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RED BRIDGE N.W. LAND USE PLAN

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Barton Aschman Associates, Inc.
Transportation Planning

In Conjuntion With
Kansas City,Missouri,City Development Department
June,1985

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CHAPTER I. INTRODUCTION

PURPOSE:

The purpose of this report is to document the process taken by HOK and Barton-Aschman to arrive at the Master Land Use Plan for the Red Bridge N.W. Study Area. In doing so, it analyzes a variety of factors which influence the study area and its surroundings, and consequently the assignment of land uses, roadways, open space buffers and landscape areas.

The purpose of this project is to develop a comprehensive set of land use recommendations to guide development of the Red Bridge Study Area in order to maximize the long-term utilization of the architectural, open space, and aesthetic assets of the study area.

Since the development will occur over a long period of years and by various developers, a master plan is needed to coordinate this process towards the successful achievement of the project goals. The intent of this report is to establish guidelines for development based on long-range planning parameters which take advantage of development opportunities while supporting and preserving the existing built environment.

This report provides technical and inventory information upon which land use plan decisions were based, as well as overall land use design concepts, circulation patterns and detailed land use. The end result of this report, the Master Land Use Plan, should not be confused with a Final Development Plan, but viewed simply as a conceptual diagram from which to initiate full scale design.

LOCATION:

The Red Bridge H.W. Study Area consists of an approximately one square mile area bounded by I-435 (on north), Wornall Road (on east), Red Bridge Road (on south) and State Line Road (on west). The study area is approximately fifty percent undeveloped with the remaining fifty percent being developed single and multi-family residential, limited office and commercial uses and St. Joseph's Hospital with related medical facilities. Being adjacent to the loop highway system, the study area is within a major growth corridor in the southwest sector of the city. Large tracts of land have been developed for office, institutional and residential purposes within the area that have had an impact on traffic and proposed development and certain large lot subdivisions may be the subject for development with the study area which, therefore, makes a land use plan essential.

PLAN INTENT:

The objective of the Master Land Use Plan is twofold: (1) to define areas within the study area which are best capable of supporting proposed land uses, and (2) to propose the size, density and layout of land uses, roadways and open space areas.

The master plan must respond to broader plannning goals for a project of this nature. The original goals of the project are listed below. They were the basis for determining the appropriate land uses which would be environmentally, socially, and economically acceptable.

1. To develop a plan which responds both to modern social demands and the physical environment of the site itself.

2. To develop a plan which will provide the opportunity for employment within close proximity to housing.

3. To develop a plan which will preserve and enhance the unique natural features of the site such as bluffs, water bodies, rolling terrain, woodlands, wooded ravines and to encourage the preservation of these features for open spaces, visual amenities and recreational use.

4. To develop a plan which will be responsive to adjacent land uses, i.e. provides uses within the study area which are compatible to and reinforcing adjacent land uses.

5. To develop a plan which encourages proper relationships of land uses and development types within the study area.

6. To plan for adequate vehicular circulation which responds to the needs of each diverse land use.

REPORT PROGRAM:

The Master Plan report describes verbally and graphically the development of the Red Bridge Master Land Use Plan. It is based on:

1. Initial goals and concepts of both the client and the planning consultants as discussed above.

2. The planning process and data analysis by which the consulting team developed the stated planning program.

3. Plan formulation - land uses and land use patterns; circulation; landscape sensitivity and density.

4. Implementation analysis - considerations of densities; public improvements and design guidelines.

PLAN DESIGN CONCEPTS:

The Red Bridge Master Land Use Plan is based on three principle design concepts:

Organizational Clarity: Organizational clarity provides a consistent and understandable land use hierarchy for physical planning - vehicular circulation, land uses, open space, and community services. Physiographic conditions determine the location of overall land uses as well as the density, scale and three dimensional design. Greenways generally follow valley floors, drainageways and land use boundaries.

Identity: A distinct physical identity for the Red Bridge study area can be gained from a combination of elements.

1. Preservation and utilization of land form as a basic design element.

2. Utilization of views and vistas.

3. Open space as a buffer yet creates strong visual linkage of community units.

4. Physical and architectural massing and form which responds to the site.

Environmental Suitability and Sensitivity: Environmental suitability responds to the natural conditions of the study area, topography, soils, drainageways, views, and vistas. The suitability of the developmet to the variety of site conditions enhances environment and aesthetic qualities and has a positive effect on continued development costs and property values.

1. Adaptability. The plan must be adaptable to changing market opportunities without changing the basic organizational structure on diminishing environmental quality. The study area should continue to be adaptable to a variety of land uses, use mixes, densities, and cost considerations.

CHAPTER II. PLANNING PROCESS

DESCRIPTION:

The conceptual master planning process has two preliminary phases:

Site Inventory and Analysis: Information - gathering of a variety of data related to the site and to adjacent land uses.

Concept Planning: Analysis of land use types as they relate specifically to the Red Bridge area.

More specifically the process included the following tasks:

1. Inventory of man-made and natural resources on the site to establish physical limitations for land use.

2. Define proposed land uses in terms of their relationships to each other and to the site.

3. Evaluation of natural resources in terms of degrees of suitability for each proposed land use, i.e., high, moderate and low suitability.

4. Formulation of land use concepts from a synthesis of land use suitabilities.

5. Preparation of Master Land Use Plan.

SITE INVENTORY AND ANALYSIS:

Site inventory and analysis phases are an initial investigation of physical site features as related to development potential. Various site features were catagorized and investigated in terms of four potential conclusions.

1. What limitations do they pose to development.

2. What situations do they create which should be eliminated or de-emphasized.

3. What characteristics do they contribute which should be preserved or expanded upon.

4. How do these factors influence the direction to be taken toward a final land use plan.

Constraints to development can be overcome by technological solutions, however, the resulting additional cost to both the public and private entities can create a very costly development alternative both physically and aesthetically. It is best then to limit the development of an area to the

densities, uses and land use patterns which are most agreeable with the study areas environmental and existing land use characteristics.

The existing environment always influences the layout, style, type and quality of new development. A general axiom is that the quality of the existing environment represents the minimum quality of any new development. To fully understand the current site conditions, a site inventory and analysis was conducted and is summarized in the following text and graphics.

LOCAL CONTEXT:

Although a marketing demand study was not a part of the scope of work for this project, it is important to analyze past trends to gain an understanding of how they might influence future trends. The rate of population growth, income levels of residents, growth rate and trend of existing professional services (hospital), and likely changes in employment patterns all have an inpact in determining future land use patterns.

The local context drawing examines existing and past changes in population, existing facilities, income and employment. Past trends are identified and an explanation of the reasoning behind these trends (for example the hospital) are discussed. Finally, conclusions are discussed on anticipated changes.

It should be noted that the conclusions or projections are by no means tested. A separate marketing would address this issue: The best conclusions to be made might be as follows:

1. The forces which determined population, income and employment trends in the past are likely to continue to be influential.

2. Suburban growth has been relatively clustered in its development rather than dispersed. This development has taken place along highways due to the need for accessibility and in areas where municipal services have existed. Yet, the land in the central zone of the study area is primarily undeveloped. This condition is likely to change due to (1) the construction of I-435 and improved accessibility and (2) the completion of St. Joseph Hospital and the related land use spin-offs which become viable.

3. The employment pattern is primarily professional services and retail trade which is a typical pattern in predominately residential areas. All of these uses continue to grow in the area proportionately.

4. The speculative environment of urban development and the small size of the study area will make any conclusion on future land use growth difficult. The master land use plan must continue to remain flexible.

NATURAL FEATURES - TOPOGRAPHY, LANDFORMS, HYDROLOGY, AND VEGETATION:

The natural features drawings examine elevation, landforms, hydrology, slope and vegetation. These features are illustrated graphically and conculsions are made regarding pertinent physical characteristics of the area and the consequences of development on these characteristics.

The study area is gently rolling in character and lacks any specific orientation due to the square nature of the boundaries. The site topography is a major element in the character of the study area and divides the area into two distinct zones. The lowland area is more intensely developed with office, commercial, institutional and higher density residential. The upland area is primarily medium to low density residential which is divided by ridges or rolling hills.

Although the area is rolling in character, there are only negligible pockets of restrictive slopes, the majority of which are adjacent to the two drainageways. The rolling nature of the topography is a dominant attribute of the site which should be expressed in the final development concepts. It provides opportunities for overlooking the site and its surroundings, topographic screening of parking and service areas, and staggering of building heights and entry locations. Topographic conditions will play an important role in determining drainage patterns and the design and cost of sanitary and storm sewer systems.

Drainageways run between the ridges and terminate at two low points located along the east and west property lines of St. Joseph Hospital. Since the majority of the storm water leaves the study area at these points, development density upstream and resultant runoff should be closely controlled.

The natural vegetation in the upland area (particularly that which is undeveloped) is in strong contrast to the stark effect of the lowland area which has been more developed and has a more grassland nature. Existing trees contribute dramatically to the character of the site and possibly form the basis for a landscape concept (buildings within trees) and provide buffers along various land use peripheries and surroundng development.

Soils and geologic conditions appear to pose no restrictions to development, but additional soil borings should be made throughout the site to confirm this. Of greatest importance will be areas in which buildings are proposed.

LAND USE CHARACTERISTICS

	19[illegible]		19[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

SOURCE: [illegible] DATA CENTER

WORK FORCE BY OCCUPATION

OCCUPATIONAL WORKFORCE WITHIN 3-MILE RADIUS OF 1980 CAPTOLREN [illegible]

[illegible] CHARACTERISTICS	[illegible]	%
MANAGERIAL & PROFESSIONAL		
EXECUTIVE, ADMINISTRATIVE & MANAGERIAL	[illegible]	[illegible]
PROFESSIONAL SPECIALTY	[illegible]	[illegible]
TECHNICAL, SALES & ADMINISTRATIVE SUPPORT		
TECHNICIANS & RELATED SUPPORT	[illegible]	[illegible]
SALES	[illegible]	[illegible]
ADMINISTRATIVE SUPPORT (INCL. CLERICAL)	[illegible]	[illegible]
SERVICE	[illegible]	[illegible]
FARMING, FORESTRY & FISHING	[illegible]	[illegible]
PRECISION PROD., CRAFT & REPAIR	[illegible]	[illegible]
OPERATORS, FABRICATORS & LABORERS	[illegible]	[illegible]
CIVILIAN LABOR FORCE TOTAL, AT WORK	[illegible]	
ARMED FORCES, AT WORK	[illegible]	
TOTAL	[illegible]	[illegible]

UNIVERSE: EMPLOYED PERSONS 16 YEARS & OVER
SOURCE: 1980 CENSUS [illegible]

POPULATION PROJECTION

	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

LAND USE FACILITIES

[illegible]

NEW CONSTRUCTION OVER $1 MILLION

[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

HOSPITAL OVERVIEW

[illegible]

LEGEND

DEVELOPED

UNDEVELOPED

CONCLUSIONS

1. THE STUDY AREA HAS HIGHWAY ACCESS FROM I-435.

2. SURROUNDING LAND USE IS SUBURBAN IN CHARACTER AND CONSISTS MOSTLY OF LOW DENSITY RESIDENTIAL DWELLINGS.

3. MAJORITY OF STRIP COMMERCIAL IS LOCATED NORTH OF I-435.

4. EXTENSIVE FLOOD AREAS TO NORTH AND EAST OF STUDY AREA.

5. DEVELOPMENT ALONG I-435 CORRIDOR FROM METCALF TO HOLMES HAS BEEN RAPIDLY EXPANDING ON BOTH SIDES OF STATE LINE, PRIMARILY IN KANSAS. SIMILAR TYPES OF HIGH DENSITY OFFICE & COMMERCIAL AND MEDIUM/LOW DENSITY RESIDENTIAL CAN BE ANTICIPATED TO OCCUR WITHIN THE REGION.

6. STUDY AREA IS 30 MINUTES FROM DOWNTOWN - EMPLOYMENT BASE MORE CLOSELY ASSOCIATED WITH POPULATION BASE.

7. I-435 PROVIDES EXCELLENT REGIONAL ACCESS BY SERVING AS A LOOP SYSTEM FOR K.C. METRO AREA. ATTRACTIVE TO DEVELOPMENT.

LOCAL CONTEXT

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS

LEGEND

- CONTOUR
- 0-10%
- 10-15%
- 15% +

CONCLUSIONS

1. ROLLING HILLS AND LOWLANDS FRAGMENT SITE INTO DISTINCT KNOLLS, VALLEYS, AND FLAT LAND.
2. BUILDABLE SLOPES (0-10%) ON [illegible], IN VALLEYS AND FLAT LAND AREA.
3. AREAS OF 10-15% SLOPE REQUIRE MODERATE GRADING FOR DEVELOPMENT.
4. 0-10% SLOPE AREAS OFFER NO SPECIAL LIMITATIONS.
5. AREAS OF 15% SLOPE AND GREATER REQUIRE SPECIAL DESIGN AND CONSTRUCTION MEASURES.
6. MAJORITY OF UNDERDEVELOPED AREA LIES IN AREA WITH DRAMATIC CHANGE IN TOPOGRAPHY.
7. MINIMIZE BUILDING SIZE BY STEPPING DOWN SITE AND BREAKING BULK INTO MODULES.
8. UTILIZE SLOPE TO FACILITATE BASEMENTS, SERVICE, AND PARKING UNDER BUILDING.

NATURAL FEATURES

TOPOGRAPHY

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS

MAN MADE FEATURES - LAND USE, ZONING, UTILITIES, AND CIRCULATION:

Final development must be sensitive to the character of surrounding land uses. Landscape buffers should be provided along residential edges to limit views and noise while buffers along commercial edges should screen parking lots and act as a separation between developments of different visual character. Although the Hall Estate property directly west of the study area is presently agricultural, it most likely will be re-zoned. Site treatment and circulation along this edge should anticipate this and be developed accordingly.

In general, land uses surrounding the study area are compatible with and will offer no visual or aesthetic problems to be addressed by any proposed development. A majority of the land immediately surrounding the property is either residential or institutional. The character of these surrounding areas enhances the desirability of development.

The existing land use pattern within the study area is the foundation for establishing potential land use patterns. The existing uses may serve to attract land uses which are compatible or limit the development of uses which are incompatible. Furthermore, the physical layout of exisitng uses may establish the arrangement of future land uses. The local context and land use drawings and their corresponding conclusions more fully address these issues.

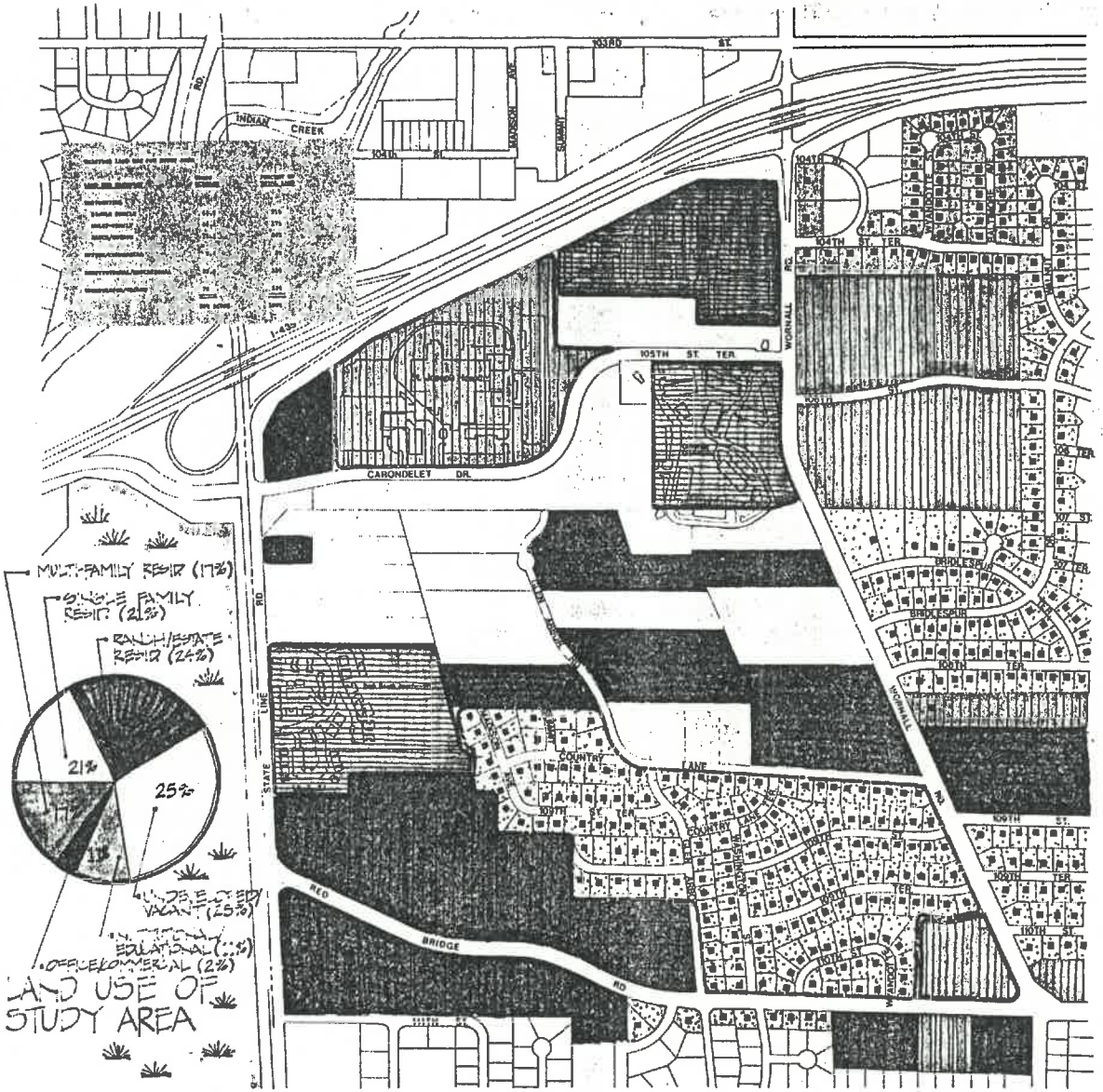
Since nearly all existing utilities are located within the study area and capacities appear to be adequate, no restrictions presently exist due to easements of right-of-ways. Additional storm and sanitary sewer lines will need to be provided for new development and will be a cost implication based on topography, density and distance traveled.

With a considerable amount of new development occuring in the recent past, the traffic and circulation impact on State Line Road and Wornall Road has been significant. These issues are addressed graphically with corresponding conclusions in the site access and traffic circulation drawings. Concurrent with this information, a traffic/transportation analysis conducted by Barton-Aschman is a part of this study and addresses traffic impacts and improvement concepts that can benefit the area in dealing with the impacts. This analysis is discussed in Chapter VI.

There are several basic discussions of the existing land use. First, the character and scale of the existing development north, east and south of the potentially developable parcels is already basicaly determined. These areas are both substantially developed and uniform in their development pattern. Thus, it is not suggested that future development be starkly different from past examples.

Second, St. Joseph Hospital and the presence of Interstate 435 with its two interchanges at State Line and Wornall Road are the only two existing uses likely to significantly create a demand for additional development. Although future residential development will likely provide a market for additional commercial service, the hospital and good regional access provided by I-435 will certainly be the primary force in determining future development patterns.

Third, if development of the study area is to proceed at a more intense rate than presently exists, the existing perimeter circulation network should be improved simultaneously. These public improvements are addressed in Chapter VI.



LEGEND

- SUBDIVISION/RESIDENTIAL
- RANCH/ESTATE RESIDENTIAL
- MULTI-FAMILY RESIDENTIAL
- INSTITUTIONAL/EDUCATIONAL
- OFFICE/COMMERCIAL
- UNDEVELOPED/VACANT
- AGRICULTURE

CONCLUSIONS

1. RELATE LAND USE TO SITE CHARACTER & LAND USE COMPATIBILITY.
2. LAND USE SHOULD BE STRONGLY ORGANIZED VISUALLY AND PHYSICALLY SO AS NOT TO CONTRAST WITH SURROUNDING ORGANIZATION.
3. DEVELOP CLEAR EDGES BETWEEN USES TO HELP DEFINE AREAS i.e. ROADS, BUFFERS, MASSING, FORM.....
4. MAJORITY OF RECENT DEVELOPMENT HAS OCCURED IN LAST 10 YEARS AND NORTH OF GLEN ARBOR ROAD
5. IS IT POSSIBLE TO RELATE DEVELOPMENT SOUTH OF CARONDELET TO HOSPITAL? IS TOPOGRAPHY A BARRIER FOR RELATIONSHIPS?

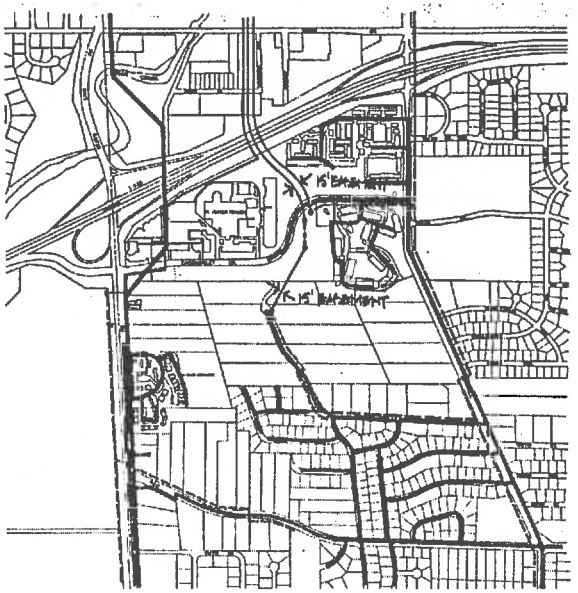
MAN-MADE FEATURES

LAND USE

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS



LEGEND

- GAS
- ELECTRIC, ABOVE GROUND
- ELECTRIC, BELOW GROUND

CONCLUSIONS

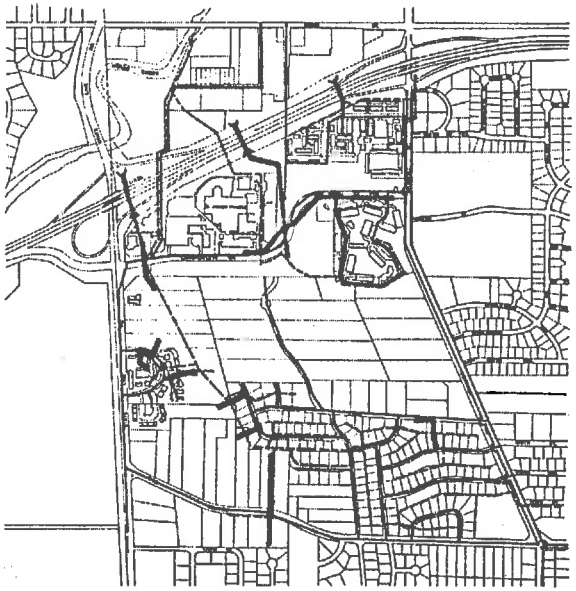
1. UTILITIES AND EASEMENT LOCATIONS RELATIVELY FIXED AND POSE NO MAJOR LIMITATION TO DEVELOPMENT.

2. ANY NEW UTILITY CONSTRUCTION SHOULD ATTEMPT TO MINIMIZE FURTHER FRAGMENTATION OF SITE AND DISTURBANCE OF EXISTING VEGETATION.

3. TRY TO OVERLAY EASEMENTS, IE MULTIPLE USE WHERE FEASIBLE FOR NEW DEVELOPMENT.

4. NEW DEVELOPMENT MAY REQUIRE RELOCATING OR BURYING OF POWER LINES.

5. FUTURE UTILITY SYSTEMS WILL HAVE TO DEAL WITH TOPOGRAPHY AND VEGETATION.



LEGEND

- WATER
- SANITARY SEWER
- STORM SEWER

CONCLUSIONS

1. THREE PRINCIPAL SANITARY SEWER LINES SERVE AREA FOLLOWING DRAINAGE CORRIDORS.

2. SANITARY SEWAGE FLOW SHOULD BE DIVIDED INTO 2 SYSTEMS BASED UPON DRAINAGE AREAS TO INSURE NOT OVERLOADING ONE SYSTEM WHEN DEVELOPING CENTRAL TRACT.

3. SANITARY SEWERS ARE PROBABLY SIZED FOR TOTAL DEVELOPMENT OF AREA BASED ON ZONING AT THE TIME OF THEIR DESIGN OR ANTICIPATED FUTURE ZONING.

4. IF CENTRAL TRACT IS DEVELOPED IN A MORE INTENSIVE THAN ORIGINALLY ZONED (OR ANTICIPATED), EXCESS CAPACITY OF EXISTING INTERCEPTORS MUST BE STUDIED FOR THAT DEVELOPMENT.

5. MAJORITY OF STORM WATER RUNOFF IS HANDLED ADEQUATELY BY SURFACE DRAINAGEWAYS AND GROUND PERCOLATION.

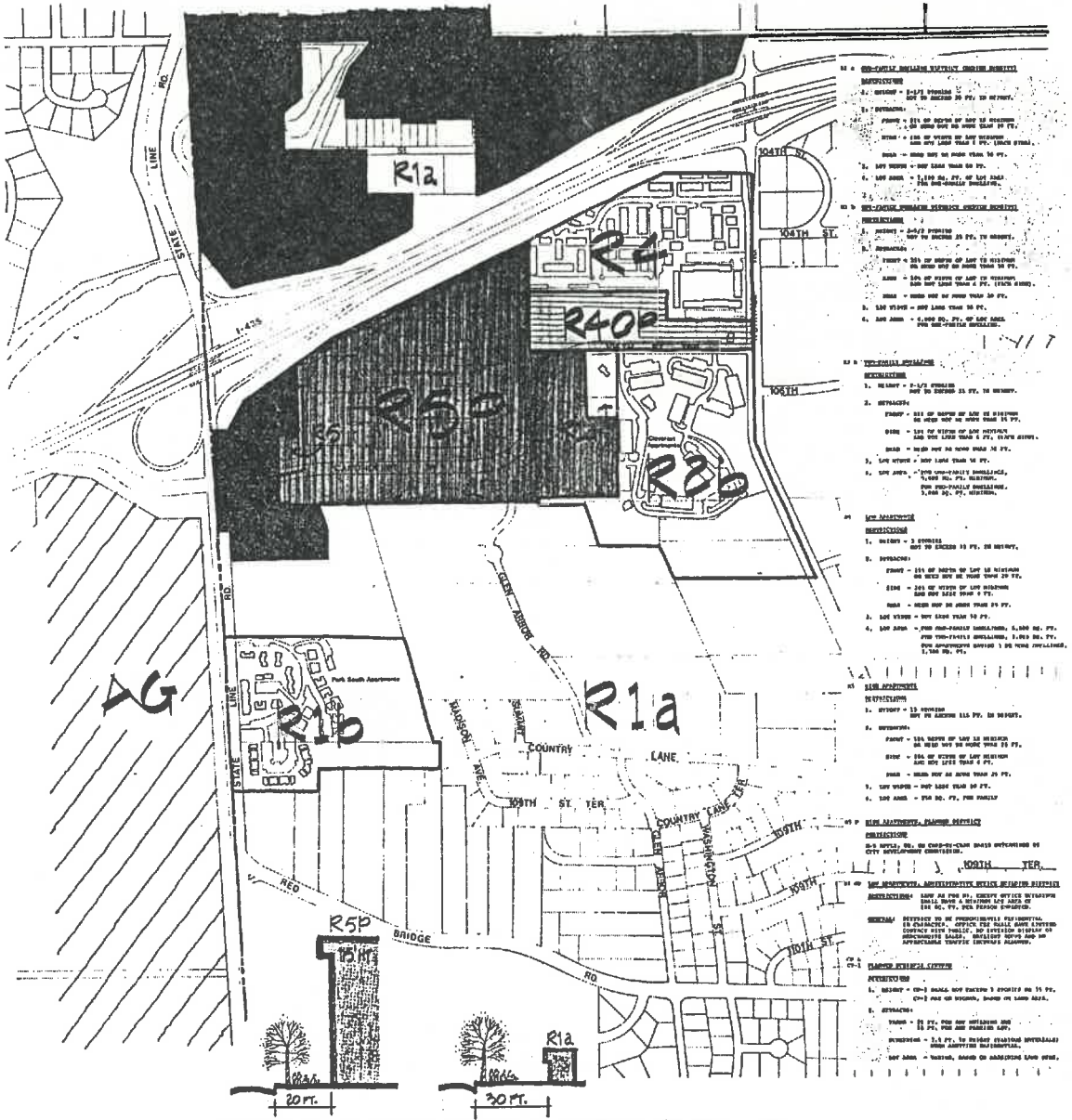
6. CONSTRUCTION OF NEW STORM DRAINAGE LINES MAY BE NEEDED DEPENDENT UPON DENSITY OF NEW DEVELOPMENT.

MAN-MADE FEATURES UTILITIES

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS



SECTION THRU HEIGHT & FRONT YARD SETBACK FOR R5P AND R1a

LEGEND

- RESIDENTIAL
- RESIDENTAL, ADMINISTATIVE OFFICE
- HIGH APARTMENTS, PLANNED DISTRICT
- PLANNED BUSINESS CENTERS
- AGRICULTURE

R1a SINGLE FAMILY (MEDIUM-DENSITY)

R1b SINGLE FAMILY (MEDIUM-DENSITY, LOT AREA VARIES)

R2b TWO FAMILY

R4 LOW APARTMENTS

R40P LOW APARTMENTS, ADMINISTRATIVE OFFICE

R5 HIGH APARTMENTS

R5P HIGH APARTMENTS, PLANNED DISTRICT

CP, CP1, CP2, CP3 PLANNED BUSINESS CENTERS

AG AGRICULTURE

ZONING

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS

LEGEND

- PRE - 1950'S (2)
- 1950 - 1959 (5)
- 1960 - 1969 (3)
- 1970 - 1979 (7)
- 1980 + (1)

CONCLUSIONS

1. HOSPITAL DEVELOPMENT [illegible] HAVE SPARKED INTEREST [illegible] THIS LARGE NUMBER OF CHANGES IN PROPERTY OWNERSHIP.
2. SUGGESTION: PROPERTY OWNERS AND DEVELOPERS, OUT AND OF GROWTH IN AREA, THEY ARE HOLDING ONTO PROPERTY FOR INVESTMENT RETURN, SPECULATION FOR DEVELOPMENT.
3. LARGE CHANGE IN PROPERTY OWNERSHIP IN 60's & 70's MIGHT SUGGEST THEY THOUGHT AREA WAS PRIME FOR OTHER DEVELOPMENT THAN RESIDENTIAL.
4. 25% OF PROPERTY IS UNDEVELOPED AND 24% IS IN RANCH/LARGE ESTATE ZONE.
5. EXISTING PROPERTY OWNERS WITH LONG-TERM OWNERSHIP OBVIOUSLY ENJOY AREA, THE SAME IN FUTURE, CONCERNED WITH GROWTH/CHANGE, CHARACTER, PROPERTY VALUES...

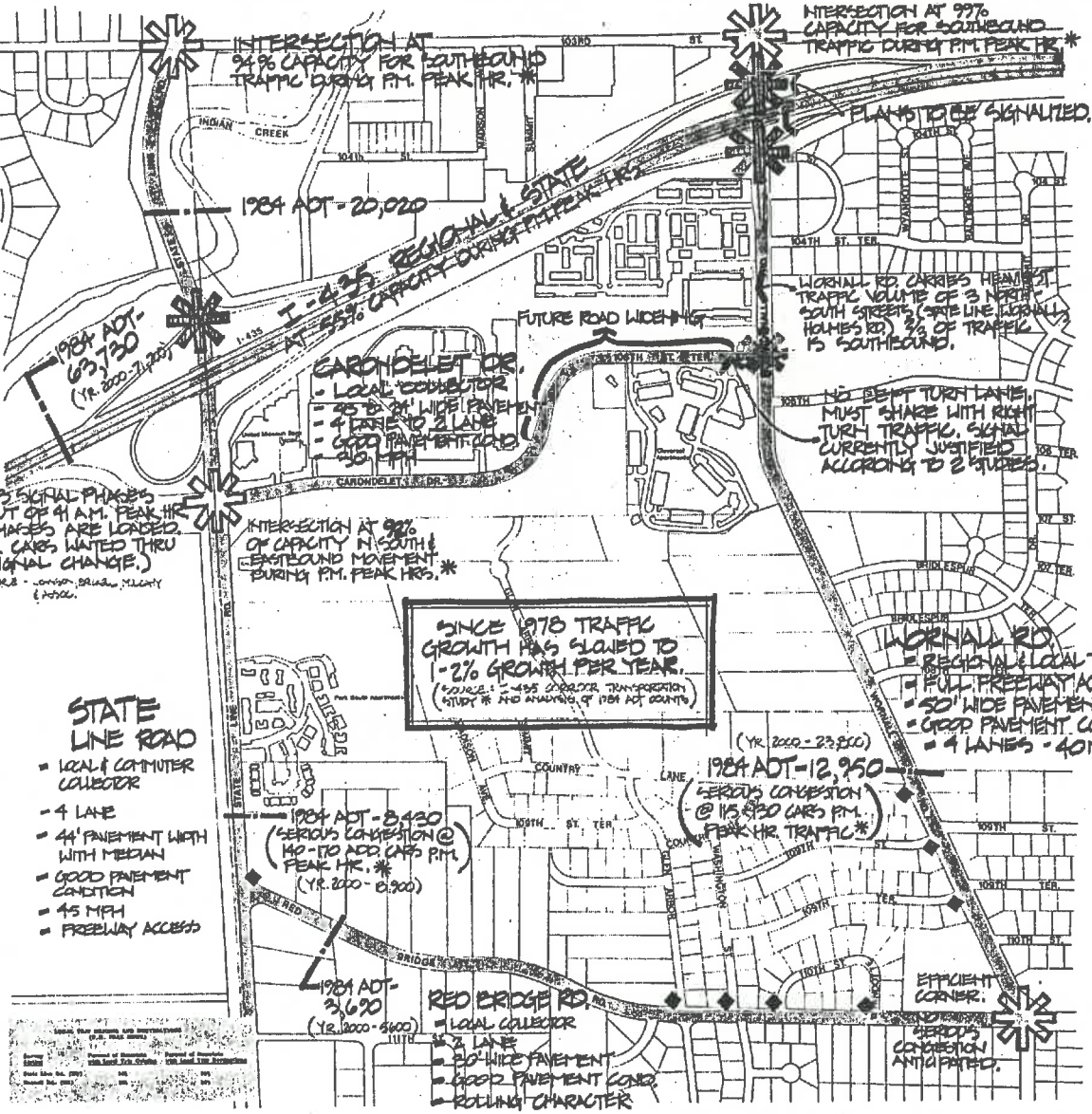
SOCIAL FACTORS

PROPERTY OWNERSHIP

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS

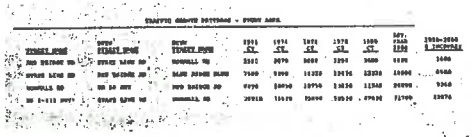


LEGEND

- SIGNALIZED INTERSECTION
- PROPOSED SIGNALIZATION
- STOP SIGN
- I-435/103RD CORRIDOR TRANSPORTATION STUDY. CRAMPERD ASSOC. LEISCH ASSOC., & HOK ARCH., ENG., PLANNING 1980.

CONCLUSIONS

1. CARONDELET AND STATE LINE -- POOR INTERSECTION GEOMETRICS, PARTICULARLY FOR SOUTHBOUND LEFT TURNING MOTORISTS.
2. STATE LINE AND WORNALL ROADS WILL BECOME SERIOUSLY CONGESTED IN THE PEAK HOUR IF TRAFFIC VOLUMES INCREASE BY ADDITIONAL 15 - 20%. SEVERAL OF THE SIGNALIZED INTERSECTIONS ALONG THESE TWO STREETS EXPERIENCE HIGH ACCIDENT RATES. *
3. FOR MAJOR DEVELOPMENT OF VACANT AREAS TO OCCUR, SIGNIFICANT TRANSPORTATION IMPROVEMENTS ARE NEEDED ALONG STATE LINE & WORNALL RD. AS AN ALTERNATIVE, SOME EXISTING TRAFFIC COULD BE DIVERTED TO OTHER ARTERIALS IN THE REGION. *
4. POTENTIAL TRAFFIC GROWTH IS SERIOUS CONCERN. HALL PROPERTY, ST. JOSEPH HOSPITAL AND OTHER PROSPECTIVE DEVELOPMENTS SOUTH OF CARONDELET MAY CONTRIBUTE FURTHER TO TRAFFIC IN AREA.



MAN-MADE FEATURES

TRAFFIC CIRCULATION

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

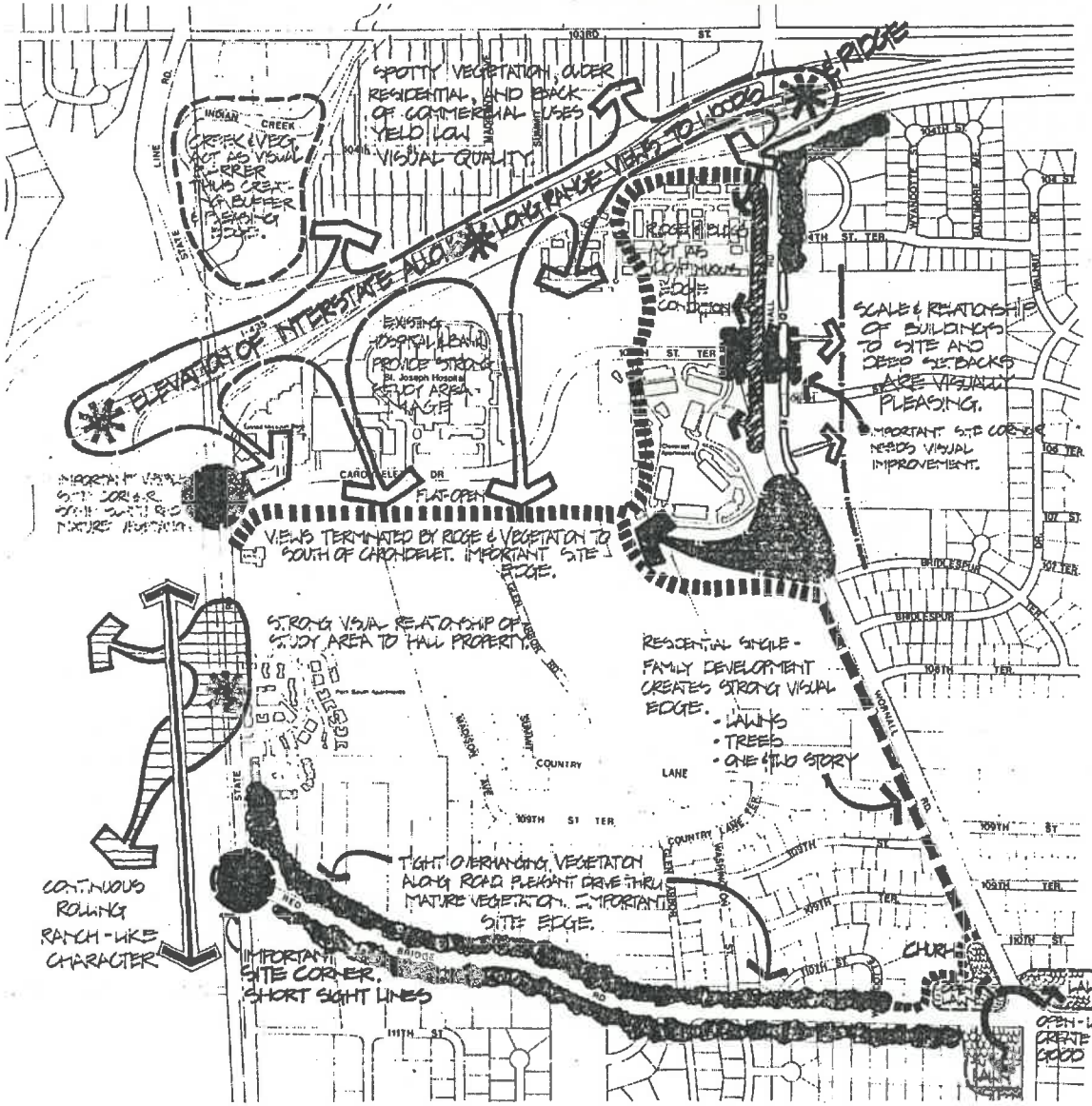
HOK ARCHITECTS

VISUAL ASSESSMENT SUMMARY:

Based on topographic conditions, a variety of visual opportunities exist. Ridges contain off-site views and thereby limit sightlines into the study area. Tree stands further reinforce this by filtering views into the area. The combined effect of these tree rows and ridges creates a semi-secluded pocket at the center of the study area. The only point in the area where a large majority of the pocket can be viewed from is the zone south of Carondelet Drive, particularly the high points near the apartments and along the highway to the northeast. Although this area is presently secluded, a three story building located here (or anywhere else in the study area) will be visible from many directions.

Within the study area a variety of pastoral views up, down, and over the topography and existing development are possible. Although future development will more than likely decrease the quantity of on-site views, it should strive to maintain the quality and character of these views. The most favorable views, presently directed toward the south and east should be emphasized when presently possible.

At the central zone of the study area the tree character of the area is expressed. Centrally located, it is visually secluded from the majority of these surrounding development as well as being the least intensely developed. It portrays the untouched, timeless quality which used to be characteristic of the south sector of the city. It is this disappearing image, the majestic tree lines dominating and clearly defining rolling parcels of landscape, that should be expressed in the final development of the site.



LEGEND

- KEY VIEWING POINTS
- VISUAL BARRERS
- SHORT RANGE VIEWS
- PANORAMIC VIEWS

CONCLUSIONS

1. MAJORITY OF VIEWS TO INTERIOR OF STUDY AREA ARE LIMITED - SCREENED BY DEVELOPMENT, ELEVATION AND TREES.
2. SAVE EXISTING MATURE TREES:
   - BUFFERS
   - VISUAL BARRERS
   - STRONG EDGES
   - VISUAL BACKDROPS
3. VISUAL CHARACTER NORTH OF CARONDELET IS: CONTEMPORARY ARCH./COMPATIBLE MATERIALS. HIGH DENSITY AND LARGE SCALE. OFFICE, INSTITUTIONAL & MULTI-FAMILY.
4. VISUAL CHARACTER SOUTH OF CARONDELET IS:
   - LOW DENSITY & SINGLE-FAMILY RESIDENTIAL CHARACTER.
   - ROLLING HILLS AND WOODED TERRAIN.
5. PRESERVE GREEN WOODED RIDGELINE SOUTH OF CARONDELET.

VISUAL ASSESSMENT

OFF-SITE VIEWS

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS

SITE ANALYSIS SUMMARY:

By overlaying the conclusions determined in previous segments, zones of least constraints are developed. Constraints are limited to zoning regulations, existing vegetation, lowland drainageways, existing development and slope. Obviously areas without constraints are more desirable for development than those which contain restrictions. In view of this, a large contiguous area of highly developable land is located in the center of the study area. Surrounding this are areas of smaller developable parcels as well as zones which are already developed in various degrees of density.

Analyzing the study area from the standpoint of development attractiveness, the most desirable parcels are south of the bluff along Carondelet and in a zone adjacent to State Line Road. This location incorporates zones of access from State Line Road and Carondelet Drive yet can buffer and orient itself from existing development.

The accompanying development features map is an overview of the potential for identified parcels based on the site analysis and inventory and land use documentation phase task. Issues discussed include ways to take advantage of roadway visibility, ease of access, relationship to existing development and generalized character. Consideration of open space will not only enhance the overall appearance of any new development, but can also double as a buffer to existing development.

CONCEPT PLANNING:

Prior to establishing land use patterns, the different land use types are studied to analyze the relationship of one type to another. The development of the planning program is graphically described in the Program Development drawing. Analysis of the relationships of those land uses to one another results in potential spin-off uses and a definition of adjacencies.

The occurence of natural resources on any site establishes certain physical limitations for land use. If in assigning land uses, these resource limitations are ignored and the resources themselves are modified (i.e., grading steep slopes, draining low-lying areas, etc.), both development costs and environmental impact are high. The overriding objective for the study area is to keep physical impact to a minimum. By doing this, development costs and impacts on surrounding land uses can be kept down.

The land uses for the study area have been jointly developed by HOK Planning Consultants, the Red Bridge Liaison and Coordinating Committee, input from potential developers, and City Planning staff. The definition, physical requirements, and spin-off potential of these land uses are described in the following pages.

LEGEND

SUITABLE DEVELOPMENT AREA

MAJOR CONSTRAINTS
CRITERIA: WET AREAS/FLOODWAYS
DENSE VEGETATION
STEEP SLOPES
R.O.W.'S
UTILITY EASEMENTS
NOISE
VISUAL BARRIER
BUFFER
PHYSICAL SETBACK

CONCLUSIONS

1. DEVELOPMENT ZONES FRAGMENTED BY TOPOGRAPHY, NATURAL CHARACTER AND EXISTING DEVELOPMENT.
2. FRAGMENTS WILL REQUIRE CIRCULATION AND/OR ARCHITECTURAL CONNECTION.
3. SITE HAS VERY FEW, IF ANY, NEGATIVE CONSTRAINTS. MAJOR POSITIVE CONSTRAINTS ARE THOSE IMPOSED BY THE NATURAL CHARACTER OF THE STUDY AREA.
4. PRESERVE AS MANY EXISTING TREES AS FEASIBLE AND ADD ADDITIONAL LANDSCAPE TO BUFFER HIGHWAY AND EXISTING DEVELOPMENT.
5. DEVELOP HIERARCHY OF VIEWS AND CIRCULATION.
6. AREA SOUTH OF CARONDELET DR. AND BEYOND RIDGELINE PROVIDES BEST SCREENING AND OPPORTUNITY FOR VIEWS & DEVELOPMENT INTEGRATED WITH SITE CHARACTER.
7. LOWLAND AREA MOST SUITED TO MORE INTENSE DEVELOPMENT (HIGHWAY IDENTIFICATION, EXISTING LAND USES, ACCESS.)

1. SOUTH OF STUDY AREA MOST VISIBLE & ACCESSIBLE, MORE RELATED TO HIGHWAY IDENTIFICATION AND HIGHWAY RELATED DEVELOPMENT. PRESENTLY NOT INTENSELY DEVELOPED.

2. CORE PARCEL - GEOGRAPHIC CENTER OF STUDY AREA. STRONG FUNCTIONAL & VISUAL LINK TO RESIDENTIAL & HOSPITAL ZONE. AREA NOT PHYSICALLY DISTURBED - STRONG NATURAL AMENITIES. AREA VALUABLE FOR INTERNAL FOCAL DESIGN - VISUAL BUFFER TO EXISTING.

3. PARCEL AREA HAS STRONG VISUAL & FUNCTIONAL RELATIONSHIP TO CORE PARCEL AND EXISTING RESIDENTIAL. SIMILAR PHYSICAL AMENITIES. LANDUSE SHOULD RELATE ACCORDINGLY.

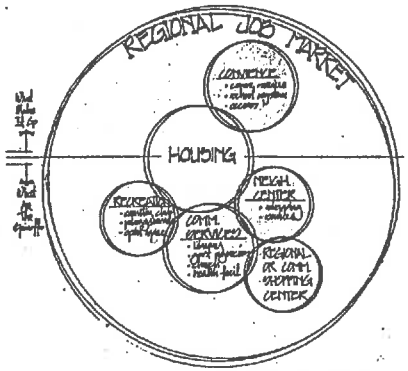
4. MAJORITY OF THIS AREA IS DEVELOPED. SUBURBAN AMENITIES - RESIDENTIAL CHARACTER. VISUAL BUFFER TO ANY NEW DEVELOPMENT MUST BE CONSIDERED.

DEVELOPMENT FEATURES OPPORTUNITES/CONSTRAINTS COMP.

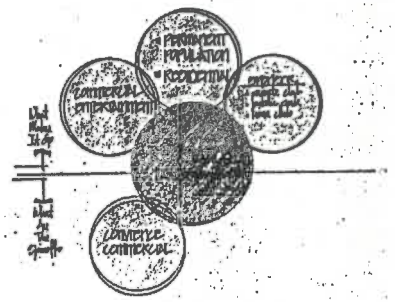
RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS



USE RELATIONSHIPS



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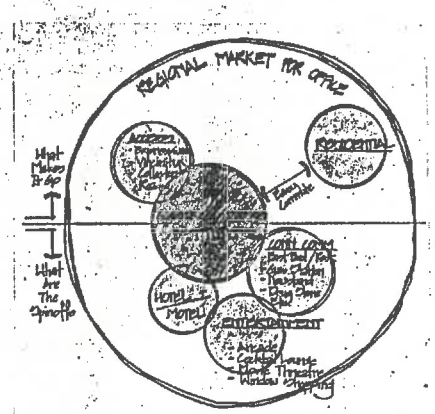

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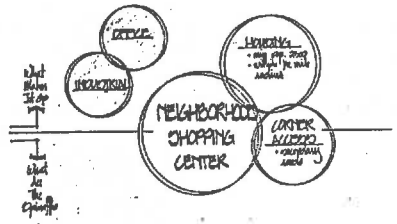

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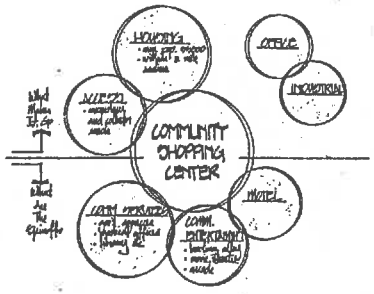

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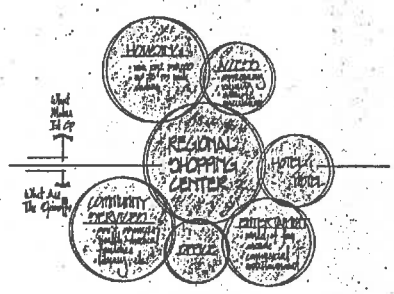

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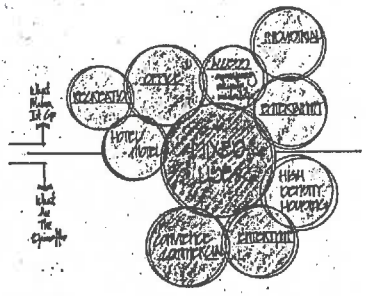
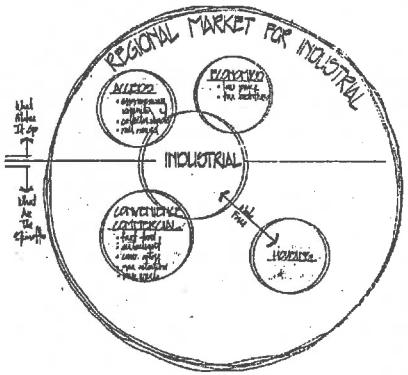


USE RELATIONSHIPS



USE RELATIONSHIPS

LAND USE

PROGRAM DEVELOPMENT

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS

Residential

Residential development includes detached and attached single family, multi-family attached townhouses, garden and multi-story buildings. These are both apartments, condominiums and retirement type units. Housing densities may range from 1-5 units/acre for detached single family homes to 25-35 units/acre for multi-story apartments. Ancillary use for the convenience and general enhancement of residential area might include man-made lakes, equestrian and bicycle trails, park and play areas, recreational complexes, neighborhood shopping and community service facilities (i.e., health clinic and library).

Housing Types:

Type	Dwelling Density Per Acre
Detached house - single family	1-5
Semi-detached - one or two family	6-10
Townhouse	6-14
Condominium (2 or 3 story)	15-20
Multi-story apartment (to 8 stories)	25-35
High-rise apartment	40-85 approx.

Housing Themes

- o Individual lots
- o Cluster development - zero lot line
- o Recreational subdivision
  - water feature
  - tennis complex
  - equestrian (riding trails adjacent to each lot)
- o Estate lots (farmettes)
- o Elderly retirement community (grand scale)

Associated Land Uses

- o Neighborhood center (shopping)
- o Recreation (active and passive)
- o Community Services (government agencies, libraries, churches, post office, health facilities, etc.)

Office

Office uses might be designed for finance, corporate, industrial, professional and government activities. Building patterns vary and include individual lots, free standing office park settings, high rise/low rise buildings and cluster arrangements. Building flexibility is the key - the grouping of buildings to suit a single tenant or a multiplicity of tenants. Associated uses include eating and drinking facilities and commercial entertainment. Often found on a small scale in office areas are eating and drinking facilities and convenience stores.

Building Patterns:	individual lots/free standing park setting (10 acre minimum) high-rise/low-rise cluster arrangement
Office Types:	professional/corporate/governmental related

Design Implications:

- o convenience a primary factor
- o flexibility - grouping of buildings to suit single tenant or a multiple of tenants
- o cluster of office/institutional structures having characteristics of the P.U.D., i.e. "controlled environment"
- o unified architecture
- o on-site parking for tenants and tenant-callers (visitors)

- o on-site traffic circulation
- o frontage adjacent to an arterial or direct connector to interstate
- o extensive landscaping and signage control
- o complementary uses: office supply store, bank, restaurant, gift shop

Associated Land Uses:

- o hotel/motel
- o convenience commercial (food service, car wash, gas station, newstand, etc.)
- o commercial entertainment

Commercial Retail

Retail areas to be considered for this study may be sub-divided into two categories: neighborhood and community. Neighborhood retail centers provide for the sale of convenience goods and personal services for day to day living needs of the immediate neighborhood. Principal tenants are stores, drugstores, dry cleaners, etc. and the general character is of one story buildings oriented to the curb. These areas may be designed as small centers. Community retail centers may includes some of the same functions as the neighborhood center but are intended to serve a larger population. The principal tenants include supermarkets, variety stores and small department and hardware stores. The character of the community center is architecturally unified buildings around a large parking lot.

Commercial - Neighborhood Center

Function: provides for the sale of convenience goods and personal services for day to day living needs of the immediate neighborhood.

Tenants: convenience food store † principal tenants
drug store

one to three of these:

family shoe	florist
hardware	jewelry
beauty shop	sporting goods & camera supplies
barber shop	gifts, stationery, & books
cleaners	radio, TV, music & records
coin laundry	

Location: intersection of collector streets and secondary roads

Service Area: 1/2 mile radius with min. pop. of 2,500

Site Area: 4-8 acres

Number of Stores: 5-20

Parking: 200-600 spaces

General Character: one story buildigns oriented to curb. Rapid parking turnover. Try to adapt to surrounding residential character.

Store Types: rows of convenience goods outlets found in center of neighborhood community.

Commercial - Community Center

Function: some functions of the neighborhood center plus sale of shopping goods (wearing apparel, appliances, hardware, etc.)

Tenants: supermarket † principal tenants
variety store
small department store

Several of these:

restaurant	bakery
cocktail lounge	cards and gifts
real estate	beauty and barber shop
family shoes	cleaners
hardware	bank
drugs - photography supplies	medical and dental offices
auto supplies	shoe repair
sporting goods	jewelry
bowling alley	

Location: intersection of major roads or expressways

Service Area: 2 mile radius with min. pop. of 35,000

Site Area: 10-30 acres

Number of Stores: 15-20

Parking: 1,000-3,000 spaces

General Character: unified architecturally (possibly arcades).

Store Types: balances collection of supplementary stores. Stresses convenience and service.

Mixed Use

Mixed use development for the Red Bridge area involves combining two or more significant revenue producing uses to provide for variety of activities for residents and the working population. For this project, the principal mix suggested is office and commercial at the community and regional center levels. Examples of mixed-use incude convenience and retail commercial and specialty boutiques as a drawing card for a metro-wide market; other activities include: personal service (banks), professional and governmental offices, eating and drinking facilities, and indoor and outdoor recreational facilities.

Mixed Use Development Types:

- o civic/community theater
- o movie theater
- o hotel/conference center
- o quality restaurants
- o cocktil lounge/nighclub
- o curio/specialty and boutique shops
- o ladies and mens apparel
- o leather goods and luggage
- o card and gift shop
- o beauty salons
- o art supplies/galleries
- o health club
- o leased office space (professional, governmental, private)
- o covered parking preferable
- o condominium housing

The key word to describe a MXD is diversity. Diversity in mixed use development means integrating three or more significant revenue producing uses (for example, office, residential, retail, recreational, or hotel/motel in a preplanned manner. Each serves as an anchor to the whole project. Combined in a compact physical configuration, this mix makes possible the multi-purpose trip, and substitution of pedestrian for vehicular travel.

Diversity in mixed use development also means drawing people after close of the business day. A variety of eating and drinking facilities, entertainment facilities (e.g., movie houses, legitimate theatre, indoor commercial and public recreation-health centers, libraries, etc.) and programming of a busy schedule of events (such as specially designated plaza areas) are a few means of achieving this objective.

To realize mixed use dynamics for this project, the aim is to achieve a rich mix of uses:

- providing each other with continuing, mutual support;
- spanning the widest possible activity period - for permanent attractions to shorter programs and from working hours to leisure time activities; and
- responding to the broadest possible audience (resident, worker, shopper, and visitor).

Though no mix is appropriate for every situation, some patterns have emerged. The following are the land use components of a typical large mixed use development.

Office Component:

Almost every mixed use development contains an office use. Among the reasons are:

- office uses can easily fit into almost any mixed use development.
- office uses in mixed use development can be competitive, even in over-built markets.
- office uses often produce a market synergy for other components (e.g., retail).

Retail Component:

The prevalence of retail uses in mixed developments may be attributed to the following factors:

- there is a ready-made market from which to draw support for retail space from other on-site components (e.g., residential).

- specialty boutiques or anchor stores may be a drawing card for a metro-wide market.

- retail uses are a good way to extend the activity cycle, adding excitement and diversity to the project.

A hotel/motel provides a "resident" population, which helps extend the activity cycle by providing entertainment, conference and food facilities.

Public/Semi-Public Uses:

Public uses, especially essential services, can act as an additional incentive for locating office uses in the Red Bridge development area.

Examples of other uses: health clinics, hospital, state agencies, post office, public park, library, etc.

Recreation Uses:

Recreational facilities for the tenant employees and/or general public or public or commercial basis can act as:

- an additional incentive for locating an office, or a residential project in the development area.

- an activity cycle extender.

Examples of recreation uses which might work here are: civic centers, health club, swimming pool, skating rink, tennis and other courts, field tracks, movie theatres, legitimate theatre and public park.

Residential Component:

Residential uses are a highly desirable component of mixed use developments. Nevertheless, they are often absent, especially in small scale development projects, because of:

- the complexity of introducing residential uses into a commercial environment.

- the limitations imposed on land use integration flexibility.

- higher costs or lower returns for residential uses, as compared with other uses.

On the other hand, residential components for this project can use land not suitable for high intensity uses; provide resident population to support other uses, and consume land rapidly, thus accelerating the development process.

There are two categories of residential uses which might be suitable for the Red Bridge area:

- for employees working for on-site establishments (medium to high density housing).

- for general public (medium and low density housing).

Mixed Use Concept

The major design or concept elements for a mixed use development in a suburban location generally includes:

- pedestrian environment and pedestrian vehicular traffic separation.

- organization and articulation of retail uses for maximum synergism.

- transportation accessibility.

- amenities package.

- higher density.

- common shared open spaces and pedestrian circulation.

- mixing of housing types and uses in a horizontal plane.

- staged process development.

- flexible zoning and other land use controls (such as performance standards and design guidelines).

Open Space/Greenways:

Open space consists of natural drainageways, bluffs and slopes too steep to build on and pedestrian plazas. Open spaces can function in the Red Bridge area the following ways: (1) as a visual amenity including landscaping, walks, benches, and lakes which enhance fronting properties, (2) as a convenience for walking and linking the various activities (residential, commercial, office), (3) as a buffer, separating land use districts and areas, (4) as a drainageway for storm water runoff, (5) and as areas for both active and passive recreation.

Recreation:

Activity	Ideal Size	Minimum	Radius Served
Neighborhood Park	10 acres	3 acres	1/2 mile
Horse trail/Hiking trail	minimum of 10 acres provides a 3 mile trail approx. 8 ft. wide		

Additional recreation activities:

- handball
- racquetball
- squash
- ice skating
- jogging track
- tennis

CHAPTER III. LAND USE ALTERNATIVES

NATURAL FEATURES SUMMARY

To understand the impacts that the previously discussed land uses have on natural resources, land use must be described or defined in terms of their physical relationship to the land. Ideally, each land use has certain needs related to terrain, soil, water and vegetation conditions. The goal of the master plan for natural systems is to minimize alterations and environmental impacts and identify development constraints. Any land use can be imposed upon the landscape by making greater site alterations to accommodate the land use (i.e., grading, draining, clearing, etc.). The land uses previously discussed need the following site alterations in varying degrees:

1. vegetative removal and/or replanting
2. stable soil conditions
3. grading and compaction (excavation and fill)
4. subsurface and surface sheet water flow reduction and interruption
5. change in streamflow characteristics generated by impervious surfaces (i.e., parking, walkways, buildings).

These site alterations generate impacts ranging from increased amount and rate of surface water runoff, soil erosion, a destruction of the regenerative capacity of natural plant communities, to a change in the entire visual environment.

However, if the resource base or land in its existing condition already satisfies some land use needs, necessary site alterations and their resulting impacts are kept to a minimum. In other words, some areas of the site are presently more suitable to certain land uses than others. The land use needs and existing Red Bridge site were analyzed for compatibility or suitability.

MAN-MADE FEATURES SUMMARY

Without the benefit of a market demand analysis, it is still important to consider a probable demand based on common sense and logical planning procedures. There are several inputs which have a force in the demand for future development. In summary they are:

Existing Land Uses: A majority of the exterior edges of the study area have already been developed which establishes the scale, character and land use pattern. Development opportunities for the undeveloped parcels must obviously respond to these established land uses. In addition to buildings and open space, existing street layouts and utility systems may shape or limit future land uses based on layouts, capacities and code regulations. In short, the existing uses and supporting infrastructure may dictate future development based on the impact that it may have on the usability and visual or aesthetic value of present uses.

Site Access: In order that parcels can become developable, accessibility must be feasible and must be able to handle the capacities required by any proposed development. Areas which are already developed and have existing street networks should not be negatively impacted by any particular type of traffic generated by a proposed development. For example, a mixed use development should not bring unwanted traffic through new or existing residential development. In addition, some uses may require available access to the metropolitan area and a closer relationship to the interestate system is sensible (i.e. hospital related use).

Land Use Adjacencies: A comparison of suitable land uses indicates that there are portions of the Red Bridge study area which are equally suitable for several different land uses. To further distinguish between areas that are equally suitable for several land uses, non-ecological design criteria such as program requirements, aesthetic considerations and land use relationships were used:

1. Separation of institutional, office, commercial, residential and through traffic.
2. Visual separation or buffer between different development land uses.

3. Residential and office areas oriented to take advantage of significant views, i.e., views to the suburban skyline, wooded ravines and bluffs.

4. Consideration of noise generated by Interstate 435.

5. Off-site accessibility.

6. Size: adequate land area for economic development.

The result of the synthesis of the above natural and man-made inputs is the basis for the formulation of land use alternatives.

LAND USE DETERMINATION

The assignment of particular uses is based on standard planning and development factors. Each potentially developable parcel was examined for the following:

1. slope and topography

2. drainage, hydrology and flood plain

3. existing and surrounding land use

4. significant vegetation

5. street access

6. visual exposure to I-435

7. visual character and quality

8. configuration

9. easements and right-of-ways

10. acreage and density to sustain a given land use.

Each of these factors influences what type of development could and should occur. Of equal importance were recent development pressures in the form of rezoning requests or inquiries by developers to City officials concerning possible new development in the area.

Also influencing this process was current planning by the City of Kansas City in this southern zone of the City. In addition, a traffic impact analysis by Barton-Aschman and continued team work sessions on traffic and land uses became valuable input.

Each of the above factors were compared against the following land uses to determine compatibility or suitability of the parcels to a land use:

1. commercial/retail

2. office

3. hotel/motel

4. institutional

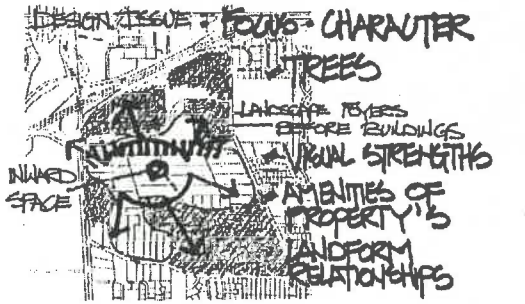
5. recreational

6. single family residential

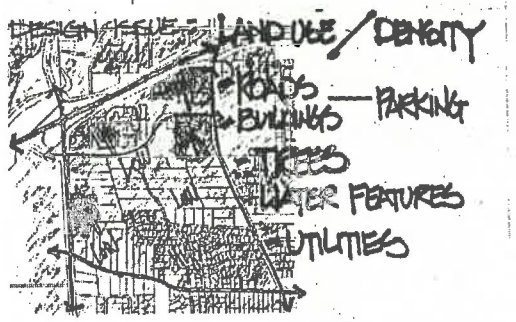
7. multi-family residential

8. mixed use

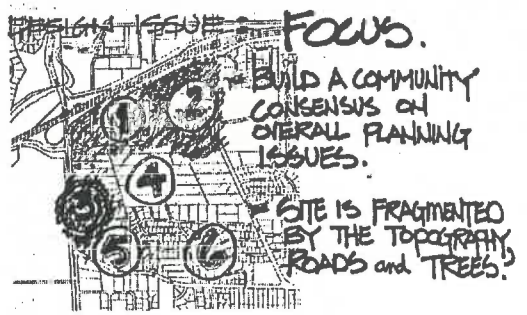
In most cases, each parcel was judged suitable for at least two uses. The land use alternatives are illustrated in the following pages along with summary conclusions of the three most distinct approaches. Neither plan is necessarily the ideal development plan, but the eight alternative plans shown represent the broad spectrum of alternatives. The final master land use plan is a result of the synthesis of these alternatives after input from the City, interested community groups and the planning consultants.



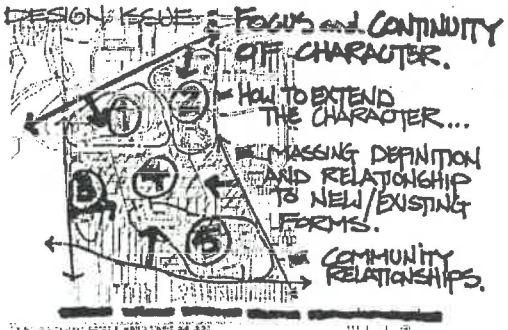
HOW TO BUILD THE CENTER...



HOW MUCH CAN YOU HAVE...

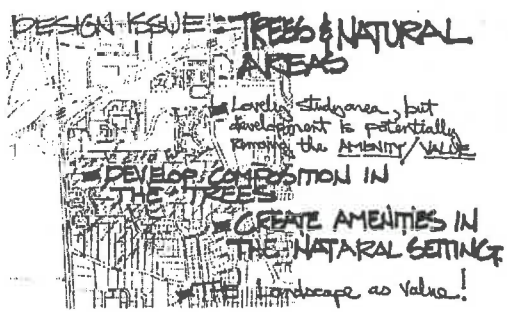


WHAT IS THE UNIFYING CHARACTER/THEME...

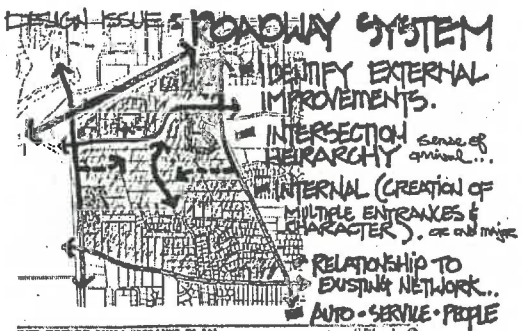


HOW TO UTILIZE THE DISTINCT ROOMS OF THE STUDY AREA...

HOW TO CAPTURE THE AMENITY OF THE LANDSCAPE in PLACEMENT/DESIGN and NOT DESTROY IT....



WHERE TO SAVE THEM AND WHERE TO BUILD...



HOW TO STRENGTHEN CIRCULATION and ACCESS... AND WHAT USES SUGGESTED BY LIMITATIONS OR OPPORTUNITIES?

CHARACTER OF USES BY LINKING TO EXISTING...

CONCLUSIONS

FOCUS/IMAGE

- VIEWS TO NORTH OUT OF OFFICE ABOVE BLUFF TO OTHER ROOFTOPS MAYBE POTENTIALLY UNAPPEALING.
- CONTINUOUS LINEAR OFFICE USE ALONG BLUFF AND AT EDGES (CORNERS) ALLOWS FOR VISUAL EXPOSURE AND ACCESS FROM ARTERIALS.
- LAND USES INTERNALIZED AND DEVELOPED AROUND NATURAL FEATURES.
- OFFICE DEVELOPMENT BOTH ABOVE AND BELOW BLUFF CAN RELATE VIA ARCHITECTURAL CHARACTER, MATERIALS & ACCESS.

ROADWAY SYSTEM

- ACCESS TO CORE AREA POTENTIALLY POOR IF NOT DEVELOPED AS A WHOLE VS. FRAGMENTATION.
- EACH LAND USE HAS POTENTIAL FOR SEPARATE INTERNAL CIRCULATION HOWEVER OFFICE NORTH OF BLUFF CAN BE LINKED TO LOWLAND AREA.
- POSSIBLE INTERNAL CIRCULATION AS NOTED ON DRAWING
- IMPACT ON EXISTING EXTERNAL CIRCULATION NOT YET IDENTIFIED
- ALIGN CURB CUTS ALONG ARTERIALS

NATURAL FEATURES

- NORTH EDGE OF CORE AREA POTENTIALLY DEVELOPED IN HIGH DENSITY YET CONSISTENT WITH ADJACENT LAND USES AND NATURAL FEATURES.
- STRONG VEGETATIVE BUFFERS TO BE MAINTAINED BETWEEN LAND USES - GOOD POTENTIAL

LAND USE/DENSITY

- PERCENTAGE (%) OF PROPOSED OFFICE AND LOCATION IS STRONGEST LAND USE STATEMENT BUT CAN BE CONTROLLED BY DENSITY, ORIENTATION, SLOPES, TREES, ETC.
- UTILITIES, ROADS, GRADING ETC., IMPORTANT PRO FORMA FACTOR FOR VIABILITY OF LAND USES. - INFRASTRUCTURE AS RELATED TO PROFIT.

LINKAGES

- CIRCULATION LINKAGES BETWEEN DIFFERENT LAND USES WHICH MIGHT PROMOTE SHORTCUTTING NOT ENCOURAGED.
- OFFICE IN LINEAR DEVELOPMENT AND ON CORNERS RELATES WELL TO HOSPITAL ZONE AND ARTERIALS FOR ACCESS
- RESIDENTIAL ZONE BECOMES CRITICAL IN TERMS OF ADJACENT DENSITY, VIEWS.

ALTERNATIVE A

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY : MISSOURI

HOK ARCHITECTS

PROPOSED DEVELOPMENT FOR HALL PROPERTY

APPROX. 435,000 SQ. FT. COMMERCIAL.

APPROX. 900 UNITS RESIDENTIAL

CONCLUSIONS

FOCUS/IMAGE

LARGE HOMOGENEOUS LAND USE PATTERNS WITH POTENTIAL FOR INTERNAL FOCUS AND BUFFER FROM ADJACENT LAND USES.

OFFICE DEVELOPMENT BOTH ABOVE AND BELOW BLUFF CAN RELATE THRU ARCHITECTURAL CHARACTER, MATERIALS, ORIENTATION & ACCESS.

QUALITY OF SINGLE-FAMILY RESIDENTIAL RELATED TO EXISTING OR TO RANGE IN CHARACTER TO UPPER SCALE.

ROADWAY SYSTEM

EACH LAND USE HAS POTENTIAL FOR SEPARATE INTERNAL CIRCULATION – OFFICE NORTH OF BLUFF CAN BE LINKED TO LOWLAND AREA.

IMPACT ON EXISTING EXTERNAL CIRCULATION NOT YET IDENTIFIED

STATE LINE HAS POTENTIAL FOR HIGHER IMPACT

ALIGN CURB CUTS ALONG ARTERIALS

NATURAL FEATURES

STRONG VEGETATIVE BUFFERS TO BE MAINTAINED BETWEEN LAND USES - (WIDE) GOOD POTENTIAL

OFFICE (26 AC.) MUST MAKE BEST OF SLOPE CONDITIONS

LAND USE/DENSITY

PERCENTAGE (%) OF LAND USE MIX NEARLY EQUAL

LAND USES RESPONSIVE TO EXISTING & SURROUNDING CONDITIONS

EXTENSION OF MULTI-FAMILY & SINGLE-FAMILY RELATED TO POTENTIAL COLLEGE BLVD. EXTENSION.

LINKAGES

PROPOSED LAND USES ATTEMPT TO BUILD ON EXISTING LAND USES WITH COMPATIBLE RELATIONSHIP TO EACH OTHER.

VISUAL AND ARCHITECTURAL LINKAGES AMONG OFFICE USES ENCOURAGED - OTHER LAND USE LINKAGES MINIMIZED AND INTERNAL.

ALTERNATIVE B

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS

CONCLUSIONS

FOCUS/IMAGE

- OFFICE IS LOCATED TO CORNERS AND GROUPED IN ASSOCIATION WITH VISUAL LINKAGES AND TRAFFIC
- MULTI-FAMILY IN CORE AREA SERVES AS STRONG LAND USE BUFFER AND PRESERVES IMAGE OF BLUFF (BUILD IN TREES)
- DEVELOPMENT NORTH OF BLUFF RELATED TO HOSPITAL ZONE
- EXTENSION OF MULTI-FAMILY TO RED BRIDGE - RELATED TO COLLEGE BLVD. EXTENSION

ROADWAY SYSTEM

- POSSIBLE INTERNAL CIRCULATION AS NOTED ON DRAWING
- SEPARATE INTERNAL CIRCULATION FOR SINGLE-FAMILY
- IMPACT ON EXISTING EXTERNAL CONDITIONS NOT YET IDENTIFIED
- ALIGN CURB CUTS ALONG ARTERIALS
- MINIMAL INTERNAL CROSS TRAFFIC

NATURAL FEATURES

- CORE AREA POTENTIALLY DEVELOPED IN LESS DENSITY ON SOMEWHAT CONSISTENT TOPOGRAPHY. - RESIDENTIAL CHARACTER
- STRONG (WIDE) VEGETATIVE BUFFERS TO BE MAINTAINED BETWEEN LAND USES - GOOD POTENTIAL.

LAND USE/DENSITY

- PERCENTAGE (%) OF PROPOSED OFFICE AND LOCATION NOT VISUALLY OBTRUSIVE.
- DENSITY OF OFFICE (19 & 15 ACRES) AND SINGLE FAMILY RESIDENTIAL GOVERNED BY TOPOGRAPHY.

LINKAGES

- OFFICE ON CORNERS RELATES WELL TO HOSPITAL ZONE DEVELOPMENT AND TRAFFIC ACCESS
- VISUALLY RELATE ALL DEVELOPMENT TO EXISTING WITH ARCHITECTURAL MATERIALS, ORIENTATION & SCALE.
- EXTENSION OF SINGLE-FAMILY VISUALLY RELATES TO EXISTING & SURROUNDING RESIDENTIAL.

ALTERNATIVE C

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS

ALTERNATIVE 1

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY . MISSOURI

HOK ARCHITECTS

ALTERNATIVE 2

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS

ALTERNATIVE 3

RED BRIDGE N.W. LAND USE PLAN

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ALTERNATIVE 4

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

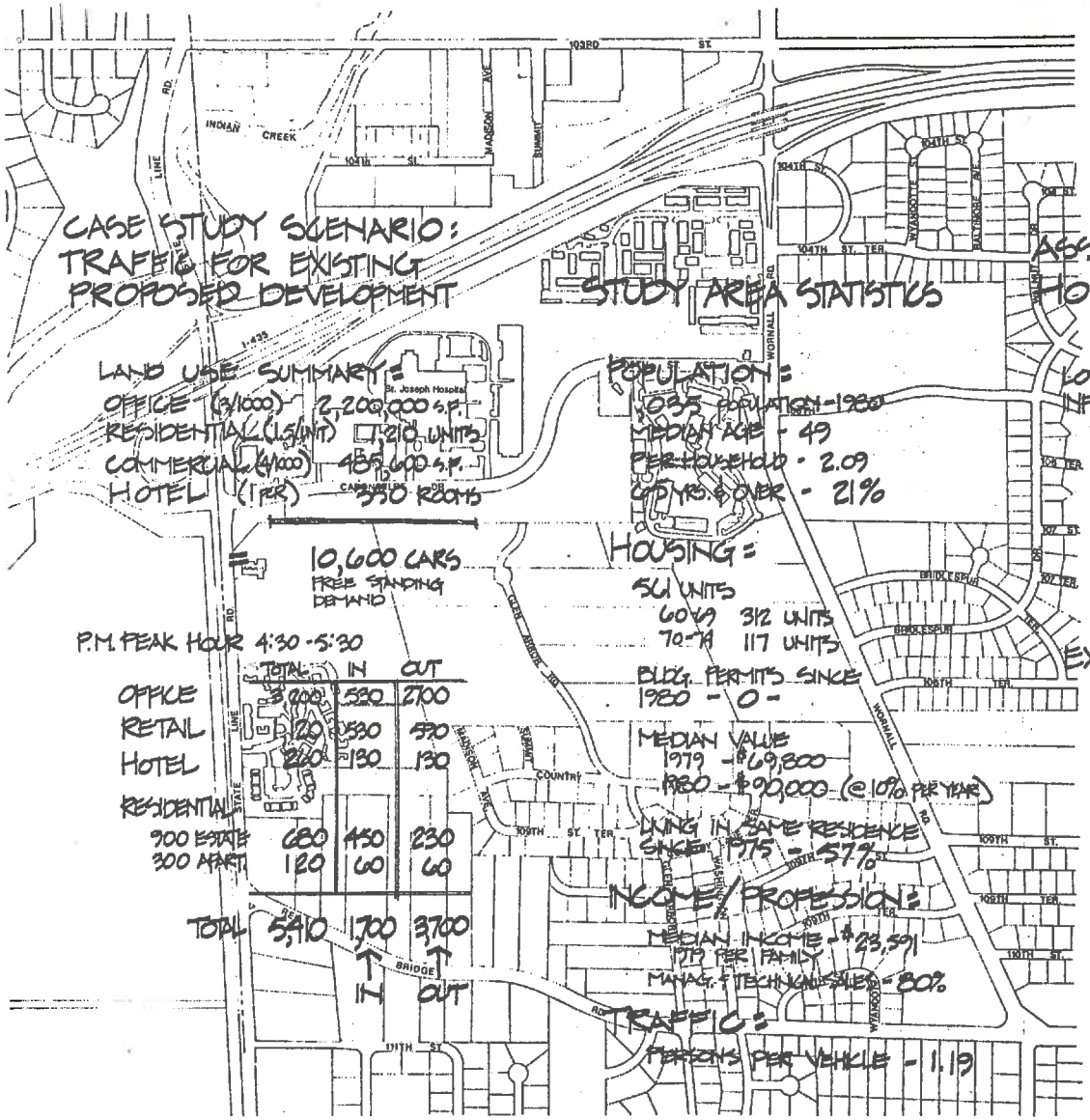
HOK ARCHITECTS

ALTERNATIVE 5

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS



CASE STUDY SCENARIO: TRAFFIC FOR EXISTING PROPOSED DEVELOPMENT

LAND USE SUMMARY:

OFFICE (3/1000) 2,200,000 S.F.
RESIDENTIAL (1.5/UNIT) 1,210 UNITS
COMMERCIAL (4/1000) 485,600 S.F.
HOTEL (1 PER) 350 ROOMS

= 10,600 CARS
FREE STANDING DEMAND

P.M. PEAK HOUR 4:30-5:30

	TOTAL	IN	OUT
OFFICE	3,200	530	2700
RETAIL	120	530	590
HOTEL	260	130	130
RESIDENTIAL			
900 ESTATE	680	450	230
300 APART.	120	60	60
TOTAL	5,410	1,700	3,700
		↑ IN	↑ OUT

STUDY AREA STATISTICS

POPULATION:
1,035 POPULATION - 1980
MEDIAN AGE - 49
PER HOUSEHOLD - 2.09
65 YRS. & OVER - 21%

HOUSING:
561 UNITS
60-69 312 UNITS
70-74 117 UNITS

BLDG. PERMITS SINCE 1980 - 0 -

MEDIAN VALUE
1979 - $69,800
1980 - $90,000 (@ 10% PER YEAR)

LIVING IN SAME RESIDENCE SINCE 1975 - 57%

INCOME/PROFESSION:
MEDIAN INCOME - $23,591
1979 PER FAMILY
MANAG. & TECHNICAL SALES - 80%

TRAFFIC:
PERSONS PER VEHICLE - 1.19

ASSUMED SINGLE-FAMILY HOUSING COSTS

LOT COSTS INCLUDING INFRASTRUCTURE - $3.50 sq. ft.
THUS:
1/3 ACRE LOT ± $50,000
1/4 ACRE LOT ± $38,000

AVG. S.F. RESIDENTIAL BUILDING COST $50

EXAMPLE:

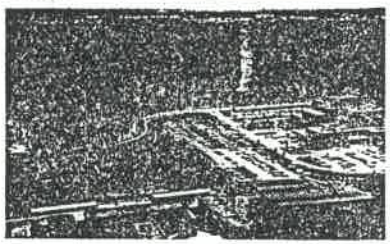
2200 S.F. RESID. @ $50 S.F.
3 BDR. = $110,000
+ 1/3 AC. LOT = 50,000
$160,000

1500 S.F. @ $50 S.F.
3 BDR. = $75,000
+ 1/4 AC. LOT = 38,000
$113,000

NUMERICAL ANALYSIS

1 LOOKING NORTHWEST

2 LOOKING EAST



3 LOOKING SOUTH

4 LOOKING NORTHEAST

EXISTING PROPOSAL FOR DEVELOPMENT

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS

CHAPTER IV. MASTER LAND USE PLAN

The master land use plan has two purposes: one is to indicate the best direction for physical growth based on sound planning principles and an understanding of future needs and the goals stated earlier in this report. The other is to determine a potential density of the various parcels to accommodate the suggested future land uses.

The master land use plan is a broad statement about future urban development and begins to answer the questions concerning future land use boundaries, image and flexibility or response to change. The drawing represents ideas, not definite design decisions, and is conceptual in nature. Identified parcels are intended to indicate general scale and land coverage. The proposed land uses are concepts and ideas founded on valid design and planning principles and generated in the context of the whole study area, not merely pieces of it.

OVERALL DESCRIPTION

The final step in the planning process was the transformation of the land use alternatives into a master land use plan. With this approach the final plan represents a compromise between the conceptual approach of each of the previous alternative plans.

The master land use plan graphically illustrates the character and magnitude of the Red Bridge study area. The final plan represents the input to establish a balanced variety of land uses as illustrated in Alternative A while controlling the location and maginitude of development of higher intensity uses (i.e. mixed use, office, residential) in order to achieve the character of Alternative B. To better understand the plan, this discussion divides it into nine areas, each of which is more fully described in the following text:

AREA A - MIXED USE:

This area is at the corner of I-435 and State Line Road. Excellent visibility and vehicular access for Carondelet and I-435 make the area ideal for commercial and office development.

Summary of Suitabilities:

1. Majority of site already developed.
2. Good visibility from I-435.
3. Excellent access from State Line, Carondelet, I-435.
4. Adjacent land uses (hospital and medical offices) are compatible and act as generators.

Roads: Direct access to parcel is available from Carondelet Drive. Intersection at Carondelet and State Line should be improved and is summarized in the traffic analysis study.

Land Uses: The focus of activity on this parcel is an exisitng bank, office space and restaurant, The building component is a mid high-rise. Future building activity is limited due to existing building and parking.

Site Features: Again, already presently developed and landscaped entry portals designated at the corner of State Line and Carondelet would create a special image for visitors.

Plan Take-Offs: Total acreage ±4 acres

AREA B - INSTITUTIONAL

The medical facilities zone lies east of the mixed use zone previously described and between I-435 on the north and Carondelet on the south. Again, excellent visibility and access is available and makes this an ideal zone for the land use and future related uses. The major roadway network puts hundreds of thousands of metropolitan Kansas City area citizens within twenty minutes drive of this zone.

Summary of Suitabilities:

1. Majority of site already developed.
2. Good visibility from I-435.
3. Excellent access from State Line, Wornall Road and I-435.
4. Adjacent land uses (i.e. bank, apartments) are compatible.
5. New development/facilities to be spin-offs of existing medical functions.

Roads: To facilitate east-west movement improvements to Carondelet will be needed with increased development. Direct access to this parcel off Carondelet is excellent, however, new curb cuts should be minimized.

Land Uses: St. Joseph Hospital and medical office buildings presently exist on the site. An ideal site for future related medical facilities of related spin-offs lies at the eastern edge of this parcel and encompasses about 3 acres.

REFINED ALTERNATIVE

OPTION A

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS

REFINED ALTERNATIVE

OPTION B

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

HOK ARCHITECTS

DEVELOPMENT ASSUMPTIONS FOR HALL PROPERTY

- 650,000 sq. ft. MIXED USE
- 1,500 SINGLE FAMILY RESIDENTIAL (ESTATE LOTS)
- GOLF COURSE

CONCLUSIONS

FOCUS/IMAGE

- Large homogeneous land use patterns with potential for internal focus and buffer from adjacent land uses
- Mixed use development both above and below bluff can relate thru architectural character, materials, orientation and access. low-rise character suggested.
- Land uses internalized and developed around natural features
- Extension of multi-family to Red Bridge related to College Blvd. extension
- Quality of single-family residential should be related to existing or to range in character to upper income scale.

ROADWAY SYSTEM

- Each land use has potential for separate internal circulation. Mixed use south of bluff can be linked to lowland area at Carondelet separate internal circulation for single-family as noted.
- Multi-family land use in northeast corner at I-435 to be accessed from 104th St. Terrace.
- Potential internal circulation for study area as noted on drawing
- Impact on existing external conditions identified in text
- Align curb cuts along arterials

NATURAL FEATURES

- Strong (wide) vegetative buffers to be maintained between land uses – good potential exists
- Mixed use zone of study area developed in high density yet should be consistent with adjacent land uses and natural features
- Minimize building scale by stepping down the site and breaking bulk into modules
- Develop landscape and water features by incorporating existing natural conditions to enhance design theme

LAND USE/DENSITY

- Percentage (%) of proposed land use mix nearly equal on acreage basis
- Land uses responsive to existing and surrounding conditions
- Density of mixed use development is strongest statement but can be visually controlled by orientation, slopes, vegetation road networks, etc.
- Utilities, roads, grading, etc. are important feasibility factors for viability of land uses – infrastructure as related to profit

LINKAGES

- Mixed use development in northwest sector relates well to hospital, bank & office zone development and traffic circulation
- Circulation linkages between various land uses which might promote shortcutting is not encouraged
- Proposed land uses attempt to build on existing land uses with compatible relationships to each other
- Visual and architectural linkages among mixed use encouraged while other land use linkages should be minimized and internal

LEGEND

Mixed Use
OFFICE
HOTEL
COMMERCIAL RETAIL
INSTITUTIONAL
RESIDENTIAL

Institutional

Landscape Buffer

Single Family Residential

Multi-Family Residentia

RED BRIDGE N.W. LAND USE PLAN

KANSAS CITY, MISSOURI

MASTER LAND USE PLAN

HOK ARCHITECTS

Site Features: The developable areas are primarily flat and open areas with excellent visibility and scenic views to surrounding areas. Buildings should selectively placed when close to adjacent land uses (apartments).

Plan Take-Offs: Suggested developable acreage ±3 acres.
Suggested density: ±40,000 sq. ft.
Suggested uses: Institutional, office, commercial (medical related).

AREA C - MULTI-FAMILY RESIDENTIAL

This existing development lies south of I-435 and west of Wornall Road. Visibility is somewhat buffered by the topography and foreground vegetation. Vehicular access from Wornall Road is adequate yet a problem due to traffic volumes and sightlines.

Summary of Suitabilities:

1. Large contiguous zone of existing medium density multi-family residential.
2. Access available from I-435, Wornall Road and 105th Terrace.
3. Existing development reduces available developable land.
4. Developable area flat and influenced by character of existing surrounding uses.

Roads: To ensure that 105th St. Terrace and Wornall Road are capable of handling new development, capital improvements must be made and are addressed in the traffic analysis discussion. Access to the developable site should be from 105th St. Terrace.

Land Uses: Medium density multi-family apartment and condominium units presently exist on most of this area. The developable area to the south should reinforce these uses in architectural character and orientation.

Site Features: This high ridge zone in relatively flat and open with good visibility. The elevation of this area above the highway and existing developmnent serving as a buffer, significantly reduces the effects of road noise.

Plan Take-Offs: Suggested developable area ±4 acres.
Suggested density: 100 units (25 units/acre).

AREA D - MULTI-FAMILY RESIDENTIAL

Like its neighbors to the west, east and south, this corner is ideally suited to residential and offers a potential for higher densities than is presently platted. The area is bounded by I-435 on the north and Wornall Road on the west.

Summary of Suitabilities:

1. Existing vegetation is a potential scenic natural feature.
2. Vehicular access limited for any high volume uses.
3. Residential character of adjacent properties and roads.
4. Gently rolling terrain.
5. Existing vegetation can serve as noise and land use buffer.

Roads: Access to this parcel should be oriented to 104th St. Terrace due to high volumes, sightlines, ramps, and stack times along Wornall Road. Internal circulation for the site has been platted but should not be considered a given. Potential access hazards and character of adjacent land uses should limit high traffic turnover uses.

Land Uses: Several single single-family residences presently exist, however, continued build out of the parcel has not occured. Depending upon the market, multi-family residential at a low density would be appropriate with an internal orientation and buffer from adjacent single family.

Site Features: The area is heavily wooded and development may take advantage of this condition rather than modifying it through large scale grading and earth movement. The environment can be a positive selling point to downplay the adjacency of I-435.

Plan Take-Offs: Total acreage ±8 acres.
Suggested density: ±70 units (9 units/acre).

AREA E - MULTI-FAMILY RESIDENTIAL

This residential component of the study area lies along the western edge of Wornall Road and incudes Cloverset Apartments. The terrain is rolling and primarily open and is a constraint to development options.

Summary of Suitabilities:

1. Site slopes severely in certain areas.

2. Residential character of adjacent roads and property.

3. Access somewhat difficult.

4. Land use easily buffered by elevation and vegetation.

5. Configuration reduces land use efficiency.

Roads: The major arterial is the north-south Wornall Road and primary access occurs from 105th St. Terrace. Future development access may occur from Wornall Road. Internal loop circulation which exists may be utilized for new development.

Land Uses: Adjacent land uses have not been directly related by existing development as much of it is open and not directly adjacent. Extension of the multi-family development to the south is suggested and architectural character and orientation may be upgraded.

Site Features: Active terrain allows for variety of architectural alternatives and may also affect site development costs. Developable area offers panoramic views to adjacent areas.

Plan Take- Offs: Total developable acreage ±8 acres.
Suggested density: ±110 units (14 units/acre).

AREA F - MIXED USE

This rectangular area lies south of Carondelet Drive and west of State Line Road and encompasses nearly 45 acres. The area is the one most suitable to a variety of land uses, but it has been determined from planning inputs that like its neighbors to the north, it is ideally suited for office and commercial activities and offers potential for a mixed use development. Mixed use activities are described earlier under alternatives.

Summary of Suitabilities:

1. Potential visibility from I-435 and State Line Road.

2. Site readily accessible from I-435 and State Line Road and Carondelet.

3. Designation as mixed use was influenced by the adjacent land uses and ability to be sufficiently buffered. Locating mixed use near similar existing facilities is a major benefit.

4. Low-rise structures (3-4 stories) are more compatible with surrounding architectural scale.

5. Adjacent land uses (hospital, offices, bank, residential) act as generators and are compatible.

Roads: To facilitrate internal circulation and site access, curb cuts from Carondelet Drive and State Line Road should be designed to be compatible with existing road network. A major internal boulevard may be a good design alternative. Landscaped entry portals to a unified development creates a unique theme for potential projects.

Land Uses: The focus of activity in this area is a regional mixed use development with both office and retail buildings along major drainageways. Also included is a skilled nursing facility which is multiple-family residential in character and related hospital use. Any phased development or building by several developers should be a smooth transition between uses. The sloping terrain offers exciting design opportunities. Density will respond to the market opportunities but should be controlled.

Site Features: The high ridge along the northern edge of this parcel provides excellent visibility and scenic views of the surrounding area, however, the exisitng vegetation can be an overall image and character for the area and design feature. Although adjacent land uses are resiential, site is large enough to support mixed us with sufficient buffers by existing vegetation.

Plan Take-Offs: Total developable acreage 44.5 acres
Suggested density: 650,000 sq. ft. office/hotel
125,000 sq. ft. retail
6.5 acres medical related

AREA G - SINGLE-FAMILY RESIDENTIAL

The principle single-family residential component of the study area lies to the north of existing single-family development and west of Wornall Road. The terrain is rolling with forested sideslopes and open ridgeways.

Summary of Suitabilities:

1. Residential character of adjoining parcels and streets.

2. Rolling wooded nature of area.

3. High volume vehicular circulation needed to be minimized due to residential adjoining properties.

4. Good access to area is provided from Wornall Road and Country Lane.

5. Nearby buffer or "greenway" could offer special features, thus influencing type and quality of housing.

6. Topography may influence land use efficiency.

Roads: The major north-south arterial is Wornall Road and provides good access to I-435 and necessarly commercial activities. The layout of secondary streets and internal orientation are a function of terrain and housing arrangements.

Land Uses: Adjacent land uses are compatible and quiet with low density use. Density may change depending upon market opportunities, however, the greenway should further enhance the development and should be accessible for passive recreation.

Site Features: The area is heavily forested and contains areas of deep ravines and valleys. To preserve existing woods and terrain, housing design should take advantage of these conditions rather than modify them through large scale grading. The natural environment can be a positive selling point.

Plan Take Offs: Developable Area, 48 acres
Suggested Density: 110 units @ 1/3 acre lots

AREA H - MULTI-FAMILY RESIDENTIAL

This area south of the currently developing Park South apartments is presently single family residential; however, it may be impacted by the extension of College Boulevard near the Red Bridge Road intersection. This is long-range planning with impacts that must be considered. Multi-family residential would then be an appropriate extension to this zone.

Summary of Suitabilities:

1. Vehicular access would be good.

2. Adjacent land use is residential and this extended land use would act as buffer at busier intersection.

3. Adjacent future land uses are compatible and may act a generators for future residents.

Roads: Primary access is from State Line Road with future service potentially from Red Bridge Road. The area is well served and interior site loop roads should be a function of terrain and housing arrangements.

Land Uses: Multi-family mid-rise housing which continues to develop should transition in scale and character with existing adjacent development.

Site Features: Treatment along the State Line and Red Bridge Road edge will be important to the overall image and character of the area. The rolling terrain can serve as a design feature and reduce impact of density.

Plan Take Offs: Developable acreage, 4.3 acres
Suggested Density: 75 units (17 units/acre)

AREA I - LANDSCAPE BUFFER

This zone runs in an east-west orientation along the center area of the study area and is to function as (1) a buffer separating land use districts and areas; and (2) an amenity

including landscaping and passive recreational activities such as walking trails, bridal trails, running paths or par course.

Summary of Suitablililty:

1. Quiet, rolling wooded character.

2. Excellent pedestrian access from land uses.

3. Offers possible linear park concept.

4. Influences type and quality of adjacent development.

Roads: Each designated land use will have circulation internal within its development and no roadways are to penetrate the buffer zone. Thus, site shortcutting is minimized.

Land Uses: This green corridor should provide transition between land uses and increases site amenities for visual and aesthetic benefits. The buffer zone should be significant, 50-80 ft minimum in width.

Site Features: Existing vegetation should be preserved and enhanced with additional plantings where appropriate. Pedestrian amenities previously mentioned are appropriate.

Plan Take Off: Total acreage ±10 acres.

PLAN IMPLEMENTATION

PROJECT PHASING

The detailed Master Land Use Plan presented here serves several purposes. First, it refines the land use concepts based on a thorough examination of the study area; and understanding of land uses, their needs, suitabilities and spin-off potentials; some agreement as to what can be absorbed by the marketplace; and and understanding of the current development taking place in this general area of the city.

Secondly, the plan adds a realistic dimension to the development of the property. The layout of land uses, roads, landscape and open space zones turns large areas into a better defined picture and site "fit" for decision making purposes.

Third, the level of detail illustrates the magnitude and scale of the proposed development which enables one to analyze the impacts to existing development and circulation networks.

The question to be most often asked is "what can be done now?" First, one must consider the plan diagrammatic and certainly flexible. Besides accommodating needs of already planned and existing development, the stage can now be set for future development potentials. The quality of the first development and its environment will heavily influence future development.

With this in mind, the merits of the first projects developed should be weighted against criteria such as:

1. Being economically justifiable and respondent to a developing market for the particular activity,

2. being of sufficient quality to reinforece the city's longe-range commitment to growth and create and impact capable of visually and aesthetically competing with existing development within the metropolitan area, and

3. encouraging other development not just in adjacent areas but also residential development in the central zone of the study area.

Success breeds other successes. Long-term development potential is highly dependent upon that development and the quality of that development completed in the next five or so years. The true development constraints are financial and political and the nature of these will become more clear once development actually begins.

The Master Land Use Plan pictures a complete development of the study area based upon factors we know to be valid today. Future unknown market forces may certainly change the mix and quantity of uses shown on the plan. It is recommended that regular reviews of the plan (every 3 to 5 years) be done. Proposed changes should rate equal to or better than the original plan in terms of the evaluation criteria (e.g., site analysis; suitabilities; uses, their relationships and spin-offs; traffic impacts; planning of the whole vs. individual parcel).

DESIGN STRATEGY

The design strategy is twofold. First, the development of the area must offer an image unique to Kansas City, and image capable of attracting new business. Secondly, the development of the parcels should provide a balanced environment for working and living. The area should be planned to permit a variety of uses to coexist, side by side in a compatible manner. This is the concept of planned development.

By planning for a variety of uses, from residential through mixed use, the success of the development is not dependent upon one land use or market activity. Also, the large size of this study area still permits integration of large land uses (such as corporate offices) with smaller uses.

The idea of a mixed use community is appealing to many businesses. For a business looking for a new location, it is important to know what is likely to occur around a particular site; what kind of quality of future development is anticipated; and what "conveniences" are available in the area for employees. The planned and balanced community can be a powerful force for development opportunities.

The balanced community concept tends to forestall the development of future monocultures whose future success, quality of maintenance, and stabilization of property values is often at the whim of shifting market forces. The mixed or balanced community tends to attract businesses and dwellings which promote diversity and convenience and which become assets to the community.

CHAPTER V. DEVELOPMENT GUIDELINES

PURPOSE

Development guidelines are not just for developers. They ensure that future residents, workers and visitors will have an environment which will enhance their living and working experience. Guidelines are quality control mechanisms which influence the image of a development. A good image is necessary to a successful project. People must be able to identify favorably with the project, feeling that what has been built creates a pleasant place to live, stabilizes property values and is representative of what is to come. Unless people perceive the project as "permanent" and reflective of a concerned developer, then the project will not fulfill the original expectations and intentions. It is, therefore, important to establish minimum criteria for development.

Additionally, the size of the study area, the magnitude of proposed development and the expected long range time frame for development mean that over the life of the projects there will be many developers and contractors involved. Regardless of the time element, it is important for everyone who works on this project to be aware of the design/development intentions of the original plans, concepts and ideas.

SITING

The practical purposes of the site development guidelines are to create a context for the individual projects within the study area. The major general consideration is the reinforcement of natural and man made edges. The need is to overcome the usual tendency of individual projects to become visually and functionally fragmented. Natural edges are the topography and large tree masses. Roads and building groups are located to reinforce the natural situation by creating visual masses and functional groupings.

Location of roads and buildings relate to ecological conditions and preserve the drainage system. Planting, drives, parking areas, courts and buildings are delineated by edges composed and reinforced with planting, paving, walks, and lighting. The purpose is to create a visual harmony in which individual companies are identifiable within a comunity context.

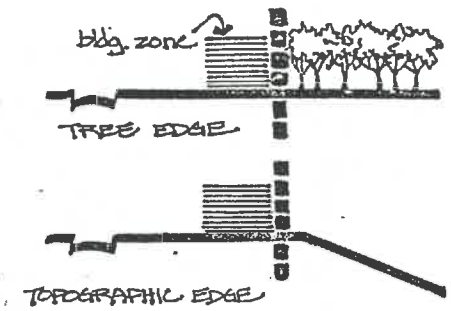
Visibility and Approach

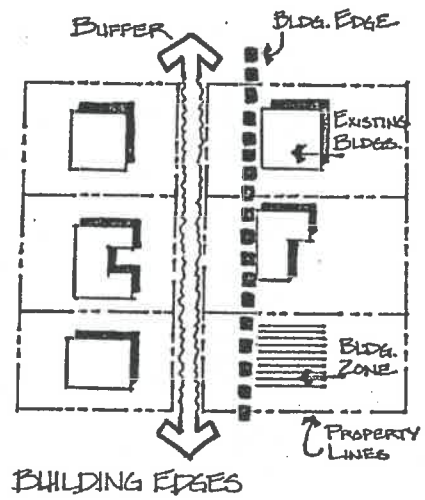
Effective siting of the building on the land must enhance the site and building; establish acceptable relationships between b°uildings, parking, and adjacent property; and define circulation corridors, access, and entrances.

Creation of grades and building masses should correspond to the overall topographic pattern, and supplemental features such as planting and lighting should reinforce the development.

Buffer Areas

These are required in certain areas where it is desirable to control a vista or to separate a change in land use. Visual screening is often more important than a physical separation. Visual control may be accomplished by grading, planting, fencing or retention of a natural area. Specific visual controls will vary from site to site and with varying uses, and will not be firmly established until a specific use and building have been proposed.





Ecological Conditions

Conservation of soil, water, wooded areas on developed sites as well as on open land is a primary objective. The objectives are:

1. Prevention of soil erosion and subsequent pollution and siltation of streams.

2. Prevention of rapid runoff of surface water and flash floods.

3. Retention of normal soil-water relationships in entire area.

The principle criteria in establishing the pattern of sites should be ecological.

Damage and alteration during construction is the most serious, and stringent control if runoff is necessary. Ponds and lakes created to filter silt out of surface runoff water from open excavations will be recommended. The ponds can be retained as recreation areas and visual amentities.

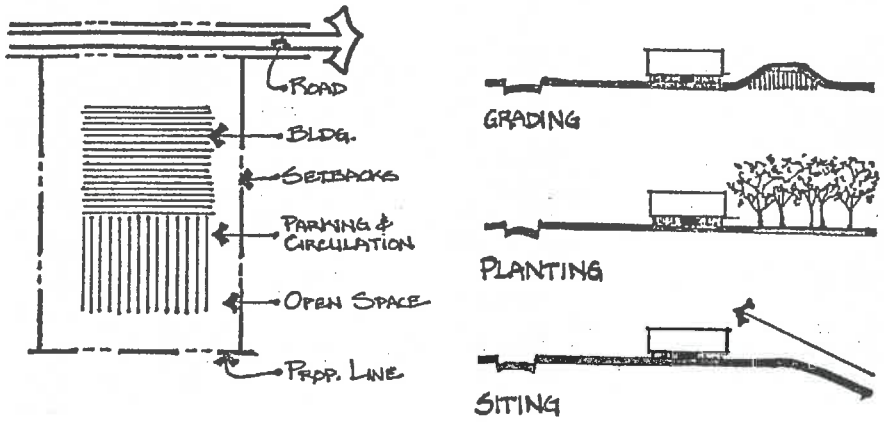
Sloping topography exists where a site slopes at a grade in excess of 5%. In these areas the following measures are required to minimize natural disturbances:

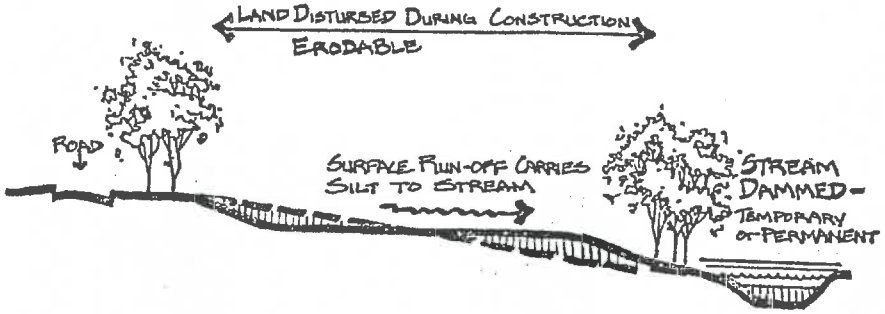
1. Grade separations should be minimized as much as possible in terraces with erosion control plantings on intervening slopes.

2. Existing grade should be left undisturbed wherever possible.

3. Roof water whould be carried through storm drainage system to drainage easement or storm water system outfall.

4. Surface runoff from paved parking and plaza areas should be collected in inlets and carried through storm water system to approved outfall.





PONDING FOR SILTATION

GRADING

Drainage

The basic functions of grading are to prepare land for development, control surface runoff, situate and relate buildings to the landscape, control movement, and special effects. Massive grading to reduce a site to a uniform plan is unecessary. Grading and re-contouring should be restricted to meeet the objectives of site use and limited to the area of improvement. Land forms must be designed to effectively integrate changed contours with the natural landscape and control surface water. Grades, berms, channels, and swales should be an integral part of architectural grading and paved surface design. All runoff from improved surfaces must be collected on the site and disposed of in an approved manner.

Building Location

Building location has two sets of criteria related to grading:

1. Siting of the building on a slab and creating architectural land forms to integrate it into the natural landscape.

2. Treatment of the building as a four-sided structure.

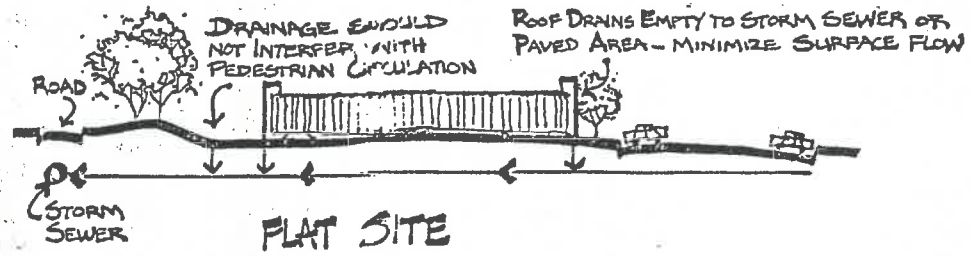
   a. entrance and image-creating detail

   b. employee parking and entrances

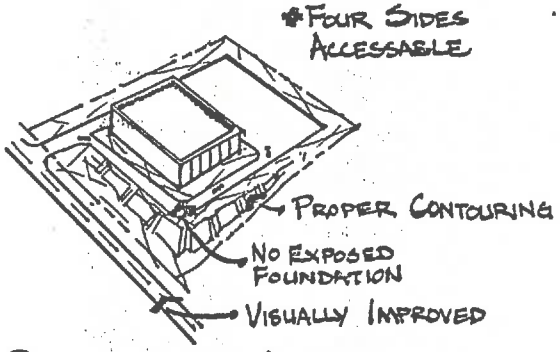
   c. service, storage and work area

   d. expansion

Locations of the structure must consider these questions as well as the overall integration of a project with its surroundings.



FLAT SITE



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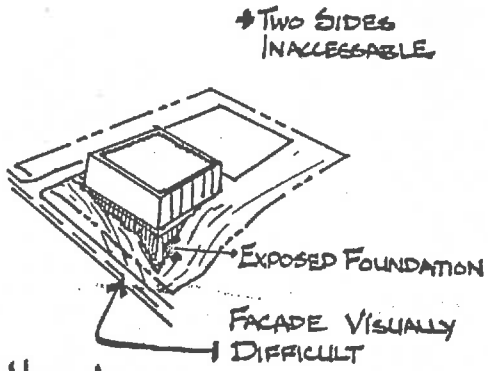

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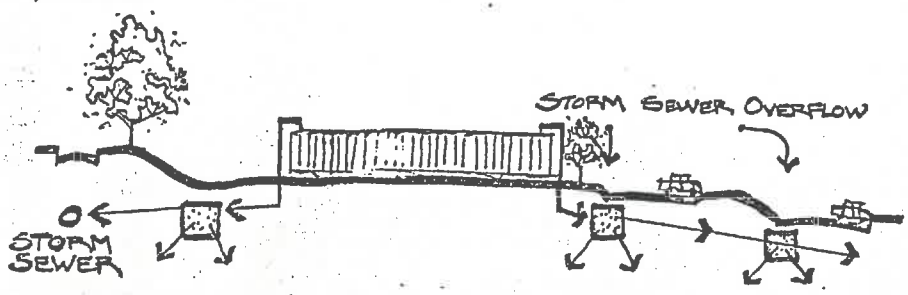


SLOPING SITE

CIRCULATION AND PARKING

Road Definitions

Land forms parallel to roads should reinforce the roadway geometry, seperate vehicle and pedestrian traffic and visually screen features as necessary. In those instances of grade separation of pedestrian and vehicular paths, drainiage to the curb and gutter is not required. Concrete curb and gutter is required for roads and parking areas.

Parking Definition and Separation

Parking lots do not represent spatial features and should not be defined by land forms. Mounds and terraces in parking areas should be used to define pedestrian flow within parking areas.

Pedestrian Definition

Pathways past parking area edges, service areas, and courts can be defined as land forms with movement on top or alongside as the need dictates.

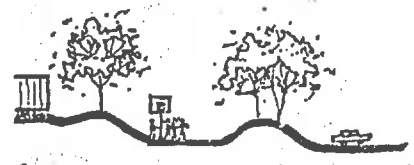
Service Area Screening

Service areas exposed to streets, paths, and other use can be buffered with land forms.

In all cases the land form should relate to the buildings and traffic in such a way as to clarify the pathway through the sub-units.

SEPARATE LAND USES

DEFINE PROPERTIES



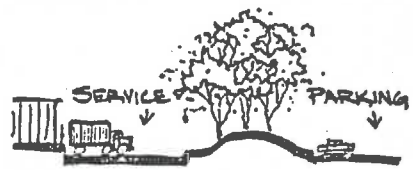
SCREEN OUTDOOR ACTIVITY AREAS

SCREEN OUTDOOR STORAGE AREA

ROAD DEFINITION

PARKING DEFINITION & SEPARATION

PEDESTRIAN PATH DEFINED



SERVICE AREA SCREENING

Separation of Land Uses

Natural channels and plantings can be reinforced with naturalized plantings to define major land use changes. In some instances these features can be reinforced with designed spoil areas to reinforce the visual barrier. Care must be taken not to interrupt drainage or unnecessarily damage natural materials.

Definition of Property

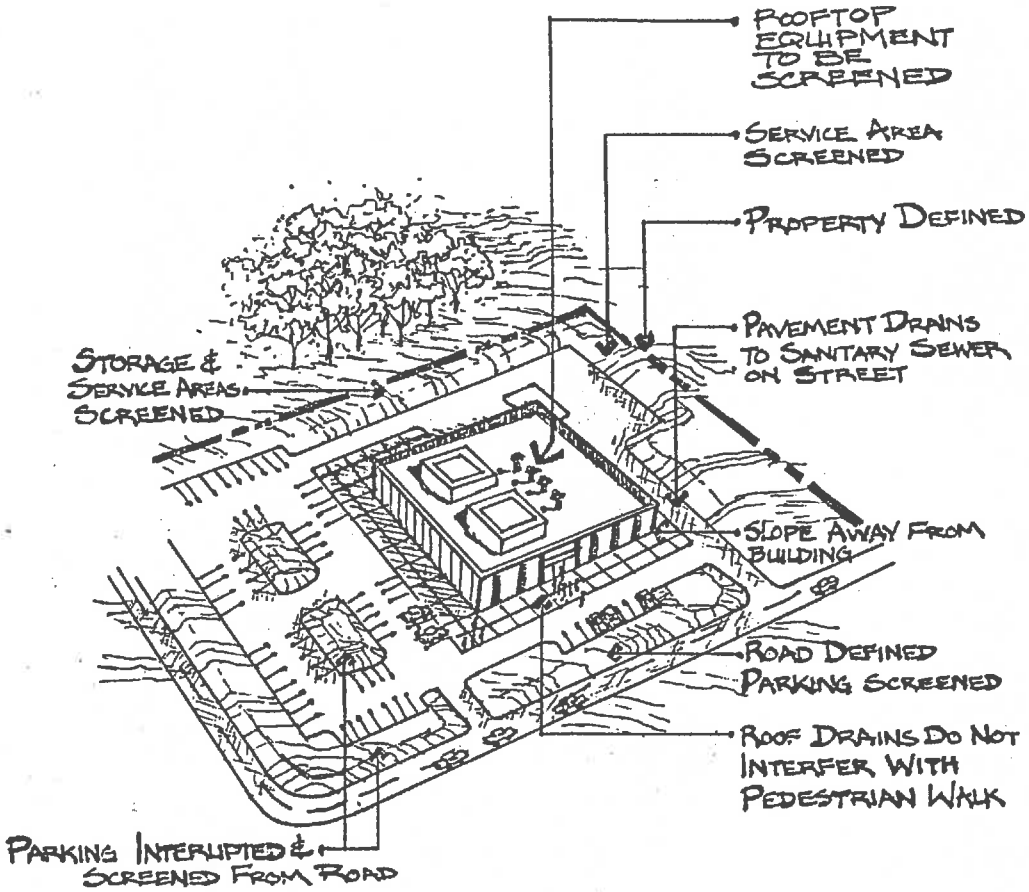
Individual properties can be defined by subtle changes in land form that reinforce the architectural scheme.

Screening Outdoor Activity Areas

Outdoor activities on flat sites can be created with land form enclosures that separate them visually from parking, service areas, and roadways.

Screening Outdoor Storage Areas

Storage on flat sites and around buildings can be shielded from view with earth features that reinforce the architecture.



ARCHITECTURAL CRITERIA

Architectural criteria applies to all building development and is generally described here.

The design of a new building should be consistent with the character and basic design of any existing building nearby. Some of the design elements may be in contrast with that of the existing buildings; however, the overall image must be harmonious, to visually unify the entire development.

Architectual unity is influenced by:

1. Building Characteristics:

   Building elements should be consistent, harmonious, and of distinguished contemporary design. Building design should also be considered in relation to the manner and instance in which it is viewed:

   a. Building heights should conform to the maximum height standards set by the City of Kansas City.

   b. The basic mass and form will be viewed from medium to high speed traffic arteries.

   c. The texture of building materials and facade details will be perceived by pedestrians and by people in cars approaching the building.

2. Mass and Form:

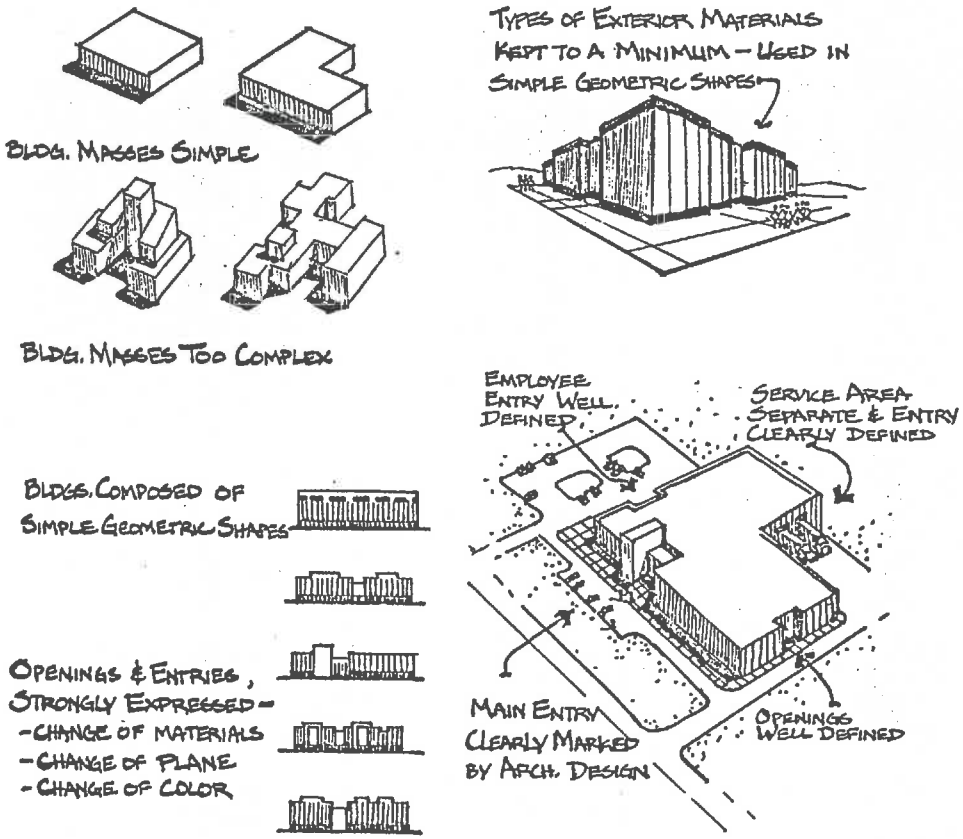
   Building mass and form will serve as dominant design elements in forming project unification. Mass and form should conform to site orientation and the relationship within buildings.

3. Roofs:

   Mechanical equipment and roof color shall be compatible and well integrated into the building design. Roof materials, location, or design should be well planned and not be "left to chance".

   Roof mechanical equipment should be screened or preferably hidden entirely by a parapet wall so as not to be seen from ground level.

   The selection and use of building materials should respect the environmental effects of the Kansas City region (i.e. cold, dust, and wind) are:



4. Footprint:

   a. Building function

   b. Circulation

   c. Building orientation

   d. Relationship with other buildings

   e. Efficient site layout

   f. Other land uses (i.e. parking)

   g. Views

   h. Energy conservation

   i. Floor plan requirements

   j. Office layout

5. Ornamentation:

   Building ornamentation should be harmonious with the overall design intent. Ornamentation should also enhance the specific design and function of a building. Horizontal and vertical design elements (i.e. fascias, windows, base treatments, other elements) are to relate to the ornamentation on other project buildings.

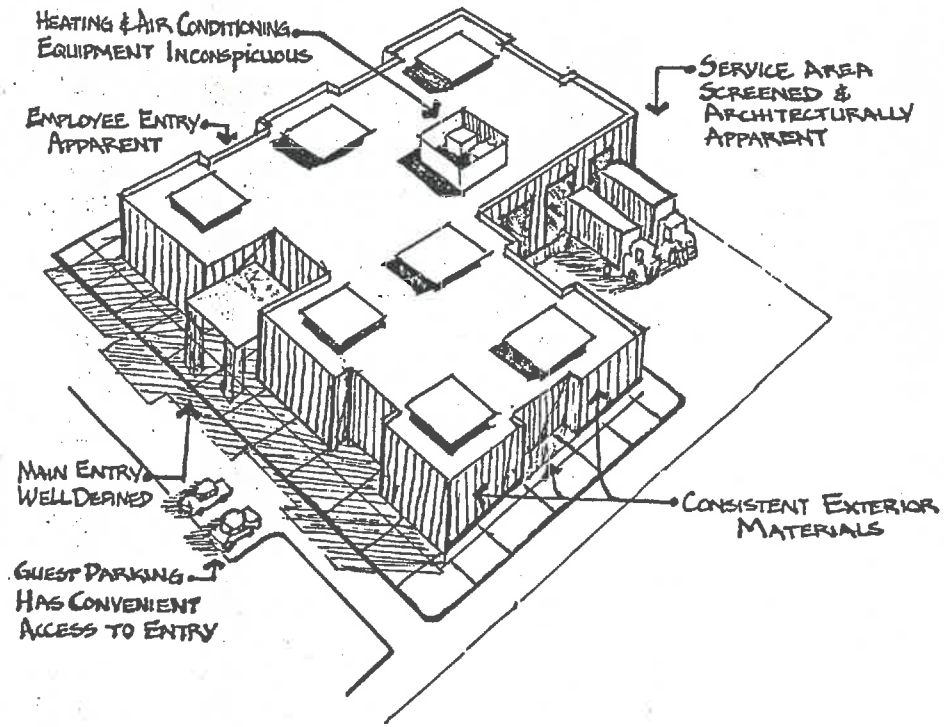
6. Building Entries:

   Clear, distinct building entries should be provided from streets and parking lots. A drop-off area is desirable. Retail and office entries should be highly visible from both roadways and parking areas.

7. Color:

   Color is an integral element of the overall building design and will add to the unity and identity of the project.

   The dominant color range should be related in family within the entire project (even though the residentaial areas may adopt a more intense color family). Accent colors are not restricted and can be chosen with flexibility to identify specific building tenants or to draw attention to certain architectural details.



CIRCULATION

The principle objective of the on-site roadway system will be to permit freedon of movement while minimizing traffic in residential areas.

Most travel should be through a network of roads located in a logical and efficient manner and largely located by terrain constraints and the pattern of existing roads around the study area.

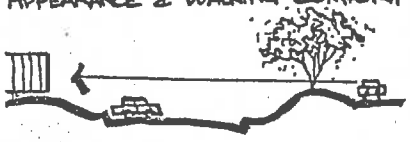
The lower volume type roadways in the proposed network (primarily in residential areas) would be designed to discourage through traffic movements. As a result, residents of the area will be spared the air, noise, and visual pollution created by the high-volume traffic corridors. Pedestrian bridges and walkways should be constructed to further diminish conflicts between people and vehicles.

Every effort should be made in the planning, design, and construction of the proposed roadway systems to minimize disturbance to, and a reasonable preservation of, the site's wildlife and related natural resources. Areas immediately adjacent to the travel lanes will be reserved for the planting of grass and low shrubs. Large trees would constitute hazardous "fixed objects" if planted within the roadway areas and should be placed outside the right-of-way. Reserved green belts and areas of high aesthetic interest should be circumvented and both horizontal and vertical alignments will fit to existing contours to reduce disturbance of the soil. Side slopes should be rounded and blended wih the natural terrain to aid in erosion control and to reduce the need for guardrail.

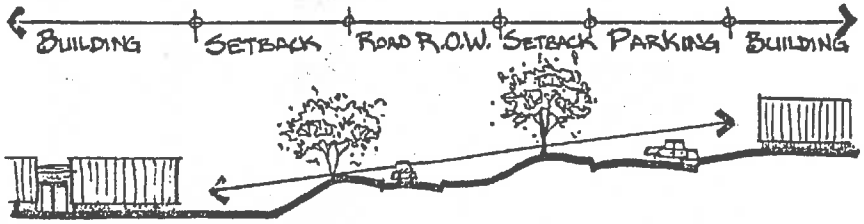
For actual roadway engineering work, Kansas City, Missouri and Missouri State Highway Department current engineering standards should be followed.

AVOID LARGE UNBROKEN PAVEMENT AREAS

BREAK AREAS UP FOR RUN-OFF CONTROL APPEARANCE & WALKING COMFORT

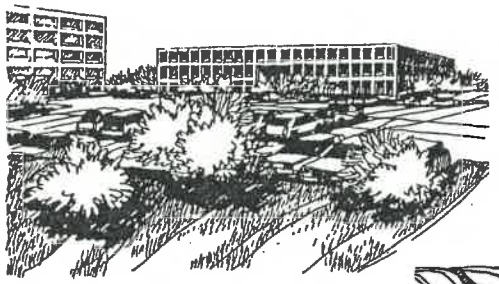


PARKING IN FRONT OF BUILDING SHOULD NOT INTERFER WITH VIEWS

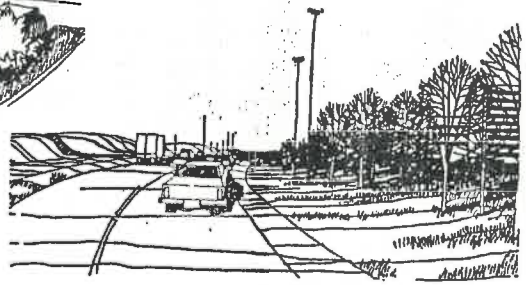


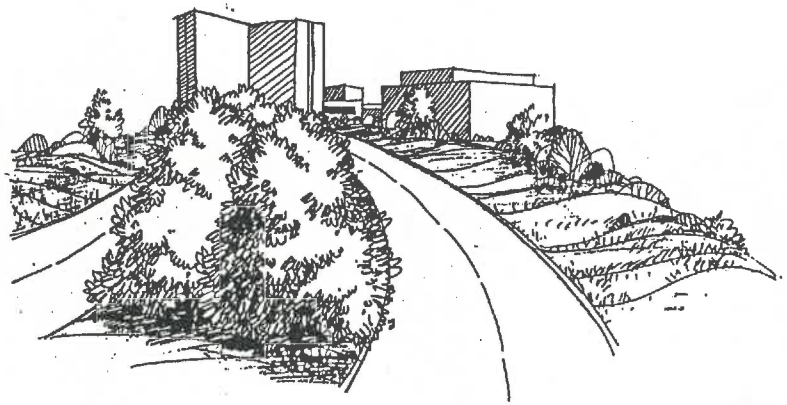
PARKING BESIDE OR BEHIND BUILDING WHEN BELOW LEVEL OF ROAD

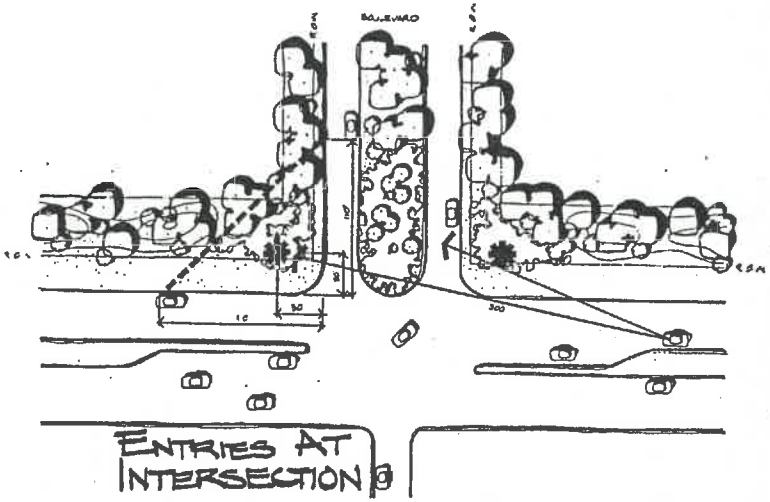
PARKING IN FRONT WHEN NECESSARY WHERE BUILDING IS ABOVE LEVEL OF ROAD



Parking lots should be seen thru a frame of grass berms, treed roadway, and landscape planting screening blocks of cars in the parking lots.

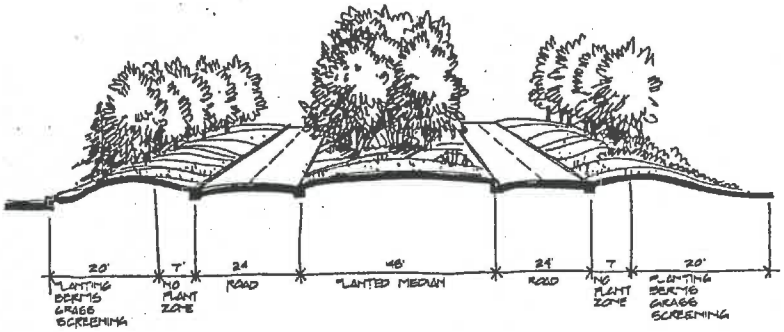


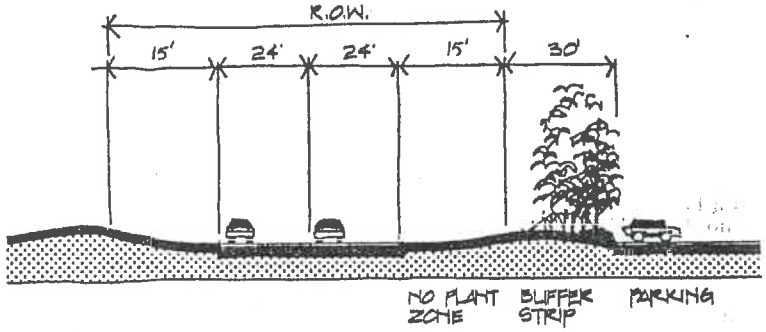


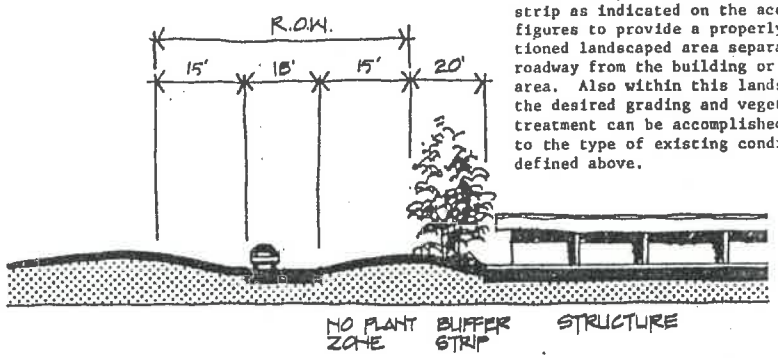


Intersection designs should give special attention to vehicle vision lines, safe stopping distances, and ease of intersection identification. Landscaping, berms, and non-traffic related signs should be set back the appropriate distances.

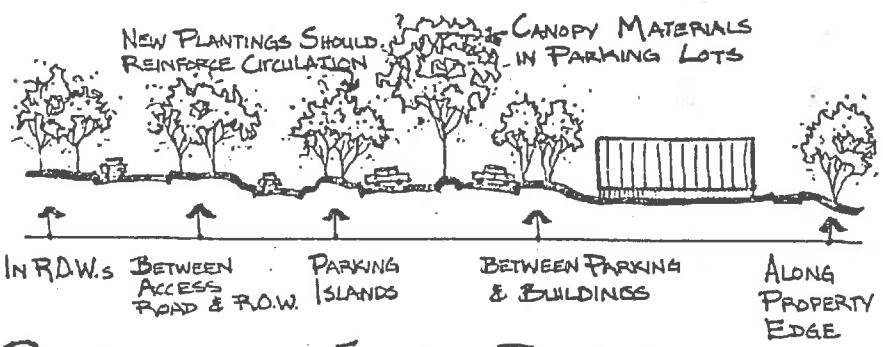
Boulevard medians should be landscaped with clusters of large evergreen, deciduous and flowering canopy trees, and open lawn areas. The landscape plan should consider vision lines of a stopped vehicle on a local street entering the boulevard through traffic.



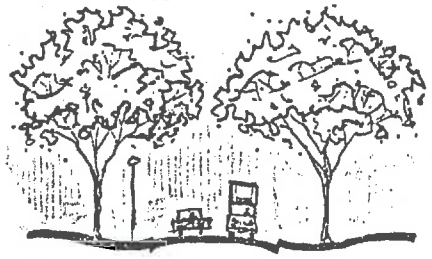




Buffer Strip - Provide adequate buffer strip as indicated on the accompanying figures to provide a properly proportioned landscaped area separating the roadway from the building or parking area. Also within this landscaped area the desired grading and vegetation treatment can be accomplished according to the type of existing condition as defined above.

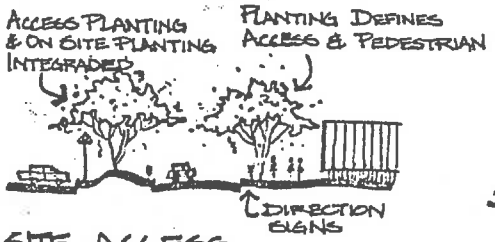


PRESERVATION OF EXISTING PLANTING



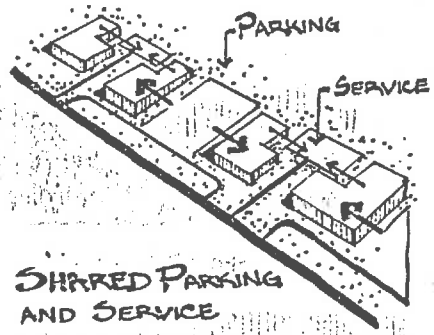
CORRIDOR STRENGTHENED BY CANOPY PLANTING

PARKING ENTRIES SCREENED & EMPHASIZED

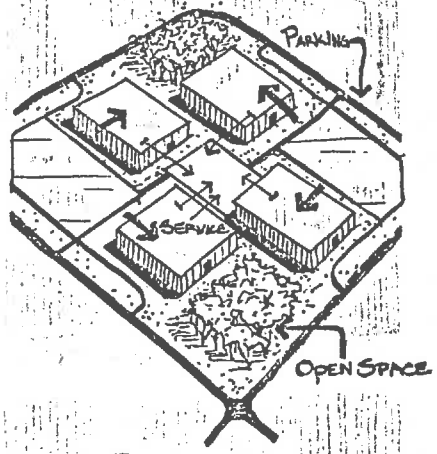


SITE ACCESS PLANTING

The streets, parkways, and intersections are the auto-related background to tie the development together visually. The road network is also a buffer/transition between different land use zones.



SHARED PARKING AND SERVICE



SHARED PARKING, SERVICE, & OPEN SPACE

LIGHTING

The developer should install attractive and efficient light fixtures which adequtely light the property and avoid light spillover onto adjacent properties. The lighting system should reinforce the basic physical organization of the development.

A basic hierarchy of lighting includes the following

levels:

a. Roadways

b. Parks

c. Parking Lots

d. Walkways to Buildings

e. Building Entries (optional - to be designed by each architect).

Lighting along streets and in parking lots should be of high pressure sodium. Other illumination at a pedestrian scale should have an incandescent source, or a warm tone color corrected mercury vapor system.

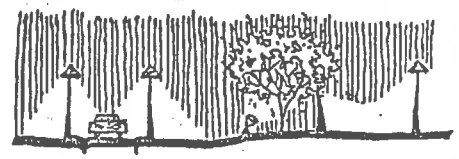
Night lighting equipment is to be consistently low key and background in appearance. Lighting levels are to be safe and of uniform low level. There is to be no glaring or obtrusive light to distract from the overall atmosphere of the entire development. Flashing lights, unshielded sources and cheap looking fixtures will not be accepted. No restrictions should be set on building entry lighting but their review should be required.

Parking lots should be illuminated in a range of .50-1.0 footcandles. Light standards should be a maximum of 25 feet high and have an illumination source of high pressure sodium.

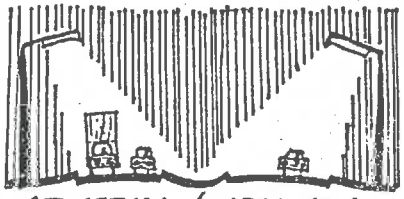
Open Space Walkway Fixtures

Open space and walkways should be illuminated to .25 footcandles and the liiumination source should be incandescent.

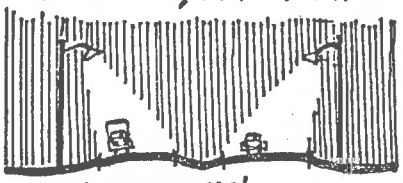
Sign lighting, architectural, accent, and effect lighting are accessory lighting used to create mood and highlight. There is no restriction if compatible with color, materials, etc.



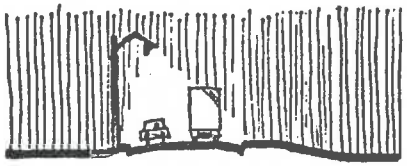
SITE ACCESS TRANSITION PARKING ZONE



ARTERIAL/PARKWAY



CITY PARKWAY



INTERNAL ROADWAY

SITE ACCESS

SIGNAGE

The purpose of these standards is to (1) insure optimum overall preservation and enjoyment of private properties and the scenic, aesthetic, and open space resources of the area; (2) to reduce traffic hazard by controlling obstructions and distractions that may contribute to traffic accidents, and (3) to eliminate hazards that may be caused by signs hanging or projecting over public right-of-ways.

Any graphic material, symbol, enmblem, logo, replica, insignia, trademark, etc., which is displayed in lettered, written, pictorial, or any other visually perceptible form for the purpose of conveying a message, should be controlled through ordinances restricting sizes, numbers, placement, lighting, and construction materials of such signs.

With this purpose in mind, the following general design guidelines are recommended. All public and private signs should be:

a. Compatible with their surroundings.

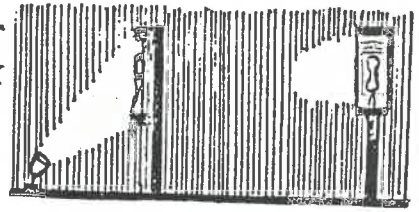
b. Non-obstrusive and subordinate to the natural environment.

c. Appropriate to the type of activity to which they pertain.

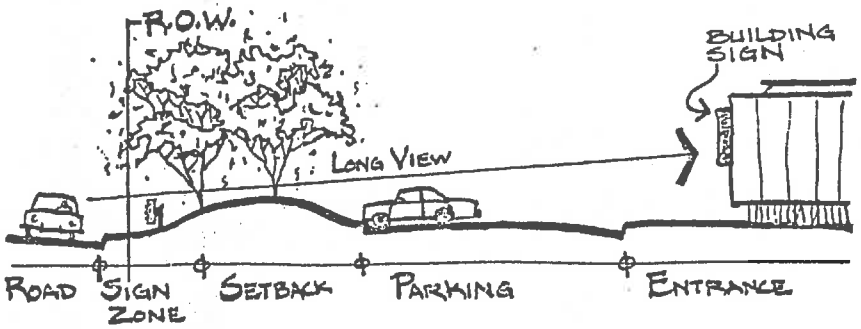
d. Expressive of the identification, instructional, and advertising needs of the individual properties and the traffic control authority.

e. Legible in the circumstances in which they are seen.

Standardizing signage and graphic systems is necessary to promote visual unity within the development. Signage should invite rather than demand public attention, and information overload should be avoided.



UP LIGHTING BACK LIGHTING



PLANTING

Planting serves many functions in the overall community. Areas may be defined by different types and sizes of plant materials. For example, pine trees may predominate in one area, oak in another; and so forth. Area definition planting related to the circulation corridors and is intended to reinforce the visual identity of the area, the circulation type, and site groupings.

Access Planting

Planting to reinforce the linearity of low speed roads can be small blocks of flowering trees, evergreens or columnar trees. Large canopy forming trees can be used in rows along these roads for spatial definition. Low masses at transition points can reinforce the definition of site groups.

Planting of site access roads can commonly be integrated with building related planting to reinforce the unity of site organization.

Parking

Planting in parking areas should be of canopy forming materials and be located to reinforce the internal circulation and turning movements. Delineation of the parking area boundaries serves no useful purpose and should be avoided.

Existing Planting

Natural areas, trees, hedgerows and abandoned right-of-way plantings should be preserved for the identity of developing areas.

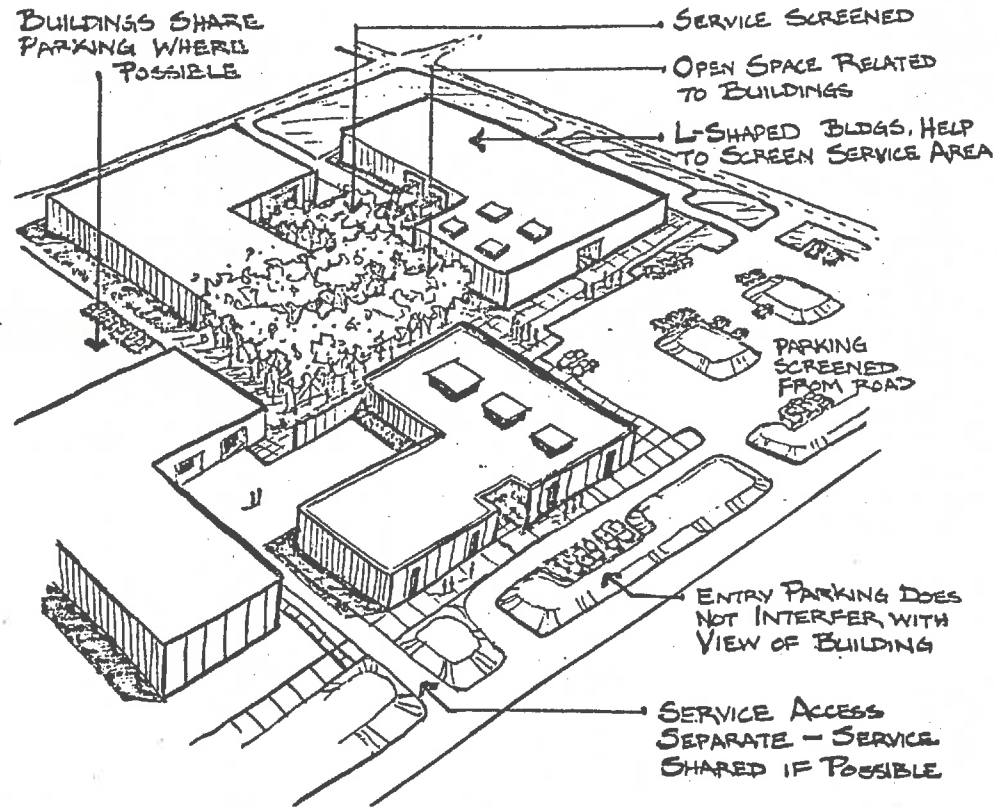
Concepts

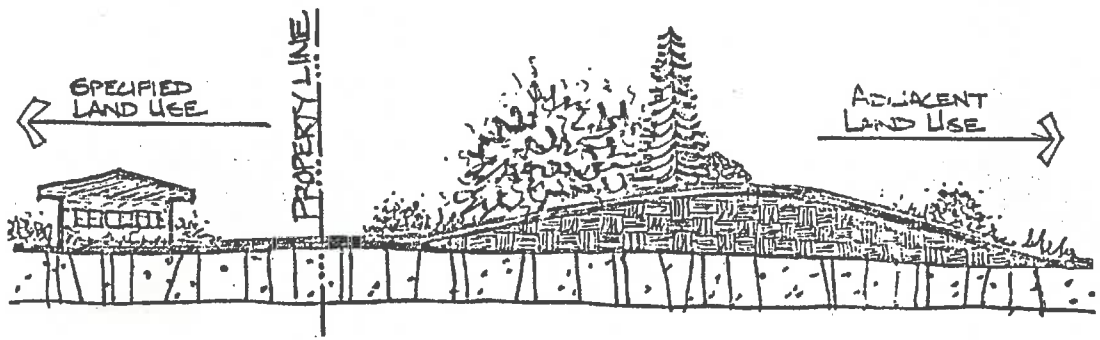
Landscaping plans should incorporate existing vegetation into informal and natural arrangements of deciduous, evergreen, and flowering plant materials. Landscaping should provide a smooth transition between open and landscaped areas.

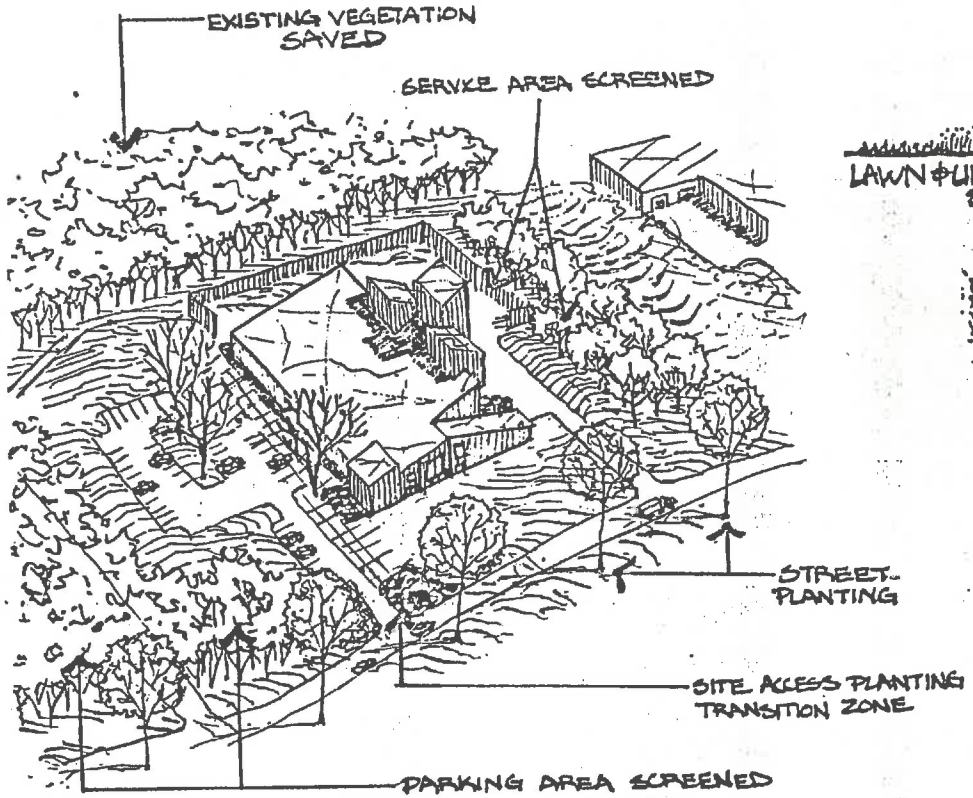
Planted earth berms should be used to provide screening of parking areas, delivery-service zones and large structures to reduce undesirable visual impacts.

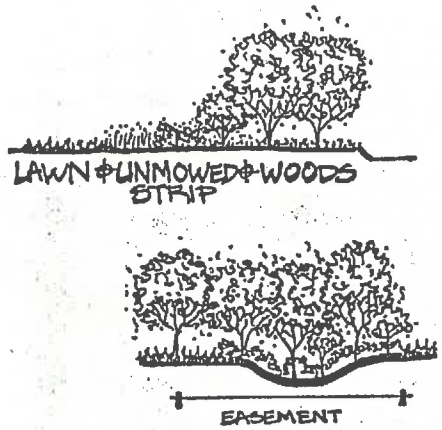
Clusters of dense trees mixed with low shrubs and selective openings can provide effective screening in a natural manner consistent with the existing vegetation patterns.

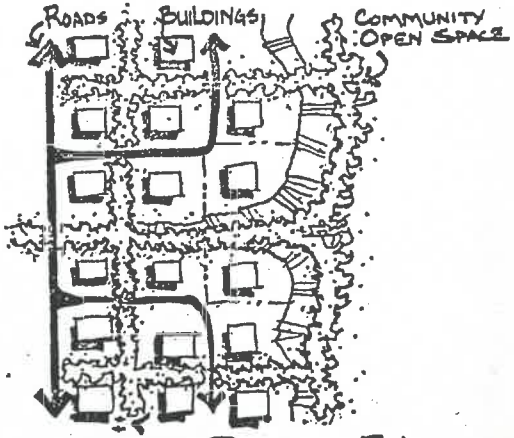
Berms or earth mounds should be planted with grass, shrubs, and trees and designed to blend gently with the existing topography both for visual reasons and to control erosion.



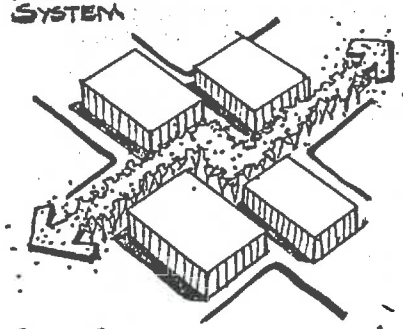








OPEN SPACE DEVELOPED BY INDIVIDUAL OWNERS IN CONTINUOUS SYSTEM



OPEN SPACE AS STRUCTURE-LINKED

EARTH MOUNDING

TRANSPORTATION PLANNING STUDY

I-435/RED BRIDGE AREA

Prepared for:

CITY OF KANSAS CITY, MISSOURI

Prepared by:

Barton-Aschman Associates, Inc.

TRANSPORTATION PLANNING STUDY

I-435/RED BRIDGE AREA

Prepared for:

City of Kansas City, Missouri

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Barton-Aschman Associates, Inc.

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1. INTRODUCTION

During the recent past, a considerable amount of development has been proposed and discussed within an area on either side of Interstate Highway 435 from the State Line Road area to the Holmes Road area. The City of Kansas City, Missouri, recognizing that such development could place an undue burden upon the highway and street network within this vicinity, retained Barton-Aschman Associates, Inc. to conduct a traffic impact analysis of the area in order to aid in determining the potential traffic impact of the envisioned development. The underlying purpose of the study was to determine the traffic impacts and develop some improvement concepts that could aid in dealing with the impacts. In other words, how much development could reasonable be accommodated without causing severe traffic congestion within the area.

Concurrent with the traffic/transportation analysis, the City retained HOK Architects to accomplish land use planning studies for certain portions of the area.

This report provides the findings and conclusions of the traffic impact studies conducted for the area and is intended to be a guideline for the City to aid in providing data upon which more definitive judgment can be made regarding land use and development within the area.

2.
EXISTING AREA CHARACTERISTICS

This section of the report will provide a discussion of certain existing characteristics regarding the roadway system within the area. Figure 1 provides a graphic of the area in which the most intensified study has taken place.

Area Roadway System

The major roadway facilities in the area that could be most affected by the development potentials include I-435, Holmes Road, Wornall Road, State Line Road and to a lesser degree, 103rd Street and Red Bridge Road. A brief discussion of these roadways follows.

Interstate 435 - This regional freeway provides for three (3) travel lanes in each direction. Within the vicinity of the study area, interchanges with I-435 are inplace with Holmes Road, Wornall Road, and State Line Road. All of these interchanges provide for fully directional movement for vehicular traffic. There is an additional off-ramp, for westbound traffic to 103rd Street. This off-ramp is located east of the Holmes Road interchange.

State Line Road - This four-lane roadway is the boundary of the States of Missouri and Kansas. The four-lane segment narrows to two-lanes south of Red Bridge Road.

Wornall Road - This is also a four-lane roadway in the study area.

Holmes Road - Holmes is a four-lane street that, as is the situation with State Line Road and Wornall Road, provides for north-south travel within the sub-region.

103rd Street - This east-west facility is basically a two-lane street that contains a continuous left turn lane between State Line Road and Wornall Road.

Red Bridge Road - This two-lane roadway presently extends from State Line Road west and passes through residential areas.

Carondelet Drive - This is an east-west street between State Line Road and Wornall Road. The street is constructed for four-lanes from State Line past the St. Joseph Hospital area at which point it narrows to two-lanes until it terminates at Wornall Road.

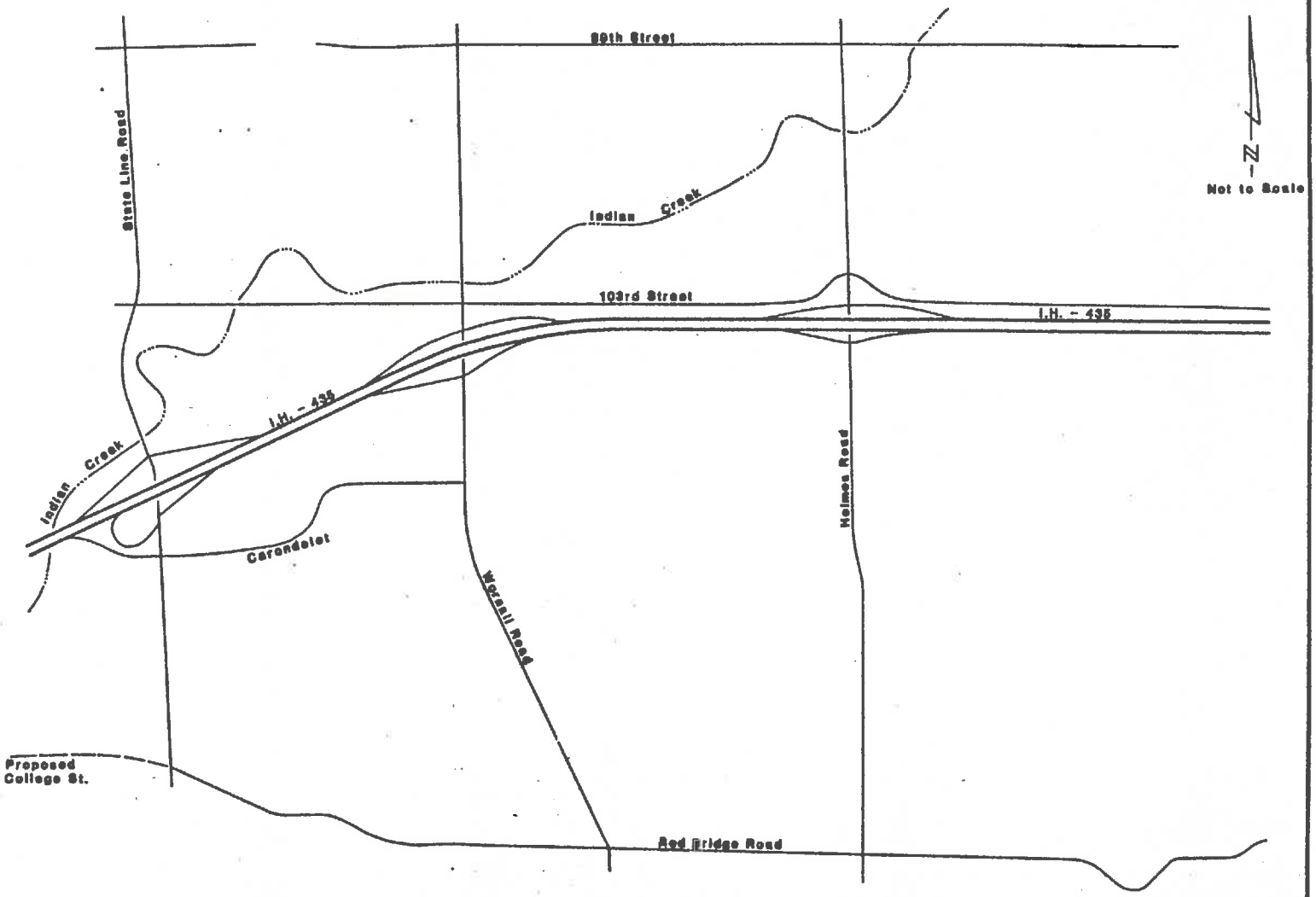

FIGURE 1

STUDY AREA MAJOR ROADWAYS

Hellmuth, Obata & Kassabaum, Inc.

The generalized lane availability for major street segments is shown on Figure 2.

Existing Traffic Volumes

All existing traffic volume data utilized in this study was obtained from the City of Kansas City and from various recent reports prepared for proposed developments in the area and from the I-435 report prepared in 1981. The most recent 24-hour volume data is contained on Figure 3. Morning peak hour intersection count data is shown on Figure 4, while Figure 5 contains some evening peak hour volume data.

Existing Levels of Service

Utilizing the available traffic volume data, intersection service levels have been calculated using existing lane configurations. The existing levels of service can be used as a comparison for existing conditions to certain proposed land use and roadway configuration conditions that are discussed later in this report. Certain volume to capacity ratios and the resultant levels of service are shown on Figure 6.

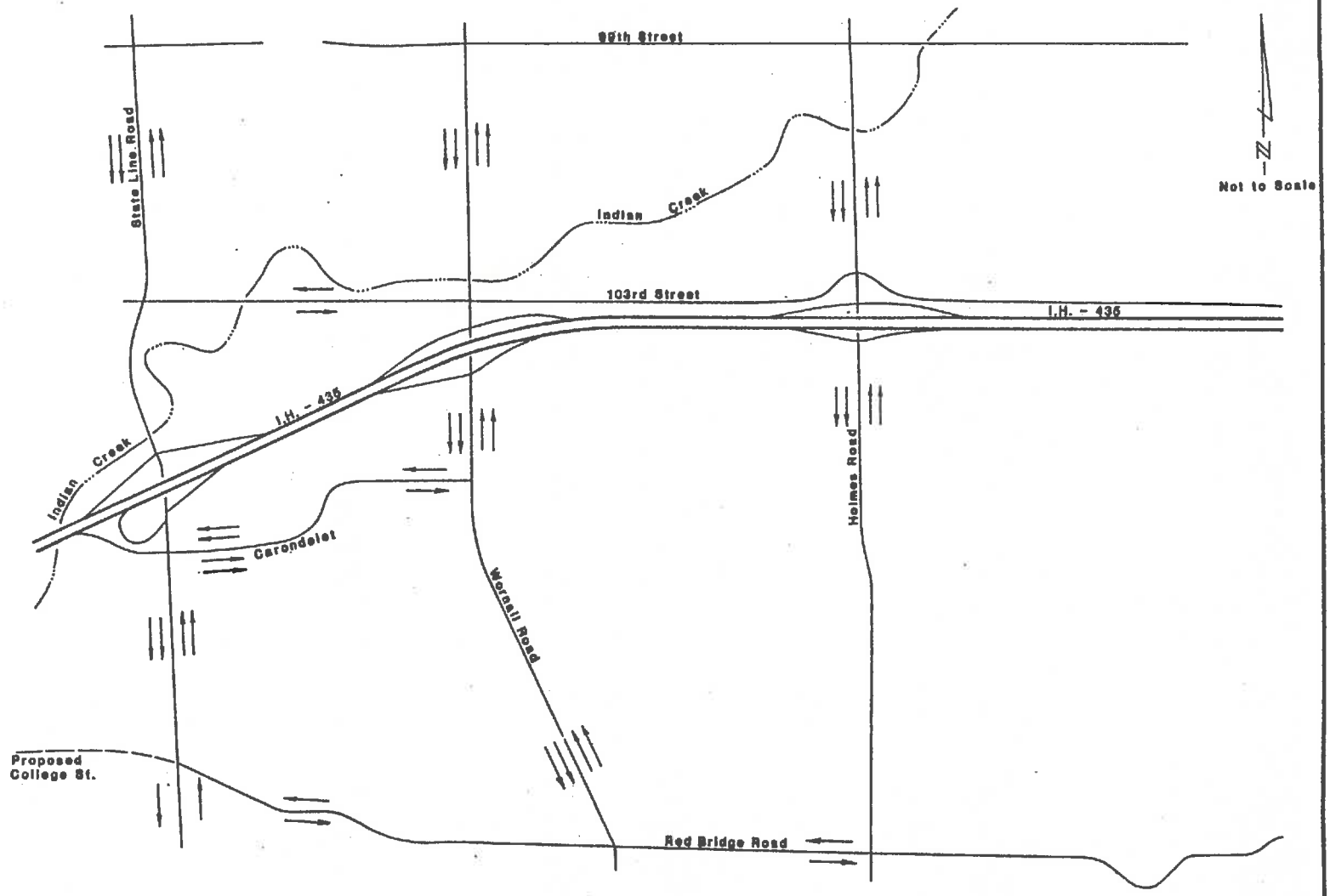

FIGURE 2

EXISTING LANE AVAILABILITY

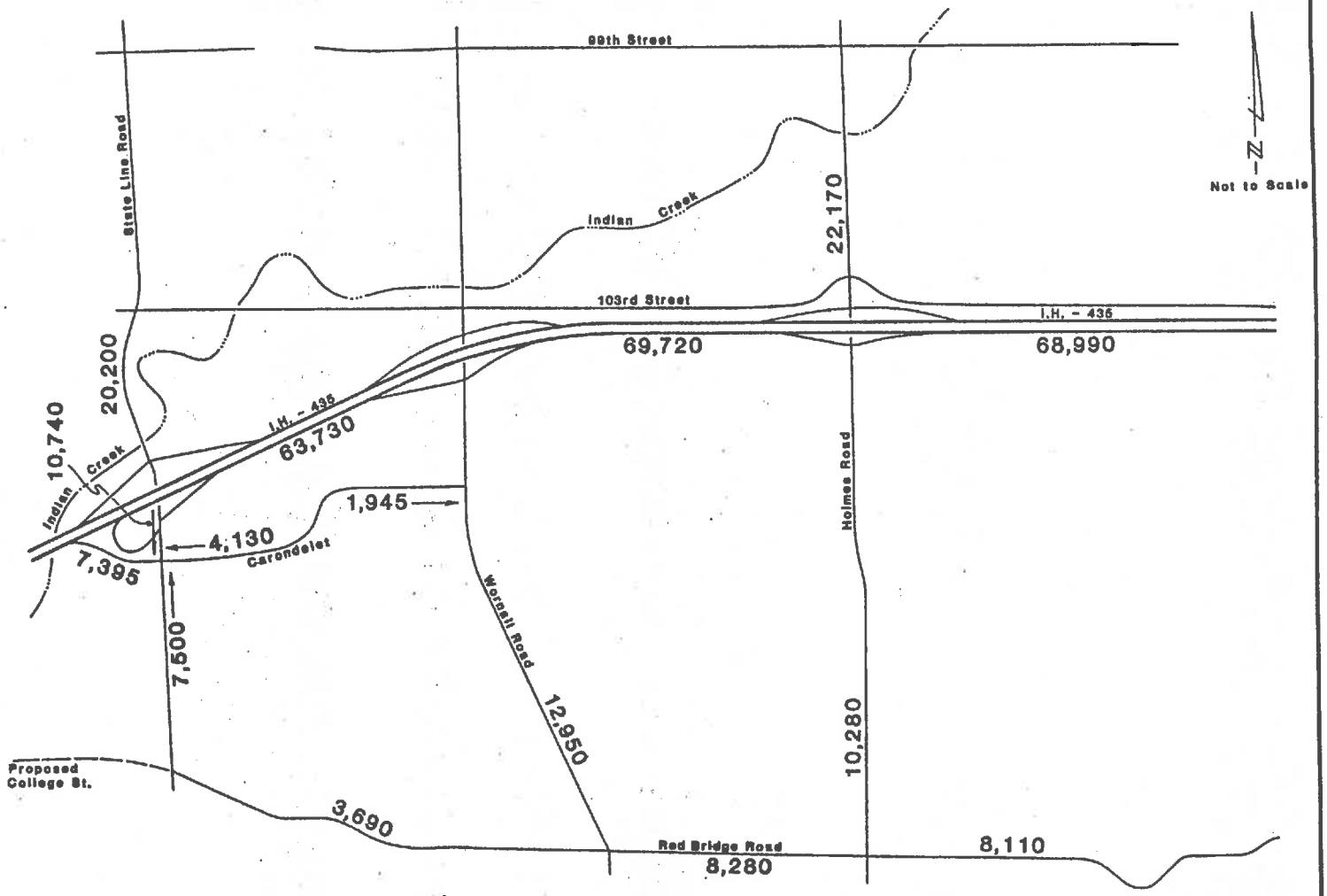

FIGURE 3

AVERAGE DAILY TRAFFIC VOLUMES

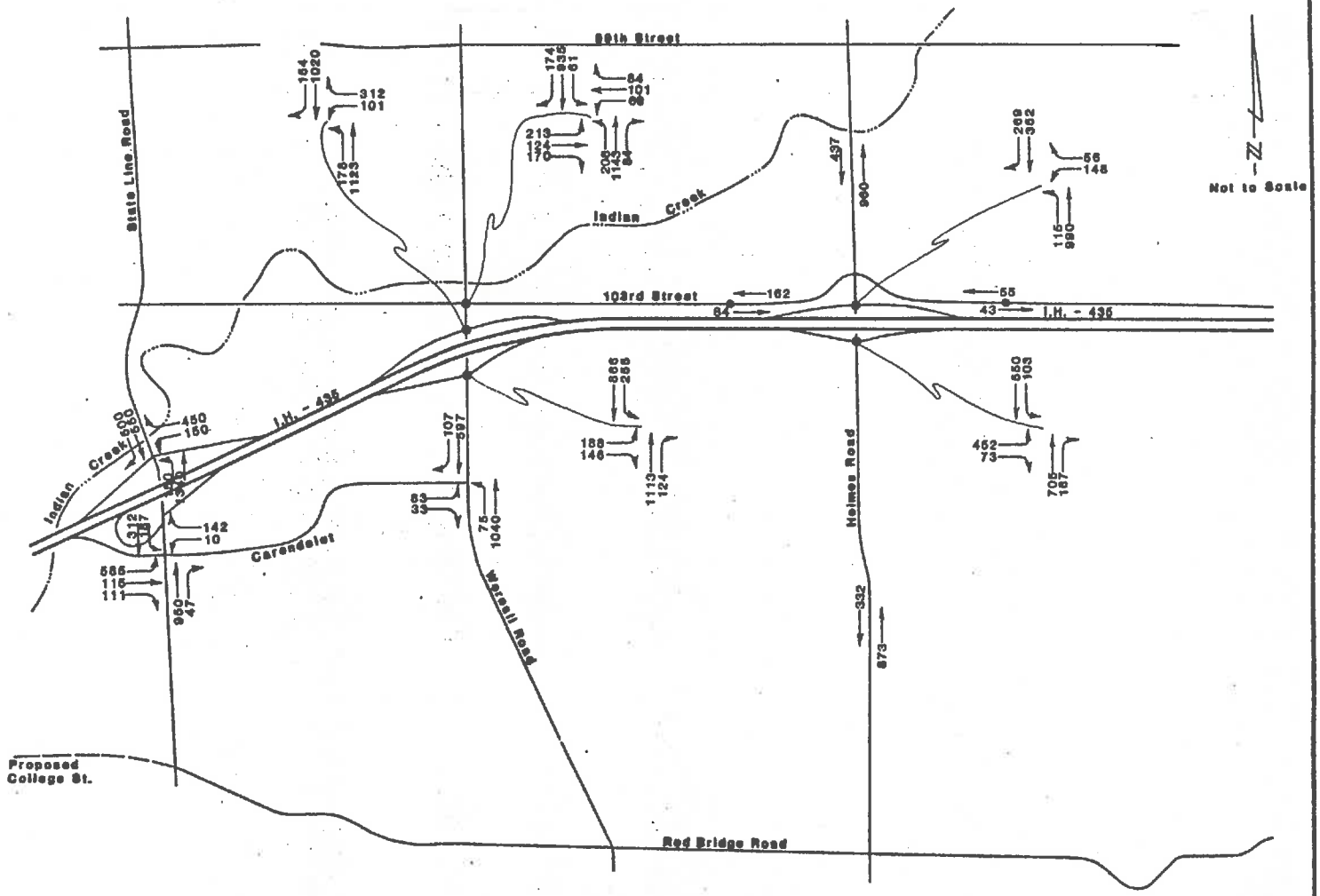

FIGURE 4

A.M. PEAK HOUR VOLUMES

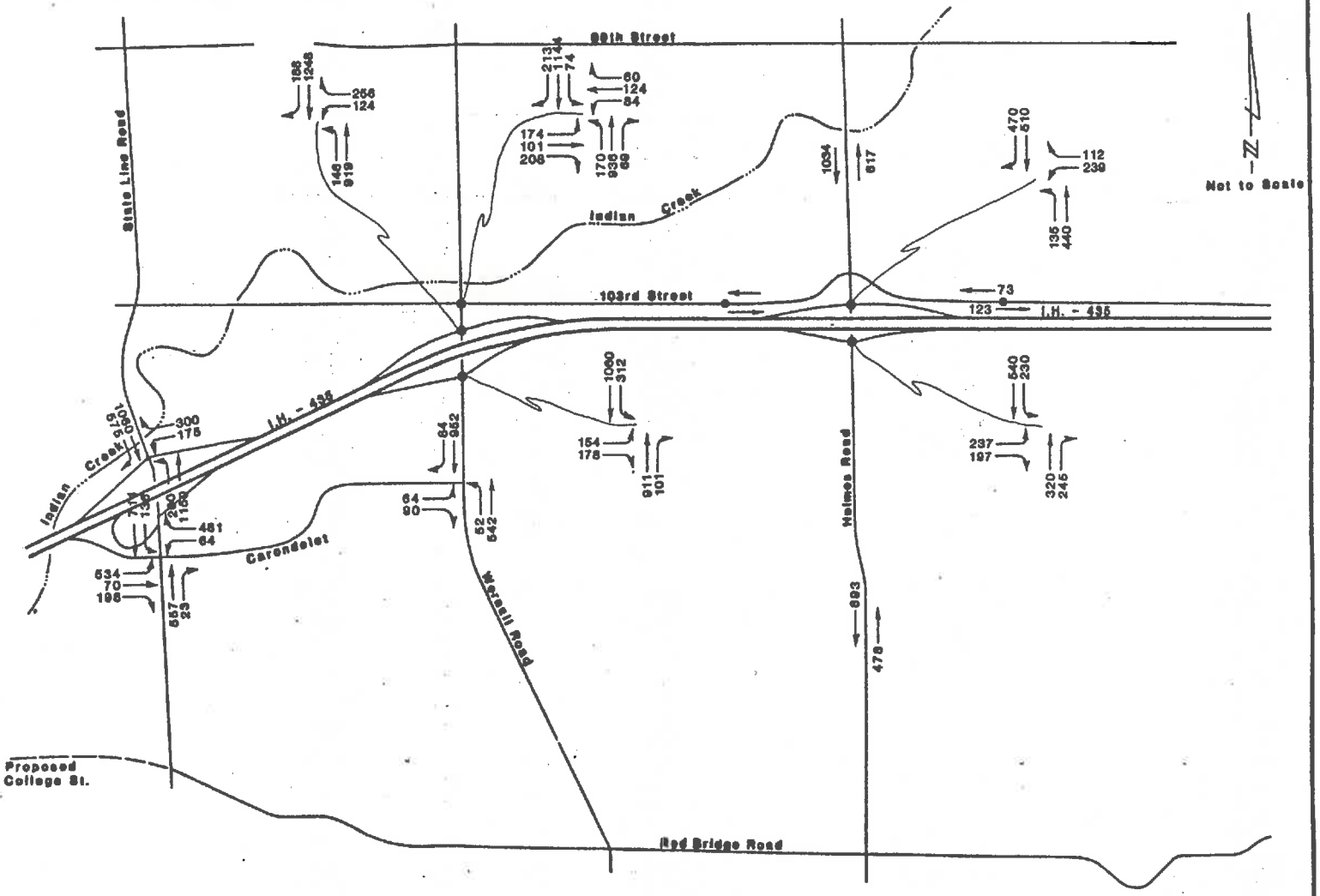

FIGURE 5

1984 P.M. PEAK HOUR TRAFFIC VOLUMES

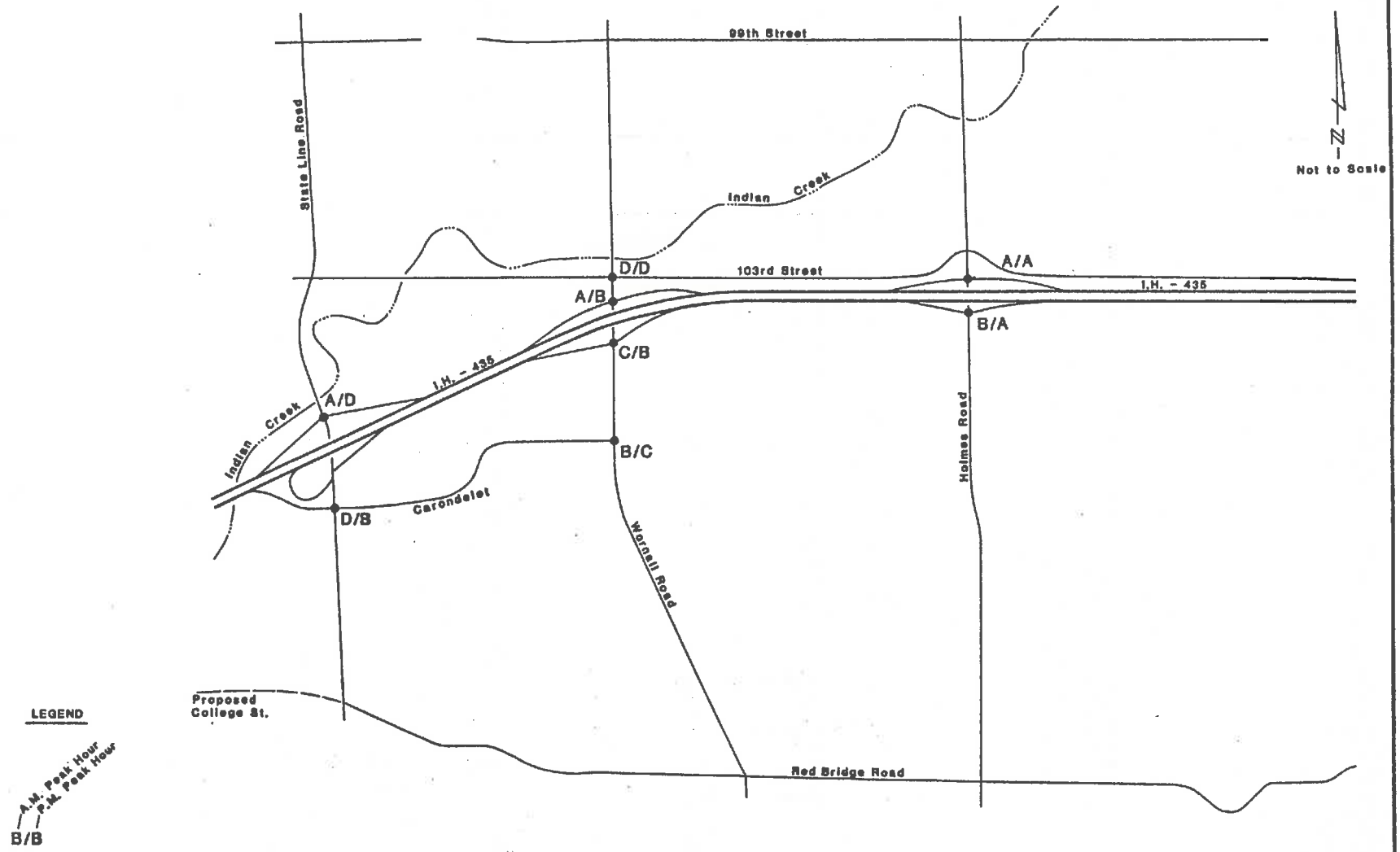

FIGURE 6

EXISTING LEVELS OF SERVICE

Hellmuth, Obata & Kassabaum, Inc.

3.
LAND USE DEVELOPMENT POTENTIALS

The most difficult assessment for any transportation planning study is the estimation of potential land use development. The variations in land use type and density presents combinations which are endless. A series of land use potentials have been discussed during the course of this study and some have been tested as to their resultant effect upon critical locations of the roadway network.

The I-435/103rd Street Corridor Study that was completed in 1981 identified numerous development opportunities within the study area. Since that time, some development has taken place and other new development opportunities have been identified. In order that a base could be established, as to development potential, staff of the City identified certain development potentials that should be included in the study analyses. This "base" could be used to test variations in land use proposals at the time that they are more definitively identified. The land use types and densities that have been used to test the roadway system are illustrated on Figure 7.

The volumes of traffic that could be generated by the land use identified on Figure 7 has been estimated by considering trip generation rates contained in the informational report titled Trip Generation as published by the Institute of Transportation Engineers (ITE). Consideration of the trip rates has also been tendered by data on trip rates contained in the files of Barton-Aschman Associates, Inc.

The estimated traffic generated by the potential land uses identified on Figure 7 are contained on Table 1 which follows.

The estimated trips contained on Table 1 have been derived as if each land use entity were to act as a freestanding development. Given the mixture of land uses, there would be some reduction in traffic due to the land use mix. This reduction could be related to dual purpose trips and some of the generated trips already being on the roadway system. The reduction in the trip totals could range between 10 and 20 percent of the volumes indicated on Table 1.

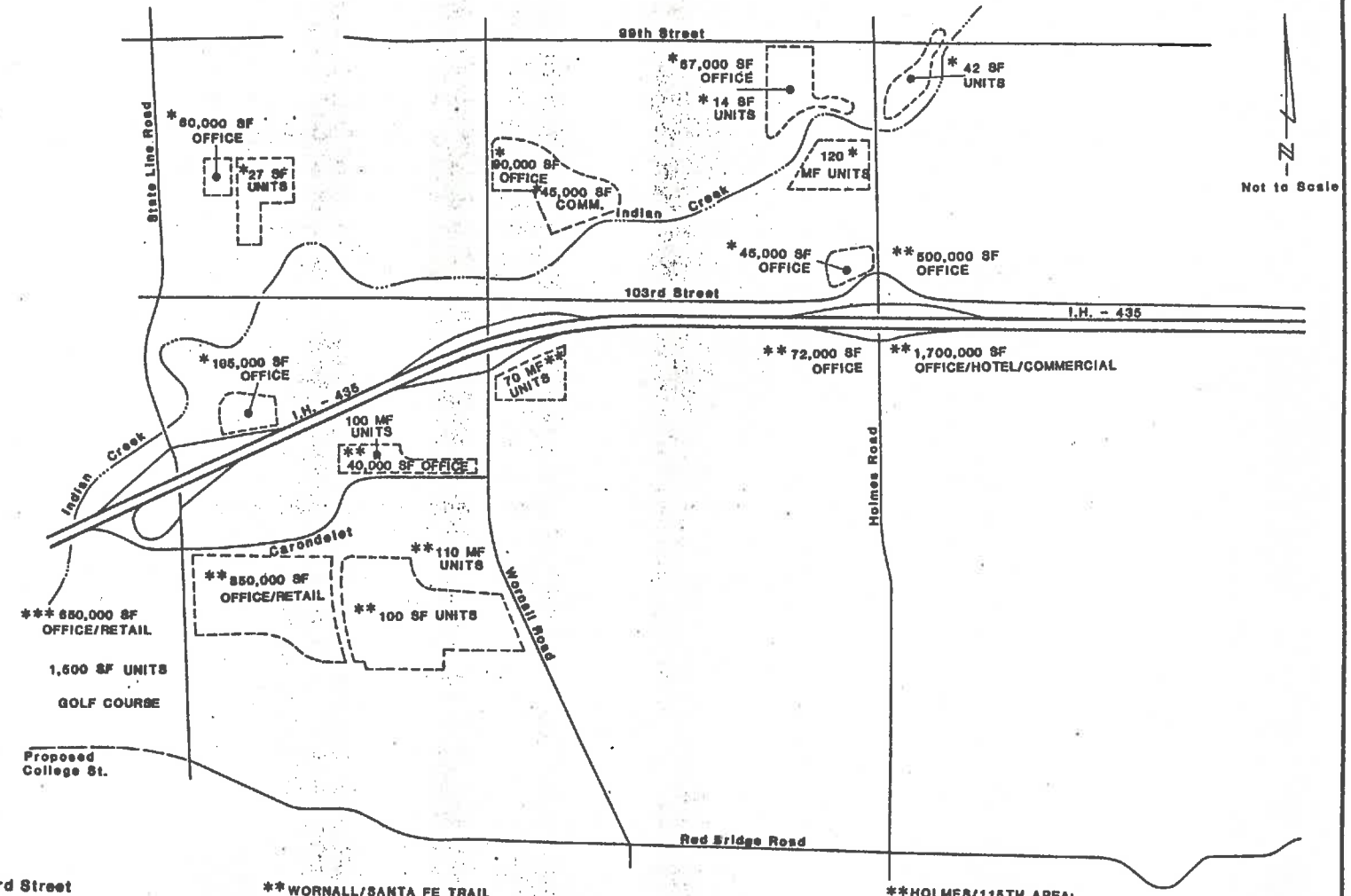

FIGURE 7

LAND USE DEVELOPMENT ASSUMPTIONS

If the 10-20 percent reduction is applied to the volumes estimates contained on Table 1, the estimates would be as follows:

A.M. Peak Hour (2-way)	-	6,530 to 7,345
P.M. Peak Hour (2-way)	-	8,020 to 9,020
Daily (2-way)	-	67,440 to 75,870

The estimates do not consider any transportation system management (TSM) techniques such as staggered work hours, flex-time, carpools, or vanpools which would reduce the trips further.

Table 1
ESTIMATED TRAFFIC VOLUMES - DEVELOPMENT POTENTIALS

Land Use Area refers to Figure 7)	Land Use Assumptions	Density	Estimated Traffic Volumes				
			A.M. Peak Hour		P.M. Peak Hour		Daily
			In	Out	In	Out	(2-way)
1	Office	60,000 SF	85	15	10	70	1,060
	SF Residential	27 DU	5	15	15	10	270
2	Office	105,000 SF	195	25	45	185	1,500
3	Office	90,000 SF	130	20	20	105	1,595
	Commercial/ Retail	45,000 SF	40	35	260	260	5,305
4	Office	67,000 SF	95	15	15	75	1,185
	SF Residential	14 DU	5	10	10	5	140
5	MF Residential	120 DU	10	50	50	25	730
6	Office	45,000 SF	65	10	10	50	795
7	SF Residential	42 DU	10	25	25	15	420
8	Office	500,000 SF	815	90	170	750	4,500
9	Office	72,000 SF	105	20	15	80	1,275
10	MF Residential	70 DU	5	30	30	15	425
11	Office	40,000 SF	60	10	10	45	700
	MF Residential	100 DU	10	40	40	20	610
12	MF Residential	110 DU	20	45	45	25	670
13	SF Residential	100 DU	20	55	65	35	1,000
14	Office/Retail	850,000 SF	1,210	230	490	1,285	14,430

Table 1 (Continued)
ESTIMATED TRAFFIC VOLUMES - DEVELOPMENT POTENTIALS

Land Use Area refers to Figure 7)	Land Use Assumptions	Density	Estimated Traffic Volumes				
			A.M. Peak Hour		P.M. Peak Hour		Daily
			In	Out	In	Out	(2-way)
15	Office/Retail	650,000 SF	930	175	365	980	10,750
	SF Residential	1,500 DU	315	825	945	555	15,000
16	Office	10,000 SF	15	5	5	10	175
	MF Residential	500 DU	50	200	200	100	3,050
17	MF Residential	450 DU	45	180	180	90	2,745
18	Office	800,000 SF	1,305	145	270	1,200	7,200
	Hotel	200 Rooms	115	60	70	75	2,100
	Commercial/ Retail	100,000 SF	90	80	290	310	6,670
	TOTALS		5,750	2,410	3,650	6,375	84,300

4.
FUTURE VOLUME ESTIMATES

The future volumes upon which the roadway system is to be tested consists of considering the existing volume data and adding to that the estimated development traffic assumptions. In addition to that, there will normally be some growth in the traffic volumes that can be attributed to other regional growth that has not been accounted for in this analysis. This type of growth is very difficult to assess over a long time span. For purposes of this assessment, it is assumed that the volumes will increase by 22 percent by the Year 2000 over the existing in addition to the development trips already considered. This seems to be a fair assumption when considering the volume of development trips that are already added to the system.

Considering that methodology of trip estimation, the Year 2000 volumes have been estimated along the critical sections of roadway. It must be recognized that these estimates are for transportation planning purposes and can change dependent upon the future development trends that occur within the area.

Based upon all of the above stated assumptions, the Year 2000 estimates have been calculated and are provided on Figures 8, 9, and 10. The volumes on Figure 8 are for the morning peak hour while those shown on Figure 9 are for the afternoon peak hour. An estimate of future year average daily traffic for specific segments of the major roadways is shown on Figure 10.

Contact was made with the regional planning agency regarding Year 2000 projections that they have conducted. They stated that the Year 2000 volumes they have are not realistic and new assignments are being conducted and should be ready by the end of the year.

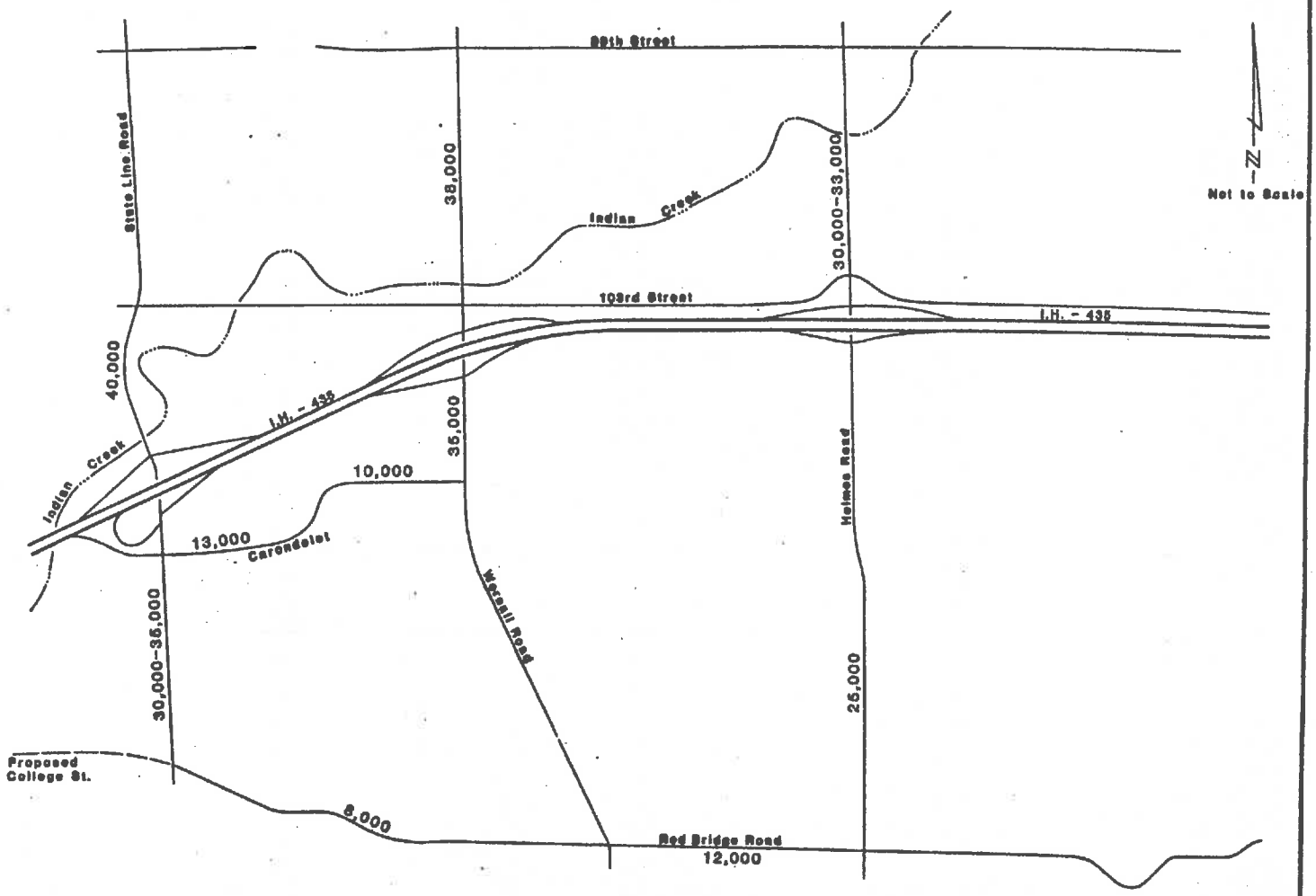

FIGURE 8

ESTIMATED YEAR 2000
DAILY VOLUMES

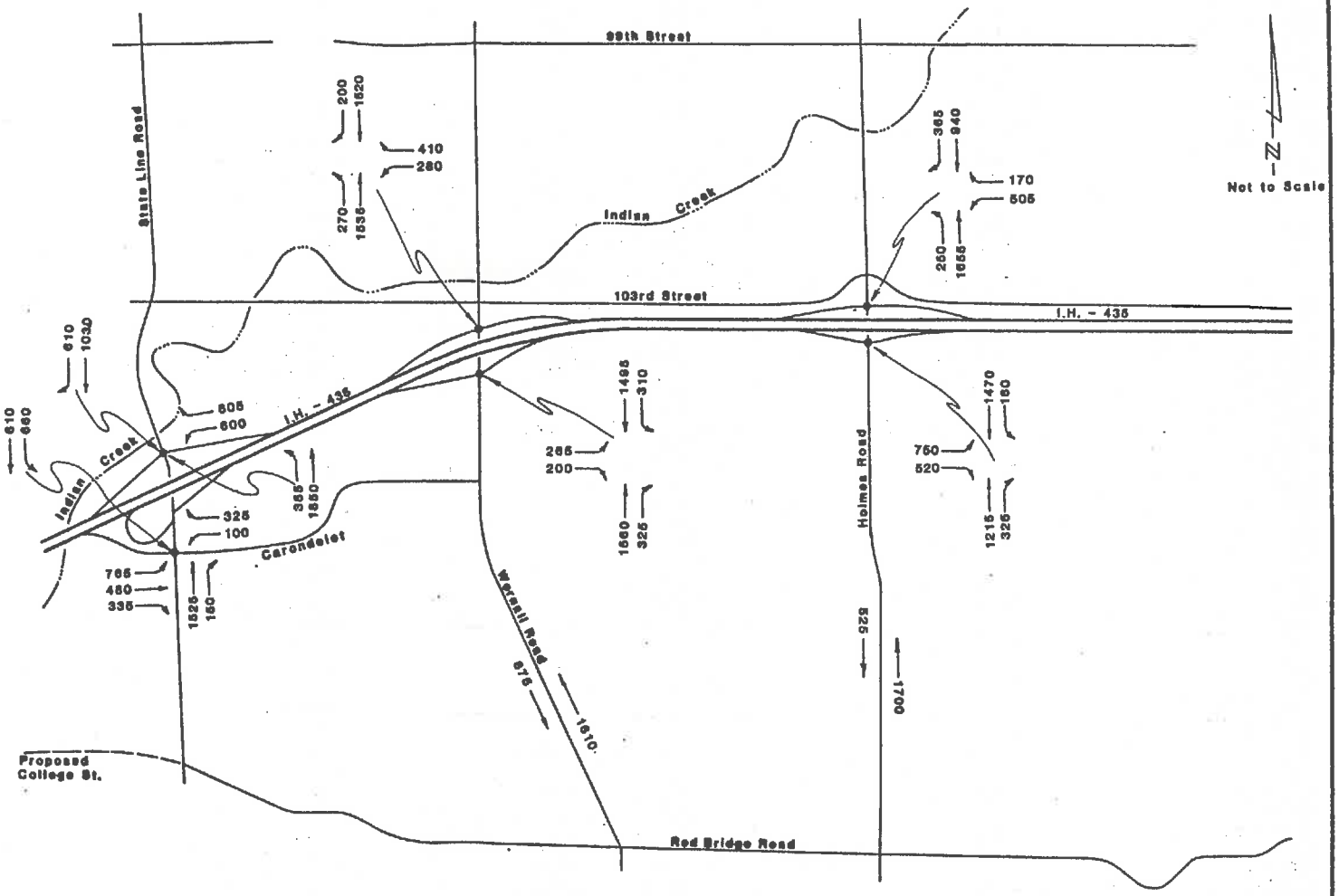

FIGURE 9
ESTIMATED YEAR 2000
A.M. PEAK HOUR VOLUMES

5.
ROADWAY SYSTEM ANALYSIS

The analysis of the major street system utilizes two items as the basis for the analysis. These are the intersection volume to capacity analyses that have been conducted and general planning criteria for roadway segments considering projected average daily volumes. A discussion of the analysis for each major roadway in the study area follows.

State Line Road - This major north-south arterial roadway provides for travel in those directions in addition to function as a primary ingress/egress route for existing land uses and the assumed development potentials used in this study analysis. The present four-lane segment along State Line Road is adequate to accommodate today's traffic. The interchange of State Line Road with I-435 is also accommodating existing volumes without any great degree of congestion.

The development assumptions used for this analysis will change the service levels along this roadway. It is estimated, given the development assumptions, that State Line Road, between Red Bridge Road and 103rd Street could experience daily volumes ranging between 30,000 and 40,000 vehicles per day in the Year 2000. Volumes at those levels will require the provision of a six-lane divided roadway. It is normally assumed that a four-lane divided roadway can accommodate approximately 30,000 vehicles per day at an acceptable service level. When volumes begin to reach the 30,000 vehicles per day level, it is highly advantageous to consider the provision of a six-lane divided facility.

The service level along State Line Road will be controlled by the signalized intersections that are, or could be, inplace. The intersections, if not planned properly, will cause a degradation of the service levels along State Line Road. There is, at the present time, four critical intersections along State Line Road. These are the intersections of State Line Road with 103rd Street, the I-435 westbound on/off ramp, the I-435 eastbound off ramp (Carondelet), and with Red Bridge Road. The most critical intersections will, as is the case today, be the Interstate ramp terminal intersections. Considering the Year 2000 morning and evening peak hour volume estimates (see Figures 9 and 10), the levels of service for these intersections has been calculated using a basic four-lane divided roadway but incorporating some turn lanes at the intersections. The lane assumptions used in the analysis are shown on Figure 11 as are the predicted Year 2000 service levels. The analysis indicates levels of service could be at E and F which can be considered to be undesirable. The specific traffic demand, which if addressed, would cause an improvement in the intersection

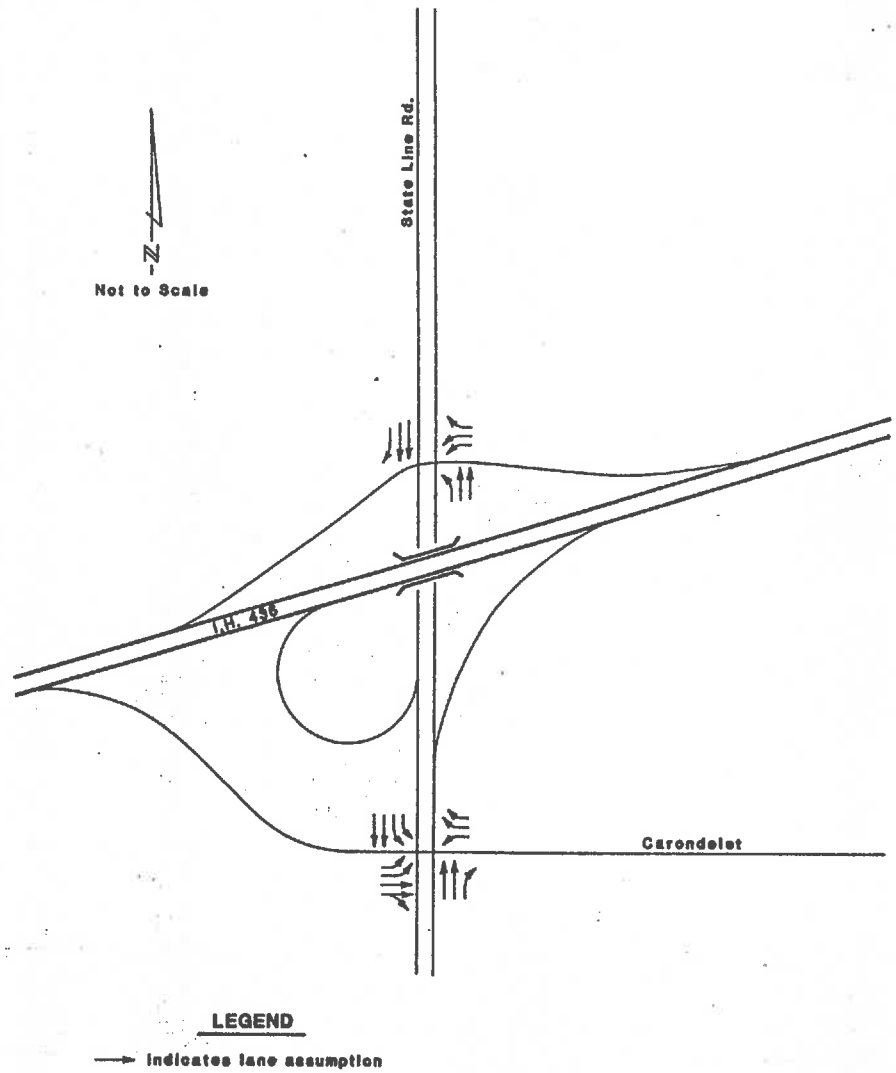

FIGURE 11

I.H. 435/STATE LINE ROAD
LANE ASSUMPTIONS

operation, are southbound left turns at Carondelet, westbound right turns from Carondelet to State Line Road, and northbound left turns from State Line Road to the westbound on ramp. Those turning movements, in addition to the high north-south through volumes will cause future problems given the assumed volumes. In order to alleviate some of these potential problems, alternative treatments of these intersections have been tested. The provision of a loop ramp in the northeast quadrant of the interchange to accommodate the north to west left turns would be a very advisable improvement as would the provision of a six-lane section through this area. A test of an improved interchange has been conducted. The lane assumptions used in the test are shown on Figure 12. The service levels that would be provided with this alternative, also shown on Figure 12, would range from B to E depending upon the peak hour chosen. This analysis indicates that the lane assumptions shown on Figure 12 would solve the majority of the projected problems in the Year 2000.

A review of State Line Road south of Carondelet indicates that State Line Road should contain a six-lane divided section from Carondelet to a location where major access to properties to the east and west are taken. In other words, between Carondelet and Red Bridge Road, a major property access (signalized) intersection can be allowed. This access should have exclusive left and right turn lanes along State Line Road. South of this location, a four-lane divided section through the Red Bridge Road/College Street extension will be necessary.

College Street, proposed to be extended from State Line Road to Roe Street, will probably be a four-lane divided roadway with Year 2000 volumes ranging between 10,000 and 20,000 vehicles. There are not any regional assignments which have a projection for this roadway at this time.

Wornall Road - The future Year 2000 volume estimates along Wornall Road indicate the possibility of the need for a six-lane divided roadway. The critical locations will again be the intersections with the I-435 ramps. These intersections, considering a four-lane divided Wornall Road would provide future service levels ranging from D to E. If both off ramps on both sides of the Interstate could be widened, at Wornall, to provide dual left turns and an exclusive right turn lane, the intersection operation at both locations could be improved to a level of service no worse than D in the peak hours.

The most critical problem north of I-435 along Wornall is the location of the Wornall-103rd Street intersection. That signalized intersection is very close to the intersection of Wornall with the I-435 westbound off-ramp. The major concern is ramp traffic wishing to make the right turn to Wornall and then quickly merge left to make a left turn at 103rd Street. One solution previously proposed was to close the westbound off-ramp. This

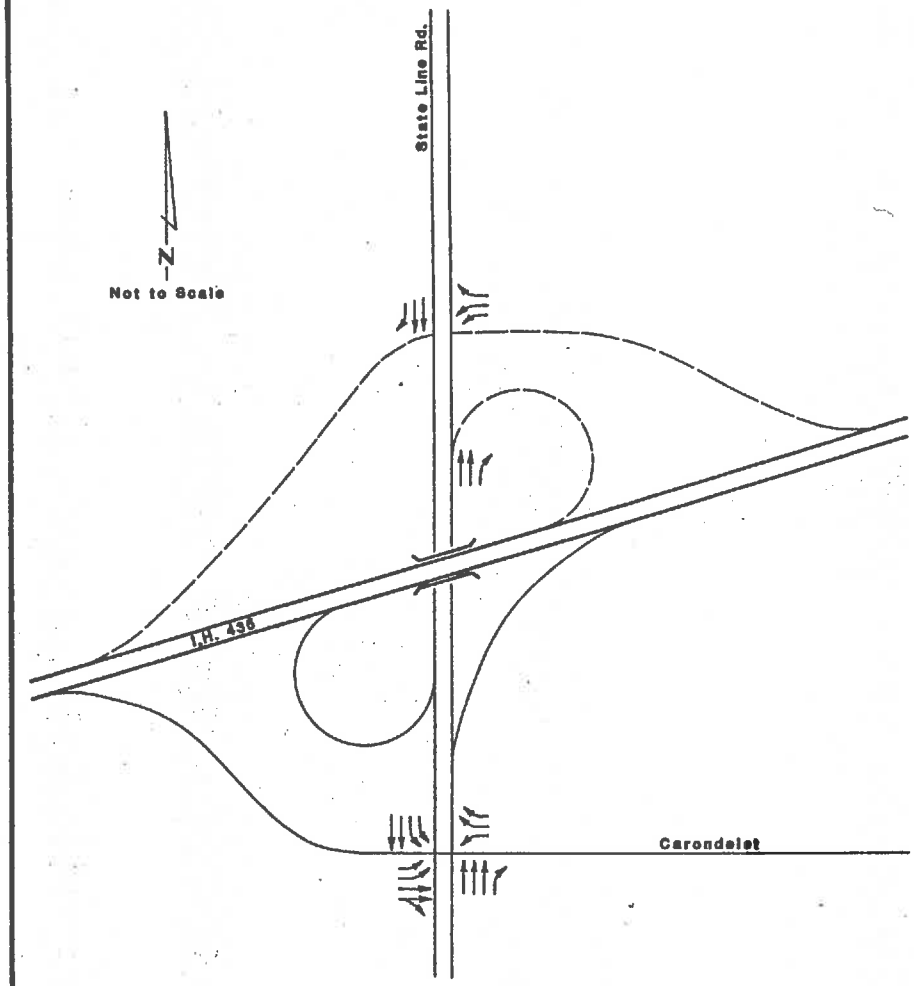

FIGURE 12

I.H. 435/STATE LINE ROAD IMPROVEMENT CONCEPT

would help to solve the problem and reduce volumes on Wornall. If the westbound ramp were to be closed, that traffic would have to use either the Holmes Road or State Line Road off-ramps and then move east-west to arrive at Wornall Road via Red Bridge Road or any residential street that provides a connection from Holmes to Wornall.

A review of the traffic using the three westbound off-ramps and desiring to go south shows that the volume would range from 1200 to 1400 vehicles in the peak hours. A closure of the westbound Wornall ramp could cause overloading of the other two ramps and possibly increase east-west volumes through residential areas. This is probably not a desirable situation.

An alternative would be to prohibit right turn ramp traffic from making a left turn at 103rd Street. This could be attempted with signing on the ramp or if that fails, providing a physical barrier along Wornall that would not allow the ramp traffic to use the left turn lane. That traffic would have to utilize Holmes Road and then 103rd Street between Holmes and Wornall. When the ramp terminals at Wornall are signalized, a sophisticated signal system needs to be provided that will allow the three signalized locations along Wornall to function as effectively as possible.

Holmes Road - The projected volumes along Holmes Road, if access can be controlled, can function as a four-lane divided roadway in the future. The basis for that conclusion is drawn from two considerations. The first involves the present construction in the interchange area that will provide loop ramps in the northeast and southwest quadrants of the interchange thus removing the left turns from Holmes to the Interstate. The second is the redesign of 103rd Street on the north and the 104th Street connection on the south which help to create adequate distances from the ramp terminals. The provision of a four-lane divided Holmes Road through this area should be sufficient to accommodate future volume projections given the assumptions used in this study.

Carondelet - This east-west roadway presently contains four lanes on the west segment and two lanes on the east where it is actually 105th Street Terrace. Given the development proposals and the volume projections, the two-lane segment must be upgraded to a four-lane segment for the entire length of the roadway.

Red Bridge Road - At the present time, Red Bridge Road from State Line Road thence proceeding to the east, is a two-lane roadway passing through a residential area. The present plan of the City of Leawood, Kansas, calls for extending College Street east to intersect State Line Road opposite Red Bridge Road. This extension of College Street is needed if the development assumed in this study for the property west of State Line Road occurs. The provision of college Street does not however mean that Red Bridge needs to be widened. That street, given the adjacent land uses should remain in its present form.

6.
ROADWAY IMPROVEMENT CONCEPT

Given the analyses conducted in this study, a series of proposed improvements have been addressed. The improvements, if they are constructed will serve to provide acceptable service levels in the study vicinity. Some of the improvements are major in that an interchange would have to be rebuilt. Some of the improvements are not as costly. Certain improvements may require the provision of additional roadway right-of-way especially along State Line Road. The improvements discussed and recommended as a result of this study are shown on Figure 13. The graphic illustrates the lanes necessary to accommodate the projected volumes. The improvements shown on Figure 13 can accommodate the development densities and land uses assumed in this study. The Year 2000 levels of service for the improved roadways are shown on Table 2. If no improvements are provided along State Line Road, it is estimated that only one half of the development assumed, development that would require State Line Road for access, could be provided before any available roadway capacity would be used up and undesirable congestion would occur.

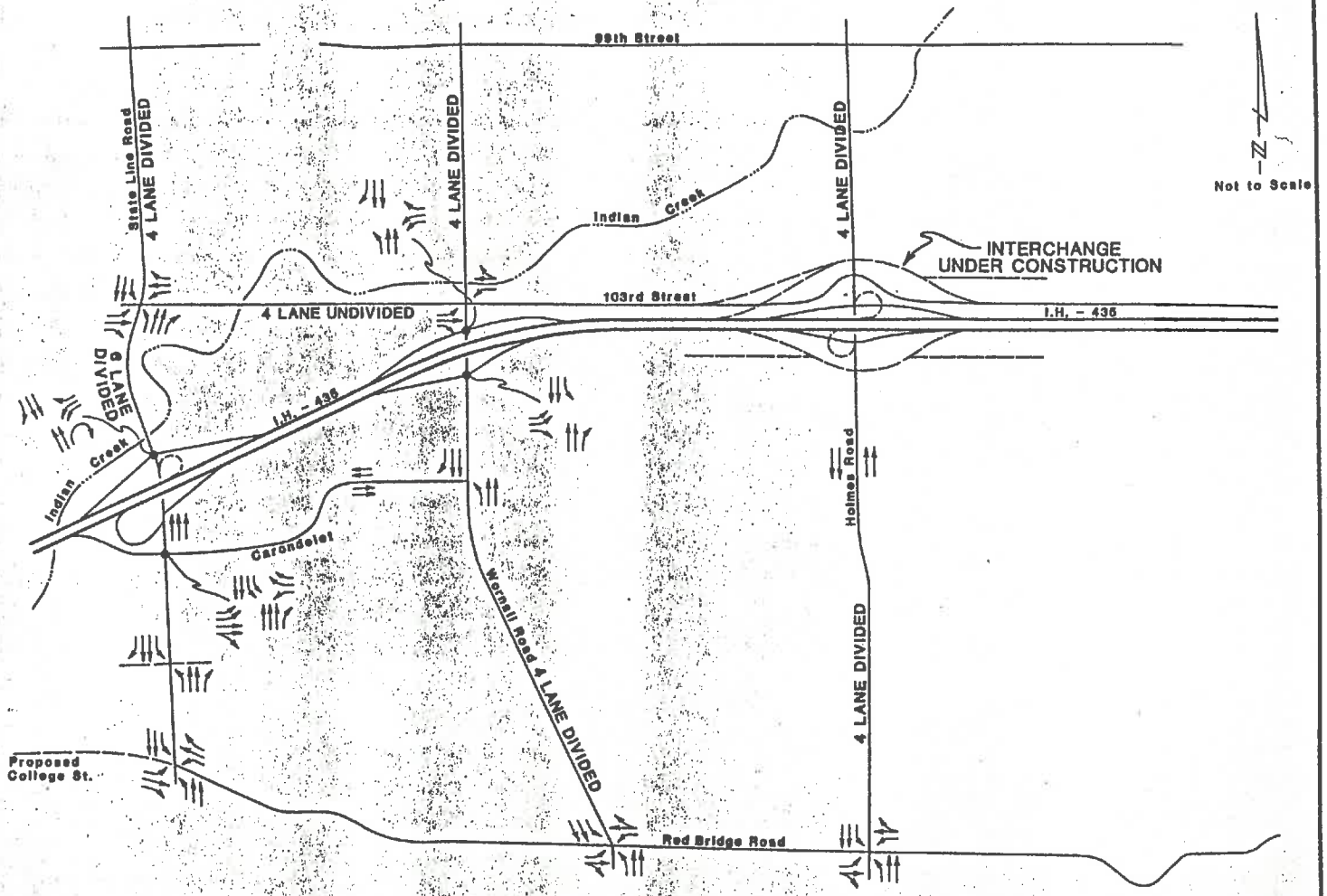

FIGURE 13

RECOMMENDED IMPROVEMENT CONCEPT

Table 2
INTERSECTION LEVELS OF SERVICE - YEAR 2000

Intersection	Level of Service			
	A.M. Peak Hour		P.M. Peak Hour	
	V/C	LOS	V/C	LOS
State Line Road and I-435 WB Off Ramp	0.78	C	0.68	B
State Line Road and I-435 EB Off Ramp/Carondelet	0.94	E	0.81	D
Wornall Road and I-435 WB Off Ramp	0.77	C	0.85	D
Wornall Road and I-435 EB Off Ramp	0.81	D	0.88	D
Holmes Road and I-435 WB Off Ramp	0.72	C	0.55	A
Holmes Road and I-435 EB Off Ramp	0.74	C	0.54	A

7. ADDITIONAL DEVELOPMENT POTENTIAL

The land uses and densities assumed in this study can be adequately served if the improvements discussed can be provided. The question of additional density which would create additional trips and when will the system cease to function is difficult. It is conceivable that some additional areawide density in the range that would produce 10 percent more daily trips could be accommodated. Any additional trips beyond 10 percent would begin to cause unmanageable traffic problems and congestion that would be undesirable. Should the area that has been studied develop beyond that assumed in these analyses, additional lanes would be necessary in the vicinity of the higher density projects.

The area south of I-435 between State Line Road and Wornall Road should not be considered for additional density that would generate more trips unless additional access can be made available. One alternative that has been discussed during the course of the study is the provision of additional access from the Interstate system. The concept should on Figure 14 would provide additional access that could allow the densities in that area between State Line and Wornall to be increased by as much as 30-35 percent. The concept merely provides a pair of one-way service roads between Wornall and State Line Road and adds ramps to/from the service road. A north-south connection between 103rd Street to Carondelet with a grade separated crossing of I-435 would also be required. The access concept creates increased accessibility to the areas north and south of I-435 and would help to relieve the interchanges on the east and west. This concept should receive serious consideration and studies regarding the physical potential of providing the concept should be undertaken.

It is recommended that any development proposal that comes before the City, for property in this study area, should be required to conduct a traffic impact analysis. This would be necessary to ensure that the development could be adequately served and given the propensity for change of development assumptions and traffic volumes, such review at the time a development is actually being proposed is advisable.

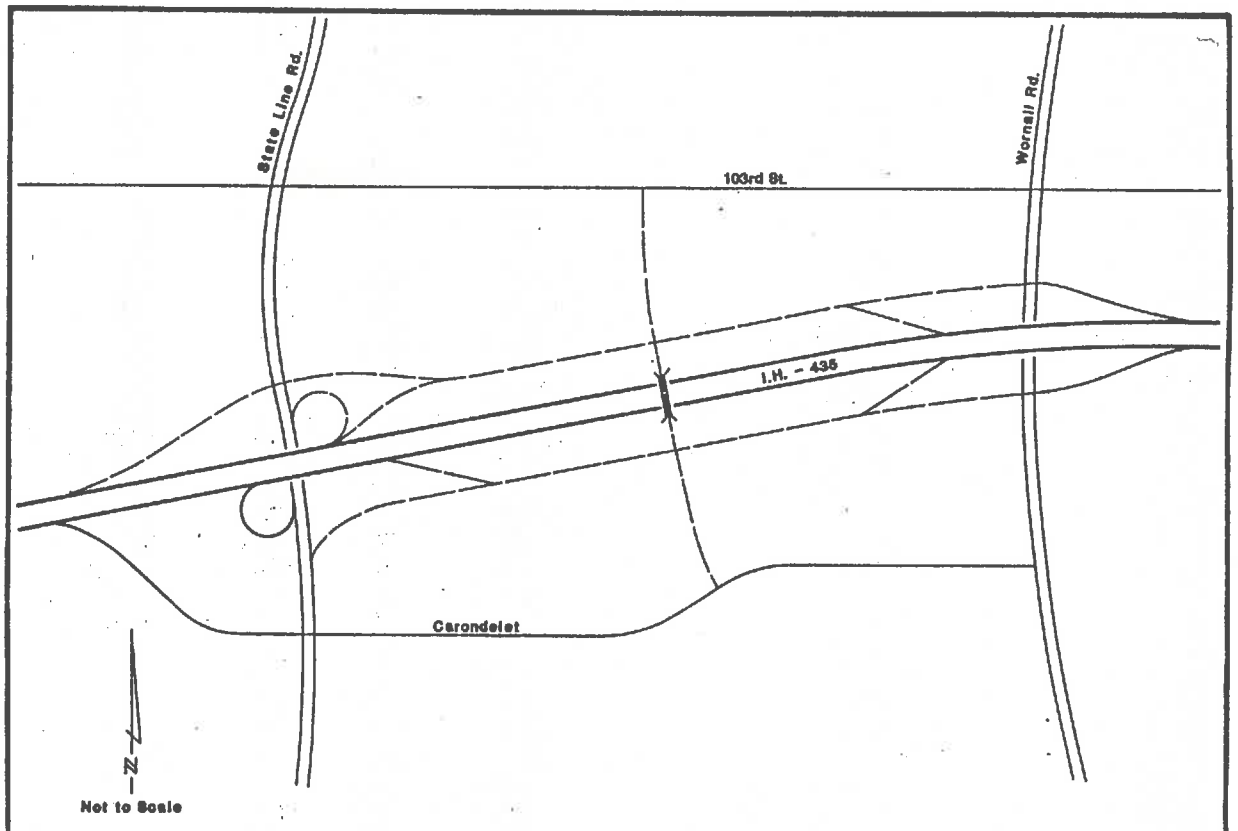

FIGURE 14
ACCESS IMPROVEMENT CONCEPT

8.
CONCLUSIONS

It is concluded, as a result of the previous analyses, that a series of roadway improvements will become necessary in the future to accommodate the expected volumes. The development potentials assumes in the analysis can be accommodated if the improvements are implemented.

Additional density can be accommodated south of I-435 between State Line Road and Wornall Road if freeway service roads and an additional roadway crossing of I-435 can be provided.

Development proposals should be evaluated on a case-by-case basis in order to determine their traffic impact. The City should consider the improvements recommended in this report and derive an accepted plan to be made a part of the overall City Thoroughfare documents. Whatever plan ultimately is provided will require cooperation of numerous governmental agencies as well as assistance from the private sector. Such cooperation will be required in establishing an acceptable plan and a funding mechanism as well as protection and acquisition of roadway right-of-way for any agreed upon improvements. The process will take time but must commence as soon as possible in order to help effectuate an orderly growth.