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Bedford city plan, 1971-1991



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BEDFORORD CITY ZONING STUDIES ENVIRONMENTAL ASSESSMENT

CARTER & BURGESS, INC.

ENGINEERS - PLANNERS







ABSTRACT

TITLE: Bedford City Plan

AUTHORS: Carter & Burgess, Inc. - Engineers and Planners - Fort Worth, Texas

SUBJECT: Zoning Studies and Environmental Assessment

NAME OF PLANNING AGENCY: City of Bedford, Texas

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ABSTRACT: The planning document herein encompasses two (2) separate parts. Part I, Zoning Studies, analyzes local characteristics influencing residential zoning and recommends Unified Residential Development Zoning Districts and other changes in the Zoning Ordinance. Part II, Environmental Assessment, investigates the municipality's 1971 City Plan. BEDFORD CITY PLAN 1971 - 1991

ZONING STUDIES

ENVIRONMENTAL ASSESSMENT

PREPARED THROUGH THE COOPERATION OF THE OFFICE OF THE GOVERNOR OF THE STATE OF TEXAS

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CARTER & BURGESS, INC. ENGINEERS - PLANNERS.....FORT WORTH, TEXAS

APRIL, 1973

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INTRODUCTION

Since the adoption in 1968 of the City's present zoning ordinance a new City Plan has been prepared and an accelerated rate of urbanization has taken place. These two factors and the need to adjust to the changing trends of land planning have created a demand to investigate the Zoning Ordinance in relation to residential development. As a result of this investigation a technique to permit Patio Homes, Cluster Homes, Zero Lot Lines and Town Houses is recommended herein. This technique is somewhat unique because it provides an option, at the applicants discretion, to develop property under the present method or as a Unified Residential Development.

Several other recommendations are made in this report. One of the most important is a revision of the PLANNED UNIT DEVELOPMENT DISTRICT. These revisions create a more workable district by removing ambiguities and confusion.

The second part of this report is entitled ENVIRONMENT ASSESSMENT and fulfills the requirement of the Federal Government in measuring the impact of the Land Use Plan on the environment and the factors in the environment which affect the plan.

Zoning Studies

PART



INTRODUCTION

Zoning, like most tools, is flexible because it serves different functions for different cities. For instance, in large and older cities where neighborhood patterns are already established, zoning serves to protect those patterns and consequently the land owners living in the neighborhood. In the case of Bedford, a growing dynamic municipality, the primary purpose of zoning is to initiate the establishment of neighborhoods and land use patterns and to assure, as much as possible, a physical, economic, and social long-lasting quality.

Because different land uses have diverse characteristics and requirements, zoning normally considers land and its use in three major categories: residential, commercial, and industrial. This report follows the normal viewpoint of zoning by addressing each of the three categories (residential, commercial, industrial) separately, but moreover attempts to present a logical approach to relating land uses and zoning to the more contemporary techniques of land development.

HISTORY OF BEDFORD'S ZONING ORDINANCE

The City of Bedford was incorporated on January 22, 1953, but did not adopt its first zoning ordinance until April 1, 1960. This early zoning ordinance established four (4) residential districts, a commercial district and a utility district. In general, the requirements of each of these districts were:

TABLE I-1

	Lot Area (SF)	Lot Width	Lot Depth	House Size (SF)	
A-1 Single-Family	20,000	100'	150'	2,500	
A-2 Single-Family	10,000	80'	100'	1,500	
A-3 Single-Family	7,500	65 '	100'	1,000	
A-4 Single-Family	6,000	60'	90'	600	
Commercial	5,000	50'	100'	NA	
Utility	No specific area requirements				

This ordinance permitted an "accumulation" of uses; that is, any use permitted in the A-1 Single-Family District could be constructed in the A-2, A-3, A-4 and Commercial Districts. Such an ordinance assumes that single-family land use is the "highest and best" of land.

The 1968 Comprehensive Plan, preparatory to recommending the present zoning ordinance, analyzed the 1960 Zoning Ordinance and stated in part....

"One purpose of zoning is to secure a reasonable development pattern by keeping similar and related uses together and separating dissimilar and unrelated uses. Zoning attempts to locate the various uses of land in some form of relationship to each other and in relationship to all transportation facilities, utilities and public facilities and services; zoning assumes that land differs as to the use for which it is best suited based on its relationship to other uses, physical features and facilities available.

The 1960 Bedford Zoning Ordinance is in conflict with this principle. This ordinance permits a single-family residence to be constructed in the commercial use district. For example, several single-family homes strategically located on prime commercial land could easily "chop" the land up

sufficiently so that a large commercial facility could not or would not be able to assemble enough land for its needs. Therefore, any revision of this ordinance <u>must</u> consider the various land use types and their relationship to each other and establish use districts more compatible with this relationship."

In March 1968, a series of study sessions with a citizens group, Planning and Zoning Commision and City Council was conducted to review, adjust and revise a proposed new zoning ordinance. Subsequently, in August 1968, the present zoning ordinance was adopted. This ordinance established thirteen (13) zoning districts as follows:

''AG''	Acricultural
''A-1''	One-Family
"A-2"	One-Family
"A-3"	One-Family
''A-4''	One-Family
''A-6''	Two-Family
"A-10"	Multi-Family
"PUD"	Planned Unit Developmen
''S''	Service Commercial
"Гн	Light Commercial
''H''	Heavy Commercial
''F''	Light Industrial

"M" Mobile Home Park

The 1968 Zoning Ordinance established "layers" of use and eliminated, in effect, the principle of "accumulation." For instance, single-family units can only be constructed in the "AG", "A-1", "A-2", "A-3", "A-4", "A-6", and "PUD" Districts, and the commercial facilities can only be constructed in the "PUD", "S", "L", and "H" Districts. This ordinance does not assume that there is a single highest and best use - rather that each type of land use (residential, commercial, industrial) must fit together in a compatible way and that the indiscriminate mixing of land uses generates an unhealthy condition.

Since the adoption of the city's first zoning ordinance in 1960, the community has added approximately 75% (8,300) of its total (1972) population and 61% (3,216) of its total housing units. A total of 1,499 housing units, consisting of 94.5% single-family and 5.5% multi-family, was added to the city between 1960 and 1968 under the city's original zoning ordinance. Since 1968, under the present zoining ordinance, an additional 1,717 housing units have been constructed, of these 1,145 or 66.5% were single-family and 572 or 33.5% were multi-family.

Now, in 1972, after testing the present zoning ordinance for four (4) years it is evident that revisions should be made. Such revisions cannot be arbitrarily established but should be based on experience with the 1968 Zoning Ordinance, as well as analysis of future zoning problems. The following study makes an in-depth analysis of the municipality's land use and development problems and serves as a basis for recommending certain changes in the zoning ordinance.

RESIDENTIAL LAND USE AND ZONING (POPULATION CONSIDERATIONS)

The determination to zone and use land for residential purposes must necessarily be directly related to and be a function of population, not only the quantity but the characteristics of that population as well. In other words, residential zoning must be related to the existing and forecast population of the community.

Projecting population is not a crystal ball process, rather, as presented in the 1971-1991 Comprehensive Plan, a very detailed and accepted scientific approach for forecasting population was conducted.

This population projection forecast that the City of Bedford, under normal conditions, will have the following population:

TABLE I-2

PROJECTED POPULATION 1975-1990

Year	Projected Population
1975	16,000
1980	28,100
1985	46,000
1990	54,000

Of course, unforeseen events such as a major economic depression, natural disaster, war, political decision, etc., will alter this projection; but, because Bedford is an integral part of a rapidly expanding metropolitan area, the city will be called upon, so to speak, to serve this number of population.

The estimate of population shown earlier is compared to the Tarrant-Dallas County area population below:

TABLE I-3

BEDFORD'S POPULATION AS A PART OF THE METRO AREA

	Tarrant-Dallas Counties Population	Bedford Population	Percentage Of Two Counties	
1975	2,451,000	16,000	0.65	
1980	2,927,000	28,100	0.96	
1985	3,403,000	46,000	1.35	
1990	3,879,000	54,000	1.38	

The 1971-1991 Future Land Use Plan designates 2,844 acres for residential use, 1,043 acres (90.5%) as low density and 270 acres (9.5%) as medium and high density. Of this projected total, 931 acres of residential land use presently exists, consisting of 860 acres of single-family, 0.4 acres of duplex, and 27 acres of multi-family; thus, 1,913 acres are remaining to be used for residential purposes (see Table I-4 - Existing Land Use and Zoning Characteristics - 1972 and Table I-4A - 1972 Zoning).

These existing 931 acres of residential land use serve a population of approximately 11,000 persons, which represents a gross density of urbanized residential land*of 11.8 people per acre. Theoretically, if the City of Bedford were to continue urbanizing at this same population density, about 24,650 additional persons could be absorbed. This resulting population would be approximately 24,000 short of what is anticipated for the 1990 population. Meeting the population projected for 1990 of 54,000 will require increasing the present (1972) population density to approximately 18 people per acre.

Another interesting way of looking at the future of the city is to compare 1970 "Living Units Per Gross Acre" to a few large major cities:

^{*} Gross density of urbanized residential land includes only that land developed for residential use.



LAND USE AND ZONING Tabulations for The City of Bedford, texas	AREA ZONING IN CLASS- Acres Ification	1631.56 A-1	1042.12 A-2	717.34 A-3	186.67 A-4	1.67 A-6	473.69 A-10	1042.88 PUD	9.32 INDUST- Rial	44.64 S.COMM.	11.62 L.COMM.	267.57 H.COMM.	205.73 UN.COMM.	CITY TOTALS IN ACRES
SINGLE FAMILY		62.52	184.55	507.71	118.58	0.42	7.00	7.95	0.50	-	-	4.86	10.40	904 49
S MULTI FAMILY		-	_	-	-	-	27.41	-	-	_	-	-	-	27 41
COMMERCIAL		5.51	5.41	-	-	-	- 54	4.66	-	1.23	8.81	8.38	19.05	53 50
SE PUBLIC PARKS		9.18	8.52	-	-	-	-	3.05	_	-	-	-	16.56	37 31
W SEMI PUBLIC		3.60	28.27	4.42	1.84	-	1.76	-	_	_	_	-	.73	40.82
OTHER PUBLIC		84.11	13.59	9.63	-	-	-	-	-	3.35	_	_	3.52	114 20
S VACANT		1486.64	801.78	195.58	66.25	1.25	436.98	1027.22	8.82	40.06	2.81	254.33	155.47	4457.19
TOTAL STREET ACREAGE	IN CITY													868.15

TABLE I-4 EXISTING LAND USE & ZONING CHARACTERISTICS-1972

TOTAL ACREAGE IN CITY

6502.96

TABLE I-4A 1972 ZONING CITY OF BEDFORD.....TEXAS

CLASSIFICATION	ACRES	PERCENT OF CITY
A-1	1631.56	25.09
A-2	1042.12	16.03
A-3	717.34	11.02
A-4	186.67	2.87
A-6	1.67	0.03
A-10	473.69	7.28
P.U.D.	1043.47	16.05
Industrial	9.32	0.14
S. Comm.	44.64	0.69
L Comm.	11.62	0.18
H Comm.	267.57	4.11
Unclassified Comm.	205.73	3.16
Street & Alley R.O.W.'s	868.15	13.35
TOTAL CITY AREA In Acres	6502.96	100.00

TABLE I-5

LIVING UNITS PER GROSS ACRE*

City	1970 Living Units Per Gross Acre
Boston	6.8
Cambridge, Mass.	8.2
Chicago	7.4
Jersey City, N.J.	8.5
New York: Bronx	18.6
Brooklyn	18.2
Manhattan	32.4
Queens	8.9
Newark, N.J.	7.8
Philadelphia	7.4
San Francisco	7.8
Tokyo, Japan	21.0
BEDFORD	0.43

* Represents living units per total area of city.

It is interesting to note that if the remaining acreage (1,964 acres) of the city that is available (via the Land Use Plan for residential purposes) were totally zoned and totally developed under any one of the city's singlefamily residential zoning classifications, the city still could not absorb its projected 1990 population. However, if the same area were zoned as A-10 apartments, an additional 55,200 people over the projected 54,000 population for 1990 could reside in the city.

Zoning Category	Probable Units Yield Per Acre	Population X Per Dwelling Unit	X Available Land	Possible = Population + 11,000	Over/Above 1990 Population
A-1	2.5	3.5	1,964	28,185	(-) 25,815
A-2	3.0	3.5	1,964	31,622	(-) 22,378
A-3	3.5	3.5	1,964	35,059	(-) 18,941
A-4	4.5	3.5	1,964	41,933	(-) 12,067
A-6	10.0	3.0	1,964	69,920	(+) 15,920
A-10	20.0	2.5	1,964	109,200	(+) 55,200

TABLE I-6

PROJECTED POPULATION BASED ON EXISTING ZONING ORDINANCE CHARACTERISTICS

An analysis of the information brought to light at this point in the report reveals two important zoning issues:

First -

The Need for Better Utilization of Land for Living Purposes. Today's methods of planning and zoning land for residential purposes has not changed radically in a hundred years. Each single-family unit is still situated on a large parcel of land with excessive waste in the front and side yards and will continue to be platted in that manner until zoning laws are altered. These planning and zoning techniques are not completely obsolete because many families still desire this type of living; however, because of changing life styles with more leisure time available, higher income, etc., a definite trend to less yard with less area and yard maintenance is prevalent.

As a result of this trend more families are desiring to reside in apartments, townhouses and cluster homes with home owner associations responsible for all outside maintenance including the exterior walls of

the living unit. The outdoor space provided for individual living units is normally a small area, but is supplemented by common space of sufficient size to permit active recreation (swimming, softball, tennis, picnicking, etc.). This innovative housing technique results in an increased density (units per acre), but provides more useable space for outdoor living and recreation - in short, a more efficient utilization of land.

Second -

The Need for a Mixture of Residential Densities. It is evident that the low density residential zoning categories (A-1 through A-6) cannot provide a sufficient quantity of housing units to meet the anticipated population of the city. It is also evident that high density residential zoning (A-10) throughout the city will produce densities (living units per gross acre) near that of major eastern cities, a density out of character with Bedford, the surrounding area and the region. It is not necessarily true that the phrase "low density residential" is synonymous with "ownership" nor "high density" with "rental" even though the general public assumes it. However, it is true that residential areas with densities greater than typical single-family can be owner occupied provided that the zoning ordinance will permit such densities. Therefore, it is evident that if the City of Bedford is to meet its population obligation and provide living spaces for its future citizen body a zoning formula or ratio of land to living area is one logical approach to providing a satisfactory mixture of densities.

RESIDENTIAL LAND USE AND ZONING (HOUSING CONSIDERATIONS)

In August 1972, FHA published a report entitled <u>Analysis of the Fort Worth</u> Texas Housing Market as of March 1, 1972. This report presents an analysis

of the housing market from March 1, 1972 to March 1, 1974 based on trends and projections. Many of the statistics and projections are applicable to the City of Bedford in assisting to analyze the need for and type of zoning ordinance changes. For instance, Bedford's building trend since 1968, as shown below, is not in conformity with trend of other statistical units of the region.

TABLE I-7

Bldg.Permits 1968-1971	Fort Worth Std. Metro Stat.Area*	Tarrant County	Arlington	Fort Worth	Bedford**
Total	42,027	40,693	10,745	14,405	1,380
Single-Family	18,332	17,220	4,581	3,935	808
% of Total	43.6%	42.3%	42.6%	27.4%	58.5%
Multi-Family	23,695	23,473	6,164	10,470	572
% of Total	56.4%	57.7%	57.4%	72.6%	41.5%

BUILDING PERMITS 1968-1971

* Defined by U. S. Census as Tarrant and Johnson Counties.

** Data from city records.

For discussion purposes, it is assumed that the city will reach its projected 1980 population of approximately 28,100, which is approximately 18,000 additional people over 1972, and that the family size will remain approximately 3.5 people during the 1973-1980 period. These assumptions would produce a forecast demand of approximately 5,150 additional dwelling units. Assuming the breakdown of single-family and multi-family percentages by statistical units as shown in Table I-7 above as indicative of future trends, a projection for the City of Bedford's 1972-1980 housing composition is presented below:

TABLE I-8

	Single-Family (Units)	Mu	lti-Family (Units)
SMSA (43.6%)	2,245	SMSA (56.4%)	2,905
Tarrant (42.3%)	2,178	Tarrant (57.7%)	2,972
Arlington (42.6%)	2,193	Arlington (57.4%)	2,957
Fort Worth (27.4%)	1,411	Fort Worth (72.6%)	3,739
Bedford (58.5%)	3,012	Bedford (41.5%)	2,138
Average	2,208		2,942

PROJECTED 1973-1980 BEDFORD HOUSING COMPOSITION (BASED ON 1968-1971 TRENDS)

Based on an analysis of the amount of land zoned compared to the amount of "land used as it is zoned," it was discovered that 872 acres of singlefamily (A-1 through A-4), are being used as zoned. Breaking this down further we find:

TABLE I-9

	SINGLE-FAMILY LA	ND USED AS	ZONED	(1972)	
	4	Acres		%	of Total
A-1		62.52			7.16
A-2	1:	84.55			21.14
A-3	50	07.12			58.12
A-4	1	18.58			13.58
	87	72.77			100.00

A further projection of Bedford's housing composition for 1980 is presented in Table I-10 below. This projection is based on the forecast 2,208 singlefamily units demanded by 1980 (Table I-8) and on the mixture of existing used/zoned land (Table I-9).

TABLE I-10

FORECAST	HOUSING	UNIT	DEMAND	BY	ZONING	CATEGORY	1973-1980
						Housing	g Units
A-1						1	58
A-2						40	57
A-3						1,28	84
A-4						2	99
Total Sin	gle-Fami	ly				2,20	08
A-10						2,94	42

Meeting this forecast housing demand for 1980 will require the construction of 276 single-family and 367 multi-family units per year. This demand exceeds the 1960 to 1972 average, but conforms, generally, to the single-family permits issued in the city since 1970 (267). It exceeds the average (216) multi-family permits over the same period. It also exceeds the city's historical (1969-1971) share (5%) of the projected Tarrant County Housing Market.

Based on maximum probable yield of 2.5 lots per acre for A-1, 3 lots per acre for A-2, 3.5 lots per acre for A-3, 4.5 lots per acre for A-4 and 18 units per acre for A-10, the following Table (I-11) provides a possible demand for land for single-family and multi-family by 1980.

TAI	BLE	I-]	11

POSSIBLE 1980 SINGLE-FAMILY AND MULTI-FAMILY LAND DEMAND

	and printer of the state of the		
	Single-Family (Acre)	Multi-Family (Acre)	Exist.Zoned (1972) Vacant Land (Acre)
A-1	63	-	1,466
A-2	153		801
A-3	366		195
A-4			66
Total Sing.	-Fam. 656		2,528
A-10 (Total	Multi-Family)	147	436
TOTAL			2,964

Table I-11 shows that approximately 656 acres of land will be needed for single-family and 147 acres for multi-family by 1980 and that 2,964 acres of land (2,528 single-family and 436 multi-family) is presently zoned for residential uses but is unoccupied. An analysis of the present (October 1972) zoning map in relationship to the Future Land Use Plan and "known" forthcoming development greatly reduces the 2,964 acres of "zoned but vacant" property that is seemingly available for housing. For instance:

A-1, 1,466 Acres Zoned But Vacant

The greatest part of this land (893 acres or 61%) lies north of the major ridge line and cannot be sewered within the near future. The Future Land Use Plan designates 66 acres for industrial and commercial use, 84 acres for school or park, and 124 acres for high density housing. In other words, only 299 acres or 19% of the land zoned A-1 is available for use as single-family at this time. It should be noted that almost 100% of the land presently zoned A-1 is a "hold over" from the 1960 ordinance and for all practical purposes can be considered as agricultural use.

A-2, 801 Acres Zoned But Vacant

The Future Land Use Plan has designated 334 acres or approximately 40% of the 801 acres zoned but vacant A-2 land for commercial and high density housing. Of the total designated for commercial, 137 acres lie within the "football" central business district. A breakdown of this land which is unavailable for single-family use is presented below:

> Proposed for Non-residential - 223 acres Proposed for High Density Housing - <u>111</u>

> > 334

Thus, only 467 acres or 58% of the land zoned for A-2 is available for use as single-family at this time.

A-3, 195 Acres Zoned But Vacant

The 132 acres comprising the Forest Plaza Addition and Oak Grove Estates, which are situated between Highway 157 and proposed Freeway 121, are scheduled in the Future Land Use Plan as industrial use. Removal of these 132 acres from the total would reduce the amount of A-3 zoned land to 63 acres, which is 303 acres less than the 1980 probable demand.

A-4, 66 Acres Zoned But Vacant

A 40-acre tract zoned A-4 appears to be available, but is presently under construction for single-family use and, therefore, must be considered as unavailable. Thus, only 22 acres or 33% of the land zoned for A-4 is available for single-family at this time. This available land is 52 acres <u>less</u> than that projected 1980 demand.

A-10, 436 Acres Zoned But Vacant

The Future Land Use Plan designates approximately 270 acres for medium to high density (medium - 10 to 24 units/acre, high - 25 to 50 units per acre) and the 1980 probable demand, based on 18 units/acre, indicates a need for 147 acres. Yet, 436 acres of vacant land is zoned for A-10 land use. A majority of this zoned but vacant land lies in the Mary Ann Barnes Survey and the Bedford Boys Ranch. Another 200+ acres are zoned Planned Unit Development (PUD) and proposed for high density housing.

TABLE I-12

COMPARISON OF LAND ZONED AND LAND AVAILABLE TO 1980 DEMAND

	Exist.(1972) Residential Zoned Vacant Land	Existing Single-Fam. Zoned Land Avail.for Single-Fam.	Land Actually Available for Single-Family Use	Percentage of Total (Available)	Poss.1980 Single-Fam. Demand	Percentage of Total (Demand)*
4-1	1,466	1,167**	297	25.0	95	14.4
4-2	801	334	467	55.0	156	23.6
4-3	195	132	63	7.4	343	52.2
4-4	66	40***	22	2.6	66	10.0
	2,528	1,673	849		656	

* May not total due to rounding

** Includes 893 acres which cannot presently be sewered

*** Under construction

Table I-12 above clearly illustrates that the present zoning map is out of balance with the "Possible Single-Family Demand;" for instance, approximately three (3) times as much usable land is zoned A-1 and A-2 than the 1980 Market demands. Conversely, the demand for A-3 land exceeds the available land by five (5) times, and the demand for A-4 land exceeds the amount available by three (3) times.

RESIDENTIAL LAND USE AND ZONING (MARKET CONSIDERATIONS)

The same FHA report mentioned earlier presents an estimate of "New Nonsubsidized Sales Housing - Fort Worth Housing Market Area" for the two-year period from March 1, 1972 to March 1, 1974, as follows:

TABLE I-13

NEW NONSUBSIDIZED SALES HOUSING - FORT WORTH HOUSING MARKET AREA 1972-1974

Price	Floor Space (SF)*	Comparable Min.Zoning Required**	Number of Units	Percent of Total
Under \$20,000	Under 1,150	NA	425	11
\$20,000 - 22,499	1,150 - 1,300	NA to A-2	600	15
22,500 - 24,999	1,300 - 1,450	A-3	775	20
25,000 - 27,499	1,450 - 1,600	A-2 to A-1	775	20
27,500 - 29,999	1,600 - 1,750	A-2 to A-1	350	9
30,000 - 34,999	1,750 - 2,000	A-1	475	12
35,000 and over	Over 2,000	A-1	500	13
TOTAL			3,900	100

- * Estimated comparable floor space based on price, Tarrant County Home Builders Association.
- ** Minimum floor area square foot requirements (zoning area) A-1 = 2,000; A-2 = 1,500; A-3 = 1,200; A-4 = 1,200

For analysis purposes, both the upper and lower extremes of Table I-13 have been eliminated because a lower priced detached single-family unit (under \$20,000) cannot meet the zoning (square foot) requirements, and the general economic characteristics of the "Bedford Family" are typically lower than the requirements needed to qualify for the upper price (\$35,000 and over) home. These assumptions eliminate approximately 24% of the total two-year housing market. Table I-13 above also illustrates the major portion (40%) of the two-year housing market to be in the \$22,500 to \$27,499 price. Such a housing unit, if constructed as a detached single-family unit, would vary in floor space from 1,300 to 1,600 square feet, which is larger than the minimum floor space (1,200) requirement of the A-3 zoning category and smaller than the A-2 (1,500) category and, therefore, would require most of the single-family categories (A-2, A-3 and A-4) to satisfy the market.

Another 15% of the market is the \$20,000 to \$22,499 - 1,150 to 1,300 square feet unit - which will generally meet either the A-3 or A-4 zoning category requirement at the lower end of the price scale, but is substantially smaller than the requirements of the A-2 category (1,500) at the upper end.

The smallest (9%) part of the coming two-year housing market is in the \$27,500 to \$29,999 - 1,600 to 1,750 square feet range and will meet the minimum requirements of the A-2 category (1,500).

The remaining 12% of the market is the \$30,000 to \$34,999 - 1,750 to 2,000 square feet - housing unit. As a single-family detached house, such a unit can be constructed in the A-2 (1,500 square feet) category, but just meets the 2,000 square feet required of the A-1 category.

The characteristics of the future market as presented in Table I-13, of course, only provides an indication of need and, like any projection of this nature, will vary. It does, however, point out certain basic zoning problems within the city. For instance:

1. It is evident that the city's zoning ordinance tends to eliminate approximately 15% of the housing market. None of the under \$20,000

(under 1,150 square feet) homes, 11%, and part, say a third, of \$20,000 to \$22,499 (1,150 to 1,300 square feet) homes can meet the city's smallest permitted single-family living area size.

2. The coming two-year housing market indicates a need for the full range of home sizes and price brackets, yet, as indicated in Table I-12, 80% of the city's land that is available for single-family is zoned A-1 and A-2, which has a minimum lot area of 15,000 square feet and 10,000 square feet, and minimum floor space of 2,000 square feet and 1,500 square feet, respectively. Theoretically, if the city had only one single-family category, say A-4, with its minimum 1,200 square foot floor space living area and 6,500 square foot lot area requirements, all but approximately 15% of the market could be built.

RESIDENTIAL LAND AND DEVELOPMENT COST

Two of the most important factors of low density single family residential development which are related to zoning are land cost and community facilities construction cost. Unfortunately, the City of Bedford has no, or very little, control over these. Typically they are governed by outside forces beyond the influence of a local scene.

Not too long ago, say 1968, raw land prices within the community were approximately \$3,000 per acre. Today this same land exceeds, in most cases, \$6,000 per acre. The reason for this increase is twofold. First, a rapidly expanding metropolitan area adding approximately 18,000 population per year strongly influences the "supply and demand" of land suitable for residential purposes. Second, rapid overall urbanization coupled, in the case of northeast Tarrant County, with the prospects of the additional economic stimulus of the Dallas/Fort Worth Regional Airport has caused extraordinary amounts of land speculation.

It is interesting to note that this speculation is somewhat unique to this part of Texas and in the New York Financial circles is referred to as the "Dallas Deal." The workings of this speculation are simple - - a parcel of land is purchased, by a group of individuals who need a "tax write-off", with minimum down payment, optimum interest rates and no principal payment for five to ten years. Because of the "tax write-off" many of these "syndications" have been sold over and over again, each time driving the price of the land higher.

The second factor of residential development which is related to zoning is the construction cost of community facilities (water, sewer, streets, storm drainage, electric, gas, etc.). Unfortunately, low density single family residential development requires more community facilities per unit used
than any other type of land uses. For instance, even though commercial and industrial land uses require larger water facilities, the total cost of water facilities is, in many cases, only a small percentage higher. This is because the cost of 8-inch water pipe (as needed for commercial) is only slightly higher than the 6-inch pipe (as needed for residential) but the cost of installation is usually much greater in residential areas due to the need for numerous taps and service lines and excessive lengths of pipe. Because of the large amounts of water used for the washing machine, dishwasher, bathing, etc., sanitary sewer facilities are greater. Short blocks and numerous intersections create the need for more paving and more paving creates the need for more storm drainage. The cost for these facilities and their installation within a low density single family area add up to be the most expensive of any land uses.

Recent cost analysis studies conducted by Carter & Burgess indicate that single family lot (70-feet above frontage) development is costing approximately \$10,000 per acre.

Based on \$6,000 per acre for land and \$10,000 per acre for development the COST of single family land is \$16,000 per acre. Add to this cost 60% for financing, promotion, overhead and profit and divide by 3.5 lots per acre and we see that the price for "finished" single family land is approximately \$7,300 per lot or about \$100 per front foot.

Using the real estate rule of thumb of 5 to 6 times the land cost to determine the price of single family detached homes, it is evident that the home must sale for between \$35,000 to \$44,000.

Through innovative planning techniques such as zero lot line, common open space, private patios, short cul de sac streets, etc., this same land could

be subdivided for patio homes, town houses or cluster homes with approximately six (6) dwelling units per acre. With these innovative techniques the same 20 acre tract of land that yeilded 70 single family <u>detached</u> dwelling units with a double garage and 1750 square feet of living area could yield 120 single family <u>attached</u> homes with the same living area and garages yet about 40% of the land would remain as open space or recreation areas. Therefore, at \$25,600 per acre "finished" land price (\$16,000 + 60%), a lot within a patio, cluster or town house subdivision could sale at a retail price of about \$4,300.

Table I-14 below compares a 20-acre subdivision by showing the differences in characteristic between a <u>single family detached</u> and <u>single family attached</u> developments. This comparison is based on a house size of 1750 square feet of living area which is only about 20% of the total Bedford housing market. The most important conclusions which can be drawn from this comparison are:

E I-14	
SINGLE FAMILY SUBDIVISION	
Single Family Detached	Single Family Attached
3.5	6
70	120
1750	1750
Double	Double
\$ 6,000	\$ 6,000
\$10,000	\$10,000
\$16,000	\$16,000
\$25,600	\$25,600
\$ 7,314	\$ 4,266
\$35,000 to \$44,000	\$30,000 to \$37,000*
0	8 acres
	E I-14 SINGLE FAMILY SUBDIVISION Single Family Detached 3.5 70 1750 Double \$ 6,000 \$10,000 \$10,000 \$16,000 \$25,600 \$ 7,314 \$35,000 to \$44,000 0

* Construction cost per square foot reduced by 6% due to a common wall.

- Using acceptable real estate and financial criteria, the retail price of a single family detached house situated on land costing \$6,000 per acre must be in the \$35,000 and above range.
- A \$35,000 and above home will satisfy only about 31% of Bedford's total market.
- Approximately 50% of the city's housing market could be met if \$6,000 per acre raw land were developed into cluster, patio and town houses.

RESIDENTIAL LAND USE AND ZONING - CONCLUSIONS, OBSERVATIONS AND RECOMMENDATIONS

The previous analysis has investigated the problem of residential development through the city's major controlling tool, the Zoning Ordinance. It looked at residential development from four (4) different directions:

- 1. Population
- 2. Housing Composition
- 3. Market
- 4. Cost

As a result of this analysis several basic problems of residential growth and development have been identified. Not all of these are confined to the City of Bedford but are widespread throughout this metropolitan area and the nation. Unfortunately, not many communities have seen fit to address their housing supply problems nor work toward an answer; therefore, there is little precedence to use for guidelines.

The answer to these problems of residential growth and development is an adjustment and revision of the Zoning Ordinance because the problems stem from two identifiable factors:

- 1. A trend toward a changing form of single family living
- 2. The rising cost of raw land, community facilities construction and building construction.

Bedford and many other cities today must face the need to adjust municipal ordinances to guide and control a new form of housing which is rapidly coming to the forefront. This new housing type consists of patio homes, zero "0" lot lines, cluster homes and town houses and represents the only method presently available to overcome the high cost of land, land development and building construction.

The present zoning ordinance establishes four (4) single family detached districts but makes no provision for the "attached" type dwelling unit. This ordinance also establishes minimum floor area and minimum lot area for each residential zoning district which, in the author's opinion, eliminates approximately 11% of the total housing market as well as tends to raise the cost of homes in the A-1 and A-2 districts beyond an acceptable market demand. These minimum floor space and lot requirements were originated in the 1960 Zoning Ordinance and have been retained with only slight revisions.

The developer of residential property is faced with many obstacles, some of these are:

- 1. Market which is dictated by a supply-demand factor, financing and family expenditures available to meet housing need.
- 2. Raw land prices which, in the City of Bedford, is dictated by Land Speculators who have no interest in a user.
- 3. Development Cost which is dictated by the quality of community facilities established by the city and the cost of construction labor for installation.
- 4. Zoning requirements which must meet the approval of the Planning and Zoning Commission, City Council and a majority of the adjacent property owners as well as requirements for lot size and house size.

Because a majority of these obstacles are beyond the control of the developer he must, in order to make a profit, manipulate as many factors as possible; for instance:

 Market - Even though the subdivision may be large the developer builds only a few homes at a time to test their salability and consumer preference.

- 2. Raw Land Price Because of high land prices the developer, even though his expertise is in the residential area, may have to seek some commercial or apartment zoning (high value uses) to offset the cost of the land to be used for single family purposes.
- 3. Development Cost There is little the developer can do about municipal policies which establish the size and quality of community facilities nor the prices of material and the cost of labor. He will, many times, attempt to persuade the municipality to pay for some part of the facilities, purchase land where facilities are readily available and, in almost every case, award a contract to the lowest bidder.
- 4. Zoning Requirements Because of the high cost of raw land and development, the developer is forced to distribute this cost to as many lots as possible; therefore, he seeks a zoning classification which will permit a greater density. He also would prefer a zoning classification which allows the smallest minimum house so that he can have maximum flexibility to build in relation to the market.

Many times the developer seeks a zoning category which permits the smallest lot and house size because there is no alternative in the zoning ordinance and as a result residential subdivisions tends to have a "look alike" appearance with no "realistic open space" and amenities. In short, he relies on the muncipality to supply the residents of the subdivision with such facilities as playgrounds, swimming pools and open space.

The obvious conclusion from the previous analysis of residential growth and development leads to the following recommendations:

- 1. Revise A-2, A-3, A-4, A-6 and A-10 zoning districts to permit:
 - a. Twenty (20) foot front yard setback
 - b. Smaller living area (floor space) requirements
 - (1) A-1 from 2,000 S.F. to 1,800 S.F.
 - (2) A-2 from 1,500 S.F. to 1,300 S.F.
 - (3) A-3 No change
 - (4) A-4 from 1,200 S.F. to 1,100 S.F.
 - c. Smaller lot area
 - (1) A-1 from 15,000 S.F. to 10,000 S.F.
 - (2) A-2 from 10,000 S.F. to 7,500 S.F.
 - (3) A-3 from 7,500 S.F. to 6,500 S.F.
 - (4) A-4 from 6,500 S.F. to 5,000 S.F.

An alternate to the above is to reduce the lot area requirements in all four districts and remove the floor area requirements.

2. Adopt the attached recommended UNIFIED RESIDENTIAL DEVELOPMENT provisions (See Appendix E and F) which permit the application of a LAND USE INTENSITY RATIO as an alternate method to developing residential land and permits innovative housing techniques.

The accompanying sketches entitled "Typical A-4 Subdivision," "LUI with 14 Dwelling Units" and "LUI per Recommended Ordinance" compare the development of a 2.18 acre tract of land, as follows:

Typical "A-4" Subdivision - Uses the requirements of the present zoning ordinance to put 14 dwelling units with 1200 square feet of living area and double garage on minimum 6500 square foot lots with 25 foot front yard setbacks.



30'



(







CLUSTER HOMES





LINE LOT ERO

LUI with 14 Dwelling Units - Uses the same land and puts the same 14 dwelling units with the same building space characteristics except a 20-foot building line and usable front yard as "0" Lot Line Homes or Patio Homes.

LUI per Recommended Ordinance - Uses the same land but applies the recommended Unified Residential Development Ordinance and results with 17 dwelling units.

The following table compares the land use intensity ratio statistics of the later sketches:

LAND USE INTENSITY (LUI) RATIO

1200 Square Foot Dwelling Unit with Double Garage

	LUI with 14 Dwelling Units	LUI per Recommended Ordinance
Floor Area Ratio (FAR)	16,800 S.F.=17.6% (14 DU)	28% = 26,685 S.F. (17 DU)
Open Space Ratio (OSR)	51,554 S.F. or 1.18 acres = 307%	170% = 45,364 S.F. or 1.04 acres
Recreation Area Ratio (RAR)	15,750 S.F. = 94%	15% = 4,002 S.F.

Based on observations, direction from the City Council and Planning and Zoning Commission, and interrogation of the staff, several changes in the Zoning Ordinance are needed; therefore, this report contains a recommended amendment to the PLANNED UNIT DEVELOPMENT (PUD) District (See Appendix G) and the following changes in "S" Service Commercial (See Appendix H), "L" Light Commercial (See Appendix I) and "H" Heavy Commercial Districts (See Appendix J).

ADMINISTRATIVE CONTROLS

The rapid urbanization, as indicated in the amount of land developed between 1966 and 1972, is contingent on a multitude of economic, physical and social factors which in most cases are beyond the direct control of that community. In most cases the origin of these factors is from outside sources or trends. For instance, in the case of the municipalities located in northeast Tarrant County, the Dallas-Fort Worth Regional Airport is an economic factor causing land prices to increase at a rapid rate, which in turn influences the use and utilization of the land within the city. These outside factors many times cause a chain reaction with the only identifiable result being felt at the local level.

In contrast to the many uncontrollable factors affecting a municipality there are several which the city and only the city can and does dictate; for instance, the ways and means a particular property can be subdivided, the quality of community facilities such as streets, utilities, parks, etc., and the financial assistance given to the construction of community facilities. In other words, municipalities really have a limited role to play in their growth and development, and that role deals with those physical elements we see, live with and use each day - the house, the drinking water, the street, the street sign, etc. Because of this limited role and because this role deals with our everyday life it is imperative the quality of community facilities be initially installed to the most reasonable level of economic and physical possibilities. Therefore, the City of Bedford has an obligation to establish controls, procedures and standards for the development of land and installation of the public facilities which go onto the land.

The Subdivision Process - The planning, platting, zoning and development of land, in short urbanization, within a municipality is a long, complicated and expensive process, and it varies somewhat with each separate parcel of land. However, the typical procedures (not necessarily in consecutive order) which the city must be cognizant of are set out below:

Municipality

Developer

1. Land Acquisition 2. Boundary Survey 3. Topographic Survey 4. Preparation of Preliminary Plan 5. File Preliminary Plan with City for Review Review Preliminary Subdivision 6. Plan - Planning & Zoning Commission File Zoning Application 7. 8. Public Hearing on Zoning -Planning & Zoning Commission Public Hearing on Zoning -9. City Council Preparation of Final Plat 10. 11. Review of Final Plat - Planning & Zoning Commission Final Plat filed in Courthouse 12. Preparation of Engineering Plans 13. (Streets, Water, Sewer & Drainage) 14. Determination of Electrical, Gas & Telephone Utilities 15. Review of Engineering Plans Award of Construction Contracts to 16. City Approved Contractors 17. Inspection and Approval of Construction 18. Release of Payment and Performance Bonds Issuance of Building Permit 19. Issuance of Certificate of 20. Occupancy Release of Maintenance Bond One 21. Year after Acceptance of Construction. Of the twenty-one steps listed above the city has direct responsibility of

twelve. The process for handling the eleven (11) city functions typically falls into four (4) areas:

1. Subdivision Rules and Regulations

- 2. Zoning Ordinance
- 3. Engineering and Construction Standards and Inspection
- 4. Building Code

An analysis of each of these four important land development tools with regard to the city follows:

<u>Subdivision Rules and Regulations</u> -The rules and regulations for the subdivision of land, Ordinance No. 28, were adopted August 27, 1968, as a result of the 1968 Comprehensive Plan. Based on five years of experience in working with this ordinance it is the planner's opinion that the ordinance is workable except for Article 2.14 (Plats - Approval within thirty days).

Zoning Ordinance - This ordinance was adopted August 27, 1968, as Ordinance No. 28 and as a result of the 1968 Comprehensive Plan. In general this ordinance is workable except for the need to:

- Clarify the Planned Unit Development (PUD) District
- Create a Townhouse or Cluster Housing District
- Clarify the types of uses permitted in the various commercial districts

Engineering and Construction Standards - In general, ordinances or policies have been adopted regarding all engineering and construction standards. Ordinance No. 156 establishes standards for the design and construction of water and sewer facilities. The same type of standard for streets and storm drainage is presently being prepared.

Building Code - The Southern Standard Building Code has been used by the city and each revision of the code has been adopted including the latest revision as set forth in the 1969 printing.

In summary, it is evident that the city must update, change or create additional tools to govern the development of land. The previous parts of this report provide justification for amending the Zoning Ordinance and presents recommended changes. Appendix K is a recommended change to the subdivision rules and regulations.

EXISTING LAND USES

An inventory of existing land uses was conducted during the summer of 1972. This inventory is illustrated on the accompanying map entitled "1972 Land Uses" and tabulations of existing land uses within each neighborhood planning sector and district are presented in a series of tables identified as I-15 through I-21. A map entitled "Neighborhood Planning Areas" illustrates the location and configuration of the statistical units used to analyze the various parts of the community. For comparison purposes the Planning Areas and Tables are the same format used in the 1971-1991 Comprehensive Plan. These comparisons assist in analyzing the community's development pattern and quantity, for instances:

Between August 1966 and January 1971 (say 52 months) the City of Bedford had developed approximately 513 acres or 9.8 acres per month. Between January 1971 and August 1972 (19 months) this rate had increased to 13.8 acres per month. Another way of looking at the "Developing Trend" is that an average of 10.9 acres of vacant land has been urbanized each month since 1966, an amount equal to approximately 0.16% of the city per month.

These statistics, of course, are indicative of the rapid urbanization taking place, but more important is the identification that residential development is the greatest user of land and, therefore, demands a closer examination and the creation of the proper tools to govern development.

LAND USE CHANGES: 1966 - 1972

A land use survey resulted in the land use arrangement found on the "1972 Land Use Map." Land Use Tabulations by Neighborhood Planning Sectors and Districts are indicated on Table I-14, for that recorded in the summer of 1966 and the summer of 1972. Comparisons of these tabulations reveal changes which have occurred over the four and one-half year period. The following summary analyzes highlights of these land use changes and intensity:

	Summer 1966	Summer 1972	Change
Total City Acreage	6,473.52	6,502.96	29.44
Developed Acres	1,268.74	2,045.77	777.03
Vacant & Undeveloped Acres	5,204.78	4,457.19	-747.59
% of Total City Acres Developed	19.60	31.45	11.85
Persons per Developed Acre	5.14	5.37*	.23
*Based on 11,000 population.			





			ACRES	0 F	USE		
	RESIDE	NTIAL	COMMERCIAL	PARKS		SFMI	INDUSTRIAL
	1966 1972	1966 1972	1966 1972	1966 1972	1966 1972	1966 1972	1966 1972
I. NORTH SECTOR NEIGHBORHOOD:							
Northwest Dist. 1	14.09 72.45	0 0	0 4,20	0 3 05	0 22 04		
North Central Bist. 2	4.21 14.20	0 0	0 1 83	0 0.00	0 22.04	0.81 4.48	0 0
TOTAL	18.30 86.65	0 0	0 1.05	0 0	0 0	0 0	0 0
		0 0	0 0.03	0 3.05	0 22.04	0.81 4.48	0 0
II. CENTRAL SECTOR NEIGHBORNOOD:							
West Central Dist. 3	41.39 124.99	0 0	0.80 2.83	0 16.08	16 08 0 55		
milu-central pist. 4	33.31 71.12	0 0	3.25 8.91	0 0	10.00 9.00	9.64 13.90	0 0
IUTAL	74.70 196.11	0 0	4 05 9 74	0 10 00	1.51 6.70	7.65 8.64	0 0
			4.00 0.74	0 10.08	17.59 16.25	17.29 22.54	0 0
ITT. SOUTH SECTOR NEIGHBORHOOD:							
Southwest Dist. 5	304.85 362.67	0 20.06	8.96 28.52	8 5 2 8 5 2	0 11 11 10		
South Central Dist. 6	93.40 180.25	0 7.35	1 72 7 24	0.02 0.02	0.11 11.16	2.56 1.76	0 0
TUTAL	398.25 542.92	0 27 41	10 69 25 70	0 9.00	2.57 41.98	0 4.42	0 0
			10.00 33.70	8.52 18.18	10.68 53.14	2.56 6.18	0 0
IV. EAST SECTOR NEIGHBORHOOD:							
Northeast Dist. 7	17.14 32.12	0 0	1 10 0 50				
East Central Dist. 8	35.73 46 69	0 0	1.10 0.59	0 0	0 22.77	0 5.58	0 0
TOTAL	52 87 78 81	0 0	U 1.47	0 0	0 0	0 1.84	0 0
	02.07 70.01	U U	1.18 2.06	0 0	0 22.77	0 7 42	0 0
CITY TOTALS	544.12 904.49	0 27.41	15.91 53.59	8.52 37 31	29 07 114 00		0 0
Land Use Change (1966 - 1972)	+360.37	+27.41	437.68	400 70	20.2/ 114.20	20.66 40.62	0 0
			01100	. 20. / 9	*85.93	19 98	0

NOTE:

I-36

1. Residential properties larger than 1 acre tabulated as 1 acre.

2. Residential properties less than 1 acre tabulated as to size.

3. Commercial properties tabulated as to size.

4. Public properties tabulated as to size.

TABLE 1-15 (CONTINUED)

		STRE Alley 1966	ETS & R.O.W.'S 1972	RES 1966	VACANT AN . Lots 1972	ID UNDEVELOPEI Agr. 1 9 66	0	TI A1 1966	DTAL CRES 1972	TOTA DEV 1966	L ACRES	% 0 Area 1966	DEVELOPE
I. NORTH SECTOR NEICHRODI	1000.											1000	1012
Northwest Dist	1000.												
North Control Dist.		28.06	69.51	0	72.28	690.63	485.58	733.59	733.59	42.96	175.73	5.86	23.95
North Central Dist.	2	19.76	20.44	0	0	678.62	666.12	702.59	702.59	23.97	36.47	3.41	5.19
IUTAL		47.82	89.95	0	72.28	1369.25	1151.70	1436.18	1436.18	66.93	212.20	4.66	14.78
II. CENTRAL SECTOR NEIGHBO	RHOOD:												
West Central Dist.	3	92.48	99 88	54 40	23 00	402 22	410 70	202.04					
Mid-Central Dist.	4	101.56	101 56	9 50	20.00	432.22	410.78	707.01	707.01	160.39	267.23	22.69	37.80
TOTAL		194 04	201 44	0.09	0.00	622.96	5/5.90	778.83	778.83	147.28	194.93	18.91	25.03
		104.04	201.44	02.99	31.00	1115.18	992.68	1485.84	1485.84	307.67	462.16	20.71	31.10
III. SOUTH SECTOR NEIGHBORN	100D:												
Southwest Dist.	5	189.05	104 09	170 10	00.75								
South Central Dist.	6	81 16	110 00	178.10	89.75	243.40	218.11	944.63	944.63	522.05	626.77	55.27	66.35
TOTAL		270 21	212.00	32.73	23.00	585.78	433.90	797.36	826.80	178.85	369.90	22 43	AA 7A
		270.21	313.08	211.91	122.75	829.18	652.01	1741.99	1771.43	700,90	9 96 . 67	40 24	56 20
IV. EAST SECTOR NEIGHBORHO	00:											40.24	30.20
Northeast Dist.	7	50 85	102 00	00.00									
East Central Dist.	8	79.34	100.00	68.30	74.57	794.87	702.63	941.34	941.34	78,17	164.14	8 20	17 44
TOTAL		120 10	100.00	42.44	74.00	710.86	583.57	868.17	868.17	115.07	210 80	12 25	11.44
		100.18	203.68	110.74	148.57	1505.53	1286.20	1809.51	1809.51	193 24	374 74	13.23	24.26
CITY TOTALS		851 00	000 15								3/4.14	10.68	20.71
		001.20	008.15	385.64	374.60	4819.14	4082.59	6473.52 6	3502.96	1268.74	2045.77	19 60	21.40
Land Use Change (1968 –	- 1972)	+	216.89		-11.04		736.55		+29.44		† 777.03	+	11.86

NOTE: RES. = Residential AGR. = Agriculture O.S. = Open Space

NORTH NEIGHBORHOOD PLANNING SECTOR 1966-1972 Land USE and Land USE Changes City of Bedford.....texas

			SINGLE	RESIDE	NTIAL		COMME	RCIAL		PUBLIC	SE	I PUBLIC	INDUS	STRIAL
			1966	1972	1966	1972	1966	1972	19	66 197	2 19	36 1972	1966	1972
8	NORTH SECTOR NEIGHBORHOOD:													
	NORTHWEST DISTRICT 1													
	1-1-1		0.59	30.52	0	0	0	0		0 2.2	0	0 0	0	0
	1-1-8		2.42	5.00	0	0	0	3.19		0 0.8	5	0 0	0	0
	I-1-9 I-1-10		0	14.55	0	0	0	0		0 22.04	0.8	1 0.88	0	0
	DIST. TOTAL		8.06	14.00	0	0	0	1.01		0 0)	0 2.20	0	0
	NORTH CENTRAL DISTOLOT		14.00	12.43	U	0	0	4.20		0 25.09	0.8	1 4.48	0	0
	1-2-2													
	1-2-4		1.20	1.20	0	0	0	0		0 0		0 0	0	0
	1-2-11		1.20	9.00	0	0	0	1.83		0 0	1.19	0 0	0	0
	DIST. TOTAL		0	1.00	0	0	0	0		0 0		0 0	0	0
			4.21	14.20	0	0	0	1.83		0 0			0	0
											ALC: NOT THE OWNER	U	0	0

TABLE I-16 (CONT'D.)

NORTH NEIGHBORHOOD PLANNING SECTOR 1966-1972 LAND USE AND LAND USE CHANGES CITY OF BEDFORD.....TEXAS

ACRES OF USE

I NORTH SECTOR NEIGHBORHOOD: Northwest district 1	STREETS & ALLEYS R.O.W.'s 1966 1972	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	T & UNDEVELOPED AGR.& O.S. 1966 1972	TOTAL Acres 1966 1972	TOTAL ACRES DEVELOPED 1966 1972	% OF TOTAL Area developed 1966 1972
I-1-1 I-1-2 I-1-8 I-1-9 I-1-10 DIST.TOTAL NORTH CENTRAL DISTRICT 2	2.09 18.57 3.57 10.86 6.57 8.50 3.57 16.32 12.26 15.26 28.06 69.51	0 24.20 0 14.25 0 0 0 24.43 0 9.40 0 72.28	121.62 48.81 139.91 111.75 150.24 122.84 118.08 64.15 160.78 138.03 690.63 485.58	124.30 124.30 145.90 145.90 162.64 162.64 121.65 121.65 179.10 179.10 733.59 733.59	2.68 51.29 5.99 19.90 12.40 39.80 3.57 33.07 18.32 31.67 42.96 175.73	2.16 41.26 4.11 13.64 7.62 24.47 2.93 27.18 10.23 17.68 5.86 23.95
I-2-3 I-2-4 I-2-11 I-2-12 DIST. TOTAL	4.76 4.76 1.98 2.66 11.26 11.26 1.76 1.76 19.76 20.44	0 0 0 0 0 0 0 0 0 0	216.19 216.19 120.95 111.25 212.18 210.38 129.30 128.30 678.62 666.12	222.15 222.15 124.74 124.74 224.64 224.64 131.06 131.06 702.59 702.59	5.96 5.96 3.79 13.49 12.46 14.26 1.76 2.76 23.97 36.47	2.68 2.68 3.04 10.81 5.55 6.35 1.34 2.11 3.41 5.19

CENTRAL NEIGHBORHOOD PLANNING SECTOR 1966-1972 Land use and land use changes City of Bedford.....texas

		F	RESIDE	NTIAL		C OMM	ERCIAL		PUBLIC	SEMI	PUPLIC	INDUCEDIAL
		SINGLE	FAMILY	MULTI-F/	AMILY					JENT	FUDLIC	INDUSTRIAL
		1966	1972	1966	1972	1966	1972		1966 1972	1966	1972	1966 1972
II CENTRAL SECTOR NEIGHBORHOOD:												
WEST CENTRAL DISTRICT	3											
11-3-17		0	0	0								
11-3-18		1 20	41 01	U	U	0	0		0 0	5.10	5.10	0 0
11-3-19		1.30	41.21	0	0	0	0.93		0 9.55	1.74	0	0 0
11-3-25		0.82	37.31	0	0	0	0		0 0	0	0	0 0
11-3-26		0	0	0	0	0	0	1	6.08 16.08	0	0	0 0
11-3-27		22.33	34.14	0	0	0.80	0.80		0 0	0	0	0 0
11-3-28		8.46	9.91	0	0	0	1.10		0 0	2 90	0 00	0 0
		2.42	2.42	0	0	0	0		0 0	2.00	8.80	0 0
DIST. TOTAL		41.39	124.99	0	0	0.80	2 83	11	3 09 25 02	U	0	0 0
MID-CENTRAL DISTRICT							2.00		5.00 25.03	9.64	13.90	0 0
11-4-20	4											
		3.49	31.44	0	0	0.85	1 73		E1 0 74			
11-4-21		21.93	24.00	0	0	1 20	1.75		. 51 0.74	3.09	0.73	0 0
11-4-29		7.89	11.18	0	0	1.20	4 01		0 0	4.56	7.91	0 0
11-4-30		0	4.50	n	0	1.20	4.81		0 5.96	0	0	0 0
DIST. TOTAL		0.0		U	U	U	0.37		0 0	0	0	0 0
		33.31	71.12	0	0	3.25	6.91	1	.51 6.70	7.65	8 84	0 0

TABLE 1-17 (CONT'D)

CENTRAL NEIGHBORHOOD PLANNING SECTOR 1966-1972 LAND USE AND LAND USE CHANGES CITY OF BEDFORD.....TEXAS

ACRES 0 F USE

18.91 25.03

	STREETS & ALLEYS R.O.W.'s 1966 1972	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	INDEVELOPED	TOTAL Acres 1966 1972	TOTAL ACRES DEVELOPED 1966 1972	% OF TOTAL Area developed
CENTRAL SECTOR NEIGHBORHOO	D:					1300 1372
WEST CENTRAL DISTRICT	3					
11-3-17 11-3-18 11-3-19 11-3-25 11-3-26 11-3-27 11-3-28 DIST.TOTAL MD-CENTRAL DISTRICT	7.13 7.13 6.37 13.77 17.97 17.97 12.28 12.28 19.93 19.93 10.43 10.43 18.37 18.37 92.48 99.88	$\begin{array}{cccc} 0 & 0 \\ 8.19 & 0 \\ 28.19 & 19.00 \\ 0 & 0 \\ 13.95 & 4.00 \\ 4.07 & 0 \\ 0 & 0 \\ 54.40 & 23.00 \end{array}$	45.66 45.66 155.12 107.32 139.93 118.63 0 0 23.80 21.94 57.11 52.63 70.60 70.60 492.22 416.78	57.89 57.89 172.78 172.78 192.91 192.91 28.36 28.36 80.81 80.81 82.87 82.87 91.39 91.39 707.01 707.01	12.23 12.23 9.47 65.46 24.79 55.28 28.36 28.36 43.06 54.87 21.69 30.24 20.79 20.79 160.39 267.23	21.13 21.13 5.48 37.89 12.85 28.66 100.00 100.00 53.29 67.90 26.17 36.49 22.75 22.75 22.69 37.80
II-4-20 II-4-21 II-4-29 II-4-30 DIST.TOTAL	20.03 20.03 5.59 5.59 24.42 24.42 51.52 51.52 101.56 101.56	8.59 8.00 0 0 0 0 8.59 8.00	175.77 150.66 114.67 110.45 150.73 137.87 181.79 176.92 622.96 575.90	213.33 213.33 147.95 147.95 184.24 184.24 233.31 233.31 778.83 778.83	28.97 54.67 33.28 37.50 33.51 46.37 51.52 56.39 147.28 194.93	13.58 25.63 22.49 25.35 18.19 25.17 22.08 24.17 18.91 25.03

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TABLE ! - 18

SOUTH NEIGHBORHOOD PLANNING SECTOR 1966-1972 LAND USE AND LAND USE CHANGES CITY OF BEDFORD.....TEXAS

		RESID Single Family 1966 1972	ENTIAL	COMMERCIAL 1966 1972	PUBLIC	SEMI PUBLIC	INDUSTRIAL
III SOUTH SECTOR NEIGHBORHOOD: Southwest district	5					1372	1966 1972
111-5-34 111-5-35 111-5-36 111-5-40 111-5-41 111-5-42 111-5-43 111-5-44 DIST. TOTAL SOUTH CENTRAL DISTRICT	8	8.57 8.57 26.25 31.11 21.52 31.90 9.96 16.13 67.32 71.75 18.29 17.94 115.55 113.05 37.39 72.22 304.85 362.67	$\begin{array}{cccc} 0 & 0 \\ 0 & 3.12 \\ 0 & 0 \\ 0 & 16.94 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 20.06 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	$\begin{array}{cccc} 0 & 0 \\ 8.11 & 7.71 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 3.45 \\ 0 & 0 \\ 8.52 & 8.52 \\ 16.63 & 19.68 \end{array}$	$\begin{array}{cccc} 0 & 0 \\ 0 & 1.76 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 2.56 & 0 \\ 0 & 0 \\ 0 & 0 \\ 2.56 & 1.76 \end{array}$	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
111-6-37 111-6-38 111-6-39 111-6-45 111-6-46 111-6-47 DIST. TOTAL		0 2.00 0 3.05 0.59 1.00 72.10 121.41 20.12 50.79 0.59 2.00 93.40 180.25	0 0 0 0 0 7.35 0 0 0 0 0 7.35	$\begin{array}{cccc} 0 & 4.04 \\ 0 & 0 \\ 0 & 0 \\ 1.72 & 0.85 \\ 0 & 2.35 \\ 0 & 0 \\ 1.72 & 7.24 \end{array}$	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	0 0 0 0 0 0 0 0 0 4.42 0 0 0 4.42	0 0 0 0 0 0 0 0 0 0 0 0 0 0

TABLE 1-18 (CONT'D.)

SOUTH NEIGHBORHOOD PLANNING SECTOR 1966-1972 LAND USE AND LAND USE CHANGES CITY OF BEDFORD.....TEXAS

> ACRES 0 F USF

> > 22.43 44.74

STREETS & ALLEYS R.O.W.'s 1966 1972	FES.LOTS 1966 1972	UNDEVELOPED	TOTAL Acres 1966 1972	TOTAL ACRES Developed 1966 1972	% OF TOTAL Area developed 1966 1972
18 81 10 01					
18.13 31 02	3.45 0	66.10 61.32	98.00 98.00	28 45 36 69	00.00
52 21 28 20	25.43 0.50	13.17 9.52	91.09 91.09	52 40 91 07	29.03 37.43
5 62 5 60	98.95 69.00	55.49 88.88	228.17 228.17	72.70 70 00	57.62 89.00
5.62 5.62	0 0	23.11 0	39 39 20 20	13.13 70.29	32.31 30.81
28.27 28.27	9.75 4.00	3 48 1 05	100 00 39.38	16.27 39.38	41.32 100.00
7.11 7.11	2.83 2.37	0.40 1.00	108.82 108.82	95.59 103.77	87 84 05 00
34.26 34.26	4.19 2.88	0 0 0	31.97 31.97	29.14 29.60	91 15 92 50

- 5 - 34 - 5 - 35 - 5 - 36 - 5 - 40 - 5 - 41 - 5 - 42 - 5 - 43 - 5 - 44	18.81 18.81 18.13 31.02 52.21 38.39 5.62 5.62 28.27 28.27 7.11 7.11 34.26 34.26 24.84 84.80	3.45 0 25.43 0.50 98.95 69.00 0 0 9.75 4.00 2.83 2.37 4.19 2.88	66.10 61.32 13.17 9.52 55.49 88.88 23.11 0 3.48 1.05 0 0 0 2.50	98.00 98.00 91.09 91.09 228.17 228.17 39.38 39.38 108.82 108.82 31.97 31.97 160.02 160.02	28.45 36.68 52.49 81.07 73.73 70.29 16.27 39.38 95.59 103.77 29.14 29.60	29.03 37.43 57.62 89.00 32.31 30.81 41.32 100.00 87.84 95.36 91.15 92.59
DIST. TOTAL SOUTH CENTRAL DISTRICT 6	189.05 194.08	34.58 21.00 179.18 99.75	82.05 54.84 243.40 218.11	187.18 187.18 944.63 944.63	70.55 111.34 522.05 626.77	97.38 96.64 37.69 59.48 55.27 66.35
III-6-37 III-6-38 III-6-39 III-6-45 III-6-46 III-6-47 DIST.TOTAL	14.59 14.59 13.07 13.07 0 29.00 32.81 37.52 20.20 24.33 0.49 0.49 81.16 119.00	$\begin{array}{cccc} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 9.98 & 18.00 \\ 22.75 & 5.00 \\ 0 & 0 \\ 32.73 & 23.00 \end{array}$	126.90 76.38 130.18 127.13 79.19 76.54 157.11 88.11 83.49 58.24 8.91 7.50 585.78 433.90	141.49 141.49 143.25 143.25 79.78 109.22 273.72 273.72 149.13 149.13 9.99 9.99 797.36 826.80	14.59 65.11 13.07 16.12 0.59 32.68 106.63 167.61 42.89 85.89 1.08 2.49 178.85 369.90	10.31 46.02 9.12 11.25 0.74 29.92 38.96 61.23 28.76 57.59 10.81 24.92 22 43 44.74

III SOUTH SECTOR NEIGHBORHOOD:

SOUTHWEST DISTRICT 5

TABLE 1-19

EAST NEIGHBORHOOD PLANNING SECTOR 1966-1972 LAND USE AND LAND USE CHANGES City of Bedford.....texas

			RESID	ENTIAL-		C	MMERCIA	L	PUB	LIC	SEM		INDUCTOIAL
		SINGLE	EFAMILY	MULTI	FAMILY						OLM	TODETC	INDUSIKIAL
		1966	1972	1966	1972	19	66 197	2	1966	1972	196	5 1972	1966 1972
IV EAST SECTOR NEIGHBORHOOD:													
NORTHEAST DISTRICT	7												
IV-7-5		0	1.00	0	0		0 1		0	0			
IV-7-6		7.27	13.00	0	0	0	50 0		0	0		U	0 0
18-2-2		4.85	8.00	0	0	0.	0 0		0	U		0	0 0
IV-7-13		0 20	2 00	0	0		0 0	22, 149	U	U	(0	0 0
IV-7-14		1 81	4 00	0	0			AB-145	0	0	0	0	0 0
18-7-15		0 50	4.00	0	U	υ.	59 0.58	Str. Wat	0	22.77	C	0	0 0
17-7-18		0.09	1.00	U	0		0 (0	0	0	5.58	0 0
		2.42	3.12	0	0		0 0		0	0	0	0	0 0
DIST. TOTAL		17.14	32.12	0	0	1.	18 0.59		0 :	22.77	0	5.58	0 0
EAST CENTRAL DISTRICT	8												
IV-8-22		33.43	42.40	0	n		0 0		0	0			
IV-8-23		0	0	n	n		0 0		0	U	U	1.84	0 0
IV-8-24		1.20	3 19	0	0		0 1 47		U	U	0	0	0 0
IV-8-31		0	0.10	0	0		0 1.47		0	0	0	0	0 0
IV-8-32		n	0	0	0		0 0		0	0	0	0	0 0
IV-8-33		1 10	1 10	0	U		0 0		0	0	0	0	0 0
		1.10	1.10	U	U		0 0		0	0	0	0	0 0
UIST. IUTAL		35.73	46.69	0	0		0 1.47		0	0	0	1.84	0 0

TABLE 1-19 (CONT'D.)

1961 5 1 - 10 100

EAST NEIGHBORHOOD PLANNING SECTOR 1966-1972 LAND USE AND LAND USE CHANGES CITY OF BEDFORD......TEXAS

	STREETS & ALLEYS R.O.W.'s 1966 1972	₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩₩	UNDEVELOPED	TOTAL Acres 1966 1972	TOTAL ACRES Developed 1966 1972	% OF TOTAL Area Develope 1966 1972
V EAST SECTOR NEIGHBORHOOD: Northeast district 7						
IV-7-5 IV-7-6 IV-7-7 IV-7-13 IV-7-14 IV-7-15 IV-7-16 DIST. TOTAL EAST CENTRAL DISTRICT 8	2.07 2.07 3.61 4.33 4.65 36.43 3.83 3.83 2.77 19.05 24.86 29.89 18.06 7.48 59.85 103.08	$\begin{array}{cccc} 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 0 & 0 \\ 25.31 & 29.03 \\ 42.99 & 45.54 \\ 68.30 & 74.57 \end{array}$	140.15 139.15 189.10 163.24 140.22 105.29 137.46 135.66 58.06 116.82 49.88 35.14 0 7.33 794.87 702.63	142.22 142.22 180.57 180.57 149.72 149.72 141.49 141.49 163.23 163.23 100.64 100.64 63.47 63.47 941.34 941.34	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	1.46 2.16 6.35 9.60 6.35 29.68 2.85 4.12 3.17 28.43 25.29 36.24 32.27 16.70 8.30 17.44
V-8-22 V-8-23 V-8-24 V-8-31 V-8-32 V-8-33 DIST. TOTAL	8.39 8.39 14.54 34.59 25.81 14.44 12.58 26.09 12.97 43.79 5.05 33.30 79.34 160.60	$\begin{array}{cccccccccccccccccccccccccccccccccccc$	87.01 86.30 115.05 95.00 155.06 128.75 67.20 53.69 140.71 109.89 145.63 109.94 710.66 583.57	141.93 141.93 129.59 129.59 190.85 190.85 79.78 79.78 153.68 153.68 172.34 172.34 868.17 868.17	41.82 52.63 14.54 34.59 27.01 19.10 12.58 26.09 12.97 43.79 6.15 34.40 115.07 210.60	29.47 37.08 11.22 26.69 14.15 10.01 15.77 32.70 8.44 28.49 3.57 19.96 13.25 24.26

EXISTING LAND USE SUMMARY

ACRES OF USE

	RESIDENT					
	SINGLE FAMILY	MULTI-FAMILY	COMMERCIAL	PUBLIC	SEMI-PUBLIC	INDUSTRIAL
	1966 1972	1966 1972	1966 1972	1966 1972	1966 1972	1966 1972
I. NORTH SECTOR NEIGHBORNOOD:	18.30 86.65	0 0	0 6 0 3	0 25 00	0.81 4.40	
NORTHWEST DISTRICT 1	14.09 72.45	0 0	0 4.20	0 25.09	0.01 4.48	0 0
NORTH CENTRAL DIST. 2	4.21 14.20	0 0	0 1.83	0 0	0 0	0 0
II CENTRAL SECTOR NEIGHBORHOOD:	74.70 196.11	0 0	4.05 9.74 1	7 50 32 33	17 20 22 54	0
WEST CENTRAL DIST. 3	41.39 124.99	0 0	0.80 2.83 1	R 08 25 62	0 64 12 00	0 0
MID-CENTRAL DIST. 4	33.31 71.12	0 0	3.25 6.91	1.51 6.70	7.65 8.64	0 0
III SOUTH SECTOR NEIGHBORHOOD:	398.25 542.92	0 27.41	10 68 35 76 1	0 20 71 22	0.50.0.10	
SOUTHWEST DISTRICT 5	304.85 362.67	0 20.06	8.96 28.52 1	6.63 19.68	2.56 1.78	0 0
SOUTH CENTRAL DIST. 6	93.40 180.25	0 7.35	1.72 7.24	2.57 51.64	0 4.42	0 0
IV EAST SECTOR NEIGHBORHOOD:	52.87 78.81	0 0	1,18 2,06	0 22 77	0 7 40	
NORTHEAST DISTRICT 7	17.14 32.12	0 0	1.18 0.59	0 22.77	0 5 59	0 0
EAST CENTRAL DIST. 8	35.73 46.69	0 0	0 1.47	0 0	0 1.84	0 0
TOTAL CITY	544.12 904.49	0 27.41	15.91 53.59 31	8.79 151.51	20.66 40.62	0 0

NOTE:

1. Residential properties larger than 1 acre tabulated as 1 acre.

2. Residential properties less than 1 acre tabulated as to size.

3. Commercial properties tabulated as to size.

4. Public properties tabulated as to size.

TABLE I-20 (CONT'D.) Existing Land USE Summary

TABLE 1-20 (CONT'D.

	STREET & Alley R.O.W.'s	RES.LOTS	AGR.& O.S.	TOTAL Acres	TOTAL ACRES Developed	% OF TOTAL Area developed
	1966 1972	1966 1972	1966 1972	1966 1972	1966 1972	1966 1972
I NORTH SECTOR NEIGHBORHOOD	47 82 80 05	0 70 00	1000 05 1151 70			
NORTHWEST DISTRICT	47.02 03.55	0 72.28	1309.25 1151.70	1436.18 1436.18	66.93 212.20	4.66 14.78
NORTH OFNEDAL DIGT	28.06 69.51	0 72.28	690.63 485.58	733.59 733.59	42.96 175.73	5.86 23.95
NORTH CENTRAL DIST. 2	19.76 20.44	0 0	678.62 666.12	702.59 702.59	23.97 36.47	3.41 5.19
II CENTRAL SECTOR NEIGHBORHOOD:	194.04 201.44	62.99 31.00	1115.18 992.68	1485.84 1485 84	307 67 482 18	20 71 21 10
WEST CENTRAL DIST. 3	92.48 99.88	54.40 23.00	492.22 416.78	707 01 707 01	160 20 007 00	20.71 31.10
MID CENTRAL DIST. 4	101.56 101.56	8.59 8.00	822 98 575 90	770 03 770 00	100.39 207.23	22.69 37.80
			022.00 070.00	110.03 110.83	147.28 194.93	18.91 25.03
III SOUTH SECTOR NEIGHBORNOOD:	270.21 313.08	211.91 122.75	829.18 652.01	1741.99 1771.43	700.90 996 67	40 24 58 28
SUUTHWEST DIST. 5	189.05 194.08	179.18 99.75	243.40 218.11	944.63 944.63	522 05 828 77	FF 07 00.20
SOUTH CENTRAL DIST. 6	81.16 119.00	32.73 23.00	585.78 433.90	797 36 826 90	170 95 200 20	55.27 66.35
				107.00 020.00	178.85 369.90	22.43 44.74
IV EAST SECTOR NEIGHBORHOOD:	139.19 263.68	110.74 148.57	1505 53 1288 20	1900 51 1000 54		
NORTHEAST DIST. 7	59.85 103.08	68.30 74.57	794 87 702 82	1009.51 1809.51	193.24 374.74	10.68 20.71
EAST CENTRAL DIST. 8	79.34 160.60	42 44 74 00	710 88 500 57	941.34 941.34	78.17 164.14	8.30 17.44
		12.14 /4.00	/10.00 383.5/	868.17 868.17	115.07 210.60	13.25 24.26
TOTAL CITY	651.28 868.15	385.64 374.60	4819.14 4082.59	6473.52 6502.96	1268.74 2045.77	19,60 31,46

1972 SUMMARY EXISTING LAND USE City of Bedford.....texas

LAND USE	ACRES	PERCENT OF CITY	
Developed	2045.77	31.45	
Residential	931.90	14.33	
Commercial	53.59	0.82	
Public	151.51	2.33	
Semi-Public	40.62	0.62 $\rangle = DEVELOPED A$	RFA
Street & Alley R.O.W.'s	868.15	13.35	
Industrial	-	-	
Vacant & Undeveloped	4457.19	68.55	

TOTAL CITY AREA IN ACRES 6502.96

100.00
PART 11 **Environmental Assessment**



PART II- ENVIRONMENTAL ASSESSMENT OF BEDFORD

The culture of a people, while admittedly a function of their society, technology, and economic order, is nevertheless intimately related to the natural environment that supports them. The recognition of this fact and the realization that no longer can an imbalance between purely economic consideration and consideration of the impact on environmental necessities be tolerated caused the enactment of the National Environmental Policy Act of 1969.

This report, the Environmental Assessment of Bedford, Texas, is the acknowledgement of Bedford's commitment to this act and the fulfillment of the planning requirements of that act. It is a general overview of the major environmental factors of the Bedford Community and will make an assessment of the existing Comprehensive Plan as to its impact on the environment. The assessment will consider the proposals and data developed within the Comprehensive Plan but will also consider any new data available.

This report consists of three parts: (1) a summary of the Comprehensive Plan; (2) an inventory of the existing environment with the identification of the adverse and favorable qualities and how the natural aspect may affect the man-made environment; (3) an analysis of the environmental impact of the proposed plan or policies specifically identifying those adverse environmental effects which cannot be avoided should the proposed plan be implemented, listing the irreversible or irretrievable commitment of resources with alternatives and recommendations to the proposed plan or policies and an analysis of their impact on the environment.

If the planner and users of the Comprehensive Plan intend to maintain a quality of life - meaning a flexibility of choices and freedom of action then the following principles must be considered in order to develop an ecological attitude towards orderly development.

- What is done to the environment is likely to have repercussions in other places and at other times. Some of the effects of man's endeavors are bound to be unpredictable, and the effects may not be measurable for years - possibly not for decades.
- 2. If man's actions are massive enough, drastic enough or of the right sort, they will cause changes which are irreversible, such as the loss of genetic material due to extinction of a species or the waste of nonrenewable resources, such as the erosion of soil.
- 3. The environment is finite and our nonrenewable resources are finite. When the stocks run out, we will have to recycle what we have used.
- 4. There is a limitation to capacity of the environment to act as a sink for our total waste to absorb it and recycle it so that it does not accumulate as pollution.
- 5. In such a finite world and under present conditions, an increasing population can only worsen matters.

SUMMARY OF PROPOSED PLAN

The Land Use Plan serves as an overall long-range guide for the development or redevelopment of a community. The city can expect to attain approximately 55,600 persons by 1990 within a land area of 10.2 square miles. Approximately 9.65 square miles of the total corporate area are expected to be developed in urban land use. The <u>Future Land Use And General Development Plan</u> map is a summary of the plan.

Residential Land Use

The land use pattern reflects a balanced population around the center of the community expanding outward into lower density residential uses along the periphery of the city. This plan, while insuring a maximum degree in choice of housing types and density, will further encourage development of the central area and lessen urban sprawl.

The Residential Land Use Plan uses three residential density categories which are as follows:

Low Density Residential - This land use category reflects a net density of three to nine dwelling units (families) per net residential acre. Lot areas vary in size from 15,000 square feet down to 5,000 square feet and reflect both conventional single-family development as well as cluster housing and mobile home park development. The resulting population density ranges from 11 to 33 persons per net acre.

<u>Medium Density Residential</u> - This residential category allows for 10 to 24 dwelling units (families) per net residential acre. Dwelling units such as one-family detached (mobile homes in mobile home parks), one-family semi-detached (low density one-story duplexes), one-family attached (one-

and two-story row or town houses), two-family detached (moderate and medium density one- and two-story duplexes), two-family semi-detached (high density two-story four-plexes), and multi-family garden apartments (low, moderate, medium, and high density units). The lot area per family varies from 1,750 square feet upwards to 3,960 square feet per family.

<u>High Density Residential</u> - High density residential uses reflect a net density of 25 to 50 dwelling units (families) per net residential acre. This use category provides for conventional multi-family apartments of from two to four stories in height with lot area per family varying from 870 square feet to 1,500 square feet. It is within this category that sufficient open space provisions should be maintained within and adjacent to this type of development. Minimum retail shopping and certain types of service commercial activities are permissible within this type of land use category.

The Residential Land Use Plan recommends the following net dwelling densities for Bedford:

TABLE II-1

RECOMMENDED NET DWELLING DENSITIES BY HOUSING TYPE

LOW DENSITY: 3-9 dwelling units (families) per net residential acre

Housing Type	Land Area (Sq. Ft. per Fa	Net Dwellingamily)Density
ONE - EAMILY DETACHED		
Conventional - Perinheral Suburban	15 000 SE	2 0
Conventional - Suburban	10,000 SF	2.5 A 3
Conventional - Fringe	0,000 SF	4.5
Conventional - Outer Urban	7 500 SF	5 8
Conventional - Inner Urban	6 000 SF	7 3
Cluster - Inner lirban	5,000 SF	8.7
Mobile Home - In MH Subdivision	5,000 SF	8.7
MEDIUM DENSITY: 10-24 dwelling units	(families) per n	net residential acre
ONE-FAMILY DETACHED		
Mobile Home - In MH Park	3,960 SF	11.0
ONE-FAMILY SEMI-DETACHED		
Low Density 1-Story Duplex	4,000 SF	10.8
ONE-FAMILY ATTACHED		
1-Story (Row) Town House	2,500 SF	17.4
2-Story (Row) Town House	2,400 SF	18.1
TWO-FAMILY DETACHED		
Moderate Density 1-Story Duplex	3,000 SF	14.5
Medium Density 2-Story Duplex	2,500 SF	17.4
TWO-FAMILY SEMI-DETACHED		
High Density 2-Story 4-Plex	2,400 SF	18.1
MULTI-FAMILY GARDEN APARTMENTS		
Low Density	3,000 SF	14.5
Moderate Density	2,500 SF	17.4
Medium Density	2,000 SF	21.8
High Density	1,750 SF	24.9
HIGH DENSITY: 25-50 dwelling units (f	families) per ne	t residential acre
MULTI-FAMILY APARTMENTS		
2-Story	1,500 SF	29.0
3-Story	970 SF	45.0
4-Story	870 SF	50.0

Commercial Land Use

Commercial land use is divided into four basic categories: regional centers; community centers: general commercial areas; and neighborhood centers.

<u>Regional Centers</u> - Two major regional centers are shown on the Land Use Map. The proposed Sears Shopping Center is identified adjacent to the east side of Central Drive and south of State Highway 121. Approximately two to three major department stores are planned, and will further contain a concentration of other shops and supporting commercial activities such as home furnishings and household equipment. Office buildings are also planned to be located on the site.

The second regional center proposed is designated as the Central Business District (CBD). This center is located north of State Highway 121, south of Bedford Road, and in the center of the community. The area is characterized by the existing governmental center located on the western edge, with major retail, entertainment, specialty shops, and office uses expected to occupy the remaining portion of the business district. The CBD is envisioned as an orderly arrangement of logical and compatible land uses, coupled with quality shopping and entertainment facilities capable of serving the subregion.

<u>Community Center</u> - Eight small community centers are located throughout the city at strategic points. These facilities are designed to contain some functions of the neighborhood centers, plus the sale of limited shopping goods, such as wearing apparel, appliances, etc. Supermarkets, variety, and small department stores are also characteristic of the

community center. The radius of service approximates one to one and one-half miles, and the sites contain areas ranging from five to thirty acres, depending upon population density and distribution. It is recommended that one off-street parking stall for each 400 square feet of retail space be provided in order to maintain adequate parking space. Locations are confined to the junctions of major thoroughfares in order to accommodate the traffic generated by these centers.

<u>Neighborhood Center</u> - Various neighborhood centers are located throughout the area, particularly in the vicinity of the low and medium density residential portions of the plan. The major function of these centers is to provide convenience goods and personal services to the surrounding neighborhood. Leading occupants, such as grocery stores, shoe repair, drug stores, etc., are characteristic of this type of facility. The locations shown are at the intersections of collector streets or with collector streets and major thoroughfares. The center sizes are dependent upon the population served and vary from 1-1/2 to 4 acres in size. A 4 to 1 parking ratio should be established for the neighborhood centers.

<u>General Commercial</u> - The "general commercial" areas shown are those which contain a wide variety of uses. These uses are not necessarily limited to service stations and related auto facilities, but include motels, restaurants, drive-in theaters, and, in some cases, neighborhood shopping areas.

Industrial Land Use

The industrial land use is primarily located in the eastern sector of the community, within a triangle formed by State Highway 121, Spur 350 and FM 157. It is within this area that the Bedford Forum commercial/industrial park has been planned.

Public Land Use

Public land uses shown on the plan are stratified into two basic categories: educational and governmental; and parks and open space.

Educational and Governmental - This classification includes elementary, junior high, and senior high schools, as well as varying types of governmental facilities, such as: the governmental center (city hall, police station, library), fire stations, service facilities such as water wells and water treatment stations, and hospital. These land uses recognize both existing as well as proposed facilities required to satisfy the demands of the future population load expected by 1990. The plan provides for expansion of the present governmental center, an additional fire station, four new elementary schools, one new junior high school, and one new senior high school. Also included is a new public hospital south of Spur 350 and east of the Sears Shopping Center.

<u>Parks and Open Space</u> - The parks and open space uses consist of both neighborhood and community parks, as well as greenbelts along the major drainage ways. To maximize the effectiveness of the park and open space system, and to minimize resource requirements for the acquisition of areas for these purposes, it is recommended that easements be obtained along the major drainage ways, coupled with minimum acquisition requirements in order to achieve a balanced park and open space program. The realization of these greenbelts can greatly relieve the monotony of urban development and provide both aesthetic amenities to the community as well as protect the drainage features from urban encroachment. Approximately 10 additional park areas, ranging from neighborhood to community parks

will need to be acquired. It should be noted that the park locations are linked with the greenbelts to provide pedestrian access, and are situated on a variety of topographic land features to achieve variety of use. The plan outlines approximately 556 acres of parks, recreation and open space required by the year 1990, with 419.32 acres to be consumed in non-school recreation and open space use.

Semi-Public Land Use

Semi-public facilities indicated on the Land Use Plan reflect churches, cemeteries, and other semi-public uses. While it is difficult to anticipate the physical size and locations of future semi-public facilities, various general locations and criteria are suggested in the "Public and Semi-Public Facilities Plan." Future semi-public facilities, such as churches, lodges, private recreation areas, etc., can be expected to develop as the city matures. These land uses should be integrated by appropriate design, and screening where required, when considered in or adjacent to residential areas. Locations along collector streets and major thoroughfares are recommended for most semi-public uses.

Public Facilities

Public Schools and Playgrounds - Within the corporate limits of Bedford the plan provides space for seven elementary, two junior high, and two senior high schools for a total of 11 school plant facilities. The total acreage required for all elementary, junior, and senior high schools approximates 172.27 acres by 1990. By including the present auxiliary school facilities, such as the school administration and maintenance area, plus the proposed athletic stadium, a total of 213.57 acres of

land will be consumed by school and related school use by 1990. Table II outlines the existing and proposed school related auxiliary land space requirements for the City of Bedford. The accompanying map titled "Public School Plan" depicts the location of the physical sites for the existing and proposed facilities contained in this report. The plan also outlines the proposed elementary and junior high school service areas. The location of these service areas deletes major non-residential uses as derived from the "Future Land Use and General Development Plan." It should be noted that major freeways and thoroughfares are not crossed in regard to the elementary school service facilities, and junior high school service areas contain service areas without crossing major thoroughfares.

Parks and Open Space - In general, the urban area should contain at least 10 acres of park and recreation area for each 1,000 persons in the community (or population served), including miscellaneous greenbelts and open space. The plan gives consideration to three general types of park and recreation facility: Neighborhood Parks, Community Parks, and Regional (or Natural) Parks, plus general open space considerations. In some instances, two types of park are combined into one, depending on location and types of neighborhood served. Of the recommended 10 acres of park and recreation area per 1,000 persons at least three acres per 1,000 persons should be comprised of Neighborhood Parks, two acres per 1,000 persons should be allocated to City-Wide Parks.

Community Recreation Centers and Facilities - As the city matures, needs will be created for various types of Community Recreation Facilities to

serve the population demands. It is recommended that optimum use be made of junior and senior high school facilities, particularly gymnasium, locker facilities, multi-purpose rooms, cafeterias, and outdoor playfields to satisfy much of the demands.

It is envisioned that a centrally located Community Recreation Center would be required for city-wide meetings and other forms of indoor and outdoor recreation activities, and would require approximately one to two acres. Such a center should also encompass a swimming pool, lighted ball diamonds, and playfields. The location for this center should be within the proposed community park, near the present municipal maintenance and service area which is found north of Bedford Road between Maxon Drive and Central Drive. A second municipal pool should be in Euless Park, south of Spur 350 and adjacent to the west side of Wright Richardson Road. Should Euless elect not to build a swimming facility in this location, an alternate location should be considered in the proposed park between the projected new junior high and elementary school along the east side of Martin Drive.

A public 18-hole golf course should be considered northwest of the new junior high located along Brown Trail. Since a portion of the 120 acres required would fall in both Hurst and Bedford, cooperation between the two cities would be required to develop and operate such a facility.

Hospital - Currently, the semi-public Hurst General Hospital provides health care needs to the residents within the area. This facility is located along Brown Trail and north of Pipeline Road, in the southwest

corner of Bedford. As the Tri-Cities expand, a need for a large public hospital will emerge to serve the total H-E-B area. Anticipation of this need has already been met through the creation of a public hospital board comprised of representatives of the three cities. A site has been purchased and lies adjacent to the east boundary of the proposed Sears Regional Shopping Center and south of Spur 350, in the southeast quadrant of Bedford. Initial development should occur on or before 1980 in order to adequately accommodate the Tri-Cities population expectations.

<u>Municipal Maintenance and Service Center</u> - The city utilizes a former elementary school site along the north side of Bedford Road, east of Maxon Drive, containing slightly over three acres. The school building provides space for storage and maintenance. Vehicles and miscellaneous equipment are also stored on the site. The city's dog pound occupies a portion of the area.

<u>Drainage</u> - The drainage facilities in Bedford take on a dual role of providing areas and channels for surface runoff water as well as for open space greenbelts.

A major portion of the community lies in two large drainage areas, both flowing to the south. The remaining northerly part of the community drains to the north into Colleyville. Where development has already occurred, the drainage system is more sophisticated in that street and surface drainage patterns have been established and designed.

Governmental Center - City Hall, Police Station, Library - In 1970, a new building was constructed along the east side of Forest Ridge Drive, between

Bedford Road and SH 121, to house the City Administration Offices and Police Station, on a 6.6 acre site. The site also accommodates a public library presently housed in a wood frame residential building. Present plans call for the development of a complex of three buildings around an open court area, interconnected by a covered pedestrian arcade, and parking space for approximately 250 vehicles.

<u>City Hall</u> - The present City Hall is planned for conversion to a police and jail building, thereby requiring a new City Hall building at the east portion of the court area. Based on estimated space needs of 132 square feet per employee, approximately 13,200 square feet will be necessary to meet space requirements by 1980, and 26,400 square feet must be satisfied by 1990.

Police Station - The conversion of the present city hall building to a police headquarters and jail will be necessary before 1980, in order to adequately accommodate needs. The space requirements necessary to serve the 1990 population should approximate 17,500 to 18,000 square feet. Consideration should be given to the development of a Tri-Cities Police District with Bedford acting as the central facility, due to its geographic location in respect to Hurst and Euless.

Library - The present library is housed in an old frame residential building within the governmental center site. One large, well located central facility is deemed adequate to accommodate the expected population of 55,600. The development of a new library will be

required before 1980 and should be constructed, as planned, on the north outer edge of the governmental center site.

Fire Station - Currently only one station exists within Bedford, that being located at the north side of the intersection of Parkwood Drive and Bedford Road. Present requirements call for two pumper companies and one ladder company. This will increase to four pumper companies and two ladder companies by 1980 and at least six pumper companies and three ladder companies by 1990.

Semi-Public Facilities

Semi-public facilities considered in this report concern only Church, Cemetery and Post Office uses in regard to future requirements.

<u>Churches</u> - At the present time, approximately 11 churches are found within the City of Bedford and reflect a land use average of approximately 3.32 acres per church. Using an average of 4.0 acres per church, estimated land use needs reflect 136 acres by 1980, or 96.16 acres in addition to the present usage. By 1990 an additional 132 acres will be required, reflecting a total of 268 acres in church use.

<u>Cemeteries</u> - One small cemetery exists within the city, owned by the Church of Christ and located adjacent to the north side of Bedford and east of Central Drive. The future extension of Central Drive to the north will limit expansion possibilities to the west of the present western boundary. The area to the north of the present cemetery could be expanded as far as the drainage way, providing state requirements are met. No new cemeteries are anticipated within the urban area due

to the present state law prohibiting the development of new cemeteries within five miles of an incorporated urban area.

Post Office - The present site is conveniently located along the north side of Bedford Road between Maxon Drive and Central Drive, in a central location to properly serve the community by 1990. The present two acre site houses a 2,000 square foot building and ample space exists for future expansion. As the industrial area develops, a future need may exist for a branch facility, and postal substations can be accommodated in shopping center areas for the dispensing of stamps, and money orders, plus acting as a receiving station for mailing of packages.

Utilities

<u>Water System</u> - There are two water plants in Bedford, each with a well, surface reservoir, and other production equipment. One of these has a Trinity well, and the other has both a Trinity and a Paluxy. A new water well is under construction and anticipated to be in production shortly. This new plant has the same facilities as the two mentioned above, with Trinity and Paluxy wells. Two Paluxy wells which feed directly into the system also exist.

It is estimated that the water consumption of the city will have reached the capacity of the underground water supply before 1980.

The City of Bedford, in coordination with the City of Euless, Trinity River Authority, and Tarrant County Water Control and Improvement District No. 1, has negotiated for a long-range water supply to be furnished from Cedar Creek Reservoir, using Lake Arlington as a storage and holding facility.

Water would be transported from Lake Arlington, after treatment, to the city from the south, possibly along Central Drive. Such a supply would put the City of Bedford on an equal basis with the City of Fort Worth.

<u>Sanitary Sewer System</u> - The municipal area is divided into four major drainage areas, three to the south and the fourth to the north. The latter area presently has no sewer facilities; however, the Trinity River Authority has plans to extend an outfall line along Bear Creek, lying to the north of Bedford, in Colleyville. Such action is contingent on the three cities of Bedford, Euless, and Colleyville, and is anticipated within the next five years.

The westernmost part of Bedford is served through the City of Hurst. Recently, engineering opinions regarding the system's pipe capacity has recommended no new additional connections. This problem is presently being investigated in greater detail and several alternate methods are available, including lift stations on additional outfall lines.

Transportation and Circulation

Wherever possible the plan incorporates existing streets and future streets, realignments, and connections were noted. The mass transit route and terminals are also designated thereon.

The plan consists of providing easy and convenient access to and from major and minor traffic generators, better access to major traffic routes, extension of existing streets for traffic continuity, and separating local and through traffic routes. Due to topography and existing streets and land use, the overall concept is one of an enlarged grid pattern controlled by points of freeway penetration and established and anticipated traffic volume movements. The major highlights of the plan can be divided into general and specific elements, as follows:

- Extension of existing streets to insure adequate circulation for future growth.
- Recognition of existing and future land use, with provisions to adequately serve these facilities with proper streets.
- Provisions for sufficient right-of-way and roadway widths for major and minor streets.
- Provisions for a future mass transit system route, and related terminals.

EXISTING CONDITIONS

The legitimate resource needs of our society require an adequate inventory, description and delineation of these resources. Also, the conscientious environmental assessment of the Bedford City Plan: 1971-1991 and the responsible land planning of that community requires this basic information in order to alleviate any unintentional development costs, maintenance costs or environmental degradation costs. These resources are investigated herein:

Climate

The subhumid climate of Bedford is similar to that of most of Tarrant County - annual average rainfall of 32 inches and a mean annual temperature of 66° F. The greatest amount of precipitation occurs during the months of

April, May, June and October. Hail falls about three days out of the year, and measurable snowfall occurs one or two times a year. Neither snow nor hail are important sources of moisture. The growing season is usually long with close to 248 frost-free days. The wind is predominantly from a southwestern direction but with strong northwestern winds occurring during the winter months.

Geology

The rock strata, geology, is the "basement" to the community. Knowledge as to structural competence, hydrologic character and mineralization will allow proper use of the available resources.

Bedford lies upon the westward outcropping of the Woodbine formation. The formation has a maximum thickness of 310 feet in Tarrant County decreasing in thickness to the south. Like most of the strata of the county, the Woodbine formation dips gently southeastward. According to Leggat <u>Geology and</u> <u>Ground-Water Resources of Tarrant County, Texas</u>, Texas Board of Water Engineers Bulletin 5709, 1957, the Lewisville and the Dexter member are the two members of the formation identified in Tarrant County.

The Dexter member is 80 to 100 feet thick and is extensively crossbedded, massive to thin-bedded fine-grained iron-stained sandstone and laminated as well as sandy clay. The red color of the outcrop is due to the oxidation of the accompanying iron and manganese mineral staining the sands.

11-18

The Lewisville member lies above the Dexter member and consists of at least 200 feet of laminated lignitic (low grade coal) and iron-bearing sandstone, vari-colored and sandy clay interbedded with seams of lignite and gypsum.

The Woodbine formation is an important source of ground water for domestic use, but most of the wells are drilled into the sands of the Dexter member. Generally, the water from the Lewisville member is too mineralized for practical use.

The foundation-bearing quality of this formation is approximately 15,000 psf plus and is overlain by thick, active sandy-clay soils. The movement of the basal clays of the Woodbine as well as certain overlying paleo-soils are responsible for paving and pipeline failure in Tarrant County and must be considered a constraint in their development.

The Woodbine formation does not yield large quantities of water in Tarrant County, and further hydrological statements will be found under the heading Hydrology.

Physiography

Bedford lies within the East Cross Timbers Land Resource Area. This area is delineated according to topographic character, soils and plant and animal assemblage.

The southeastward dipping beds of the geology are disected by the north-south trending drainage streams of the area. The drainage divide between the Bear Creek and Trinity River drainage basins is expressed by the topographically high, rounded, wooded plateau which is on a down-dip or northwest-southeast trend. This plateau is upheld by the more competent basal strata of the Woodbine Formation.

It should be suspected that the complete area was forested but now only definable stands of oaks are found. The open grass lands which are generally fringed with trees give a pastoral texture to the area. The area's quasi-natural beauty and proximity to the new regional airport will cause Bedford sites to be in great demand in the future.

Hydrology

Hydrology is concerned with the total distribution of water. It is concerned with the quantity and, here, the quality of that water.

Bedford, Texas, derives its available water from the local precipitation (average 32 inches per year) and local aquifirs. The surface area is divided between two drainage basins: Trinity River and Little Bear Creek.

Surface water runoff is rapid and probably accounts for more than forty percent of the precipitation. This runoff factor is caused by the slow infiltration rate and permeability of the soil. This runoff factor should increase during development to sixty or eighty percent, depending on the density of urbanization.

The infiltration rate is slow and is caused by a slow permeability of 0.06 in./hr. to 0.20 in./hr. of the soils.

The two aquifers available to Bedford are the Trinity Group (Paluxy sands and Travis Peak formation) and the Woodbine. The Trinity Group is the primary aquifer while the Woodbine is considered the secondary aquifer. A primary aquifer is defined as an aquifer capable of supplying large quantities of water over a large area of the basin, while a secondary aquifer is only capable of supplying large quantities of water in small areas.

The Trinity Group exhibits a transmissibility coefficient of 4,000 to 7,000 gpd/ft. in Denton County and a coefficient of storage of 0.000065. Water from the Trinity Group is a sodium bicarbonate type of good quality. Dissolved solids generally range from 400 to 600 ppm. Chemical analyses show that the chloride and sulfate contents are low. Generally, iron content is low (less than 0.3 ppm) but may present some problem. The fluoride contents are not evident. It has a total hardness of 300 to 400 ppm and is considered hard.

The Woodbine aquifer was a coefficient of transmissibility of around 1,000 gpd/ft. with a coefficient of storage undetermined. The quality of water of the Woodbine is the poorest of the available aquifers. It is a soft, sodium-bicarbonate type of water and generally high in dissolved solids, sulfate, fluoride and an excess of iron (less than 1500 ppm dissolved solids).

Soils (Pedology)

At the present time there is no comprehensive soil study of Bedford which is not more than forty years old. Sporadic small areas have been mapped and identified by the Soil Conservation Service during the past fifteen to twenty years, but most of these are considered inadequate for urban development use.

The following general analysis was developed from field observations, technical opinions of the Soil Conservation field technician, Ralph Hill, and the earlier Soil Conservation Service field mapping and reports. Under no circumstance should this analysis be considered as a substitute for a comprehensive soil analysis of the area.

The soils of Bedford are predominantly highland sandy-loam soils. The soils are a reflection of the parent geological material or paleo-terrace deposits.

Generally, the soils contain a high percentage of montmorillonitic clay. Most of the soil species exhibit a high water erosion potential, slow infiltration rate, a moderate to high runoff rate, a moderate to high shrink-swell potential, low traffic-support capacity and a moderate to high corrosion potential.

The important property that characterizes the montmorillonitic type of clays is the absorption of water in the crystal lattice. It has been shown that the lattice expands and contracts according to the amount of water present. There is little bonding force between the adjacent sheets of the lattice, and water may enter and cause it to swell twice the thickness. As the water is squeezed out during drying, the lattice shrinks. Because of the expansion and contraction of montmorillonitic clay it is poor material for low structure foundations and usually have low permeabilities.

Runoff is defined as the portion of precipitation that makes its way towards streams, channels, lakes or oceans as surface flow. Part of the precipitation is intercepted by the vegetation. Some of it is stored in depressions on the ground surface and is called surface detention. Some of the precipitation is absorbed and held by the soil, and that amount is dependent upon the infiltration characteristic and soil-moisture condition at the time of precipitation. Runoff occurs when the rate of rainfall, or the rate at which the water reaches the ground, exceeds the infiltration rate or the ability of the soil to absorb water in a sloped area. So it is seen that the low infiltration rate and the moderate rolling topography will not allow for much water retention and accounts for the high runoff rate.

The low infiltration rate is a consequence of the clay content which will not allow the deep penetration of surface moisture. The rate also indicates a low permeability.

The shrink-swell potential is a quantitative measure of the swelling and contraction of the soil due to water content. This shrinking and swelling property causes the soil to buckle streets and sidewalks, crack foundations, and rupture water and sewer pipes as well as any other buried utilities.

The traffic support capacity is the ability of the undisturbed soil to support moving loads and indicates the desirability of the soil as subgrade material. A low traffic support capacity would indicate that the soil would require stabilization when used as a roadbed.

The high water-erosion potential means that the soil is easily eroded by moving water. There are two steps in the erosion process. The first of these is detachment, the breaking away of particles or small aggregates at the surface of the soil. The second step is transportation, which results in the actual loss of soil material. For detachment to occur, the energy of the moving water must be able to overcome the forces responsible for maintaining the soil in a coherent state. Therefore, a well aggregated, fine textured soil may erode less readily than a noncoherent sandy loam soil. The erodability of a sandy soil is because the sand particles have very little cohesive force and weaken any aggregate. Rainfall erosion is controlled by five major factors: (1) the nature of the rainfall as determined by its frequency, intensity, and seasonal distribution; (2) the soil as it affects infiltration and susceptibility to detachment and transport; (3) the steepness and length of slope; (4) the nature of the cover provided by plants and their residues; and (5) cultural and soil management practices that reduce runoff by modifying soil and cover conditions.

All metals corrode to some degree when buried in the soil. The corrosion potential is a quantitative measure of corrosivity of a particular soil.

II=23

This potential depends on the physical, chemical, electrical and biological characteristics of the soil, as well as some external factors as man-made electrical currents. Water mains, gas pipelines, communication lines and sewer pipes buried in the soil may break if not protected from the inherent electro-biochemical reaction occuring in the soils of Bedford, Texas.

Vegetation

Bedford's vegetive cover is dominated by the Post Oak Upland Forest and the Cedar-Elm Streamside Forest. In some areas a Purplethree Auch-Ragweed Abandoned Old Field community can be found.

The upland Post Oak Community is structurally simple. The long-lived post oak, <u>Quercus stellata</u> is the dominant species while the short-lived blackjack oak, <u>Q. marylandica</u>, occurs in areas which have been cut or fired and allowed to repopulate. The blackjack oak is usually competitively eliminated in a semi-disturbed stand within fifty years (its seedlings are shade intolerant). The winged elm, <u>Ulmus alata</u>, and Texas hickory, <u>Carya texana</u>, are subdominant and discontinuous.

With stream dissection of the undulating Woodbine plain, two factors alter the vegetation pattern (1) stream silt deposited during flood stage and changes in nutrient and ion retention, water holding capacity and gas exchange; and (2) the spring and fall inundation of the floodplains of the Little Bear Creek and its tributaries as well as those tributaries of the Trinity River.

The increased complexity of the Hackberry-Cedar-Elm Streamside Forest is both laterally and vertically. It is controlled and dominated by the southern hackberry, <u>Celtis laevegata</u>, on the low terraces. The burr oak, <u>Quercus</u>

macrocarpa, and red ash, Fraxinus pennsylvanica, are principal secondary species with a few honey locust, <u>Glenditsia tricanthos</u>, and red mulberry, Morus rubra, in association.

The Upland Post Oak forest borders the streams where the topography is steep and floodplain development limited.

The shrub and herb strata are discontinuous. Coralberry, <u>Symphoricarpos</u> orbiculatus, is a desultory upland shrub, but no herb was consistently present. The presence of elderberry, <u>Sambucus sp</u>, <u>Elymus canadensis</u>, <u>Viola</u> <u>missouriensis</u>, <u>Ruellia strepens</u> and <u>Rivian humilis</u>, indicate a near climax forest condition in the floodplain forest - this all depends on their quantitative value.

It is suspected that these two forests covered Bedford before settlement. Since that time, the forests have been reduced to their present level. Planned urbanization will continue to reduce their presence; therefore, those stands along the drainage ways and those which form the most impressive park sites should be set aside. It should be remembered that the post oak is a long-lived and slow-growing species, and they should be saved where development will allow.

It should be noted at this point that the willow, <u>Salix nigra</u>; cottonwood, <u>Populus deltoides</u>; and the sycamore, <u>Platanus occidentalis</u>, will easily pioneer in the bottom lands but are short-lived. They can be used in areas where one needs quick shade.

Many people point out that the edaphic factors - those physical factors such as soils which alter a natural climax community - make the East Cross Timbers

unique in a region of midgrass prairie. This narrow band of trees which exists on the sandy substrata has been under attack since settlement began. The community priorities will determine the degree of impact Bedford will make on the forests. A complete obliteration of the forest would be a sad thing since it houses wildlife, creates an aesthetic atmosphere and sound buffers, as well as controlling precipitation runoff; and an effort should be made to maintain a great percentage of this cover.

Wildlife

The wildlife community is part of the diversity of the ecosystem existing within the boundaries of Bedford. As previously noted, ecologically speaking a diverse community is the most stable. Also, the presence of wild native animals provides a positive aesthetic value and enhances the enjoyment of an area.

This part of the community is made up of three major parts: amphibians and reptiles, birds and mammals. While time did not allow an extensive study the following lists have either been sighted by the investigator or should be expected in this area. The quantity of individuals was not taken, but their population is believed to be reduced relative to the reduction of their natural habitat.

Amphibians and Reptiles - Few quantitative data are available on amphibian and reptilian population densities and their roles in the dynamics and stability of ecosystems. Recent studies of their energetics and metabolism indicate they are extremely efficient in secondary production and are probably important in the energy flow and production dynamics of ecosystems. Also, their carnivorous habit is believed to function in regulation of

numerous populations of invertebrate and vertebrate herbivores (mice, army worms, etc.). A list of amphibians and reptilian species which should be expected is found in Appendix 'A'.

<u>Birds (Aves)</u> - The listing of birds is primarily from the Audubon Society and on-site observation. The ability of birds to enhance the environ with the presence of their song, color and activity has been noted by poets, men of letters, naturalists and the average home owner.

Compared to the bird population and variety believed to have existed before Southlake began its growth, the numbers are greatly reduced. This loss is probably due to loss of habitat and increased noise, toxic fumes and waste.

A list of expected resident and migrant species is found in Appendix 'B'.

<u>Mammals</u> - The mammalian fauna is considerably less than was present several decades ago. The encroachment of man on their habitat, the reduction of their food supply and the general polluting quality (noise, fumes, waste and erosion) of man has caused many to move on to the less intensely used areas of the state.

Those species most prevalent are able to live with man and exploit the situation while others like deer, raccoon and armadillo require a more primitive existence.

A general list of those species which should be expected is found in Appendix 'C'.

Those species of interest to the hunter include only foxes, squirrels and white-tail deer. The former are seen occasionally and provide a limited source for hunting pleasure. Deer are rare in the area, and only several

years of reforestation and discontinuation of urbanization would allow for source for hunting pleasure. Deer are rare in the area, and only several years of reforestation and discontinuation of urbanization would allow for their return.

PLAN ASSESSMENT

No doubt increased urbanization and population will have a profound impact on the existing natural and man-made environment. During this urbanization it should be recognized that a more intense use of the environment and its resources are essential. Therefore, guidelines which permit a maximum but wise use of the environment with its resources are far more realistic than highly restricted use or total preservation. A balanced ecological use of the environment equals conservation.

The assessment consists of environmental impact statements for the Land Use Plan, Transportation Plan, Public Facilities Plan and Utilities Plan and shall evaluate the effects of the environment on the plan and the impact of the plan upon the environment. The assessment attempts to enumerate the beneficial and the adverse environmental effects of the plan, noting those adverse effects which cannot be circumvented through plan alteration. Alternatives are given for those adverse portions of the plan which can be made environmentally acceptable.

According to HUD the environment is not defined in the basic legislation. It is easily inferred from Section 102 of the Act and in other parts of the Act that it is broadly defined to include physical, social and aesthetic dimensions and that interdisciplinary analyses are required well beyond the normal technical and economical consideration. Pertinent examples of

environmental considerations are: air, water, and noise pollution; erosion controls; natural hazards; land use planning; conservation of flora and fauna; urban congestion, prevention of urban sprawl, etc.

General Observations

The encroachment on the natural environment by the urbanization of Bedford, like any land development, will cause an environmental stress on the various existing ecosystems. With ultimate development, the residential land use will exceed 2,800 acres, the road system will exceed 1,250 acres, and the commercial and industrial land uses will be around 900 acres. Their development will cover a large percentage of the land and the aquifer recharge area.

The physical city will crowd the natural community, replace the niches, remove the feeding and breeding grounds - fields and forest - and generally destroy the natural order of things. The normal activities in the city will create levels of noise pollution, air pollution, water pollution, and congestion which cannot be tolerated by most of the existing wildlife and plants.

Transportation and Circulation Plan

Technically, the Transportation and Circulation Plan is well developed. The plan utilizes existing roads, developing an efficient semi-grid pattern scheme. Utilization of the existing roadways, as mentioned in the plan, shows very little consideration for the topographic and drainage texture of the area. While the rolling characteristic of the topography does not hinder the grid pattern of the system, the alignment of State Highway 121 and the proposed mass transit system does create an unnatural breakup of the city.

The main environmental constraints are the high shrink-swell potential of the soils making it necessary to stabilize the subgrade and the drainage pattern which will make it necessary to construct bridges and subdrains.

Generally, a community uses about 25% of its land area in streets and in circulation systems. This removes the availability of the land for other uses; reduces the recharge area of the aquifer and creates physical barriers to all foot traffic by man and beast.

The statistics developed in the plan indicate an abnormally high percentage of the land being developed in roads and alleys which, of course, is caused by the disproportionate amount of land devoted to freeway facilities. Also, the plan favors and encourages the exclusive use of automobiles for intra-city travel. In other nations streets are designed for people, like walks and bike trails, and result in design and location of buildings which are more convenient for people's use and are less time consuming in getting to and from the desired designation. It is ironic that the transportation plans of our society should be built around the dimension of our high speed machine - the family auto - and not around the family needs. The streets should not be a threat to the community where one fears to walk day or night, but should be designed to be an integral part of the community life.

The increased traffic loads along the major thoroughfares and arteries will affect the quality of the air (due to vehicle exhaust), water (due to precipitation runoff washing the streets), and will greatly increase the noise incidence.

While nothing can be done about the alignment of State Highway 121 or the mass transit system through Bedford, a greenbelt can be developed along their length for noise and air pollution absorption. The use of trees and other vegetation as a traffic noise buffer has strongly been suggested for some time by Boyce (1969), Doolittle (1969), Spelbaus (1969), and others. A reduction in noise level is ascribed to absorption by ground cover and tree foliage

and multiple scattering by tree limbs and trunks. Most investigations have demonstrated greater vegatative sound attenuation as the sound frequency increases but Embleton (1963) suggested that attenuation is independent of frequency within the 200 to 2000 cps band for all tree types studied. Meister (1957) stated that a "relatively dense woods" would have an attenuation effect on traffic noise of between 0.16-0.18 db per meter. He concluded that a residential development would have low traffic noise if it was separated from a main traffic artery by woods 200 meters (660 feet) in width.

The ability of trees to lessen the amount of pollutants in the air has been demonstrated by Doolittle (1969), Rich (1968), and Spelbaus (1969). Air contaminants are either aerosols, very small particles of solid or liquid matter that can remain suspended in the atmosphere for extended time periods, such as smoke, fumes, dust pollen, fibers and microbial spores; and gases such as oxides of sulfur, nitrogen and carbon which photo chemically produces gases such as ozone, peroxyacetyl nitrate and related materials.

Numerous studies evaluating interception of airborne particles on plant foliage do provide indirect evidence to support the contention that trees can effectively filter certain aerosols. Elder and Hosler (1954) found that ragweed pollen was significantly reduced by interception in a Pennsylvania forest canopy.

The ability of plants to improve air quality by absorbing gaseous contaminants is even less appreciated. Plants are known to absorb sulfur dioxide and transform it into sulfates and to absorb carbon monoxide and carbon dioxide transforming them into oxygen during transpiration.

While the plan does not specifically delineate the neighborhood circulation pattern certain policies should be adopted in order to best serve the community:

- Streets should parallel topographic contour lines as closely as possible to reduce velocity of water runoff.
- That street coverage should not be anymore than 20-25% of the land area in any sector of the city.
- That alternative means of transportation should be made available within the neighborhoods and out of the neighborhoods.
- That street construction should take into account the possible need for subdrainage due to the low percolation rate of the soils.

COMMUNITY FACILITIES PLAN

Public Schools and Playgrounds

The incorporation of the concept of an elementary school facility as a focal point of a neighborhood and the location of junior and senior high schools adjacent to major transportation arteries are well established planning practices. The plan well locates the various schools except for those noted in the plan. The development of the school-park (playgound) system will allow for a multi-use of the land and a preservation of open space.

The low traffic support capacity of some of the soils will require that some playgrounds will need to be reworked.

Park and Open Space Plan

The plan generates an ambitious but needed system of parks and open spaces. While this plan may accomplish its goals and objectives of aesthetics and leisure time uses, one must be aware of the influence the vegetation of this system has on the physical environment.

According to Borman, et al (1969), water quality is significantly conditioned if forests are present. Water from a forested area is characteristically clear and lacks appreciable amounts of silt and other debris. The presence of a

forest acts to condition the structure of the soil so that during periods when light, moderate and occasionally heavy precipitation fall it infiltrates the soil surface and percolates through the soil without causing significant erosion.

The influence of tree covering on urban flooding apparently varies with the nature of the flood according to Hoover (1962). During instances of minor flooding - intense but brief shower - they lessen resulting damage while during large floods their mitigating effect is thought to be slight if any at all.

The air and noise pollution control quality of vegetation, mentioned in the Transportation and Circulation Plan Assessment, are also applicable here.

PUBLIC FACILITIES PLAN

This plan covers the development of the City Hall Complex, Police Station, Fire Station, Library, Community Recreation Centers and Facilities, Hospital, Municipal Maintenance and Service Center, and Drainage.

The environmental impact of all these facilities, with the exception of the drainage, is equivalent to the coverage and replacement of the natural system. Their cultural or man-made quality will be determined in their design and the functional efficiency by the location.

The single function drainage system such as paved culvert and storm drains reduces the available open space, creates urban barriers, and increases the cost of primary drainage. Proper design of streets and curbs for decreased runoff velocity, secondary drainage design incorporated in site plans, and the "blue-green" development of the drainageways will greatly reduce the cost monetarily and/or aesthetically to the community.

Utility

The utility plan consists of the water and sewage plan. They are both technically correct. The movement of the soil due to the shrink-swell potential and creep will need to be considered in their design to allow for long term usage. The erodibility of the soil will require construction erosion precautions to be taken such as settling ponding, minimum removal of vegetation and guarding against over-steepened slopes.

Land Use Plan

The plan is basically well developed. Separation of non-compatible land uses will occur, and a general balanced development is planned. It reflects the four basic concepts set forth in the plan:

- 1. "....create an urban community compatible with anticipated social, economic and population growth..."
- 2. "....orderly expansion of all urban areas.."
- 3. "....recognizes the need for open green spaces as an integral part of Bedford's environment.."
- 4. "....streets and thoroughfares are designed to accommodate traffic generated by existing and proposed land uses.

The residential segment allows for a choice of housing type and density as well as being apart from the non-compatible land uses such as commercial and industrial land uses. The plan works against scattered housing which adds to the cost of services and uses up all the open spaces. The plan indicates approximately 44% of the land use will be residential. With the approach of complete development an open space park matrix should be considered. The preservation of the open space natural country texture can occur if higher density planned residential units were developed within an integrated linearpark and retention pond matrix which utilized the "blue-green" concept along the
north-south drainageway and a crisscrossing "greenbelt" concept along the major thoroughfares. This would allow for a reduction of development cost, service cost, a continuing recharge of the aquifer, a continuing contact with the existing natural elements, a reduction in the danger of runoff flooding, a decrease in the cost for storm drainage construction, the creation of an aesthetic matrix which will allow for the molding of a community with humans in mind. All of this would add up to a large savings monetarily and an increase in the valuation of the community.

State Highway 121-A and the proposed mass transit corridor divide the city into three east-west strips. While this will not probably affect the neighborhood unit, it will create some inter-neighborhood traffic problems by forcing people to use automobiles. The noise level from these transportation corridors will require sound proofing of structures adjacent to them and a deep setback.

The soil instability will generally cause foundation problems if the shrinkswell characteristic is not minimized.

According to the plan, a little more than 3% of the land will be used in commercial land use. While the neighborhood centers are strategically located on collector and thoroughfares, they should also be oriented to accommodate the foot and bike traffic from the neighborhoods in order to eliminate the necessity of the use of the automobile.

The CBD and planned regional shopping center are well located except for their division by State Highway 121-A. From a cultural environment point-of-view, the traffic generation and interference at 121-A and Central Drive could be very hazardous. The strip of commercial along 121-A adjacent to the industrial park is probably the best use except for possibly alternate development of a green-belt linear park.

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The industrial park is well situated with major transportation arteries on all three sides. A rush-hour transporation system linked to the adjacent communities, as well as the mass tranist system, would alleviate excessive traffic problems. Incorporations of a recreational park and liberal use of landscaping would create a good working environment instead of a sterile industrial park and would aid in the control of runoff as well as force recharge the aquifer.

In reviewing urban land development, it is obvious the natrual order of things will be disturbed. To minimize man's affect on nature and maintain a working relationship with nature one must note and minimize the possible occurances during urbanization;

- of coverage of the land with structures and pavement accompanied by the removal of topsoil and vegetation, the increase in precipitation runoff, and the displacement of the natural stable-complex ecosystem by a simple instable man-controlled system;
- of air pollution through trash burning, heating and cooling system emission, dust generation by power tools (lawn mowers, etc.);
- 3. of noise pollution from cooling compressors, lawn mowers and edgers, neighborhood recreation, increased auto traffic, and minibikes and motorcycles;
- 4. of water pollution through the leaching of commercial fertilizers and pesticides, septic tank sepage and overflow, urban trash and waste chemical washed by rain off the pavements;
- 5. of sight pollution through outdoor storage, bad site plan layout, billboards, signs, structural disrepair causing urban blight;
- 6. of congestion due to increased transportation interference; bad site plan layout with a loss of a sense of privacy and a loss of open natural space;

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7. of a loss of personal security due to an absence of a contact with nature and an aesthetic surrounding as well as a total dependence on a non-responsive busy urban community.

A community productiveness can be counted by the goods which it adds to the GNP, but the mass product and its greatest resourse is well-rounded functional human beings whose welfare is the measure of the community welfare.

The complexities of productivity are determined by more than the urban bounds of a community. While agricultural and natural productivity are drastically altered by the urban development of Bedford, the judgement of an informed community can eliminate the destructive use which occurs in most larger communities. By understanding the five basic ecological truisms stated at the beginning of the assessment, creating a partnership with nature and cultivating the good in man, the community can insure and enhance the long term productivity.

ENVIRONMENTAL CONTROLS

A national default of conscience produced our present level of environmental degradation. A general over-riding belief that producing goods for man was more important than cultivating the good in man has prevailed during the machine age.

The passage of the <u>National Environmental Policy Act of 1969</u>, <u>Public Law 91-191</u>, was the beginning of our overt recognition of this conscious failure. This act declared a national policy which would ".... encourage productive and enjoyable harmony between man and his environment and, promote efforts which would prevent or eliminate damage to the environment, and stimulate the health and welfare of man..".

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This act strengthened existing national acts such as the Refuse Act of 1899, the Fish and Wildlife Coordination Act, and the Federal Water Pollution Control Act.

The area of environmental control vested in the municipalities comes from the above mentioned acts, state regulations, and local ordinances. The areas usually covered are: air, water, and noise pollution with controls on solid waste, congestion, visual pollution, and land pollution.

Air Quality Control

- The federal <u>Clean Air Act of 1963 (Public Law 89-272)</u> set forth national standards for autombile emission.
- 2. Under the Federal <u>Air Quality Act of 1967 (Public Law 90-148)</u>, authority was granted to cities of the United States to implement air pollution control programs with the federal government assisting in the form of a matching funds grant. This act also preempted states from adopting automotive emission control standards.
- 3. The State of Texas has passed the <u>Clean Air Act of Texas, 1967</u>, <u>(Art. 4477-5)</u> which was enacted to ".... safeguard the air resources of the state from pollution by controlling or aboting air pollution..". The official rules and regulations are promulgated by the Texas Air Control Board, Order No. 68-1 (January 3, 1968). The regulations are titled:
 - a. Control of Air Pollution from smoke, visible emission, and particulate matter.
 - b. Control of air pollution from sulfur compounds.
 - c. Control of air pollution from motor vehicles.
 - d. Control of air pollution from volatile organic compounds and carbon monoxide.

- e. Control of air pollution by permits for new construction or modification.
- f. Control of air pollution from nitrogen compounds.
- g. Control of air pollution emergency episodes.

According to Lewin, et al (1970), "".... While there is not a great deal of doubt as to the ability of a municipal corporation to take certain steps to control air pollution under its police powers, it is still necessary to insure that any action taken does not exceed charter, constitutional, or statutory limitation..". Lewin develops a model code for air pollution control and gives a listing for air quality aid programs. The City of Fort Worth City Ordinance No. 5965 (July 8, 1968) may also be used as a model.

Water Quality Control

The Federal Water Pollution Control Act was amended in 1972 by the Water Quality Act which required the states to set water quality standards for all interstate waters or portions thereof and to provide means of enforcement. Through the coordination of the enforcement of the Rivers and Harbors Act of 1899 with the enforcement of the Federal Water Pollution Control Act, regulatory authority can extend to intrastate waters where no Federal Water Quality Standards apply.

In compliance with the requirements of the Federal Water Pollution Control Act and the Water Quality Act, the State of Texas has passed the <u>Injection</u> <u>Well Act of 1969</u>, the <u>Solid Waste Act of 1969</u>, the <u>Water Pollution Misdemeanor</u> <u>Act of 1969</u>, the <u>Texas Water Quality Act of 1967</u>, and the <u>Texas Water Quality</u> <u>Standards Summary (April 1972)</u>. Texas Water Quality Board Order # 70-0828-5 has controlled the discharge of hazardous metals into the streams of Texas.

^{*}Lewin, S. F., A. H. Gordan, C. J. Harteluis (1970) Law and the Municipal Ecology: Air, Water, Noise, Over-Population, National Institute of Municipal Law Officers, p. 199.

In order to simplify procedures, avoid delays, save expenses, and facilitate the administration of the Texas Water Quality Act, Injection Well Act, and Solid Waste Disposal Act, the Texas Water Quality Board has written the Rules of the <u>Texas Water Quality Board</u> (1970), which is a review of the laws administered by the State of Texas.

Also the State Department of Health has written a standard for home water supplies. This may be obtained from the County Health Department as <u>Individual</u> Home Water Supplies publication.

Noise Pollution Control

According to Lewin, et al (1970), to combat urban noise, most municipal corporations have found it necessary to pass their police power ordinances making excessive or unnecessary noise coming from certain sources illegal.

The municipalities have the power to regulate noise by ordinances to preserve the public peace and tranquility, to abate noise as a nuisance and use-by category zoning.

Lewin, states that ".... constitutional questions raised in regard to minicipal noise prevention or abetment ordinances have at times caused municipal ordinances to be struck down for being vague..". Noise ordinances do not need to set decibel limits in order to be constitutional, but a decibel ordinance does avoid the question of vagueness.

In Law and the Municipal Ecology by Stuart F. Lewin, on page 77, is a model noise ordinance developed from over 100 municipal ordinances.

The city can assist in a lower noise level by requiring quieter tires to be used on their vehicles and that the noise level of all municipal-bought equipment be rigidly specified.

Solid Waste Control

Solid waste and municipal waste are covered under the water quality controls presently.

Congestion Control

This can be population concentration and size or spot congestion due to movement of people during their daily activities.

The municipality has the power to control transportation and circulation within the city limits through their urban plans, capital improvements, ordinances, and the development of "people and goods movers."

The control of population concentrations is through dwelling unit concentration regulation. While the number of families in a dwelling unit are controlled, there is no control on the size of families. The size is presently a moral issue that might need to be answered soon.

Visual Pollution Control

The average city has visual pollution of all sorts - billboards and signs garish and pleasing and juxtaposed so as to create eye "noise" (there is no symmetry to their location or design); power transmission line mazes creating a forest of steel and deadwood; string development of businesses and almost no rational pattern of relationships among different use zones.

While sign zoning regulates size and placement, it does not regulate the garishness or appropriateness of the signs. Presently the aesthetics cannot and probably should not be regulated by legislation.

Land-use zoning has been used in most cities to control development and spread of non-compatible land uses. Instead, it has served as a method for realization of great profits by real estate interests and speculators creating the unwanted

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incompatible land uses and eventual urban blight - the worst sort of land clutter and visual pollution. Use of capital improvement programs to control extent and degree of public service would snub speculation, reduce cost to the community in developing services and control when, where and what type of development would take place. Density zoning and fire protection zoning are two other methods which could be used in conjunction with the Comprehensive Plan. Haphazard development is not equated to quality or economy, but is a waste of the community resources.

SUMMARY OF PLAN ALTERATIVE AND ENVIRONMENTAL RECOMMENDATIONS

In summary, the following are recommendations and plan alternatives deemed necessary for preserving the environmental quality, both manmade and natural:

- Streets should parallel topographic contour lines as closely as possible to reduce velocity of water runoff.
- Road and street coverage should not exceed 20-25% of the land area in any sector of the city.
- Curbs and gutters should be minimized in the community development, and the streets should be built as berms creating empoundment for forced recharge of the aquifer.
- Alternative means of transportation within the community should be developed, such as walkways, bike and horse trails.
- Greenbelts along the transportation routes should be developed in order to increase the aesthetic quality, absorb noise and air pollution, and control screening of other land uses.
- That trees and other vegetation should be prudently removed in order to preserve as much of this natural amenity.
 - That a "blue-green" and "greenbelt" matrix be adopted as a development criteria for the community.

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- That erosion prevention projects and precautions should be taken during and after development so as not to lose topsoil and pollute the watershed with silt.
- That multi-purpose drainage systems be adopted as a development criteria for the community in lieu of the paved culverts or drain pipes.
- That residential developments should limit their coverage of open space and forest through the development of row-house, cluster housing, patio houses, garden apartments, condominiums, townhouses, etc.
- That commercial pesticides and fertilizers should be minimally used with mulching, organic fertilization and the development of the natural prey-predator association for pest control be used instead.
- That commercial sites should plant trees in their parking lots and landscape to meld into the community.
- That neighborhood shopping centers should be an integral part of the neighborhood by virtue of their aesthetics, function and safety.
- That no industrial sites should be allowed in the residential segment west of Sate Highway 121-A.
- That the planned industrial park incorporate a garden park and recreation facilities for the employee enjoyment and aesthetic quality of the park.
- That all residential land uses be kept above the 50-year flood line.
- That all developers be responsible for the initial unimproved land runoff of their property (riparian-rights law).
- That no liquid runoff, storm or otherwise, from commercial or industrial sites should be allowed to enter the street gutter system or storm drain system without removal of polluting elements such as oil slicks, wash chemicals, trash, sillage, etc.
 - That regional and national pollution laws should rigidly be enforced.

- That sign location and type be highly regulated so they are not the cause of "sight pollution."
- That outdoor storage commercial, industrial or individual should be aesthetically screened if not included.
- That a request for regular monitoring of air pollution should be made to the court or the City of Fort Worth.
- That school and park site acquisition should occur together.
- That solid waste should not be disposed of in unsealed landfills within the Woodbine aquifer recharge area.
- That at least one-third to one-half of Bedford be left uncovered by urban development and remain as an open recharge area for the aquifer.
- That septic tanks not be allowed because of the soil condition and their pollution of the surface and ground water of the area.

It should be remembered that planning is a conscious process in which data are developed and analyzed, and a program is formulated to bring about a desired result - the plan is the program of action to bring about desired results.

APPENDIX 'A'

AMPHIBIANS AND REPTILES *

Scaphiopus holbrooki Eastern spadefoot

Bufo debilis Girard--Green Toad

Bufo speciosus Girard--Texas Toad

Bufo woodhousei Girard--Woodhouse's Toad

Chelydra serpentina Snapping Turtle

Kinosternon flavescens Yellow Mud Turtle

Pseudemys scripta Pond Slider

Terrapene ornata Western Box Turtle

Acris crepitans Baird--Cricket Frog

Pseudacris clarki Spotted Chorus Frog

Rana castesbeiana Shaw--Bullfrog In or near temporary breeding ponds in pastureland

Rocky hillsides and grasslands; often under rocks

City streets, county roads and temporary pools of water in grasslands

City streets, county roads, gardens, temporary pools of water in grasslands, ponds

Ponds, ditches, streams; sometimes seen on roads

As above

Ponds, streams, reservoirs; most often observed sunning on logs and sometimes seen on roads

Grasslands, woodlands, streamside forests, residential areas, pastures, county roads

Ponds, streams, flows, streamside forests

Streamsides borders by pasture, ponds, temporary rain pools

Ponds, streamsides and reservoirs

*After Fitzpatrick, L.C. (1972) A Systems Evaluation of the Environmental Impact of the Aubrey Reservoir Project on Elm Fork of the Trinity River In North Texas; U.S. Corps of Engineers.

Appendix 'A' Page 1 of 3 Amphibians and Reptiles - Continued

Rana pipiens Schreber--Leopard Frog

Trionyx spinifer Lesueur--Spiny Softshell

Phrynosoma cornutum Texas Horned Lizard

Sceloporus olivaceus Texas Spiny Lizard

Eumeces septentrioalis Prairie Skink

Lygosoma laterale Ground Skink

Haldea striatula Rough Earth Snake

Masticophis flagellum Coachwhip

Natrix erythrogaster Plain-bellied Water Snake

Natrix rhombifera. Diamond-backed Water Snake Ponds, streamsides and reservoirs

Ponds and streams with sandy shores and sandbars

Flower beds, yards, rocky fields, county roads, dry areas in fields near ant beds

Bases of trees, shrubbery, in and on old wood piles, under logs, around and in old deserted houses or barns

Prairie with sparse vegetation, rocky areas, and sandy soils interspersed with oaks, rotting logs in streamside forests, marginal vegetation at edges of ponds

Floodplains with streamside forests, under decayed logs and rocks in sandy pastures, rocky wooded slopes, rock and sand areas interspersed with oak, oak-hickory associations, residential areas

Rocky slopes, beneath planks and old boards, often under flat rocks in fields

Pastures, rocky slopes, grasslands, river bottoms, gravel pits, county roads

Creeks

Ponds and streams

Appendix 'A' Page 2 of 3 Amphibians and Reptiles - Continued

Opheodrys aestivus Rough Green Snake

Tantilla gracilis Flat-headed Snake Shrubs, underbrush, <u>Smilax</u> tangles; mostly occurs along stream systems

Rocky hillsides and fields, sandy to rocky pastures. Found most often under rocks

Agkistrodon piscivorus Cottonmouth Wooded streams, ponds with much marginal vegetation

Agkistrodon contortrix Copperhead

> Appendix 'A' Page 3 of 3

APPENDIX	9	B	1
BIRDS			

Species*	Resident	Migratory
Great Blue Heron		
Green Heron		++
Little Blue Heron		++
Common Egret		**
Gadwall		**
Pintail		
Green-Winged Teal		+
Blue-Winged Teal	++	
American Widgeon		++
Shoveler		++
Redhead Duck		++
Turkey Vulture	+++	
Black Vulture	+	
Cooper's Hawk	+	
Red-Tailed Hawk	++	
Swainson's Hawk		+
Marsh Hawk	++	
Sparrow Hawk	++	
Bobwhite	++	
American Coot	++	
Kildeer	***	
Upland Plover		+
Spotted Sandpiper		+
Sandpiper		++
Mourning Dove	++	
Screech Owl	++	
Great Horned Owl	+	
Chuck-Wills-Widow		++
Common Nighthawk		++
Chimney Swift		+++
Ruby Throated Hummingbird		++
Black Chinned Hummingbird		+
Belted Kingfisher	++	
Yellow Shafted Flicker		++
Red-Bellied Woodpecker	+++	
Downy Woodpecker	+++	
Eastern Kingbird		++
Scissor-tailed Flycatcher	+++	
Great-crested Flycatcher		++
Eastern Wood Peewee		
Horned Lark	++	
Bank Swallow		++
Barn Swallow		++
Cliff Swallow		+
Bluejay	***	
Crow .	**	
Larolina Unickadee	**	
Turted Trumouse	***	
	1	Appendix 'B'

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Birds - Continued

Species*	Resident	Migratory
Brown Creeper		+
House Wren		++
Carolina Wren	++	
Mockingbird	+++	
Cathird		++
Brown Thrasher	++	
Rohin	+++	
Fastern Bluebird	++	
Cedar Waxwing		++
Loggerhead Waxwing	+++	
Starling	+++	
Red-eved Vireo		++
Warblers (various)		++
House Sparrow	+++	
Eastern Meadowlark	+++	
Redwinged Blackbird	++	
Orchard Oriole		+
Boat-tailed Grackle	++	
Cowbird	++	
Cardinal	+++	
Blue Grosbeak		++
Indigo Bunting		++
Painted Bunting		+
Dickcissel		++
Savannah Sparrow		+++
Vesper Sparrow		++
Lark Sparrow		+++
Goldfinch	+	
Slate-colored Junco		++
Field Sparrow		+++
Harris' Sparrow		++
White Crowned Sparrow		++
White Throated Sparrow		++
Lincoln's Sparrow		++
Song Sparrow		++

* + = rare; ++ = occasional; +++ = common

Appendix 'B' Page 2 of 2 APPENDIX 'C' MAMMALS

SPECIES	GRASSLAND	UP LAND FOREST	STREAMSIDE FOREST
Onossum Didelphis marsupialis		***	* * *
Armadillo, Dosvnus novemcinctus	**	**	
Red hat. Losueruis borealis		**	**
Raccoon, Procyon lotor		**	***
Ringtail, Bassariscus astutus		*	
Spotted skunk. Spilogale putorius		*	
Striped skunk, Mephitis mephitis	*	**	*
Grav fox. Urocyon cinereoargenteus		*	
Covote, Canis lotrans	*	#	
Fox squirrel, Sciurus niger		**	**
Pocket gopher, Geomys bursarius	**		
Hispid pocket mouse, Perognathus hispidus	*		*
Long-tailed harvest mouse,			
Reithrodontomys fulvescens	**		
Grav harvest mouse.			
Reithrodontomys montanus	**		
Deer Mouse, Peromyscus maniculatus	**		
White-footed mouse, Peromyscus			
leucopus		**	**
Cotton rat. Sigmondon hispidus	***		
Eastern wood rat, Neotoma floridana		*	*
Muskrat, Ondatra zibethicus			**
Nutria, Myocastor coypus			*
Housemouse. Mus musculus	**		
Jack rabbit, Les californicus	*		
Cottontail, Sylvilagus floridanus	***		
Swamp rabbit, Sylvilagus aquaticus			*
White-tail deer, Odocaileus			
virginianus		*	*

* = rare, ** = occasional, *** = common

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APPENDIX 'D'

REFERENCES FOR TRANSPORTATION AND CIRCULATION PLAN

Boyce, S. G. (1969)	Trees can help humanize our cities, Journal of Forestry, 67: p. 462-3
Doolittle, W. T. (1969)	Research in urban forestry, <u>Journal</u> of Forestry, 67: p. 650-6
Elder, F. and Hosler, C. (1954)	Ragweed pollen in the atmosphere; Department of Metro., Pennsylvania State University
Embleton, T.F.W. (1963)	Sound propagation in homogenous deciduous and evergreen woods. Journal of the Acoustical Society of America, vol. 35, p. 1119-25
Meister, F. J. (1957)	Measurements of traffic noise in West Germany; Journal of the Acoustical Society of America, vol. 29, p. 81-4
Rich, S. (1968)	Plants as air purifiers, Frontier of Plant Science, vol. 21, p. 6-7
Spilhaus, A. (1969)	If trees could vote, Journal of Forestry, vol. 67, p. 8-10

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APPENDIX 'E'

RECOMMENDED UNIFIED RESIDENTIAL DEVELOPMENTS

It is evident that the coming trend in housing will be in some other land planning and land utilization technique than our present single-family detached dwelling unit. This trend is forecast to be cluster homes, town houses, "O" lot line, patio homes, etc., because of rapidly increased land and building costs. It is vital that the city have tools available to meet the anticipated demand. The following are recommended regulations governing the development of the above mentioned types of housing and would be optional, except in the "A-1" district. For instance, any single-family, two-family or multi-family residential zoned land, except "A-1", could be developed either as a typical residential subdivision or as a unified residential development using the guides set forth herein. The "A-2", "A-3", "A-4", "A-6" and "A-10" Zoning District text would be amended to read:

UNIFIED RESIDENTIAL DEVELOPMENT OPTION:

It shall be the option of the developer to utilize the requirements set forth in the UNIFIED RESIDENTIAL DEVELOPMENT section of this ordinance provided that the total area to be developed is not less than three (3) acres in size.

RECOMMENDED AMENDMENT TO ZONING ORDINANCES

UNIFIED RESIDENTIAL DEVELOPMENT PROVISIONS

Legislative Intent: It is the legislative intent of the City Council, in adopting these Unified Residential Development regulations, to encourage the most appropriate uses of land; clustering of residential structures to provide larger amounts of usable open space; consolidation of recreational facilities and other community amenities; reduction of costs of utilities and public services; recognition of problem building sites where unique topographic or other features preclude the normal building pattern of individual lots and blocks; and to encourage a better environment for the benefit of the occupants, the neighbors and the community as a whole.

Permitted Uses: The Unified Residential Development provisions are designed specifically for dwelling uses. The permitted uses shall be limited to single family dwellings, two family dwellings and multi-family dwellings constructed as detached, semi-detached, multi-family and apartment buildings; or as town houses, patio houses or condominiums; and accessory buildings and uses as specifically authorized in these regulations; or any combination of these which are in compliance with the building and other codes of the city.

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The Unified Residential Development shall be an optional use in Districts "A-2", "A-3", "A-4", "A-6" and "A-10":

Accessory Uses: Accessory buildings and uses customarily incidental to the primary uses permitted in the "A-2", "A-3" and "A-4" one-family district and "A-6" and "A-10" districts shall be permitted. The following uses shall also be

- 1. Recreation areas and spaces within buildings primarily for use of the dwelling occupants.
- 2. Kindergarten and day nursery primarily for use of the dwelling occupants.
- 3. Mechanical and storage buildings necessary for operation and maintenance of the project.
- 4. Garages and carports.

Site Plan Required: No permit shall be issued for construction in a Unified Residential Development area unless there has been a site plan approved by the City Plan Commission and a subdivision plat thereof recorded in the County Plat Records.

Site Plan Information Required:

- 1. The name of the record owner and the engineer, surveyor, architect or land planner responsible for preparation of the site plan.
- 2. The name of the subdivision; the names of adjacent subdivisions, the designation of adjacent unsubdivided property with property owners shown; the names and location with widths of adjacent streets; and numbers of all existing and proposed lots, blocks and tracts. The subdivision plat, in addition to a subdivision name, if any, shall be clearly labeled "Unified Residential Development Site Plan."
- 3. The following information shall be required on the preliminary plan:
 - a. The location of all building setback lines, utility easements, and emergency access easements.
 - b. Certificates of approval to be completed by the commission.
 - c. Profiles of grades for streets, when the grade exceeds 10%, other rights-of-way and easements if required by the commission.
 - d. North point, scale and date.
 - e. Topographic map with contour intervals as required (normally five foot intervals) by the commission, spot elevations may be required. Wooded areas shall be outlined.
 - f. Approximate outlines of the perimeter walls of buildings with their distances from property lines and each other building.

- g. Identification of open space, recreation space, car parking areas, driveways and other access features.
- h. A table showing the approximate net land area and the planned amounts of floor area, open space, recreation space and car parking spaces with their ratios to the net land area.
- i. A preliminary landscape plan for the entire net land area.
- 4. The following information shall be required on a final plat:
 - a. An accurate boundary survey of the property with correct bearings and distances, referenced to survey lines and adjacent subdivisions, and showing the lines of all adjacent lands and the lines of adjacent streets and alleys, with their width and names.
 - b. The location of lots, streets, public highways, alleys, parks and other features, with accurate dimensions and with all other information necessary to reproduce the plat on the ground.
 - c. A certificate of dedication of the plat and a copy of any restrictive covenants to be filed with the plat.
 - d. Waiver of any claims for damage to the city.

Submission, Hearing and Approval: Submission, hearing and consideration and approval of a Unified Residential Development Site Plan shall be in accordance with the rules of procedure of the City Plan Commission. The commission may deny, modify, approve, or approve with conditions.

The City Plan Commission may authorize and direct the chairman to execute its certificate of approval on Unified Residential Development site plans which are in strict compliance with the criteria and guidelines which the commission shall develop and promulgate for that purpose.

Procedure: The Planning Commission shall review only those plans prepared for land zoned "A-2", "A-3", and "A-4" single family, "A-6" duplex and "A-10" multi-family, as set out below:

- 1. Upon receipt of an application the Zoning Administrator shall make notification of a public hearing as set forth in the zoning ordinance.
- 2. The Zoning Administrator shall prepare a written report analyzing the development plan and such report shall be given to the Planning Commission and applicant at least three (3) days prior to the public hearing.
- 3. The Site Plan may, in some cases, be a two-phase document. The first phase (Concept Plan) shall illustrate and contain the applicant's request and suggestion for the use, configuration of building, parking, etc., and the second phase (Preliminary Plan) shall illustrate the development plan showing the suggestions and recommendations of the Planning Commission after review of Phase One. In either case the applicant shall provide as much detail as possible.

4. Upon approval of the Preliminary Plan the applicant shall proceed to prepare a final plat in accordance with Ordinance No. 28, Subdividion Rules and Regulations, as set forth herein.

General Requirements in all Districts

- 1. <u>Height Regulations</u>: The maximum permitted height for a building or structure in any unified residential development, shall not be limited except by other applicable codes and ordinances.
- 2. Front Yard: There shall be a front yard of not less than twenty feet on any portion of the site which has frontage on a public street. (This does not apply to public access easements.) The required front yard cannot be paved except for necessary driveways and must remain as open space. The City Plan Commission, for good cause shown at a public hearing, may modify or waive the front yard requirements on a Unified Residential Development site plan where all of the dedicated street frontage is in one block-face.
- 3. <u>Side Yard</u>: There shall be a side yard of at least ten feet adjacent to any lot not a part of the Unified Residential Development and which is zones resident purposes and is occupied by a use permitted in those districts; otherwise no Side Yard shall be required. Paved driveways are permissible in Side Yards.
- 4. Rear Yard: There shall be a rear yard of at least ten feet when adjacent to any lot not a part of the Unified Residential Development and which is zoned for residential purposes and is occupied by a use permitted in those Districts; otherwise no Rear Yard shall be required. Paved driveways are permissible in Rear Yards.
- 5. Where outside entrances to individual dwelling units are provided, no such dwelling unit need front upon a dedicated street.
- 6. Emergency access shall be provided to each principal building by:
 - a. A street or public alley; or by
 - b. A private way, alley, or paved place, delineated on an approved subdivision plat conforming to the requirements of Article 974a. Revised Civil Statutes of Texas. Access may also be provided by an emergency access easement approved by the City Plan Commission and recorded in the Tarrant County Deed Records, provided that where access is not available by a street, alley, place or recorded easement; and recorded easement access is planned, construction permits may be issued and construction may proceed by certificate of occupancy shall not be issued until the required emergency access easements are approved by the City Plan Commission and filed for record in the Tarrant County Deed Records. Emergency access easements shall be not less than twenty-six (26) feet in width, the boundaries shall be distinctly and permanently marked on the ground and the entrances shall be permanently marked by signs not less than two (2) square feet nor more than four (4) square feet in face area.

Appendix 'E' Page 4 of 5 The paved width of an emergency access easement may be reduced to, but not below, 20 feet provided that curbs shall not exceed 5 inches in height and further provided that there shall be no obstructions which will interfere with the use of the full 26 foot width of the easement by emergency vehicles and their appurtenances.

FLOOR AREA RATIO, OPEN SPACE, RECREATION SPACE:

The maximum floor area, the minimum open space, the minimum recreation space shall be as tabulated below for the district in which the Unified Residential Development is located:

DISTRICT	MAXIMUM ¹ F.A.R.	MINIMUM ² O.S.R.	MINIMUM ³ R.S.R.	MINIMUM PARKING
"A-2", "A-3"	28%	170%	15%	See Footnote 4
"A-6"	37%	120%	14%	11
"A-10"	43%	100%	13%	11

1_{F.A.R.} is ratio of floor area (all stories) to land area.

 2 O.S.R. is ratio of open space to total floor area.

 3 R.S.R. is ratio of recreation space to total floor area. (Exclusive of 0.S.R.)

⁴In any Unified Residential Development there shall be furnished and maintained one (1) car parking space for each 500 square feet of floor area in the dwelling, excluding mechanical and storage spaces; plus one (1) additional space for each 100 square feet of indoor recreation area; provided that the total number of car parking spaces required shall not be less than 1.5 per dwelling unit and need not exceed 2.5 per dwelling unit.

ADJACENT OPEN SPACE BONUS:

Subject to City Plan Commission approval, adjacent and abutting beneficial open space which has a reasonable expectance of perpetuity (such as a river or a public park) may be considered as bonus net land area for computation of the number of dwelling units permitted on a site, with these limitations:

- 1. Not more than 100 feet of the depth of the abutting open space shall be counted, and
- 2. The increase in the total floor area allowable by bonus open space shall not exceed 20%.

APPENDIX 'F'

With the adoption of the Unified Residential Development Section the following definitions should be added to the Zoning Ordinance:

CAR SPACE: A Car Space is the space required to park one motor vehicle. The number of car spaces required shall mean that all necessary ingress, egress and maneuvering space shall be in addition to the Car Spaces.

CAR SPACE RATIO: The Car Space Ratio is the ratio of the Car Spaces to one dwelling unit on the site. The total number of Car Spaces is the minimum number of car spaces per dwelling unit for the district in which the site is located times the number of dwelling units.

CLUSTER SUBDIVISION: A Cluster Subdivision is a grouping of individual building lots or sites in close proximity, each of which, or the majority of which, has less land area than required for isolated individual lots, with the additional area in the cluster subdivision being devoted to open space, recreation space, car spaces and access facilities in addition to required yards. Cluster Subdivisions are permitted by these regulations and are expressly encouraged subject to the performance standards of the Unified Residential Development.

DWELLING UNIT: A residential unit providing complete, independent living facilities for one family including permanent provisions for living, sleeping, cooking, eating and sanitation.

EMERGENCY ACCESS EASEMENT: An area other than a dedicated street or place, or an alley, which is maintained free and clear of buildings, structures and other obstructions for the purpose of providing free passage of service and emergency vehicles.

FLOOR AREA: The sum total of the area of all buildings on the Unified Residential Development Site excluding utility rooms and mechanical rooms, measured between the outer perimeter walls of the buildings, provided that space in a building or structure used for parking of motor vehicles shall not be computed in the floor area. Courts or balconies open to the sky and roofs which are utilized for recreation, etc., shall not be counted in the floor area but shall be part of the recreation space.

FLOOR AREA RATIO: The ratio of the total floor area to the net land area. The ratio is computed by dividing the floor area by the net land area and multiplying by 100 to read a percentage.

LAND USE INTENSITY: Land Use Intensity, which may be found abbreviated as LUI, is a modification of the Land Use Intensity Rating used by the Department of Housing and Urban Development to determine if a proposed project will be compatible, in density and amenity scale, to the neighborhood in which it is proposed.

NET FLOOR AREA: For purposes of the unified residental development Net Floor Area is defined as the area in the various floors of the building, measured between the exterior faces of the building, including mezzanines and interior balconies, but excluding:

1. All basements, subbasements and cellars whose ceilings are at or below grade (ground level of the finished building);

- 2. All interior spaces devoted exclusively to vehicular parking and loading and all access ramps and maneuvering area accessory thereto;
- 3. All arcades which have at least a 14 foot ceiling and are open to public traverse during the normal business hours of the building;
- 4. All courts.

NET LAND AREA: Net Land Area is all of the privately owned property embraced within the outer perimeter property lines, not including dedicated public streets. Dedicated rights-of-way for open space, drainage or access, approved private streets or dedicated easements which can be used by the land occupants for private purposes shall be included in Net Land Area. Where land is dedicated for future opening or widening of a public street such land shall not be computed as Net Land Area.

OPEN SPACE: The Net Land Area minus the Building Area, the Recreation Area and Car Space. Open space must be open to the sky and cannot be paved, with the exception of necessary sidewalks. All recreation space furnished in excess of the minimum space requirements may be credited 2:1 as open space.

OPEN SPACE RATIO: The ratio of the Open Space to the Floor Area. The ratio is computed by dividing the net open space by the floor area and multiplying by 100 to read a percentage.

PARKING SPACE: A minimum off-street parking space for passenger automobiles shall be considered to be nine (9) feet in width and eighteen (18) feet in length, not including maneuvering space.

PATIO HOUSE: An attached or detached one family dwelling unit with an outdoor area enclosed by walls to form a secluded outdoor living area.

RECREATIONAL SPACE: Outdoor space which is made available and maintained in a suitable condition to afford occupants space for passive and active recreational pursuits to the exclusion of all other uses and/or recreation rooms or buildings available to all occupants of the development.

RECREATION SPACE RATIO: The ratio of the Total Recreation Space to the Floor Area. The ratio is computed by dividing the total recreation space by the total floor area and multiplying by 100 to read a percentage. All Recreation Space furnished in excess of the minimum recreation space requirements may be credited 2:1 as open space.

TOWN HOUSE: (Sometimes referred to as Row House). A single-family dwelling constructed as part of a series of dwellings, all of which are either attached to the adjacent dwelling or dwellings by party walls or are located immediately adjacent thereto with no visible separation between walls or roofs.

UNIFIED RESIDENTIAL DEVELOPMENT: For the purposes of this ordinance a Unified Residential Development is defined as a grouping of residential structures, with their permitted accessary buildings and uses, open space, recreational spaces, car parking spaces and emergency access facilities; all developed, or proposed to be developed, on a tract of land initially under single ownership or unified control as opposed to the usual development of one dwelling on one lot of record; having approval of the City Plan Commission and being recorded in the County Records; all to the aim of permitting more flexible and innovative land use while securing greater amenities of livability space, recreational space and car space to the benefit of the occupants and the community. Within the limits of the performance standards for a Unified Residential District, as set out below, Unified Residential Developments shall include "Cluster Subdivision," "Row Houses," "Patio Houses," "Town Houses" and "Mixed Use Structures."

UNIFIED RESIDENTIAL DEVELOPMENT SITE PLAN: A plan which shows existing and proposed physical features together with data in respect to number of dwelling units, floor area ratio, open space ratio, car space ratio and such additional data as will furnish the City Plan Commission a complete picture of the proffered Unified Residential Development; and which will provide inspection personnel sufficient data for processing of permit applications. The use of the words "site plan" for the purposes of this definition shall mean a Unified Residential Development Site Plan.

APPENDIX 'G'

RECOMMENDED CHANGES TO ZONING ORDINANCE - ORDINANCE NO. 29

Recommended "PUD" Planned Unit Development District

USE REGULATIONS: The purpose of this district is to accommodate planned associations of uses developed as integral land use units such as industrial parks or industrial districts, office, commercial or service centers, shopping centers, residential developments of multiple or mixed housing, or any appropriate combination of uses which may be planned, developed and operated as integral land use units either by a single owner or combination of owners. This district is designed to permit flexibility and encourage a more creative, efficient and aesthetically desirable design and placement of buildings, open spaces, circulation patterns and to best utilize special site features such as topography, size and shape.

For purposes of this district the following definition shall apply:

Residential Planned Unit Developments

- Dwelling units grouped into clusters, allowing an appreciable amount of land for open space.
- Project with much or all its housing in townhouses or apartments or both.
- Higher densities than conventional single-family projects of the same acreage.
- Part of the land used for nonresidential purposes, such as shopping or employment centers.

Nonresidential Planned Unit Developments

- Commercial or industrial uses grouped into clusters, allowing an appreciable amount of the land for open space or joint use such as parking and storage.
- Commercial or industrial projects with part of the land used for residential purposes.
- Single purposes commercial or industrial uses of innovative land utilization.

Height Regulations: The maximum height requirement for permissible uses in this district shall conform to the maximum height requirements which would be applicable to such uses if the same were situated in the most restrictive districts in which such uses are permitted. However, the zoning commission shall establish specific heights after consideration of the building height on the surrounding and adjacent property.

Area Regulations: The minimum dimensions of lots and yards of any lot shall conform to the minimum lot and yard requirements which would be applicable to such uses if the same were situated in the most restrictive districts in which such uses are permitted. However, the zoning commission shall establish specific lot, yard and area requirements after consideration of density, building coverage, relationship of proposed buildings and relationship to surrounding and adjacent property.

Parking Regulations:

- 1. All parking and vehicle use areas shall be paved with an allweather surface.
- 2. Off-street parking facilities shall be provided at locations designated on the approved development plan.
- 3. Minimum off-street parking requirements shall be established in the approved development plan, but shall not be less than the minimum requirements for permitted uses prescribed in the applicable sections of the zoning ordinance.

Application: An application for a Planned Unit Development District may be made to the Planning and Zoning Commission in the same manner that an application for zone change is made. Applications for approval of a Planned Unit Development District shall be processed according to the procedure specified herein and a development plan and related data shall be submitted for approval in accordance with the requirements set out below.

Application Process Procedure:

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- 1. An application for a Planned Unit Development shall be accompanied by a development plan meeting the requirements set forth in this ordinance.
- 2. Upon receipt of an application the Zoning Administrator shall make notification of a public hearing as set forth in the zoning ordinance.
- 3. The Zoning Administrator shall prepare a written report analyzing the development plan and such report shall be given to the Planning and Zoning Commission and applicant at least three (3) days prior to the public hearing.

Development Plan Required: An application for a Planned Unit Development District shall include and be accompanied by a development plan which shall become a part of the amending ordinance and shall be referenced on the Zoning District Map. Changes in the development plan shall be considered the same as changes in the Zoning District Map and shall be processed as required except that changes of detail which do not alter the basic relationship of the proposed development to adjacent property and which do not alter the uses permitted or increase the density, floor-area ratio, height or coverage of the site, or which do not decrease the off-street parking ratio, or reduce the yards provided at the boundary of the site as indicated on the approved development plan may be authorized by the Zoning Administrator. Any applicant may appeal the decision for review and decision as to whether an amendment to the Planned Unit Development District ordinance shall be required.

The Development Plan may, in some cases, be a two-phase document. The first phase shall illustrate and contain the applicant's request and suggestion for the use, configuration of building, parking, etc., and the second phase shall illustrate the development plan showing the suggestions and recommendations of the Planning and Zoning Commission after review of Phase One. In either case the applicant shall provide as much detail as possible to include, but not necessarily limited to:

- 1. A scale drawing showing any proposed public or private streets and alleys; building sites or building lots; any areas proposed for dedication or reserved as parks, parkways, playgrounds, utility and garbage easements, school sites, street widening, street changes; the points of ingress and egress from existing public streets on an accurate survey of the boundary of tract and topography with a contour interval of not less than five (5) feet, or spot grades where the relief is limited.
- 2. Where multiple types of land use are proposed, a land use plan delineating the specific areas to be devoted to various uses shall be required.
- 3. Where building complexes are proposed, a site plan showing the location of each building and the minimum distance between buildings, and between buildings and the property line, street line and/or alley line shall be submitted. For buildings more than one (1) story in height, except single-family and two-family residence, elevations and/or perspective drawings may be required in order that the relationship of the buildings to adjacent property, open spaces and to other features of the development plan may be determined. Such drawings need only indicate the height, number of floors and exposures for access, light and air.
- 4. A plan indicating the arrangement and provision of off-street parking and off-street loading where required. Such a plan may be presented as a ratio of off-street parking and off-street loading area to building area when accompanied by a typical example indicating the feasibility of the arrangement proposed and when the areas where the example would be applied are dimensioned on the drawing of the entire site. Any special traffic regulation facilities proposed or required to assure the safe function of the circulation plan shall also be shown.
- 5. A designation of the maximum building coverage of the site shall be indicated upon the site plan.
- 6. Screening and landscaping plan shall be required where such treatment is essential to the proper arrangement of the development in relation to adjacent property. Such plan shall, when required,

include screening walls, ornamental planting, playgrounds, wooded areas to be retained, lawns and gardens if such are determined to be necessary by the City Council.

7. Any or all of the required features may be incorporated on a single drawing if such drawing is clear and capable of evaluation by the Zoning Administrator and interpretation by the Building Inspector.

Development Schedule: An application for a Planned Unit Development District shall be accompanied by a development schedule indicating the appropriate date on which construction is expected to begin and the rate of anticipated development to completion. The development schedule, if adopted and approved by the City Council, shall become part of the development plan and shall be adhered to by the owner, developer, and his successors in interest.

Annually the Building Inspector shall report to the Planning and Zoning Commission the actual development accomplished in the various Planned Unit Development Districts as compared with the development schedule.

The Planning and Zoning Commission may, if in its opinion the owner or owners of property are failing or have failed to meet the approved schedule, initiate proceedings to amend the Zoning District Map or the Planned Unit Development District by removing all or part of the Planned Unit Development District from the Zoning District Map and placing the area involved in another appropriate zoning district. Upon the recommendation of the Planning and Zoning Commission and for good cause shown by the owner and developer, the City Council may also extend the development schedule or adopt such new development schedule as may be indicated by the facts and conditions of the case.

Special Conditions: The permanent character of common open space lands shall be insured by private reservation for the use and benefit of residents, by dedication to public use, or by a combination thereof. Common open spaces not dedicated to public use shall be maintained by the owner thereof. Land required for common open space shall not include the following:

- 1. Areas reserved for the exclusive use and benefit of an individual tenant or owner.
- 2. Dedicated streets, alleys or other public rights-of-way.
- 3. Vehicular driveways, private streets or parking, loading or storage areas.

Health Regulations: If the permitted use is not to be served immediately by a water utility, occupancy shall be prohibited until water satisfactory for human consumption is available from a source on the land, or a public utility source, in adequate and sufficient supply for human use. Individual water supplies must be in conformity to the local plumbing code. If the permitted use is not to be served immediately by a sewage collection system connected to a community treatment plant, or to a public sewerage facility, occupancy shall be prohibited until a septic tank and subsurface drainage field designed and constructed in accordance with methods and standards approved by the State Department of Health and the local plumbing code have been installed, inspected and approved by the City.

Procedure For Establishing Standards: In approving the development plan and the ordinance establishing the Planned Unit Development District, the City Council shall, after recommendation by the Planning and Zoning Commission, specify such maximum height, floor-area ratio, density and minimum off-street parking and loading standards within the limits of those specified in the districts listed for the specific uses involved as is appropriate for the development. The City Council shall, after receiving the recommendation of the Planning and Zoning Commission, establish the standards for yards, signs, building spacing, site coverage, access, screening walls or landscaping, building area, open space, pedestrianways, public or private streets, and alleys to be observed in a Planned Unit Development District and such standards shall be specified in the ordinance establishing the district.

Approval: Every Planned Unit Development District approved under the provisions of this ordinance shall be considered as an amendment to the zoning ordinance as applicable to the property involved. In carrying out the development of a Planned Unit Development District, the development conditions and the development schedule, if required, shall be complied with and such conditions as are specified for the development of a Planned Unit Development District shall not be construed as conditions precedent to the approval of the zoning amendment, but shall be construed as conditions precedent to the granting of a certificate of occupancy and compliance.

APPENDIX 'II'

RECOMMENDED CHANGES TO THE "S" SERVICE COMMERCIAL DISTRICT

USE Regulations: The intent of this district is to permit commercial types of Land Use with the primary purpose of service and to promote a high standard of commercial facilities not predicated on heavy retail trade or traffic.

In "S" Service Commercial Districts no building, structure, land or premises shall be used and no building or structure shall hereafter be erected, constructed, reconstructed, or altered except one or more of the following:

- 1. Apothecary
- 2. Animal hospitals, if entirely within a building and no animals are kept outside
- 3. Auto parking areas, for passenger cars only
- 4. Barber and beauty shops
- 5. Book or stationery stores or newsstands
- 6. Camera shop
- 7. Children's nurseries and kindergartens
- 8. Clinics (Medical or Dental)
- 9. Dancing schools
- 10. Florists, retail sales only
- 11. Greenhouses (commercial)
- 12. Hospitals, sanitariums, or carehomes, except that none may be used for contagious, mental, drug or liquor addict cases
- 13. Hotel and motels
- 14. Medical, surgical or dental laboratories
- 15. Mortuary
- 16. Offices, business or professional
- 17. Restaurants, cafes or cafeterias without curb or drive-in services (service to be entirely within the building)
- 18. Schools operated as a business
- 19. Signs and billboards on the ground are prohibited but signs may be erected on buildings provided they are fastened flat against the wall, or erected on the roof. Signs on the roof shall not extend beyond the building wall, nor shall any sign have a height of more than six (6) feet.

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- 20. Studios art, artists, dance music, drama, health, massage and reducing and interior decorations.
- 21. Any other service type, office or mercantile use, similar to those listed above, provided such use is recommended to the City Council by the Zoning Commission.

SCREENING: Where property zoned "S" Service Commercial abuts property zoned or used for residential purposes (including multi-family) there shall be a masonry screening fence at least six (6) feet in height.

APPENDIX 'I'

RECOMMENDED CHANGES TO THE "L" LIGHT COMMERCIAL DISTRICT

USE Regulations: The intent of this district is to permit retail facilities for the use of neighborhood areas for purposes of supplying day to day retail needs of the residents such as food, drugs and personal services.

In "L" Light Commercial Districts no building, structure, land or premises shall be used and no building or structure shall hereafter be erected, constructed, reconstructed, or altered except one or more of the following:

- 1. Any use permitted in "S" Service Commercial District
- 2. Ambulance service
- 3. Antique shop, provided the storage of all goods are within the building
- 4. Bakery, retail sales only
- 5. Blueprinting or photostating
- 6. Camera shop
- 7. Candy, cigars and tobaccos, retail sales only
- 8. Cleaning, dyeing and laundry pickup station, for receiving and delivery of articles to be cleaned, dyed and laundered, but no actual work to be done on the premises
- 9. Cleaning and laundry (self-service)
- 10. Delicatessen shops
- 11. Drug store, retail sales only
- 12. Gasoline filling stations. (Retail sales and minor repairs without body repairs, or painting
- 13. Greenhouses (commercial)
- 14. Grocery store, retail sales with no more than two (2) checkout stands
- 15. Jewelry stores and optical goods
- 16. Meat market, retail sales only
- 17. Miniature golf courses and driving ranges
- 18. Photograph studios
- 19. Restaurants and cafes (no drive-in services), limited to 100 eating spaces

- 20. Retail stores (other than listed) offering all types of personal consumer goods for retail sale
- 21. Any other convenience retail sales or service use similar to those listed above provided such use is recommended to the City Council by the Zoning Commission

SCREENING: Where property zoned "L" Light Commercial abuts property zoned or used for residential purposes (including multi-family) there shall be a masonry screening fence at least six (6) feet in height.

APPENDIX 'J'

RECOMMENDED CHANGES TO THE "H" HEAVY COMMERCIAL DISTRICT

USE Regulations: The intent of this district is to permit all types of retail sales and services with emphasis on large shopping centers or related types of commercial areas.

In an "H" Heavy Commercial District no building, structure, land or premises shall be used and no building or structure shall hereafter be erected, constructed, reconstructed, or altered, except for one or more of the following uses:

- 1. Any use permitted in "L" Light Commercial District
- 2. Aquarium
- 3. Auction gallery
- 4. Auto laundry without boiler, heating and steam cleaning facilities, in which all washing operations are carried on within the building. (Hand car wash)
- 5. Auto repair garage where all work is conducted inside the building and not including the open storage of vans, trailers, or trucks
- 6. Auto seat cover sales, covering, upholstering
- 7. Banks, banking offices, wholesale sales office or sample room
- 8. Bird and pet shops retail
- 9. Bowling alley if air conditioned and soundproof
- 10. Cafeteria cafe with drive-in facilities or curb service
- 11. Caterer and wedding service
- 12. Cleaning and pressing shops having an area of not more than six thousand (6,000) square feet
- 13. Curtain cleaning shop having an area of not more than six thousand (6,000) square feet
- 14. Department store, novelty or variety shop, retail sales only
- 15. Dyeing plant with not more than six thousand (6,000) square feet of floor space
- 16. Electrical goods, retail sales only, provided the storage of all goods are within the building
- 17. Electrical repairing domestic equipment and autos, retail sales only
- 18. Exterminating company, retail

- 19. Fix-it shops, bicycle repairs, saw filing, lawn mower sharpening, retail only but without outside storage
- 20. Furniture repairs and upholstering, retail sales only and where all storage and display is within the building
- 21. Frozen food lockers, retail
- 22. Grocery stores, retail sales only
- 23. Ice delivery station
- 24. Job and newspaper printing
- 25. Letter and mimeograph shop and type setting
- 26. Moving picture theatre
- 27. Nursery, retail sale of plants and trees
- 28. Enameling and Painting and Paint Shops
- 29. Piano and musical instruments, retail sale only
- 30. Public garages (Parking)
- 31. Plumbing shop, retail sales only, without warehouse facilities to insure storage for ordinary repairs but no storage for material for contracting work
- 32. Restaurant with drive-in facilities provided no food or drink may be served to vehicles parked on the public street
- 33. Retail store or shop for custom work or the making of light and nonobnoxious articles to be sold for retail on the premises
- 34. Rug cleaning shop having an area of not more than six thousand (6,000) square feet, chemical type, where cleaning operations are carried on within a building where rugs are laid flat on the floor, the chemical mixed with water, applied with a brush, and removed by vacuum cleaning, entirely without the generation of dust
- 35. Seed store
- 36. Wearing apparel including clothing, shoes, hats, millinery and accessories
- 37. Used and new car lots
- 38. Any other retail use provided such use is not obnoxious or offensive by reason of the emission of odors, soot, dust, noise, gas fumes or vibration

SCREENING: Where property zoned "H" Heavy Commercial abuts property zoned on deed for residential purposes (including multi-family) there shall be a masonry screening fence at least six (6) feet in height.

Appendix 'J' Page 2 of 2
APPENDIX 'K'

RECOMMENDED CHANGES TO SUBDIVISION RULES AND REGULATIONS - ORDINANCE NO. 28

Articles 2.14 and 2.15 read:

2.14 SAME - APPROVAL WITHIN THIRTY DAYS: Within thirty days from the filing of any plat, the Commission shall approve such plat provided:

- (1) The plat complies with the provisions of this article;
- (2) The uses proposed for the property being subdivided are consistent with its zoning;
- (3) The subdivider has complied with the provisions of paragraphs3.21 to 3.38 of this ordinance;
- (4) In all subdivisions the subdivider agrees to construct and install streets, paving, curbs, gutters, utilities, and drainage facilities in his subdivision in accordance with the provisions and standards of the City, or has made provision by making a cash or corporate surety bond or depositing money in escrow, each in an amount equal to the estimated cost of constructing and installing the required improvements, that in the event of the failure of the subdivider to make such improvements the same will be constructed and installed without cost to the City.

When the Commission is satisfied that the technical requirements of any such subdivision plat have been complied with by the subdivider, the Commission, preparatory to submitting the plat to the City Council for completion of utility contracts, if any, and such other matters, including street construction and drainage, as the City Council may lawfully review or consider, shall enter an order approving the plat subject to action of the City Council with reference to such utility contracts, street construction, drainage, and other matters to be considered by the Council. Upon taking such action, the Commission shall cause the plat to be forwarded to the City Council without delay accompanied by a copy of the Commission's action with reference thereto, together with a written statement of any grievance or disagreement which the subdivider has requested that the Council act upon. After the City Council is satisfied that the subdivider will comply with all requirements for utilities and street construction and has returned the plat to the Commission, indicating such action as the Council may have taken in regard to the plat, then the Commission shall enter its order giving final approval of such plat.

Any plat not disapproved within thirty days from the date of its filing with the Commission shall be deemed to have been approved, and on demand the Commission shall issue a certificate showing the filing date and the failure to take action thereon within thirty days from the filing date. Such certificate shall be sufficient in lieu of a written endorsement of other evidence of approval.

2.15 SAME - RECORDATION: After a plat has been approved the Commission shall cause such plat to be recorded in the plat records of the County.

Recommend Article 2.14 to read:

2.14 <u>SAME - APPROVAL WITHIN THIRTY DAYS</u>: Within thirty days from the filing of any plat, the Commission shall approve such plat provided:

- (1) The plat complies with the provisions of this article;
- (2) The uses proposed for the property being subdivided are consistent with its zoning;
- (3) The subdivider has complied with the provisions of paragraphs3.21 to 3.38 of this ordinance;
- (4) In all subdivisions the subdivider agrees to construct and install streets, paving, curbs, gutters, utilities, and drainage facilities in his subdivision in accordance with the provisions and standards of the City, or has made provision by making a cash or corporate surety bond or depositing money in escrow, each in an amount equal to the estimated cost of constructing and installing the required improvements, that in the event of the failure of the subdivider to make such improvements the same will be constructed and installed without cost to the City.
- (5) Upon compliance of all technical requirements the Commission shall:
 - a. The chairman and secretary of the Commission shall affix their signature to the approved plat and enter an order approving the plat contingent on completing community facilities agreements.
 - b. Submitting the plat to the City Council for completion of community facilities agreements.
- (6) Upon completion of the community facilities agreements, the Mayor and City Secretary shall affix their signature and shall enter an order giving final approval of such plat.
- (7) Any plat not disapproved within thirty days from the date of its filing with the Commission shall be deemed to have been approved, and on demand the Commission shall issue a certificate showing the filing date and the failure to take action thereon within thirty days from the filing date. Such certificate shall be sufficient in lieu of a written endorsement or other evidence of approval.

Recommend Article 2.15 to read:

2.15 <u>SAME - RECORDATION</u>: After a plat has been approved by Commission and the community facilities agreements approved by the City Council, the City shall record the plat in the plat records of the County.

APPENDIX - L

SUBDIVISION CHECK LIST

PRELIMINARY PLAN

Case No.

The "Subdivision Rules and Regulations" of the City of Bedford contains instructions to guide the preparation and submittal of preliminary plans. The following check list identifies information required in accordance with the Rules and Planning Commission policies.

- I. Basic Information
 - A. Proposed Name of Subdivision
 - B. Name of Owner and Developer
 - C. Name of Land Planner
 - D. Legal Reference of Tract to be Subdivided
 - 1. Deed Reference and Legal Description
 - 2. Corners, Line Lengths and Bearings
 - 3. Acreage of Subdivision
 - E. North Point and Scale (Not less than 1" = 200')
 - F. Date of Plan Preparation
- II. Existing Conditions
 - A. Zoning
 - B. City Limit Line If on or near tract
 - C. Physical Features
 - 1. Man-made Improvements
 - 2. Natural Features (Contour lines, creeks, water courses)
 - 3. Areas Subject to Flooding
 - D. Utilities
 - 1. Water
 - 2. Sewer
 - 3. Gas Lines (High pressure and transmission)
 - 4. Power Lines
 - 5. Telephone Lines

III. Adjacent Area

- A. Platted Areas Abutting Subdivision
- B. Unplatted Areas
 - 1. Ownership of Adjoining Acreage
- IV. Proposed Layout
 - A. Streets
 - 1. Proposed Name
 - 2. Width
 - B. Easements
 - 1. Purpose
 - 2. Width
 - C. Lots
 - 1. Width and Depth
 - 2. Typical Lot (Area)
 - D. Proposed Uses Indicate Type of Use or Uses

Pleas	e	provi	de the fo	llowing	informatio	on :		1600 400		
Name	of	Prop	osed Subd	ivision_						
Name	of	Owne	r							All Marian a Bar Construction of Source States
			Address				The South Mary Doctor	Phone		
Name	of	Deve	loper		Strate of the sport of the spor					
			Address_	Territoria Constantino Constantino		and the second second	an Gran and gauge and an and an and	Phone		
Name	of	Land	Planner	Strattantina and the spender of		- Constant Store (S	un fan Geralden gerregen g			
			Address	and the second second second second		Romonsterade		Phone		
					Sign	ed				
							(Owner,	Developer,	Land	Planner)

Appendix 'L'

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APPENDIX M

ZONING CHECK LIST

•	Nati	ture of Request	
	Α.	. Purpose of Proposal	
			۷.
		And a state of the	
	Β.	Zoning Map - This proposal is to relocate zoning changing property:	district boundaries by
		FromFrom	From
		ТоТо	To
•	Prop	perty Description	
	Α.	Laymen's identification of location:	
	Β.	Property is unsubdivided according to the County Page	Deed Records, Vol
		1. a metes & bounds description and the property are attached.	nd a sketch map locatin
	C.	Property is subdivided as described below:	
		Subdivision Name	
		Block; Lot(s); Block; Lot	ot(s)
	D.	Total land area contained herein, not counting str ways. Acres	reets and public right- Square Feet
	Fili	ing Fee	
	Mama		
	Names	is a Addresses of adjacent property owners, within 2	200 feet.
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			the second s
	-		Station of the design of the d
	Appea Date_	arance before the Zoning Commission to request Publ	ic Hearing.
	Appea Date_ Notic	earance before the Zoning Commission to request Publ	ic Hearing.

Page 1 of 2

Receipt of P	lanning Consulta	int's Review Lett	er. (Date)	
Brief Descri	ption of Zoning	Commission Heari	ing. (Date)	
				ъ. 1
	1			
Results of C	ity Council Heat	ring. (Date)		

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