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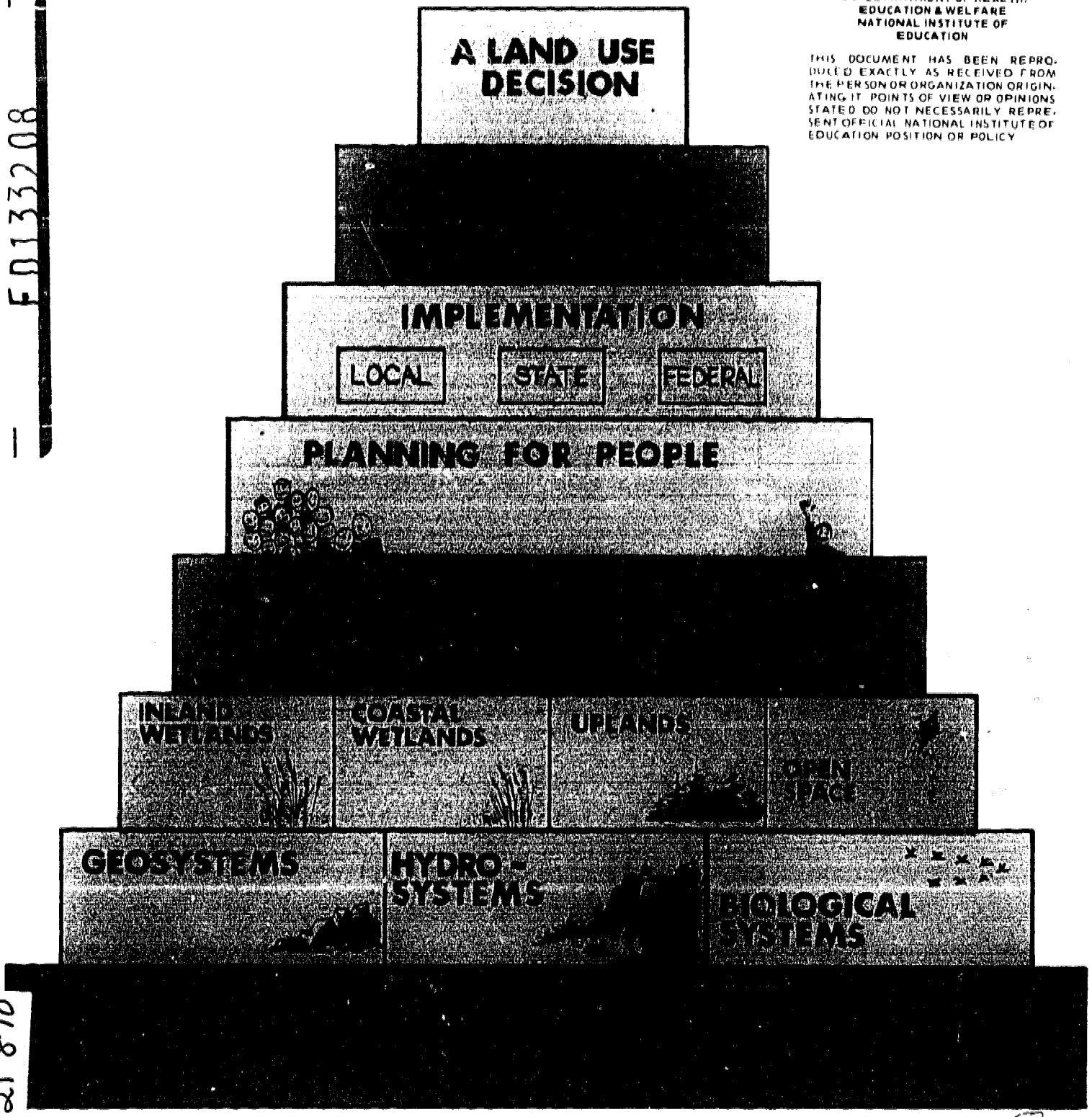
ABSTRACT

Included in this set of materials are two units: (1) Introduction to Land Use Decision Making Kit, and (2) Economics of Land Use. Each unit includes student guide sheets, reference material, and tape script. A set of 35mm slides and audiotapes are usually used with the materials. The introductory unit provides an overview of land use and suggested use of the materials. The unit on Economics of Land Use emphasizes economic as well as environmental and social factors in land use decisions. Included are materials for determining property values, cost-benefit analyses, and considering the use of these various techniques. (RH)

INTRODUCTION
TO
LAND USE DECISION MAKING KIT



K.P.

INTRODUCTION
TO
LAND USE DECISION MAKING KIT

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and

Larry Schaefer

Prepared By:

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21 Merritt St.
Hamden, CT 06511

1975

Under a grant from

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TO OUR WIVES,

SUE and LINA

with love and thanks

for just being special people

TO OUR CHILDREN,

present and future

that their world may be a better one.

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It has been a great source of encouragement that so many people have taken an active interest in the preparation of the Land Use Decision Making Kit. In a great many cases, we have incorporated helpful suggestions into the scripts and guide sheets. The ultimate responsibility for all statements must, of course, rest with the editors. To those individuals and agencies listed below, we extend our grateful appreciation.

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GUIDE SHEET # 1

LAND USE: AN INTRODUCTION

When man first travelled into outer space, his concept of the earth's unlimited bounty was suddenly challenged. Man was not the resident of a world with unlimited resources of air, minerals, fossil fuels, soil and water. He was, in fact, just a passenger on a space ship with finite and definable resources. This new definition of man's relationship to the earth has kindled an interest in the careful management of Earth's resources and has focused attention on land use decision making.

The significance of the role of land use decision making in America's future is emphasized in the following statement by Russell W. Peterson, Director of the Environmental Protection Agency.

> Land use is perhaps the most complex and pervasive environmental issue of all. Pollution levels, agricultural productivity, housing patterns, and recreation are a few of the manifestations of the way that we use our land. But unlike many of the other environmental issues, there is no common scale upon which to measure progress toward good land use. Planners can suggest some better ways to design and locate development; economists can tell us what patterns are most efficient from the point of view of land consumption, energy use, industrial location, etc.; and lawyers can advise on what is legal and constitutional in the way of land use regulations. Yet is really the community itself - whether locality, region, or state - which must try to pull all these considerations together into coherent land use planning and regulatory policies in order to preserve those things that the community values and to foster the growth and change that the community wants.

GUIDE SHEET # 2

THE AMERICAN INDIAN AND THE LAND

The earth was created by the assistance of the sun, and it should be left as it was... The country was made without lines of demarcation, and it is no man's business to divide it... The earth and myself are of one mind. The measure of the land and the measure of our bodies is the same... Understand me fully with reference to my affection for the land. I never said it was mine to do with as I choose. The one who has the right to dispose of it is the one who created it. I claim a right to live on my land, and accord you the privilege to live on yours.

- Chief Hin-mah-too-yah-lat-kekht -
Nez Perce Indian Tribe

Holy Mother Earth, the trees and all nature are witnesses of your thoughts and deeds.

- A Winnebago Wise Saying -

We always had plenty; our children never cried from hunger, neither were our people in want... The rapids of Rock River furnished us with an abundance of excellent fish, and the land being very fertile, never failed to produce good crops of corn, beans, pumpkins, and squashes... Here our village stood for more than a hundred years, during all of which time we were the undisputed possessors of the Mississippi Valley... Our village was healthy and there was no place in the country possessing such advantages, nor hunting grounds better than those we had in possession. If a prophet had come to our village in those days and told us that the things were to take place which have since come to pass, none of our people would have believed him.

- Ma-ka-tai-me-she-kia-kiak -
Chief of the Sauk and Fox

The Dakota is a true naturist - a lover of nature. He loved the earth and all things of the earth, the attachment growing with age. The old people came literally to love the soil and they sat or reclined on the ground with a feeling of being close to a mothering power. It was good for the skin to touch the earth and the old people liked to remove their moccasins and walk with bare feet on the sacred earth. Their tipis were built upon the earth and their alters were made of earth. The birds that flew in the air came to rest upon the earth and it was the final abiding place of all things that lived and grew. The soil was soothing, strengthening, cleansing and healing.

That is why the old Indian still sits upon the earth instead of propping himself up and away from its life-giving forces. For him, to sit or lie upon the ground is to be able to think more deeply and to feel more keenly: he can see more clearly into the mysteries of life and come closer in kinship to other lives about him...

Kinship with all creatures of the earth, sky and water was a real and active principle. For the animal and bird world there existed a brotherly feeling that kept the Dakota safe among them and so close did some of the Dakotas come to their feathered and furred friends that in true brotherhood they spoke a common tongue.

The old Dakota was wise. He knew that man's heart away from nature becomes hard; he knew that lack of respect for growing, living things soon led to lack of respect for humans too. So he kept his youth close to its softening influence.

- Chief Standing Bear of the Dakota Tribe -

Behold my brothers, the Spring has come; the Earth has received the embraces of the sun and we shall soon see the results of that love!

Every seed has awakened and so has all animal life. It is through the mysterious power that we too have our being and we therefore yield to our neighbors, the same right as ourselves to inhabit this land.

- Sitting Bull, Sioux Warrior, 1877 -

GUIDE SHEET # 3

CONCEPT OF LAND USE IN EARLY AMERICA - CULTURES IN CONFLICT

The tipi is much better to live in: always clean, warm in winter, cool in summer; easy to move. The white man builds big house, cost much money, like big cage, shut out sun, can never move; always sick. Indians and animals know better how to live than white man; nobody can be in good health if he does not have all the time fresh air, sunshine and good water. If the Great Spirit wanted men to stay in one place he would make the world stand still; but He made it to always change, so birds and animals can move and always have green grass and ripe berries, sunlight to work and play, and night to sleep; summer for flowers to bloom, and winter for them to sleep; always changing; everything for good; nothing for nothing.

The white man does not obey the Great Spirit; that is why the Indians never could agree with him.

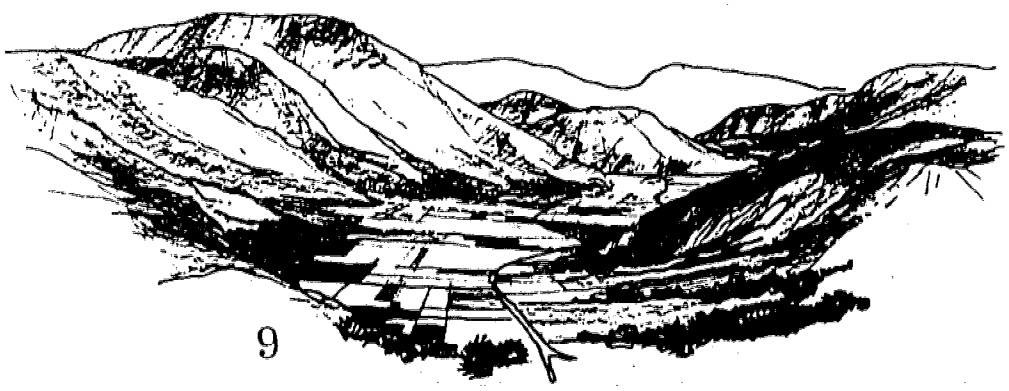
- Chief Flying Hawk of the Sioux Indians -

The Lord hath pleased to turn one of the most hideous, boundless and unknown Wildernesses of the world ..... to a well ordered Commonwealth.

-Edward Johnson, 1653-
Massachusetts Bay Colony

I wish I could be acquainted with the thoughts and feelings which must agitate the heart and present themselves to the minds of an enlightened Englishmen when he first lands on this continent. He must greatly rejoice that he lived at a time to see this fair country discovered and settled; he must necessarily feel a share of national pride, when he views the chain of settlements which embelishes these extended shores... There he beholds fair cities, substantial villages, extensive fields, an immense country filled with decent houses, good roads, orchards, meadows, and bridges, where a hundred years ago all was wild, woody and uncultivated.

- Hector St. John, 1765 -
Pine Hill, New York



THE DECIDEDLY UNFORKED MESSAGE OF CHIEF SEATTLE

Chief Seattle, leader of the Suquamish tribe in the Washington territory, delivered a prophetic speech, in 1854, to mark the transferral of ancestral Indian lands to the federal government. An adaptation of his remarks, based on an English translation by William Arrowsmith, appears at right.

More than 100 years later, his words have an eerie ring of truth and are punctuated by the energy crisis which shadows the land. Having recently learned that our technology can kill our environment, including us, will we throw much of that lesson to the winds in a mad scramble for energy at any price?

Expo '74 was created with the idea that we, in our highly mechanized society, can indeed live in harmony with our land and all life. Chief Seattle saw no distinction between life and the earth. One of the major failings of people in this age is drawing a deadly imaginary line between the two. Perhaps the thought generated by Expo '74 will help erase it.

Visitors entering the U.S. Pavilion will be confronted by a quotation from Chief Seattle's speech – "The earth does not belong to man; man belongs to the earth." Those are not idle words. Let's not be idle about observing their wisdom . . . to the letter.

The Great Chief in Washington sends word that he wishes to buy our land.

The Great Chief also sends us words of friendship and good will. This is kind of him, since we know he has little need of our friendship in return. But we will consider your offer. For we know that if we do not sell, the white man may come with guns and take our land.

How can you buy or sell the sky, the warmth of the land? The idea is strange to us.

If we do not own the freshness of the air and the sparkle of the water, how can you buy them?

Every part of this earth is sacred to my people. Every shining pine needle, every sandy shore, every mist in the dark woods, every clearing, and humming insect is holy in the memory and experience of my people. The sap which courses through the trees carries the memories of the red man.

The white man's dead forget the country of their birth when they go to walk among the stars. Our dead never forget this beautiful earth, for it is the mother of the red man. We are part of the earth and it is part of us. The perfumed flowers are our sisters; the deer, the horse, the great eagle, these are our brothers. The rocky crests, the juices in the meadows, the body heat of the pony, and man – all belong to the same family.

So, when the Great Chief in Washington sends word that he wishes to buy our land, he asks much of us.

The Great Chief sends word he will reserve us a place so that we can live comfortably to ourselves. He will be our father and we will be his children.

So we will consider your offer to buy our land. But it will not be easy. For this land is sacred to us.

This shining water that moves in the streams and rivers is not just water but the blood of our ancestors. If we sell you land, you must remember that it is sacred, and you must teach your children that it is sacred, and that each ghostly reflection in the clear water of the lakes tells of events and memories in the life of my people. The water's murmur is the voice of my father's father.

The rivers are our brothers, they quench our thirst. The rivers carry our canoes, and feed our children. If we sell you our land, you must remember, and teach your children, that the rivers are our brothers, and yours, and you must henceforth give the rivers the kindness you would give any brother.

The red man has always retreated before the advancing white man, as the mist of the mountain runs before the morning sun. But the ashes of our fathers are sacred. Their graves are holy ground, and so these hills, these trees, this portion of the earth is consecrated to us. We know that the white man does not understand our ways. One portion of land is the same to him as the next, for he is a stranger who comes in the night and takes from the land whatever he needs. The earth is not his brother, but his enemy, and when he has conquered it, he moves on. He leaves his father's graves behind, and he does not care. He kidnaps the earth from his children. He does not care. His father's graves and his children's birthright are

forgotten. He treats his mother, the earth, and his brother, the sky, as things to be bought, plundered, sold like sheep or bright beads. His appetite will devour the earth and leave behind only a desert.

I do not know. Our ways are different from your ways. The sight of your cities pains the eyes of the red man. But perhaps it is because the red man is a savage and does not understand.

There is no quiet place in the white man's cities. No place to hear the unfurling of leaves in spring or the rustle of insect's wings. But perhaps it is because I am a savage and do not understand. The clatter only seems to insult the ears. And what is there to life if a man cannot hear the lonely cry of the whippoorwill or the arguments of the frogs around a pond at night? I am a red man and do not understand. The Indian prefers the soft sound of the wind darting over the face of a pond, and the smell of the wind itself, cleansed by a midday rain, or scented with the piñon pine.

The air is precious to the red man, for all things share the same breath – the beast, the tree, the man, they all share the same breath. The white man does not seem to notice the air he breathes. Like a man dying for many days, he is numb to the stench. But if we sell you our land, you must remember that the air is precious to us, that the air shares its spirit with all the life it supports. The wind that gave our grandfather his first breath also receives his last sigh. And the wind must also give our children the spirit of life. And if we sell you our land, you must keep it apart and sacred, as a place where even the white man can go to taste the wind that is sweetened by the meadow's flowers.

So we will consider your offer to buy our land. If we decide to accept, I will make one condition: The white man must treat the beasts of this land as his brothers.

I am a savage and I do not understand any other way. I have seen a thousand rotting buffalos on the prairie, left by the white man who shot them from a passing train. I am a savage and I do not understand how the smoking iron horse can be more important than the buffalo that we kill only to stay alive.

What is man without the beasts? If all the beasts were gone, men would die from a great loneliness of spirit. For whatever happens to the beasts, soon happens to man. All things are connected.

You must teach your children that the ground beneath their feet is the ashes of our grandfathers. So that they will respect the land, tell your children that the earth is rich with the lives of our kin. Teach your children what we have taught our children, that the earth is our mother. Whatever befalls the earth, befalls the sons of the earth. If men spit upon the ground, they spit upon themselves.

This we know. The earth does not belong to man; man belongs to the earth. This we know. All things are connected like the blood which unites one family. All things are connected.

Whatever befalls the earth befalls the sons of the earth. Man did not weave the web of life; he is merely a strand in it. Whatever he does to the web, he does to himself.

But we will consider your offer to go to the reservation you have for my people. We will live apart, and in peace. It matters little where we spend the rest of our days. Our children have seen their fathers humbled in defeat. Our warriors have felt shame, and after defeat they turn their days in idleness and contaminate their bodies with sweet foods and strong drink. It matters little where we pass the rest of our days. They are not many. A few more hours, a few more winters, and none of the children of the great tribes that once lived on this earth or that roam now in small bands in the woods will be left to mourn the graves of a people once as powerful and hopeful as yours. But why should I mourn the passing of my people? Tribes are made of men, nothing more. Men come and go, like the waves of the sea.

Even the white man, whose God walks and talks with him as friend to friend, cannot be exempt from the common destiny. We may be brothers after all; we shall see. One thing we know, which the white man may one day discover – our God is the same God. You may think now that you own Him as you wish to own our land; but you cannot. He is the God of man, and His compassion is equal for the red man and the white. This earth is precious to Him, and to harm the earth is to heap contempt on its Creator. The whites too shall pass; perhaps sooner than all other tribes. Continue to contaminate your bed, and you will one night suffocate in your own waste.

But in your perishing you will shine brightly, fired by the strength of the God who brought you to this land and for some special purpose gave you dominion over this land and over the red man. That destiny is a mystery to us, for we do not understand when the buffalo are all slaughtered, the wild horses are tamed, the secret corners of the forest heavy with the scent of many men, and the view of the ripe hills blotted by talking wires. Where is the thicket? Gone. Where is the eagle? Gone. And what is it to say goodbye to the swift pony and the hunt? The end of living and the beginning of survival.

So we will consider your offer to buy our land. If we agree, it will be to secure the reservation you have promised. There, perhaps, we may live out our brief days as we wish. When the last red man has vanished from this earth, and his memory is only the shadow of a cloud moving across the prairie, these shores and forests will still hold the spirits of my people. For they love this earth as the newborn loves its mother's heartbeat. So if we sell you our land, love it as we've loved it. Care for it as we've cared for it. Hold in your mind the memory of the land as it is when you take it. And with all your strength, with all your mind, with all your heart, preserve it for your children, and love it... as God loves us all.

One thing we know. Our God is the same God. This earth is precious to Him. Even the white man cannot be exempt from the common destiny. We may be brothers after all. We shall see. □

LAND USE DECISION MAKING KIT

MAPS

MAP SYMBOL

LOCATION OF SITES

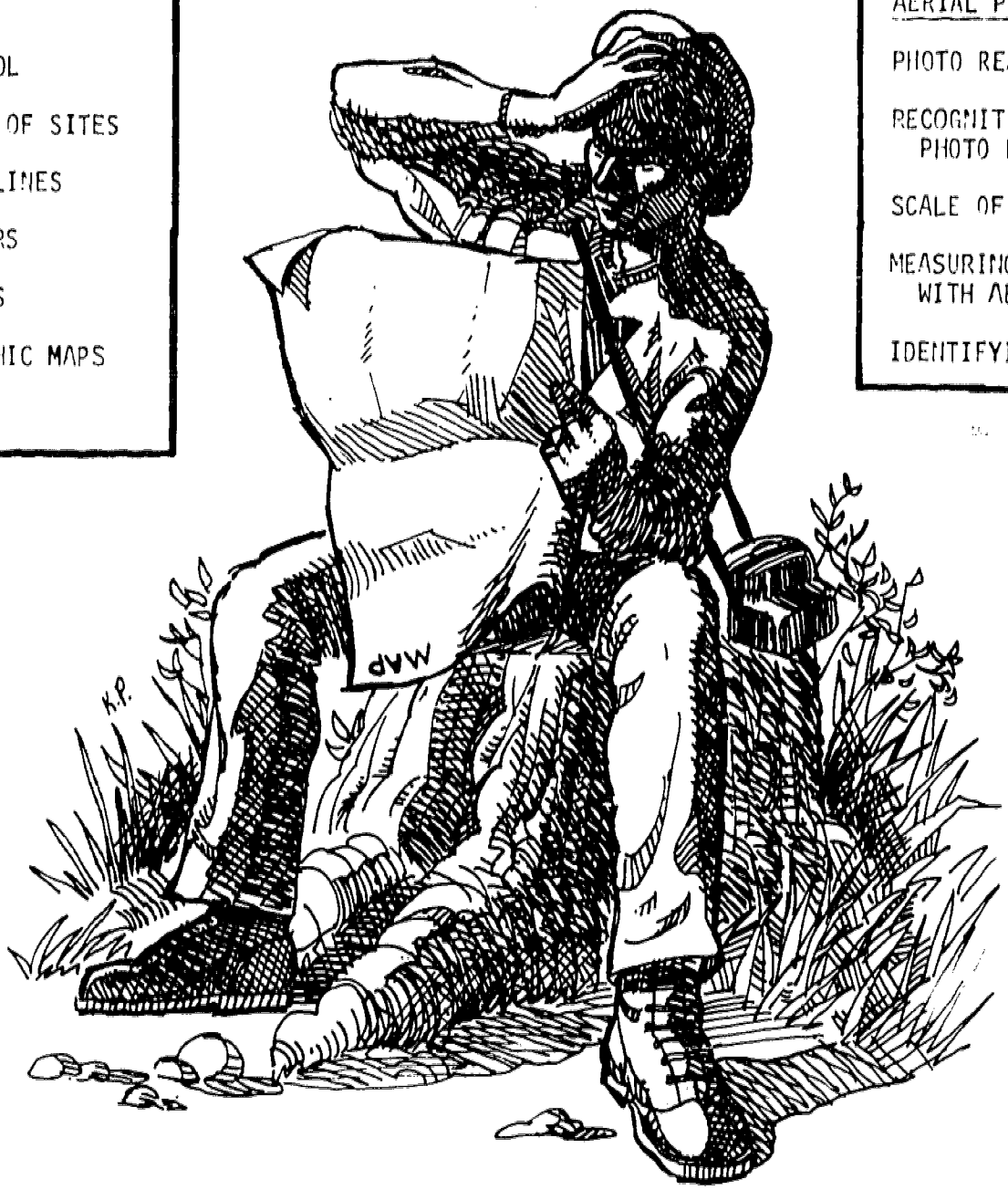
CONTOUR LINES

MAP COLORS

MAP TYPES

TOPOGRAPHIC MAPS

SCALE



AERIAL PHOTOGRAPHY

PHOTO READING

RECOGNITION CLUES FOR PHOTO READING

SCALE OF AERIAL PHOTOS

MEASURING DISTANCES WITH AERIAL PHOTOS

IDENTIFYING LAND USES

MAPS-MAP READING

AERIAL PHOTOGRAPHY

K.F.

LAND USE DECISION MAKING KIT

Soil Limitations

Experts, Citizens Air Building Rules

GUILFORD -- Experts and ordinary citizens, attorneys and developers jammed into the meeting room of the town hall Monday to discuse the proposed amendments to the subdivision regulations, concerning building on land with severely limited soils.

Using soils maps compiled by the Soils Conservation Service, the planning staff has designated areas which have very severe limitations for soil absorption sewage disposal facilities because of ledge or wetness. The proposed regulations have one alternative which could lead to prohibiting all building on such sites.

The accuracy of the maps was questioned by several persons, particularly James Brennan, attorney for Hallock Realty Co., The recommended use of maps was finally summarized by Jan Stolwijk of the Dept. of Epidemiology and Public Health at Yale. He recommended that the maps be used for reference for overall soils — but he said that in cases of dispute the fi maps of the Soil Conservati Service should be used for more accurate pinpointing soil types on specific sites.

Stolwijk pointed out that regulations w a more orderl the town, ex best land has and less desir being used. H development sure to will in limitat oils ' ottal ncu he

the regulations would be "a very useful tool in Guilford." He suggested that the maps be used as "a red flag indicating the need for further investigation."

Eric Mood, a sanitary engineer, and associate professor of Public Health at Yale, talked about the intent of the regulations, outlining the public health dangers if sewage effluent is discharged into the environment in any way. Dr. Elisabeth Adams, director of health in Guilford, gave a brief history of the beginning of the town's awareness of sewage problems, noting that "the first system failure I saw was the first system installed." She added that the leaching trenches in that system ran downhill.

Also speaking was town engineer, James Portley who said that he was generally in favor of the regulations. "The saddest thing I have seen since becoming town engineer is the homeowner who has invested his life [illegible]

SOIL TYPES

SOIL SURVEY

SOIL KEYS

ON SITE SEPTIC SYSTEM

WATER TABLE

PERCOLATION

EROSION

SOIL INTERPRETATION FOR COMMUNITY AND URBAN DEVELOPMENT

SURFICIAL GEOLOGY

BEDROCK

Giaimo Seeking Act To Control Coast Erosion

WASHINGTON, D.C. — A $6 million, five-year program to prevent the erosion of nearly 50,000 miles of shoreline has been proposed by U.S. Rep. Robert N. Giaimo, D-Conn.

Entitled "The Shoreline Erosion Control Demonstration Act of 1971," this measure would authorize the Army Corps of Engineers to conduct demonstration projects for prototype shoreline erosion control devices. At least two of these projects would be located on the Atlantic Coast, on the Gulf Coast and on the Pacific Coast, with at least one site on the Great Lakes. These sites would be chosen by a 15 member Soreline Erosion Advisory Panel established by the Secretary of the Army. This panel would also be responsible for recommending arrangements necessary to conduct the projects, undertaking periodic review and suggesting methods of informing the public about shoreline erosion control.

New Soil-Erosion Danger Feared in Food Shortage As U.S. Farmers Turn Wilderness Into Cropland

Unlike the most severe con sequences of the present worl food crisis, which are concen trated in the poor countries, th possible environmental effect of expanding and intensifying agriculture could well hurt th United States and other devel oped countries as much as the

One especially worrisome area of recent expansion has been the "southern high plains" region of eastern New Mexico and the panhandles of Texas and Oklahoma. Most of this is semi-arid grassland where the risk of prolonged drought is high enough that most expe

With the difficulty of obtaining water in much of the American West, agricultural developers are beginning to move into the wilderness areas along the Carolina coast where rainfall is abundant and dependable.

Much of this area offers boggy ground that is densely covered, inhabited by much wild-

he n.

GEOSYSTEMS

MAPS-MAP READING

AERIAL PHOTOGRAPHY

LAND USE DECISION MAKING KIT

GUIDE SHEET # 7

HYDROLOGIC CYCLE

WATERSHED

WATER QUALITY

GROUND WATER

FLOODING

IMPORTANCE OF FLOOD PLAIN

WATER POLLUTION

ON SITE SEPTIC SYSTEMS

EROSION AND SEDIMENTATION

AQUIFERS

WATER CONSUMPTION

Water Company Might Sell 16,500 Acres 'Some Day'

Profits Would Go To Stockholders

Landfill Water Flow Probe Asked

WOODBRIDGE – The Board of Selectmen voted Thursday to "urge" the Department of Environmental Protection to determine if water flow into the

He suggested that the source may be seepage from the Ansonia Reservoir or one of the two nearby streams.

Working on the assumption

to prohibit motorcycles from all town roads and specifically from Sperry Road.

Selectman Guido Calabrese, who introduced the motion, ex-

built.

Finally the organization said the SHAG members should ask themselves what effect 162 additional homes would have on the school system, police and fire service, sewers and roads.

Paglia to said the offic directors of SHAG have

Merchants To Pay For Sewer Line

ORANGE – When and if the Boston Post Road ever gets sewer lines, the total cost will home by the Post Road operty owner exclusively ould Sewer Authority Chair- an Charles H. Lipton have h ty.

"Since they need it, they want then they're going to pay for ." Lipton said of the Boston st Road property owners.

The Sewer Authority chair- an noted that other communi- s have systems whereby the operty owners served by the ewer lines pay for the installa- on of the sewer lines while ose taxpayers not being serv- d would not be charged.

He explained that as the ewer lines are expanded to ervice different areas in the ommunity, then the additional roperty owners would be roportionately assessed.

In addition to the cost of pay- g for the sewer lines, each roperty owner serviced would e an annual assessment based

In Flood Project

Initial Homes To Get Offers From State

By JOHN MEMBRINO
Staff Reporter

NORTH HAVEN – The first eight or 10 homeowners in the flood plagued Banton Street area will receive appraisal offers from the state during th week of Nov. 5, pro- na tor Sam

lion in state and federal funds. The Banton Street section is in a natural wetland area and as such has been inundated with high waters from the C ac River dur and

Approximately 24 Ba Street residents

Cost Over $1 Million

Hamden Storm Drainage Plan

By BILL MINGRONE
Staff Reporter

ing report indicates that the storm water drainage system in many parts of town is inadequate in size to handle the increase in run offs of storm wa- built up over the was first

equipment, through the capital outlay account.

Cirillo noted there are now three sweepers, one which was purchased new last year and two older ones which were

He said the Public Works built.

ment sweeps the a year

conduct the

Flooding Problem Called 'Critical'

By BILL MINGRONE
Staff Reporter

HAMDEN – Council President Robert A. Miller said Tuesday he considers the flooding of Brooksvale Avenue a "critical problem area" and top priority should be given to its correction.

"Brooksvale Avenue has long been a problem where flooding occurs during heavy rain storms and is a source of much concern to the residents," added Miller.

The portion of Brooksvale Avenue which is prone to the flooding is approximately one-

Councilman M. Philip DeCaprio and advised him of "the critical situation" involving Brooksvale Avenue.

At the February session of the Legislative Council, DeCaprio brought up the subject of street flooding problems after the lawmakers authorized the Board of Education to prepare plans and specifications for renovating the athletic complex at the high school.

"I have investigated several locations within the Sixth District where roads continually become flooded," said DeCaprio, adding that he "forwarded

Auction At A Flood Plain

The importance of conservation was brought home recently with the sale of homes on North Haven's Banton Street in the Quinnipiac River flood plain. The cottage dwellings were erected on the site before great interest in our environment came to pass.

The Banton Street area has an in- ble flooding problem so that h should not have been built there first place. The fact that they erected shows that man will def obvious laws of nature unless thou given to the consequences.

repetition of such errors. As urbaniza-

ollution Correction Asked

BRANFORD – A creek leading into the Supply Pond proper-

creek. In addition, the Supply Pond Commission explained, the run-off has created serious silting problems.

Noting that the blame seemed to be incorrectly placed on Alman in the letters, Town Engineer Don Ellis asserted that "the problem was created

letters to the Alman Co. with a request that it meet with the PZC to try to work out a way to stop the pollution. The Alman Co. it was noted, has been cooperative with the town in the past.

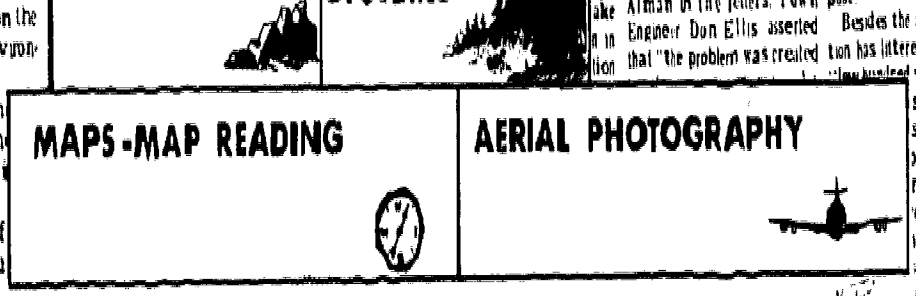
Besides the silting, the pollution has littered the brook for a

sorted non-biodegrad- sh, the letters brook is "now un- Recreational pur- ding to the Con- mission.

ment, but indicated it would like to see improvement in the architectural appearance.

The PZC learned that the Branford Electric Railway, a famous trolley museum in Short Beach and East Haven, has long range plans to expand its car barn area and intends to request a zone change for the property sometime in the future. No formal application has been made.

Informal discussions were held on proposals which have not yet officially come before the PZC, including Robert Bailey's plan to build some 41 units of housing for the elderly at 288 East Main St. and LeRoy Topping's proposal to build a warehouse on Schoolground Road.



LAND USE DECISION MAKING KIT

LAND USE DECISION MAKING KIT

ECOSYSTEM

VEGETATION

FUNCTION

VALUE

IMPACT OF DEVELOPMENT

REGULATION

COASTAL ZONE PLANNING

Wetland H
Due On O

By SUSAN J. BLANCHARD
Journal-Courier Staff Reporter

A public hearing has been set for Oct. 26 to establish the bounds of the New Haven tidal marshes as the ...

Contractor Indicates His Intent To Continue Filling Of Marsh

By JON KORPER
Register Staff Reporter

OLD LYME—A controversial construction project which has been through two state courts appeared headed for further ...

And on another front, town officials are pressing ahead with plans for a local wetlands ordinance to be presented to a ... plans for a ...

had won a unanimous decision in the Supreme Court ...

Wetlands Classification Being Appealed

By JAMES ROSE
Register Staff Reporter

MILFORD—Classification of 80 acres of land in this city as wetlands is being contested in Superior Court in Hartford.

The Beard Sand and Gravel Co., a Milford corporation, Earl and Robert Beard as individuals, are appealing the ... by Joseph Gill ... commissioner ...

contract with the State Highway Department under which that agency stored fill removed from the turnpike right-of-way. In accordance with that contract, the State Highway ... said, the stockpiled the fill ...

land carrying industrial zoning rating which "has a great value and economic potential both to the City of Milford and to adjoining towns and region."

They feel the value and economic potential is confiscated and destroyed by the wetlands classification.

They claim commissioner Gill ... arbitrarily and ...

State Officials Listen
Opinions On Marshlands Divided

GUILFORD — Representatives from the State ... ment on Agriculture and ... ral Resources came ... once again Tuesday a ... here was divided opinion on the boundaries ... undview Road ... meeting went ... town officials ... ction to the ... the state's ... undview ... of Wome ... cerned C ...

boundaries, just to allow local citizens and groups to voice ... the proposed ...

in support of the town's Planning and Zoning Commission's ... in support of the town's Planning and Zoning Commission (a few months ago) ... most of ...

Can't We Spare The Marsh That's Left?

Not much is left of what was a scarce parcel of Quinnipiac River salt marsh in New Haven. It will take only three months to complete the process by which this entire piece of wetlands property is being filled in with rubble, with total loss of the wildlife value it once had. But an attitude of enlightenment still might spare what remains — and it's worth saving.

The ...

permits it to continue. And it might go on for two years — the length of time it could take the State to make an inventory of the property involved before the conservation ... may take effect.

The C. W. Blakeslee ... parently is within the ... landfill operation but ... would gain the admiral ... public if it could manag ... some of this property th... premium in terms of a he... beautiful environment. Perh... officials can work somethin... accommodate the company ... for the financial sacrifice or ... venience involved.

A fine example would be se... ... is found ...

... of the fac... Robert P. Cr... Edge Farms ... the history of ... project. The River Edge Farm ... opment is laid out in a ... with the Neck River form... circle on the outside of the ... velopment. Houses on the ou... side of the circle have access to the river from the rear of their properties ... the inside ... ven small ... river and ... plots so ... owners ...

Public Beaches Bikini-Size In State

By EUGENE SEDER
Staff Reporter

If all three million Connecticut residents spread out along the state's 258 miles of shoreline at one time and assuming ... took a strip ... have to line ...

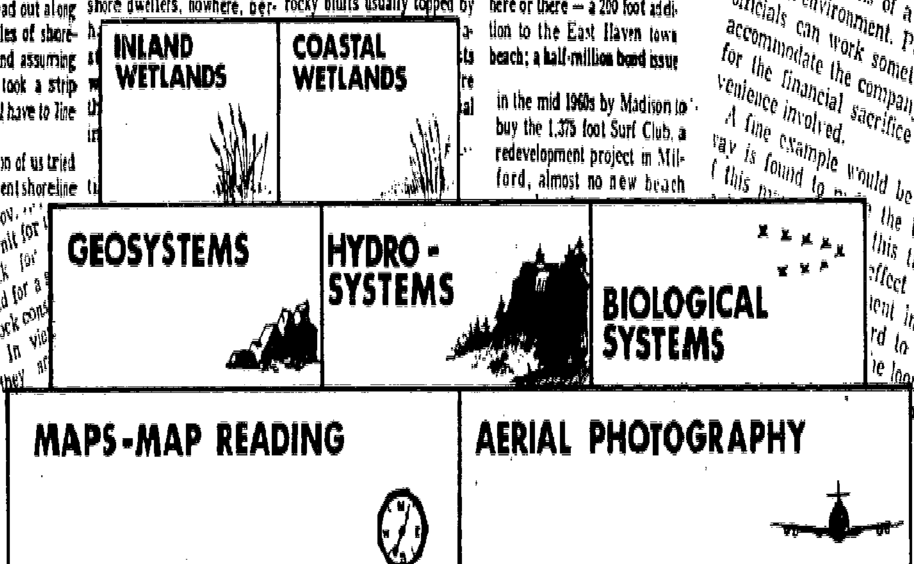
... though, spend each time stretched out on the sand.

As for the private property shore dwellers, nowhere, ...

beach. Only another 72 miles is useable beach; 51 miles are rocky bluffs usually topped by ...

... nals and river estuaries.

Except for a spot of activity here or there — a 200 foot addition to the East Haven town beach; a half-million bond issue in the mid 1960s by Madison to buy the 1,375 foot Surf Club, a redevelopment project in Milford, almost no new beach ...



Bridgeport Firm Is Denied Bid To Develop Stratford Wetlands

HARTFORD — An application by a Bridgeport corporation to fill in 277 acres of marsh in the Great Meadows area of Stratford for industrial use was denied Wednesday by Joseph N. Gill, state agriculture commissioner. It was the first such denial under the 1969 Connecticut Wetlands Act.

Gill, in denying the application filed by the Rykar Industrial Corp., said the Great Meadow area is "a viable and productive salt marsh."

Ironically, at almost the same time the announcement of the denial was made, Alexander A. Goldfarb, an attorney representing Rykar Corp., was appearing on pro-...

has been appraised at about $77 million.

Not knowing that the permit had been denied, Goldfarb said he believed the case would probably end up in court for resolution.

"Either the state will have to pay us for it, or grant us the permit."

Gill's denial was based on grounds that to use the marshlands for industrial purposes "would endanger the public health and welfare, marine fisheries, shell fisheries, wildlife protection of life and property from flood, hurricane or other natural disaster," he said.

He further concluded that fill-...

Wetlands Group Supports Action Of State Aide

The Save the Wetlands Committee, Inc. has expressed strong support of the action last week of outgoing Cmsr. of Natural Resources Joseph N. Gill, who denied the first exemption request made under the state wetlands preservation act.

"Connecticut's wetlands law and its interpretation by responsible public officials to save an important tidal marsh from destruction clearly supports the expressed wishes of most of the State's citizens," according to Freeborn G. Jewett, president of Save the Wetlands Committee of Connecticut.

Jewett was commenting on a decision to deny an application by Rykar Corp. to dredge and fill the viable Great Meadow 277-acre-marsh in Stratford.

A crowded public hearing which lasted two evenings was held on the application, the first test of the law which places wetlands under the protection of the state.

UPLANDS

- FOREST ECOSYSTEMS
- WATERSHED
- FUNCTION AND ROLES
- SUCCESSION
- AGRICULTURE
- PRESERVATION OF AGRICULTURAL LAND

OPEN SPACE

- FUNCTION
- VALUE
- TYPES
- PRESERVATION
- COMMUNITY PLANNING
- USE VALUE ASSESSMENT

LAND USE DECISION MAKING KIT

A Critical Year For The State's Farming

...ive. Land ...ec Areas

the property it owns off Evergreen Avenue for recreational use, according to informed sources.

A 45-lot subdivision proposal involving 15 acres of town-owned land plus another 4.5 acres was given conditional approval July 16 by the planning section of the Town Planning and Zoning Commission.

One of the conditions that had to be met is compliance with the inland wetlands regulations of the town. The Conservation Commission in late July sent the developer the Arco Management Corp. a letter requiring the filing of a detailed environmental impact statement concerning the ... Colony sub...

Aaron Cohen, president of Arco, said Arco is now considering several options to eliminate some of the use of the land. It will be changed, so that the wetlands are not affected, Cohen said.

"It is my desire to develop the land in accordance with the town and state statutes" stressed the Cheshire developer. When asked about ... that town hall ... most half of ... owns for ... Coh...

Connecticut

Nature Group Seeks $15,000 to Save a 'Visual Gem'

By JOHN C. DEVLIN

West Rock Group Taking Steps To Protect Ridge

area, on the Bethany-Hamden town line, would be prepared.

Rendeiro said the regional ... agency had been work... ...ea for some time ... the project ...ervices

proceed, it was necessary to define the boundaries of the ridge area and to determine the land ownership in that area.

Peter Cooper, chairman of the Woodbridge Conservation Commission, said the idea of the group was to control development to protect the skyline.

Rosson said ... attempt to create a state p... would first need approval from the towns and then support from the local senators and representatives.

Too Expensive

Rosson said the land value was out of the buying range of the individual towns.

Collins said the intention of the group was to protect the ridge and that the creation of a state park was only one way in which this might be done.

Collins said that once the ... of the ridge had been pre...

Conservation Trust Given Gift Of 22 Acres

By BABS PUTZEL
Register Staff Reporter

WOODBRIDGE — The Woodbridge Conservation Trust has received a gift of 22 acres of land which adjoin the Alice Newton Street Memorial Park in the center of town.

The new area, to be known ... Wepawaug Falls, ...

The trust is a tax-free association which acquires and maintains land for conservation and preservation of wild life and natural resources. The trust also promotes conservation and educational programs.

public meeting on Earth Day, April 22, at 8:30 p.m. at the Center School auditorium. Prof. Herbert Bormann of the Yale Forestry School will speak on a scientific forester's view of the effect of population growth on the environment.

As the population of Connecticut increased, the state did not have enough land to feed itself. Then industrial revolution saw Connecticut evolve into a state that exported manufactured products to obtain much of ...

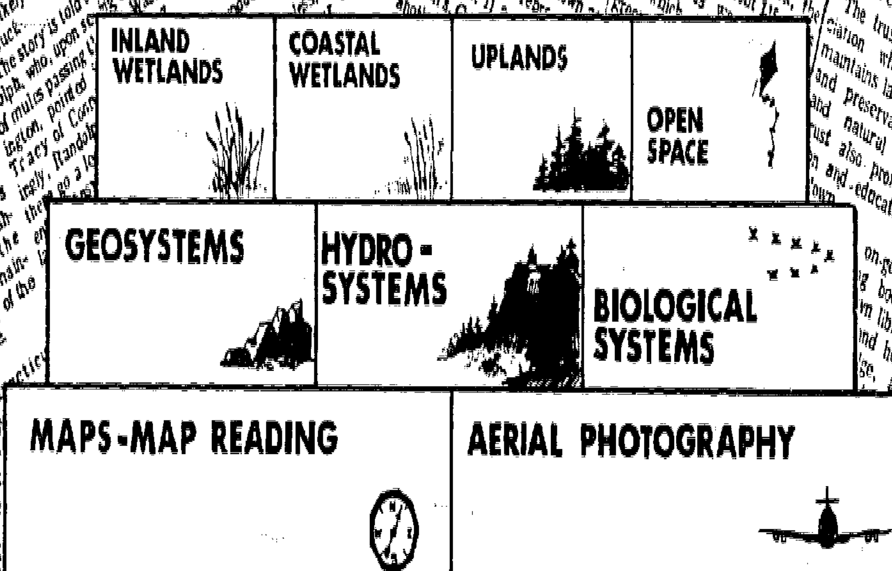
LANDS ACQUIRED FOR PRESERVATION

Nature Group Reports on Activity in 23 States

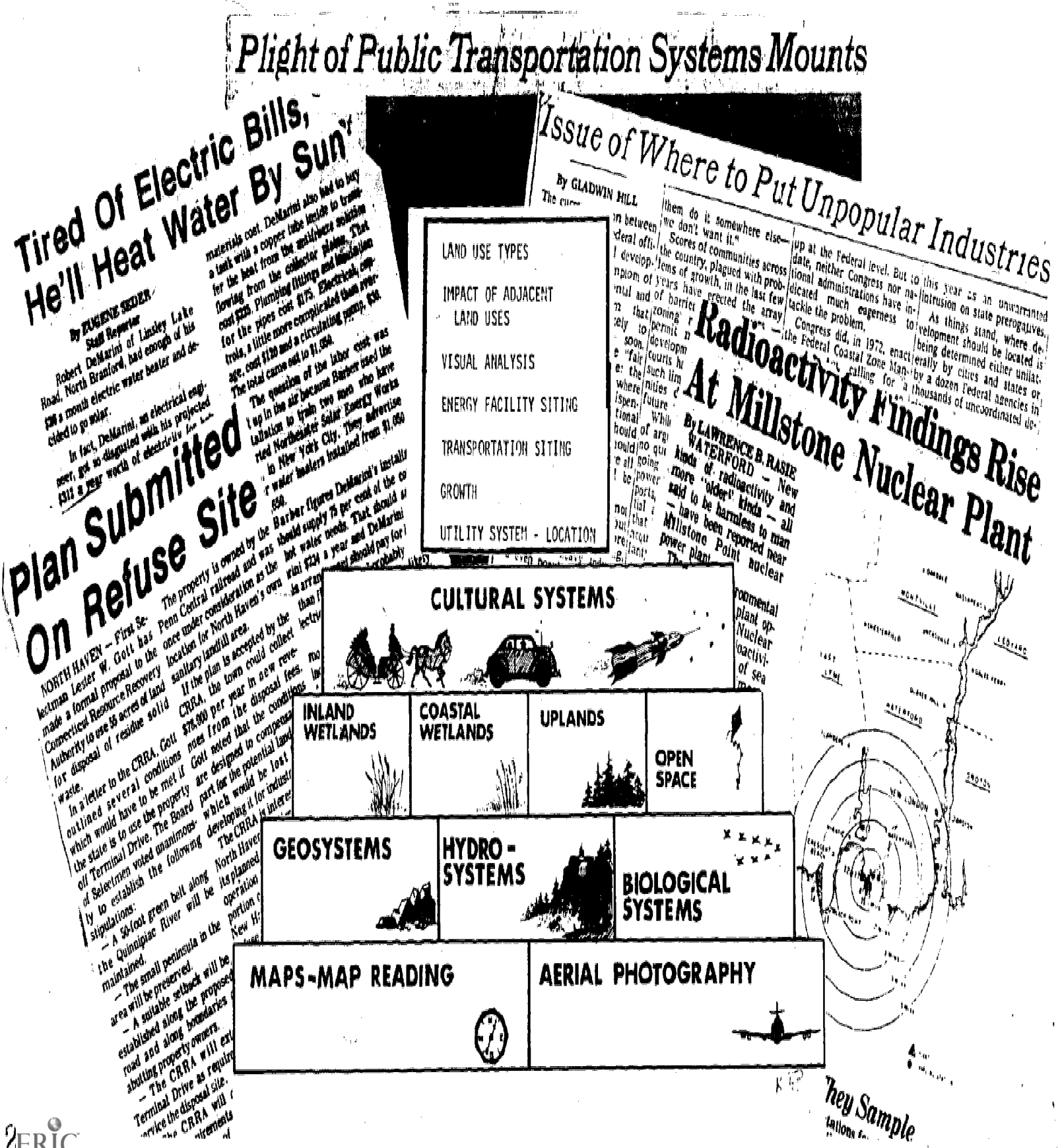
By JOHN C. DEVLIN

The Nature Conservancy, a national nonprofit conservation organization, has acquired for preservation during the last year 62,000 acres of land in 133 projects in 23 states.

The announcement was contained in the current annual report, which said acquisitions ranged from a quarter-acre salt marsh in Connecticut to a ... wildlife area in ...



LAND USE DECISION MAKING KIT



LAND USE DECISION MAKING KIT

UNDERSTANDING POPULATION CONCEPTS

USE OF CENSUS DATA IN PLANNING

COMMUNITY SURVEY

AGE STRUCTURE

GROWTH RATE

POPULATION DISTRIBUTION

Population Growth Slows, Hamden Plan Report Says

By DIANE OSBORNE
Staff Reporter

HAMDEN — The local population will probably be in the range of 57,000 to 58,000 by 1980, according to a population report done by the local planning office.

This contrasts with a projec... in the Goodkind and O'Dea

"A changing population distribution within the town indicates the need for schools, stores etc. in different parts of the town than in the past. Until such facilities can be developed there must be a convenient means of access to the facilities in the rest of the town.

"This would include such

In 1960 47.8 per cent of the population was male, compared with 47.1 per cent in 1970. Thus, the female population has the edge with 52.2 per cent of the population being female in 1960 and 52.9 per cent in 1970.

The highest per centage school age children is in ... northwestern part of to... which is one of the most rec... areas of t...

School Enrollments On Decline

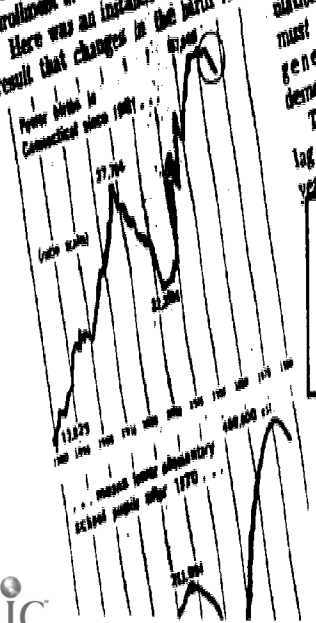
At a Parent-Teacher Organization meeting at a Cheshire elementary school the other night, the principal introduced the teaching staff, all of whom were described as returning veterans. Not a newcomer among them. In addition, he noted that two of the teachers had to be reassigned to higher grades because of a lower incoming enrollment at the beginning level.

Here was an instance of the direct result that changes in the birth rate already making adjustments according to market forecasts for the Ne...

Late last month, statistical ... issued by the U.S. Census Bur... the National Center for ... Statistics produced the news ... national birth rate has dro... milestone level, 2.1 children ... of child-bearing age, ... population growth.

Before the Unite... to have actually acc... ulation growth ho... must be ... generat... demograp...

The C... lag betw... year an...



The American Birth Rate: Evidences of a Coming Rise

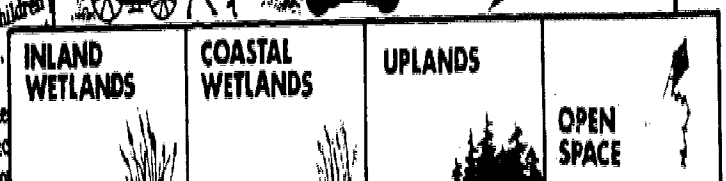
The proportion of young women who have not yet had any children is rising rapidly in this country.

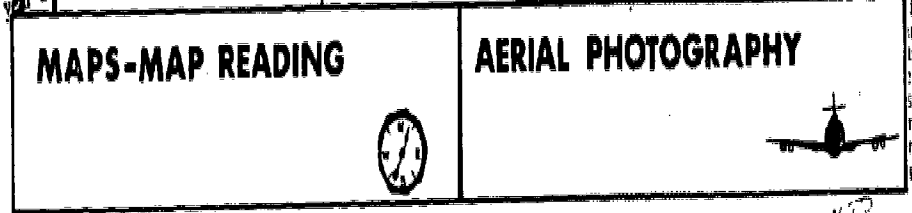
June Sklar and Beth Berkov

With only one minor exception (in 1969 and 1970), the American birth rate ... dropped steadily after its peak in 1957. By ... 1972, the latest year for which nation... ... the general fertil... ... ever recorded f... 1000 women aged ... naturally eme... decline or the low ...

Question ... ecent data ... result of ...

records in the ... numbe...





Human Tide Perils Chincoteague Isle

By B. DRUMMOND Ayres Jr.
Special to The New York Times

CHINCOTEAGUE, Va., July 30—Much of life is still governed on this marshy Atlantic isle by the ebb and flow of the tide.

So when the tide went slack this morning—this being the last Wednesday in July—the annual Chincoteague pony swim and penning began.

The Talk of Chincoteague, Va.

Some of the famous little ... horses had to be left behind ... quarantine this year be... use of a mysterious attack ... swamp fever.

... in years past—more ... n anyone can recall ... ind-up went surpris... ll, given the fact ... st of the cowboys ... n more accustomed ... ng oyster tongs and ... than reins and ...

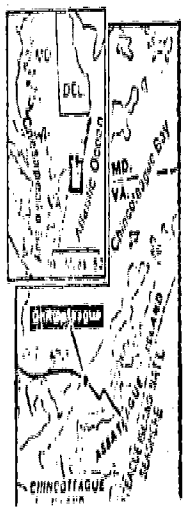
... ucial moment was ... the tide, and the ... cowboys" caught ... tly. At least 5,000 ... and tourists ... and applauded.

... r the Chincotea... ... the islanders call ... ds, will be on about ...

berry bushes, maddening green head flies and swarming mosquitos.

When swamp fever, a form of anemia, first was discovered in the herd a few months back, there was considerable fear that all the animals might die or have to be destroyed to prevent blood-sucking insects from spreading the disease to the mainland.

Destruction of the ponies



LAND USE DECISION MAKING KIT

- AL
- ING
- OD PLAIN ZONING
- U. D.
- STER HOUSING
- N PLANS
- ER OF THE PURSE

- STATE AND FEDERAL
- STATE LAND USE PLAN
- TAKING ISSUE
- INLAND WETLANDS ACT
- COASTAL WETLANDS ACT
- NEPA
- POLLUTION LEGISLATION
- FLOOD PLAIN INSURANCE
- POWER OF THE PURSE

Hamden Threatens Action

Developer Gets Edict On Zone Compliance

BY DIANE OSBORNE
Staff Reporter
HAMDEN — Zoning Enforcement Officer Angelo Lagrosse on Tuesday issued an order to the Stone Construction Co. demanding compliance with a subdivision regulation.
The order has to do with the alleged failure of ...
state basic building co... deemed Stone Construct... to be in violation of wit... to the Sky View subdi...

Hearing Tuesday On Town Plan

BY PETER ELLIS
Staff Reporter
ORANGE — The proposed plan of development will under... to its first public scrutiny ... day evening in wh... be a well att...
But even if the ... ed, this will ... everett...

Subdivision Rules To Get Hearing

GUILF... — Proposed ... amend... lan...
...ulating use of ... ...ong for soil ... ...osal sys... ... a pub... ... m...
...ance limitations are of two ...
The amended amendments ...
The commission has stated ... no harm in redundan... ...e public health is at ...rhere the proposed ...nts would have the ...fect as vigorous en... ...t of existing state and ...lary regulations.
...ent, however, ...ections beyo... ...isociated ... comm... ...sting ... int... ...by...

Other P... N...

Woodbridge To Keep Residential Look

Development Plan Shows

BY PETER ELLIS
Staff Reporter
WOODBRIDGE — For those who must have their cake and like it too, the town is becoming a ... chance. The first release of Plan of Development ... "Revision of ... most ... for those people, espe... But for those ... who'd like to see the ... intersection of ... multifamily ... housing, there will be no joy.
The revised plan, which ... calls for the ... serves ... the funding ... the plan and Zoning Commis... sion in its future plannin... makes the point which ... shares ... others: the cha... of town is not going to ... very much ...
To remain under ... the town's pred... Aensis re...
Proposed for further de... velopment is the section of ... land encompassing the lower ... end of Amity Road and Litch... field Turnpike. ... This land will encompass ... intensified business and indus... trial and commercial uses. ... Other highlights of the re... vised plan include revival of ... forgotten nature trails, con... sideration of bicycle path... and continuance of ... of traffic congested ... spaces ... On ... sugg...
items hanging over the town is ... fate of the over 700 acres of land ... the New Haven Water Co. has ... indicated it may somedayy sell ... The report recommends ... the town take action ... secure the maintenance ... of adverse ... and ... from ...

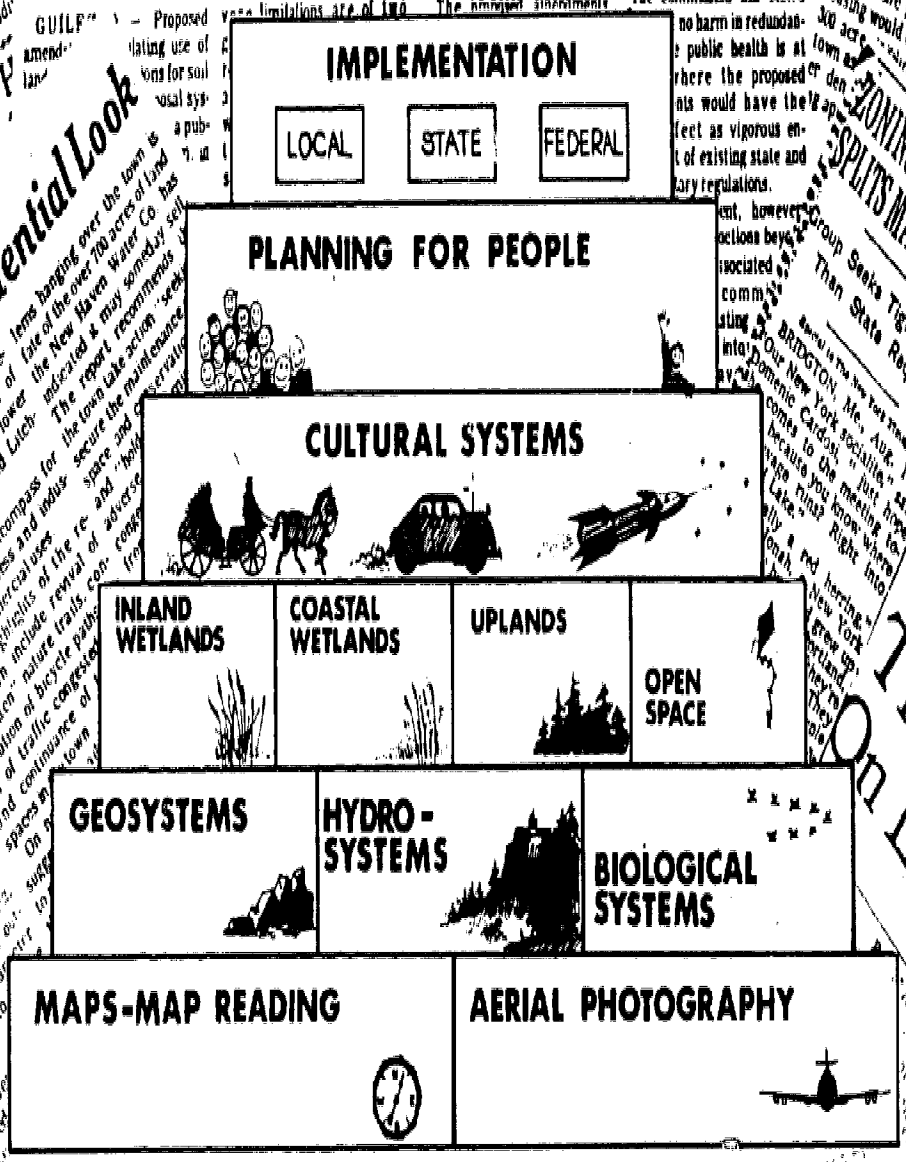
Proposed introduction of multi... houses in two tracts near the family housing ... Boston Post Road.
Under the plan, low density housing would be permitted in a ... In all three areas one acre ... 300 acre ... town a... ... re... the center of ... that high... ... borders would also be permitted. Other proposals in what is ... den... now residential areas include ... sewering almost all of the town ... for an area west of the ... from Parkway which, ... of drainage problems, ... become one and one-half ... ning for a one family ... ing. ... industrial development

ZONING LAW FIGHT SPLITS MAINE TOWN

Group Seeks Tighter Curbs Than State Requires

BRIDGTON, Me., Aug. 16... Our New York specialist ... Dominic Cardozo ... just drove ... comes to the meeting for ... because you know where ... Right into ... Lake ... miss ... ally ... ...onah ... red ... herring ... New York ... grew up ... pertaining ... herring ... They ...

When 60,000 Governments Try to Decide On Land Use



GUIDE SHEET # 14

LAND USE DECISION MAKING KIT

ATTRACTIVENESS

PROXIMITY

ACCESS

LAND USE

COST OF SPRAWL

BENEFIT-COST ANALYSIS OF VARIOUS HOUSING TYPES

ALLOCATION COMPOSITE

ECONOMICS

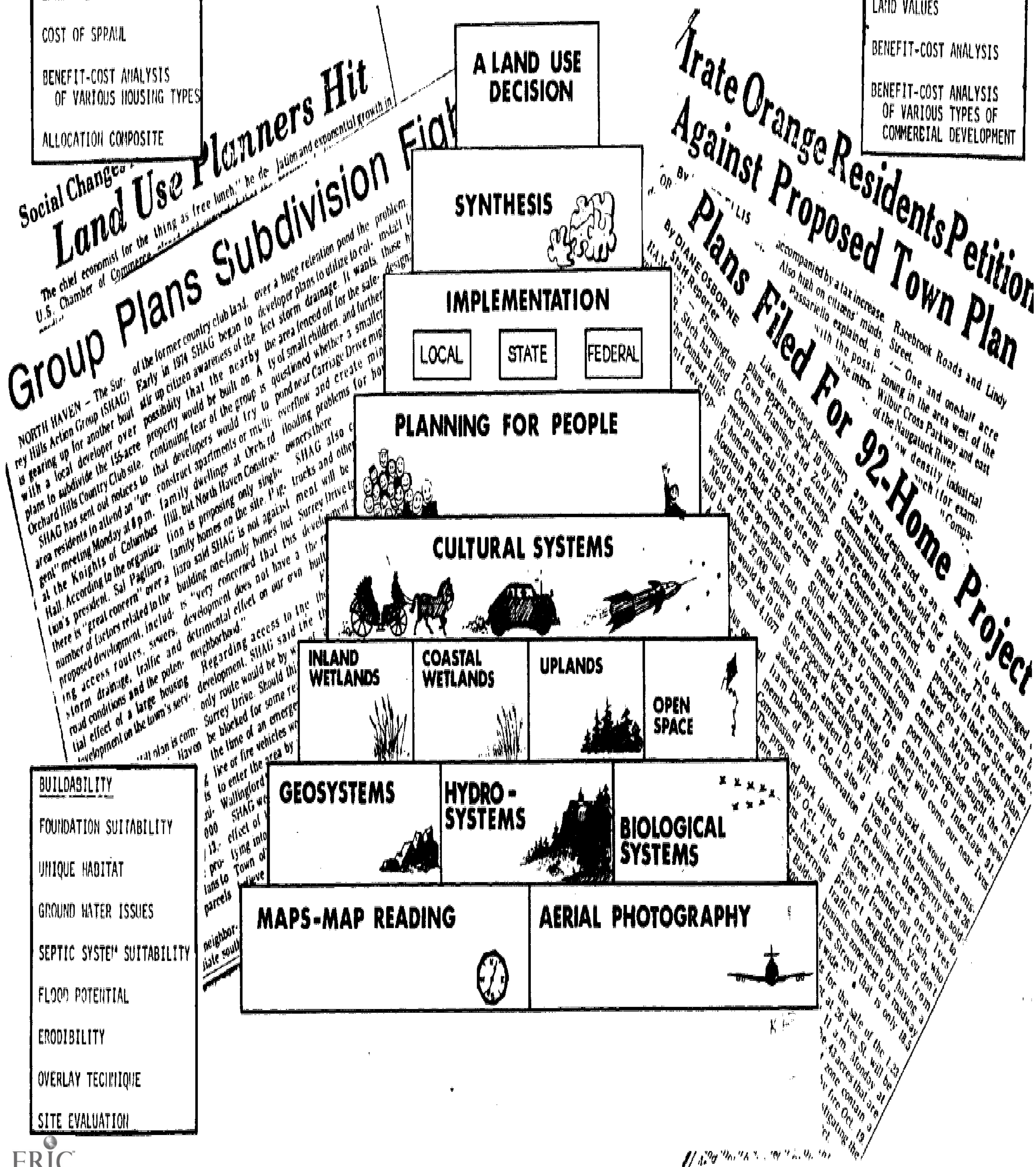
TAXES

ASSESSMENT

LAND VALUES

BENEFIT-COST ANALYSIS

BENEFIT-COST ANALYSIS OF VARIOUS TYPES OF COMMERCIAL DEVELOPMENT



BUILDABILITY

FOUNDATION SUITABILITY

UNIQUE HABITAT

GROUND WATER ISSUES

SEPTIC SYSTEM SUITABILITY

FLOOD POTENTIAL

ERODIBILITY

OVERLAY TECHNIQUE

SITE EVALUATION

GUIDE SHEET # 15

A MATRIX INDICATING THE CORRELATIONS BETWEEN LAND USE DECISION MAKING PROBLEMS AND SKILLS AND THE UNITS OF THE LAND USE DECISION MAKING KIT.

P=Primary source of information
S=Secondary source of information

	INTRODUCTION -	MAPS-MAP READING	AERIAL PHOTOGRAPHY	COASTAL WETLANDS	INLAND WETLANDS	OPEN SPACE	UPLANDS	GEOSYSTEMS	HYDROSYSTMS	CULTURAL SYSTEMS	SYNTHESIS - BUILDABILITY	SYNTHESIS - ATTRACTIVENESS	LOCAL IMPLEMENTATION	STATE AND FEDERAL IMPLEMENTATION	ECONOMICS OF LAND USE	PLANNING FOR PEOPLE
MAP READING		P	S		S	S		S			S	S	P			
MAP INTERPRETATION		P	P		S	S		S			S	S	S			
READING EARIAL PHOTOS			P	P						S		S				
USE OF SOIL KEYS					S			P			S					
INTERPRETATION OF MATRIX FOR DECISION MAKING	P			P	P		S	S	S		P					
USE OF ATTITUDE SURVEY						S	S									P
USE OF CENSUS DATA																P
OVERLAY TECHNIQUES								S			P	P				
SITE EVALUATION		P	S	P	P	P	P	P	P	S	P	P	P	P	S	S
DECISION MAKING	S	S	S	S	P	S	S	S	S	S	P	P	P	S	S	S
COST-BENEFIT ANALYSIS												P			P	
IDENTIFICATION OF COASTAL WETLANDS		S		P												
ECOSYSTEM STRUCTURE AND FUNCTION				P	P	P	P		S							
POPULATION GROWTH & PROJECTIONS	S			S	S	S	S			S		S				P
IDENTIFICATION OF INLAND WETLANDS		S			P			S	S							
FLOODING				S	S				P		P		S	S		
FOUNDATION SUITABILITY								P	S		P					
EROSION					S		S	P			P			S		
GROUND WATER POLLUTION							S		P		P			S		
WATER QUALITY				S	P		S		P		S			P		
SEPTIC TANK FAILURE								P	P		P					
SEDIMENTATION								P	P					S		
IMPACT OF HUMAN ACTIVITY ON WETLAND FUNCTIONS		S		P	P	S									S	S
URBAN SPRAWL			S			P	P			S		P	P		S	
OBTAINING INFORMATION ON LOCAL, STATE, & FEDERAL LAW				P	P	P	S		P	S			P	P	S	
UNIQUE HABITATS				P	P	P	P				S					
EFFECTS OF POPULATION GROWTH				S	S	S	S			S			S	S		P

GUIDE SHEET # 16

A MATRIX CORRELATING LAND USE ISSUES WITH UNITS OF THE LAND USE DECISION MAKING KIT.

P=Primary source of information
S=Secondary source of information

		INTRODUCTION	MAPS-MAP READING	AERIAL PHOTOGRAPHY	COASTAL WETLANDS	INLAND WETLANDS	OPEN SPACE	UPLANDS	GEOSYSTEMS	HYDROSYSTEMS	CULTURAL SYSTEMS	SYNTHESIS - BUILDABILITY	SYNTHESIS - ATTRACTIVENESS	LOCAL IMPLEMENTATION	STATE AND FEDERAL IMPLEMENTATION	ECONOMICS OF LAND USE	PLANNING FOR PEOPLE
Significance of Selected Land Uses	OPEN SPACE		S		P	P	P	P					S			S	S
	WATERSHED		S		S	P	S	P		P							
	COASTAL WETLANDS		S		P		S			S					S		
	INLAND WETLANDS		S			P	S		P	P				S	S		
	FLOOD PLAIN		S							P		P		P	P		
	AGRICULTURAL LAND			S			P	P		S						S	
	NATURAL AREAS				P	P	P	P				S					
	FORESTS		S	S		S		P		S							
Impacts of Land Use	RECREATIONAL SITE						P		S	S			S		S		S
	ENVIRONMENTAL IMPACTS				P	P		P	P	P		P	S				
	FLOOD PLAIN ZONING	S								P		S		P	S		
	ZONING PROCESS	S				S	S			S				P			
	POPULATION GROWTH	S			S		S				S						P
	ENERGY USAGE										P		S				
	TRANSPORTATION		S	S	S						P		S				
	POLLUTION				P	P		P				S	S		P		
	HOUSING			S	S	S			S		P	S	P			P	
Cost Benefit Analysis of Land Use	COMMERCIAL DEVELOPMENT												P			P	
	RESIDENTIAL DEVELOPMENT				S	S							P			P	
	INDUSTRIAL DEVELOPMENT				S	S							P			P	
	CLUSTER DEVELOPMENT						S						P	P		P	
	LAND VALUES						S	S					P			P	
Determinant Systems in Land Use	PROPERTY RIGHTS				S	S	S							S	P	P	
	SOILS	S				P			P			S					
	GEOLOGY	S							P			S					
	HYDROLOGY	S			S	S			S	P		S					
	BIOLOGICAL				P	P		P				S					
	CULTURAL	P					S				P						P
	POPULATIONS	S		S	S								S				P
	ECONOMICS	S			S	S							P			P	

Audio Tape Script

Introduction Unit

"In the beginning God created the heaven and the earth. And the earth was without form and void, and darkness was upon the face of the deep"..continue..Genesis paraphrased.

Each of man's cultural groups has its own special concept of how the Earth began, but all of them recognize Earth as mother, home, sustainer of life and the stage for all of man's activities. From the beginning, the people of America have had a close relationship to the land. The first major statements on the land ethic and America come from the American Indian. Guide Sheet #2 contains a collection of statements made by American Indians that reflect the close tie between their culture and mother earth. . Ston the recorder while you read the statements by the American Indians on Guide Sheet #2. (Pause)

When the European Settlers arrived, they changed the simple relationship that had previously existed between the native American Indians and the soil. The Indians took a dim view of these new settlers and their approach to land use. The conflicting land use practices of these opposing groups is clearly seen in the statements of Chief Flying Hawk, Edward Johnson and Hector St. John presented on Guide Sheet #3. Stop the recorder while you study the statements of these three early Americans. (Pause)

As the settlement of America's fronteers proceeded, people responded to the admonition to move west to inexpensive and fertile land. Eastern farms were slowly deteriorating under the contin ut pressure of crop production without adequate fertilization. Development of vast areas for housing and eventually industry took hundreds of acres of potentially usable farm land permanently out of production.

Slowly but surely the Indians were displaced by the new settlers. The President of the United States as authorized by Congress attempted to buy large tracts of land from the Indians. Their response was not one of acceptance. They were concerned by the white mans lack of respect for the land and felt that this lack of a land ethic might ultimately destroy the balance that existed in the environment of which man is but a part.

The magnitude of these reservations was clearly communicated in a speech by Chief Seattle. His concerns, expressed in 1854 have a new significance today as we see our technology threatening the quality of our environment and we recognize that the concerns expressed in 1854 were in fact prophecies of changes to come. Turn off the recorder, while you read Chief Seattle's speech on Guide Sheet #4. (Pause)

The calender of the 1800's rolled back and the 1900's roared in, accompanied by industrial expansion, urbanization and wide spread land abuse. Americans moved into the era of the speakeasy

and the Stutz Bear cat. Henry Ford made automobile ownership part of the American Dream. With the car came a need for more and better roads, and parking facilities. Industrialization caused people in residential districts to become concerned about the encroachment of industry upon private property. Land abuse was becoming such a concern, that communities passed laws that limited specific kinds of activities to specific zones. Thus zoning became a component of the America way of life. Zoning did not stop man's abuse of the land. Development accompanied by air, water, noise and land pollution continued. In the 1960's the public responded to the abuse of our land...a cry went out for more sensible land use planning and environmental protection. Space exploration had made Americans aware of the fact that our earth and its resources were limited and must be carefully managed.

We had come full circle. The concerns expressed by the American Indians in song, dance and basic philosophy were rephrased by Adlai Stevenson as he addressed the United Nations and said: "We travel together on a little space ship, dependent on its vulnerable supply of air and soil; all committed for our safety to its security and peace, preserved from annihilation only by the care, the work, I will say the love we give our fragile craft."

Now we stand on the threshold of a new era. Recognizing that the air, water, land and energy resources of our earth are in finite supply. The leaders of our Nation recognize land use as perhaps the most important issue of concern as it relates to environmental quality, economic development and overall quality of life in America.

In the face of population and technological expansion, government and environmental leaders have become aware of the importance of cooperative land use decision making by experts in many fields. As population expands, its impact upon the environment will be profound. Technological planning for this expansion is no longer a matter of choice; it has become a matter of urgent necessity. Environmental management techniques to harmonize the physical environment and natural resources with social needs and limitations must be developed and implemented.

Most communities have started to move toward the development of environmentally sound land use policies. In the process there is often a need to expose members of the community to educational materials on the general concepts of land use decision making. Based upon the expressed needs of several communities in the state, E-P Education Service has sought for and received funds from the Office of Environmental Education in the Department of Health, Education and Welfare for the development of individualized instructional materials on land use decision making processes. These materials have been designed for use by members of communities, community agencies and secondary schools.

The development of the materials has proceeded in a unique manner. The decision makers in Connecticut's towns were asked to share their experience relating to the need for community education in the area of land use decision making. Their responses shaped the backbone of this program.

Now lets look at the units that have been included in the kit. To complete this section of the Audio-tutorial Unit, you will need the slides for the Introduction Unit, a slide viewer and the guide sheets .

Look at slide number 2-(3 sec). This is the title slide for the unit on maps and map reading. An outline of the unit can be found on Guide Sheet #5. (3 sec) The major objective of this unit is to develop fundamental skills in map reading. You will study map symbols and learn to intrepret what the symbols represent. A major component of the unit focuses on the location of sites on the map. Slides will be used to show how sites on the map look in reality. Another exercise makes use of contour lines to describe the shape of the land.

A short segment of the tape discusses scale and the variety of maps at different scales that will prove to be useful in the land use decision making process. (Pause)

Guide Sheet #5 also contains the outline of the Aerial Photography Unit. In this unit, you will be involved in studying and reading aerial photography. You will find out how scale and photo recognition clues be utilized aerial photo interpretation. In the process of utilizing the aerial photographs we study the ways thatland has been used and we can see how man's activities have altered the land scape.

The maps and aerial photography units comprise the basic skills component of the land use decision making kit.

Now we shift our attention to natural systems that are of importance in land use decision making. Now look at slide #3. The first system is the sequence found in the geosystems unit. An outline of this unit is presented on guide sheet #6.

In this unit, attention is given to the role of soil types, soil surveys and soil keys. We find that the kinds of structures built on a specific site and the costs of construction are greatly influenced by geosystem factors.

Slide #4 presents one specific construction issue that is geosystem sensitive . (Pause) Here in slide #4 you see a cross section of an area where an on site septic system has been installed. We find that soil types, slope and depth to bedrock all play important roles in on site septic system locations. In this unit, we learn how percolation tests are conducted as one factor is determining the capability of installing on site septic systems.

Attention is also given to soil erosion and its impact on the gene[illegible]environment. Construction techniques for minimizing soil erosion are also discussed. The newspaper clippings in the background on this Guide sheet point up the role of geosystems in Land Use Decision Making.

Look now at slide #5 (Pause) Another important system is land use decision making in the hydrosystem. The outline for this unit is found on guide sheet #7.

This unit begins with a brief study of the hydrologic cycle and water sheds. Attention is given

to the factors that contribute to supplying adaquate clean water to a community.

Slide #6 shows a problem that frequently develops when hydrosystem factors are not included in the decison making equation. Here is slide #6 we see a road that is badly flooded. What causes flooding? How is a flood plain defined? How should the flood plain be utilized in planning for future community growth? All of these questions are discussed in the hydrosystems unit.

If you compare the outline of the hydrosystem and geosystem unit, you find that they both discuss erosion and on site septic systems. In many instances you will find cross references on major topics. As you study a unit, you will frequently be advised to see a section of another unit for additional, or more detailed information on a topic.

Now turn to Guide Sheet #8. Our attention will now turn from physical systems to biological systems. Look at slide #7. Inland wetlands are important biological systems. Their role in providing adequate, high quality water for a community should not be overlooked. Wetlands are great assets for a community, but historically, they have been poorly utilized, Slide #8 shows an all too common scene.. In many communities in our state ares such as this have been developed with resultant long term negative effects upon homeowners, the community and the general environment.

The inland wetland unit and coastal wetland units have parallel structures. They both begin with a treatment of the structure and function of these important systems. The economic and environmental value of the areas is considered and the impact of development of these areas is investigated.

The second half of the inland and coastalwetlands units focuses on the state and federal regulations that have a bearing on the use of these important biological systems.

Look at slide #9. (Pause) Here in slide #9 you see how man's activities have altered a major coastal wetlands area. Recommendations for coastal zone management are discussed in the coastal wetlands unit. Slides #10 and 11 show how man has altered the coastal zone. Turn off the recorder, while you view slide #10 and 11.

Another important biological system includes the Uplands. Guide Sheet #10 points out the fact that in this unit we study the structure and functions of forest ecosystems, water sheds and agricultural land. Several important ecological concepts are discussed in this unit including the process of succession.

Slide #12 shows an important Upland function (Pause.) Here in slide #12 we observe a farmer bailing hay. Is the farmer an endangered species? In this unit we discuss the issue of agriculture and population growth. Information is presented on Connecticut's changing agriculture. The issue of preserving agricultural land is carefully presented.

Slide # 13 shows some agricultural land that has value as farm land. (Pause) Can you see any other important societal use for this land?(Pause) Correct-Open Space- In the open space unit we

discuss the biological and societal functions of open space. Various types of open space are considered along with their respective roles in community planning. The process of preserving open space is also discussed in some detail.

Look at the crowd in slide #14...(Pause) How does man and man's culture affect the environment and the land use decision making process? This question is a major consideration of the cultural systems unit. The title slide for cultural systems, slide #15 shows how man's multifaceted culture causes some rather unusual adjacent land uses. After viewing slide #15, turn your attention to the outline on Guide Sheet #11. Stop the recorder while you read Guide Sheet #11.

(Continue on next page.)

Now lets discuss the instructional format of the Land Use Decision Making Kit. Ther materials you will be using are referred to as audio-tutorial instructional units. Quite literally, we will be using an audio-tape to tutor you in various aspects of the land use decision making process. The audio-tape contains the basic instructional material. The information on the tape has been written and edited by a writing team, which includes individuals who have expertise in the area under consideration.

As you are being tutored by the narrator, you may find that some sections of the tape are of particular interest, or perhaps some of the material was presented too rapidly. In either case, feel free to stop the recorder whenever you wish. If you want to repeat a segment of the tape, rewind that section and play it over again.

You will often be asked to stop the recorder while you study slides, maps, guide sheets or other supportive materials. STop the recorder for as long as you wish, when you have completed the assigned task, turn the recorder back on!

On several occasions, you will be asked to refer to some supportive material, but you will not be advised to turn off the recorder. At these points, there is a short pause in the narration so you can carry out the activity. If the pause is too short, stop the recorder! Remember, as the learner, you can start, stop, repeat,or pass over any section of the tape you desire ! It is a rare opportunity to direct the instructor and to ask to have sections of a discussion repeated or deleted ! So use the recorder to your benefit.

If you are not familiar with the stop, start, rewind and fast forward controls on your tape recorder, then take a few seconds to locate those buttons now (Pause). If you would like, stop the recorder while you familarize yourself with the tape recorder controls (Pause).

In addition to the tape recording, each unit has supplementary material that reinforces or expands the information presented on the tape. Depending upon the unit, these materials may include such things as slides, aerial photographs, maps, booklets, or acetate overlays. In all of the units there will be a set of guide sheets to accompany the tape recording.

Instructions for the use of the supplementary materials will be given by the narrator of the recording. Follow the instructions carefully. Do not make the error of skipping over the supplementary materials and activities. These items have been integrated into the instructional sequence at specific points to amplify or demonstrate important concepts, or to permit the practice of skills that have been developed. The supplementary materials are a vital component of the audio-tutorial learning experience, be sure to make full use of these materials. If you need more time than is alloted on the tape, to utilize these materials, then stop the recorder until you are ready to continue. Remember, you are the instructional manager, use the resource materials to maximize your potential for learning about the subjects which are of interest or concern to you ! Adjust the pace

of instruction to meet your needs !

As you begin each unit, there are a few basic procedures that should be followed. First, locate the guide sheets, tape recording and when included, the slides for the unit. Place the tape recording in the recorder. The label for the unit you want to study should be on top when you insert the tape into the recorder. Next, rewind the tape to the beginning by pressing the rewind button. When the tape is rewound, turn to guide sheet #1. Here you will find the objectives for the unit and in some instances, a list of special materials that will be needed to complete the audio-tutorial lesson. Study the objectives for the unit carefully. The objectives will act as an organizer for the unit to be studied. The objectives tell you what you will learn by studying the unit ! As you proceed through the audio-tutorial material, you will find that you will master the concepts and skills that are presented in the unit objectives. At the conclusion of the unit, you should go back to the list of objectives and evaluate your mastery of each of the major concepts or skills.

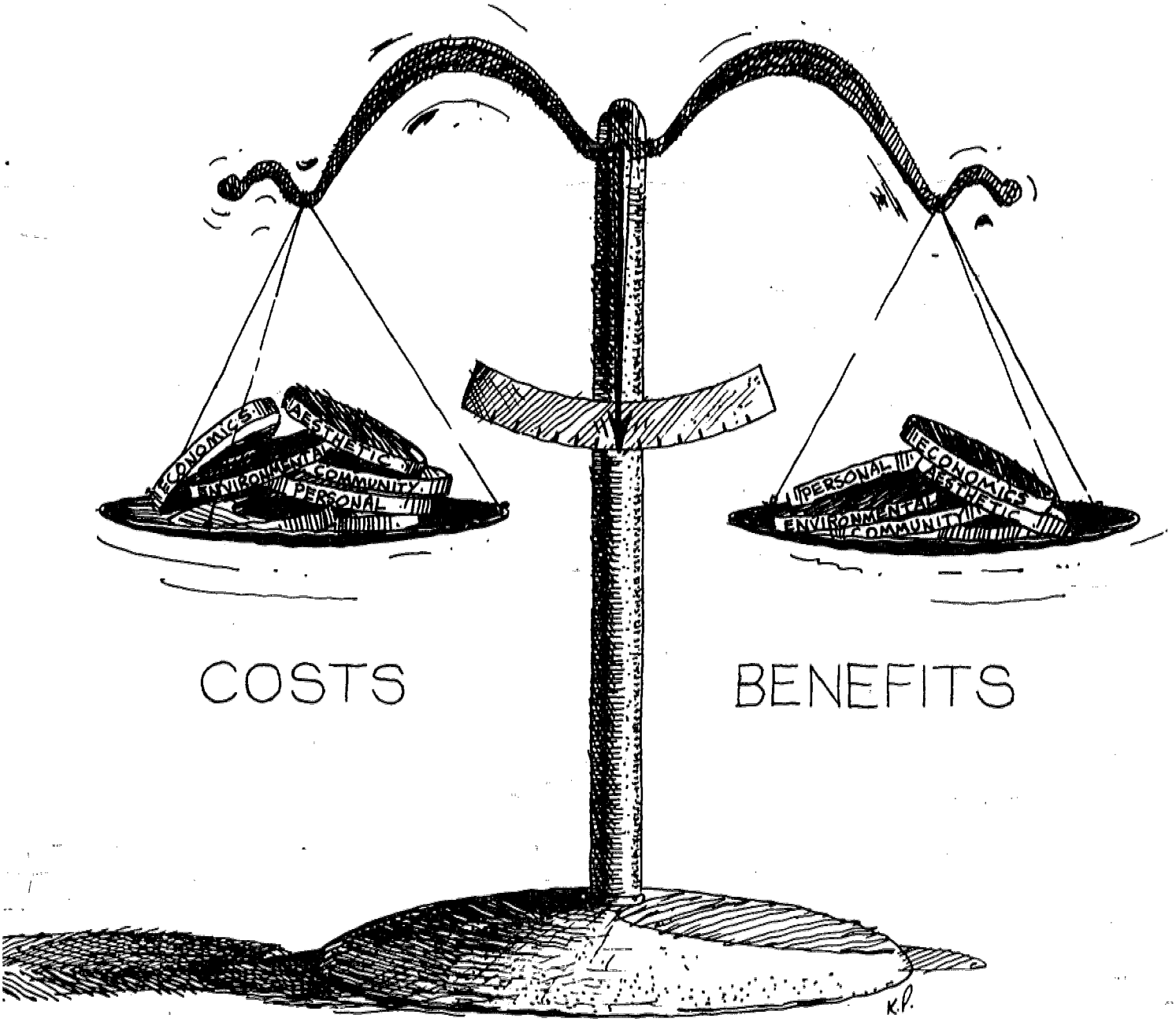
By studying the objectives you can determine whether or not a unit treats material which is of interest or concern to you. In addition, you can use it as a pre-test of your information or skill base. If you have already mastered the material described by the objectives you may want to skip the audio-tutorial material and move directly to the reading recommended for further study in the bibliography at the end of the guide sheet booklet.

The Land Use Decision Making Kit can be customized to meet the needs of your community. As you and other members of the community work your way through the units, collect items that will help focus attention on local areas and issues. For example, include topographic maps of your community, for use with the maps unit. Aerial photographs of your community can be added to the aerial photography unit. Copies of recent land use laws, local zoning maps and ordinances, photographs, newspaper articles, minutes of hearings, and numerous other local items can help make the Land Use Decision Making Kit an effective instructional tool for concerned citizens of your community.

As you attempt to locate these materials, you may want to make use of the citizens guide to information on land use decision making. A copy of the citizens guide can be found in the Kit. The citizens guide, the local library and town hall can all be of assistance as you begin your quest for local, state and federal materials that deal with your community and the land use decision making process. (Pause)

This unit started with a statement about the earth and its limited resources of land, water and air. As you procede through other units in the kit, keep in mind the fundamental fact that we must make land use decisions that permit necessary growth to occur, while we maintain or improve environmental quality. As Chardin so eloquently summed it up, " The future of the earth is in our hands... how shall we decide ? "

ECONOMICS OF LAND USE



ECONOMICS OF LAND USE

GUIDE SHEET #1

"It is hard to deny that economics plays a crucial role in the problem of the troubled world ecological cycle. Phrased in the broadest possible terms, the importance of work, money and the exchange of goods and services is too well known to all of us. We ignore the realities of the marketplace only at our peril. We can protect this reality and wish that the world were not so, but even the most fervent revolutionary must ultimately bend to gross facts of economic life."

From: Managing the Environment: An Economic Primer
By: William Ramsay and Claude Anderson

OBJECTIVES

The Unit on Economics of Land Use is designed to add one necessary consideration into the land use decision making process. Most of the units in the Land Use Decision Making Kit have emphasized the environmental and social criteria for land use decisions because they are the ones most often ignored. However, the economics of many situations is often the controlling factor. Within the economic methodology, the cost-benefit analysis provides a framework for considering the economic as well as the environmental and social factors involved in land use decisions. More specifically, at the conclusion of this unit on economics of land use, you should be able to:

1. Recognize the components of economic value.
2. Identify the specific factors that determine the relative value of property.
3. Understand the concept of cost-benefit analysis.
4. Identify the externalities in a cost-benefit analysis.
5. Recognize the factors that should be evaluated in a cost-benefit or cost-revenue analysis.
6. To compare and contrast cost-benefit and cost-revenue analysis.
7. Recognize the value and limitations of cost-benefit or cost-revenue analysis to the decision-maker.

Economics of land use is also discussed in many of the units in the kit. Other source of information on land use economics can be found in the open space, synthesis-attractiveness, local implementation and uplands units.

To begin this unit, place the cassette in the tape recorder.

BE A RECYCLER YOURSELF. WRITE YOUR COMMENTS, NOTES, AND ANSWERS ON SCRAP PAPER INSTEAD OF THESE GUIDE SHEETS. IN THIS WAY, THESE GUIDE SHEETS WILL BE AVAILABLE FOR THE NEXT PERSON IN YOUR COMMUNITY WHO WILL BE MAKING USE OF THIS UNIT.

Written by: Larry Schaefer

Edited by: Harry O. Haakonsen and Larry Schaefer

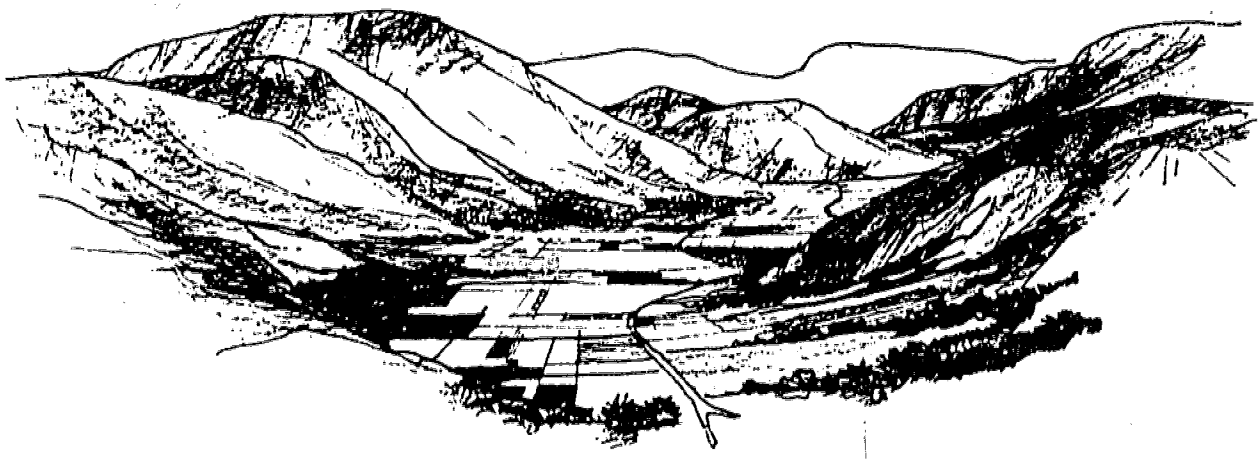
Produced by: E-P Education Services

The project presented herein was performed pursuant to a grant from the U.S. Office of Education, Department of Health, Education, and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U.S. Office of Education, and no official endorsement by the U.S. Office of Education should be inferred.

THIS MATERIAL IS PRINTED ON PAPER MADE FROM RECYCLED FIBERS AT DIAMOND INTERNATIONAL CORPORATION, HYDE PARK, MASSACHUSETS MILL.

GUIDE SHEET #2

You are in the market for a building lot for your family home. List the factors that you would consider in selecting a location and the factors you will evaluate in determining the amount of money you are willing to pay for the lot.



After you have completed your list, turn the recorder on!

GUIDE SHEET #3

FACTORS INVOLVED IN LAND VALUE DETERMINATION

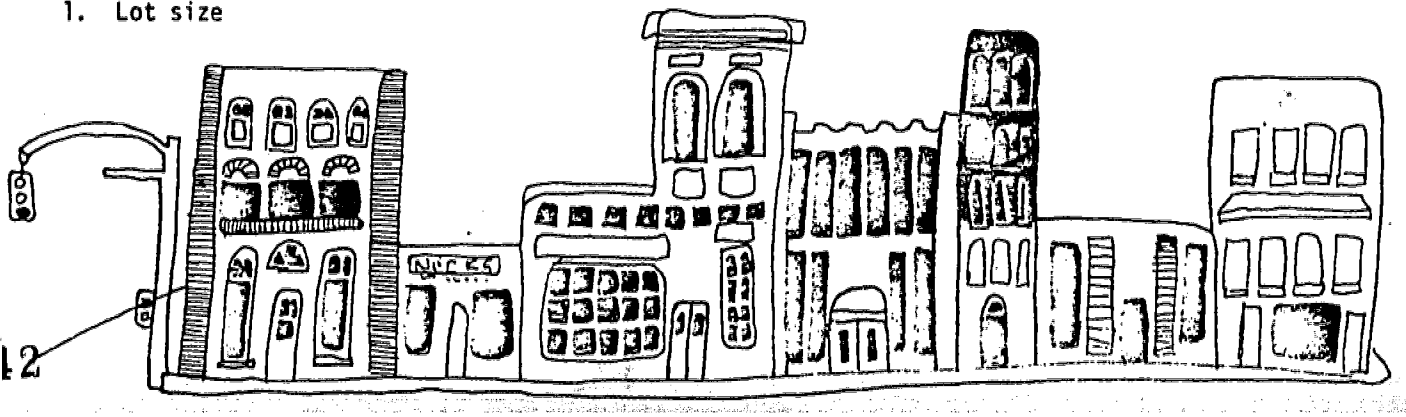
1. Topography
   a. Presence or absence of hills, fields, brooks, bluffs
   b. Percent slope
   c. Extent of flood prone areas
   d. Depth to water table
   e. Seasonal wetness
   f. Soil characteristics
      1. Acidity and alkalinity
      2. Mineral content
      3. Depth of root zone
      4. Content of sand, silt, loam, and clay
   g. Marketable surface and subsurface natural resources
      1. Trees, plants, etc.
      2. Coal, iron, oil, sand, gravel, etc.
   h. Natural soil drainage
   i. Permeability
   j. Depth to bedrock
   k. Ability of soil to sustain a load - Bearability

2. Location
   a. Climate
   b. Population of surrounding community
   c. Public services available
      1. Police
      2. Fire
      3. Sewers, waste disposal
   d. Tax system
      1. Local property tax structure
      2. Sales tax
      3. Business tax
   e. Income of surrounding community
   f. Transportation
      1. Access roads
      2. Major highways
      3. Railroads
      4. Airports
      5. Seaports
      6. River travel
   g. Availability of inputs
      1. Distance to source
      2. Transfer costs
      3. Local labor market
   h. Availability of output market
      1. Local job market
      2. Road frontage
      3. Access to consumer
         - Local traffic patterns
         - Local advertising media
         - Transfer costs
   i. Local construction and maintenance costs
      1. Utilities
   j. Surrounding competitors
   k. Local zoning regulations
   l. Lot size

3. Cultural
   a. Health service availability
      1. Hospitals
      2. Doctors per capita
   b. Education system
      1. Schools
      2. Libraries
   c. Park and recreational facilities
   d. Social activities
      1. Clubs
      2. Theaters
      3. Concerts
      4. Sporting events
   e. Level of congestion
      1. Traffic
      2. Facilities

4. Environmental
   a. Surrounding open space
   b. Local pollution levels
      1. Air
      2. Water
      3. Noise
         - Near-by airport, railroad, highway, etc.
   c. Wildlife
   d. Aesthetic value

5. Supply and Demand of Land



GUIDE SHEET #4

COST-BENEFIT ANALYSIS OF INDUSTRIAL AIR POLLUTION

COSTS

Item	Who pays ?	How measured ?
high laundry bills	residents	cost of cleaning clothes
tree damage	---	----
paint damage on houses	---	----
lung damage	residents	medical bills
decreased visibility	residents	mental state of mind
increased respiratory related deaths	residents	mortality rate

Benefits

Item	Who benefits ?	How measured ?
high laundry bills	cleaners	income of dry cleaners
paint damage on houses	---	---
lung damage	doctors	increased business
lung damage	hospitals	more beds occupied
lower cost product	---	---

GUIDE SHEET #5

	Action	Damage to Industrial Park	Cost	COST PAID BY c/ Gov't	Industrial Park Tenants	Benefits to Industrial Park Tenants	Benefit-Cost Ratio	Net Benefits	Total Cost of Using Plan by Industry
A.	Do Nothing	$356,000.00	---	---	---	---	---	---	$356,000.00
B.	Build Resevoir on Creek	$201,500.00	$8,400.00	$8,400.00	---	$154,500.00	18.3	$154,500.00	$209,900.00
C.	Flood Warning and emergency action	$222,100.00	$8,100.00	$800.00	$7,300.00	$133,900.00	16.5	$125,800.00	$230,200.00
D.	Flood resistant building	$152,600.00	$27,200.00	---	$27,200.00	$203,400.00	7.5	$176,200.00	$179,800.00
E.	Flood proofing (combination of C & D)	$98,300.00	$35,400.00	$1,500.00	$33,900.00	$257,700.00	7.3	$222,300.00	$133,700.00
F.	Reservoir and flood resistant building	$104,700.00	$35,600.00	$8,400.00	$27,200.00	$251,300.00	7.1	$215,700.00	$140,300.00
G.	Reservoir and flood proofing	$74,500.00	$43,800.00	$9,900.00	$33,900.00	$281,500.00	6.4	$237,700.00	$118,300.00
H.	Reservoir and flood warning emergency action	$96,000.00	$16,500.00	$9,200.00	$7,3000.00	$260,000.00	15.6	$243,500.00	$112,500.00

GUIDE SHEET #6

FOUR SECTIONS OF THE COST-REVENUE ANALYSIS

(1) a descrention of the two sites and the alternative land uses,
(2) an estimation of the major exnenditures required to sunnort the alternative land uses,
(3) an estimation of the tax return to the Town from the alternative land uses, and
(4) a summary of the findings in a comparison of the annual costs and annual tax return to the Town for the alternative land uses.

CHARACTERISTICS OF THE SITES

CHARACTERISTIC	SITE
General Location	South of I-95, east of Route 117, off Hazelnut Hill Road in generally sparsely developed area.
Size	100 acres
Zoning	IP-200B - Industrial Park
Access to Site	None
Physical Features	A partially wood site with undulating topography, very low in areas.
Existing Utilities	None

Site

LAND USE ALTERNATIVES

A. Single-Family Residential
B. Townhouse Residential
C. Townhouse and Garden Apartment Residential
D. Industrial Park

CHARACTERISTICS OF THE ALTERNATIVE LAND USES

	Land Use Alternative	Total Acres	Minimum Lot Requirement	Dwelling Units (d.u.) or Floor Area (sq. ft.)	Residential Population*	Miles of Internal Road System	Area For Recreation
SITE							
A.	Single family	100	20,000 sq.ft./d.u.	174 d.u.	600 @ 3.45/d.u.	1.65	10 acres
B.	Townhouse	130	15,000 sq.ft./d.u.	260 d.u.	806 @ 3.1/d.u.	.825	10 acres
C.	Townhouse	65	15,000 sq.ft./d.u.	174 d.u.	539 @ 3.1/d.u.	-	-
	Garden Apt.	35	10,000 sq.ft./d.u.	130 d.u.	377 @ 2.9/d.u.	-	-
	Total	100	-	304 d.u.	916	.651	10 acres
D.	Industrial Park	100	200,000 sq.ft.	490,000 sq. ft.	-	.568	-

SOURCE: Cost-Revenue Analysis of Alternative Land Uses on Two Sites in the Town of Groton. Southeastern Connecticut Regional Planning Agency, 139 Boswell Ave., Norwich, Connecticut. February, 1971.

GUIDE SHEET #7 COSTS

THE MAJOR EXPENDITURES TO SUPPORT ALTERNATIVE LAND USES

A.

ESTIMATED EDUCATIONAL COSTS
RELATED TO RESIDENTIAL LAND USES

	Residential Alternative	No. of Units	No. of Units According To No. of Bedrooms S*	1	2	3	4	5	No. of Children's Bedrooms	No. of School-age Children @ .32/bdrm.	Educational Cost Total @ $832/ Student	Educational Cost Town's Share @ $414/ Student
SITE												
A.	Single family	174	-	-	-	113	44	17	426	136	$113,152	$56,304
B.	Townhouse	260	-	-	156	78	26	-	390	125	$104,000	$51,750
C.	Townhouse	174	-	-	105	52	17	-	260	83	$ 69,056	$34,362
	Garden Apt.	130	-	20	90	20	-	-	130	42	34,944	17,388
	Total	304	-	20	195	72	17	-	390	125	$104,000	$51,750

B.

ESTIMATED COSTS FOR STREET MAINTENANCE AND LIGHTING
RELATING TO RESIDENTIAL LAND USES

	Land Use Alternative	Miles Of Street	Total Cost @ $5,000/mi./yr.
SITE			
A.	Single family	1.650	$8,250
B.	Townhouse	.825	4,125
C.	Townhouse - Garden Apt.	.651	3,255

C.

ESTIMATED COSTS FOR POLICE PROTECTION
RELATED TO RESIDENTIAL LAND USES

	Land Use Alternative	Total Residential Population	No. of Policemen @ 1.5 policemen/ 1,000 pop.	Cost for Police Protection @ $12,000/yr./man
SITE				
A.	Single family	600	0.9	$11,250
B.	Townhouse	806	1.2	15,000
C.	Townhouse - Garden Apt.	916	1.35	16,875

D.

Industrial Park Costs

Facilities and Utilities to Open Site

Item	Quantity	Cost
1. Access Road	3,000 ft.	$250,000.00
2. Water to Site	7,000 ft.	225,000.00
3. Sewerage System	6,500 ft.	350,000.00
4. Storm Drainage	---	75,000.00
		$900,000.00

Annual Costs

Interest and Principal on 20 yr. Bonds for Capital Costs.	$73,350.00
Lighting and maintaining industrial access road	$2,840.00
	$76,190.00

SOURCE: Cost-Revenue Analysis of Alternative Land Uses on Two Sites in the Town of Groton. Southeastern Connecticut Regional Planning Agency, 139 Boswell Ave., Norwich, Connecticut. February, 1971.

GUIDE SHEET #8

REVENUE

THE TAX RETURN TO THE TOWN FROM THE ALTERNATIVE LAND USES

A. ESTIMATED MARKET VALUE OF BUILDINGS, LAND AND PERSONAL PROPERTY

Type	No. of Units	Building and Land Value Per Unit According to Bedroom Size: No. of Bedrooms	No. of Units	Value Per Unit (Includes Land Cost)	Total Value
SITE					
A. Single family	174	3	113	$25,000	$2,825,000
		4	44	30,000	1,320,000
		5	17	35,000	595,000
					$4,740,000
B. Townhouse	260	2	156	$22,000	$3,432,000
		3	78	25,000	1,950,000
		4	26	28,000	728,000
					$6,110,000
C. Townhouse	174	2	105	$22,000	$2,310,000
		3	52	25,000	1,300,000
		4	17	28,000	476,000
Garden Apt.	130	1	20	$13,750	$ 275,000
		2	90	16,000	1,440,000
		3	20	19,500	390,000
					$6,191,000

	Building Value: Floor Area	Value/ sq.ft.	Total Building Value	Land Value: No. of Acres	Value Per Acre	Total Land Value	Total Value
D. Industrial Park	490,000 sq.ft.	$11.50	$5,635,000	100	$8,250	$825,000	$6,460,000

B. ESTIMATED TAX RETURN FOR ALTERNATIVE LAND USES

Land Use Alternative	No. of Units / Floor Area	Full Value: Building	Land	Personal Property	Assessed Value: Building	Land	Personal Property	Total Assessed Value	Total Tax Return @ 44.9 Mill Levy
SITE									
A. Single family	174	$4,740,000		-	$3,318,000		-	$3,318,000	$148,978
B. Townhouse	260	$6,110,000		-	$4,277,000		-	$4,277,000	$192,037
C. Townhouse	174	$4,086,000		-	$2,860,200		-	$2,860,200	-
Garden Apt.	130	2,105,000		-	1,473,500		-	1,473,500	-
Total	304	$6,191,000		-	$4,333,700		-	$4,333,700	$194,583
D. Industrial Park	490,000 sq.ft.	$5,635,000	$825,000	-	$3,944,500	$577,500	-	$4,522,000	$203,037

C. ESTIMATED COST-REVENUE COMPARISON

Land Use Alternative	COSTS: Education Town's Share	Education Total	Public Utilities	Roads Construction	Roads Maintenance	Community Facilities Police	Community Facilities Fire	Total Cost	REVENUE: Annual Cost To The Town	Annual Tax Return To The Town *
SITE										
A. Single-Family	$56,304	$113,152	-	-	98,250	$11,250	-	$132,652	$75,804	$148,978
B. Townhouse	$51,750	$104,000	-	-	$4,125	$15,000	-	$123,125	$70,875	$192,037
C. Townhouse-Garden Apt.	$51,750	$104,000	-	-	$3,255	$16,875	-	$124,130	$71,880	$215,610
D. Industrial Park	-	-	$650,000	$250,000	$2,840	-	-	$902,840	$76,190	$203,037

SOURCE: Cost-Revenue Analysis of Alternative Land Uses on Two Sites in the Town of Groton. Southeastern Connecticut Regional Planning Agency, 139 Boswell Ave., Norwich, Connecticut. February, 1971.

PART II

GUIDE SHEET # 1

COMMERCIAL COST ANALYSIS
SUMMARY OF ASSUMPTIONS - PRIVATE FACILITIES

	Commercial Development Pattern		
	Convenience	Strip	Center
Length of Commercial Area	217.8'	2,640'	860'
Depth of Commercial Area	100'	200'	860'
Length of Building	150'	Not estimated	490'
Depth of Building	50'	Not estimated	490'
Number of Buildings	1	28	1
Number of Stores	3	28	32
Building Area Number of Stories	All stores one floor.	All stores one floor.	Junior department or discount stores two floors; costs include escalators; all other stores one floor.
Air Conditioning	100% central air conditioning.	Same as Convenience.	Same as Convenience.
Common Area	No common area.	No common area.	Enclosed mall and public areas.
Equipment and Furnishings	Stores contain all equipment and furnishings required to conduct business; includes display racks and shelves, cash registers, automotive service equipment, heating, cooling and refrigerating equipment, etc.	Same as Convenience.	Same as Convenience.
Parking and Circulation Area Paving	Concrete driveways and walkways, asphalt paving; catch basins included.	Same as Convenience.	Same as Convenience.
Lighting	2 one-arm mercury lights assumed; underground wiring.	42 one-arm mercury lights assumed; underground wiring.	13 two-arm mercury lights assumed; underground wiring.
Utility Connectors			
Number of Connections	1	28	1
Length - Building to Street	50'	100'	185'
Length - Within Building	100'	None	980'
Sanitary Sewerage	6" vitrified clay.	6" vitrified clay (8" vitrified clay for supermarket).	6" vitrified clay within building; 12" vitrified clay from building to street.
Storm Sewerage	None assumed on-site.	12" reinforced concrete pipe.	18" reinforced concrete pipe - 2,640', in parking area; 30" reinforced concrete pipe - 180', in connecting 18" pipe to street.
Water	1.5" copper pipe; no hydrants assumed on site.	6" cast iron pipe; no hydrants assumed on site.	6" cast iron pipe in building - 490'; 12" cast iron pipe around perimeter of building and two connectors to street - 4,050'; 4 hydrants assumed on site.
Gas	2" pipe.	2" pipe.	2" pipe.
Electric	Type 3/C 4-0 cable; 1 meter per store.	Type 3/C 4-0 cable; 1 meter per store; 8 transformers.	Type 3/C 4-0 cable in building; type 750 MCM cable from building to street; 1 meter per store; 5 transformers.
Telephone	100 pair cable.	100 pair cable.	100 pair cable.

PART II GUIDE SHEET # 2

COMMERCIAL COST ANALYSIS
PRIVATE FACILITIES

	Commercial Development Pattern		
	Convenience	Strip	Center
Capital Costs			
Structure [1]			
Sales Area	$ 140,140	$3,452,140	$3,421,980
Common Area	-	-	565,600
Equipment and Furnishings [1]	80,500	1,327,400	629,950
Subtotal	$ 220,640	$4,779,540	$4,617,530
Parking and Circulation [1]			
Paving and Lighting	$ 8,181	$ 176,855	$ 140,548
Automotive Sales and Service (car lots and storage areas)	-	30,000	-
Subtotal	$ 8,181	$ 206,855	$ 140,548
Utility Connectors [2]			
Sanitary Sewerage	$ 932	$ 17,846	$ 8,742
Storm Drainage	-	65,010	75,291
Water Supply	1,268	67,704	140,177
Gas	449	8,372	3,184
Electricity	7,865	73,840	44,473
Telephone	887	16,562	6,299
Subtotal	$ 11,401	$ 249,334	$ 278,166
Total Capital Costs	$ 240,222	$5,238,729	$5,036,244
Operating and Maintenance Costs Per Year			
Maintenance Costs [3]	$ 1,125	Unclear as to how cost varies; no expense for common area and less elaborate parking, thus less costly. Greater exposure of building and greater parking area perhaps more costly.	$ 30,000
Operating Costs [3]			
General Administration, Insurance, Advertising and Promotion	1,500	Little or no common functions; costs incurred by individual establishments only.	40,000 for common purposes
Utilities [3]	675	Strip probably more expensive since more heating, sewage, water required for individual separated stores.	44,000
Real Estate Tax [3]	2,100	Could be more or less than center depending on sales volumes and taxing practice.	48,000
Total	$ 5,400	Likely to be greater, but is uncertain.	$ 162,000

See notes on following page.

PART II GUIDE SHEET # 3

COMMERCIAL COST ANALYSIS
PUBLIC FACILITIES

	Commercial Development Pattern		
	Convenience	Strip	Center
Capital Costs			
Streets [1]	$ 27,323	$331,188	$215,774
Utilities			
Sanitary Sewerage [1]	$ 3,136	$ 55,033	$ 33,767
Storm Drainage [1]	5,078	96,542	62,899
Water Supply [1]	11,816	148,250	94,761
Gas [1]	654	7,894	5,142
Electricity [2]	1,706	25,792	18,616
Telephone [1]	1,294	15,615	10,174
Subtotal	$ 23,684	$349,126	$225,359
Total Capital Costs	$ 51,007	$680,314	$441,133
Operating and Maintenance Costs			
Streets	N.E.	N.E.	N.E.
Utilities	N.E.	N.E.	N.E.

Notes:

N.E. = Not estimated.

1/ Source: All costs derived from neighborhood and community cost analyses, except for costs of electric equipment.

2/ Source: Commonwealth Edison Company, Chicago.

PART II GUIDE SHEET # 4

COMMERCIAL COST ANALYSIS
PUBLIC SERVICES

	Commercial Development Pattern		
	Convenience	Strip	Center
Operating and Maintenance Costs			
Police Services	Requirements perhaps not greater than needed for residential areas; crime, traffic and traffic accidents not excessive.	Particular problems with longer distances and setbacks for police surveillance; greater expenses in patrolling. Traffic regulation and traffic accidents also more problematic; greater traffic volume along higher speed arterial likely to result in more severe accidents.	With enclosed building area, less problem in surveillance. Traffic may be congested, but also may be self-regulating, accidents less severe; less requirements for police services, partly because center provides own security personnel.
Fire Services	Demands are within neighborhood level of services; no special equipment required.	Fire losses may be minimized due to separation of buildings but grass fires on vacant land possible; fire also more likely in automotive services or food establishments than in other retail. Longer distances result in longer response time.	Possible large loss, involving entire structure; fire perhaps less likely with higher proportion of merchandise, less automotive or food. More ladder, rescue, and pumper equipment required.
Postal Services	Volume of mail and locations such as may be accommodated by neighborhood route.	Distances and multiple stops require vehicle service both for delivery and pickup.	Single vehicle, single stop service; perhaps some economy in shorter distances for delivery and pickup. Reliance on vehicle considerably less.
Solid Waste Collection and Disposal			
Collection Costs 1/	$312	$12,870	$ 3,412
Disposal Costs 2/	59	2,908	2,059
Total Costs	$371	$15,778	$ 5,471

Notes:

1/ Solid waste collection calculated as follows:

a/ Assuming 38.96 tons per acre per year and 475 lbs. per cubic yard. The number of cubic yards per week is:

Convenience	1.54
Strip	76.00
Center	54.00

b/ Assuming 20 cubic yard truck, number of pickups per week and time of pickups per week is:

Convenience	2 pickups	20 minutes
Strip	4 pickups	792 minutes
Center	3 pickups	210 minutes

c/ Weekly cost assumed to be $750 for 3-man truck, for 40-hour week (see Chapter V, Solid Waste Collection and Disposal, for derivation).

2/ Solid waste disposal calculated based on $3.11 per ton, average cost derived from solid waste cost analysis, Chapter V.

Source: Clark and Toftner, "Land Use Planning and Solid Waste Management," (ref. no. 07-002) and Real Estate Research Corporation.

PART II GUIDE SHEET # 5

COMMERCIAL COST ANALYSIS-AIR POLLUTION

	Commercial Development Pattern		
	Convenience	Strip	Center
Pollutants From Private Automobiles 1/ 2/ (Pounds per Day)			
On-site Parking and Circulation Area			
CO	.06	1.89	5.23
HC	.01	.23	.63
NO_x	.01	.22	.61
Street R.O.W. Area			
CO	.07	24.97	7.32
HC	.01	3.00	.88
NO_x	.01	2.93	.86
Total Pollutants			
CO	.13	26.86	12.55
HC	.02	3.23	1.51
NO_x	.02	3.15	1.47
Pollutants From Private Automobiles per Acre (Pounds per Day)			
On-site Parking and Circulation Area 3/			
CO	.18	.15	.46
HC	.03	.02	.05
NO_x	.03	.02	.05
Total Pollutants 4/			
CO	.13	.89	.60
HC	.02	.11	.07
NO_x	.02	.10	.07

Notes:

1/ Vehicle miles per day derived from vehicle trip generation per day x trip distances. Vehicle trip generations per day assumed as follows:

a. Convenience center = 500 trips per day
b. Community strip = 13,325 trips per day

Assumes the following trip generation ratios (in trips/1,000 square feet retail area, unless indicated otherwise):

Type of Establishment	No. of Trips
Supermarket, convenience food	30.5
Drive-in restaurant	2,200
Sit-down restaurant	220
Tavern	250
Discount/Junior department stores	25.5
Other convenience, comparison goods	25
Services (beauty, barber, dry cleaning)	10 x No. of operators
Medical/dental offices	34
Automotive sales and service	5
Service stations	250 per station
Bowling	15 x No. of lanes

Source: Derived from Traffic Engineering Handbook (Ref. No. 13-093) and Harland Bartholomew and Associates, 1973.

c. Community centers = 12,000 trips per day

Source: Traffic Engineering, September 1969 (Ref. No. 13-097)

Distance factors (feet per trip) assumed as follows:

	Commercial Development Pattern		
	Convenience	Strip	Center
Commercial area	85'	100'	307'
Street R.O.W. area	105'	1,320'	430'
Total	190'	1,420'	737'

Source: Derived from commercial prototypes. Distances represent one-way trip only.

PART II GUIDE SHEET # 6

COMMERCIAL COST ANALYSIS-WATER POLLUTION AND EROSION

	Commercial Development Pattern		
	Convenience	Strip	Center
Sediment from Erosion			
Average Volume During Construction Period (Tons per Year) 1/	.64	31.75	24.70
Pollutants From Sewage Effluent			
Total Volume (Liters per year) 2/	41,445,750	2,010,118,875	1,409,155,500
Pollutants (Kilograms per year) 3/			
BOD	207.3	10,050.6	7,045.8
COD	1,741.1	84,425.0	59,184.5
N	704.7	34,172.0	23,955.6
P	41.5	2,010.1	1,409.2
S.S.	82.9	4,020.2	2,818.3
FCB (Number x 10^{-6} per year)	100% Removal	100% Removal	100% Removal
Pollutants From Storm Run-Off			
Volume from commercial area	1,953,230	82,241,280	66,409,834
Volume from street R.O.W. area	1,953,230	23,438,765	15,235,197
Total Volume (Liters per year) 4/	3,906,460	105,680,045	81,645,031
Pollutants (Kilograms per year) 5/			
BOD	91.02	2,464.34	1,902.32
COD	246.10	6,657.84	5,143.63
N	10.54	285.33	220.44
P	3.12	84.54	65.31
S.S.	3,906.46	105,680.05	81,645.03
FCB (Number x 10^{-6} per year)	4,750.25	128,506.88	99,280.32

Notes:

1/ Volume of sediment calculated in same manner as neighborhood and community cost analyses, assuming the following:

a. Average duration of construction is:
   - Convenience center = .5 years
   - Community strip = .6 years
   - Community center = 1.0 years

b. Areas derived from commercial prototype land budgets.
c. Volumes of sediment (tons per square mile per year) assumed as follows:

Developed urban areas	700
Construction areas	2,300

2/ Volume of sewage effluent calculated as follows:

a. Assume 60,000 gallons of sewage per acre per day
b. 1 gallon = 3.785 liters

Source: Grava, Urban Planning Aspects of Water Pollution (Ref. No. 15-015)

3/ Pollutant quantities from sewage effluent use same assumptions as in analysis of neighborhood and community water pollution and erosion.

4/ Volume of storm water run-off calculated using same assumptions as in analysis of neighborhood and community water pollution and erosion. Areas derived from commercial prototype land budgets. Annual precipitation is assumed to be 40 inches.

5/ Pollutant quantities from storm water run-off use same assumptions as in analysis of neighborhood and community water pollution and erosion.

PART II GUIDE SHEET # 7

COMMERCIAL COST ANALYSIS
PERSONAL EFFECTS

	Commercial Development Pattern		
	Convenience	Strip	Center
Time Consumption			
Travel Time (hours spent by persons in vehicles per day)[1]			
Time in Commercial Area	1.25	36.64	105.00
Time in Street ROW Area	.75	249.84	75.00
Total Travel Time	2.00	286.48	180.00
Shopping Time	Very brief amounts of time, generally less than five to ten minutes; one-stop shopping for convenience goods.	Amount of time may vary considerably; longer times in automotive service and sit-down restaurants; less time in supermarket, discount or junior department store; least amount in drive-in restaurants, service stations. More orientation to quick service and convenience goods; possible to make multiple stops, however, increasing shopping time.	Time may vary considerably, but generally more time spent in shopping in the center (especially for comparison goods at department or other stores) than in the strip; number of stores in one location may increase total shopping time.
Traffic Accidents			
Variations in Accident Occurrence[2]	Slight possibility for major accidents within parking area; minor collisions (scrapes or dents) possible; such accidents usually not severe. Very low probability of accident on arterial street adjacent to convenience center; based on low total travel; accident rate may be higher than totally residential area.	Accidents within parking area less severe than on arterial street; less internal circulation driving than in center, so less moving accidents; likely to be more minor collisions if parking area is cramped. Simultaneous peak flows will result in heavier traffic volume, and greater likelihood of accidents due to large number of openings onto street. Likelihood of accident occurrence within right-of-way may be five times greater than in the center.	Accidents less severe than on streets; possible accidents resulting from driving within parking area; depending on design of parking area, minor collisions may occur if area is cramped. Peak flows may result in temporary heavy volume, increasing accident occurrence. Less likelihood of accidents than in strip area due to smaller number of openings onto street. Likelihood of accidents estimated to be one-fifth that of the strip.
Crime	Vandalism, perhaps burglary or robbery, might be a problem; easy surveillance by police patrols.	Requires longer police patrols or use of private security service by individual stores. Vandalism, also burglary or robbery, possible types of crime.	Depending on security arrangements, crimes within center could be minimized; possible to shut off access to or exit from center; surveillance adequate by patrolling police.
Psychic Costs			
Convenience	One-stop shopping for selected items; limited choice of goods and services, but very accessible.	One or more stops for shopping, largely for convenience goods. Possible to purchase variety of goods and services but several stops are then likely; accessibility not particularly favorable for driving; less walking required.	One-stop shopping for a variety of goods and services; generally more accessible in terms of driving, but walking in parking areas and within center is greater.
Comfort	Probably not of concern, since nature of shopping involves quick and convenient access.	Necessity to make multiple stops in inclement weather may be unfavorable; heating and cooling generally adequate in all commercial types.	One-stop shopping may be more comfortable in inclement weather, but long walk to car may be unfavorable. Common areas may serve as resting or meeting place; air conditioning and heating adequate.
Aesthetic	Depending on design of convenience center, may be attractive or not. Because of location in residential area, may detract from nature of area.	Generally unappealing visually, although design will make a difference; establishments usually not related to one another in design; lack of amenities make strip development less attractive.	Can be attractive internally with use of fountains, art objects, decoration, landscaping in common area and common design of retail area; parking area may be enhanced by trees or garden areas. Again, attractiveness depends on design more than type of commercial pattern.

Notes

1/ Travel time per day derived from person trip generations per day x trip times.

Person trip generations assume the following:

a. Number of trips per day for Convenience = 500
Strip = 11,325
Center = 12,000
Source: Real Estate Research Corporation, from Air Pollution Analysis, Commercial Cost Analysis.

b. 1.5 persons per vehicle per trip.
Source: Derived from Traffic Engineering Handbook (ref. no. 13-093).

c. Person-trips per day are Convenience = 750
Strip = 19,987.5
Center = 18,000

Trip times assume the following:

a. Traffic speed along arterial street assumed at 20 miles per hour.

b. Trip times along arterial street are Convenience = .06 minutes
Strip = .75 minutes
Center = .25 minutes

c. Traffic speed within commercial areas assumed at 10 miles per hour.

d. Trip times within commercial area are Convenience = .10 minutes
Strip = .11 minutes
Center = .35 minutes

Source: Real Estate Research Corporation.

2/ Traffic accident differences based on likely circulation patterns, number of vehicle miles traveled, and traffic accident rates as suggested in Interstate System Accident Research Study, I (ref. no. 20-007).

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Welcome to the unit on the Economics of Land Use. In this unit we will concentrate on two important concepts: land values and cost-revenue or cost benefit analysis. To begin, we will examine what gives land economic value.

Economic value has three important components. The property in question must have use-value or utility to its owner or user. Otherwise, no one would want it. Coupled with the idea of use-value are the assumptions that the land resource promises future flows of money and/or satisfaction and that a demand will continue to exist for the land. A secondary necessary component is scarcity in supply. Regardless of the utility of the land, it must be scarce to command a price. Finally, to have economic value, an object must be able to be possessed and be transfered from one owner to another.

The economic value of property is usually identified with the going exchange value of the market price of land. In this sense, economic value always depends upon the interaction of the forces of supply and demand. It represents the worth of given properties in given markets at a given time and place. Far from being something that is fixed for each type of property, economic value is really a subjective concept that is dependent on the desires of people to possess and use land and upon their ability and willingness to offer money or other considerations in exchange for the privilege of ownership or possession.

Turn to Guidesheet #2, (Pause)

Here on guide sheet #2, there is space for you to list the factors that are important in deciding the price you would pay for a piece of land. Stop the recorder while you prepare your list. (Pause) Now lets compare your list of factors that contribure to the value of land to our list.

On guide sheet #3, we have prepared a list of factors that would determine the value of land for us. Compare our list to yours. (Pause) Did you include factors from the major categories such as topography, location, cultural, environmental as well as supply and demand? Which were the most important factors to you? Why were these factors of such great importance?

(Pause)

Often, one of the most influential factors affecting the value of land are the regulations or restrictions placed on the parcel of land.

For instance, if a 4 acre site is zoned residential and you are interested in building a new industrial park, the value of the site to you will be very low. However, if the 4 acre site was zoned industrial and was otherwise suitable, the land may have substantial value. A land use regulation can substantially affect the value of land. As we discuss many of the new local, state, and federal laws that affect land use, consider the effect that the law will have on the economic value of land as well as the social and environmental value of the site.

It is important to realize that the value of land is determined by a combination of factors that will vary for each buyer. Return to guide sheet #3. Divide the factors listed in terms of primary importance, secondary importance or of little importance to you in determining the value of a parcel of land. Stop the recorder while you work.

(Pause)

Once you have made a list of these factors and have arranged them in order of their importance to you, you should be able to determine if a particular piece of land satisfies your needs. This decision is usually reached by estimating and comparing the costs and benefits that would be received with that particular piece of property. For example, if the local tax rate or construction costs were unusually high a businessman might be reluctant to purchase the land. However if a store were to be built on the property near an apartment complex or on the main street, and it could be estimated that there would probably be a substantial number of regular customers, the businessman would probably buy the land with hopes of receiving a satisfactory profit.

The concept of comparing costs and benefits not only applies to choosing locations but also to any other situation when information must be organized as the basis for decision making. The method of comparison is called cost-benefit analysis. The method of comparison entails identifying all the economic, environmental, and social benefits of a project.

The starting assumption of economic cost-benefit analysis is that theprice of a good is a measure of its relative value. The use of market price does not always fairly evaluate the social and environmental costs or benefits of a project. Social and environmental costs and benefits, often called externalities, are referred to as market failures because they are not incurred directly by the producer or consumer. Instead they are received by persons not involved in the market transaction.

Turn to Guide Sheet #4

Let's begin our analysis by comparing the cost and benefits of air pollution caused by the development of an industrial site.

The issue we will investigate is, what are the costs and benefits of doing nothing about heavy air pollution from a local factory. For each cost or benefit listed on guide sheet #4, it is necessary to identify who pays or benefits from the activity and how are the cost and benefits measured. We have completed part of the table. Can you add items to the costs or benefits list? After you have finished the list, identify who pays or benefits from each item and the measure of cost or benefit. Stop the recorder while you work. (Pause)

It is evident from this simple analysis that it is difficult to identify all factors to be considered in a costs and benefits analysis as well as weighing the value of the costs or benefits. It is also important to realize that not all costs or benefits can be measured in dollars and cents.

On guide sheet #5, there is an analysis of the flood problem for a local industrial park. Try to decide which of the eight options prepared by the Corps of Engineering you would select. In evaluating the chart, consider the role you are playing in making the decision. For instance, are you placing yourself in the role of an industrial park tenant, a construction firm, a congressman or a taxpayer. As you evaluate the chart on guide sheet #5, will your decision change if you change roles. In considering a decision in each role consider who will pay the costs and who will benefit. Stop the recorder, while you make your decisions. (Pause)

There are four basic concepts for the land use decision makers to learn concerning cost benefit analysis. The first concept is that every-action, including the decision to take no action, entails both benefits and costs.

The second concept is that many benefits and costs are hard to measure. It is often easy to estimate the cost of building a dam and probable benefits in terms of damage averted. But it is very difficult to measure things such as the cost of forcing people off the land they own, the cost of destruction of wilderness, the benefits of supplying recreational lands and lakes, or the benefits of amenities such as quiet or scenic beauty.

The third basic concept is that benefits and costs may fall on individuals in a variety of patterns, which may to some extent be capricious and unforeseen. Frequently, the people who pay the costs are not necessarily the people who get the benefits. A factory owner gets the benefit of dumping wastes into the atmosphere, for example, and householders in the vicinity of the factory pay the costs. If pollution control is installed, the householders benefit and the factory or the consumers of the factory s products pay the costs.

The fourth basic concept is that values held by individuals are involved in all environmental problems. Cost-benefit analysis in its broadest form is intended to help decision makers weigh values against each other. Cost-benefit analysis is sometimes confined to measurements made in dollars and cents, but it should also be used in the broad sense of considering all costs and benefits related to a particular decision.

when a new land use is proposed a town official must ask the question, "How much will it cost the Town to provide services to support this land use and how much can the Town expect in tax returns?" The cost-revenue analysis is essentially a reply to this question.

A cost-revenue analysis is very similar to a cost-benefit analysis. The only difference is that the only benefits that are considered in a cost-revenue analysis are monetary revenues.

The first decision to be made in the analysis is to set an accounting stance. In other terms, the accounting stance is the point of view of the study. In this study, the accounting stance is the local town government.

A cost-revenue analysis deals with numerous factors that vary between municipalities and must be developed on the basis of local information.

It should be clear that a cost-revenue analysis, although an interesting and valid planning study, has a limited planning function. Overall this analysis considers only one factor in a hierarchical series of factors that should be evaluated in the process of planning for the appropiate type and location of a land use.

The analyses consists of four major sections listed pn guide sheet #6

(1) a description of the two sites and the alternative land uses,

(2) an estimation of the major expenditures required to support the alternative land uses,

(3) an estimation of the tax return to the Town from the alternative land uses,

(4) a summary of the findings in a comparison of the annual costs and annual tax return to the Town for the alternative land uses.

Guide sheet #6 characterizes the site and the alternative land uses considered for this site.

The alternative land uses include single family houses, townhouses, townhouses and garden apartments or an industrial park.

The single-family detached house is located on an individual lot and is owned and occupied by one family. Generally the single family residence will have a larger family than an apartment unit.

A townhouse is a row house type dwelling. Each townhouse unit has an individual entrance and often a private yard space. It is generally two stories and the shape tends to be more narrow than deep. The townhouse is intended for a single family and may be either rented or owner-occupied.

The garden apartment is a popular type of rental housing in moderately built up areas. There is usually a common entrance to the apartment building and common open space or play area is normally available for the tenants' use. The apartment building may be from one to three stories in height and is usually a frame or brick veneer construction.

An industrial park provides a completely serviced site for a community of industrial and industrially-oriented activities. It is a highly restricted type of planned district in which special emphasis and attention is given to aesthetics and community compatibility. The industrial park is subdivided and developed according to a comprehen-

necessary utilities.

The site is not served by public sewers, and a developer constructing a single-family residential complex on this site would most likely install individual septic tanks for each residence. A preliminary estimate indicates a half-acre lot for each single-family residence. The minimum-lot-size requirements for the other residential uses considered on this site reflect the minimum area advisable for an acceptable community sewerage treatment system.

Costs related to the various facilities and services required for each land use are estimated on the guide sheet. Each alternative land use on the site will require a different type and degree of community services. The major expenditure relating to residential land uses is for public school education. The industrial park will require an initial capital outlay for an access road and public utilities.

Each land use will have an impact upon the other major community services - fire, police and recreation. The costs required to expand and improve these services were estimated.

Another community expense often overlooked is the annual cost to maintain and provide street lighting to the new public streets required for each land use. The cost to the Town to provide these services was $5,000 per year for each mile of local road.

The results of the analysis are summarized on the guide sheet #7.

The following information was available to estimate the educational costs related to alternative residential land uses;

a. The number of school-age children per children's bedroom for private homes and high-cost rentals was determined.

b. The number of children's bedrooms in each residential development was determined by allocating the residential units according to bedroom size based on the type of housing and local trends in housing size.

c. The per-pupil total cost for education, as reported by the Board of Education for 1969-1970, was $832 per pupil. The Town's share of this total was $414 per pupil.

The result of the educational cost analysis are provided on the first table on guide sheet #7. If you wish, stop the recorder to study the table. (Pause)

An examination of the estimated educational costs on a per-unit basis shows that a single-family residence will generate more school-age children and educational expenses than an apartment. The small garden and elevator apartments will individually generate fewer school-age children than the single-family or the townhouse. However, because the zoning regulations will allow more apartment units than single-family residences on a site of the same area, there is little difference between the total educational costs for the alternative residential land uses.

multi-family development requires less street area than a sprawling single-family subdivision. Multi-family residential buildings can be grouped around a short service street while each single-family residence must have street frontage. It will cost the Town between 2 and 2 1/2 times more to maintain and provide street lighting to the streets in the single-family subdivision than for either of the multi-family developments.

The accepted standards for police protection and the local police costs were the factors used to determine the total cost for police protection required for each residential land use. These standards recommend 1.5 policemen for each 1,000 population. The Groton Police Chief estimated that "the cost for four men (a complete police shift) is around $50,000, which would include such costs as salary, training, uniforms, cars and etc." At this rate it would cost $12,500 to add one new police officer to the force. Table C lists the expenditures required to provide police protection for each of the alternative residential developments. According to the fire department, none of the alternative land uses would have an impact on the fire depattment equipment and personel needs.

The Town does not have a policy of providing active recreational facilities for a new residential development. But there is a provision in the subdivision regulations requiring that 10% of the gross site area of a subdivision be devoted to open space and if there is a continuing demand over a 5 to 10 year period, the Town may construct recreational facilities for a residential development.

The Town does, however, encourage a developer to construct recreational facilities to meet the needs of the proposed land use. The costs in this case would be borne by the developer.

An industrial park can be developed by private individuals, a municipality, a development corporation or in a number of other ways. If a non-stock, non-profit development corporation, comprised of civic-minded citizens developed the Site as an industrial park, the Town would be responsible for only a few relatively minor reoccuring expenses. With the approval of the Town, a development corporation could combine state and federal grant programs with funds raised from private individuals to finance the preparation of an industrial park site and attract industrial tenants.

The facilities and utilities required to open the site for industrial use include:

a. an access road to the industrial park from Route 117 near the I-95 interchange, extending about 3,000 feet into the industrial park site,

b. a water line from the filtration plant approximately 4,500 feet to the site and 2,500 feet along the access road,

c. a sewer line from Route 1 and Ring Drive approximately 4,000 feet to the site and 2,500 feet along the access road,

d. a limited storm drainage system for the developed area of the site.

Based on a land use study completed by the Planning Office and a preliminary estimate by the Town Public Works Director, The facilities and utilities required to open the site are costed in Table D.

If the Town elected to develop the Site for an industrial park, the costs for these improvements could be financed with the 20-year bonds at an

interest rate of 6 percent per year. The cost to retire such a bond for $900,000 would be approximately $99,000 the first year, decreasing to $47,700 in the twentieth year, or an average annual payment of $73, 350.

The only recurring expense to the Town for the industrial park would be the cost of providing street lighting and maintaining an industrial access road. The total annual cost of providing these services for a 3,000 foot road would be $2,840.

Turn to guide sheet #8.

The central source of local revenue in the State of Connecticut is the local property tax. Fifty-nine cents of every dollar of Town revenue is derived from local property taxes. Each type of land use-residential, industrial, commercial and office - pays a tax on the assessed value of both land and buildings.

The full value of the land buildings and personal property for each alternative land use is shown on Table A of guide sheet #8. The full value, assessed value, and tax return for each use are shown on table B.

The present assessment ratio and mill rate was used to determine the local tax return. The assessment ratio is 70 percent of full value and the tax rate is 44.9 mills.

In a comparison of the estimated tax return shown on this table, the single-family land use will return substantially less tax revenue than the multi-family uses. The industrial park fully developed will produce the largest annual tax revenue.

The estimated costs and revenues related to each land use are compiled on Table C. The last two columns of this table show a comparison of annual costs and annual revenues to the Town. The annual cost to the Town for each residential alternative is the total of the recurring costs for road

maintenance, police and fire protection, plus the Town' share of the cost for education. For the industrial park, the annual costs include recurring costs for road maintenance, police and fire protection and the average annual cost of a 20-year bond, at an interest rate of 6 percent, covering the cost for the construction of roads and public utilities.

An evaluation of these annual costs and tax returns to the Town provides some general findings in reply to the question, "How much would the Town pay to support these land uses and how do the costs compare to the tax return?

The major finding of this study is that each of the alternative land uses will "pay its way." Based on the estimated annual costs and tax returns each proposed land use would annually generate more local tax dollars than the Town would be required to spend for supporting services. It is important to note that this analysis completed from the state or federal governments point of view might yield different results.

The cost-revenue comparison is only one of several impacts that must be evaluated in planning for particular land uses in specific areas. Economic benefit does not necessarily imply overall community benefit. Other social and environmental impacts are of equal or greater importance. A full cost-benefit analysis would consider envireonmental and social impacts of each alternative land use.

Another example of benefit-cost analysis is illustrated in the second section of quidesheets in this unit. Turn to Part II guidesheet #1. A recent government study, The Cost of Sprawl, attempted to do a comparative analysis of three types of commercial development patterns-convenience, strip or center. Guide sheet #1 defines the assumptions made in the study.

2 A neighborhood convenience center consists of three retail establishments which provide goods and services to a small area such as a single neighborhood. A Community Strip development is usually located in a linear fashion along a major arterial street. Usually a strip development consists of over 30 retail establishments. A community center has been defined as a single building with an enclosed mall and surrounding parking area that houses over 30 retail stores. The center is optimally located at the intersection of two major arterial streets.

Turn to guide sheet #2 part II. (Pause)

The first table breaks down the costs paid by the commercial establishments. Costs are divided into capital costs and yearly operating and maintenance costs. On guide sheet #3 part II, capital costs and yearly operating and maintenance costs are estimated for the public facilities to the stores. Public facility costs mostly involve streets and utility to the site. Finally, on guide sheet #4 part II the cost of public services, such as police, fire, sanitation, and postal services, were estimated for the three types of commercial developments.

Recalling our earlier discussion, not all costs or benefits can be converted to dollars and cents. Oftentimes, environmental and social costs cannot be stated in monetary terms without argumentative assumptions. One way to evaluate environmental and social costs is by a comparative analysis. Turn to guide sheet #5 part II. Here is a comparative analysis of air pollution generated by travel to the three types of commercial developments. The values are not in dollars but pounds per pollutants. However, it is possible to compare air pollution generated in each. Which of the

three types of development generate the most air pollution per acre ofstore? (Pause) Right, in terms of total pollution, travel to the strip commercial development generates significantly more air pollution. A similar analysis was made for water pollution and erosion on guide sheet #6 part II. In your judgement, which type of commercial development generates the least air and water pollution? Stop the recorder while you emamine the data to make your,decision. (Pause) What was your evaluation? (Pause) The Cost of Sprawlstudy concludes that air and water pollution is usually greatest from strip commercial developments. Finally, there is one other set of costs. Guide sheet #7 part II compares the personal effects of each development. These include time consumption, traffic accidents, crimes, and psychic costs. Often personal effects are referred to as social costs. Continue your analysis by comparing personal effects for the three developments. (Pause)

The primary value of the Cost of Sprawl study does not lie in the absolute cost estimates. The general approach and scientific methodologies are important. Overall, cost estimates are believed to be accurate within 10 per cent. However, the cost estimates should not be considered absolute figures but rather a moderately accurate measure that is suitable for comparison studies. Take the time to review the information in the commercial development analysis. Consider the following questions as you review the study.

In your opinion, are there other items which should be included in the analysis? What are they? Stop the recorder while you study the commercial cost analysis. (Pause)

Another section of the Cost of Sprawl study compared different types of residential developments. The analysis includes a comparison of costs for land, schools, roads, utilities, and town services for five types of residential developments-single family homes, a cluster development, townhouses, walkup apartments, and high rise apartments. For the details of this study refer to the Synthesis-Attractiveness Unit.

The analysis of costs and benefits involves the application of various data under certain assumptions. The data may be faulty and the assumptions may be false. It is critical for objective project review that the data sources and assumptions be explicitly listed. Also, the benefit-cost information should be accompanied by a non-monetary account of all social and environmental effects.

Deciding on values to place on a consideration is one of the hardest jobs of the planner. Without believable criteria for making decisions, the whole planning process is crippled before it even begins. The problem of relating the usual financial criteria employed by the businessman or economist to fuzzier criteria of social and environmental concerns is a very difficult task. There are not set answers.