water to the sea, thereby preventing erosion and flooding. Property owners should minimize disturbance to these often fragile, natural water flow paths.

5. Setback buildings and structures from the shoreline. Shoreline setbacks are used to allow property owners to enjoy the privilege of living or establishing a business on the waterfront while protecting the views of adjacent property owners as well as recognizing public interests and ecological considerations. The setback may often be 50 to 100 feet or more depending on the site, nature of the proposed development, extent of vegetation removal and other development practices.

6. Minimize clearing of trees and other native vegetation. Shoreline areas contain many different ecological communities and the greatest number and variety of plants and animals. Leaving dead snags (for eagles and other birds to nest/roost, leaving native trees and shrubs (for deer to use in winter), and setting structures back from the shoreline (leaving tidelands undisturbed) are all ways to provide for the needs of native animals. It is recommended that within 200 ft of the shoreline, at least 50% of the natural vegetation should remain undisturbed.

7. Share access improvements with neighbors (docks, driveways, beach stairs/ boardwalks, bridges, etc.) Shoreline lots typically are narrow to maximize access to and enjoyment of this limited amenity. Neighbors can cooperate to construct and maintain improvements in order to reduce costs and protect the natural beauty. On long, narrow waterfront lots, shared driveways can cut necessary land clearing by half. Subdivision layouts such as that illustrated on this page can include provision for shared docking facilities for both waterfront properties and upland parcels.

8. Allow for walking along the shoreline. Property lines typically extend landward from the mean high tide line, permitting public movement along the shore when tides are low. Docks, jetties, mooring lines and other shoreline structures should not interfere with this except as required for economic development activities. A "best practice" in Borough waterfront subdivisions is to provide shoreline trails where needed above the mean high tide mark to help people more easily negotiate obstructions such as rock outcrops, logjams, small creeks, etc.

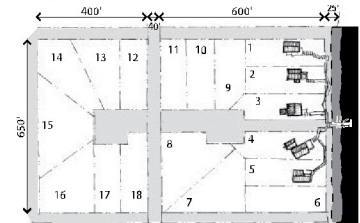
9. Keep wastewater out of the sea. Residential development creates two kinds of wastewater: sewage and surface runoff (from buildings, driveways, etc.). For years, waterfront properties took advantage of the significant tidal flushing of Tongass Narrows to dilute sewage. This is no longer permitted due to higher water quality standards and increased population. Surface runoff can best be controlled with site grading and landscaping. Wherever possible, runoff should be directed into a natural basin or swale where sediments and possible pollutants can be naturally filtered prior to flowing to the sea. Sewage treatment systems should be regularly checked to insure proper functioning.

10. Avoid difficult site conditions. Some shoreline lots have especially difficult site conditions such as a high bank, very steep topography, or a large creek running through. These may mean that one cannot build as close to the shoreline as desired, or special professional assistance is needed to work within these constraints. In a few cases, such limitations may indicate that the lot should not be developed at all.

11. Minimize site disturbance during construction. Providing access for heavy equipment and storing building materials typically requires land clearing and site modification beyond the perimeter of the finished building. Minimizing and keeping these areas upland, away from the shoreline, will save later landscaping costs and maintain the natural quality of the site. Trees and areas to remain undisturbed by construction crews should be clearly marked.

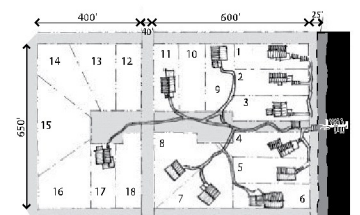
12. Keep vehicles and clutter back from shoreline. Shorelines are visually sensitive parts of the landscape; they are frequently viewed and have low screening ability. Derelict vehicles, piles of building materials and similar items should be kept upland, screened by vegetation. Providing for vehicular access to the waterfront requires site disturbance (clearing and re-grading). Unless essential for conducting business, driveways, garages, and parking are best kept on the parcel's upland side.

Docks



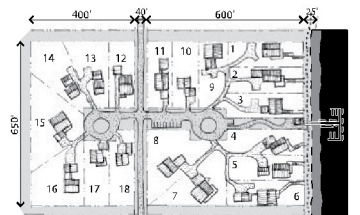
Stage 1: Waterfront properties sell first and are developed around a shared dock and access by boat only. Note development of shoreline trail/ boardwalk.

Trails/Pioneer Roads



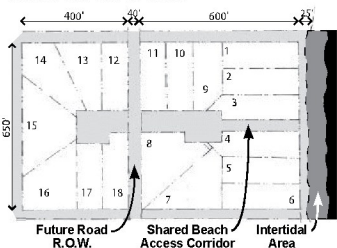
Stage 2: Some upland properties also develop with access still by boat only. Note development of central access corridor down to shared dock.

Main Road



Stage 3: Road extended to subdivision. Upland properties begin to develop, and waterfront properties add driveways and parking. Note shared driveways along lot lines and road down to beach/shoreline.

Shoreline Subdivision Layout
 Incorporating Many of the Recommended
 Practices Described Here



Subdivision layout establishes 18 lots (6 waterfront properties), access easements and open space reserves for shoreline and upland properties. Note recommended 25 ft. shoreline common space above mean high tide to allow for walking along beach. Public/common space is shaded.

Part Two: Policies
**11/Implementation
 Strategy & Costs**

The Borough's Role

As the principal landowner in the North Gravina area, the Borough has a key role in plan implementation. The Borough has local responsibilities for land management (including the subdivision and sale of Borough lands and the regulation of land uses), economic development, and transportation planning. These responsibilities imply important leadership roles to:

- promote and implement economic development and land use activities within the North Gravina area;
- determine an effective transportation network for this area;
- stimulate private/public partnerships for initiatives such as the Industrial Park and the Rock Point/Rosa Reef and High Mountain Creek planned developments proposed in this area plan;
- secure access to the waterfront for Borough uplands to insure long-term versatility and value for development purposes;
- develop recreational uses and facilities on selected lands as proposed in this plan;
- secure federal/state funds for infrastructure improvements; and
- assist in establishing a local service area to finance and maintain North Gravina area improvements.

One important early regulatory initiative will be the proper zoning of Gravina's lands to provide the framework for the plan's recommendations to be implemented. New zoning classifications are needed (resource management, planned development and others) and some existing zones should be modified. The Borough can facilitate priority economic development projects by working with regulatory agencies to pre-qualify sites so that planning and environmental review steps are complete and a project applicant can go directly to site, engineering and construction plan review.

To successfully implement the plan, the Borough will need to commit to sufficient staff (contracted or "in-house") to assume its leadership roles. It will require close cooperation between the Planning Commission, Borough Assembly, and Planning and Public Works Departments. It will also require collaboration between these organizations, other public agencies, and the private sector, including individuals and firms interested in investing in the projects conceptually proposed in this plan.

Interagency Partnerships

Implementation of the North Gravina Area Plan requires working relationships between the Borough and those public agencies and land trusts given responsibility for managing major portions of this area's lands and resources: State DNR (including the Division of Parks), State DOTPF, and the Mental Health Trust. Each of these has its own mission and objectives. Each needs to coordinate with the others for effective implementation. In order to secure an intergovernmental partnership, it is recommended that a task force of these agencies and trusts be formed and meet at least once a year to define cooperative actions to manage area resources. Cooperative actions may include:

- joint financing for construction of roads, trails and recreational facilities;
- cooperative harvest management to sustain timber flows to local processors;
- land exchanges to facilitate better and more cost effective management;
- identification of quarry locations for construction projects;
- road maintenance and closure policies to manage habitat and contain maintenance costs; and
- agreements on mitigation lands to facilitate projects.



Pacific Log and Lumber development in the foreground with Ketchikan International Airport about 2 miles to the south.

Financing Implementation

Implementing the North Gravina Area Plan is expected to take place in three segments determined in large part by the extent of road and infrastructure extensions: Airport Terminal to north end of the Airport Reserve (Segment A); north end of the Airport Reserve through the Industrial Park to the KPC tract (Segment B); and vicinity of KPC tract to Rock Point (Segment C). Order-of-magnitude costs of road, water and sewer utility extensions of these segments are estimated to be \$8 million for Segment A; \$2.25 million for Segment B; and \$5.63 million for Segment C (see sidebar). The above order-of-magnitude costs represent a paved road, developed to a 35-45 mile per hour Forest Highway standard, water main, and sanitary sewer. Water and sewer would be connected to existing treatment facilities at Ketchikan International Airport, extension across Tongass Narrows is not included. Residential, commercial, and some industrial uses can be serviced with a Septic Tank Effluent Pumping (STEP) system, as an alternative to a large-dimension sanitary sewer and centralized treatment plant.

To provide the necessary funds for this development, several possible sources are available, as follows:

Segment A: North Gravina Road At the time of preparing this document, the Planning Department had finalized the route of the North Gravina Road from the terminal to the north end of the Airport Reserve, had secured approval for mitigation lands for construction of the route and had obtained (jointly with PL&L) a Corps of Engineers permit for construction. PL&L had completed a one lane pioneer road from the sawmill south to a point west of the terminal. A road connecting the pioneer road to the airport terminal is expected to be constructed by the State in late 2005. Upgrading of the pioneer road is expected to occur when harvest activities commence on State and National Forest lands beyond Bostwick Lake. Financing of related sewer and water for this segment is not yet secured.

Road Segments B and C Design and construction funding for subsequent segments is anticipated from assessments to benefited property owners and possible State grant support. The Planning Department is now securing a Corps of Engineers permit for segment B.

Water and Sanitary Sewer Systems: Funding for these services is provided by U.S. Environmental Protection Agency programs, which often funds approximately 50% of total project design and construction cost.

Electrical and Telephone Systems: Electrical and telephone systems have previously been installed by the City of Ketchikan, Ketchikan Public Utilities, with their development cost repaid by customers.

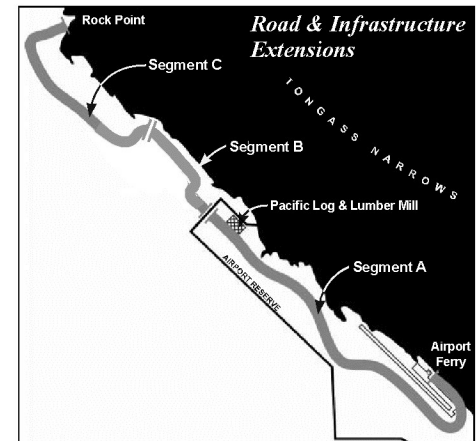
Local Financing The local share of these sub-area development costs, can be provided by assessments to benefited private properties, using a Local Improvement District (LID). The LID may be initiated either by the Borough or by property owners in the benefit zone. Assessments upon individual properties are based on a set of factors that can include area of property, building area located on the property, the property's demand for services and degree of benefit from the improvements. A majority of property owners within the LID boundaries must approve its establishment and their respective assessments.

Summary of Estimated Road and Infrastructure Extension Costs

Segment A: Airport Terminal to north end of Airport Reserve
 Road: 4 miles @ \$1.25 million/mile = \$5.0 million
 Water: 3 miles @ \$0.5 million/mile = \$1.5 million
 Sewer: 3 miles @ \$0.5 million/mile = \$1.5 million
Total: \$8.0 million

Segment B: North end of Airport Reserve to north end Industrial Park
 Road: 1.0 mile @ \$1.25 mil/mile = \$1.25 million
 Water: 1.0 mile @ \$0.5 mil/mile = \$0.5 million
 Sewer: 1.0 mile @ \$0.5 mil/mile = \$0.5 million
Total: \$2.25 million

Segment C: North end of Industrial Park to Rock Point
 Road: 2.5 miles @ \$1.25 mil/mile = \$3.125 million
 Water: 2.5 miles @ \$0.5 mil/mile = \$1.25 million
 Sewer: 2.5 miles @ \$0.5 mil/mile = \$1.25 million
Total: \$5.63 million



In determining the sum to be assessed under an LID, an allocation formula usually determines a public share of the total cost, attributable to community benefits for public safety, recreation and other purposes, as well as the shares representing benefits to private property owners.

When public and private shares of the LID are determined, a municipal bond may be sold to cover their cost. The public share of such a bond issue is sometimes collateralized by a pledge of anticipated real estate tax receipts from the benefited properties, while the private shares are collateralized by the agreed assessment of the properties, supported by their fair market value.

North Gravina can be developed in stages, the first of which can provide some set of improvements of a given sub-area. For example, if property owners in sub-area B, the industrial zone, consented to an LID for extension of road, water, sewer, and electrical services, available grant sources could be determined for this full array of services. However, in sub-area C, the residential and commercial zones extending north to Rock Point, property owners could decide that a more limited set of improvements would satisfy their first stage development needs. Such improvements could include initial small boat harbor development, extension of electrical service and minimal water and sewer services. These property owners' access, in lieu of a road extension, could be by water.

North Gravina Industrial Park

A plan for the North Gravina Industrial Park is presented in conceptual form (see pp 17) in order to stimulate discussion on the future of this important project. An early priority for implementation is to work with property owners and prospective Industrial Park tenants or owners to determine a desirable master plan to guide development of private and Borough property in this growth center. The North Gravina Industrial Park master plan should address:

- existing property owner and prospective tenant/owner interests;
- an ideal set of complementary industrial and business activities as well as potential anchor tenants;
- land, security, waterfront facilities and infrastructure requirements for each activity;
- access of present and future businesses to the waterfront and to the airport (including all Borough lands);
- an efficient road network to serve the Industrial Park and future expansion;
- rock materials sources and site reclamation policies;
- development of a method to process overburden for use in site reclamation and landscaping and identification of a site for overburden disposal;
- a capital improvements plan with funding source identification; and
- a marketing strategy.

The Planned Developments

The proposed High Mountain Creek and Rock Point/Rosa Reef planned developments have similar requirements to meet for successful implementation. (For a discussion of the planned developments, see pp 18-21.) Both are presented in conceptual form in this area plan. In both cases, Planned Development Master Plans will need to be prepared that provide strategies for development, including:

- defined land use plan for each commercial and residential development site;
- preferred recreational facilities mix and locations;
- shared use facilities/infrastructure (wastewater, roads, power, water, docks);
- financing of infrastructure;

- land sales and lease terms;
- waterfront access measures; etc.

In both areas of the North Gravina shoreline, access by water can allow some development to proceed without road access, minimizing initial development cost to both the private property owners and to the Borough. In this stage of development, public investment can be concentrated on other infrastructure, such as water, sewer, electrical and telephone utilities. The area plan can provide for future more intensive development, especially of inland areas, when property values will be sufficient to justify the cost of roads.

The interim result of such a staged development process can include some relatively large and functional industrial sites, such as the PL&L sawmill, along with smaller but still productive uses. Residential development can follow the existing pattern well established on Pennock Island, where waterfront residences have electricity and telephone services. At North Gravina, water and sewer can be added to these services and shared public moorage and boardwalks can facilitate a degree of inland development by non-waterfront property owners. In the potential marina/commercial area at Rock Point/Rosa Reef, fishing lodge development, complemented by public moorage, can proceed during this early stage of development.

The above-described level of development can proceed within five years, accelerating the pace at which North Gravina can become a productive component of Ketchikan's overall land base. With a plan in place for road access, eventual development of the roads can proceed incrementally as funds become available to support the cost of road construction and maintenance.

Small Boat Harbor and Related Facilities at Rock Point/Rosa Reef

The proposed small boat harbor is capable of accommodating approximately 400 boats, averaging 36 feet in length, if the moorage is completely developed. However, it could be practical for this moorage and related facilities and services to be developed in stages, beginning with 40 boats, or fewer. The small boat harbor could be developed with a capital investment of approximately \$1,000 per lineal foot of moorage, or \$36,000 for an average-sized 36-foot berth. A first-stage development of 40 berths, then, would require capital investment in moorage of approximately \$1.4 million.

Related infrastructure for a 20 lot commercial-residential waterfront subdivision using boardwalk access and an isolated water and sewer system would require additional capital investment of approximately \$30,000 per lot, more or less evenly divided into costs of access, water and sewer systems.

The Borough could induce early development of this type by trading Borough land in the Rock Point-Rosa Reef area for development rights on that portion of the small boat harbor site that is privately owned. The Borough then could finance the small boat harbor, boardwalk access and utilities using a combination of grants and revenue bonds, with the debt repaid by a Local Improvement District in which benefited property owners would participate. The result of public-private participation in such a staged development could be to create a sound and attractive addition to commercial and residential land uses in the Borough without a major initial capital investment.

Part Two: Plan Recommendations
11/Implementation Strategy & Costs
 (continued)

2005-2006 Action Plan

The first year action plan outlines 8 priorities, estimated costs and lead responsibilities. Together they represent a logical strategy for responding to the development issues and opportunities described in this plan.

1. New Zoning Classifications

Objective: Add three new zoning classifications to meet plan recommendations (Resource Management, Development Reserve, Planned Development).

Description/Tasks: Conduct background research related to new zoning classifications; draft new ordinances; solicit public comment; secure approval by Planning Commission and Borough Assembly; prepare legal descriptions of zone boundaries.

Lead Responsibility: Planning Department.

Estimated Costs: \$10,000 (consultant fees) (this work will be applicable to all three Gravina plan areas and in other planning work underway such as Clover Pass).

Financing Strategy: Planning Department Budget (FY 2005-06).

Implementation Actions: Allocate funds; develop contract scope-of-work; select/manage consultant.

2. North Gravina Industrial Park Master Plan

Objective: Prepare and secure approval for a master plan and action strategy to guide development of private and Borough property within designated industrial park site.

Description/Tasks: Form industrial park plan advisory group (property owners and prospective tenants/owners); complete engineering assessment (including site survey); complete market analysis; prepare alternative physical layouts and financing/marketing strategies for discussion; conduct community workshop to help promote public awareness and select preferred alternative.

Lead Responsibility: Planning and Public Works departments

Estimated Costs: \$20,000
Financing Strategy: Planning and Public Works budget (\$10,000, from FY 2005-06 budget), with matching funds (\$10,000) from economic development grant.

Implementation Actions: Write grant proposal(s) and secure funds; develop scope of work; identify consultant(s).

3. Gravina Interagency Task Force

Objective: Establish a mechanism for Gravina Island agency and selected private stakeholders to discuss and coordinate management and development plans.

Description/Tasks: Prepare information packet for task force members; establish first year task force priorities and meeting schedule.

Lead Responsibility: Borough Manager's Office

Estimated Costs: Minimal

Implementation Actions: Identify task force membership; secure commitments for participation; prepare information packet.

4. North Gravina Local Improvement District

Objective: Establish a mechanism for area property owners to share in decision-making and costs of road, utility and services brought into the area.

Description/Tasks: Conduct necessary background research (including estimates of public/private shares); prepare informational materials for

property owners/ beneficiaries; prepare legal and operational documents; outline implementation strategy.

Lead Responsibility: Borough Legal and Finance Depts.

Estimated Costs: \$10,000 (staff time plus option for consultant assistance).

Financing Strategy: Legal and Finance Dept. budget (FY 2005-06)

Implementation Actions: Secure funds; develop work program; identify possible assistance from contractors.

5. North Gravina Road Extensions

Objective: Determine specifics of North Gravina Road extensions (north of PL&L sawmill) to serve the proposed industrial park and shoreline properties.

Description/Tasks: Research options and costs of road extensions; meet with property owners; secure Corps permit; develop service area and LID to finance local costs of road extension; recommend proposed project(s) to Borough Assembly.

Lead Responsibility: Public Works and Planning Depts.

Estimated Costs: \$6000 (consultant fees).

Financing Strategy: Public Works Department budget (FY 2005-06)

Implementation Actions: Secure funding, develop scope of work, identify consultant.

6. North Gravina Utilities Strategy

Objective: Determine cost effective strategy for extending utilities to North Gravina area.

Description/Tasks: Evaluate basic utility (water, electricity, phone, and sanitation) needs for area and the various options for providing them; summarize cost estimates and possible financing approaches; support KPU project to extend electricity and telephone to PL&L area and secure local support through formation of a service area to finance extension of those services north of the Airport Reserve.

Lead Responsibility: Borough Planning and Public Works departments.

Estimated Costs: \$9,000 (consultant technical assistance)

Financing Strategy: Planning Department budget (FY 2005-06)

Implementation Actions: Secure funding; develop work program and scope of work; identify possible assistance from contractors.

7. Land Trades/Acquisitions

Objective: Ensure public access to key beaches and shorelines and maintain value and development potential of adjacent Borough owned tracts.

Description/Tasks: Meet with landowners of two privately owned shoreline parcels (KPC tract, Webber Air Investors tract) to discuss options for joint development with Borough, or possible land acquisitions or trades.

Lead Responsibility: Borough Manager's Office

Estimated Costs: to be developed.

Implementation Actions: Briefing materials for Borough Manager.

8. Materials Sites

Objective: Identify the most cost-effective means for meeting rock materials needs for North Gravina area development.

Description/Tasks: Estimate materials needs for roads, industrial park and other developments; identify potential sites and evaluate quality and amounts of recoverable materials; compare costs of developing new quarry sites with bringing in materials from existing Gravina sites; research options for reclamation and/or reuse of depleted sites (e.g., wastewater treatment); recommend strategy to Borough Assembly.

Lead Responsibility: Public Works Department

Estimated Costs: \$10,000

Financing Strategy: Public Works Department budget (FY 2005-06).

Implementation Actions: Secure funding; prepare scope of work; identify consultant(s).

Borough Responsibilities for Implementation

	Borough Assembly	Planning Commission	Manager's Office	Planning Department	Public Works Department	Legal Department	Finance Department	Rec. Department
Plan approval/policy setting	●	●	○	●	●	●		
Project planning for roads/infrastructure		●		●	●		●	
Master planning for industrial parks		●	●	●	○	●		
Recreation projects		●		○				●
Land use regulations/zoning		●		●		○		
Grant-writing				●	○		●	●
Creation/coordination of interagency task force	●			●	○	●		●
Airport-related economic Activities		●		●	●	●	●	
Political lobbying	●		●				●	
Formation of LIDs	●			○		●	●	
Financial management	●		●				●	
Project Management			●	○	●		○	●

● Leadership/Coordination Role
 ○ Major Role
 ● Advisory/Participation Role