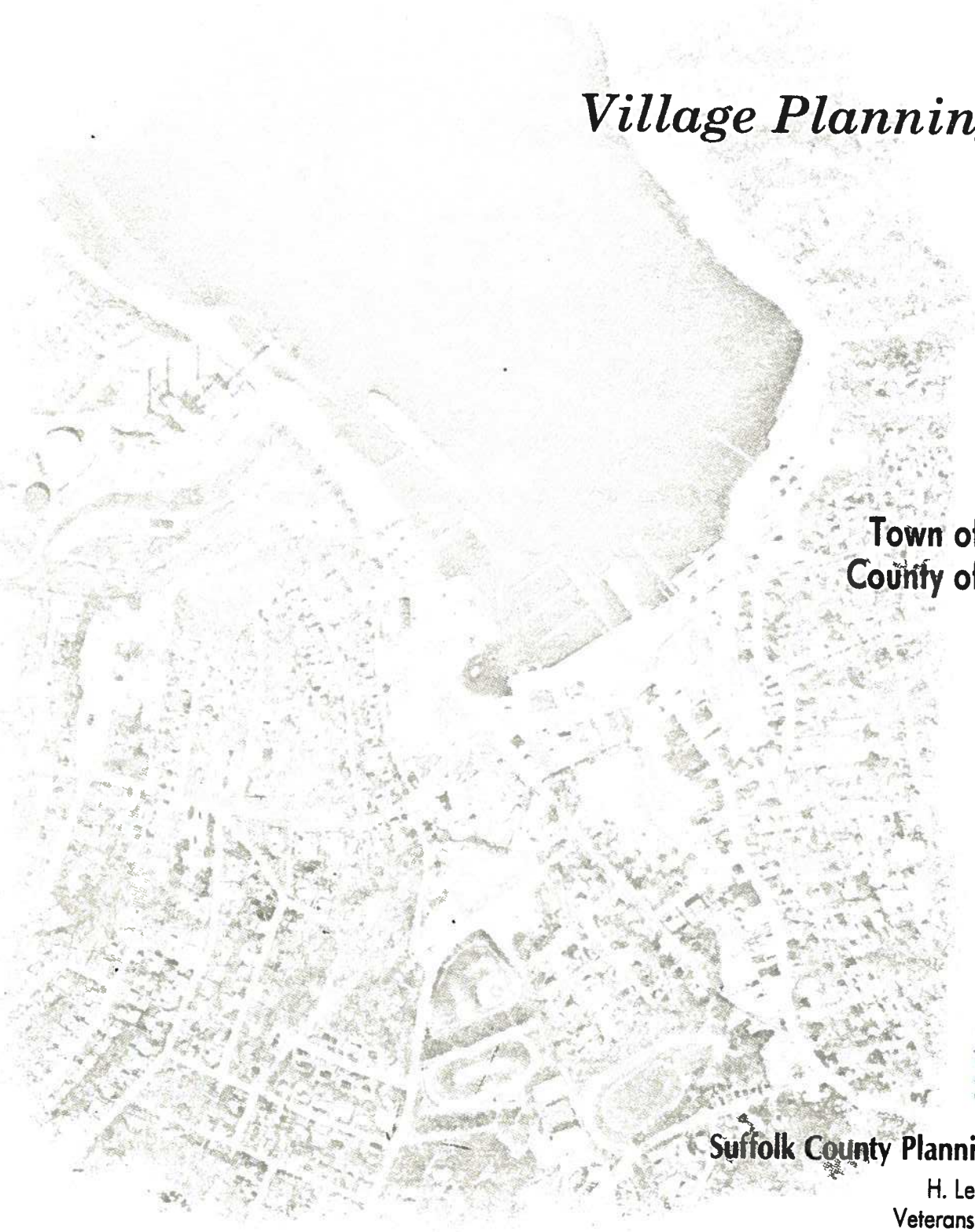
Peter Lambert

VILLAGE OF PORT JEFFERSON

Village Planning Study



did not adopt.

Town of Brookhaven.
County of Suffolk, N.Y.

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Prepa red by:
Suffolk County Planning Department
H. Lee Dennison Building
Veterans Memorial Highway
Hauppauge, New York 11788

Village Planning Study

VILLAGE OF PORT JEFFERSON

May 1987

COUNTY OF SUFFOLK

Department of Planning
H. Lee Dennison Office Building
Veterans Memorial Highway

Division of Transporation
H. Lee Dennison Office Bldg.
Veterans Memorial Highway

Suffolk County Planning Commission

John F. Luchsinger - Chairman

Gilbert L. Shepard - Vice Chairman

* * * * * *

George R. Gohn

Patricia McCrann

Robert N. Martin

Lloyd L. Lee

Dennis Lynch

Samuel Lester

Maurice J. O'Connell

Mardooni Vahradian

Vincent A. Wick

Richard Ward

Lee E. Koppelman - Director

Participating Staff

Planning

James Bagg
Roy Fedelem
Arthur H. Kunz
Carol Walsh

Transportation

Robert Felber
John Murray

Graphics

Tom Frisenda
Carl Lind
Anthony Tucci

Clerical

Paula Davantzis
Terry Kinkead
Jeanne Widmayer

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INTRODUCTION

The Village Board, in late 1986, requested assistance from the Suffolk County Planning Department in responding to a number of development issues in the Village. The original comprehensive plan which was prepared by consultants in 1965 has been partially implemented. Some areas of the plan remain to be carried out while changes in land use and development in the Village will require certain modifications. Therefore, this study is designed to evaluate recent trends in the Village and the surrounding area and recommend new policies that can be used by the Village Board, Planning Board, Zoning Board of Appeals and any other agencies that are concerned with planning issues.

Many of the original recommendations such as increased public use of the waterfront, expanded recreational facilities, community buildings, plus downtown and residential rehabilitation have occurred. However, all of this activity has exacerbated the traffic and parking situation since many of the proposals relating to transportation were not implemented. This study will address these deficiencies along with the other issues that have been raised by the Village and observed by the staff.

OVERVIEW OF VILLAGE GOALS

The preparation of a comprehensive plan for the Village should be preceded by a discussion of goals for the Village and how the various interests in the community view development in the Port Jefferson area. There are five different types of communities that could characterize the Village of Port Jefferson. They are as follows:

(1) Predominantly residential with a local service area:

This assumes that the major emphasis is on the maximum amount of residential use in the community. The business uses would be deemed a local service area which is designed to provide for the needs of nearby Village residents to the exclusion of most others. It is possible to direct the Village planning towards this goal; however, it would be rather difficult since rehabilitation of the business area in the last ten or fifteen years has made it into an attraction that extends way beyond the Village's borders.

(2) A tourist center:

The major emphasis here would be on serving a visiting population, along with the indigenous residential neighborhoods. A heavier emphasis on waterfront recreational and commercial uses would be required. At the present time, the Village is developing in this manner. To continue, would mean a further emphasis on accommodations and services, especially in the downtown area and on the remaining waterfront that does not now provide public access. Important decisions concerning expanded parking and improved traffic circulation would then become part of the overall planning.

(3) An employment center:

The existing business area, plus the major hospital centers and a certain amount of medium size office space have already brought a significant amount of employment to the Village. There is land available for office development on existing hospital properties and on underutilized land adjacent to the business district. This could be developed for major office space because of the ties to the institutions and the attractiveness of offices adjacent to all the services that are provided in downtown. If this goal were to be achieved, the primary limitation would be the road network and overall transportation system that would have to be geared to extensive peak hour travel.

(4) A transportation oriented center:

The plans for electrification of the railroad could create an increased demand for commutation from the Port Jefferson station. The current ferry service across Long Island Sound is heavily used, especially during the peak summer months. Major expansions of ferry service, along with parking and access improvements in the vicinity of the railroad would be necessary to upgrade the importance of these transportation facilities. The railroad demand is likely to put additional pressure on the immediate area for more extensive housing and commercial development in the station area. Expansion of the ferry service would require more of the available waterfront area, thus causing conflict with recent efforts to expand public access to the waterfront.

(5) A regional economic and service center:

The size of the current business district and the possibility of expansion, if parking and access questions can be resolved, make the above idea a possible goal. Rather than emphasizing tourist facilities,

the downtown business area could be oriented towards providing the retail and service needs of the Village and all of the surrounding communities which tend to have fewer commercial areas than are necessary to serve the population. The Village could provide all the specialty shopping and service needs of the areas that have limited potential for such uses.

FINDINGS

Population

The population for the Village of Port Jefferson was estimated to be 7,390 as of January 1987. This amounts to a population density of 2,459 people per square mile. Since 1980 the population has has grown by 9.8%, which is a little below the rate for the Town of Brookhaven but almost twice the growth rate for Suffolk County. Table 1 shows population comparisons for Port Jefferson Village, Brookhaven Town and Suffolk County.

Table 1

Population, 1970-87

Area	1970	1980	1987	change 1970-1980 Number	%	change 1980-1987 Number	%	Square Miles	1987 Density
V. of Port Jefferson	5,795	6,731	7,390	936	16.2	659	9.8	3.51	2,459
Town of Brookhaven	245,260	365,015	405,844	119,755	48.8	40,829	11.2	253.35	1,602
Suffolk County	1,127,030	1,284,231	1,355,034	157,201	13.9	70,803	5.5	911.00	1,487

The age distribution for Port Jefferson Village shows that it has an older population than both Brookhaven Town and Suffolk County. In Port Jefferson Village 13.8% of the people were aged 65 or over which is over one and one half times the percentage for Brookhaven and Suffolk. The higher elderly population is offset by a smaller youth population.

Table 2 shows the Village to have a small minority population and a higher than average income. The poverty rate is below the Town and County levels.

Table 2
Age, Race & Economic Characteristics

Area		Age 0-17	Age 18-64	Age 65+	Median Age	Year-Round Population	White	Black	Hispanic	Family Income	Belo Povert
V. of Port Jefferson		1,859	3,943	929	33.2	6,731	6,492	92	179	29,199	36
		27.6	58.6	13.8		100.0	96.4	1.4	2.7		5.
Town of Brookhaven	#	125,181	209,180	30,654	27.8	365,015	344,650	11,965	16,052	22,270	27,00
	%	34.3	57.3	8.4		100.0	94.4	3.3	4.4		7.
Suffolk County	#	405,724	762,679	115,828	29.9	1,284,231	1,185,109	71,741	58,689	24,195	82,087
	%	31.6	59.4	9.0		100.0	92.3	5.6	4.6		6.

Source: U. S. Census, 1980

Occupations

Major occupation groups are shown on Table 3. The major observation is that Port Jefferson Village has a very high percentage of its workers employed in white collar occupations. At the same time the Village has less than half the Town and County rates employed in blue collar occupations. Service workers make up about the same proportion in all three jurisdictions and farming and fishing employment is negligible for Village residents.

Table 3

Major Occupation Groups

Area		White Collar	Blue Collar	Service	Farming & Fishing	Total
V. of Port Jefferson	#	2,215	382	402	6	3,005
	%	73.7	12.7	13.4	0.2	100.0
Town of Brookhaven	#	82,760	36,282	19,371	1,787	140,200
	%	59.0	25.9	13.8	1.3	100.0
Suffolk County	#	312,521	147,261	71,419	7,350	538,551
	%	58.0	27.3	13.3	1.4	100.0

Source: U. S. Census, 1980

Journey to Work

An analysis of work patterns is useful to help understand various traffic problems. Using the 1980 U. S. Census we can analyze work patterns for both residents and workers employed in Port Jefferson Village.

Table 4 is an analysis of the resident workers and commutation patterns. Over one fourth of the Village resident workforce worked in the Village. This accounts for Port Jefferson's median travel time of 21.6 minutes being the lowest of any community in Western Suffolk County or Nassau County. Seventy percent of the Village's resident workers worked in Brookhaven Town and nearly 93% worked within Suffolk County. A very small number of residents worked outside the Nassau-Suffolk area. On a percentage basis one fourth as many Village residents worked outside of Nassau-Suffolk as did Brookhaven Town residents. The car was the primary means for residents to get to work with 89% or 2,624 Village residents opting for this mode of travel. Five percent of the workers were able to walk to their jobs and the same percentage used public transportation.

Table 4

Journey to Work

Area		Place of Work of Residents: Port Jefferson	Brookhaven	Suffolk	Nassau	Other	Total	Mean Travel Time	Mode of Travel: Drive	Mass Transit	Walk
V. of Port Jefferson	#	747	1,903	2,516	121	75	2,712	21.6	2,624	140	13[illegible]
	%	27.5	70.2	92.8	4.5	2.8	100.0	min.	88.7	4.7	4.[illegible]
Town of Brookhaven	#	NA	56,915	97,508	12,352	13,678	123,538	32.1	125,641	6,361	3,43[illegible]
	%		46.1	78.9	10.0	11.1	100.0	min.	90.5	4.6	2.[illegible]
Suffolk County	#	NA	NA	323,995	76,950	75,097	476,042	31.0	460,625	38,070	14,62[illegible]
	%			68.1	16.2	15.8	100.0	min.	87.5	7.2	2.8

Source: U. S. Census 1980

Since the Port Jefferson area, which includes the Village as well as Port Jefferson Station, is the twenty-ninth largest employment area on Long Island there is data available for workers coming into this area. Of the 10,657 people who worked in this area 9,982 or 93.7% came by auto in 1980. In spite of having a railroad station a negligible number came by rail. A high 24.0% of area workers also lived in the area. Considering that over three fourths of the area's workers come from Brookhaven Town and most of these are concentrated along the north shore it is easy to understand why Route 25A is so congested. Table 5 shows where people come from to work in the Port Jefferson Area.

Table 5

Workers by Residence by Mode of Travel
To the Port Jefferson Area - 1980

Residence	Total	% of Total	Mode			
			Auto	Rail	Bus & Subway	Other
Total Workers	10,657	100.0	9,982	12	20	643
Nassau County	323	3.0	323	-	-	-
North Hempstead	49	.5	49	-	-	-
Hempstead	100	.9	100	-	-	-
Oyster Bay	174	1.6	174	-	-	-
Suffolk County	10,241	96.1	9,581	12	5	643
Huntington	264	2.5	264	-	-	-
Babylon	84	.8	84	-	-	-
Smithtown	486	4.6	475	-	-	-
Islip	778	7.3	757	-	-	-
Brookhaven	8,333	78.2	7,705	12	5	611
Riverhead	117	1.1	117	-	-	-
Southold	48	.5	48	-	-	-
Shelter Island	4	-	4	-	-	-
Southampton	106	1.0	106	-	-	-
East Hampton	21	.2	21	-	-	-
Port Jefferson Area	2,562	24.0	2,044	12	-	506

New York City	87	.8	72	-	15	-
Bronx County	-	-	-	-	-	-
Kings County	-	-	-	-	-	-
New York County	52	.5	37	-	15	-
Queens County	35	.3	35	-	-	-
Richmond County	-	-	-	-	-	-
All Other Counties	6	.1	6	-	-	-
Westchester	6	.1	6	-	-	-

Housing

Selected housing characteristics are displayed on Table 6. Two thirds of the occupied housing units in the Village of Port Jefferson are renter occupied. This is a low number relative to Brookhaven Town and Suffolk County. The Village's average household size of 2.81 is relatively small due to the higher elderly population and the higher number of rental units. Nearly all of Port Jefferson's homes are served by public or semi-public water systems and 43% have public sewers.

Table 6

Housing

Area		Total Housing Units	Occupied	Owner Occupied	Seasonal & Vacant Units	Average Household Size	Individual Wells	Public Water	Public Sewer	Persons In Group Quarters
V. of Port Jefferson		2,355	2,227	1,482	128	2.81	12	2,312	990	465
	%		94.6	66.5	5.4		0.5	99.5	42.6	
Town of Brookhaven	#	120,833	109,266	84,903	11,567	3.26	28,165	84,368	26,134	9,056
	%		90.4	77.7	9.6		25.0	75.0	23.2	
Suffolk County	#	431,722	385,719	308,006	46,003	3.25	66,808	338,859	61,205	30,380
	%		89.3	79.9	10.7		16.5	83.5	15.1	

Source: U. S. Census, 1980

Table 7 shows the year structures were built and the number of households which are paying over 35% of their income on housing. It is evident that the Village has a large stock of old houses. Over 800 housing units were built in the Village prior to 1940. This is 35.6% of all housing units in the Village which is three times the percentage for the Town and two and one half times the County percentage.

Port Jefferson Village has a smaller percentage of households which pay more than 35% of their income than does the Town or County. However, there are 478 households which are stretching their income by spending over 35% of their income on housing costs.

Table 7

Housing - Age and Cost Factors

Area		Year Structure Built						Housing Costs of 35%+ of Income Area		
		1970-mar.80	1960-69	1950-59	1940-49	before 1940	Total	Owner	Renter	Total
V. of Port Jefferson		496	609	282	109	828	2,324	256	222	478
		21.3	26.2	12.1	4.7	35.6	100.0	19.3	32.2	23.7
Town of Brookhaven	#	43,220	31,447	18,931	8,399	13,603	115,600	16,548	9,552	26,100
	%	37.4	27.2	16.4	7.3	11.8	100.0	21.9	43.3	26.8
Suffolk County	#	92,601	123,667	100,936	30,896	57,567	405,667	54,918	29,625	84,543
	%	22.8	30.5	24.9	7.6	14.2	100.0	20.2	42.4	24.7

Source: U. S. Census, 1980

Condominium and Homeowners Associations

Condominiums accounted for 27 units of the total housing stock with only 10 units occupied on April 1, 1980. As of September 1986 there are approximately 110 condominium or Homeowner Association units in the village in two complexes, Belle Harbor Mews (18 u.) and The Riviera at Harbor Hills (95 u.). At the present time none of the 5 apartment complexes within the village boundaries have converted to the cooperative form of ownership. There were 1,420 persons occupying rental units in Port Jefferson in 1980 which averages 1.93 persons per rental unit.

Table 8

Apartment Complexes in the Village of Port Jefferson

(Built Prior to 1980 Census)

Name	Address	No. of Units
Bellaire Garden Apts.	Myrtle & Belle Terre Rds.	92
Belle Terrace	Dark Hollow Road	64
Harbor Heights Country Club Apartments	645 Belle Terre Road	96
Town House East Apts.	N. Country Road	40
Town House West Apts.	N. Country Road	30
		322
Condominium and Homeowner Associations (Constructed after 1980 Census)		
Belle Harbor Mews	High Street	18
The Riviera at Harbor Hills	Oakwood Road	95
		113

Institutional Population

The 1980 U.S. Census counted 472 persons residing in group quarters in the village, of which 428 were in homes for the aged. The village contains 2 nursing home/health related facilities; the Port Jefferson Nursing Home and Health Related Facilities (capacity 120) and Sunrest Health Facilities, Inc. (capacity 207). There are also two hospitals within the village boundaries, John T. Mather Hospital and St. Charles Hospital which may have had elderly patients backed up awaiting nursing home placement, accounting for the discrepancy between the census figure and the nursing home capacity. The Maryhaven Center of Hope has a capacity of 50. Table 9 lists the institutional capacity within the Village.

Table 9

Institutional Capacities - Village of Port Jefferson

	Capacity (No. of Beds)
John T. Mather Memorial Hospital North Country Road	228
Pt. Jefferson Nursing Home and Health Related Facilities Dark Hollow Road - P.O. Box 637	120
St. Charles Hospital 200 Belle Terre Road	271
Sunrest Health Facilities, Inc. 70 N. Country Road	207
Maryhaven Center of Hope Division of St. Charles Hospital 450 Myrtle Avenue	50

Existing Land Use

The existing land use was done in the autumn of 1986 and updated in May of 1987. This was done by using tax records, aerial photographs and field surveys. The results are shown on the Existing Land Use map and tabulated in Table 10.

The dominant land use is residential. Within the residential category, there are four density categories. High density refers to apartment houses. Most of these have densities of 15 dwelling units per acre. Major apartment complexes are located on Belle Terre Road, Dark Hollow Road and North Country Road.

The second highest density category is called "Intermediate". These are single and two-family homes on less than quarter acre lots. The major concentration in this category is east of Main Street with pockets on the west side of the Village, the southeast corner of the Village and around Puritan Path. The Belle Harbor Mews condominium on High Street falls into this density category.

The largest residential category is "Medium". This category has one to four dwellings per acre and is in all areas of the Village. The largest amount of land in this category is north of East Broadway and Old Post Road. Other concentrations are on the western and eastern fringes of the Village. The Riviera at Harbor Hills Condominium is in this category because its overall density, including open space, is only two units per acre.

The final residential category is "Low" density, which is residences on one acre or more. Most of these are in the Harbor Hills area east and west of the country club. There is another concentration near the Cedar

Hills Cemetery and a smaller one along Crystal Brook Hollow Road where larger lots were used in an effort to reduce impact on the steep slopes.

Commercial uses are mainly along Main Street, East Main Street and East and West Broadway. Port Jefferson has a well defined central business area north of Maple Place on Main Street and East Main Street. Another well defined business area is just north of the railroad tracks on Main Street.

In 1982 Port Jefferson had 138 retail establishments which employed 760 people and generated $46.2 million in sales. At the same time, the Village had 135 service establishments employing 1,130 and generating $38.1 million in receipts.

Office buildings have become increasingly popular in the Village. Concentrations exist along North Country Road, Belle Terre Road and Main Street. New office construction and conversion of homes to offices has recently been occurring along Main Street north of Stony Hill Road.

Industrial uses are predominately along the waterfront with most of this being fuel depots. The other waterfront industrial use is the stone docks on the west side of the harbor. Other industrial uses are along Columbia Street.

The dominant use in the Transportation/Utility category is Lilco's oil fired power plant. The next largest use is parking lots which are along the waterfront, in the downtown area and at the railroad station. Recharge basins and Suffolk County Water Authority properties are in this category.

Institutional uses are a major category in Port Jefferson. This includes Mather Memorial Hospital, St. Charles Hospital, the Maryhaven Center, three schools and numerous churches.

The Open Space/Recreation category contains mostly Village owned property with the exception of the 31 acre Cedar Hill Cemetery. The 116 acre Village owned country club is by far the largest parcel in the Village. A detailed breakdown of this land use category can be found in the "Open Space" section.

The final land use category is "Vacant." There are 261 acres in this category half of which are in the process of being developed. Most of this is in the southeastern part of the Village. A more detailed breakdown of vacant land can be found in the "Land Available for Development" section. Map 1 indicates the existing land use.

Map 1

Existing Land Use Map

Exisiting Land Use - 1987

Table 10

	High Density	Inter-mediate Density	Medium Density	Low Density	Commer-cial	In-dustrial	Transpor-tation Utility	Roads	Insti-tutional	Open Space	Vacant	Total
Acres	23.0	98.0	586.2	200.5	69.5	15.0	80.9	243.0	129.8	216.8	260.6	1,923.[illegible]
% of Total	1.2	5.1	30.5	10.4	3.6	0.8	4.2	12.6	6.7	11.3	13.5	100.[illegible]

Zoning

The Village zoning ordinance contains fourteen districts, thirteen of which are shown on the map. The I-1 waterfront industrial district does not appear even though there are such uses in the MW district.

The six residential districts provide a good range of lots size from one acre down to one-quarter acre. The one-quarter acre zone also allows new two-family unit conversions if the lot size is at least 18,500 square feet. The multi-family zone with a three acre minimum allows 12 apartments per acre.

There are two office-institutional type zoning categories. The R-0 district allows offices without dwellings, along with adult homes. The PA district allows hospitals, offices, apartments and nursing homes.

The commercial is well separated into a central district and a general commercial district, while waterfront commercial is contained in a MW district. A light industrial and power generation district round out the zoning ordinance.

The variety of uses and general requirements are generally very good for a village of this size. A few elements that are questioned are the minimum size lots (less than one-half acre) for office buildings in the R-0 district. Today's larger size offices should be located on a larger lot, especially along a heavily travelled major roadway. The lot width in the two commercial zones also tends to encourage scattered small lot development in some parts of the Village, even though there has been very good examples of combined commercial uses that have been built in recent years.

Other Ordinances

Most of the Village ordinances relating to land development have been updated in recent years and provide the type of controls that are necessary for an area that is receiving various types of building activities.

The flood regulations are in accord with the federal requirements for insurance where it will be necessary in the low-lying sections of the Village.

A separate ordinance regulating clearing of trees for lots of one acre or more lots that are not on old filed maps includes clearing and grading, but it does not appear to give the planning board a clear set of guidelines, especially relating to the size of trees to be removed and the amount of regrading that is needed. Even though and individual grading plan is a requirement in some cases, the remaining steep slopes in the Village will require some fairly strict guidelines to avoid erosion and runoff problems.

The subdivision standards clearly spell out standards for major and minor subdivisions and have very specific requirements for drainage, road work and most other public improvements.

The provision for cluster development on five or more acres is very useful, especially for the aforementioned steep slope area. The only question concerning the open space is that there is not a clear indication of who should own the open land and be responsible for its future maintenance.

Land Available for Development

This section deals with the future potential for development, both residential and non-residential. There are four categories of land available for development, each broken down by the existing zoning (Table 11). The potential number of housing units is calculated for each category under what the zoning allows, taking into account current proposals. (See Map 2 for Land Available for Development).

The first category is "Individual Vacant Lots." These can each accommodate one dwelling and since they are already subdivided and in separate ownership, they can be built on relatively soon. There are 174 lots in this category. As can be seen from the map titled "Land Available for Development", the lots are spread throughout the Village with a concentration on the eastern side, which is the rapidly developing Millers Woods subdivision.

The largest category, with 52% of the available land, is called "Subdividable Vacant Lots." These are vacant lots which the zoning would permit to be subdivided. Almost all of this land is in the southern part of the Village. Most of this land has recently been the target of development. Recent site plans seek to development 105 acres from this category and would yield 342 new housing units or 44% of the total housing potential of the Village. This high potential can be mostly attributed to the former Rason asphalt parcel which was rezoned multi-family. This is a better use for that parcel than industry. Outside of what is under review, the largest parcel is the school owned parcel east of the elementary school, 14 acres of which is still wooded.

The third category is "Oversized Occupied Parcels." This includes parcels which have homes on them and can be further subdivided according

Map 2

Land Available for Development

to the zoning. Only 78 more houses can be added from this category with most of these near the Cedar Hill Cemetery.

The fourth and smallest category is "Reuse." Reuse includes boat and car storage lots as well as some waterfront areas which have oil tanks and stone docks. There is 14.5 acres in this category but because of a potential for a zoning change, it could add 60 more housing units.

All categories combined total 334.2 acres and could yield 773 new housing units. Of this, 63.5 acres are available for non-residential development.

LAND AVAILABLE FOR DEVELOPMENT

Table 11

Zoning	#	Individual Vacant Lots Acres	Individual Vacant Lots Potential Housing Units	Subdividable Vacant Lots Acres	Subdividable Vacant Lots Potential Housing Units	Oversized Occupied Lots Acres	Oversized Occupied Lots Potential Housing Units	Reuse Acres	Reuse Potential Housing Units	Total Acres	Total Potential Housing Units
RB-3	3	.6	3							.6	3
RB-2	101	34.5	101	96.6	159	54.9	72			186.0	332
RB-1	56	34.7	56	4.6	7					39.3	63
R-A	4	3.4	4							3.4	4
R-A1	8	8.0	8							8.0	8
M-F				33.4	293					33.4	293
Residential Total	172	81.2	172	134.6	459	54.9	72			270.7	703
R-0	2	.6	2	1.2	2	4.2	6			6.0	10
P-A				33.4						33.4	
C-1	6	2.4						2.5		4.9	
C-2	9	1.2		3.3						4.5	
MW	4	1.3						10.1	60	11.4	60
I	1	1.4						1.9		3.3	
Non-Residential Total	23	6.9	2	37.9	2	4.2	6	14.5	60	63.5	70
Grand Total	195	88.1	174	172.5	461	59.1	78	14.5	60	334.2	773

Environmental Analysis

Steep Slopes

One of the key areas of concern within the Village deals with development on steep slopes and the resulting environmental impacts of erosion and sedimentation. The Environmental Factors Map for the Village of Port Jefferson shows the various slopes found within the study area on the as yet undeveloped open space areas that are left. For the most part, the topography of the Village of Port Jefferson is rolling and irregular with elevations that range from zero feet at the shoreline to approximately 280 feet on the Harbor Hills Moraine along the southern border. The slopes have been categorized from 0 to 10%, 10% to 20% and greater than 20%. Steep slope areas of greater than 10% are directly associated with specific environmental impacts, including increased runoff, moderate to severe erosion, sedimentation and increased flooding of low lying areas, and unsafe road grades greater than 10%. Most of the undeveloped parcels within the Village contain steep slopes.

Soils

Shown on the General Soils Map are the soils found on the undeveloped parcels within the Village. As can be seen from that map, the majority of the soils associated with steep slopes in the undeveloped areas are Carver-Plymouth sands (15 to 35% slopes), which are almost exclusively found on moraines. These soils are characterized as deep, excessively drained and coarse textured with very low moisture capacity and very low natural fertility. Permeability is very rapid throughout all soil layers. The hazard of erosion is moderate to severe on these soils. Due to the droughtiness and steep slopes associated with them, there are severe limitations when revegetating such areas. Therefore,

Map 3

Environmental Factors.

Map 4

~~Granal~~ Soils

steep sloped areas with carver plymouth soils should remain in natural vegetation wherever possible. Other soils found on undeveloped parcels within the Village include:

Symbol	Name
Bc	Beaches
CpE	Carver and Plymouth sands, 15 to 35 percent slopes
CuB	Cut and fill land, gently sloping
CuC	Cut and fill land, sloping
CuE	Cut and fill land, steep
Du	Dune land
Es	Escarpments
HaA	Haven loam, 0 to 2 percent slopes
HaB	Haven loam, 2 to 6 percent slopes
He	Haven loam, thick surface layer
PiC	Plymouth loamy sand, 8 to 15 percent slopes
RdC	Riverhead sandy loam, 8 to 15 percent slopes
Tm	Tidal marsh
Ur	Urban land

The constraints to development of these soils is found in Table 12, which lists the soil limitations to town and county planning of the soils within the study area as identified by the Soil Survey of Suffolk County, New York. The soils associated with the beach and dune areas, as well as those found in tidal marshes, are very dynamic and associated with periodic flooding and high groundwater elevations . These conditions impose severe environmental constraints to development.

The soils associated with the golf course are basically Haven soils which, although having very few developmental constraints, are considered prime farm soils.

Wetlands

The major tidal wetlands within the Village are found on the west side of Mt. Sinai Harbor. According to the Village's draft Coastal Zone Management (CZM) Program Report, this marsh is on the flyway of migratory birds and is the home of many species of Gulls, Terns, Cormorants and Herons. The Village has bought and spread seed clams on the flats in

Table 12

Limitations of the soils for town and country planning

Soil	Sewage disposal fields	Homesites [1]	Streets and parking lots	Lawns, landscaping, and golf fairways	Pipeline locations [2]	Sanitary landfill	Camp areas	Paths and trails	Picnic grounds and extensive play areas	Athletic fields and intensive play areas
Beaches	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.
Carver and Plymouth sands, 15 to 35 percent slopes.	Severe: slopes [3].	Severe: slopes.	Severe: slopes.	Severe: slopes; sandy surface layer.	Severe: stability.	Severe: rapid permeability; hazard of water pollution.	Severe: sandy surface layer; slopes.	Severe: sandy surface layer; slopes.	Severe: sandy surface layer; slopes.	Severe: sandy surface layer; slopes.
Cut and fill land, gently sloping [4].	Slight.	Slight.	Moderate: slopes [4].	Severe: sandy surface layer.	Severe: stability.	Severe: rapid permeability; hazard of water pollution.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.
Cut and fill land, sloping [4].	Moderate: slopes.	Moderate: slopes.	Severe: slopes [5].	Severe: sandy surface layer.	Severe: stability.	Severe: rapid permeability; hazard of water pollution.	Severe for trailers: slopes. Moderate for tents: slopes; sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Severe: slopes.
Cut and fill land, steep [6].	Severe: slopes.	Severe: slopes.	Severe: slopes.	Severe: slopes; sandy surface layer.	Severe: stability.	Severe: rapid permeability; hazard of water pollution.	Severe: slopes.	Moderate to severe: slopes.	Severe: slopes.	Severe: slopes.
Dune land.	Moderate: water table within 4 feet of surface in places.	Variable.	Variable.	Severe: sandy surface layer.	Severe: stability.	Severe: hazard of water pollution.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.	Severe: sandy surface layer.
Escarpments. Variable; no interpretations made.										
Haven loam, 0 to 2 percent slopes.	Slight [7].	Slight.	Slight.	Slight.	Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Slight.	Slight.	Slight.	Slight.
Haven loam, 2 to 6 percent slopes.	Slight [7].	Slight.	Moderate: slopes [4].	Slight.	Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Moderate for trailers: slopes. Slight for tents.	Slight.	Slight.	Moderate: slopes.
Haven loam, thick surface layer.	Severe: flooded during prolonged wet periods in places.	Severe: flooded during prolonged wet periods in places.	Severe: flooded during prolonged wet periods in places.	Slight.	Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Severe: flooded during prolonged wet periods in places.	Slight.	Moderate: flooding in places during season of use.	Moderate: flooding in places during season of use.
Plymouth loamy sand, 8 to 15 percent slopes.	Moderate: slopes [7].	Moderate: slopes.	Severe: slopes [5].	Severe: sandy surface layer.	Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Severe for trailers: slopes. Moderate for tents: slopes; sandy surface layer.	Moderate: sandy surface layer.	Moderate: sandy surface layer.	Severe: slopes.
Riverhead sandy loam, 8 to 15 percent slopes.	Moderate: slopes [7].	Moderate: slopes.	Severe: slopes [5].	Moderate: slopes.	Moderate: stability.	Severe: rapid permeability; hazard of water pollution.	Severe for trailers: slopes. Moderate for tents: slopes.	Slight.	Moderate: slopes.	Severe: slopes.
Tidal marsh.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.	Severe: high water.
Urban land. Variable; no interpretations made.										

[1] High water table is less restrictive for houses without basements.
[2] Stability, as used here, refers to the tendency of the soils to slough on a ditch 6 feet deep; limitations are less restrictive for shallower ditches.
[3] In some areas, the water table is 1½ to 4 feet below the surface of these parts. Downward movement of water is impeded by silt and sand.
[4] Slight for town or county roads.
[5] Moderate for town or county roads.
[6] These units are mainly in built-up areas, and they are not well suited to uses other than present use. Interpretations in the table apply to small ungraded areas.
[7] Possible pollution hazard to lakes, springs, or shallow wells in these rapidly permeable soils.
[8] If the till layer is less than 3 feet thick in these soils, the limitation is severe.
[9] The till substratum of these soils is more difficult to excavate than the substratum of other soils in the county; however, the till does not appreciably reduce workability.
[10] Water infiltration rates are slightly impeded by silty subsoil in places.

this area to enhance its ecological and recreational attractiveness. The CZM report further states that the entire Village frontage on the west side of Mt. Sinai Harbor has been declared a nature preserve in perpetuity. It is adjacent to other lands of Brookhaven Town which have been similarly designated. Field trips to the wetland area have revealed that the wetlands have been adversely impacted due to increased sedimentation resulting from erosion and runoff from nearby developed steep slope areas.

The Village's two mile beach on Long Island Sound and around into Mt. Sinai Harbor is almost entirely devoted to public use by its residents. Towards the center area of the beach is a small tidal lagoon behind the barrier beach at the base of the bluff at the Harbor Hills Country Club. The area adjacent to Long Island Sound has been classified by the State as a coastal erosion management area under Article 34 of the Environmental Conservation Law and 6 NYCRR Part 505.

Water Quality

According to the New York State Department of Environmental Conservation, the marine waters bordering the Village of Port Jefferson, within the entrance of Port Jefferson Harbor (up to the LILCO bulkhead and beach house at the end of Beach Road, Belle Terre), and Mt. Sinai Harbor in its entirety, are classified as "SA" tidal salt waters and as such, can be utilized for shellfishing and market purposes and other usage. The waters at the southern end of Port Jefferson Harbor closest to the LILCO Power Station and town dock facilities are classified as "SC" tidal salt waters best suited for fishing and other usages except bathing or shellfishing for market purposes. The tributaries to both Port Jefferson Harbor and Mt. Sinai Harbor are considered Class "D" fresh

waters being best used for agriculture, industrial cooling or processing, and any other usage except fishing, bathing or as a source of water supply for drinking, culinary or food processing purposes. The poor water quality at the southern end of Port Jefferson Harbor is probably due to the fact that the tributary which runs through the Village into Port Jefferson Harbor collects road runoff from the hills to the east, west and south as far away as Port Jefferson Station. According to the CZM Report, the stream known as Olde Mill Creek generally has a petroleum slick on it and as it rains, the coliform count in the harbor rises due to the runoff in this creek. Also lack of holding tank facilities at the marinas, as well as the effluent discharge from the sewage treatment plant, are probable causes for increased coliform counts. The harbor has been closed periodically to clamming at the southern end.

Flood Areas

The Environmental Factors Map also shows the 100 year flood boundary line which coincides with lowlying areas adjacent to the shoreline which would be subject to the probability of flooding at least once in 100 years. These areas are subject to severe flooding during storm periods, septic system failure and possible contamination of fresh water supply. A good portion of the downtown Port Jefferson area lies within this zone and therefore, the Village has set a minimum first floor elevation of 13 feet above mean sea level for new construction in keeping with federal flood insurance policy. In addition, the first floors in buildings being restored are required to be set as high as possible.

History

Port Jefferson is rich in cultural heritage which dates back to its settlement in the late 1600's. The area developed slowly during the

1700's, however, during the 1800's the area developed rapidly as a good deep water port with numerous ship yards and industrial facilities. Many of the early structures and landmarks of this rich historic past remain today. Half of the first house in the Village, which was built in 1682, is on the waterfront and has been restored as a community information center. The third house built in 1763, also has been identified on East Main Street. Other houses on East Main Street include one built in 1799, one in 1812 and a number of stores built from 1850 to 1888. These have examples of bead and reel moldings as well as ornamental bracketry. Similar houses like them can also be found on Main Street. Many old captain's homes built from 1840 to 1880 still exist on Prospect Street, South Street and High Street. On the west side of the Village are homes which were built in the 1880's and 90's in the Italianiate and Queen Anne styles along Barnum, Oak and Randall Avenues. With the exception of a couple of modern structures and homes, most of the new construction in the historic areas of the Village have been designed to blend with the older architecture. The Village CZM Report contains a detailed historic analysis.

In order to aid in the preservation of irreplaceable historic structures and sites, the Federal government has passed several laws allowing favorable tax treatment. The Tax Reform Act of 1976 allows for the accelerated depreciation over a five year period of restored commercial or industrial historic structures or buildings within districts created by state or local statutes which meet the federal criteria. In addition, certified historic structures meeting federal criteria are eligible. The Economic Recovery Tax Act of 1981 also provides tax incentives to accomplish preservation of historic

structures. The tax incentives in this law now make rehabilitation of historic buildings a more attractive investment. The new law establishes a three tier investment tax credit (ITC) for qualified rehabilitations of older buildings. For substantially rehabilitated buildings, 30 years or older, a 15% ITC is available. For those 40 years or older, a 20% ITC can be used; and for certified historic structures, a 25% ITC is allowed. To quality, a building must be substantially rehabilitated. Rehabilitation costs must exceed either $5,000, or the adjusted base of the property, whichever is greater. Rehabilitation costs must also be incurred within a 24 month period ending on the last day of the taxable year. Under the Tax Treatment Extension Act of 1980, homeowners of historic residential structures may donate easements to qualified organizations insuring the preservation of their buildings. Such a donation is considered a charitable contribution, and a deduction on federal income, state and gift taxes for the value of the donation is allowed.

The Tax Reform Act of 1986 kept the tax benefits of historic restoration and preservation pretty much intact except that the maximum ITC was lowered from 25% to 20%.

Parks and Recreation

Most of the Village parkland has been recently acquired. Large tracts of land such as the golf course, beach and wetlands have given the Village a large amount of acreage for recreation purposes. If you base the standard of 10 acres per thousands population on the current Village population, there would be a need for 73 acres of local parkland. The following table indicates that the Village has more than twice this amount of land:

Table 13

Village Parks & Open Space

Name & Location	Acres
Village Golf Course	129.9*
Village County Club & Beach	34.1
Village Beach & Wetlands at Crystal Brook Hollow Road	5.0
Wooded Hillside at Crystal Brook Hollow Road	3.7
Wooded area at Meroke Trail	1.7
Roosevelt Avenue Park	1.1
Greenbelt area at Oakwood Road	2.7
Heywood Park - Caroline Street	4.3
Clifton H. Lee Memorial Park	8.0
Beach Street Park	0.5
Wooded Area - Adler Drive	1.2

*13.6 acres in Village of Belle Terre

Even though the Village has a significant amount of open land, almost half is concentrated in the golf course (See Map 5). In addition, the recreation facilities are concentrated in the northern and western part of the Village. The entire eastern portion is without public recreational space. The large 25 acre school recreational facility on Scraggy Hole Road does provide some recreation and should be retained for that purpose. The proposed recreational site in the vicinity of

* Parks Commission Master Plan for the Recreation Department, Jan. 1983

the railroad could also provide for the needs in this portion of the Village. A report done by the parks commission of the Village in 1983* indicates the demand for boat slips and ramps. Little has been done to accommodate these.

map 5

Parks & Open Space.

Future Population

The potential for population growth is directly related to the amount of land available for development. From that section we determined that if every parcel which was available were developed, the Village could add 773 new housing units. This is called saturation and represents the maximum zoning will allow. By applying the most current average household size figure (2.81) to single family homes and (2.17) for multi-family units or condominiums, it was estimated that 1,985 more people could be added to the Village by this method. The 2.81 household size figure assumes that although new housing units generate a higher average household size that will be offset by aging in the old housing units.

Institutional population is proposed to increase by 274 people. The proposed Geriatric Center is expected to have 250 beds and Maryhaven is proposing to add 24 new residents.

The maximum population increase the Village can expect is 2,259 which would bring the Village population to 9,649. This would represent, at most, a 31% increase over existing population. If this were to happen, the population density would increase from 2,459 persons per square mile to 3,211.

Traffic Impact Analysis

Overview

Port Jefferson Village shares a problem with many other areas within Suffolk County in which the primary east/west arterial becomes overloaded with locally generated trips and externally generated through trip. The Village is currently experiencing a traffic situation in which people are using any road or combination of roads in an attempt to avoid using NYS 25A/Main Street. At the present time, the Village is faced with rapid development of its remaining vacant land, as well as a continued build-up of the "downtown." Recent development proposals before the Village Board have prompted the request for a traffic study in order to determine the effects of this development upon the Village road system.

The purpose of this section is (1) examine existing traffic conditions, (2) determine the effect the proposed development will have upon the existing road system, and (3) recommend roadway improvements.

The study area is generally bounded by Main St./NYS 25A on the west, Crystal Brook Road on the east, the rail tracks to the south, and East Broadway to the north. With the exception of Main Street, which is maintained by the State, the remaining roads are Village jurisdiction and include: Belle Terre Road, Oakland Road, North Country, Sheep Pasture Road, Columbia Street, Myrtle Ave., East Broadway, Stony Hill Road and Pine Hill Road.

Data Collection

Data for this study is the result of February/March inventory compiled during the season of lowest traffic volumes. Depending upon which location is observed, summer traffic is estimated to increase anywhere between one-third to one-hundred percent over the winter months. In order to document this, traffic counts are planned during the summer months.

Automatic traffic recorders were set out in twelve locations, for a 24-hour seven day count where possible. Manual turning movements were taken during the weekday and weekend p.m. and a.m. peaks as determined by the automatic counters. While in most cases traffic volumes are recorded as average daily traffic (ADT), volumes vary considerably by the hour of the day, by the day of the week, and the month of the year. It is these variations which generally create the problems of congestion. In addition, traffic peaks during the morning and evening reflect the orientation of journey-to-work trips.

In addition to the volume data, a physical inventory was taken of each roadway within the system. In includes lane width, shoulder, right-of-row parking patterns and general comments concerning the roadway, summarized on Table 14. This information provides an understanding of the character of the roadways involved. In addition, it aids in a determination of capacity which is a method of approximating traffic conditions based upon traffic volumes.

Capacity or the congestion point is the maximum number of vehicles which can be handled by a highway. It is generally a factor of the road's geometrics, composition of traffic, number of intersections and abutting land uses. It is a theoretical designation because one change in either of the above conditions can alter capacity significantly. In developed areas such as the study area containing a mix of commercial, office, residential uses and through traffic, the capacity is controlled to a large extent by the number of intersections and the relative volumes of the cross street traffic. This analysis conducted a general assessment of the physical constraint of each roadway link and the intersections, the latter being the greater restraint to traffic flow.

TABLE 14
ROADWAY INVENTORY

Road (From-To)		Travel Lane	Shoulder/ Side Clearance	Total Pavement Width	Row	Comments
North Country Rd. (Belle Terre-Pine Rd.)					Variable (minimum) 60'	Pavement lane markings. Some side friction from abutting land use, particularly Mather Hospital. Heavy right turns onto Belle Terre from N. Country shoulder for most of the way. North Country is classified as an arterial and serves as such. North Country functions as by-pass to Main St.
	EB	12'	8'	8'		
	WB	12'	11'	11'		
	2-way	24'	19'	43'		
North Country Rd. (Pine Rd.-Crystal Bk.)					Variable	No pavement marking. Minimal abutting land use.
	EB	13'	3'	16'		
	WB	13'	4'	17'		
	2-way	26'	7'	33'		
North Country Rd. (Belle Terre-Main/NYS 25A)					Variable	Lane connecting segment between Belle Terre and Main St. with heavy utilization. Over 42% EB traffic turns left left onto Belle Terre. Over 3/4 of WB traffic turns left onto Main St. during PM peak. Mixed abutting land uses, some backing up on WB traffic during PM peak.
	EB	See Comment Section				
	WB					
	2-way			42		
Sheep Pasture Rd./Continuation of N. Country Rd. (Main St.)						
	EB	12'	0'	12'	(minimum) 42'	Extension of N. Country. Classified as Collector roadway with increasing arterial function for East/West traffic. Commercial mix near Main St. Narrow roadway.
	WB	13'	0'	13'		
	2-way	25'		25'		
Oakland Ave./Continuation of Belle Terre (Belle Terre-Perry)						
	NB	?	?		(minimum) 40'	No lane markings. Primary use as by-pass for NB Main St. traffic and access to railroad parking.
	SB					
	2-way					
Belle Terre (North Country-Myrtle)					50'	
	NB	14'	0'	14'	(minimum) 40'	No pavement marking. Raised curb limits width of useable shoulder. Classified as local road that is in area singly serving as arterial route. Significant abutting land use consisting of apartments, single family and medical office. Belle Terre Rd. functions as by-pass to Main St.
	SB	16'	0'	16'		
	2-way	30'		30'		

TABLE 14
ROADWAY INVENTORY
(Continued)

Road (From-To)	Travel Lane	Shoulder/ Side Clearance	Total Pavement Width	Row	Comments
Belle Terre (Myrtle-Thompson)					
NB	14'	0'	14'	?	No lane marking. Narrow road. Provides access to St. Charles.
SB	14'	0'	16'		
2-way	28'		28'		
Belle Terre (N. Country-Stony Hill)					
NB	17'	0'	17'	50'	Very heavily used. Connecting link to N. Country has heavy weaving action as WB/EB vehicles cross lanes to continue trip.
SB	20'	0'	20'		
2-way	37'		37'		
Belle Terre Rd. (Thompson-E. Broadway)					
NB	?	?	?	?	No lane markings. Narrow road continues as by-pass to Main St.
SB					
2-way					
Stony Hill Rd. (N. Country-High St.)					
EB	10'	0'	10'	50'	No lane markings. Narrow road with skewed intersection with N. Country. Poor vertical/horizontal sight distance. Consideration for one-way or realignment with N. Country.
WB	14'	0'	14'		
2-way	24'		24'		
Myrtle Ave. (Belle Terre-Inwood Rd.)					
EB	14'	0'	14'	?	No lane marking. Pavement almost up to utility poles. Provides access to St. Charles Hospital.
WB	11'	8'	11'		
2-way	25'		25'		
Pine Hill Rd. (N. Country-Ellen Dr.)					
EB	15'	0'	15'	Variable	
WB	23'	0'	15'	(minimum)	
2-way	38'	-	38'	45'	
Columbia Ave. (N. Country-NYS 25/Hallock)					
NB	15'	0'	15'	50'	No lane markings. Road width expands to 36 near intersection with Hallock. Provides some function as by-pass to Main St.
SB	15'	0'	15'		
2-way	30'		30'		
Main St./NYS 25A (N. Country-Stony Hill)					
NB	13'	0'	13'	Variable	Two lanes SB - one is clumbing lane. No commercial. No parking allows 3 lanes. Over 90% of SB traffic is straight through the intersection.
SB	23'	0'	23'		
2-way			36'		

TABLE 14
ROADWAY INVENTORY
(Continued)

Road (From-To)	Travel Lane	Shoulder/ Side Clearance	Total Pavement Width	Row	Comments
Main St./NYS 25A (N. Country-RR Track)				Variable	
NB	14'	8' park-ing	22'		This is "Main" St. with commercial use on both sides of the parking roadway. Very restricted flow with one lane in each direction. Parking on both sides. One-quarter of NB PM traffic turns right onto N. Country. The remainder continues through the intersection. Two lanes of traffic reduce capacity.
SB	14'		14'		
2-way	28'		36'		
Main St./NYS 25A (RR Track-Hallock)				Variable	
NB	27'	0'	27'		Two lanes over the tracks become 4 lanes just s/o track. NB traffic backs up as 2 lanes. Merge into one. SB traffic free up somewhat as one lane opens into 2 lanes. This is a traffic jam producing element.
SB	25'	0'	25'		
2-way	52'		52'		

Note: NB - northbound
SB - southbound
EB - eastbound
WB - westbound
PM - afternoon

Land Use Proposals

A number of land use changes are proposed that will have an effect upon traffic within the Village and particularly within the study area.

They are as follows:

1 - Medical Office Building at St. Charles Hospital.....70,000 sq. ft.

2 - Apartments at Columbia/Oakland.....264 units

3 - Apartments/Retail at N. Country & Main St.....5 Units/5,000 sq. ft.

4 - Condominiums at N. Country/Pine Hill.....29 units

5 - Medical Office Building at Mather Hospital.....30,000 sq. ft.

6 - Condominiums at Belle Terre Rd.....28 units

7 - Geriatric Center at Pine Hill/N. Country.....250 beds

8 - Single Family Development at Myrtle Ave.....19 units

9 - Recreation Center at Oakland Ave.....6 acres

As a result of this development, a number of traffic trips will be generated. The number of trips is related to the specific use of the land. Trip generation rates were developed from the Institute of Transportation Engineers Handbook. This trip generation data for the proposed development is shown in Table 15 on a road-by-road basis. This table also indicates the existing situation consisting of volume, congestion point per lane, and the percent to which the volume is over or under the congestion point. Future build consists of: trips generated by the new land uses, the percent increase over the existing volumes, total number of trips generated (existing and future) and the percent to which the volume is over or under the congestion point.

Table 15
PM PEAK-CAPACITY ANALYSIS

Roadway Leg	Existing Volume	No Build: Congestion Point per Lane	No Build: Percent Relationship Volume to Congestion	Build: Land Use Generated Trips	Build: Percent Increase Over Existing	Build: Total Trips Generated	Build: Percent Relationship Volume to Congestion
North Country Rd.: (Belle Terre-Mather)							
EB	784	550	42% over	86	11%	870	58% over
WB	461	550	19% over	49	10%	510	7% under
2-way	1,245	1,100	9% over	135	10%	1,380	25% over
North Country Rd.: (Belle Terre-Walnut St.)							
EB	368	550	49% under	41	11%	409	25% under
WB	562	550	2% over	71	13%	633	24% over
2-way	930	1,100	18% under	112	12%	1,055	4% under
Oakland Ave.: (North Country-Perry St.							
NB	342	600	75% under	48	14%	390	53% under
SB	76	600	690% under	40	53%	136	328% under
2-way	418	1,200		88	21%	426	180% under
Belle Terre Rd.: (North Country-Stony Hill)							
NB	819	500	63% over	69	8%	880	76% over
SB	583	500	16% over	116	20%	700	40% over
2-way	1,402	1,000	40% over	185	13%	1,580	58% over
Belle Terre Rd.: (Stony Hill-Midpoint)							
NB	619	500	23% over	55	9%	674	34% over
SB	315	500	58% under	85	27%	400	25% under
2-way	934	1,000	8% under	140	15%	1,074	7% over
North Country Rd.: (Walnut-Main St.)							
EB	416	550	32% under	41	10%	457	19% under
WB	462	550	19% under	71	15%	533	377% under
2-way	878	1,100	25% under	112	13%	990	10% under
Sheep Pasture Rd.: (Main St.-Overton Ave.)							
EB	372	350	6% over	28	7%	400	14% over
WB	226	350	54% under	12	5%	238	46% under
2-way	598	700	17% under	40	6%	638	9% under

Table 15

PM PEAK-VOLUME ANALYSIS

Roadway Leg		Existing Volume	No Build: Congestion Point per Lane	No Build: Percent Relationship Volume to Congestion	Build: Land Use Generated Trips	Build: Percent Increase Over Existing	Build: Total Trips Generated	Build: Percent Relationship Volume to Congestion
Main St./NYS 25A (Perry St.-N. Country Rd.)								
	NB	680	500	36% over	10	1%	690	38% over
	SB	601	500	20% over	54	9%	655	31% over
	2-way	1,281	1,000	28% over	64	5%	1,345	34% over
Main St./NYS 25A (High St.-N. Country Rd.)								
	NB	476	600	26% over	5	1%	481	25% under
	SB	622	600	4% over	3	1%	625	4% over
	2-way	1,098	1,200	9% under	8	1%	1,106	9% under
North Country Rd. (Mather Entrance-Pine Hill)								
	EB	851	550	35% over	78	9%	929	76% over
	WB	406	550	37% under	47	11%	453	22% under
	2-way	1,257	1,100	14% over	125	9%	1,382	25% over
North Country Rd. (Pine Hill-Columbia)								
	EB	813	550	48% over	62	7%	875	23% over
	WB	368	550	50% under	25	7%	393	41% under
	2-way	1,181	1,100	7% over	87	7%	1,268	15% over
Pine Hill Rd.: (Wilmot Rd.-Intersection with North Country)								
North Country)	EB	40	400	900% under	40	100%	80	400% under
	WB	38	400	900% under	50	131%	88	400% under
	2-way	78	800	900% under	90	115%	168	370% under
Belle Terre: (Midpoint-Myrtle)								
	NB	318	500	57% under	37	11%	335	41% under
	SB	515	500	3% over	51	10%	566	13% over
	2-way	833	1,000	20% under	88	10%	921	9% under
Belle Terre: (Myrtle-St. Charles Entrance)								
	NB	233	500	117% under	22	9%	255	100% under
	SB	290	500	72% under	30	10%	320	56% under
	2-way	523	1,000	92% under	52	9%	575	75% under

Table 15
PM PEAK-VOLUME ANALYSIS

Roadway Leg	Existing Volume	No Build: Congestion Point per Lane	No Build: Percent Relationship Volume to Congestion	Build: Land Use Generated Trips	Build: Percent Increase Over Existing	Build: Total Trips Generated	Build: Percent Relationship Volume to Congestion
Myrtle Ave: (Belle Terre-Hosp. Entrance)							
WB	120	400	233% under	15	12%	135	207% under
EB	222	400	81% under	18	8%	240	67% under
2-way	542	800	under	33	6%	375	116% under
Myrtle Ave: (Belle Terre-Scraggy Hill)							
WB	148	400	166% under	10	6%	158	150% under
EB	110	400	263% under	20	18%	130	207% under
2-way	258	800	207% under	30	12%	188	321% under
Columbia Ave: (Hallock Ave./25A-North Country)							
NB	135	400	185% under	32	24%	167	135% under
SB	217	400	81% under	50	23%	267	48% under
2-way	352	800	42% under	82	23%	434	109% under
Belle Terre Rd: (St. Charles Entrance-Thompson)							
NB	292	500	72% under	30	10%	322	56% under
SB	273	500	85% under	22	8%	295	67% under
2-way	565	1,000	78% under	52	9%	617	61% under
Belle Terre Rd: (Thompson-Broadway)							
NB	219	400	81% under	74	33%	293	38% under
SB	161	400	150% under	52	32%	213	90% under
2-way	380	800	110% under	126	33%	506	60% under
Thompson Ave.: (Belle Terre-Scraggy Hill)							
EB	12	400	- under	30	230%	43	900% under
WB	28	400	- under	40	142%	68	471% under
2-way	41	800	under	70	170%	111	627% under

DEVELOPMENT ISSUES

Hospital - Office Expansion

The journey to work statistics in the demographic analysis section showed that the Port Jefferson-Port Jefferson Station area is the twenty-ninth largest employment center on Long Island. Projections of future employment indicated that the existing concentration of jobs will continue to attract some new employment because of transportation access, business services and community facilities. Therefore, the office expansion proposed at St. Charles and the Mather Hospital is a contemplated increase of private office space that will supplement the more than 200,000 square feet of existing major office space along with the very large amount of small to medium size offices in the village and station area.

The office development that is proposed at the hospital is indicative of the trend at other hospitals in the County. At the present time, both St. Johns Hospital and Community Hospital of Western Suffolk have received approval for related office construction. Both of these hospitals have excess land that is being used for medical buildings and parking which will be similar to the expansion at St. Charles and Mather Hospitals.

Waterfront Conversion and Public Access

Increased public access to the waterfront has been a goal of most Long Island coastal management programs for the last decade or two. The Coastal Zone Management Program that was done for the Village in December 1985 reemphasized the need for improved public access. The removal of the myriad of industrial uses that formerly occupied strategic locations along the shoreline and the replacement by commercial and recreational uses that provide public access has been ongoing in many locations. Port

Jefferson Harbor is one of the examples of this trend. The remaining conversion of the southern portion of the harbor is now contemplated and shall allow continuous public access from one end of the harbor to the other under the land that is used for commercial and recreational purposes.

The need for some industrial access in the vicinity of the power plant, sewer plant, pipeline connection and stone docks means that this area will not be a possible site for additional public access in the northwestern section of the harbor.

The parking and loading area for the Bridgeport ferry occupies some of the space that is in demand for public access to the shoreline. Therefore, any further expansion of ferry services across Long Island Sound should not be from any of the waterfront in the Village which is is far too valuable as an adjunct to the pedestrian traffic to the downtown area. The existing ferry service with the access improvements implemented is the maximum that is acceptable without an adverse impact on the waterfront, the traffic volumes and the downtown areas in general.

Downtown Parking

All recent studies that have been done for the Village show that there is a lack of parking facilities in the downtown area. Recent efforts to separate Village parking from the general parking facilities, the creation of special areas for employee parking, and the institution of short term and meter parking have had mixed results. Restrictions on employee parking, short term parking and meter parking are all perceived as having a negative effect on activities in the business area.

There are alternatives to solving these problems; however, it could involve an extensive amount of public funding. The first approach is to provide an amount of parking for both employees and visitors that would be adequate for normal demand outside of the summer Sunday peak which is virtually impossible to accommodate. The use of unused commuter space for employee or visitor parking would be the only way to alleviate the peak problem. If parking for the usual demand is provided, a second step would have to be followed which would severely limit any new commercial expansion in the core area if it did not also provide the required off-street parking.

Site Development Plans and Environmental Factors

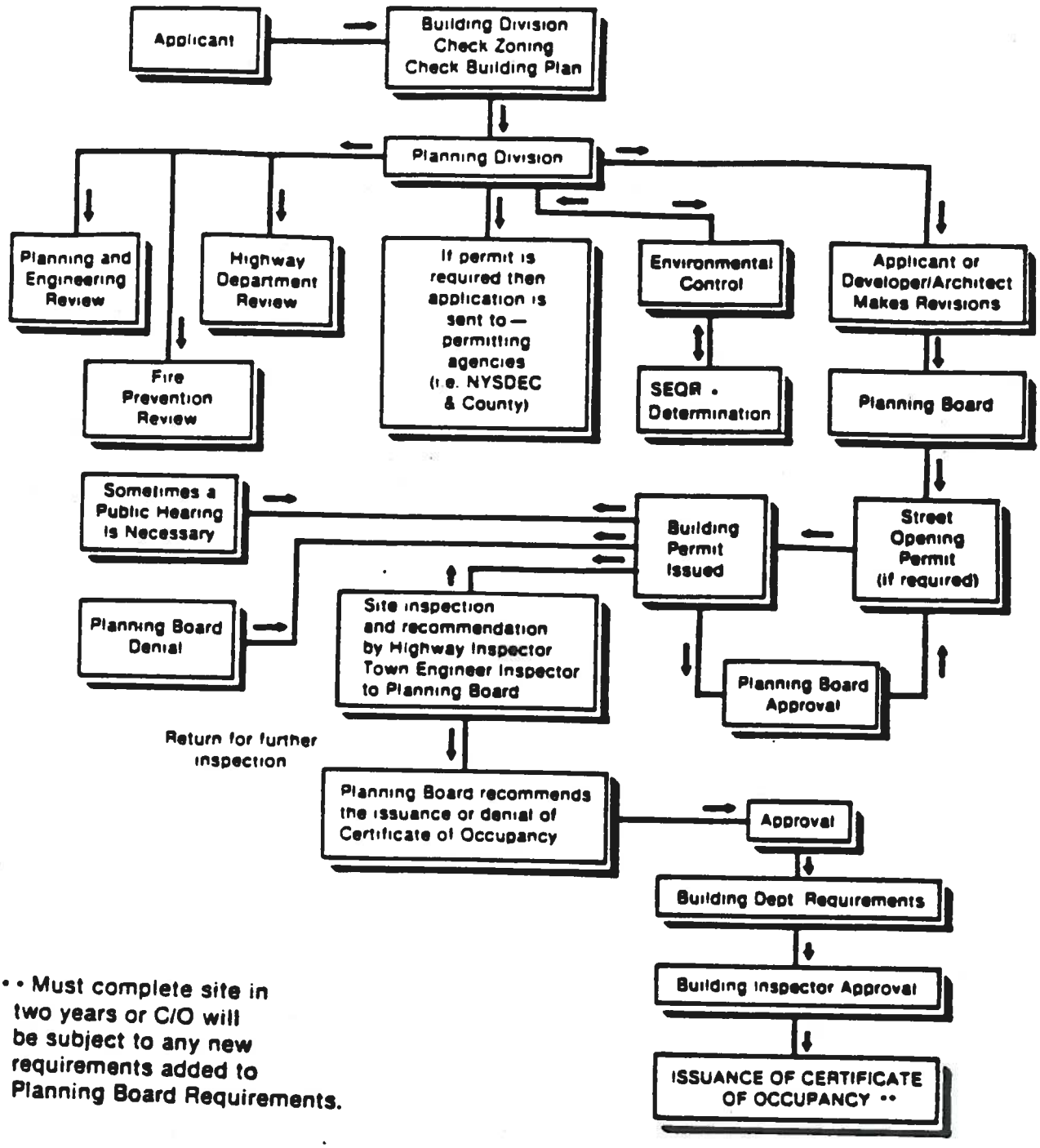
The Long Island Regional Planning Board's **Nonpoint Source Management Handbook** thoroughly covers the general site plan review process as shown in Figure 1. That report points out that the site development plan is an integral part of the site plan review or subdivision review process and also may be used for single lot development, a proposed change of zone, a zoning variance or a special permit.

The site plan specifies the present and future characteristics of a parcel of land and its surroundings. The plan is usually presented in graphic form, possibly with a narrative to explain these portions of the plan that cannot be described graphically. The plan indicates the design, arrangement and intended activities for the parcel to be improved.

The site development plan may be prepared by a licensed landscape architect, architect, civil engineer, land surveyor or other professionally qualified person, as specified in the municipal ordinance. The site plan is reviewed to determine if the proposed development is compatible with existing zoning and environmental ordinances and to determine the potential physical, social and economic impacts of the plan upon the community, including the need for additional facilities and services. The site plan should be comprehensive so that the municipal reviewers will have sufficient information for a thorough review. Table 16 is a list of typical design considerations.

State law allows local regulations to specify the site development plan components that must be submitted for approval. These components can be categorized generally as:

- legal data
- impact on the environs



** Must complete site in two years or C/O will be subject to any new requirements added to Planning Board Requirements.

*SEQR process must be completed and permits obtained before Planning Board approval

Source: Town of Babylon

FIGURE 1 *Generalized Site Review Process*

- natural features
- existing man-made features
- proposed development

A local ordinance or law can identify the submission requirements in either general or specific terms. If they are stated in general terms, the detailed review requirements can be spelled out in the regulations promulgated by the planning board. The reviewing agency usually develops a checklist, in accordance with its plan submission requirements, for the purpose of making certain that all components of the application have been received. The checklist may be broadened to include other information, such as a procedural history of the proposal, so that its status can be easily determined. A checklist is provided in Table 17.

Large and small parcels of land proposed for development may be subject to site plan review, depending on the intended use of the property. Most municipalities require review for high density residential, industrial and commercial development. Single family low and medium density residential, residential-retirement, neighborhood business, special exception and special purpose area developments may also be subject to site plan review. Architectural review is also part of the process in some areas.

Since 1976, municipal planning boards have assumed the primary responsibility for the approval or disapproval of site plans. Previously, the planning boards performed an advisory function. Various other departments, including building, environmental control or protection, highway and engineering act in an advisory review capacity. Planning board (or municipal board) site plan review is required before a building permit may be issued. In addition to municipal review, items such as the construction of wells, septic systems, the connection to

TABLE 16

Typical Development Considerations

Regional and Local Environs	Natural Features	Design and Aesthetics	Circulation	Miscellaneous
Relationship to Comprehensive Plan	Geology	Site Usage	Vehicular	Construction Specifications
Compatibility with Surroundings	Topography	- Density	- Ingress and Egress	Utilities
Accessibility	Soil Characteristics	- Geometrics	- Road Layout	Maintenance
- Pedestrian	Vegetation	Structures	- Parking Areas	Staging of Development
- Automobile	Micro-climate	- Relationship to Site	- Loading Areas	
- Trucking	Wildlife	- Plans	- Traffic Control	
- Public Transportation	Open Space	- Elevations	Pedestrian	
Economic Impact	Erosion	- Functional Adequacy	- Walkways	
Fiscal Impact	Surface Drainage	Architectural Features	- Safety	
- Air, Water, Noise	Groundwater	Signs		
Facilities and Services Availability	Wetlands	Landscaping		
Visual Compatibility	Flood Hazard Areas	Recreation Areas		
Historic and Archeologic Considerations		Incidentals		
		- Fencing		
		- Buffer strips		

*Adapted from Local Government Technical Series, *Site Development Plan Review. Procedure and Guidelines*. New York State and Department of State February 1984.

TABLE 17

Site Development Plan Review Checklist

Legal Data

1. Name and address of applicant and authorization of owner if different from applicant.
2. Name and address of owner(s) of record, if different from applicant.
3. Name and address of person or firm preparing the plan and map.
4. Ownership intentions, such as purchase options.
5. Current zoning classification of property, including exact zoning-boundary if in more than one district.
6. Property boundary line plotted to scale. Distances, angles and area should be shown.
7. North arrow, scale and date.
8. Locations, widths, elevations and names of existing and proposed adjacent streets.
9. Property lines and names of owners of adjoining parcels.
10. Location, width and purpose of all existing and proposed easements, set-backs, reservations and areas dedicated to public use within and adjoining the property.
11. Description of all existing deed restrictions or covenants applying to the property.
12. Record of the application and approval status of all necessary state and county permits. (Final only.)

    Another element, necessary to determine conformity with the intent of the regulations, is the identification of any state or county permits required for execution of the project.

Impact of Proposal on Environs

1. Relationship to adjacent and nearby land uses, both public and private.
2. Relationship to existing and proposed traffic patterns.
3. Relationship to existing and projected water supply, sewage disposal and similar service capabilities.
4. Relationship to the community's ability to provide adequate recreation, education, fire protection and similar facilities and services to its residents.
5. Visual compatibility with surroundings.
6. Effect on air and water quality.
7. Effect on energy consumption and conservation. Draft Environmental Impact Statement (DEIS) and Environmental Impact Statement (EIS) will be required if the reviewing agency deems the proposal to be significant pursuant to the State Environmental Quality Review Act (SEQRA).

TABLE 17 (Continued)

Natural Features

1. Geologic features, such as the location of kettle holes, erratics, eskers, or other geologic features.
2. Topographic features, including a map showing existing contour intervals of no more than five feet. Two-foot contour intervals should be required if the topography is relatively flat. Areas of steep slopes should be delineated as necessary.
3. Vegetative cover, including existing wooded areas, significant isolated trees and similar features.
4. Soil characteristics, such as load bearing capacity and drainage capacity.
5. Hydrogeologic features should include drainage and runoff patterns, flood hazard areas, wetlands and depth to groundwater, groundwater and surface water quality data, Special Groundwater Protection Areas, and Deep Aquifer Recharge Areas.

Existing Development and Infrastructure

1. Location and dimensions of major buildings and structures.
2. Location and width of roads and paths, including site access.
3. Location, size and flow direction of sewers, water supply lines and culverts. Major electric, gas and telephone lines and appurtenances should also be shown.
4. Location of other existing development and uses, including parking and loading areas, fences, trees and landscaping.

Proposed Development

1. Grading and drainage plan showing proposed topography at appropriate contour intervals. This information can be combined with the map of existing topography if it can be clearly depicted.
2. Location, proposed use and height of buildings and other structures, such as retaining walls, fences, outdoor storage tanks, air conditioning units and waste disposal units.
3. Location, proposed use, design and construction materials of improvements not requiring structures, such as parking, loading, and outdoor storage areas.
4. Location and arrangement of site access and egress, including all paths for pedestrian and vehicular travel within the site. Information should include profiles and cross-sections of roadways and sidewalks showing grades, widths and location and size of utility lines.
5. Location and size of water and sewer lines and appurtenances. Any means of water supply or sewage disposal other than extensions of existing systems should be described, including location, design and construction materials.
6. Location, design and construction materials of all energy distribution facilities, including electric, gas and solar energy.
7. Location, size and design of all outdoor lighting facilities and public address systems.
8. Location, size design and construction materials of all outdoor signs.
9. General landscaping plan and planting schedule, including the treatment of buffer areas and the location and types of trees to be planted.
10. Estimated project construction schedule with possible phasing plan for large projects. (Final only.)
11. Additional specifications for materials.
12. Performance bond, amount, completion schedule, public improvements covered, inspection and bond approval.

*Adapted from Local Government Technical Series, *Site Development Plan Review. Procedure and Guidelines.* New York State and Department of State February 1984.

sewage treatment plants, or the proposed use of lands adjacent to surface waters or fresh water or tidal wetlands may require review and approval at the county or state levels.

Site plan review provides a mechanism for protecting the community health, safety and welfare by ensuring that the site plan conforms to the municipality's land use recommendations and zoning. Important considerations in making site plan review decisions include:

- location of structures
- provision of adequate means of access, parking, landscaping, buffers and architectural features
- provisions for water supply, sewage treatment and stormwater control
- environmental impacts
- impact on adjacent land uses
- other factors relating to the maintenance of the general welfare of the community

The local legislative body (the municipal board/and/or the planning board) normally establishes the regulations and criteria for the review of site plan applications. These are usually specified in the zoning or other municipal ordinances. The review agencies may make revisions periodically in order to incorporate recently developed laws, guidelines and knowledge. The review criteria are usually specific enough to facilitate compliance but are also somewhat flexible in order to enable the site developer to provide the best possible design. See Figure 2 for a sample review sheet used by the Town of Brookhaven. Criteria may include mandatory setbacks and structural height limits for various zoning districts within the municipality, such as those shown in Table 18. The site plan review process differs for each municipality.

In addition to the various planning and site considerations taken into account during the site plan review process, the environmental impacts and concerns must be reviewed and analyzed pursuant to the State

TOWN OF BROOKHAVEN
PLANNING BOARD
SITE PLAN REVIEW SHEET

SITE PLAN FOR: _____

DATE OF APPLICATION: _____ ZONE _____

1. Field Inspection Completed.....
2. Drawing: Scale 1" = 20' or larger.....
3. Boundary:
   (a) Metes and bounds from actual survey by licensed land surveyor.....
   (b) One copy of referred survey.....
4. Topography:
   (a) Contours or elevations.....
   (b) Physical features adjacent to property boundary, elevations out from property line.....
   (c) Town road cross-sections every 50'.....
   (d) Town of Brookhaven datum (National Geodetic Survey).....
5. Key Map: Scale 1" = 1,000' showing zoning limits.....
6. Adjoining property:
   (a) Zoning.....
   (b) Use.....
   (c) Record Owner.....
7. Site Data:
   (a) Intended use of property.....
   (b) Area of site from title survey.....
   (c) Area of buildings.....
   (d) Parking spaces provided.....
   (e) Graphic representation of test hole.....
8. Proposed Site Work:
   (a) Grading contours with spot elevations of critical points, building corners at entrances, catch basin inlets, change of gradient, etc.....
   (b) Walks, curb, paving.....
   (c) Seeding, planting and fencing.....
   (d) Outline of all buildings with offsets from property lines.....
   (e) Striping for parking and traffic control with dimensions.....
   (f) Lighting layout and specifications.....
   (g) Estimate of quantities data.....
   (h) Cross-Sections:
      (1) Transition of parking to highway.....
      (2) Transition to adjoining property.....
   (i) Drainage:
      (1) Catch basins, manholes, etc.....
      (2) Pipe size, type, gradient, invert.....
      (3) Method of recharge or discharge.....
      (4) Design data.....
9. Standard Town Notes.....
10. County - State Letter.....
11. Building Plans.....
12. Plans prepared under the seal of a licensed Engineer, Architect or Land Surveyor.....
13. Deeds:
   (a) Road Widening.....
   (b) Other.....
14. Property Checked for Covenants.....
15. Agency Approvals:
   (a) Suffolk County Health Department
      Date _____ Number _____.....
   (b) Town of Brookhaven Environmental Protection.....
   (c) Town of Brookhaven Fire Protection.....
   (d) Town of Brookhaven Board of Appeals
      Date _____ Number _____.....
   (e) Town of Brookhaven Traffic Review.....
   (f) Town of Brookhaven Planning Board
      Meeting Date _____.....
   (g) Signs.....
16. Fees:
   (a) Application fee paid.....
   (b) Inspection fee paid.....
   (c) Recreation fee paid.....

FIGURE 2 *Sample Site Plan Review Sheet*

Source: Town of Brookhaven

TABLE 18

Sample Zoning Regulations

ARTICLE IX
Height, Area and Bulk Regulations

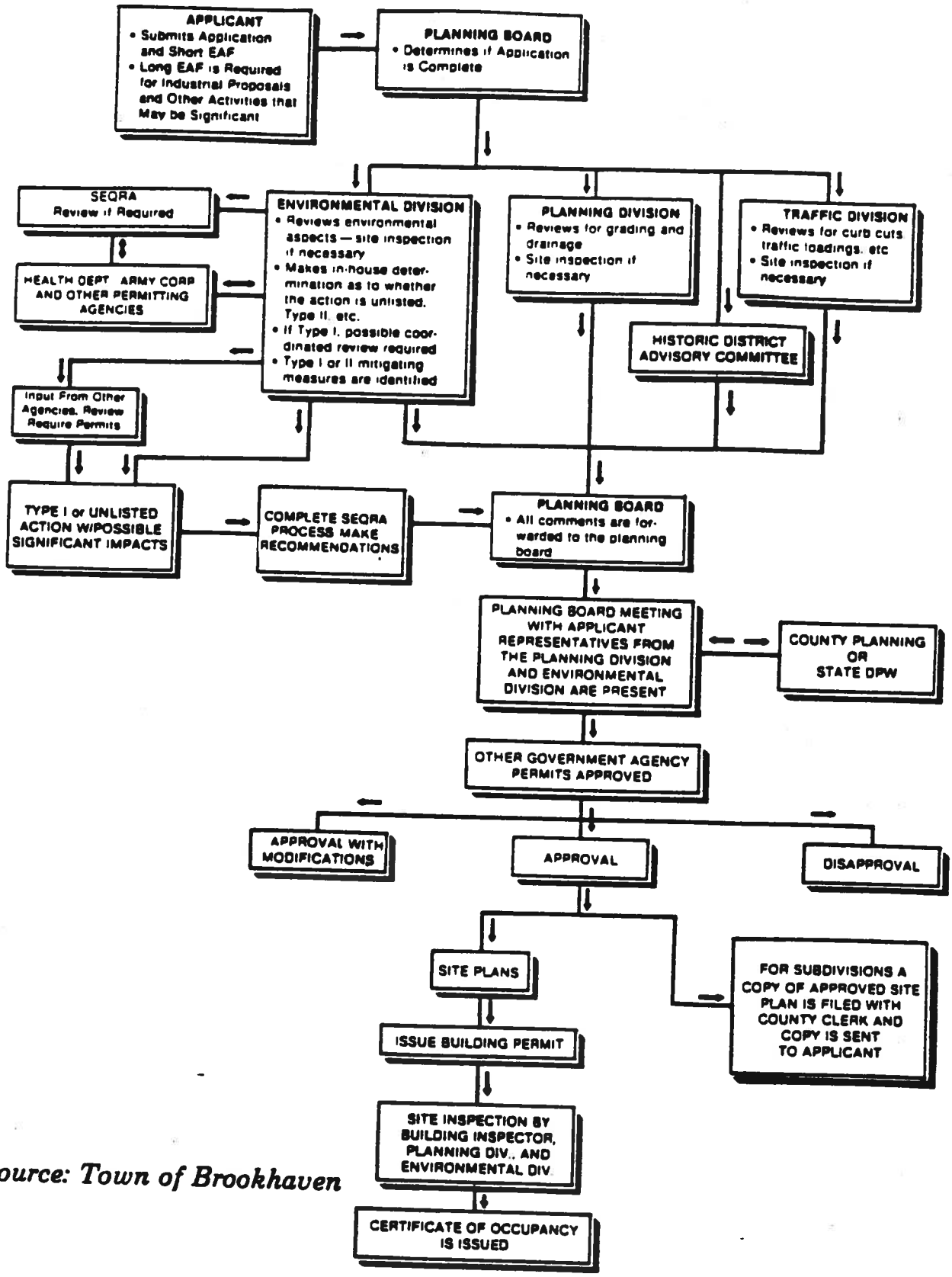
Symbol	Section Number	District	Uses Permitted in District to Which Standards Apply	Maximum Building Height (stories)	Maximum Building Height (feet)	Minimum Depth of Yards: Front Yard (feet)	Minimum Depth of Yards: Rear Yard (feet)	Minimum Side Yards: Number of Yards	Minimum Side Yards, Interior Lots: Width of One Yard (feet)	Minimum Side Yards, Interior Lots: Combined Width of Two Yards (feet)	Minimum Side Yards, Corner Lots: Width of Yard on Street Side (feet)	Minimum Side Yards, Corner Lots: Width of Interior Side Yard (feet)	Minimum Lot Area: Area per Dwelling Unit (square feet)	Minimum Lot Area: Gross Area (square feet)	Minimum Lot Width (feet)	Minimum Lot Frontage (feet)	Maximum Percent of Lot Covered by Building
	198-13	R 80 Residence	All uses	2½	35	50	50	2	25	60	50	25	2 acres	2 acres	150	40	—
	198-14	R-40 Residence	All uses	2½	35	50	50	2	25	50	50	25	1 acre	1 acre	125	40	—
	198-15	R-20 Residence	All uses	2½	35	30	25	2	20	40	50	20	20,000	20,000	100	40	—
	198-16	R 15 Residence	All uses	2½	35	30	25	2	12	24	30	12	15,000	15,000	100	40	—
	198-17	R-10 Residence	All uses	2½	35	30	25	2	12	24	30	12	10,000	10,000	100	40	—
	198-18	R 7 Residence	All uses	2½	35	25	25	2	7	15	25	7	7,500	7,500	75	40	—
	198-19	R-5 Residence	Single-family dwellings	2½	35	20	25	2	5	13	20	5	5,000	5,000	50	40	—
			Two-family dwellings	2½	35	30	25	2	12	24	30	12	5,000	10,000	100	40	—
	198-20	R 3M Residence	All uses	3	45	30	25	2	12	24	30	12	3,000	15,000	100	40	—
	198-21	R-RM Residence	All uses	2½	35	100	100	2	100	100	100	100	3,000	15 acres	—	—	25
	198-22	C-1 Office Residence	Single-family dwellings	2½	35	20	25	2	5	13	20	5	5,000	5,000	50	40	—
			Two-family dwellings	2½	35	20	25	2	12	24	20	12	5,000	10,000	80	40	—
			Multiple-family dwellings	2½	35	20	25	2	12	24	20	12	3,000	15,000	100	60	—
			Other uses	2½	35	20	25	2	12	24	20	12	—	5,000	50	40	—
	198-23	C-2 Single-Purpose Office Building	Offices and research uses	2	30	75	75	2	40	80	75	40	—	3 acres	—	—	25
	198-24	C-3 Special Business	Dwellings	2½	35	30	35	2	15	30	30	15	5,000	—	50	40	—
			Other uses	2½	35	30	35	2	15	30	30	15	—	—	—	—	—
	198-25	C-4 Neighborhood Business	Dwellings	2½	35	See §198-26	25	2	12	24	30	12	5,000	5,000	—	40	—
			Other uses	2	35		35	—	—	—	20	—	—	—	—	—	40
	198-26	C-5 Planned Shopping Center	All uses	2	35	60	25	2	25	70	60	35	—	2 acres	—	—	25
	198-27	C-6 General Business	All uses	3	45	See § 198-28											
	198-28	C-7 Highway Business	All uses	2	30	None except as provided in § 198-27							—	—	—	—	—
	198-29	C-8 General Business A	Dwellings	2½	35	35	15	2	25	50	50	25	—	—	—	—	25
			Other uses	2½	35	35	15	2	12	24	30	12	5,000	5,000	50	40	—
	198-30	C-9 Harbor Use	All uses	3	45	20	None except as provided in § 198-30	—	—	—	20	—	—	—	—	—	50
	198-31	C-10 Planned Motel	All uses	2	35	75	50	2	50	100	75	50	1,500	3.5 acres See § 198-31	—	200	—
	198-32	C-11 Automotive Service Station	All uses	1	—	25	25	2	25	50	25	25	—	20,000	—	150 on all frontages	25
	198-33	C-12 Professional	All uses	1	—	50	25	2	25	50	50	25	—	3 acres	—	—	—
	198-34	I-1 Light Industry	All uses	—	45	100	50	2	50	100	50	50	—	6 acres	400	200	30
	198-35	I-2 Light Industry	All uses	—	45	75	25	2	25	75	50	25	—	3 acres	250	150	33⅓
	198-36	I-3 Light Industry	All uses	—	45	50	20	2	10	25	25	10	—	1 acre	125	50	40
	198-37	I-4 Light Industry	All uses	—	35	50	10	2	10	20	50	10	—	1½ acres	200	100	60
	198-38	I-5 General Industry	All uses	—	45	25	25	2	25	50	25	25	—	—	—	—	—
	198-39	I-6 Generating Station	All uses	—	200	200	200	2	200	400	200	200	—	50 acres	—	—	—

Source: Town of Huntington

Environmental Quality Review Act (SEQRA). A simplified SEQRA review process is shown in Appendix A. A more detailed diagram of the SEQRA process, with the citation of the relevant provisions of the law for each step, is also shown in Appendix B. A generalized diagram of the integration of the SEQRA process with site plan review and the subdivision review processes in the Town of Brookhaven are shown in Figure 3.

A number of municipalities require applicants as part of site plan review to complete an Environmental Assessment Form (EAF) as required by municipal laws enacted pursuant to the SEQRA. The form is designed to provide sufficient information to alert municipal officials to proposed development that may have a significant impact on the environment and to permit a determination of the need for further environmental review.

Type I actions require more stringent SEQRA review, while unlisted actions may or may not require detailed review. Under SEQRA the localities may develop their own list of Type I actions (those that most likely may have a significant impact on the environment) and Type II actions (those that do not have a significant impact), so long as the list is as stringent as the NYS SEQRA requirements. Various towns have made additions or alterations to the State's list of Type I or Type II actions. For example, the Towns of Babylon and Brookhaven consider a residential development of 25 or more units in an unsewered area or 50 or more units in a sewered area as a Type I action. The Towns of Islip and Southold consider the construction or alteration of residences accommodating no more than fifty persons as a Type II action except when located in critical areas. The Town of Oyster Bay's Type I action list includes subdivisions of up to four houses in critical areas. The Town



Source: Town of Brookhaven

FIGURE 3 *Site Review Process Incorporating SEQRA Action*

of Southampton regards minor subdivisions and site plans as Type II actions unless the subject property is located in a critical area.

The Code of the Village of Port Jefferson has several chapters and sections that deal with site plan review and environmental resources warranting protection. The following chapters within the Village Code deal with either review of development or natural resources.

Chapter 6A, Environmental Conservation Advisory Board - This section of the Code deals with the establishment of a commission for conservation of the environment of the Village of Port Jefferson. The commission is granted numerous powers and duties, one of the most important of which is to advise the Village Board of Trustees on matters affecting the preservation, development and use of the natural and man-made features and conditions of the Village in so far as beauty, quality, geologic integrity and other environmental factors are concerned.

Chapter 38, Flood Damage Prevention - This section deals with the local law enacting the Village of Port Jefferson Flood Damage Prevention Ordinance. The major purpose of this ordinance is to bring the Village Code in conformance with the National Flood Insurance Program and to promote the public health, safety and general welfare, while minimizing public and private losses due to flood conditions within the 100 year flood boundary line.

Chapter 55, Pollution - This section of the Code deals with control of atmospheric, vehicle, waste oil and petroleum products pollution. Its major emphasis is to reduce such unnecessary emissions and discharges which pollute the Village environment.

Chapter 60, Sand Pits and Quarries - This chapter of the Code states that no person shall excavate sand, gravel, stone or other minerals, or

strip topsoil from any lands within the Village unless such person shall have obtained a special license thereof.

Chapter 61, Sewage and Drainage - This section deals with the handling of sewage and stormwater drainage within the Village and states that it is in the Village's interest to adequately regulate such discharges so that they do not affect surrounding areas and become a nuisance.

Chapter 67, Subdivision of Land - This section of the Code lays out the subdivision rules and regulations and outlines planning board policy. In addition to various planning considerations and subdivision review, it is stated that the conservation of the natural character of the land shall be considered in all land development. The conservation of all elements of topography and plant growth including the natural waterfront, woodlands, ponds and streams which contribute to the natural ecological and visual attractiveness of the Village shall be encouraged.

Chapter 73, Trees, Grading and Land Clearing - The intent of this section of the Code states that the destruction and damage of trees, the indiscriminate and excessive cutting of trees, the removal, stripping and storing of topsoil, and the improper, indiscriminate or excessive clearing of land all cause barren and unsightly conditions, destroys barriers to soil erosion, create surface drainage problems, increase municipal costs to control drainage, thus resulting in various adverse impacts affecting the environment, health, safety and general welfare of the Village inhabitants. Therefore, it is the duty of the planning board to look closely into any proposed tree, grading and land clearing.

Chapter 78, Village Environmental Quality Review - This section of the Code implements the requirements of the State Environmental Quality

Review Act. The major purpose of the law is to incorporate the consideration of environmental factors into the planning review and decision making process of the Village agencies at the earliest possible stage so that a suitable balance of social, economic and environmental factors may be incorporated in the decision.

Parking Needs at theRailroad Station

The electrification of the Port Jefferson Branch which should occur in the next decade will increase the demand for parking spaces in the vicinity of the station. The existing parking facilities are well used and electrification will attract a higher percentage of New York City commuters to the railroad from the service area which extends to Wading River. This area is still experiencing new residential development which will increase the parking space demand.

According to 1980 census records, if we assume that 2/3 of all of the commuters that go to Manhattan, downtown Brooklyn, and the Queens-Long Island City to Jamaica corridor, 719 commuters would have been generated from the service area. The latest railroad estimate of westbound commuters from Port Jefferson is 1,110 daily. Since the majority own vehicles to reach this station, this is a pretty good indication that the present parking facilities are inadequate. The only parking area that consistently has spaces available is the very poorly located Route 25A lot which is one-third of a mile from the station.

According to Long Island Railroad records, there are 565 legal spaces and 115 illegal. By 1992, 355 more spaces will be needed and at the turn of the century, 815 more will be required so that there will be 1,380 spaces accessible to the station. The following table indicates the number of cars and spaces in the various lots as of Thursday, April 4, 1985.

Table 19

Cars & Spaces at the Port Jefferson Railroad Station

Ownership	Legal Spaces	Number of Cars
Village parking lot on Perry Street	62	50
Village parking lot on Linden Place	22	18
L.I.R.R. parking lot	145	145
Private parcel at Oakland Avenue	35	42
New York State lot	171	181
Route 25A lot	170	97
East side of Union St. and north side of Maple Street	75	60
	680	593

It is difficult to determine which cars are illegally parked since vehicles tend to make their own parking spaces and are often able to accomplish this on a daily basis without being ticketed. However, this allows possible damage to vehicles and creates congestion when leaving the area.

In order to provide the 815 parking spaces in the future, six acres would be required since each acre, if rectangular in shape, could produce up to 145 spaces. An additional 1 1/2 acres are needed for replacement of the poorly located 25A lot since another part of this report recommends that this temporary lot be removed and the Route 25A by-pass be constructed on the property that was originally acquired for such a roadway.

The area around the existing railroad station is either densely developed or experiencing new construction, especially within the Village

of Port Jefferson (see Land Use map). The business area that is within the Village roughly bounded by Sheep Pasture Road, Texaco Avenue and Oakland Avenue, accommodates almost half of the station parking. No on-street parking is allowed since the commercial and office uses do not have enough on site spaces. Further business development in this small area limits the options for any new station parking.

The business industrial and residential area south of the station in the unincorporated area of the town has some onstreet and some offstreet parking for commuters. Removal of buildings would be necessary to significantly expand the parking space.

In addition to the density of development, the location of the existing station causes traffic problems on Route 25A/112. A relocation a little further east and the aforementioned Route 25A by-pass would have a very beneficial effect on the entire business area.

Undersized Lots in R-O District

Most of the small lots zoned R-O and used for offices are located on Main Street. The North County Road and Belle Terre Road office districts are comprised of larger parcels.

Very little vacant individual parcels exist along Main Street that are usable as small offices. A few large tracts exist that extend westward into the hillside. Most of the small office growth will occur through conversions of homes or demolition and replacement.

The traffic flow on Main Street and the difficulty in obtaining a widening for more lanes or left turn lanes makes conversion to office use very undesirable at the present time. More small offices with many driveways to parking areas will add to the congestion and safety problems.

Residences Over Stores

The shortage of new rental space, especially moderate cost units, has led a number of towns and villages in the County to allow apartments over retail establishments in downtown areas. One of the reasons is a large amount of new free standing office construction which is generally a more desirable location than over a store. Therefore, some of this former office space is now empty. Downtown areas often have parking areas not used nights or weekends and have nearby services and transportation for apartment dwellers.

The Town of Smithtown adopted an accessory apartment ordinance for downtown apartments in 1983. The ordinance allows such units by special exception of the Board of Appeals in all central business districts and professional business zones. The general requirements are as follows:

Accessory apartment dwelling units. The following requirements shall be met:

- The apartment dwelling units shall not be located on the first floor of the buildings.
- No apartment dwelling shall consist of more than two (2) bedrooms.
- A suitable means of access to the dwelling unit shall be provided, which shall be sufficiently safe and attractive for pedestrian use.
- A smoke detector, fire alarm or sprinkler system shall be provided.
- There shall be adequate provision for offstreet parking according

to good practice, but not less than the requirements specified in this ordinance, unless the Board determines that there is adequate available offstreet parking in a public parking lot that is located within two hundred (200) feet walking distance of the access to the apartment dwelling unit.

- Accessory apartment dwelling units shall only be permitted on premises containing only the following uses: retail store or shop, personal shop, offices, bank, funeral home, restaurant, tavern, bar, inn or shop for custom work and making articles sold on the premises.
- Permission for the proposed accessory use shall be for an initial three-year period, renewable every three (3) years by the Board of Appeals, which shall determine whether or not the use is in compliance with these requirements. A covenant in recordable form shall be submitted to the Board of Appeals by the property owner agreeing to remove the residential use upon termination of the permit. Upon the property owner's failure to renew within sixty (60) days of the termination of the three-year period, the permission of the Board of Zoning Appeals shall automatically terminate.

The ordinance has a three-year permit period which allows evaluation of the policy and removal, if necessary, if there is a conflict between uses.

Growth of Accessory Apartments

The 1980 census counted 142 units in 2 unit structures or 71 structures and 40 units in 3 and 4 unit structures or approximately 14 structures.

In looking at the 1985-86 Cole's Directory, which is a reverse telephone directory, there were 157 structures with 2 different names and telephone numbers listed and 37 structures with 3 different names and phone numbers.

Field checks in late summer 1986 indicate that two telephone numbers corresponding with 2 different names is a good indication of an accessory apartment. Field checks corroborated the accessory usage by the evidence of one or more of the following: 2 mail boxes, 2 obviously separate entrances, double electric meters, garage conversions, double driveways and clustering of converted units in certain areas.

At the least, 86 single-family units have been "accessorized" and an additional 23 units have been altered to accommodate 3 units each since 1980. These estimates are probably low because 15% of renters do not have a telephone according to the 1980 census; therefore, not appearing as a double listing in the Cole's. In addition, the Cole's lists 299 addresses with no phone or non-published phones which is additional evidence of possible undercounting.

The majority of the 2 unit structures are outside of the R-B3 Zone which is the district that allows conversion and new two-family homes.

RECOMMENDATIONS

General Land Use Pattern

The majority of the Village has established a land use pattern that is unlikely to see significant changes; however, there are a few key segments of the Village that will require detailed land use analysis and recommendations. They are as follows:

Area 1 - The block bounded by Sheep Pasture Road, Dark Hollow Road and Main Street

Area 2 - The block bounded by Belle Terre and Pine Hill Road, Old Post Road and Crystal Brook Hollow Road

Area 3 - The block bounded by Myrtle Avenue, Belle Terre Road and High Street

All of the above blocks have very steep slopes and are bordered by roads that are crowded or other roads that have limited capacity. Therefore, special site recommendations will be necessary for the steep slopes and certain improvement programs might be necessary for the road network before major land use changes are made, especially if the land uses are ones that increase vehicular activity.

Area 1 should have no commercial development. The few limited uses should be phased out. The clustering of residential uses to avoid extensive regrading of the land will allow new homes to be constructed so that the area will end up being an improved residential neighborhood.

Area 2 has a number of options; however, it also has steep slopes that have been taken into consideration. The vacant land in the block could accommodate a needed recreational use for the southeastern portion of the Village. The unused institutional land should be used for health-related facilities, senior citizens housing, or something like a

continuing care facility that would take advantage of the existing nursing homes and hospitals in the area. There is also some limited office opportunity depending on access improvements.

Area 3 is surrounded by traffic problems and contains very steep slopes. Because of the nature of the available land and the surrounding uses, medium-to-high density clustered residential and medically related office uses appear to be the prime considerations especially along Belle Terre Road.

The Main Street frontage in Areas 1 and 3 is zoned to allow office use; however, the retention of the Main Street frontage between Liberty Avenue and Reeves Road in a residential zone could be justified since only a few buildings would be placed in a non-conforming use. The homes that remain could be used for two-family use. When road improvements are in place, a further reuse for office development might be acceptable.

Open Space

The southeastern part of the Village lacks any municipal recreational space. The proposed condominium at the railroad will provide a park that could also be used by Village residents. If this is not implemented, the unused portion of the school property east of Scraggy Hill Road offers the best opportunity to establish an active recreation site.

A need for a Village marina has been noted in the park commission report. The eastern portion of the harbor may still offer an opportunity to establish a municipal marina. The only alternative is to use part of the boatyard/oil storage/stone dock site on the west side of the harbor if they become available.

The expansion of Heywood Park to include the vacant parcel of land adjacent to the stream could provide the opportunity to add to the walkway system, especially if the property to the north is redeveloped for more intensive pedestrian use.

Roadway Improvements

Improvements at the Belle Terre Rd.-N. Country Rd. area are designed to accommodate new office and residential growth and to alleviate local congestion. The best way to improve the overall traffic problems in the central business district is to construct the Rt. 25A by-pass. This right-of-way which begins at Bennetts Rd. in East Setauket and extends to the intersection of Routes 25A and 112 in Pt. Jefferson Station was acquired more than twenty-five years ago. It is totally unused except for a temporary commuter parking lot adjacent to Route 112. The construction of a two-lane by-pass throughout this corridor could divert at least 1/4 of the traffic flow that now traverses the East Setauket and Pt. Jefferson business areas. The diversion could be more important on weekends since many persons that travel Route 25A know no other route and, therefore, travel through the most congested portion of the Village. The re-routing of Rt. 25A away from the business area should have a positive rather than a negative effect on the business area since the downtown area

does not rely on passerby traffic for business. The Village has become a major destination point for visitors and residents in the area. The present traffic configuration discourages some visitors and conflicts with the extensive pedestrian traffic that continues to increase each year.

The 14 detailed improvements to the roadway system in the southeastern portion of the Village are as follows:

this is not possible then to provide at least a workable solution to the problem. The improvements consist of reconstruction, new construction, signalization and traffic regulation.

1 - North Country Road - Crystal Brook Road to Columbia

The current width of the roadway is 33' with two travel lanes. An eastbound lane of 13' with approximately 3' shoulders and a westbound lane of 13' with approximately 4' shoulders. It is proposed that the roadway be widened by 11' to a cross-section of 44' consisting of two 12-foot travel lanes and 10-foot shoulders. North Country's westbound intersection with Columbia would include a separate left turn and through lane. The eastbound intersection with Columbia would include separate, through and right turns.

2 - North Country Road - Columbia to Pine Hill (Scraggy Hill Extension)

The roadway width continues at 33 feet with two 13-foot travel lanes and three to four-foot shoulders. It is proposed that it is be widened by eleven feet to a cross-section of 44 feet with a lane configuration of a painted 12' center turn median to accommodate left turns into abutting land uses and a through-lane of 12', the four-foot shoulders in combination with the center median would be sufficiently wide to safely allow for right turns into abutting land uses. At Pine Hill, the North Country intersection would now be with a Scraggy Hill Extension, since Pine Hill would not intersect with Scraggy Hill and cul-de-sac at its western end. North Country's cross-section at the intersection would include separate right and through lanes. It is also reasonable to anticipate the need for a traffic signal at this intersection upon the completion of the various lane uses that will be utilizing Scraggy Hill Extension.

3 - <u>North Country Road - Pine Hill (Scraggy Hill Extension) to Belle Terre Road</u>

For this segment of the roadway, the pavement width is 43' containing two travel lanes with an eight-foot eastbound shoulder and 11' shoulder westbound. It is proposed that the cross-section be increased to 44'. This would continue the flush center median for making left turns. The minimal shoulder width of 4' in combination with the center median would allow maneuvering room as right turns are made into the abutting land uses. At North Country's westbound intersection with Belle Terre, a separate turn lane would take traffic beyond the Stony Hill intersection, thus allowing for a more

comfortable and safer merge with northbound Belle Terre traffic. This is important since Stony Hill will be one-way eastbound. Traffic continuing westbound on North Country will have its own lane as will left turns onto Oakland. The retiming of the traffic signal is proposed in order to account for anticipated traffic, as well as intersection redesign.

4 - <u>North Country Road - Belle Terre to Main Street/NYS 25A</u>

The roadway width is 42' with three travel lanes at both intersections. This segment of North Country Road functions as the shared leg of the Main Street and Belle Terre intersections. The configuration at both intersections is for two lanes: a left turn only and a shared right turn/through lane. Parking is permitted on the eastbound lane of North Country approximately 17 feet from Main Street. Minimal roadway improvements can be made as a result of the limited right-of-way. Thus, the proposals are to remove parking from the eastbound leg of North Country to allow a more efficient merge of

northbound right turns from Main Street onto North Country Road and southbound left turns from Main Street. The current lane width of North Country at this point is 10'. Removing the parking will increase it to 18'. At the Belle Terre Road intersection, the striping of two westbound travel lanes should begin with the right turn from Belle Terre onto westbound North Country. Stacking of westbound traffic on North Country waiting to get through the Main Street intersection often stretches back to Belle Terre Road. This effect is in part due to the lack of immediate right-turn/through lane delineation. In addition, the right-turn curb should be modified to facilitate turn movements. Should the projected number of right turns become a reality, the efficient flow of right turns will become essential. The traffic signal at Main Street is proposed for retiming in view of anticipated traffic and lane modification.

5 - <u>Sheep Pasture Road - Main Street to Texaco Avenue</u>

The roadway width is 40' accommodating two travel lanes of approximately 12 feet with an 8-foot parking lane on both sides of the roadway. It is proposed that parking be eliminated on the eastbound lane back to Texaco, and the roadway be restriped to provide a 12' left turn only, with a 12' shared through and right turn lane. Modifying the right turn curbs eastbound on Sheep Pasture Road should facilitate turn movements. Ideally, the recommendation is to widen the roadway by approximately four more feet in order to provide a 44' cross-section for separate left, through and right-turn lanes.

6 - <u>Oakland Avenue - Rail Parking Lot to North Country Road</u>

This road is approximately 36' wide accommodating two travel lanes.

Measurements are difficult as there are no lane markings and no clear shoulder or curbing. It is proposed that it be improved to a 44' travel section of two 12' travels lanes and 10' shoulders with parking permitted on the southbound shoulder. At the intersection, it is currently 46' with the northbound lane flared to accommodate a right turn lane, and separate left and through lanes. The realignment of Oakland and Belle Terre Road are a necessary part of the intersection improvement design. Plans have been drawn up by the Village Engineer and now need to be reassessed in light of new recommendations within this traffic study. With realignment, it is recommended that Oakland be restriped at the intersection to lane widths of 12' southbound, 11' left turn, 12' through and 11' for the right turns.

7 - <u>Belle Terre Road - North Country to Myrtle Avenue</u>

This roadway has a pavement width of 30' consisting of two travel lanes 14' northbound and 16' southbound and no shoulders. It is proposed that it be widened by an additional 14' to a cross-section of 44'. The lane configuration would consist of a flush 12' center lane for left turns, two 12' travel lanes and 4' shoulders. Belle Terre Road southbound approach to North Country Road would consist of separate right, thru and left-turn lanes. With Stony Hill proposed as eastbound one-way (up the hill) and right turns from North Country Road diverted beyond Stony Hill, much of the conflict of weaving and stacking will be greatly reduced. At the Myrtle Avenue intersection of Belle Terre Road, the proposal is for separate left, thru and right turns.

8 - <u>Belle Terre Road - Myrtle to East Broadway</u>

The existing roadway is 28' wide consisting of two travel lanes,

with curbs. It is proposed that the cross-section recommended for Belle Terre be continued up to Thompson Street. This consists of a flush 12' center lane for left turns, two 12' travel lanes and 4' shoulders. At the northbound approach to Thompson, separate left, through and right-turn lanes are recommended. In addition, it is recommended that the St. Charles Hospital Emergency entrance be relocated away from its proximity to Thompson Street. The remainder of Belle Terre Road to East Broadway is characterized by a narrow road width and "close to the street" residential development. Thus, it is proposed that the delineated with accommodation for left-turn and right-turn lanes. In addition, consideration should be given to improving the horizontal alignment of East Broadway at its intersection with Belle Terre Road.

9 - <u>Myrtle Avenue - Belle Terre Road to Main Street</u>

The current roadway is 25' wide with two travel lanes and no shoulders. It is proposed that it be widened to 44' cross-section in order to accommodate two 12' lanes with 10' shoulders. For the remainder of the roadway, widenings are limited due to the intensity of the residential land uses and the practice of parking on the street. Were it possible to eliminate on-street parking, then Myrtle could serve more of a through function than it does currently. In addition, there is a need for a right angle intersection with Main, with appropriate turn lanes. At the northern end of Myrtle, it is recommended that the northern leg of Myrtle Avenue and its signal be eliminated and all traffic channeled through the one intersection.

10- <u>Myrtle Avenue - Thompson Street - Scraggy Hill Road</u>

At present, these three roadways intersect at awkward and unsafe

angles. It is proposed that Myrtle Avenue intersect only with Scraggy Hill, eliminating the north leg, and avoiding a three-way intersection at Thompson Street. Scraggy Hill's intersection with Thompson would be a "T" with the appropriate turn lanes.

11- Scraggy Hill Road Extension - Thompson Street to Brewster Drive

It is proposed that this roadway be extended to North Country Road. The cross-section would be 44' wide with two 12-foot travel lanes and 10-foot shoulders. Its intersection with North Country Road would allow the elimination of the skewed Pine Hill intersection. Pine Hill Road would now intersect with Scraggy Hill Extension just above Wilmot Road. Old Pine Hill would be dead-ended just short of its intersection with Pine Hill Extension. Access would be via Scraggy Hill Extension or Second Avenue. As with the other road proposal, separate turn lanes would be provided.

12- Columbia Avenue - North Country Road to Hallock Avenue/NYS 25A

This roadway is 30' wide with two travel lanes, with room for three-foot shoulders. It is proposed that it be widened by 14' to a 44' cross-section with two 12' travel lanes and 10' shoulders. At its intersection with proposed South Drive, appropriate turn lanes would be provided.

13- Main Street/NYS 25A - Railroad Track to North Country Road

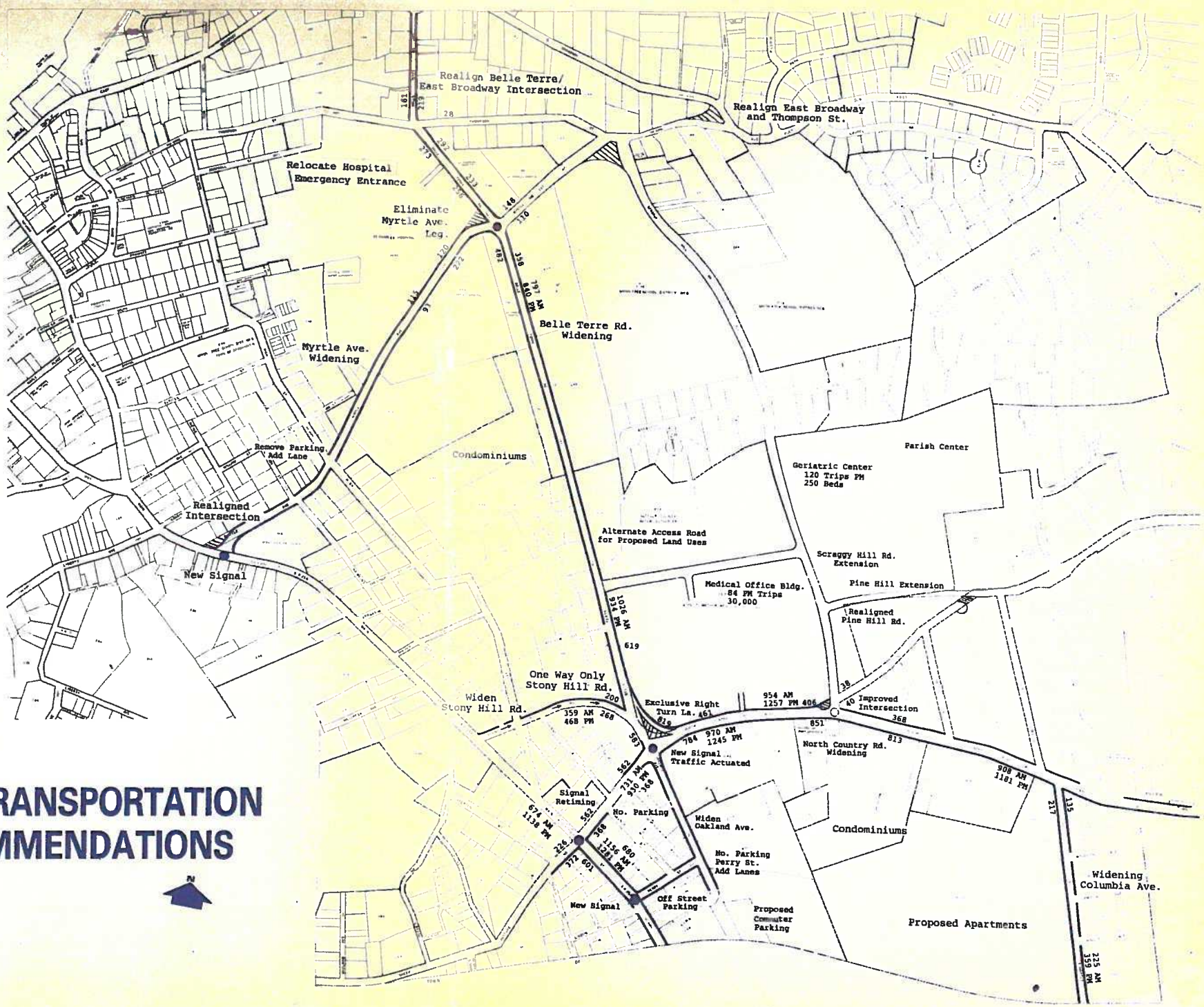
The total pavement width is 36 feet with two travel lanes and parking on both sides of the roadway. The proposal for improvement is to eliminate this on-street parking and provide for it with municipal off-street parking to the rear of the stores. The result will be to provide an additional travel lane in each direction. At the NB approach to North Country Road, the lane delineation would be

a separate left turn lane and a shared right/thru lane. At present, two lanes of traffic northbound merge into one lane just south of the track, in preparation for on-street parking just north of the track. Southbound Main Street traffic merges into one lane just south of Sheep Pasture Road in order to allow for the parking lane and continues to just south of the track where it breaks into two southbound travel lanes.

14- Perry Street - Main Street to Oakland Avenue

This roadway has two travel lanes and parking on both sides. At present, left turns are prohibited from Perry onto Main Street. It is proposed that parking be eliminated on both sides of the roadway in order to provide for separate left and right turn lanes at its intersections with Main Street and with Oakland Avenue. The intent is to provide an alternate to the North Country Main Street intersection. At Present, this function is partially in place as northbound Main Street traffic turns right on Perry and left onto Oakland. With the signalization of Perry and Main Street, left and right turns will be permitted. The effect will be to pull left turns that are currently made from North Country onto Main Street. All of the above information is shown on Map 6.

6 - TRANSPORTATION RECOMMENDATIONS



Downtown Parking

The growth in the downtown area that has been shown in other sections of this report clearly indicates the need for almost immediate solutions to the parking problem.

There are a few alternatives that could be considered to alleviate some of the parking problems. It is virtually impossible to accommodate peak Sunday afternoon traffic. However, there is continuing shortage of parking on other days of the week, especially during the summer months.

The easiest, most expensive alternative, is the construction of a parking deck. However, in the past, this option has been determined not desirable within the Village. Therefore, a second approach is to acquire any vacant and/or underutilized tracts of land that could be used for additional parking.

The last alternative is to institute a shuttle system for employees during peak hours. This would require a shuttle service from the downtown area to the commuter parking lots which are generally unused on weekends. The purchase and operation of the vehicle or vehicles to run such a system could be funded by the Village through the creation of a downtown employment district or operated by a business association.

The various parking improvements could be funded by general Village revenues or they could be obtained by means of a special benefit district. The latter district would incorporate the entire central business district. This would allocate any improvement funds to the area that needs it without burdening the entire community. There is some justification for this approach since Port Jefferson now is a major tourist center and provides community services for neighboring areas. The drawback to the creation of a benefit district is that some of the

private parking facilities that exist in the area might have to be brought under Village control and maintenance in order to create an equitable situation in the downtown area.

If this first policy is implemented by one of the alternate means, there should be a second policy of providing parking as part of any new commercial development. This would be less of a problem if a special district is created since there would be a means of funding. If there is no special district, then the commercial development would have to provide off-street spaces or pay an impact fee to acquire land or construct additional parking spaces at municipal expense.

The best opportunities for new parking space in the immediate downtown area are near Myrtle Place. The unused portion of the Village owned land south of the hand ball courts could accommodate 40 spaces. Slight reconstruction of the small adjacent parking area west of the access road could provide additional spaces to connect with this new area. The 1.1 acre vacant property south of the firehouse which is owned by the fire district, plus another acre of mostly unused land immediately south of the above parcel could provide 200 - 250 new public parking spaces. This latter parcel has access to Main St. and Barnum Ave.

The only remaining possibility of new spaces is adjacent to the new commercial construction between Mariners Way and E. Main St.

The system of tandum parking on one section of Main St. should be extended on the west side of the street from E. Main St. to Barnum Ave. to ease the flow of traffic on Main St.

See Map 7, Planning Options for the parking recommendations.

Commuter Parking

In order to accommodate future electrified or other improved rail service, a 1,000 foot platform which could accommodate 12 railroad cars will have to be constructed on a straight stretch of the track. The easiest location to build this platform is to the east of the present station. This would allow property as far east as Columbia St. to be used for some of the new parking.

Even though most of the property that might be used for new parking is zoned for industrial use, there is limited demand for new industries, especially on land that has steep topography.

The relocation of some of the commuter parking to the east would alleviate parking problems in the business area on Route 112 by allowing some commuter spaces to now be used for business parking.

The following table summarizes those parcels that could be acquired or transferred and be used for commuter parking:

Table 20

Parcels that Could Be Used for Parking in the Vicinity of the Port Jefferson Railroad Station

Parcel #	Acres	Owner	Location	Number of Cars that Could be Accommodated	Zoning	Present Use
1	0.4	Henry Rabetz	End of Oakland Ave.	50	Commercial	Railroad parking*
2	4.9	John McNamara	e/o Oakland Ave. n/o LIRR	700	Commercial and Industrial	Vacant
3	0.7	Loper Lumber	n/side of Maple Ave.	100	Industrial	One residence
4	0.6	Loper Lumber	e/side of Union St.	80	Industrial	One residence
5	2.5	Bimco Industries	e/side of Union St.	350	Industrial	Bus storage
6	2.0	L.I.R.R.	Turnaround n/o Rt. 25A	100	Industrial and Residential	Vacant
7	2.4	Suffolk County Industrial Development Agency	w/side Columbia St.	300	Industrial	Vacant
8	1.8	Dewall (Town of Brookhaven)	n/w Corner Columbia St. & Rt. 25A	250	Commercial	Highway Yard
9	2.0	Edgar Enterprises	s/e Corner Columbia St. & Hollis Ave.	290	Industrial	Boat storage
10	1.0	Robert Minaick	n/e Corner of Columbia St. & Rt. 25A	145	Industrial	Vacant
11	1.2	Donald Dehart	n/o 25A opposite William St.	140	Industrial	One Residence
12	1.0	North Shore Insulation	e/side Columbia St. s/o LIRR	125	Industrial and Residential	Vacant

* 1987 Construction on this site

Over 2,500 vehicles could be accommodated. Therefore, any combination of the above parcels that could produce the necessary 815 spaces would be acceptable. Parcels that are vacant and publicly owned should be considered first since they could be acquired at a reasonable cost. Also, parcels that are to be developed as part of an overall plan development such as Parcel 2 should also receive the highest consideration since they can be obtained as part of an overall site plan agreement. The parcels with houses and commercial storage should be the last considered since they are likely to involve relocation and possibly the highest cost per acre.

Parcel 1, which is currently being used for parking purposes, should be acquired so that properly laid-out spaces could be located on the property. In Parcel 6, the present yard area at the railroad should be used for parking purposes even though it is an odd shape and will not yield as many spaces as a more rectangular parcel. If the track is removed, this parcel has the advantage of providing direct access from a parking area to Route 25A. The use of a portion of the Bimco Industries property and the Loper Lumber property, when coupled with the aforementioned railroad parcel, could provide an entirely new parking area with access to Route 25A that could also be shared with the present New York State lot that is just south of the railroad station. The use of the Suffolk County Industrial Development Agency parcel would allow excellent circulation to Route 25A and Columbia Street.

The use of the McNamara parcel requires the construction of a roadway between the parking area and Columbia Street. This is part of an overall development plan for new residential development on the former Rason Asphalt property, which will improve access and create little conflict between residential neighborhoods and the commuter traffic.

A key to all of the future parking at the station should be a greater reliance on Columbia Street for access to the station. The southern portion of the street is already commercially and industrially oriented and the northern portion currently accommodates more than residential traffic. The use of this roadway will offset some of the congestion that presently exists on Routes 25A and 112, Oakland Avenue and Sheep Pasture Road.

Environmental Review

Chapter 7 of the report, Performance Controls for Sensitive Lands, A Practical Guide for Local Administrators, deals with the environmental importance of hillsides and steep sloped areas (See Appendix C). It points out that hillsides are very environmentally sensitive and many adverse impacts within a community can result when such steep sloped areas are developed without proper review and performance standards. The following environmental criteria and standards should be considered when developing hillsides:

Minimize Development on Steep Slopes

Slope management should result in a stable vegetated slope during site construction and operational phases of development.

Density controls are an important means of minimizing impacts on slopes. However, slope density standards alone are not sufficient for erosion management. These controls do not address areas that should be preserved or the conditions that influence erosion such as soil erosion and slope stabilization. Recommended site development erosion control techniques are listed below.

- Site structures so as to minimize alterations in grade on slopes. This does not necessarily mean building on the gentler slopes of a site. Very effective methods of slope stabilization can result from building on the steepest portion of the slope and using the structure as a retaining wall.
- Site roads and driveways on slopes less than 10%.
- Prevent development on slopes greater than 20% or on slopes within major swales.

- A site development plan should be approved before any site clearing or grading is allowed. All site plans should indicate future grades, the edge of vegetation disturbance, and stormwater runoff and erosion control measures.
- Site grading should not result in the disturbance of stable slopes or structures on adjacent properties, and should not result in the accumulation of sediments on adjacent properties or in the primary watershed area.
- The natural vegetation on steep slopes directly bordering surface waters should not be disturbed.
- Locate roads and driveways in such a manner that no stormwater from the road will reach the bluff face or the beach below.
- Construct a berm parallel to the bluff face to trap stormwater from overland flow and to allow for percolation into the soils. Do not allow stormwater flow trapped by berms to reach the bluff face on an adjacent property.
- Locate septic system leaching pools as far as possible from the face of the bluff. The underlying surficial material should not be confined by a clay lense or other impermeable layer.
- Cover disturbed soil areas with vegetation suitable for bluff locations.

<u>Minimize Erosion and Sedimentation</u>

- The majority of the site should remain in natural vegetation.
- The creation of new grades greater than 33% (3 to 1 slope) should not be allowed except in special circumstances. The cut and fill on a site should be kept to a minimum wherever possible. Slopes of 20% or greater should not be disturbed.

- No increased sedimentation of swales or wetlands resulting from the construction or operational phases of site development should be allowed.
- All sediment resulting from construction-induced erosion should be trapped on the construction site. Site disturbance from clearing and grading should be minimized.
- Site top soil should be stockpiled.
- Stockpiled soils should be stabilized by planting with rye, oats or other quick germination grasses. Grass mixes or alternative types of vegetation require minimum fertilization.
- Disturbed soils should be revegetated or seeded as soon as possible and before the certificate of occupancy is given.

<u>Reduce Stormwater Runoff and Maximize High Quality Recharge</u>

- The stormwater generated by a new development project should be recharged on-site within the boundaries of the project. Minimize the contact of stormwater runoff with the soils by recharging stormwater as close as possible to the development site.
- Maximize the recharge of stormwater for all land uses. All stormwater from rooftops, patios, decks, sidewalks, and driveways should be recharged on-site.
- Eliminate the direct discharge of all stormwater runoff from new development, existing major roads, large public parking areas, and all other paved surfaces to surface waters and wetlands. Stormwater pollutants should be attenuated by using holding ponds, sedimentation basins and other measures that reduce flow velocity and increase storage time. Water discharged from these systems should be of acceptable quality

before discharge into wetlands and surface waters. In addition, any filtering devices constructed as part of the drainage system must be adequately maintained in order to function properly.

- During the construction period, disposal of stormwater runoff generated by development activity should be handled on-site.
- Natural land features such as shallow depressions should be utilized, wherever possible, to collect stormwater on-site.
- Where topography limits the recharge of stormwater on site, the runoff should be collected from road surfaces and then either directed to sediment basins before discharge to a recharge basin or directed to leaching systems as part of an "in-line" storage system.
- Encourage site designs that reduce impermeable paving. The use of permeable pavements should be encouraged in all driveways and parking lots. Measures such as these should be required in areas within 200 feet of surface waters and wetlands.

Maintain Major Swales in their Natural State

Swales should be maintained in their natural state, with no disturbance of the natural vegetation and soils in the swales nor alteration of the surface hydrology.

- Do not increase stormwater runoff into and from swales.
- Do not alter the slope (filling, cutting) of swales.
- Direct discharge of stormwater runoff from structures, buildings, paved areas into swales should not be permitted.
- Do not dump brush into swales.

- Do not block swales except in cases of hardship where an existing structure would be undermined or inundated due to the stormwater runoff and sediment load carried in stormwater runoff.

Prepare a Hillside Development or Steep Slopes Ordinance

The Village of Port Jefferson should seriously consider adopting a "Hillside Development" or "Steep Slopes" ordinance. A copy of "Proposed Hillside Development Requirements" done by the Suffolk County Planning Department for the Village of Northport, together with proposed and adopted ordinances for Boise, Idaho, as well as those of Huntington and the Village of Northport appear in Appendix D.

Develop a Comprehensive Site Plan Review Process

The Village should also consolidate and integrate all of its laws and ordinances dealing with review of development and environmental impact into the Planning Board's site plan review process for both large and small parcels. A comprehensive checklist incorporating all Village development and environmental performance standards and thresholds should be prepared. Where any of the Village's standards or thresholds are exceeded by a proposed development, the site plan should be either modified in order to minimize adverse environmental impacts or a draft environmental impact statement under SEQRA should be required.

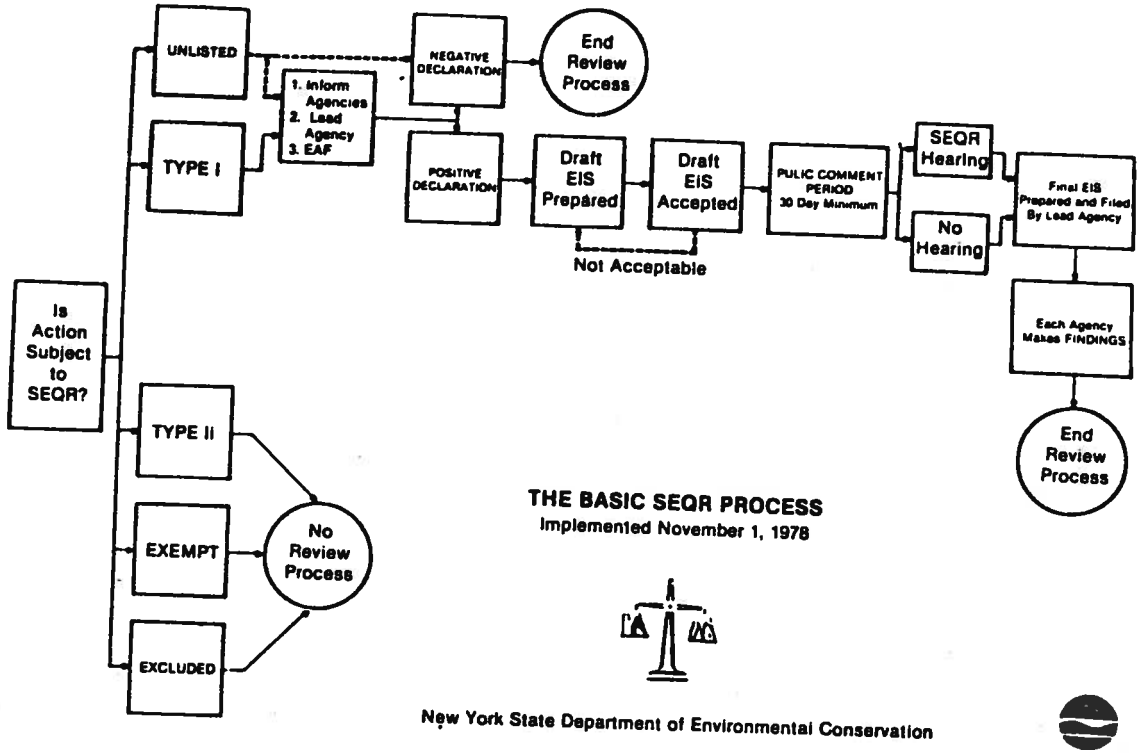
Historic Preservation

The Village of Port Jefferson has an opportunity to preserve the many historic and cultural resources found in the study area. Specific recommendations include:

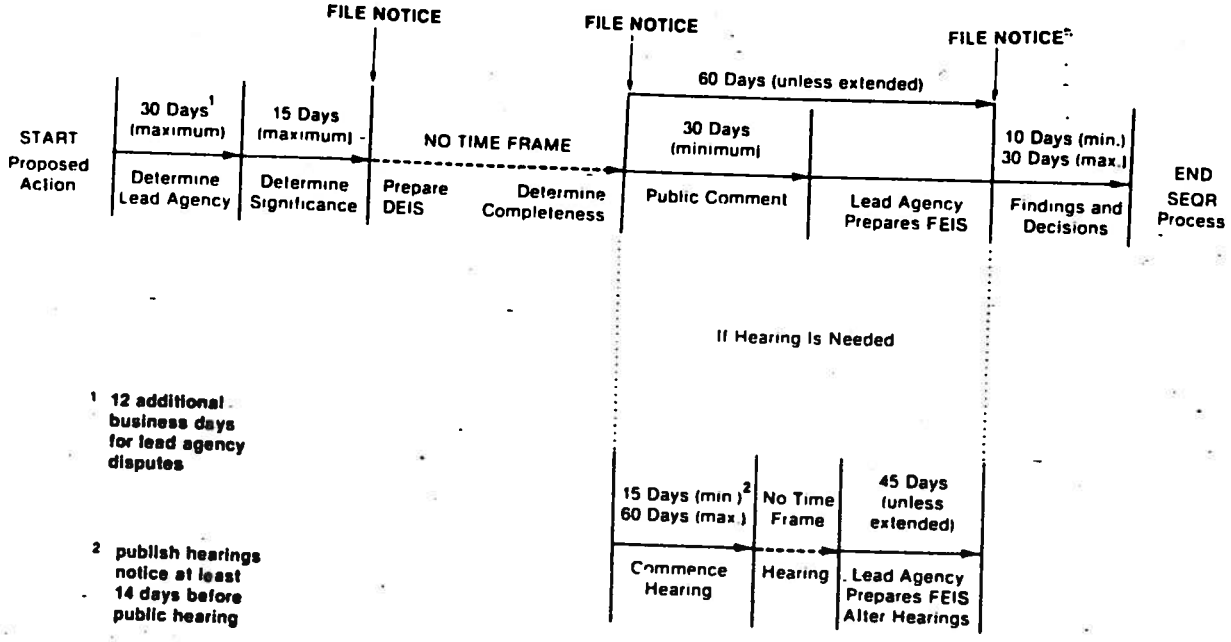
- The Village of Port Jefferson should look into the preparation of a local landmark ordinance in order to help preserve its existing historic structures, landmarks and sites. Roslyn, Oyster Bay Town, Great Neck, the Town of Riverhead, the Town of Huntington, the Village of Head of the Harbor, Northport and Brookhaven all have historic ordinances, some of which are certified by the state, which can be used as examples to aid in the preparation of a Port Jefferson landmark ordinance.
- The Village should encourage the designation of historic districts or landmarks at the local, state or federal level within the study area in order to preserve its cultural and historic integrity.
- All of the proposals for the rehabilitation and expansion of the business district should accommodate existing historic structures by encouraging their continued use in a manner that would preserve their historic character.
- Property owners of existing historic structures should be made aware of the tax advantages and wherever possible, favorable tax treatment of historic structures should be used in the rehabilitation and upgrading of the Village's historic landmarks.
- The Village should continue to require the architectural design of new development to be compatible with that of the existing historic structures and landmarks within its borders in order to perpetuate the quaint harbor village setting that makes the area attractive as a resort.

APPENDIX

APPENDIX A



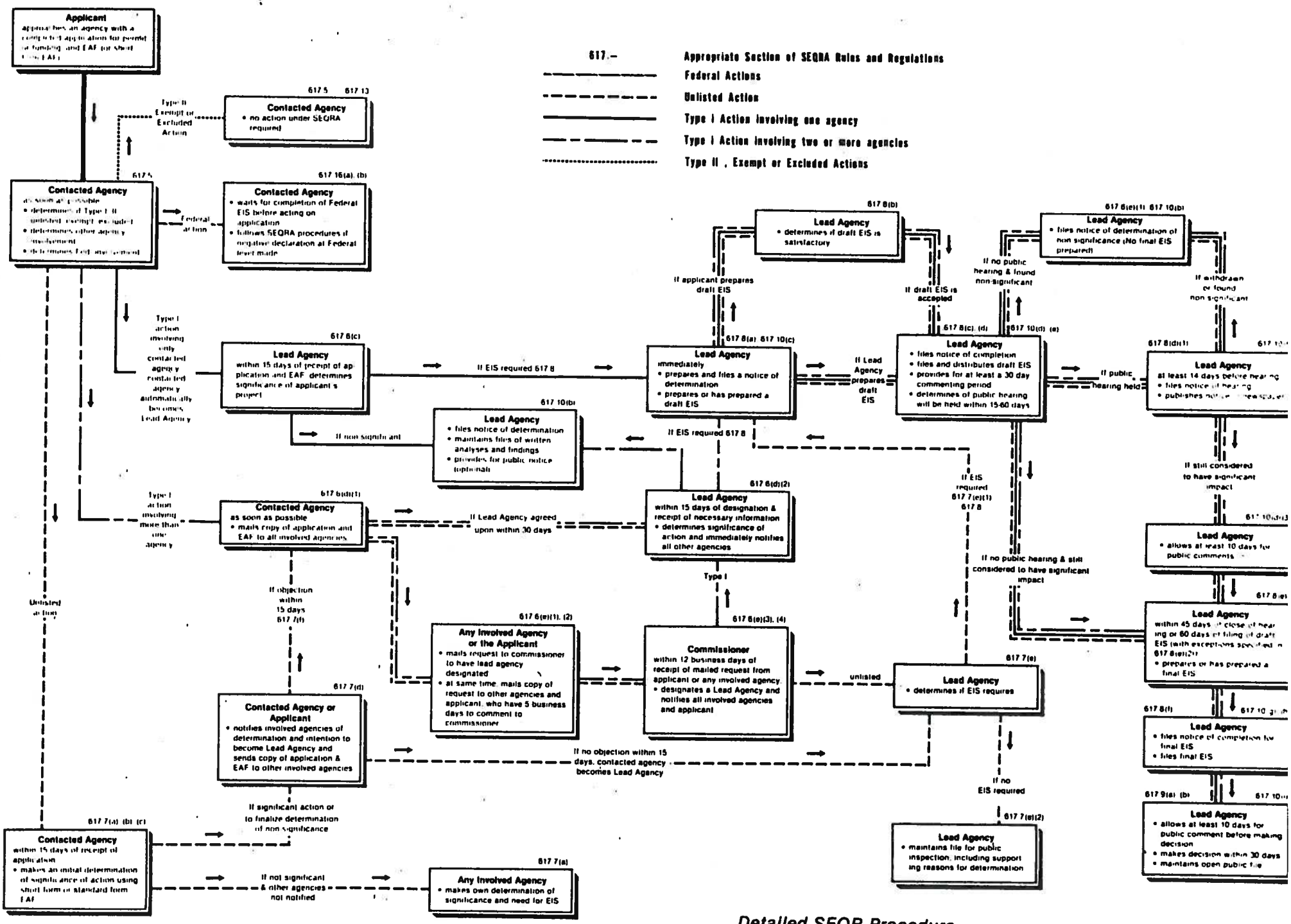
SEQR Time Frames



Simplified SEQR Procedure

Source: N.Y.S.D.E.C.

Appendix B



Detailed SEQR Procedure

Appendix C

Performance Controls for Sensitive Lands: A Practical Guide for Local Administrators, Parts 1 and 2

By Charles Thurow, William Toner, and Duncan Erley

Prepared for the Office of Research and Development,
U.S. Environmental Protection Agency, Washington, D.C. 20460

Contract No. R802-443, Program Element 1 HA098

Project Officers: Martin Redding and Isabel Reiff,
Washington Environmental Research Center,
U.S. Environmental Protection Agency

Chapter 7. Hillsides

Compared to development in other sensitive areas, hillsides have long been regulated, and consequently the regulations are quite sophisticated. A major reason for this sophistication is the number of disasters resulting from poorly designed hillside development. As with floodplain regulations, the willingness to develop land-use regulations for sensitive areas seems tied to the frequency or magnitude of "natural" disasters. However, there is nothing natural about hillside disasters which damage homes, degrade water supplies, or increase flood hazards. In almost every case such disasters are the result of insufficient predevelopment investigation, poor development design, or inappropriate construction practices.

The experience of the Los Angeles area is typical of the relationship between hazard conditions and preventive regulation of hillside development. In the early 1950s, as a result of the decreasing availability of flat land open to development within the metropolitan area, development pressures on the hillsides of the city and county increased. In these early years, hillside development generally followed standard flat-land practices. Instead of developing the hillsides in a manner compatible with hillside geology, the hillsides were simply flattened by cut-and-fill construction. As millions and millions of cubic yards of earth were moved from one place to another, little notice was given to underlying geology, drainage patterns, or soil conditions.

With the advent of each wet season, it became apparent that there was something seriously wrong. Various parts of the city and county experienced severe problems with erosion, land subsidence and settlement, and landslides. In the fifties the resulting damages totaled several millions of dollars.

By 1953 both the city and county of Los Angeles began experimenting with various regulations designed to improve previous developmental practices. By 1963 regulations had been developed and were being applied on a broad and relatively consistent scale. They included grading regulations, density restrictions, and a newly defined role for engineering geologists in the regulatory process. By the end of 1963, the city and county had developed a set of regulations which would minimize future damage in hillside areas.

These regulations were put to the test in early 1969. The months of January and February 1969 marked the heaviest rainfall in Los Angeles County in over 85 years. Of the 11,000 hillside sites developed since the new regulations went into effect in 1963, damage was limited to a total of $182,000. In the same storm, damage to sites developed prior to 1963. Clearly, the regulatory million. On a per-unit basis, sites developed under the post-1963 regulations experienced an average damage of $16, or one-tenth of the average $160 damage for each site developed prior to 1963 amounted to more than $6.3 process had been effective.[1]

Poorly designed and constructed hillside developments frequently result in substantial costs to the public, either for repairs or for protective measures to prevent further damage. Increased runoff and sedimentation from denuded hillsides require increased public expenditures for flood control and storm water management. If these costs were absorbed in specialized onsite design regulations, then the general public would be spared the additional expense. However, once the basic development pattern for an area is established, the public must either provide protection or live with the threat of disaster. In either case it is an expensive undertaking, as was recently discovered by the citizens of Orange County, California, where poorly regulated hillside development was partially responsible for a $500-million remedial flood-protection program. In Seattle a local agency recently spent several millions to shore up hillsides which threatened both the lowlands and development on the slope itself.

Not only does poorly regulated hillside development result in increased public expenditures for remedial protection from disaster, additional dollars must be spent for various public utilities and public services in such areas. Development in hillsides is more expensive than development in flatter terrain. Sewer lines and water lines in hilly areas require special engineering and sometimes

specialized equipment. Roads need the same specialized engineering and construction practices. Similar specialized attention must be given to public structures, such as schools, fire stations, and police stations. These expenditures amount to public subsidies for the benefit of hillside residents at the expense of citizens living in more accessible terrain.[2]

Since the stability of each hillside depends upon its unique combination of vegetation, climate, soil, and underlying geology, problems of hillside development also vary from region to region. In the Southwest, erosion of hillsides is a severe problem, especially in Arizona, where sparsely vegetated hillsides raise concern for the scarring of steeply sloping areas. Erosion of New Jersey, Maryland, and Virginia hillsites creates special problems for siltation in downstream areas. Landslides are a major problem along the Pacific Coast, particularly around San Francisco and Los Angeles, and in the Pacific Northwest. In Pennsylvania and West Virginia local concern focuses on abandoned mine shafts which underlie some hillsides.

Because of the variety of local concern and approaches to hillside development, regulations must be tailored to each specific case, thus requiring the collection of data and the implementation of various techniques in each area. Consequently, it is impossible to specify the "best" approach to hillside regulation. In the following material we identify those environmental factors which led to the various regulatory approaches and discuss the necessary information or expertise required to implement each approach.

HILLSIDES AND THE PUBLIC RESPONSE

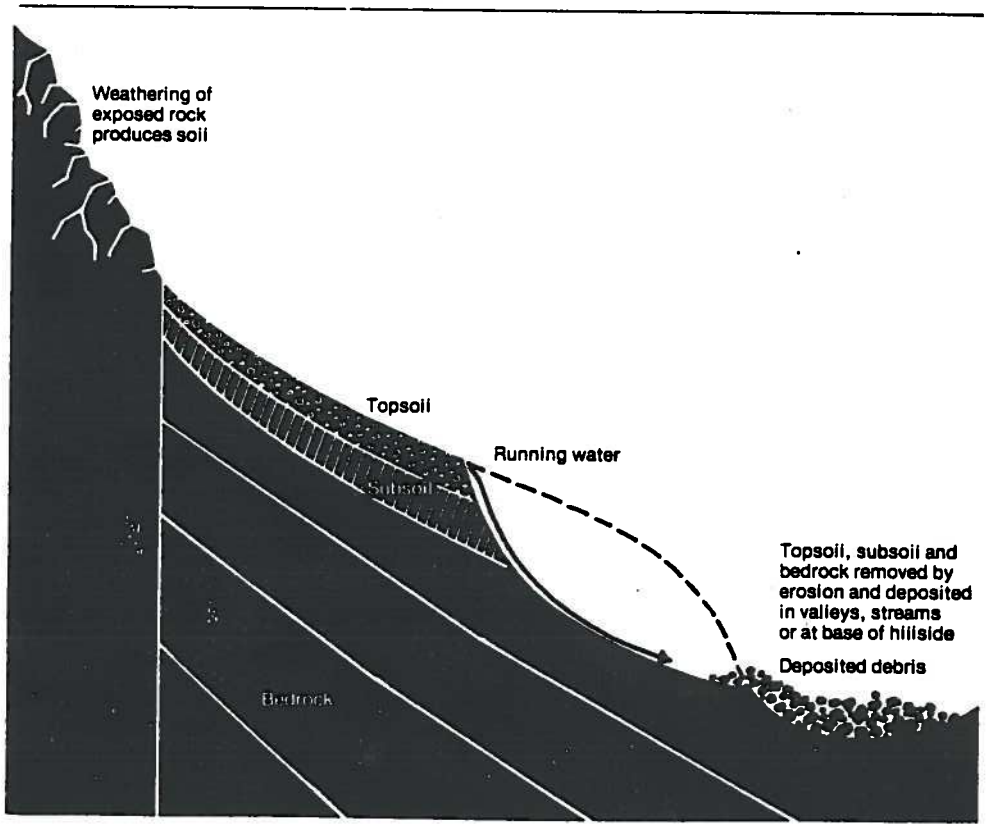
Hillsides are a different kind of critical area. Unlike groundwater, they are not a renewable resource, nor do they have clearly defined benefits for the public good, like woodlands or wetlands. Hillsides are geological features on the landscape whose slope and soils are in a balance with vegetation, underlying geology, and the amount of precipitation. Maintaining this equilibrium reduces the danger to public health and safety posed by unstable hillsides.

Development of hillsides affects the equilibrium of vegetation, geology, slope, soil, and precipitation to one degree or another, and the public objectives can be defined in terms of that disturbance:

1. Disturbance of hillsides can result in the loss of slope and soil stability as well as increased erosion. The removal of vegetation from hillsides deprives the soil of the stabilizing function of roots, as well as the moderating effects on wind and water erosion of leaves and branches. Loss of soil stability increases erosion and thus lowers downstream water quality as a result of siltation. Downstream wetlands can be injured in this way. Spring thaws or strong rains on unstable slopes can produce mass movements, such as landslides, slumps, and flaws, particularly in steeply sloping areas.

2. Disturbance of hillside can increase runoff. Development may alter the natural drainage pattern of a hillside, producing increased runoff and erosion. Removal of vegetative cover decreases percolation of precipitation into the soil, thereby reducing the amount of groundwater

FIGURE 20. EROSION AND WEATHERING



recharge and adding water to runoff that would ordinarily be transpired by trees and shrubs. Construction of impervious surfaces, such as roads and buildings, decreases the amount of groundwater percolation and thus increases the amount of runoff. Increased runoff, in addition to producing intensified erosion, also creates downstream flood hazards.

3. Disturbance of hillsides can destroy a community's aesthetic resources. A range of hills frequently marks a community's boundaries and provides an attractive setting for homes and buildings. Degradation of hillsides as result of erosion, mass movement, loss of vegetation, and damage to downstream areas deprives a community of its attractive and distinctive setting and decreases real estate values.

In these three areas, hillside development can have a far-reaching impact upon a community's land, water, economic, and aesthetic resources. Yet hillsides can be developed in a manner compatible with hillside ecology. What are the natural constraints we must consider in regulating hillside development?

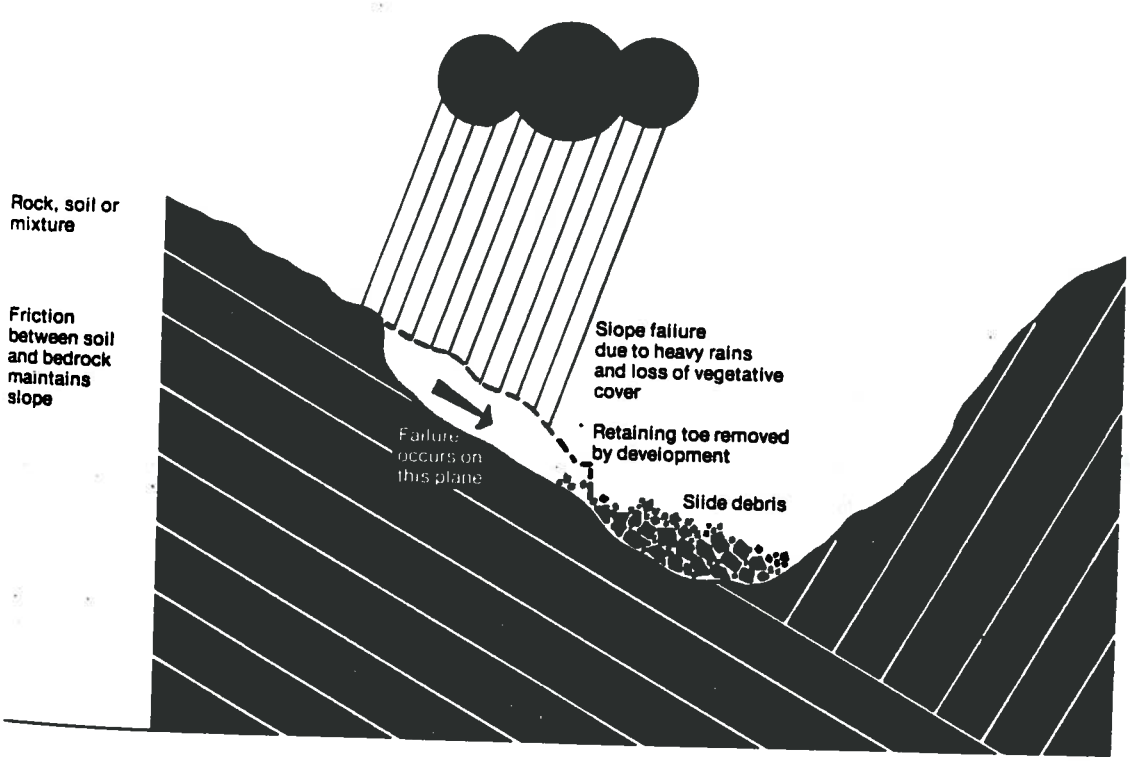
Mass Movement and Erosion

Though the slope and soil of a hillside are generally balanced with the amount of precipitation, vegetative cover, and the underlying geology, hillsides are constantly in motion. This perpetual downward movement of hills is the result of the almost imperceptible and gradual effects of weathering and erosion. Alternate freezing and thawing of rocks and the chemical action of water gradually disintegrates them into soil particles. The downward pull of gravity, aided by the force of running water or ice, moves these materials down the slopes. Hillside movement of this type is part of the hydrogeologic cycle which creates new soil by weathering and carries it via streams into valleys and plains. (See Figure 20.)

We are concerned only with rapid or large-scale movement of rocks and soils, such as landslides, slumps, and mudflows. Rock formations and soils are held in place by friction. Thus, any increase in the load can cause a landslide. Since water between the rocks and particles acts as a lubricant, rocks and soils saturated by spring thaws or heavy precipitation can overcome this friction and cause a slide. Moreover, since saturated materials are heavier than drier ones, heavy rains or melting water can overload a slope's retaining capacity. Earthquakes may also disturb the friction between rock and soil particles and cause a slide. In addition to the retaining power of friction, many slopes are held in place by accumulated debris or other formations at the bottom or foot of the hill. Loss of this support through erosion or development can also cause a landslide. (See Figure 21.)

Slumps and mudflows are less dramatic forms of mass movement caused when the soil is oversaturated, thereby decreasing the friction between the particles. Slumps occur in homogeneous materials, such as clay soils, and are frequently seen along highway grades where the collapsed materials bulge at the base of the slump. (See Figure 22.) Mudflows occur in saturated heterogeneous materials, such as gravels and silt, and are common in arid

FIGURE 21. LANDSLIDE [3]



regions during heavy rains.

Disturbance of hillsides susceptible to the mass movement of materials in landslides, slumps, and mudflows usually occurs in two ways: decreasing stability and increasing groundwater load.

Vegetation not only aids slope stability, but also consumes a great deal of water; thus removal of grasses, shrubs, and trees can increase soil saturation by the release of more water for absorption by the soil. Even in those circumstances when it is possible to replace natural vegetation with artificial landscaping, there can be severe consequences. It is estimated that one of the chief causes of slope failures in the Los Angeles area was the replacement of natural vegetation with lawns and exotic shrubbery. Unlike the natural vegetation, the new plants required large quantities of water to support their growth. The excess water found its way into the subsurface geology and reduced the friction between a layer of clay and bedrock. As a result, the slope gave way.

Even in vegetated areas the amount of moisture in the soil, particularly during seasonal rainfall or melt, may be too much to permit any development, which would increase the water content and create slide, slump, or flow hazards. A good index for such areas is the average height of the water table. If it is near the surface, development should be prohibited, not only because of potential mass movement, but also because of the likelihood of polluting the groundwater.

The mechanical alteration of the arrangement of rocks, soils, and the particles making up the slope also increases the possibility of mass movement. Though grading and road construction on the slope or the disturbance of the retaining formation at the base of a hill may not cause mass movement, these activities can make the slope more susceptible to slides, slumps, and flows. Particular care should be taken in the West and Southwest and other areas of frequent seismic activity, heavy rains, or rapid melting of accumulated heavy snowfall.[5]

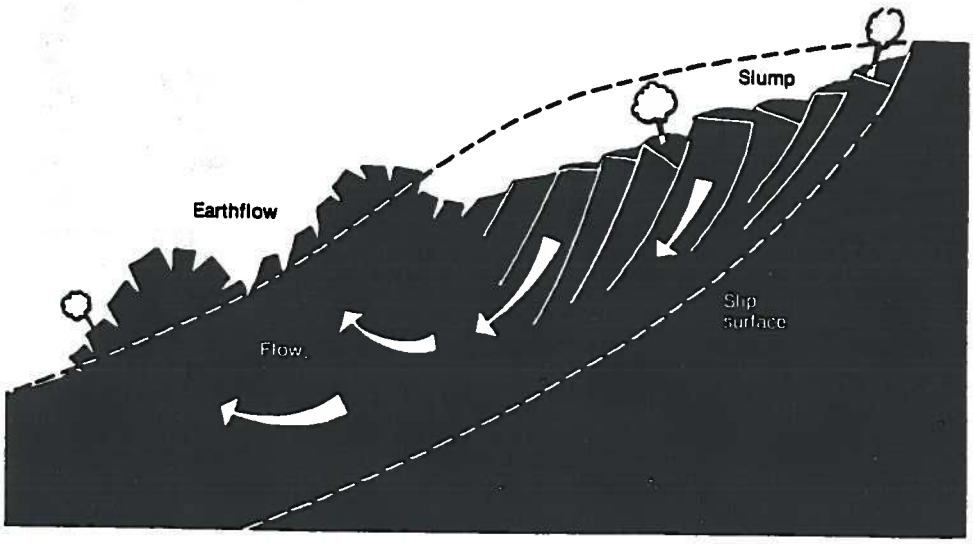
These dramatic mass movements of slopes in slides, slumps, and flows are less frequent agents of hillside movement than the slower, less catastrophic action of erosion. Erosion is a function of the degree of slope, soil type and condition, and vegetative cover. The greater the degree of slope, the more susceptible the hillside to erosion. To a lesser extent, the erosion rate is also dependent upon the length of the slope.

Steeply sloping areas are particularly vulnerable to erosion, and certain soils are more susceptible to erosion than others. In general, the less permeable or capable of absorbing and retaining water a soil is, the more likely it is to erode. Thus, clays and other soils which do not absorb water are more easily eroded than sands or gravels, which absorb precipitation.

Vegetative cover plays an important role in moderating erosion. Leaves and organic litter cushion the impact of precipitation and increase the soil's permeability. While dried hay may be scattered over a disturbed slope or vegetation may be replaced, some soils will support only specialized vegetation. In arid areas and in regions where the soil mantle is very thin, even a short period of no cover, especially during periods of heavy precipitation or melting, can erode enough of the soil to make replacing lost vegetation difficult, if not impossible. In the red clay hills of northern Mississippi and Georgia loss of vegetative cover results in rapid erosion of scant topsoil, leaving its highly unpermeable clay subject to extensive erosion. Replanting these hillsides has taken decades of experimentation and work.

Rapid erosion of hillsides causes many other problems, too. Since the effects of hillside erosion as a result of disturbance are felt throughout the entire drainage basin, what happens on the hillside will eventually be reflected in the larger watershed. The impact of increased runoff may thus be far greater in downstream areas than on the hillside itself. The increased sediment load can choke streams, fill up wetlands, and increase turbidity, thereby

FIGURE 22. SLOPE UNDERGOING SLUMP (CROSS-SECTION)[4]



making these water systems unsuitable for drinking water and for supporting many species of plants and animals.

The mechanical alteration of slopes by grading or levelling not only destroys the vegetative cover, but also alters the character of a slope. The degree of slope may be increased, thereby increasing erosion, and more easily eroded soils or rocks may be uncovered. The most extreme alteration of a hillside is to level it. This and similar radical changes of hillsides can have far-reaching consequences, including rapid erosion, disturbance of groundwater hydrology, and alteration in stream flow and drainage patterns.

In altering the slope or foot of a hill or removing vegetation, care must be exercised to disturb the equilibrium of the slope as little as possible. Areas of periodically heavy rains or melting, with scant soil cover, frequent seismic activity, or very steep slopes, are particularly vulnerable to disturbance. In these and other hilly areas, particular care must be taken not to disturb the retaining formations, or the arrangement of soil and rock, or vegetative cover.[6]

Runoff and Drainage Patterns of Hillsides

A crucial factor in the stabilization of hillsides is the development of a stable drainage system. The combination of degree of slope, soil type, vegetative cover, underlying geology, and precipitation pattern determines the particular form of streams and tributary watercourses, which carry the 35-40 per cent of precipitation that is not retained by the soil or used by plants. On a vegetated, mature hillside, the drainage pattern is relatively stable, changing only slowly as gradual erosion alters the slope. Generally, a stable system is rather complex, consisting of many connected watercourses which feed one stream or a few major ones. On slopes with no vegetation and exposed soils, the drainage pattern is simpler, becoming more complex as watercourses erode the divides between them and develop into a few major streams with tributary creeks and rills.

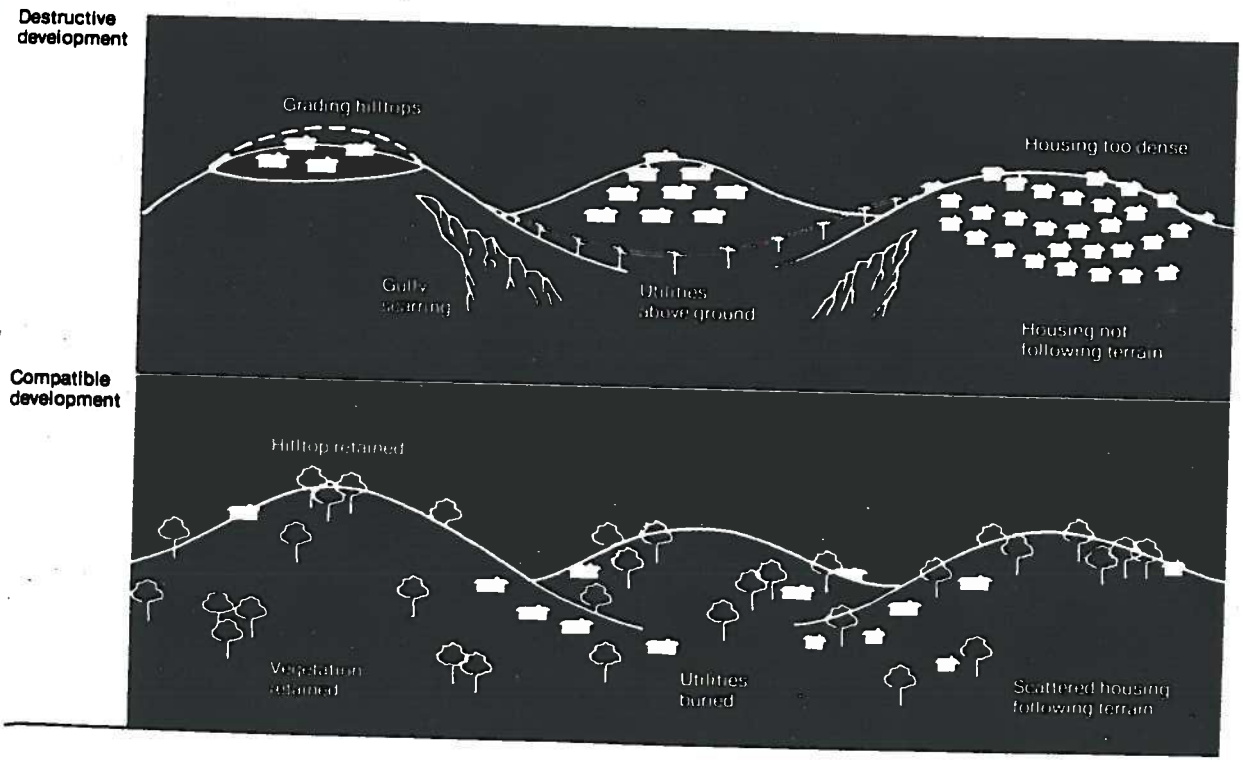
A gullied slope is an unattractive result of disturbance of a hillside's drainage pattern. Roads and other construction cutting across streams or the grading and leveling of slopes make runoff water seek new channels. The development of new watercourses and drainage systems increase erosion and the rate of runoff, resulting in downstream damage from siltation and flooding.

Usually vegetation is also disturbed by hillside development, increasing runoff. Vegetation moderates runoff in three ways. Grass, shrubs, and trees not only stabilize soils and moderate erosion, but also absorb large quantities of precipitation which is transpired by their leaves into the atmosphere. In cold areas, trees (especially evergreens) shade accumulated snowfall, allowing it to melt gradually. Vegetative litter and roots retain and slow the flow of runoff, as well as aid in the percolation of precipitation into groundwater reserves. Thus, loss of vegetation increases runoff by releasing precipitation that would either be used by plants or absorbed and retained by their roots and litter.

Building impervious surfaces on hillsides is one of the more frequent ways in which hillside drainage is altered by development. Not only is runoff and its associated problem of downstream siltation and flooding increased, but less precipitation can enter groundwater reserves.

Hillside development must proceed from a firm understanding of drainage systems. Not only must a

FIGURE 23. DESTRUCTIVE AND COMPATIBLE HILLSIDE DEVELOPMENT



stable drainage pattern be maintained, but vegetative cover must be preserved to prevent rapid runoff and erosion, downstream siltation and flooding, and loss of groundwater recharge.

Hillsides Are Aesthetic Resources

Hillsides are distinctive features of a local landscape, providing a community with an attractive setting. Often they are natural boundaries which establish the political identity of a community. One index of the aesthetic value of hillsides is the premium of real estate sites with "a view." But it is relatively difficult to quantify the aesthetic resources of a hillside in providing a varied landscape and community identity.

A comparison of the illustrations in Figure 23 suggests how the aesthetic resources of hillsides may be either destroyed or preserved by various land uses. Long lines of nearly identical housing units ring the hills of Daly City, California, and large segments of hills have been removed in Tucson, Arizona, leaving flat-topped hills and filled-in lowlands. Other communities where erosion of the scant soil cover is rapid, such as Phoenix, Arizona, have permanently scarred their hillsides. Of course these and other hillside developments are not only unattractive but also destructive to the stability of hillside geology and drainage. Scattered projects which retain most of the vegetation and distinctive features, such as hilltops and outcroppings, and follow the natural terrain are not only attractive, but also safe and ecologically sound.

CURRENT PRACTICE IN HILLSIDE REGULATION

The Intent of Regulation

In the previous section, several important public values in hillside regulation were identified, including preservation of aesthetic resources and protection from mass movement and erosion, excess runoff, and siltation. In developing local regulations it is desirable to spell out these values rather than to rely upon vague generalizations such as "preserving hillsides" or "maintaining the unique local environment." The closer local regulations are tied to specific health, safety, and welfare concerns, the more solid the legal defense of the regulation will be.

The following statements of purpose are taken from two local ordinances which establish and regulate the development of special hillside districts. These statements specify the community's particular social, economic, environmental, or aesthetic objectives in creating such regulations. Each of these objectives is then reflected in the actual standards and regulatory processes defined in the remainder of the ordinance or act. The first is from Pacifica, California:

"It shall be the purpose of the Hillside Preservation District to promote the following City objectives which shall be considered as guidelines:

(1) To maximize choice in types of environment available in the City and particularly to encourage variety in the development pattern of the hillsides;

(2) The concentration of dwellings and other structures by clustering and/or high-rise should be encouraged to help save larger areas of open space and preserve the natural terrain;

(3) To use to the fullest current understanding of good civic design, landscape architecture, architecture, and civil engineering to preserve, enhance, and promote the existing and future appearance and resources of hillside areas;

(4) To provide density and land-use incentives to aid in ensuring the best possible development of the City's natural features, open space, and other landmarks;

(5) To encourage the planning, design, and development of building sites in such a fashion as to provide the maximum in safety and human enjoyment while adapting development to, and taking advantage of, the best use of the natural terrain;

(6) To preserve and enhance the beauty of the landscape by encouraging the maximum retention of natural topographic features, such as drainage swales, streams, slopes, ridge lines, rock outcroppings, vistas, natural plant formations, and trees;

(7) To prohibit, insofar as is feasible and reasonable, padding or terracing of building sites in the hillside areas;

(8) To provide a safe means of ingress and egress for vehicular and pedestrian traffic to and within hillside areas, while at the same time minimizing the scarring effects of hillside street construction;

(9) Utility wires and television lines shall be installed underground;

(10) Outstanding natural physical features, such as the highest crest of a hill, natural rock outcroppings, major tree belts, etc., should be preserved;

(11) Roads should follow natural topography, wherever possible, to minimize cutting and grading;

(12) Imaginative and innovative building techniques should be encouraged to create buildings suited to natural hillside surroundings; and;

(13) Detailed and effective arrangements shall be formulated for the preservation, maintenance, and control of open space and recreational lands resulting from planned unit development."

Obviously, Pacifica's statement of purpose covers a whole range of local concerns. The second example is from Walnut Creek, California.

"It is therefore the intent of the City that undeveloped land in hillside areas be placed in a Hillside Planned Development District, to be identified by the initials HPD, in order to accomplish the following:

(1) To preserve significant features of a hill area in essentially their natural state as part of a comprehensive open-space system;

(2) To encourage in hill areas an alternative approach to conventional flatland practices of development;

(3) To minimize grading and cut-and-fill operations consistent with the retention of the natural character of hill areas;

(4) To minimize the water-runoff and soil-erosion problems incurred in adjustment of the terrain to meet onsite and offsite development needs;

(5) To achieve land-use densities that are in keeping with the general plan; however, in order to retain the significant natural features of the hill areas, densities will diminish as the slope of the terrain increases;

(6) To insure that the open space as shown on any development plan is consistent with the open-space element shown on the General Plan; and

(7) To preserve the predominant views, both from and of the hill areas and to retain the sense of identity and imageability that these hill areas now impart to the City of Walnut Creek and its environs."

The Walnut Creek example narrows the purposes of the ordinance. While not as complete as Pacifica, it is nevertheless a good statement of purpose.

The statement of purpose or intent summarizes the specific objectives of the local community in regulating hillside development. While the emphasis of this report focuses on environmental concerns, it is important to note that a statement of purpose should include the various social and economic objectives which also apply. The statement of purpose or intent is the basic foundation for the remainder of the regulation.

Key Features of the Regulatory Approach

There are three principal approaches to the regulation of hillside development: (1) slope-density provisions, which decrease allowable development densities as slope increases; (2) soil-overlay provisions, which assign use and density on the basis of soil characteristics in sloped areas; (3) the guiding principles approach, which is relatively free of precise standards but which emphasizes case-by-case evaluation on the basis of a number of specific policies. Grading and erosion controls are important supplements to these three techniques.

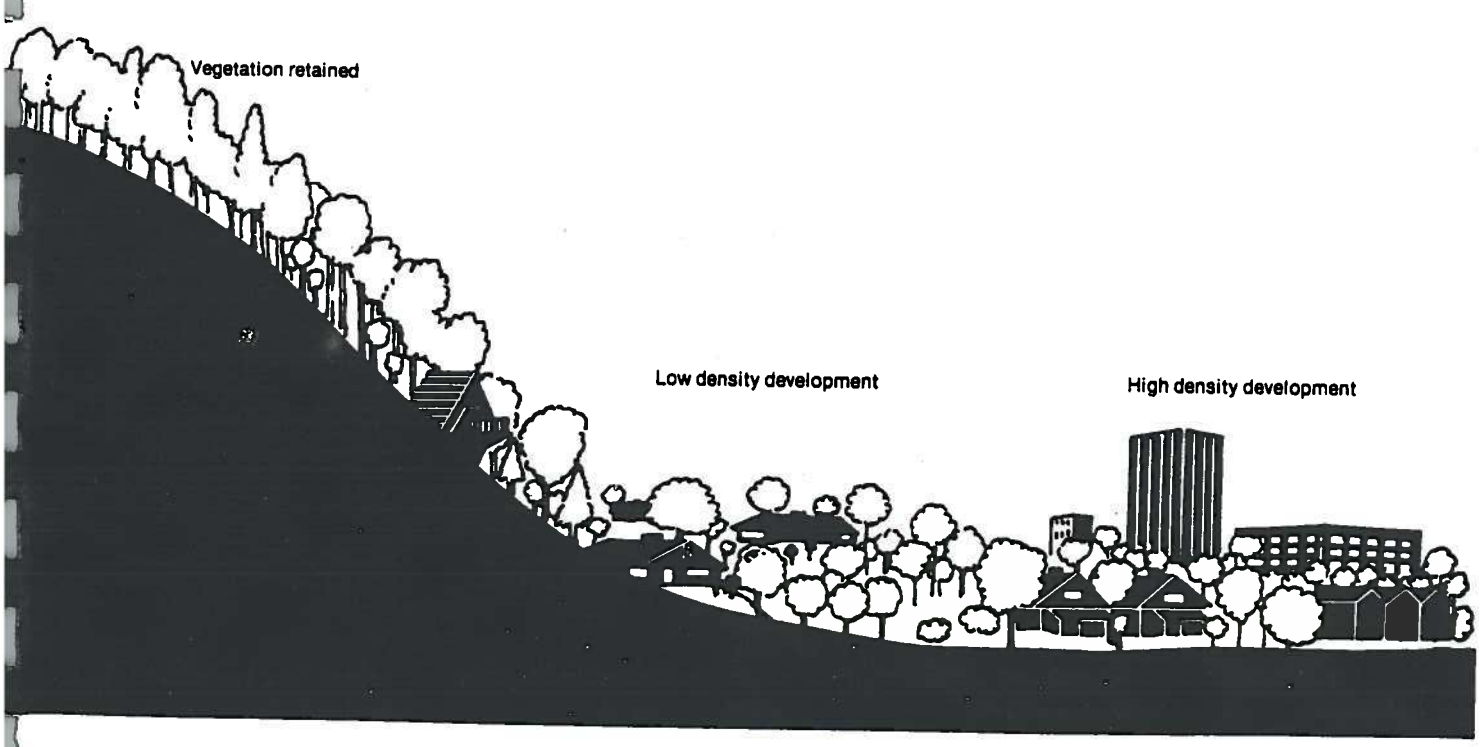
Slope-Density Provisions. Slope-density provisions are assuming an increasingly larger role in the regulation of hillside development. These provisions, which state what degree of density may be built on a particular slope, are becoming a primary means of hillside protection. Their purpose is to define the percentage of a particular parcel of land which can be developed on the basis of that parcel's average slope. The greater the slope, the less the parcel may be developed. (See Figure 24.)

The environmental rationale supporting the slope-density approach is simple. Other factors being equal, as slope increases so does the potential for environmental degradation, including slope failure, increased erosion, sedimentation, and runoff. Limiting development according to the degree of slope shifts development into areas with the least potential for environmental damage while protecting steeper, more sensitive land from development pressures.

Slope-density provisions achieve several of the typical local objectives spelled out in the purpose or intent of regulation. In lowering densities as a function of slope, the potential for environmental degradation is decreased. Economic costs to the community for public safety and other services are reduced when steep slopes are more restricted. Aesthetic values are maintained if development is encouraged in gently sloping areas while simultaneously keeping steeply sloped, dominant landscapes in their natural state. In these and other ways, slope-density provisions make good environmental sense.

Another attractive feature of slope-density provisions is the substantial flexibility in setting exact standards.

FIGURE 24. SLOPE-DENSITY DEVELOPMENT



These standards are easily adapted to reflect specific local concerns. In a community composed entirely of sloped areas, the standards may be far less restrictive than in a community intent on maintaining the natural quality of a few dominant sloping areas. In a community with a history of steep-slope failures or with extensive erosion problems, a very restrictive slope-density provision makes good sense. Each jurisdiction utilizes the same basic concept, but each is able to adjust the provision to meet specific local needs. For example, in Pacifica and Thousand Oaks, California, all lands at or exceeding an average slope of 35 per cent must be retained in their natural state. However, in Weber County, Utah, lands with an average slope of 35 per cent or greater may be developed with lot sizes ranging from 10,000 to 75,000 square feet.

Still, there are a variety of shortcomings to this approach. In general the potential for degradation increases as a function of slope; in some instances, however, it may be more of a problem on relatively gentle slopes, because erosion is sometimes more a function of vegetative cover and soil type. In other cases runoff in gently sloping areas may exceed that of steep-slope areas. Though many other factors affect the potential for hillside damage, the main strength of slope-density provisions is in the recognition of the fundamental relationship between slope and the potential for degradation. Since they are a useful device in the absence of a great deal of site-specific information, they are particularly appropriate for local communities with limited technical resources. When combined with more exacting site-specific informational requirements, they can be both flexible for developers and dependable for local communities in maintaining critical environmental values.

Another shortcoming of slope-density provisions is the method by which average slope is determined. One corner of a parcel may be steeply sloping and fall under highly restrictive regulations. However, the rest of the parcel may be gently sloping and the average slope may thus be low enough to allow development of the entire area. Regulations meet this problem of how to determine average slope by specifying that any slope above a certain percentage cannot be developed and thus must be excluded from the average slope equation. Thus, in Pacifica, California, all slopes over 35 per cent are protected, regardless of what portion of a parcel contains such steep areas.

TABLE 4. SLOPE—LOT SIZE REQUIREMENTS

Per Cent Average Slope	Santa Fe, N.M. (Proposed)	Phoenix, AZ	Orange Co., CA (Proposed)
5	.25 Acres	No Req.	No Req.
10	.50 Acres	.55 Acres	No Req.
15	1 Acre	.90 Acres	No Req.
20	2 Acres	1.30 Acres	.16 Acres
25	5 Acres	2.00 Acres	.22 Acres
30	No Develop.	3.33 Acres	.44 Acres
35+	No Develop.	5.00 Acres	1.00 Acres
40	No Develop.	5.00 Acres	5.00 Acres
50+	No Develop.	5.00 Acres	10.00 Acres

There are three principal variations on the slope-density approach: slope-lot size, slope-natural area, and slope-dwelling units. With slope-lot size, minimum lot size increases with average slope. With slope-natural area, the amount of land to be left in its natural state increases with slope. On the basis of slope-dwelling unit, the number of permissible dwelling units falls as slope increases. In some local jurisdictions, each of these variations is contained in the ordinance. In others, two of the three are used. Commonly, however, only one is chosen.

Slope—lot size. The earliest slope-density provisions grew out of efforts to define a relationship between average slope and required minimum lot size. Marin County, California, may have been the first to define such a relationship in the late 1950s. Since that time, a number of local jurisdictions have chosen this basic route. Table 3 compares the slope-lot size requirements of three jurisdictions. From this table it should be apparent that local conditions play a key role in determining minimum lot size in relation to average slope. In Santa Fe, New Mexico, hillsides are particularly vulnerable to erosion. In Phoenix, Arizona, hillsides are easily scarred. In Orange County, California, erosion, scarring, and slope failure are all questions of local concern.

Along with regulating lot sizes according to slope, local jurisdictions must also be careful to include coverage requirements. The amount of land which is covered by impervious surface is an important variable in the determination of developmental effects on hillside. Runoff, for example, is directly related to impervious surface as well as slope. When a slope is covered with impervious surface, runoff increases dramatically, thereby increasing the potential for erosion of the hillside in addition to siltation of the down-watershed areas.

One effective regulatory response to the hazards of impervious surface is found in coverage maximums, which specify the amount of land that may be covered by impervious surface. For example, in the proposed Santa Fe, New Mexico, regulation, lot sizes of up to one acre are restricted to a maximum of 30 per cent lot coverage for structures. At two acres and above, this maximum drops to 10 per cent lot coverage for structures. In the proposed Orange County ordinance, coverage maximums are also a function of lot size: the smaller the lot size (7,000 square feet), the higher the allowable coverage (40 per cent); the larger the lot size (10 acres), the lower the allowable coverage (five per cent).

In steep-slope areas, such as Orange County, large lot sizes may be required. Orange County proposes a 10-acre minimum on slopes greater than 50 per cent, allowing a maximum land coverage of five per cent. In contrast, a less rugged area of 20 per cent average slope allows a coverage maximum of 40 per cent on a 7,000 square foot minimum lot. Coverage maximums in this case provide effective support to the environmental rationale of the basic slope-density relation. The concept is simple. If, for example, a land area of some 100 acres were classified in the 50 per cent average slope category, the Orange County proposal would establish up to 10 dwelling units with a maximum impervious surface of five acres. If these same

TABLE 5. SLOPE—NATURAL STATE REQUIREMENTS

Per Cent Average Slope	PER CENT OF SITE TO REMAIN IN NATURAL STATE		
	Chula Vista, CA	Pacifica, CA	Thousand Oaks, CA
10	13.75	32	32.5
15	31.25	36	40.0
20	43.75	45	55.0
25	62.50	57	70.0
30	90.00	72	85.0
35	90.00	90	100.0
40	90.00	100	100.0

100 acres were classified in the average slope of 20 per cent, some 625 dwelling units would be allowed which would cover a total of 40 acres in impervious surface. At a lower average slope, both density and coverage could increase, while at higher average slopes density and coverage would decrease. In designing minimum lot-size slope relationships, it is important to remember that liberal coverage allowances in steep-slope areas can negate the effectiveness of such ordinances.

Slope—natural state. Some jurisdictions are facing the question of coverage more directly. The slope-density relation specifies some percentage of the site which is to be retained in a natural or undisturbed state. On the land so specified, only uses which do not require topographical change or major construction, such as conservation or recreation, are allowed. Table 5 presents a comparison of three jurisdictions which specify the per cent of each site to be retained in a natural state as a function of average slope.

Once again, there is some variation in the local application of the "natural-state" provision. In most categories, Thousand Oaks, California, requires a larger percentage of the site to be retained in a natural state. Chula Vista, California, requires a smaller percentage than the others in the low-slope categories, but more than the others at the average slope of 30 per cent. The variations reflect local conditions.

Slope—dwelling units. The final variation of the slope-density provision is found in the specification of the number of dwelling units allowable according to the degree of slope. This is commonly accompanied by provisions which establish minimum lot size as a function of slope or which establish the per cent of the site to be retained in a natural state according to slope. Table 6 identifies its application in three jurisdictions.

Once again, the relationship between average slope and dwelling units per acre can be seen to reflect varying local needs. In most categories, Phoenix is the most restrictive, with Walnut Creek the most permissive. Yet in the higher average slope categories, Thousand Oaks has the highest standards.

The use of the basic slope-density equation has grown from the determination of minimum lot size and buildings per acre to the determination of the area which must be retained in a natural state. Chula Vista, California, has extended this concept into the identification of the maximum area which may be graded as a function of slope.

TABLE 6. SLOPE—DWELLING UNITS REQUIREMENTS

Per Cent Average Slope	DWELLING UNITS PER ACRE		
	Walnut Creek, CA	Phoenix, AZ	Thousand Oaks, CA
5	No Req.	No Req.	No Req.
10	3.5	1.8	2.0
15	3.0	1.1	11.6
20	2.5	.7	1.2
25	2.0	.5	.8
30	1.5	.3	.4
35	1.0	.2	.1
40	.5	.2	.1

In all cases, this method retains the dominant environmental rationale of protecting the natural functions of hillsides, under the basic principle that steep-slope areas are more sensitive than areas of lesser slope.

Slope density is also flexible. As should be apparent from the foregoing tables, the exact specifications tied to average slope can vary significantly. Highly erodible or easily scarred slopes may require lower densities than slopes which are less erodible or less easily scarred. Slide-sensitive slopes may preclude the placement of structures altogether. Thus slope-density requirements are adaptable to local needs.

Soil Overlays. A second approach to the regulation of hillside development is through the use of soil overlay maps. The overlays are published by the Soil Conservation Service in cooperation with local agencies. A soil overlay map shows which areas are suitable for particular types of development based on soil content. With the more precise knowledge generated by soil surveys, local communities can fine-tune their regulatory approach.

McHenry County, Illinois, has developed "Soils Overlay Regulations," which are applied in addition to the requirements of the primary zoning districts. The county has established a special "Steep Soils Overlay District" for areas with certain soil types and slopes greater than 12 per cent. Since these soils are particularly vulnerable to erosion and problems of sewage disposal, the district places additional restrictions on any primary use. If the primary use is residential, the regulations specify certain procedural requirements for any "onsite sewage disposal, sewage lagoons, oxidation ponds, landfills, or extensive site modification. . . . "

The small town of Mine Hill in Morris County, New Jersey, is using a soil survey to regulate development in sensitive slope areas. The limitations of certain soils are based on an analysis of the Morris County Soil Survey Map. Eight separate soil types on slopes in excess of 15 or 25 per cent are identified as "unbuildable." The ordinance simply states that "applicants shall not place structures or construct improvements on those lands indicated . . . as unbuildable." Since soil surveys have not been completed for most of the state, New Jersey is perhaps more fortunate than many states. In the case of Mine Hill, a private consultant adopted this environmental information into ordinance form. If such information is available (and relatively current), it is an excellent foundation from which key features of a hillside development regulation may be developed.

The Soil Conservation Service Department of Orange County, New York, cooperated with the county Department of Planning to produce a set of regulations based on a variety of soil types. One interesting feature of this ordinance is a minimum lot-size formula for large-lot zoning districts where no public sanitary sewer system is planned. The formula uses soil types to determine minimum lot size, based on the capability of the land to support septic systems. The lot size in gently sloping, well-drained, erosion-resistant soils would be much smaller, for example, than lot size in moderately sloping, poorly drained, highly erosive soil areas.

Orange County, New York's subdivision regulation divides the county's many soil types into 15 major groups. Since each group is defined according to certain properties (e.g., slope, runoff potential) each has certain restrictions on development. Two of the major groups, which apply to sloped areas and have special restrictions on development, are excerpted below:

Soils developed in sands and silts that are influenced by steep slopes, moderately steep to steep:

(1) Characteristics: The soils in this group are all soils that occur on slopes ranging from 15 to 25 per cent. Slope percentages in some units are combined. The range of these soils is 15 to 35 per cent. These soils are rated rapid for surface runoff.

(2) Use and Requirements:

- Septic systems shall not be installed on these soils.
- Buildings shall not be constructed on these soils except in cases where 50 per cent of the area where the buildings are to be constructed is less than 15 per cent slope (or 4,000 square feet).
- Erodibility on these soils is low to medium, and erosion may be a problem. . . .

Soils, developed in sands, silts, and clays, that are dominated by very steep slopes:

(1) Characteristics: The soils in this group are all soils that occur on slopes ranging from 25 to 45 per cent. These soils are rated very rapid for surface runoff.

(2) Use and Requirements:

- Septic systems shall not be installed on these soils.
- Buildings with and without basements shall not be installed on these soils except in cases where it can be proven that erosion and sluffing will not occur, or necessary measures have been taken to prevent them.
- Erodability on these soils is high, and erosion and sluffing may be a severe problem.

Through the use of soil surveys, Orange County has been able to refine its regulations to reflect the special capabilities of its critical areas. Some sloped areas are more suitable for development than others; some are simply unbuildable. Such exacting information, when translated into ordinance form, makes the job of the local planning agency easier.

One important feature of most ordinances based on soil information is providing allowances for additional or more precise information. A common failing of soil surveys is that in reviewing several hundred square miles of land, mistakes are possible, or the information may be accurate only on a large scale. Consequently, most ordinances based on soil surveys allow, and indeed require, prospective developers to submit site surveys. If the results of the site survey conform with the initial findings, then the ordinance applies. If the results show some significant variation, then another set of standards applies.

The use of soil surveys to regulate hillside development is an important advance. Along with the factors of runoff and slope, the potential of soils to erode or slide allows regulations to be tailored to specific areas. This is in contrast to hillside-development regulations which apply across the board to any land with a slope greater than some minimum percentage. Clearly, the more detailed information of soil surveys enables the setting of priorities on a rational basis among various land areas. Some hillside property is more sensitive to erosion than others; some more sensitive to runoff than others; some more sensitive to failure than others. This information enables the local community to make important regulatory distinctions. A developer in one area might be required to take extensive protective measures against erosion, while a developer in another area might be required to take similar measures against runoff. For any single site, preventive measures could be focused on the greatest needs of that area.

On the negative side, soil overlays are an inexpensive undertaking and the information may become quickly dated. Also, accurate information on a large scale may not be accurate on a small scale. Further, data on soil characteristics give little information about the constraints of underlying geology, nor is such knowledge equivalent to a hydrological survey. Soil surveys are but one piece of environmental information which can focus the regulatory approach but which in themselves do not account for all factors affecting hillside stability.

Still, if the information on soils is available and reasonably current, there are few more precise sources of information to be used in the regulation of hillside development. With the knowledge of the sensitivity of particular soils, land-use regulations can be more finely tuned to the characteristics of an important natural system.

The Guiding-Principles Approach. The third major approach to the regulation of hillside development is the use of various evaluative principles. While determining the base district as residential, commercial, or industrial sets the primary type of land use in the hillside area, an overlay district is also applied to all lands within the jurisdiction whose average slope exceeds some minimum per cent. The key features of the overlay district is a set of guiding principles or policies which are utilized by an evaluative body in reviewing development proposals.

The principles themselves may or may not be connected to more exact development standards. In a pure principle approach, no precise standards are contained within the overlay district regulations. In a modified principles approach, precise standards are applied in conjunction with the evaluation principles. Slope-density provisions, for example, may be supplemented by evaluative principles in a modified approach. Two examples of the pure principle approach are found in the Irvine, California, Hillside Development Overlay District and a proposed Hillside Overlay District for Boise, Idaho. First, Irvine's:

The policies of the City of Irvine with regard to development in hillside areas are as follows:

(1) To preserve the most visually significant slope banks and ridgelines in their natural state by clustering developments into meaningful neighborhood units.

(2) To minimize the effects of grading and insure that the natural character of the hillsides is retained.

(3) To preserve visually significant rock outcroppings, native plant materials, natural hydrology, and areas of historical or visual significance identified by the General Plan or through the Environmental Impact Report Procedure to the maximum extent possible.

(4) To encourage variety in housing types, padding techniques, grading techniques, lot sizes, site design, density, arrangement, and spacing of homes of developments.

(5) To encourage innovative architectural, landscaping, circulation, and site design.

(6) To discourage mass grading of large pads and excessive terracing.

(7) To provide safe circulation of vehicular and pedestrian traffic to and within the hillside areas and to provide access for emergency vehicles necessary to serve the hillside areas.

(8) To provide safety against unstable slopes or slopes subject to erosion and deterioration in order to protect human lives and property.

(9) To permit only those developments which are not detrimental to the public health, safety, and welfare.

From this example it is apparent that the range of evaluative policies can be quite broad. The policies stress aesthestic values as well as economic, social, environmental, and public safety values. In contrast, the following Boise proposal tends to emphasize aesthetic and environmental values only:

[T]he following points shall serve as a basis for evaluating all hillside development proposals:

All development proposals shall strive for maximum retention of the natural morphological features and qualities of the site and development shall seek to enhance these natural features and qualities.

All development proposals shall take into account and shall be judged by the application of current understanding of land-use planning, soil mechanics, engineering geology, hydrology, civil engineering, environmental and civic design, architecture, and landscape architecture in hill areas. Such current understanding includes but is not limited to:

(1) Planning of development to fit the topography, soils, geology, hydrology, and other conditions existing on the proposed site;

(2) Orienting development to the site so that grading and other site preparation is kept to an absolute minimum;

(3) Shaping of essential grading to complement the natural land forms and prohibiting all successive padding and/or terracing of building sites;

(4) Developing large tracts in workable units on which construction can be completed within one construction season so that large areas are not left bare and exposed during the winter-spring runoff period;

(5) Accomplishing all paving as rapidly as possible after grading;

(6) Allocating to open space and recreation uses those areas not well suited to development, as evidenced by competent soils, geology, and hydrology investigations and reports;

(7) Landscaping of areas around structures and blending them with the natural landscape;

(8) Placement, grouping, and shaping of manmade structures to complement one another and the natural landscape, providing visual interest, and creating a sense of place within the development;

(9) Demonstrating a concern for the view *of* the hills as well as the view *from* the hills;

(10) Use of a variety of housing types in residential areas to permit steep slopes, wooded areas, and areas of special scenic beauty to be preserved as scenic easements, through the use of density transfers; such alternatives may include attached dwellings, apartments and condominiums, residential clusters, and groups of various housing types;

(11) Special consideration in the design of such visual elements as street lighting, fences, sidewalks, pathways, and other street furniture to enable maximum identity and uniqueness of character to be built into each development;

(12) Minimizing disruption of existing plant and animal life.

A great deal of evaluative expertise is required to implement the overlay policies. Indeed, generalizations such as "preserve the most visually significant slope . . . " and to "discourage mass grading . . . " and "planning of development to fit the topography, soils, geology, hydrology . . . ," leave considerable room for discretion. Success of this approach relies almost exclusively on the effectiveness of the evaluative process.

To use a pure-principle approach requires a great deal of specific information about a site, plus technical and scientific expertise to interpret the information. Without these resources, which are often unavailable to local agencies, the pure-principles approach becomes ineffective. Thus, while this approach contains the seeds of innovative hillside regulation, it may also contain the potential for a degraded local hillside resource.

As a result, a number of communities use a modified-principles method, in which the principles are supplemented by a set of minimum standards that apply exclusively to hillside development. In this case, the principles and standards are contained in the regulations of an overlay district. The base district still sets the primary uses of the area, which may range from planned unit development to exclusive residential or commercial. Within the context of the base district and the minimum standards defined in the overlay district, proposed developments may be evaluated according to the set of guiding principles. In such cases, the principles are used to determine whether bonuses should be given for such items as innovative site design, extensive open-space commitments, or preservation of a special landmark or natural resource. Once again, the evaluation is central to the effectiveness of this method, but with supplemental standards there is less room for effectiveness than in those

communities which elect the pure-principle approach.

An example of the use of the modified principle approach is found in the Walnut Creek, California, Hillside Planned Development Permit Process. In this process, prospective developments are subject to slope-density minimums. However, base density may be adjusted within a defined range if the evaluative body determines that the proposal meets one of the following characteristics:

"In order to encourage [satisfactory] hillside developments . . . , adjustments may be made in the base density in the recommendation for approval and approval of an HPD permit, pursuant to any of the following:

(1) The existence of open space beyond that [normally] required . . . ;

(2) The existence of amenities or onsite or offsite improvements which are not normally found or required in residential developments;

(3) The existence of a mixture of housing types which provides a variation in the appearance of the development and allows a range of housing prices for differing income levels, and has a projected population which is comparable to or lower than the projected population of a single housing type;

(4) The existence of landscaping of a type, size, and quantity which exceeds that required by this section;

(5) The existence of a topographical feature, including but not limited to a cliff or deep ravine, of a magnitude which causes the weighted incremental slope (average slope) to be significantly greater than would be the case if the topographic feature was not considered; and

(6) The offer to an acceptance by the City of land in excess of the park land dedication requirements of . . . this Code."

Here, the necessity for expertise is not so demanding. For example, a community may specify a certain percentage of open spaces in its hillside areas. If the proposed development can be shown to exceed this goal, then some form of bonus might be granted. This method could be applied to virtually any area of local concern such as low-income housing, varied developments, and school-site dedication.

The strength of the guiding-principle approach lies in its ability to encourage innovative hillside development. However, when this method is used without any minimum standards, increased evaluative expertise is required. If such expertise is not available, indiscriminate developments resembling those of flatland practices may result. Conversely, if the expertise is available, the flexibility allowed the developer may produce unique, environmentally sensitive development projects. Still, it is important to consider, as one planning director urges, that "90 per cent of the development industry will come in with the minimum and try to avoid all they can. The other 10 per cent are interested in doing something really worthwhile and look upon these guidelines as an opportunity to do so." Thus many jurisdictions choose a modified planning principles approach whereby minimum standards must be met and some flexibility is retained. This modified method avoids the extensive expertise requirements of the pure-principle approach without placing a straightjacket on a developer.

Grading Controls: A Supplement to Hillside-Development Regulations

Grading controls are a necessary supplement to hillside development regulations. They may be found within the hillside regulation or as a supplementary regulation. As the most potentially destructive part of the construction process, grading must be carefully regulated to maintain the stability of a hillside. Five minutes with modern earthmoving equipment can do more to alter a hillside than 500 years of natural processes.

Grading control can be included within the hillside regulation. With this method, the maximum amount of grading for any given parcel is set beforehand. This approach is generally tied to slope-density provisions, so that steep-slope areas are subject to less grading than gently sloping areas. In the Chula Vista, California, Hillside Modifying District, the percentage of any parcel which can be graded is tied directly to average slope. For example, in a parcel with a five per cent average slope, 93.75 per cent of the parcel may be graded, while in a parcel with an average slope of 30 per cent, only 10 per cent may be graded. The slope-density approach, while not establishing exact standards on how the grading occurs, does establish the maximum area that can be graded.

Beyond this broad standard, most local agencies require a permit before *any* grading is allowed. Obviously, local agencies allow some exceptions for only light grading activities. Commonly, the exceptions specify that no permit is required if the aggregate volume of earth graded does not exceed a minimum of 100 cubic yards, or so many square feet. Any construction which exceeds these limits would require a grading permit.

To be considered for a grading permit, the application must generally be accompanied by a grading plan, which is submitted in conjunction with the development permit application. The grading plan must include information concerning the existing physical characteristics of the area as well as data on anticipated changes as a result of the grading operation. It also calls for a description of the grading process itself which may include exact times and location of proposed earth-moving activities. The Placer County, California, Grading Regulation is typical. The following information shall be required, unless waived by the Planning Director:

A vicinity map showing the location of the site or sites involved.

An accurate plot plan showing:

(1) The exterior boundaries and dimensions of the property on which the grading is to be performed.

(2) Dimension of the area covered by the application.

(3) Buildings, roads, utilities, or other improvements within the area and adjacent thereto.

A map drawn to a scale approved by the Department showing:

(1) Accurate contours at two-foot intervals for slopes up to 20 per cent and five-foot intervals for slopes over 20 per cent showing the topography of the ground to be

graded and filled or cleared and the topography of the 15 feet adjacent to such area. Elevation to be based on USGS data.

(2) The location of observed springs, swampy areas, areas subject to flooding, land slides, and mud flows.

A statement of the land capabilities of the property on which the grading is to be performed, including soil name, soil group, hydrologic group, slope, runoff potential, soil depth, erosion potential, and natural drainage.

A report and map showing the existing and proposed tree and vegetative cover of the site.

A subsurface soil and geological report including subsurface investigations.

A report of the materials involved in the work, including:

(1) Classification;

(2) Suitability of material for the proposed construction

(3) Erosion potential;

(4) Recommendations for construction procedures to obtain the required stability and compaction.

A grading plan including the following:

(1) Cross-section showing both the original and proposed ground surfaces, with grades, slopes, and elevation noted.

(2) Detailed plans of all drainage devices, walls, cribbing, dams, or other protective devices to be constructed in connection with, or as part of, the proposed work.

(3) A map showing the drainage area and estimated runoff of the area served by any drains and proposed methods of runoff disposal.

(4) A soil stabilization report including final groundcover, landscaping, and erosion control.

(5) Erosion control measures to prevent soil loss when the grading is in process.

(6) A description of equipment and methods to be employed in processing and disposing of soil and other material that is removed from the grading site, including the location of disposal sites.

(7) A schedule showing when each stage of the project will be completed, including estimated starting and completion dates, hours of operation, and days of week of operation.

(8) Specifications controlling construction methods and materials in construction of the work, including:

- Provisions for control of grading operations within the construction area and on public roads.
- Safety precautions to be observed and facilities to be provided.
- Compliance with laws and local regulations.
- Control of dust.
- Other related matters.

Supplementary Data—When requested by the Director, the applicant shall procure and furnish at his own expense additional engineering, geologic, and legal reports, plans or surveys, and other material necessary to evaluate site conditions and the effect of the proposed work on abutting properties, public ways, and public welfare and safety.

A statement of the credentials of the person or persons who made the investigation or prepared the reports and plans.

SUBSURFACE INVESTIGATIONS

For the purpose of preparing the soil and geological reports, subsurface investigations shall be performed throughout the area to sufficiently describe the existing conditions.

In particular, subsurface investigations shall be conducted where stability will be lessened by proposed grading or filling or where any of the following conditions are discovered or proposed:

(1) At fault zones where past land movement is evidenced by the presence of a fault gorge,

(2) At contact zones between two or more geologic formations,

(3) At zones of trapped water or high water table,

(4) At bodies of intrusive materials,

(5) At historic landslides or where the topography is indicative of prehistoric landslides,

(6) At adversely sloped bedding plains, short-range folding, overturned folds, and other geologic formations of similar importance,

(7) At locations where a fill slope is to be placed above a cut slope,

(8) At proposed cuts exceeding 20 feet in height, unless in extremely competent rock,

(9) Locations of proposed fills exceeding 20 feet in height,

(10) Where side hill fills are to be placed on existing slopes steeper than 16 per cent,

(11) Wherever groundwater from either the grading project or adjoining properties is likely to substantially reduce the subsurface stability.

While the Placer County example is inclusive in the scope of information required, local agencies might pare it down to focus on specific local concerns. Clearly, seismic hazards may not play the same role in central Missouri as they would in jurisdictions adjacent to active faults. Still, with this level of information local agencies are better prepared to evaluate the feasibility of grading in their hillside area.

With the plan and requisite information, local agencies commonly elect one of two approaches in the evaluation of the grading information. In the first method, the plan is evaluated by the resident local expert, such as the city engineer, building engineer, or planning director. The evaluator may disapprove of the application, require modification, or approve it.

Often, the evaluator is left with the authority to adjust informational requirements for the plan itself. If, for example, the development is proposed in a particularly sensitive hillside area, the evaluator may require more detailed information concerning an important feature of the resource area. In the same way, the evaluator may modify the grading process or may require more extensive use of various protection devices. In this evaluative approach there are few if any minimum standards defined in the relevant grading provision.

Examples of this approach are taken from Los Gatos, Pacifica, and Placer County, California.

In Los Gatos, the evaluation is made by the Architectural and Site Committee. The section contains few guidelines, leaving the committee wide latitude.

TABLE 7. CUTS—STEEPNESS OF FINISHED SLOPE

Jurisdiction	Steepness of Finished Slope
Santa Fe, N.M. (proposed)	1 ft. horizontal to 1 ft. vertical
Palo Alto, Calif.	1½ ft. horizontal to 1 ft. vertical
Phoenix, Ariz.	1½ ft. horizontal to 1 ft. vertical
Boise, Idaho (proposed)	2 ft. horizontal to 1 ft. vertical
Allegheny, Pa. (model ordinance)	3 ft. horizontal to 1 ft. vertical

"No grading for which a grading permit is required by the Town of Los Gatos regulations shall be authorized except upon the securing of Architectural and Site Approval. The Architecture and Site Committee shall not grant approval for such grading except upon a finding that the purpose for which the grading is proposed is essential for the establishment or maintenance of a use which is expressly permitted herein and that the design, scope, and location of the grading proposed will be compatible with adjacent areas and will result in the least disturbance of the terrain and natural land features."

In Pacifica, the relevant section of the ordinance describes the criteria a little more fully, but still leaves the evaluation to the experts. In this case, the plan must be approved by both the Planning Director and the City Engineer who may also send it to a special hillside preservation district board.

"Approval of the permit shall be contingent upon the following conditions:

(1) The grading plan and work shall be directly related to an approved specific plan.

(2) Any grading and excavation shall be necessary for the establishment or maintenance of an approved specific plan.

(3) The design, scope, and location of the grading and excavation will cause minimum disturbance of the terrain and natural features of the land commensurate with the purpose of the grading and excavation work.

(4) All persons performing any grading and excavation operation shall put into effect all necessary safety precautions to minimize erosion, protect any watercourses and other natural features, protect the health and welfare of all persons, and protect private and public property from damage of any kind.

(5) The City shall place certain conditions on time limits and necessary site restoration and shall undertake measures to assure fulfillment of such conditions, for any grading and excavation work."

Placer County, California, establishes more specific criteria for evaluation of grading plans.

"All grading and clearing operations, when a permit is required under these regulations, shall be designed:

(1) To preserve, match, or blend with the natural contours and undulations of the land.

(2) To retain trees and other native vegetation, to stabilize hillsides, retain moisture, reduce erosion, siltation, and nutrient runoff, and preserve the natural scenic beauty.

(3) To minimize scars from cuts and fills.

(4) To reduce the amount of cuts and fills and to round off sharp angles at the top and toe and sides of all necessary cut-and-fill slopes.

(5) To limit development on steep or hazardous terrain.

(6) To compensate for geologic hazards and adverse soil conditions and their effect on the future stability of the development.

(7) So that all cleared slopes, including ski slopes, cuts and fills, and other areas vulnerable to erosion shall be stabilized.

(8) So that construction, clearing of vegetation, or disturbances of the soil be limited to those areas of proven stability.

(9) So that the natural geologic erosion of hillsides, slopes, graded areas, cleared areas, filled areas, or stream banks not be exceeded.

(10) So that sediment or other material deposited in any lake, its floodplains, or its tributaries, or any other public or private lands not exceed that which would have been deposited if the land had been left in its natural state."

In the absence of minimum standards, evaluation of grading plans places total reliance upon the expertise of the evaluator. There are no simple rules or devices to serve as basic indicators of the feasibility of the grading proposal. Further, this method presumes a great deal of technical knowledge which is rarely found in smaller local planning agencies. Clearly, this method of expert evaluation has its pitfalls. If the real expert is available, then perhaps this approach lends both flexibility and sensitivity to the development process. If not, the local agency may find its evaluative process ineffective.

The second type of approach to grading control combines basic development standards with expert evaluation. Typically, the standards cover cuts, fills, grading on steep slopes, composition of materials used in fills, and perhaps such features as retaining walls and the placement of excavated materials.

Standards relating to cuts are mainly concerned with the steepness of the finished slope. Table 7 identifies a range of standards.

The standards for the steepness of slope resulting from cuts varies considerably. These standards reflect specific local concerns in the capability of hillsides to support various cuts. The most restrictive standard of one foot horizontal to one foot vertical applies to sloped areas that are quite sensitive to any alteration. Cuts in such areas could produce slope failure or other hazards. Some flexibility in the standard may be allowed by such regulations, depending upon the evaluation of the local city engineer. Standards could then be adjusted to reflect the specific capacities of the particular parcel under consideration.

In a few cases, standards define some maximum limits of proposed cuts. In Boise, for example, the proposed ordinance suggests that cuts be limited to a height of 30 feet and a length of 400 feet. In Weber County, Utah, the maximum is placed only on the height of the cut, in this case 25 feet. However, most ordinances do not place maximum limits of the size of the cut, but rather on its finished dimensions.

TABLE 8. STANDARDS FOR FILLS

Jurisdiction	Materials	Compaction*	Steepness of Finished Slope
Orange County, Calif.	No organic No rock greater than 8 inches in diam.	Minimum to 90 % of max. density	Not greater than 2 ft. horizontal to 1 ft. vertical
Allegheny, Pa. (Model)	No organic Compacted Setback for structures	No minimum	3 ft. horizontal to 1 ft. vertical
Weber County, Utah	No organic	Minimum to 90% of max. density	Not greater than 2 ft. horizontal to 1 ft. vertical
Palo Alto, Calif.	No organic	Minimum to 90% of max. density	Not greater than 1½ ft. horizontal to 1 ft. vertical
Phoenix, Ariz.	No organic No rock greater than 8 inches in diam.	Minimum to 90% of max. density	Not greater than 1½ ft. horizontal to 1 ft. vertical
Boise, Idaho (Proposed)	No organic	95% of max. density	Not greater than 2 ft. horizontal to 1 ft. vertical

*Compaction of fill materials is usually required in fill areas which support structures.

Standards for fills commonly include provisions on the type of material used for the fill, degree of compaction required, and the steepness of the finished slope. Table 8 compares various requirements relating to fills. As should be evident, the standards for fill fall into a closely defined range. There is variation in the requirements for finished slope, but this reflects the special characteristics of the local area. As a general rule, those areas experiencing some difficulty in preventing slope failure should require more exacting minimum standards relating to the final finished slope of the fill. The city engineer or registered engineering geologist would be able to indicate the relative state of stability.

Standards regulating the type of fill material generally prohibit the use of organic material, which, upon decomposition, would present severe stability problems. Also, many ordinances prohibit the use of rocks which exceed a certain diameter, usually eight inches. If large, various-sized rocks were allowed, the stability of the slope would be less than that of smaller more uniform material, which is more easily compacted and stabilized by vegetation. Further, the surface of the fill area generally must be covered with topsoil to allow revegetation and prevent erosion, sedimentation, and further loss of stability.

Standards for the compaction of the fill fall within a narrow range, depending upon the structures which will be placed upon it. Buildings, roads, and parking lots require a high percentage of density to support their weight.

Minimum standards such as those outlined here provide the community with at least some assurance that grading will not destroy the hillside outright. Further, these standards lessen the requirements for expert evaluation, providing at least some criteria for evaluation. This approach is useful to smaller agencies with limited evaluative resources.

Maintenance of Cover and Erosion Control

A crucial factor in maintaining the stability of a hillside is preserving as much vegetation as possible, or assuring that exposed soil is revegetated or otherwise protected from runoff and erosion. Some of the preceding regulatory approaches consider this necessity. Slope-natural state provisions, for example, require a certain percentage of a developed slope to be retained in its natural state, thereby protecting vegetation cover. Soil overlays identify easily erodible soils and limit their disturbance as a result of development. Guiding principles may explicitly provide for the maintenance of vegetation and other erosion-prevention measures, as may grading regulations. However, vegetation removal and erosion are best handled by separate erosion control ordinances which are important supplements to hillside regulations. (These are discussed in detail in Chapter 3, "Streams and Creeks.")

DEVELOPING HILLSIDE-PROTECTION PROGRAMS

Each major approach to the regulation of hillside development requires different types and amounts of site information. But how that information is evaluated is a crucial factor. Of the three methods the pure-principle approach would require the most extensive information, but to be an effective approach there must be evaluative expertise. Consequently, in choosing among regulatory methods, it is wise first to determine the local community's evaluative capability. Another important factor in informational requirements is the characteristics of the local setting and the key hillside problem areas, such as erosion, slope failure, or runoff. Some problems will require different or more precise information than others. Community attitudes, such as maintaining natural or semi-natural areas on hillsides, may require detailed wildlife and vegetation surveys. Also, each of the three major regulatory approaches has unique requirements.

Slope-Density Requirements

If slope-density provisions use hillside districts, the community must be able to identify the appropriate boundary of the district. This can generally be accomplished through the use of USGS maps. Districts can include all slopes greater than some minimum, which may range from everything over five per cent to everything over 20 per cent. Beyond the initial district designation, slope density also requires site-specific information to determine such things as number of dwelling units permitted, minimum lot size, and open-space requirements. In a number of jurisdictions, this information is also used to determine which land should be entirely excluded from development. For example, in Anderson, California, no development is allowed on slopes exceeding 30 per cent while in Pacifica, California, no development is allowed on slopes exceeding 35 per cent. In Lenox, New York, no development is allowed on slopes exceeding 10 per cent when the slope is in a conservation district. Site-specific information must thus account for these various requirements.

The chief source of information for slope-density provisions is a contour map. (See Figure 25.) The contour map supplies the necessary data for using the following formula to determine the average slope of a parcel:

$$S = \frac{.0023 \times I \times L}{A}$$

where .0023 is a conversion factor, of square feet to acres, "I" is the contour interval (or the distance between adjacent contour lines on the map) in feet, "L" is the total length of the contour lines within the subject parcel, and "A" is the area in acres of the subject parcel.

Step 1. Determine "I," the contour interval, by examining the map or measuring the interval, using the key on the map. For purposes of this example, an interval of five feet is used. (To achieve accuracy within one per cent, the contour interval must be 10 feet or less.)

Step 2. Determine "L," the total length of the contour lines within the subject area, by tracing each line with a planimeter and converting to feet. In this example, "L" is 9,822 feet.

Step 3. Determine "A," area (in acres), from the development plans or permit application. Do not include areas with a slope greater than that permitted by the particular regulation; this area should be subtracted from the "A" figure. In this example, "A" is 13.767.

Step 4. Determine "S" by using the equation.

$$S = \frac{.0023 \times 5 \times 9{,}822}{13.767} = 8.22 \text{ per cent average slope}$$

The permitted number of dwelling units, minimum lot sizes, open-space requirements, and maximum are to be graded can all be determined using "S."

Although many cities and counties have the appropriate contour maps, requiring the developer to provide a survey and contour map of the land is not an unreasonable demand. Since these maps are useful for many purposes and are even necessary in the design and construction process, developers rarely complain about such requirements. Consequently, obtaining information for slope-density provisions is not expensive. Further, the task of determining average slope is relatively simple and easily within the capabilities of most planning agencies.

Soil Overlays

Soil overlays, on the other hand, require far more extensive information before an ordinance or regulation can be written. Usually this information is gathered on a cost-sharing basis between the local agency and the local or regional soil conservation agency. In a few cases, the information is already available as a result of previous investigations for other local or state agencies. In any event, the information requirements for soil overlays are quite high and rarely within the capabilities of a local planning agency.

FIGURE 25. CONTOUR MAP

Although it is an expensive undertaking, once the information is available it is easily adaptable to ordinance form. With uses closely tied to soil capabilities, it is an excellent regulatory device which requires little more than a continued reference to soil groups and soil types in order to determine special developmental standards. Since the information suffers some of the common problems of large-scale surveys, ordinances generally require specific soil interpretations at the site to evaluate effectively conformance with the initial survey and also to allow for changes in the initial survey. Small-scale surveys are within the resource limits of most developers and, as with contour maps, are quite useful in the development process. Developers, therefore, rarely complain about these additional requirements.

With the information available, requirements for evaluative expertise are minimal. Since no evaluative formulas are required and there is generally little room for negotiation on the essential information, the need for staff expertise is slightly less than slope-density provisions and far less than for the pure-principle approach.

Guiding Principles

Information requirements and evaluative expertise are quite demanding for the pure-principle approach. Since the principles tend to cover a variety of local objectives, the number of areas for which information is needed is large. Further, since any single principle can be evaluated in a number of ways, the possible range of information on any single subject area could also be quite large. When the number of concerns is combined with varying information requirements for any single one, the planning staff, planning commission, and council assume an extensive review responsibility. Except for areas with unique community resources, it is doubtful that an agency can assemble the information and expertise. Clearly, this approach is beyond the capabilities of the small city or county staff and even stretches the resources of medium-sized communities.

Because of the expertise and information requirements, the success of the pure-principle approach depends upon the involvement of the local and state agencies. The Soil Conservation Service, for example, may be called upon to evaluate the nature, distribution, and strength of soils, the proper grading procedures to minimize hazards, or necessary corrective designs. The USGS can evaluate hydrological impacts or geological conditions, and a select group of local citizens might be formed to evaluate proposals in their personal areas of expertise. In any event, this approach requires information and evaluation which are not normally available at the local level. If this approach is to be taken, local jurisdictions are well advised to review their internal evaluative capability as well as the availability of outside resources.

Other Requirements

Aside from the informational requirements of the basic approach selected, developers are commonly expected to furnish other information. This information, which focuses on the characteristics of the site both before and after development, is an environmental impact statement of a very special nature.

Most regulations commonly call for information on the present condition of soils, geology, and hydrology, as well as the anticipated condition after development. One example of these requirements is taken from the proposed ordinance for Boise, Idaho. Since a number of local, regional, state, and federal agencies played a role in drawing up the proposal, the requirements reflect a variety of perspectives on key environmental questions.

Soils Report

(1) Any area proposed for development shall be investigated to determine the soil characteristics, and a soils engineering report shall be submitted with every application. This report shall include data regarding the nature, distribution, and strength of existing soils, conclusions and recommendations for grading procedures, design criteria for corrective measures, and opinions and recommendations covering the adequacy of sites to be developed.

(2) The investigation and subsequent report shall be completed and presented to the Commission by a professional engineer registered in the State of Idaho, and experienced and knowledgeable in the practice of soils mechanics.

(3) Recommendations included in the report and approved by the engineer shall be incorporated into the design plan or specifications.

(4) Any area which presents one or more of the following limiting factors shall not be subjected to development unless the engineer can demonstrate conclusively to the Commission that these limitations can be overcome in such a manner as to prevent hazard to life, hazard to property, adverse affects on the safety, use, or stability of a public way or drainage channel, and adverse impact on the natural environment:

- Water table within six feet of the surface at any time of the year;
- Natural slopes greater than 15 per cent;
- Soils with a high shrink-swell potential . . . ;
- Soils with a unified classification of [unstable soil types].

Geology Report

(1) Any area proposed for development shall be investigated to determine its geological characteristics, and a geology report shall be submitted with every application. This report shall include an adequate description, as defined by the Commission, of the geology of the site, conclusions and recommendations regarding the effect of geologic conditions on the proposed development, and opinions and recommendations covering the adequacy of sites to be developed.

(2) The investigation and subsequent report shall be completed and presented to the Commission by a professional geologist registered in the State of Idaho and experienced and knowledgeable in the practice of engineering geology;

(3) Any area in which the investigation indicates geological hazards shall not be subjected to development unless the geologist can demonstrate conclusively to the Commission that these hazards can be overcome in such a manner as to prevent hazard to life or limb, hazard to

property, adverse affects on the safety, use, or stability of a public way or drainage channel, and adverse impact on the natural environment.

Hydrology Report

(1) Any area proposed for development shall be investigated to determine its hydrological characteristics, and a hydrology report shall be submitted with every application. This report shall include an adequate description, as defined by the Commission, of the hydrology of the site, conclusions and recommendations regarding the effect of hydrologic conditions on the proposed development, and opinions and recommendations covering the adequacy of sites to be developed.

(2) The investigation and subsequent report shall be completed and presented to the Commission by a qualified registered professional, experienced and knowledgeable in the science of hydrology and in the techniques of hydrologic investigation.

(3) Any area in which the investigation indicates hydrological hazards shall not be subjected to development unless the developer can demonstrate conclusively to the Commission that these hazards to life or limb, hazard to property, adverse affects on the safety, use of stability of a public way or drainage channel, and adverse impact on the natural environment.

(4) Flood frequency curves shall be provided for the area proposed for development.

In addition to information on soils, geology, and hydrology, another increasingly common requirement is for a survey of existing vegetative cover and how it will be altered. This is particularly important in wooded areas where trees and shrubs serve so many environmental functions. The purpose of this requirement is to ensure that the vegetative cover is retained to the maximum feasible extent. Since it is often the case that the process of development is much easier and less expensive with the absence of trees and other vegetation, a vegetation survey enables local jurisdictions to evaluate the positive features of the site more fully. In this way, important community resources can be preserved.

DATA NEEDS AND TECHNICAL ASSISTANCE

Data needs for hillsides can be broken down into the following: soil type, topography (degree of slope), geologic hazards, and hydrology.

Soil type and degree of slope are the major factors that determine the potential for erosion on a hillside. The SCS soil survey maps available for many counties indicate both the slope and soil type and classify the land according to its use suitability. Although this classification of land into management groups is primarily concerned with agricultural use, the maps do indicate the soils and slopes that should be left to natural cover and wildlife use. The SCS surveys are available through local SCS agencies. (See Part 2, Chapter 3.)

In some areas of the country seismic zones, slumps, and slides are common. The state geological survey or the USGS can help you find out if your community has any hazards associated with it. The geological survey hydrologists can also analyze the relationship of a hillside to the watershed. (See Part 2, Chapter 3.)

The vegetation of a hillside may represent a unique community; a north-facing slope may support plant species usually found much farther north, or a prairie may occur on a southern slope. A plant and wildlife inventory by the SCS, Cooperative Extension Service, or state wildlife people might be useful in determining the value of plant communities on the hillsides. (See Part 2, Chapter 3.)

NOTES

1. Charles A. Yelverton, "The Role of Local Governments in Urban Geology," in *Environmental Planning and Geology in the Urban Environment*, ed. Donald R. Nichols and Catherine C. Campbell (Washington, D.C.: U.S. Government Printing Office, 1971), pp. 80—81.

2. Livingston and Blayney, Inc., "Public Costs Are Expensive in Hillside Areas," Foothills Environmental Design Study, Report No. 3 to the City of Palo Alto, California (Palo Alto: City of Palo Alto Planning Department, May 1970). Indeed, the report concludes that "over a 20-year period the cumulative cost of city purchase of all land would be less than the public cost for residential development averaging two or four units per acre. . . ." (p. 51).

3. Don J. Easterbrook, *Principles of Geomorphology* (New York: McGraw-Hill, 1969), p. 225.

4. Easterbrook, p. 227.

5. For further reading on mass land movement and components of slope stability, see Easterbrook, Chapter 2.

6. For a more detailed consideration of erosion, types of erosion, and processes involved, see Hugh Hammon Bennett, *Soil Conservation* (New York: McGraw-Hill, 1939), Chapter 9.

Appendix D

PROPOSED HILLSIDE DEVELOPMENT REQUIREMENTS

PURPOSE

The purpose of these requirements shall not be to preclude development but to ensure that development enhances rather than detracts from or ignores the natural topography, resources, and amenities of the hillsides. To this end, the following points shall serve as a basis for evaluating all hillside development proposals:

All development proposals shall strive for maximum retention of the natural morphological features and qualities of the site, and development shall seek to enhance these natural features and qualities.

All development proposals shall take into account and shall be judged by the application of current understanding of land-use planning, soil mechanics, hydrology, civil engineering, environmental and civic design, architecture, and landscape architecture in hill areas. Such current understanding includes but is not limited to:

(1) Planning of development to fit the topography, soils, hydrology, and other conditions existing on the proposed site;

(2) Orienting development to the site so that grading and other site preparation is kept to an absolute minimum;

(3) Shaping of essential grading to compliment the natural land forms and prohibiting all successive padding and/or terracing of building sites;

(4) Developing large tracts in workable units on which construction can be completed within one construction season so that large areas are not left bare and exposed during the winter-spring runoff period;

(5) Accomplishing all paving as rapidly as possible after grading;

(6) Allocating to open space and recreation uses those areas not well suited to development, as evidenced by competent soils, and hydrology investigations and reports;

(7) Landscaping of areas around structures, and blending them with the natural landscape;

(8) Placement, grouping, and shaping of man-made structures to complement one another and the natural landscape, providing visual interest, and creating a "sense of place" within the development;

(9) Demonstrating a concern for the view <u>of</u> the hills as well as the view <u>from</u> the hills;

(10) Use of a variety of housing types in residential areas to permit steep slopes, wooded areas, and areas of special scenic beauty to be preserved as scenic easements, through the use of density transfers; such alternatives may include attached dwellings, condominiums, residential clusters, and groups of various housing types.

(11) Special consideration in the design of such visual elements as street lighting, fences, sidewalks, pathways, and other street furniture to enable maximum identity and uniqueness of character to be built into each development;

(12) Minimizing disruption of existing plant and animal life.

SPECIAL REQUIREMENTS AND DESIGN STANDARDS

Developer's Engineer

To ensure the necessary coordination of manpower and technical data, the developer shall retain a professional engineer to serve as the project engineer.

It shall be the responsibility of the project engineer: to prepare a grading plan; to incorporate into the grading plan all recommendations contained in the soils and hydrology reports; to inspect and certify all grading operations within his area of technical specialty; to act as coordinating agent if the need arises for liaison between other professionals, the developer, and the Planning Board; to prepare any revised plans and to submit to the Planning Board as-graded grading plans upon the completion of the plan.

Prior to and during grading operations, all necessary reports, compaction data, soils, and hydrology recommendations shall be submitted to the project engineer who shall provide copies to the Planning Board.

If, in the course of fulfilling their responsibilities, the project engineer, soils engineer, or hydrologist discovers that the work is being accomplished to a substantially lesser standard than required by this ordinance or by the approved final grading plan, the discrepancy, if not corrected within a reasonable time, shall be reported immediately, in writing, to the project engineer and to the Planning Board. Recommendations for corrective measures, if applicable, shall be submitted.

If the developer's engineer, the soils engineer, or the hydrologist of record is changed during the course of the work, the work shall be stopped until the replacement has agreed to accept the responsibility for certification of the work within the area of his technical competance.

Soils Report

Any area proposed for development shall be investigated to determine the soil characteristics, and a soils engineering report shall be submitted with every application. This report shall include data regarding the nature, distribution, and strength of existing soils, conclusions and recommendations for grading procedures, design criteria for corrective measures, and opinions and recommendations covering the adequacy of sites to be developed.

The investigation and subsequent report shall be completed and presented to the Planning Board by a professional engineer experienced and knowledgeable in the practice of soils mechanics.

Recommendations included in the report and approved by the engineer shall be incorporated into the design plan or specifications.

Any area which presents one or more of the following limiting factors shall not be subjected to development unless the engineer can demonstrate conclusively to the Planning Board that these limitations can be overcome in such a manner as to prevent hazard to life, hazard to property, adverse affects on the safety, use, or stability of a public way or drainage channel, and adverse impact on the natural environment:

(1) Water table within six feet of the surface at any time of the year;

(2) Natural slopes greater than 15 per cent;

(3) Soils with a high shrink-swell potential, that is, soils where the coefficient of linear extensibility is equal to or greater than 0.06, or where the Potential Volume Change (as used by the Federal Housing Administration) is equal to or greater than 4; (Note: to be determined by Village Engineer)

(4) Soils with a Unified classification. (Note: to be determined by Village Engineer)

Hydrology Report

Any area proposed for development shall be investigated to determine its hydrological characteristics, and a hydrology report shall be submitted with every application. This report shall include an adequate description, as defined by the Planning Board, of the hydrology of the site, conclusions and recommendations regarding the effect of hydrologic conditions on the proposed development, and options and recommendations covering the adequacy of sites to be developed.

The investigation and subsequent report shall be completed and presented to the Planning Board by a qualified registered professional experienced and knowledgeable in the science of hydrology and in the techniques of hydrologic investigation.

Any area in which the investigation indicates hydrological hazards shall not be subjected to development unless the developer can demonstrate conclusively to the Planning Board that these hazards can be overcome in such a manner as to prevent hazard to life or limb, hazard to property, adverse affects on the safety, use or stability of a public way or drainage channel, and adverse impact on the natural environment.

Hydrologic Controls

If the developer can demonstrate conclusively to the Planning Board that any of the following requirements...are not necessary in the proposed subdivision and that the omission of such requirement(s) would not result in hazard to life or limb, hazard to property, adverse affects on safety, use, or stability of a public way or drainage channel, or adverse impact on the natural environment, the commission may waive those particular requirements.

(1) Interceptor ditches shall be established above all cut/fill slopes and the intercepted water conveyed to a stable channel or natural drainageway with adequate capacity;

(2) Curb, gutter, and pavement design shall be such that water on roadways is prevented from flowing off the roadway in an uncontrolled fashion;

(3) Natural drainageways shall be riprapped or otherwise stabilized below drainage and culvert discharge points for a distance sufficient to convey the discharge without channel erosion;

(4) Runoff from areas of concentrated impervious cover (e.g. roofs, driveways, roads) shall be collected and transported to drainage structures with sufficient capacity to accept the discharge without undue erosion;

(5) Waste material from construction, including soil and other solid materials, shall not be deposited within natural drainageways;

(6) Drainageways or hydrologically related structures in major waterways (major waterways defined as draining an area of 10 acres or more) shall be designed for the 100-year exceedance interval; in minor waterways (minor waterways defined as draining an area of less than 10 acres) they shall be designed for the 25-year exceedance interval;

(7) With the exception of unavoidable road crossings, approved drainage structures, recreation and open space uses which do not involve the destruction of vegetal cover, development shall not be prohibited within the 100-year exceedence interval for major waterways, and the 25-year exceedence interval for minor waterways;

(8) Sediment catchment ponds shall be constructed and maintained downstream from each development, unless sediment retention facilities are otherwise provided;

(9) The overall drainage system shall be completed and made operational at the earliest possible time during construction;

(10) Alterations of major drainageways shall be prohibited except for approved road crossings and drainage structures;

(11) Natural or improved open channel drainageways shall be preserved or provided for in major waterways. Only minor waterways shall be permitted to be enclosed in conduits, except for road crossings;

(12) The commission shall reserve the right to install hydrological measuring devices in drainageways within any development, at public expense.

Grading

A grading plan shall be submitted with each application and shall include the following information:

(1) All information required by this ordinance;

(2) Details and contours, at an acceptable contour interval, of property;

(3) Details of terrain and area drainage;

(4) Location of any existing buildings or structures on the property where the work is to be performed, the location of any existing buildings or structures on land of adjacent owners which are within 100 feet of the property or which may be affected by the proposed grading operations, and proposed or approximate locations of structures relative to adjoining topography;

(5) The direction of drainage flow and the approximate grade of all streets (not to be construed as a requirement for final street design);

(6) Limiting dimensions, elevations, or finish contours to be achieved by the grading, including all cut and fill slopes, proposed drainage channels and structures, and related construction;

(7) Detailed plans and locations of all surface and subsurface drainage devices, walls, dams, sediment basins, storage reservoirs, and other protective devices to be constructed with, or as a part of, the proposed work, together with a map showing drainage area, the complete drainage network, including outfall lines and natural drainageways which may be affected by the proposed development, and the estimated runoff of the area served by the drains;

(8) A description of methods to be employed in disposing of soil and other material that is removed from the grading site, including the location of the disposal site;

(9) A schedule showing when each stage of the project will be completed, including the total area of soil surface which is to be disturbed during each stage, and estimated starting and completion dates; the schedule shall be drawn up to limit to the shortest possible period the time that soil is exposed and unprotected. In no event shall the existing ("natural") vegetation ground cover be destroyed, removed, or disturbed more than 15 days prior to grading or construction of required improvements.

The grading plan shall be prepared by a professional engineer, land surveyor, or landscape architect.

The Planning Board may require that grading operations and/or project designs be modified if delays occur which incur weather-generated problems not considered at the time approval was granted.

The Planning Board may require on-site inspections at any point during the development period to ascertain compliance with the approved grading plan and the applicable provisions of these regulations.

DEVELOPMENT STANDARDS

This section shall apply to all construction other than roadways.

No grading, filling, clearing, or excavation of any kind shall be initiated until the final grading plan is formally approved by the Planning Board.

Fill areas shall be prepared by removing organic material, such as vegetation and rubbish, and other material which is determined by the village engineer

to be detrimental to proper compaction or otherwise not conducive to stability; no rock or similar irreducible material with a maximum density greater than eight inches shall be used as fill material in fills that are intended to provide structural strength.

All retaining walls or facings with a total vertical projection in excess of three feet and associated with cut or fill surfaces shall be designed as structural members keyed into stable foundations and capable of sustaining the design loads.

If the developer can demonstrate conclusively to the planning board that any of the following requirements are not necessary in the proposed subdivision and that the omission of such requirements would not result in hazard to life or limb, hazard to property, adverse effects on the safety, use, or stability of a public way or drainage channel, or adverse impact on the natural environment, the planning board may waive those particular requirements.

Fills shall be compacted to at least 95 per cent of maximum density, as determined by AASHO T99 and/or ASTM D698.

Natural or constructed slopes in excess of 15 per cent shall not be subjected to development.

Cut slopes shall be no steeper than two horizontal to one vertical; subsurface drainage shall be provided as necessary for stability.

Fill slopes shall be no steeper than two horizontal to one vertical; fill slopes shall not be located on natural slopes 2:1 or steeper, or where fill slope toes out within 12 feet horizontally of the top of an existing or planned cut slope.

Tops and toes of cut and fill slopes shall be set back from property boundaries a distance of three feet plus one-fifth of the height of the cut or fill, but need not exceed a horizontal distance of 10 feet; tops and toes of cut and fill slopes shall be set back from structures a distance of six feet plus one-fifth the height of the cut or fill, but not exceeding 10 feet;

Borrowing for fill shall be prohibited unless the material is obtained from a cut permitted under an approved grading plan obtained for some purpose other than to produce fill material, or imported from outside the Village of Northport.

ROADWAYS

Village of Northport standards shall apply to all roadways constructed under this ordinance with certain additions and modifications, as follows:

(1) No grading, filling, clearing, or excavation of any kind shall be initiated until the final roadway grading plan is formally approved by the Village Engineer, Highway Superintendent, and Planning Board.

(2) Fill areas shall be prepared by removing organic material, such as vegetation and rubbish, and any other material which is determined by the village engineer to be detrimental to proper compaction or otherwise not conducive to stability;

(3) All retaining walls or facings with a total vertical projection in excess of three feet and associated with cut or fill surfaces shall be designed as structural members keyed into stable foundations and capable of sustaining the design loads;

(4) Borrowing for fill shall be prohibited unless the material is obtained from a cut permitted under an approved grading plan, or imported from outside the Village of Northport;

(5) Roads shall be designed to create the minimum feasible amount of land coverage and the minimum feasible disturbance to the soil;

(6) Existing vegetation of the deep-rooted perennial variety shall be preserved to the greatest extent possible in the location of roads. Road alignment should follow natural terrain and no unnecessary cuts or fills shall be allowed in order to create additional lots or building sites.

(7) Variations in rights-of-way standards shall be permitted to prevent the dedication of unnecessarily large parcels of land;

(8) Variations in road design and road construction shall be permitted in order to keep grading and cut-fill slopes to a minimum;

(9) Roads shall not exceed two lanes with a traveled way which shall not exceed 34 feet in width, exclusive of onstreet parallel parking bays...

(10) One-way streets shall be permitted and encouraged where appropriate for the terrain and where public safety would not be jeopardized. The traveled way shall not exceed 16 feet in width, exclusive of on-street parallel parking bays...;

(11) The width of the graded section shall extend three feet beyond the curb back or edge of pavement on both the cut and fill sides of the roadway. If sidewalk is to be installed parallel to the roadway, the graded section shall be increased by the width of the widewalk plus one foot beyond the curb back;

(12) Standard vertical curb (six inches) and gutter shall be installed along both sides of all paved roadways;

(13) A pedestrian-way plan shall be required in all developments. The location and design shall require the approval of the Planning Board.

If the developer can demonstrate conclusively to the Planning Board that any of the following requirements are not necessary in the proposed subdivision and that the omission of such requirements would not result in hazard to life or limb, hazard to property, adverse affects on the safety, use, or stability of a public way or drainage channel, or adverse impact on the natural environment, the Planning Board may waive those particular requirements:

(14) Natural slopes in excess of 15 per cent shall not be subject to development;

(15) Cut slopes shall be no steeper than two horizontal to one vertical; subsurface drainage shall be provided as necessary for stability;

(16) The maximum horizontal distance of disturbed soil surface shall not exceed 75 feet;

(17) Fill slopes shall be no steeper than two horizontal to one vertical; fill slopes shall not be located on natural slopes steeper than 2:1 or where fill slope toes out within 12 feet horizontally of the top of an existing or planned cut slope;

(18) Tops and toes of cut and fill slopes shall be set back from buildings a horizontal distance of six feet plus one-fifth the height of the cut of fill, but need not exceed 10 feet;

(19) Fills shall be compacted to at least 95 per cent of maximum density, as determined by AASHO T99 or ASTM D698;

(20) All slopes which are stabilized by mechanical or chemical restraints shall be adapted to conform to the surrounding terrain and shall be given proper aesthetic treatment.

DRIVEWAYS AND OTHER PARKING

Combinations of collective private driveways, cluster parking areas, and on-street parallel parking bays shall be used to attempt to optimize the objectives of minimum soil disturbance, minimum impervious cover, excellence of design, and aesthetic sensitivity.

Collective private driveways shall be encouraged where their use will result in better building sites and lesser amounts of land coverage than would result if a public road were required.

Cluster parking areas shall be encouraged where considerations of terrain or aesthetic quality would reduce the desirability of collective driveways or cluster parking.

VEGETATION AND REVEGETATION

The developer shall submit a slope stabilization and revegetation plan which shall include a complete description of the existing vegetation, the vegetation to be removed and the method of disposal, the vegetation to be planted, and slope stabilization measures to be installed. The plan shall include an analysis of the environmental effects of such operations, including the effects of such operations, including effects on slope stability, soil erosion, water quality, and fish and wildlife.

The revegetation and slope stabilization plan shall be submitted with the grading plan.

Vegetation shall be removed only when absolutely necessary, e.g., for buildings, filled areas, roads.

Every effort shall be made to conserve topsoil which is removed during construction for later use on areas requiring vegetation or landscaping, e.g., cut and fill slopes.

Vegetation sufficient to stabilize the soil shall be established on all disturbed areas as each stage of grading is completed. Areas not contained within lot boundaries shall be protected with an acceptable species of perennial vegetal cover after all construction is completed....

New plantings shall be protected with organic cover.

All disturbed soil surfaces shall be stabilized or covered prior to the first day of December. If the planned impervious surfaces (e.g., roads, driveways, etc.) cannot be established prior to December 1, a temporary treatment adequate to prevent erosion shall be installed on those surfaces.

Construction shall be scheduled to minimize soil disturbance between the first day of December and the fifteenth day of April.

The developer shall be fully responsible for any destruction of native vegetation proposed for retention. He shall carry the responsibility both for his own employees and for all subcontractors from the first day of construction until the notice of completion is filed. The developer shall be responsible for replacing such destroyed vegetation.

The use of qualified personnel experienced and knowledgeable in the practice of revegetation shall be required.

MAINTENANCE

The owner of any private property on which grading or other work has been performed pursuant to a grading plan approved or a building permit granted under the provisions of this ordinance shall continuously maintain and repair all graded surfaces and erosion prevention devices, retaining walls, drainage structures or means, and other protective devices, plantings, and ground cover installed or completed.

UTILITIES

All new service utilities, both on-site and off-site, shall be placed underground.

OBJECTS OF ANTIQUITY

No grading, filling, clearing of vegetation, operation of equipment, or disturbance of the soil shall take place in areas where any historic or prehistoric ruins or monuments, objects of antiquity, or landmarks or monuments

are present. The grading plan shall indicate all such areas on the site and shall indicate the measures that will be taken to protect such areas.

Whenever during excavation there are uncovered or become apparent any historic or prehistoric ruins or monuments, or objects of antiquity, or landmarks or monuments not previously accounted for in the grading plan, all work in the immediate area shall cease until it shall be determined what precautions should be taken to preserve the historic artifacts.

REQUEST FOR WAIVER OR REQUIREMENTS

If the developer intends to request waiver of any of the provisions of [this] section, he must submit his request in writing, with his grading plan. The request shall itemize each requirement for which a waiver is sought and shall state the reason(s) for which each waiver is requested.

PROPOSED HILLSIDE PROTECTION ORDINANCE OF BOISE, IDAHO

PURPOSE

The purpose of this ordinance shall not be to preclude development but to ensure that development enhances rather than detracts from or ignores the natural topography, resources, and amenities of the hillsides. To this end, the following points shall serve as a basis for evaluating all hillside development proposals:

All development proposals shall strive for maximum retention of the natural morphological features and qualities of the site, and development shall seek to enhance these natural features and qualities.

All development proposals shall take into account and shall be judged by the application of current understanding of land-use planning, soil mechanics, engineering geology, hydrology, civil engineering, environmental and civic design, architecture, and landscape architecture in hill areas. Such current understanding includes but is not limited to:

(1) Planning of development to fit the topography, soils, geology, hydrology, and other conditions existing on the proposed site;

(2) Orienting development to the site so that grading and other site preparation is kept to an absolute minimum;

(3) Shaping of essential grading to compliment the natural land forms and prohibiting all successive padding and/or terracing of building sites;

(4) Developing large tracts in workable units on which construction can be completed within one construction season so that large areas are not left bare and exposed during the winter-spring runoff period;

(5) Accomplishing all paving as rapidly as possible after grading;

(6) Allocating to open space and recreation uses those areas not well suited to development, as evidenced by competent soils, geology, and hydrology investigations and reports;

(7) Landscaping of areas around structures, and blending them with the natural landscape;

(8) Placement, grouping, and shaping of man-made structures to complement one another and the natural landscape, providing visual interest, and creating a "sense of place" within the development;

(9) Demonstrating a concern for the view *of* the hills as well as the view *from* the hills;

(10) Use of a variety of housing types in residential areas to permit steep slopes, wooded areas, and areas of special scenic beauty to be preserved as scenic easements, through the use of density transfers; such alternatives may include attached dwellings, apartments and condominiums, residential clusters, and groups of various housing types;

(11) Special consideration in the design of such visual elements as street lighting, fences, sidewalks, pathways, and other street furniture to enable maximum identity and uniqueness of character to be built into each development;

(12) Minimizing disruption of existing plant and animal life.

SPECIAL REQUIREMENTS AND DESIGN STANDARDS

Project Engineer

To ensure the necessary coordination of manpower and technical data, the developer shall retain a professional engineer registered in the state of Idaho, to serve as the project engineer.

It shall be the responsibility of the project engineer: to prepare a grading plan; to incorporate into the grading plan all recommendations contained in the soils, geology, and hydrology reports; to inspect and certify all grading operations within his area of technical specialty; to act as coordinating agent if the need arises for liaison between other professionals, the developer, and the commission; to prepare any revised plans and to submit to the commission as-graded grading plans upon the completion of the plan.

Prior to and during grading operations, all necessary reports, compaction data, soils, geology and hydrology recommendations shall be submitted to the project engineer and to the commission.

If, in the course of fulfilling their responsibilities, the project engineer, soils engineer, geologist, or hydrologist discovers that the work is being accomplished to a substantially lesser standard than required by this ordinance or by the approved final grading plan, the discrepancy, if not corrected within a reasonable time, shall be reported immediately, in writing, to the project engineer and to the commission. Recommendations for corrective measures, if applicable, shall be submitted.

If the project engineer, the soils engineer, the geologist, or the hydrologist of record is changed during the course of the work, the work shall be stopped until the replacement has agreed to accept the responsibility for certification of the work within the area of his technical competance.

Soils Report

Any area proposed for development shall be investigated to determine the soil characteristics, and a soils engineering report shall be submitted with every application. This report shall include data regarding the nature, distribution, and strength of existing soils, conclusions and recommendations for grading procedures, design criteria for corrective measures, and opinions and recommendations covering the adequacy of sites to be developed.

The investigation and subsequent report shall be completed and presented to the commission by a professional engineer registered in the state of Idaho and experienced and knowledgeable in the practice of soils mechanics.

Recommendations included in the report and approved by the engineer shall be incorporated into the design plan or specifications.

Any area which presents one or more of the following limiting factors shall not be subjected to development unless the engineer can demonstrate conclusively to the

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commission that these limitations can be overcome in such a manner as to prevent hazard to life, hazard to property, adverse affects on the safety, use, or stability of a public way or drainage channel, and adverse impact on the natural environment:

(1) Water table within six feet of the surface at any time of the year;

(2) Natural slopes greater than 15 per cent;

(3) Soils with a high shrink-swell potential, that is, soils where the coefficient of linear extensibility is equal to or greater than 0.06, or where the Potential Volume Change (as used by the Federal Housing Administration) is equal to or greater than 4;

(4) Soils with a Unified classification of CH, MH, OL, OH, or PT.

Geology Report

Any area proposed for development shall be investigated to determine its geological characteristics, and a geology report shall be submitted with every application. This report shall include an adequate description, as defined by the commission, of the geology of the site, conclusions and recommendations regarding the effect of geologic conditions on the proposed development, and opinions and recommendations of the adequacy of the sites to be developed.

The investigation and subsequent report shall be completed and presented to the commission by a professional geologist registered in the state of Idaho and experienced and knowledgeable in the practice of engineering geology.

Any area in which the investigation indicates geological hazards shall not be subjected to development unless the geologist can demonstrate conclusively to the commission that these hazards can be overcome in such a manner as to prevent hazard to life or limb, hazard to property, adverse effects on the safety, use, or stability of a public way or drainage channel, and adverse impact on the natural environment.

Hydrology Report

Any area proposed for development shall be investigated to determine its hydrological characteristics, and a hydrology report shall be submitted with every application. This report shall include an adequate description, as defined by the commission, of the hydrology of the site, conclusions and recommendations regarding the effect of hydrologic conditions on the proposed development, and options and recommendations covering the adequacy of sites to be developed.

The investigation and subsequent report shall be completed and presented to the commission by a qualified registered professional experienced and knowledgeable in the science of hydrology and in the techniques of hydrologic investigation.

Any area in which the investigation indicates hydrological hazards shall not be subjected to development unless the developer can demonstrate conclusively to the commission that these hazards can be overcome in such a manner as to prevent hazard to life or limb, hazard to property, adverse affects on the safety, use or stability of a public way or drainage channel, and adverse impact on the natural environment.

Flood frequency curves shall be provided for the area proposed for development.

Hydrologic Controls

If the developer can demonstrate conclusively to the commission that any of the following requirements . . . are not necessary in the proposed subdivision and that the omission of such requirement(s) would not result in hazard to life or limb, hazard to property, adverse effects on safety, use, or stability of a public way or drainage channel, or adverse impact on the natural environment, the commission may waive those particular requirements.

(1) Interceptor ditches shall be established above all cut/fill slopes and the intercepted water conveyed to a stable channel or natural drainageway with adequate capacity;

(2) Curb, gutter, and pavement design shall be such that water on roadways is prevented from flowing off the roadway in an uncontrolled fashion;

(3) Natural drainageways shall be riprapped or otherwise stabilized below drainage and culvert discharge points for a distance sufficient to convey the discharge without channel erosion;

(4) Runoff from areas of concentrated impervious cover (e.g., roofs, driveways, roads) shall be collected and transported to a natural drainage with sufficient capacity to accept the discharge without undue erosion;

(5) Waste material from construction, including soil and other solid materials, shall not be deposited within the 100-year floodplain;

(6) Drainageways or hydrologically related structures in major waterways (major waterways defined as draining an area of 10 acres or more) shall be designed for the 100-year exceedance interval; in minor waterways (minor waterways defined as draining an area of less than 10 acres) they shall be designed for the 25-year exceedance interval;

(7) With the exception of unavoidable road crossings, approved drainage structures, recreation and open space uses which do not involve the destruction of vegetal cover, development shall not be prohibited within the 100-year exceedence interval floodplain for major waterways, and the 25-year exceedence interval floodplain for minor waterways;

(8) Sediment catchment ponds shall be constructed and maintained downstream from each development, unless sediment retention facilities are otherwise provided;

(9) The overall drainage system shall be completed and made operational at the earliest possible time during construction;

(10) Alterations of major drainageways shall be prohibited except for approved road crossings and drainage structures;

(11) Natural or improved open channel drainageways shall be preserved or provided for in major waterways. Only minor waterways shall be permitted to be enclosed in conduits, except for road crossings;

(12) The commission shall reserve the right to install hydrological measuring devices in drainageways within any development, at public expense.

Grading

A grading plan shall be submitted with each application and shall include the following information:

(1) All information required by this ordinance;

(2) Details and contours (five-foot intervals) of property;

(3) Details of terrain and area drainage;

(4) Location of any existing buildings or structures on the property where the work is to be performed, the location of any existing buildings or structures on land of adjacent owners which are within 100 feet of the property or which may be affected by the proposed grading operations, and proposed or approximate locations of structures relative to adjoining topography;

(5) The direction of drainage flow and the approximate grade of all streets (not to be construed as a requirement for final street design);

(6) Limiting dimensions, elevations, or finish contours to be achieved by the grading, including all cut and fill slopes, proposed drainage channels, and related construction;

(7) Detailed plans and locations of all surface and subsurface drainage devices, walls, dams, sediment basins, storage reservoirs, and other protective devices to be constructed with, or as a part of, the proposed work, together with a map showing drainage area, the complete drainage network, including outfall lines and natural drainageways which may be affected by the proposed development, and the estimated runoff of the area served by the drains;

(8) A description of methods to be employed in disposing of soil and other material that is removed from the grading site, including the location of the disposal site;

(9) A schedule showing when each stage of the project will be completed, including the total area of soil surface which is to be disturbed during each stage, and estimated starting and completion dates; the schedule shall be drawn up to limit to the shortest possible period the time that soil is exposed and unprotected. In no event shall the existing ("natural") vegetation ground cover be destroyed, removed, or disturbed more than 15 days prior to grading or construction of required improvements.

The grading plan shall be prepared by a professional engineer registered in the state of Idaho who shall also serve as the overall project engineer.

The commission may require that grading operations and/or project designs be modified if delays occur which incur weather-generated problems not considered at the time approval was granted.

The commission may require on-site inspections at any point during the development period to ascertain compliance with the approved grading plan and the applicable provisions of this ordinance.

DEVELOPMENT STANDARDS

This section shall apply to all construction other than roadways.

No grading, filling, clearing, or excavation of any kind shall be initiated until the final grading plan is formally approved by the commission.

Fill areas shall be prepared by removing organic material, such as vegetation and rubbish, and other material which is determined by the soils engineer to be detrimental to proper compaction or otherwise not conducive to stability; no rock or similar irreducible material with a maximum density greater than eight inches shall be used as fill material in fills that are intended to provide structural strength.

All retaining walls or facings with a total vertical projection in excess of three feet and associated with cut or fill surfaces shall be designed as structural members keyed into stable foundations and capable of sustaining the design loads.

If the developer can demonstrate conclusively to the commission that any of the following requirements are not necessary in the proposed subdivision and that the omission of such requirements would not result in hazard to life or limb, hazard to property, adverse effects on the safety, use, or stability of a public way or drainage channel, or adverse impact on the natural environment, the commission may waive those particular requirements.

Fills shall be compacted to at least 95 per cent of maximum density, as determined by AASHO T99 and/or ASTM D698.

Natural or constructed slopes in excess of 15 per cent shall not be subjected to development.

Cut slopes shall be no steeper than two horizontal to one vertical; subsurface drainage shall be provided as necessary for stability.

Fill slopes shall be no steeper than two horizontal to one vertical; fill slopes shall not be located on natural slopes 2:1 or steeper, or where fill slope toes out within 12 feet horizontally of the top of an existing or planned cut slope.

Tops and toes of cut and fill slopes shall be set back from property boundaries a distance of three feet plus one-fifth of the height of the cut or fill, but need not exceed a horizontal distance of 10 feet; tops and toes of cut and fill slopes shall be set back from structures a distance of six feet plus one-fifth the height of the cut or fill, but not exceeding 10 feet;

Borrowing for fill shall be prohibited unless the material is obtained from a cut permitted under an approved grading plan obtained for some purpose other than to produce fill material, or imported from outside the hillside areas within Ada County.

ROADWAYS

Ada County Highway District standards shall apply to all roadways constructed under this ordinance with certain additions and modifications, as follows:

(1) No grading, filling, clearing, or excavation of any kind shall be initiated until the final roadway grading plan is formally approved by the Commission and the Ada County Highway District;

(2) Fill areas shall be prepared by removing organic material, such as vegetation and rubbish, and any other material which is determined by the soils engineer to be detrimental to proper compaction or otherwise not conducive to stability;

(3) All retaining walls or facings with a total vertical projection in excess of three feet and associated with cut or fill surfaces shall be designed as structural members keyed into stable foundations and capable of sustaining the design loads;

(4) Borrowing for fill shall be prohibited unless the material is obtained from a cut permitted under an approved grading plan, or imported from outside the hillside areas within Ada County;

(5) Roads shall be designed to create the minimum feasible amount of land coverage and the minimum feasible disturbance to the soil;

(6) Existing vegetation of the deep-rooted perennial variety shall be preserved to the greatest extent possible in the location of roads. Road alignment should follow natural terrain and no unnecessary cuts or fills shall be allowed in order to create additional lots or building sites;

(7) Variations in rights-of-way standards shall be permitted to prevent the dedication of unnecessarily large parcels of land;

(8) Variations in road design and road construction shall be permitted in order to keep grading and cut-fill slopes to a minimum;

(9) Roads shall not exceed two lanes with a traveled way which shall not exceed 32 feet in width, exclusive of onstreet parallel parking bays. . . .

(10) One-way streets shall be permitted and encouraged where appropriate for the terrain and where public safety would not be jeopardized. The traveled way shall not exceed 16 feet in width, exclusive of on-street parallel parking bays. . . .;

(11) The width of the graded section shall extend three feet beyond the curb back or edge of pavement on both the cut and fill sides of the roadway. If sidewalk is to be installed parallel to the roadway, the graded section shall be increased by the width of the sidewalk plus one foot beyond the curb back;

(12) Standard vertical curb (six inches) and gutter shall be installed along both sides of all paved roadways;

(13) A pedestrian-way plan shall be required in all developments. The location and design shall require the approval of the commission and, where appropriate, the Ada County Highway District;

If the developer can demonstrate conclusively to the commission and the Ada County Highway District that any of the following requirements are not necessary in the proposed subdivision and that the omission of such requirements would not result in hazard to life or limb, hazard to property, adverse affects on the safety, use, or stability of a public way or drainage channel, or adverse impact on the natural environment, the commission may waive those particular requirements:

(14) Natural slopes in excess of 15 per cent shall not be subjected to development;

(15) Cut slopes shall be no steeper than two horizontal to one vertical; subsurface drainage shall be provided as necessary for stability;

(16) The maximum horizontal distance of disturbed soil surface shall not exceed 75 feet;

(17) Fill slopes shall be no steeper than two horizontal to one vertical; fill slopes shall not be located on natural slopes steeper than 2:1 or where fill slope toes out within 12 feet horizontally of the top of an existing or planned cut slope;

(18) Tops and toes of cut and fill slopes shall be set back from buildings a horizontal distance of six feet plus one-fifth the height of the cut of fill, but need not exceed 10 feet;

(19) Fills shall be compacted to at least 95 per cent of maximum density, as determined by AASHO T99 or ASTM D698;

(20) All slopes which are stabilized by mechanical or chemical restraints shall be adapted to conform to the surrounding terrain and shall be given proper aesthetic treatment.

DRIVEWAYS AND OTHER PARKING

Combinations of collective private driveways, cluster parking areas, and on-street parallel parking bays shall be used to attempt to optimize the objectives of minimum soil disturbance, minimum impervious cover, excellence of design, and aesthetic sensitivity.

Collective private driveways shall be encouraged where their use will result in better building sites and lesser amounts of land coverage than would result if a public road were required.

Cluster parking areas shall be encouraged where considerations of terrain or aesthetic quality would reduce the desirability of collective driveways or cluster parking.

VEGETATION AND REVEGETATION

The developer shall submit a slope stabilization and revegetation plan which shall include a complete description of the existing vegetation, the vegetation to be removed and the method of disposal, the vegetation to be planted, and slope stabilization measures to be installed. The plan shall include an analysis of the environmental effects of such operations, including the effects of such operations, including effects on slope stability, soil erosion, water quality, and fish and wildlife.

The revegetation and slope stabilization plan shall be submitted with the grading plan.

Vegetation shall be removed only when absolutely necessary, e.g., for buildings, filled areas, roads.

Every effort shall be made to conserve topsoil which is removed during construction for later use on areas requiring vegetation or landscaping, e.g., cut and fill slopes.

Vegetation sufficient to stabilize the soil shall be established on all disturbed areas as each stage of grading is completed. Areas not contained within lot boundaries shall be protected with adapted, fire-resistant species of perennial vegetal cover after all construction is completed. . . .

New plantings shall be protected with organic cover.

All disturbed soil surfaces shall be stabilized or covered prior to the first day of December. If the planned impervious surfaces (e.g., roads, driveways, etc.) cannot be established prior to December 1, a temporary treatment adequate to prevent erosion shall be installed on those surfaces.

Construction shall be scheduled to minimize soil disturbance between the first day of December and the fifteenth day of April.

The developer shall be fully responsible for any destruction of native vegetation proposed for retention. He shall carry the responsibility both for his own employees and for all subcontractors from the first day of construction until the notice of completion is filed. The

developer shall be responsible for replacing such destroyed vegetation.

The use of qualified personnel experienced and knowledgeable in the practice of revegetation shall be required.

MAINTENANCE

The owner of any private property on which grading or other work has been performed pursuant to a grading plan approved or a building permit granted under the provisions of this ordinance shall continuously maintain and repair all graded surfaces and erosion prevention devices, retaining walls, drainage structures or means, and other protective devices, plantings, and ground cover installed or completed.

UTILITIES

All new service utilities, both on-site and off-site, shall be placed underground.

OBJECTS OF ANTIQUITY

No grading, filling, clearing of vegetation, operation of equipment, or disturbance of the soil shall take place in areas where any historic or prehistoric ruins or monuments, objects of antiquity, or geological landmarks or monuments are present. The grading plan shall indicate all such areas on the site and shall indicate the measures that will be taken to protect such areas. The Idaho State Historical Society shall approve the proposed projection measures before the grading plan is approved.

Whenever during excavation there are uncovered or become apparent any historic or prehistoric ruins or monuments, or objects of antiquity, or geological landmarks or monuments not previously accounted for in the grading plan, all work in the immediate area shall cease until the Idaho State Historical Society shall determine what precautions should be taken to preserve the historic artifacts.

REQUEST FOR WAIVER OR REQUIREMENTS

If the developer intends to request waiver of any of the provisions of [this] section, he must submit his request, in writing, with his grading plan. The request shall itemize each requirement for which a waiver is sought and shall state the reason(s) for which each waiver is requested.

ARTICLE X
Steep Slopes
[Added 12-21-76 by Ord. No. 76-ZC-66]

§ 198-60. Findings; purpose.

The Town Board has found that maintenance and protection of natural terrain and vegetation features is essential to the protection of the general health, safety and welfare, protection of environmental balance and maintenance of aesthetic quality; therefore, specific regulations for development and density outside conventional zoning controls are needed in order to protect the health, safety and general welfare of the residents of the town. It is for this purpose that this Article is enacted to establish appropriate safeguards and standards to meet the particular problems associated with development of hillside areas and to ensure proper and orderly development and not adversely affect the site or adjoining area as a result of water runoff, disruption of natural plant and tree growth or soil movement not only during the time of construction but also thereafter, and further to provide for a safe means of ingress and egress of vehicular and pedestrian traffic to and within the site and to furnish required access of emergency vehicles thereto.

§ 198-61. Hillside development area; requirements.

In any applications for subdivision approval of land in residential zoning districts classified R-20, R-15, R-10, R-7, R-5 or R-RM, where the natural terrain of any parcel or any portion thereof has a natural slope of ten percent (10%) [a vertical rise of ten (10) feet in a horizontal distance of one hundred (100) feet] or greater, that parcel or that portion of the parcel shall be considered to be in a hillside development area. When determining lot design for subdivision of land in the hillside development area, this Article shall govern, and the site shall be subject to the following requirements:

A. Prior to Planning Board approval of subdivision plats, it must be found that all applicable measures, including those indicated in the Subdivision Regulations, Erosion and

Sediment Control Handbook of the Town of Huntington,[12] have been specified and contained on the subdivision application drawings and plans for the purpose of controlling conditions during development of the site, including but not limited to the following:

(1) Provision for diverting, or containing and discharging to the ground, incoming storm runoff water, to be established before clearing or earthmoving is begun and maintained until final stabilization is completed.

(2) If any storm runoff water storage area exists within the site, adequate storage areas or drainage measures will be provided before the original areas are rendered ineffective.

(3) Capture storage and recharge of runoff from all new impervious surfaces shall be provided for simultaneously with the installation of these new impervious surfaces.

B. The Planning Board will make the final determination of average slope.

§ 198-62. Determination of natural average slope.

The natural average grade shall be measured perpendicular to the natural contour lines and shall be the result of an averaging of measurements made at approximately twenty-five-foot intervals.

§ 198-63. Determination of number of lots; lot sizes.

A. Procedure to determine the number of lots for that portion of the subdivision which is not in a hillside development area shall be in accordance with current zoning requirements and subdivision regulations.

B. Procedure to determine the number of lots which are in a hillside development area shall be determined by calculating the natural average slope percentage and

[12] Editor's Note: See Ch. A202, Subdivision of Land; Site Improvement.

applying the lot yield factor as shown in the following table.

LOT YIELD FOR STEEP SLOPE AREAS

Natural Slope Greater Than	Average Percentage Less Than	Minimum Lot Area (square feet)	Required Lot Width (feet)	Lot Yield Factor Gross (per acre)
10%	15%	10,000	100	3.27
15%	20%	15,000	100	2.18
20%	25%	20,000	100	1.85
25%		1 acre	125	0.85

C. The number of lots to be permitted in the subdivision shall be the total yield from the hillside development area and the flat area, if a flat area is determined to exist. If there is no flat area, then the total number of lots shall be those yielded from the hillside development area.

D. In no case shall residential lots contain an area less than the minimum required by the zoning district in which such lots are located, except in the case of a modified subdivision approved by the Planning Board pursuant to § 281 of the Town Law.

E. The Planning Board may recommend variation of lot sizes within the subdivision in order to adopt a layout to special conditions and to accomplish the intent of the hillside development requirements.

F. Each applicant in a hillside development area shall submit a drawing indicating the property boundary, topography, lot layout and calculation of average slope to the Planning Board for review prior to the submission of a preliminary application.

§ 198-64. Conflict with other regulations.

If any standard or requirement herein is in conflict with any other ordinance, standard or requirement, the provisions establishing the more restrictive requirements shall apply.

§ 198-65. Notation to be added to Building Zone Maps.

Each sheet of the Building Zone Maps shall be amended by adding the following notations thereto: Special density regulations apply in the case of properties or parcels characterized by steep slopes or irregular terrain features. These regulations will affect the number of building lots which can be designed for properties where slopes exceed ten percent (10%). Refer to Article IX of this chapter for the method of calculating density in such cases.

ARTICLE XI
Conditional Uses; Supplementary Regulations

§ 198-66. Conditional uses; special use permits.

A. The conditional uses listed in this Article possess characteristics of a nature such as to require special review and the application of special standards before locating in districts where they are not permitted by right, in order to assure an orderly and harmonious arrangement of land uses in the district and in the community. Such uses may be permitted conditionally by the Board of Appeals or the Town Board, as specified, after public hearing. A conditional use shall be authorized by a special use permit, and before such permit is issued, the appropriate Board shall find that the proposed use:

(1) Will be properly located in regard to transportation, water supply, waste disposal, fire protection and other facilities.

(2) Will not create undue traffic congestion or traffic hazard.

(3) Will not adversely affect the value of property, character of the neighborhood or the pattern of development.

(4) Will encourage an appropriate use of land consistent with the needs of the town.

PLANNING BOARD
INCORPORATED VILLAGE OF NORTHPORT

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STEEP SLOPE ORDINANCE
FOR HILLSIDE DEVELOPMENT

Declaration of Intent. The Village Board has found that maintenance and protection of natural terrain and vegetation features is essential to the protection of the general health, safety and welfare; protection of environmental balance; and maintenance of aesthetic quality; therefore specific regulations for development and density outside conventional zoning controls are needed in order to protect the health, safety and general welfare of the residents of the Village. It is for this purpose that this section is enacted to establish appropriate safeguards, and standards to meet the particular problems associated with development of hillside areas, and to insure proper and orderly development that will not adversely affect the site or adjoining area as a result of water runoff, disruption of natural plant and tree growth, or soil movement not only during the time of construction but as well thereafter, and further to provide for a safe means of ingress and egress of vehicular and pedestrian traffic to and within the site and to furnish required access of emergency vehicles thereto.

Requirement. In any applications for subdivision approval on land in residential zoning districts classified B, C, D and E, where the natural terrain of any lot or parcel or any portion thereof, has a natural slope of ten (10%) percent (a vertical rise of ten (10) feet in a horizontal distance of one hundred (100) feet or greater, that lot or parcel or that portion of the lot or parcel shall be considered to be in a hillside development area. When considering lot design for development of land in the hillside development area, this section shall govern, and the site shall be subject to the following requirements:

a. Yard setbacks shall conform to those of the residential district having the same required minimum area.

b. Prior to Planning Board approval of subdivision plats, it must be found that all applicable measures, including those indicated in the Erosion and Sediment Control Handbook of the Town of Huntington, which shall be a part of these requirements, have been specified and contained on the subdivision application drawings and plans for the purpose of controlling conditions during development of the site, including but not limited to the following:

   1. Provision for diverting, or containing and discharging to the ground, incoming storm runoff water, to be established before clearing or earthmoving is begun, and maintained until final stabilization is completed.

   2. If any storm runoff water storage area exists within the site, adequate storage areas or drainage measures will be provided before the original areas are rendered ineffective.

   3. Capture storage and recharge of runoff from all new impervious surfaces shall be provided for simultaneously with the installation of these new impervious surfaces.

c. The Planning Board will make the final determination of average slope.

Lot Yield Criteria. The following criteria are for the determination of average grade, and lot yield to be divided into two categories: flat areas and hilly areas. Natural grades of less than 10% are, for the purposes of this ordinance, flat areas. Natural grades of 10% or greater shall be the criteria for establishing "hilly areas".

1. Determination of natural average slope:

   The natural average grade shall be measured perpendicular to the natural contour lines and shall be the result of an averaging of measurements made at approximately fifty foot intervals.

2. HILLSIDE DEVELOPMENT - LOT REQUIREMENTS

STEEP SLOPE AREA

Natural, Average Slope Percentage		Street Area Factor	Required Lot Width (Feet)	Minimum Lot Area (sq.ft.)	Lot Yield Factor Gross (per acre)
Greater Than	Less Than				
10%	15%	25.9%	100	10,000	3.23
15%	20%	13.8%	100	1/2 acre	1.72

Any parcel containing a natural slope in excess of 20% shall be deemed unbuildable.

FLAT AREA

E	10%	25.9%	50	5,000	6.45
D		23.6%	75*	8,500	3.92
C		15.3%	75*	1/3 acre	2.54
B		10.8%	75*	1/2 acre	1.78
A		10.7%	150	1 acre	.89

*See Special Conditions Chapter 91-22 Paragraph D.

Performance Procedure and Standards. Application Submittals; Building Coverage and Height: A Review by the Planning Board.

1. Procedure to determine the number of lots for that part of a hillside development property which is less than 10% in natural average slope:

   The number of lots which will be allowed in that portion of a property which is less than 10% in natural average slope (the flat area) shall be determined by multiplying the total flat area by the lot yield factor, applying to the minimum lot area of the residential district in which the property is located, as found in the Table in the preceding section for flat area.

2. Procedure to determine the number of lots for that portion of a hillside development property which is 10% or greater in natural average slope:

   The number of lots which will be allowed in that portion of a property which is 10% or greater in natural average slope (the steep slope area) shall be determined by calculating the natural average slope percentage and applying the lot yield factor, from the preceding section to the total steep slope area acreage.

3. The number of lots to be permitted shall be the total of the steep-slope area and the flat-area, if a flat area is determined to exist. If there is no flat area then the total number of lots shall be those yielded from the steep-slope area.

4. The subdivider shall utilize the number of lots determined from the previous calculations in preparing subdivision plats for submission to the Planning Board. However, in no case shall residential lots contain an area less than the minimum required by the zoning district in which such lots are located.

5. The Planning Board may recommend variation of lot sizes, within the subdivision in order to adopt a layout to special conditions, and to accomplish the intent of the hillside development requirements.

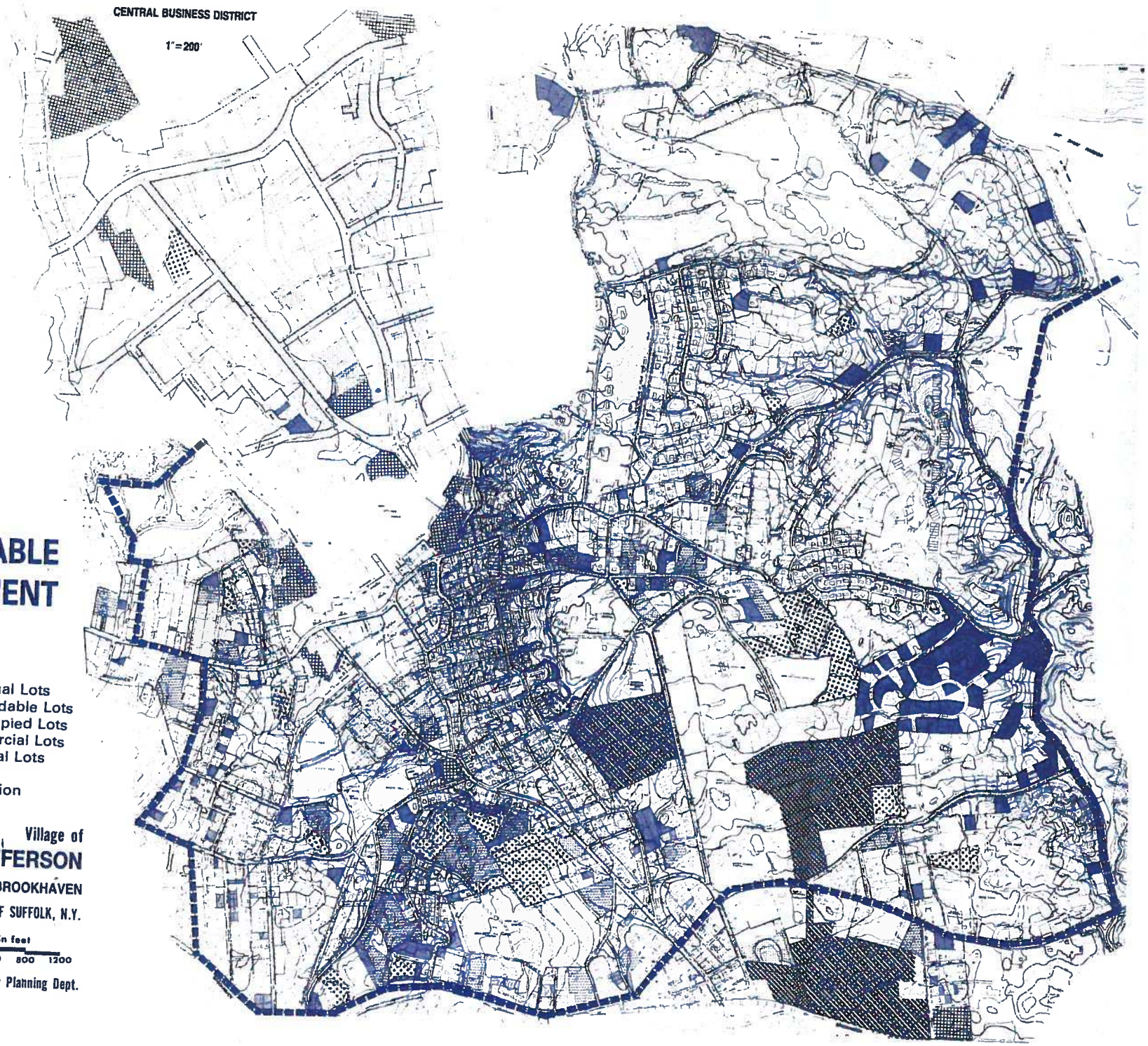
6. The Planning Board is empowered to approve an additional lot or lots when the applicant can prove that his special combination of conditions will allow greater yield than provided for in this section, provided that all zoning minimum standards are strictly adhered to, and the intent of this section is met. In general, such special combination of conditions would be: existing street frontage, existing drainage facilities, and favorable configuration of property.

7. Each applicant in a hillside development area shall submit a drawing indicating the property boundary, topography, lot layout, and calculation of average slope to the Planning Board for review prior to the submission of a preliminary application.

8. In appropriate cases the Village Board may direct the Planning Board to review a steep slope parcel for cluster development pursuant to Section 7-738 of the Village Law. In such cases the Planning Board may approve a density in excess of the calculations of this section, but in no case in excess of the yield factor for flat areas, applied to the gross tract.

Conflict with other Ordinances and Regulations. If any standard or requirement herein is in conflict with any other ordinance, standard or requirement, the provisions establishing the more restrictive requirements shall apply.

2- LAND AVAILABLE FOR DEVELOPMENT



- Vacant Individual Lots
- Vacant Subdividable Lots
- Oversized Occupied Lots
- Vacant Commercial Lots
- Vacant Industrial Lots
- Reuse
- Under Subdivision

Village of
PORT JEFFERSON
TOWN OF BROOKHAVEN
COUNTY OF SUFFOLK, N.Y.

N

scale in feet
0 400 800 1200

Suffolk County Planning Dept.