

Carthage Comprehensive Land Use Plan

INTRODUCTION

Change is a constant that will affect every individual throughout his or her life. Individuals need to make plans, which will accommodate the changes they will encounter in the future. A plan can provide valuable insight into the possible solutions to the problems, which typically accompany change. Planning for change is not limited to individuals. It also applies to communities. The development of a quality community does not occur haphazardly or without insight to a plan for expansion. For without a well-prescribed plan for future expansion, community leaders will be left unguided to make decisions, which could impact the community's ability to progressively develop.

This comprehensive land use plan is comprised of common characteristics. The first characteristic is that it is long term in nature. Hopefully, this plan will assist in the shaping of Carthage's future by providing the means necessary to attain a prescribed future. Second, this plan is comprehensive. It will be directed toward the entire community with an emphasis on the functions and services provided by the City. Third, it is a guide to the physical development of the community. It addresses the why, how, where, and when to develop various areas of the community. Finally, this plan is a statement of policy that will guide the decisions made by the City Planning and Zoning Commission, City Council and various other municipal officials. This document offers a prescription, which will assist in answering future questions concerning budgeting, capital improvements, zoning, and subdivision regulations.

In October of 2001, Carthage made the decision to develop a comprehensive land use plan, which would apply land use guidelines to the area within and outside its defined corporate limits. To accomplish this task, a planning commission was appointed with its duties to include the development of a comprehensive land use plan, zoning ordinance, subdivision ordinance, and capital improvements plan. The City Council requested the First District Association of Local Governments to provide assistance to the Planning and Zoning Commission in their endeavors.

Over an eight-month period, the First District Association of Local Governments worked with the Planning and Zoning Commission, City officials, and civic leaders in gathering information needed for the completion of this document. Thus, after many hours of meetings and the compilation and analysis of data, the Planning and Zoning Commission has completed this comprehensive land use plan.

SCOPE OF REPORT

There are many individual land use activities within Carthage. Some are quite small, such as individual residences. Likewise, others are quite large, such as commercial and industrial areas or parks. The common denominator for all land use activities in Carthage is the amount of land area needed to support a particular land use activity. Although Carthage is not landlocked, there is a limited amount of land available into which the City can reasonably be expected to grow.

The prime objective of this study is to identify where and how this growth can best take place. This required the documentation of existing land uses and the identification of opportunities and constraints that will affect future land development.

The development of a community vision and land use planning policies was required to establish the basis on which future development would take place. By integrating the community's vision and growth objectives with the available resources, a preferred direction and pattern for future development was determined, and thus, became the basis for the recommendations and future land use plan as presented in this report.

THE CITY OF CARTHAGE'S VISION

We the residents of Carthage, have a vision of our City. We believe we can shape our destiny if we can agree on goals, and cooperate to achieve them

We see our community as safe, economically strong, blessed with clean air and recreational opportunities for visitors and ourselves. We favor small City values, with emphasis on the family. We have great respect for our environment. We care about our neighbors. These are the qualities of life that we intend to preserve, nurture and enhance as times and conditions change.

We recognize that change is constant and, if poorly managed, can destroy the very qualities of life we wish to preserve. This vision statement has been developed to help guide policy-makers; concerned citizen groups, property owners, and entrepreneurs toward ends the community has agreed are desirable.

Carthage should be a growing prosperous community in which its citizens enjoy:

- Quality and diverse employment to provide income security and jobs that allow retention of a variety of youth who wish to remain here.
- A government that is financially sound and able to satisfy the needs and desires of a growing community; i.e., streets, utilities, parks, recreation facilities, and community centers.
- A quality of life which provides respect, understanding, and opportunity for all citizens, especially the youth, elderly, handicapped, and the poor.
- An expanded commercial and industrial community which provides diverse employment opportunities as well as the opportunity to purchase the basic core needs for every day living.
- A community which provides a wide variety of housing to meet the needs of all its citizens.

- Community services and systems to assure that all individuals achieve and maintain their best level of health and independence to enable them to lead a vital, productive life.

Through the utilization of our many resources and the strengths and diversity of our people, we hope to attain a community that continues to evolve to enhance the quality of life for all.

IMPLEMENTATION

The comprehensive land use plan for the City of Carthage has been designed to provide guidance for future growth for approximately ten years. With any plan of this nature, it needs to be reviewed periodically to ensure that conditions and circumstances affecting development are occurring as originally anticipated.

It should be noted that the completion of a comprehensive land use plan is only the first step in the implementation of a planning program. The plan itself is merely a guide for achieving an orderly and attractive community. The City will need to take a number of steps in order for the plan to be successful. The first is the identification and prioritization of public improvements required to support and serves the future development areas. Second, is the adoption or modification of applicable regulatory ordinances to ensure that the objectives embodied in the plan are adhered to as future parcels and tracts of land are developed. Finally, the Carthage Planning and Zoning Commission should continue to review all matters affecting physical development and remain active in promoting the plan with other planning agencies in the area.

The Carthage Planning and Zoning Commission recommends that this document be reviewed on an annual basis and that a comprehensive update to this plan occur in ten years or as deemed necessary by the Carthage Planning and Zoning Commission.

LAND USE PLANNING POLICIES

Generally, a comprehensive land use plan will utilize written policies to paint a picture of how a community should look in 10 to 15 years. An initial step in the development of a comprehensive land use plan is that of establishing land use planning policies. The following are the major goals and objectives, which have an application to the development of the comprehensive land use plan for Carthage. For this analysis a “goal” is defined as a desired end-state which is not necessarily quantifiable. An “objective” is a more specific component of a goal, which is usually quantifiable. An objective generally measures progress toward a goal.

GENERAL COMMUNITY GOALS:

The following general community goals are intended to result in the type of future living and working conditions desired by the citizens in Carthage and immediate surrounding area.

- To preserve and enhance the existing character that defines Carthage's quality of life by promoting the positive image of the community as a safe and secure place to live, work, and visit.
- To promote the economic growth and social development of the community and the surrounding area as a partner in cooperation with the private sector.
- Identify and provide for the orderly arrangement of growth objectives of the City and other governmental units and agencies within the region and coordinate when possible.
- To promote cooperation and coordination between the City and Miner County in the development of land and utilities within three miles of Carthage's corporate limits.
- To provide ample opportunities for public participation at all stages of the planning and implementation process, including public hearings, rezoning notices, and public awareness campaigns.
- Continue an active program that will maintain and enhance the community's ability to implement the comprehensive land use plan while retaining flexibility within the planning and zoning process so as to readily cope with changing social and economic conditions.

LAND USE GOAL:

Establish land use patterns which will promote and protect the health, safety and welfare of area residents and will enhance the economy, convenience and general appearance of the community by guiding physical developments through the comprehensive planning process, thus minimizing land use conflicts.

Objectives:

- Provide suitable transition zones between low-density residential areas and more intensive non-residential uses.
- Maintain an adequate supply of development land within the City at all times.
- Encourage compact, contiguous growth along the City's fringe.
- Establish land use patterns that will discourage leapfrog development on land, which cannot be economically provided with public services and facilities.
- Encourage annexation of the land adjacent to the City's corporate limits prior to development.

- Preclude the development of stream corridors, the aquifer, natural floodplains, and drainage ways and other significant natural areas, which are unsuitable for construction.
- Require that new development to be compatible with existing development.
- Protect and enhance property values by precluding development which may have a negative impact on the value of the developing and adjacent properties.

RESIDENTIAL USE GOAL:

Encourage a high quality of residential living environment, which promotes safety, privacy and sociability for all citizens living at various socio-economic levels within the City.

Objectives:

- Promote the planning, design, and construction of a variety of residential densities and housing types distributed appropriately throughout the City accommodating all income levels and age groups.
- Integrate parks and open space areas into residential neighbors where feasible.
- Discourage scattered residential developments.
- Encourage the maintenance of existing sound housing units and the replacement of substandard housing units.
- Protect and enhance residential property values by precluding development, which may have a negative impact on the value of the developing and adjacent residential properties.

COMMERCIAL USE GOAL

To locate the areas of commercial development within the context of the overall plan so that it is economically feasible to operate a business and provide goods and services in clean, attractive, safe, and convenient manner.

Objectives:

- Encourage the retention and strengthening of the central business district as a commercial center and promote future retail growth within this commercial area.
- Strategically maintain and promote the construction of well-designed clusters, but allow strip commercial development with careful regard to safety, attractiveness and public interest.

INDUSTRIAL USE GOAL:

Promote and encourage diversified industrial development at appropriate location within the area in order to provide a stable economic, which will facilitate growth.

Objectives:

- Plan for the future development of industrial areas based on expected community growth
- Encourage the establishment of industrial parks, designed with adequate service roads, and necessary primary and supporting facilities.
- Promote economic stability by encouraging diversification of area industries.

TRANSPORTATION USE GOAL:

To provide a convenient, efficient, safe, and economical system of transportation throughout the City and the study area.

Objectives:

- Plan and provide an integrated street and highway system that is planned, designed, developed, and maintained consistent with City's existing and anticipated future land use patterns and activities.
- Provide an efficient, integrated system of roads for the safe, direct, and convenient movement of persons and goods.
- Limit through traffic on local streets within established neighborhoods.
- Provide a system for pedestrians and bicycles that is planned, designed, developed, and maintained to ensure safe access and movement from residential neighborhoods to schools, commercial centers, and recreational areas.
- Promote safe and efficient movement of traffic by limiting access to arterial and major streets from private property.
- Develop sufficient parking to meet existing and future demands.
- Classify major streets and highways according to function and establish design standards for various street classifications.
- Secure sufficient rights-of-way to accommodate the City's future major arterial street system and pedestrian access to future walking and trail systems.

- Where conditions permit, the thoroughfare system should have adequate landscape treatment to maintain the appearance of the community and reduce the undesirable impact of heavy traffic on abutting private property.

PUBLIC UTILITY AND HUMAN SERVICE USE GOAL:

To provide public utilities and services consistent with current and projected future needs.

Objectives:

- Plan for public facilities – (schools etc.) sites in advance of new residential development insuring ample, uncrowded facilities at a reasonable cost.
- Encourage libraries and community cultural facilities to expand as necessary to adequately serve the needs of the population.
- Plan for continued development of police and fire protection throughout the City.
- Employ an area-wide approach in planning utility and drainage systems, which utilize and preserve natural drainage systems to the greatest extent possible.
- Utilize water and sewer line extensions from existing systems to structure growth and development in an orderly fashion.
- Plan, with existing utility providers, for adequate public services and facilities outside the corporate limits that will meet future utility needs.
- Encourage county-approved developments within the study area to require utilities compatible with City requirements.
- Provide for adequate refuse disposal.

PARK AND RECREATION GOAL:

To plan and construct park and recreation facilities that are responsive to the needs and values of the citizens of Carthage.

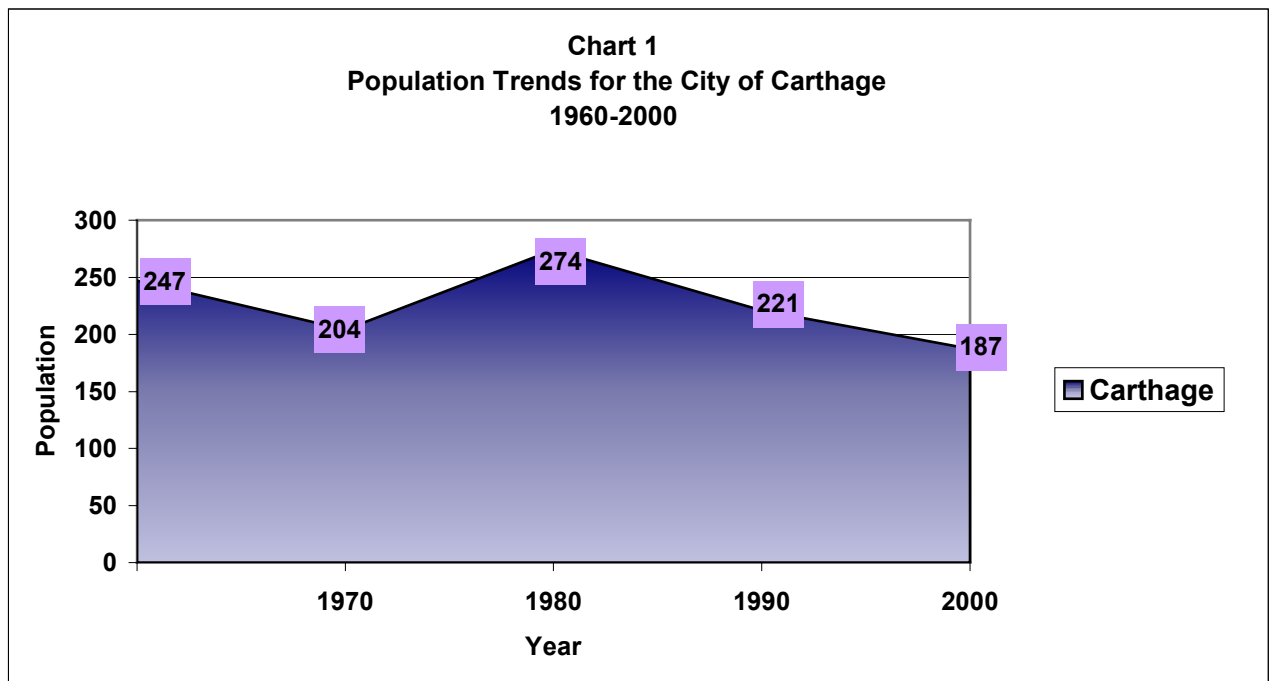
Objectives:

- Provide park and recreation areas, which are convenient to users and are maintained at a uniformly high standard which enhance the character and quality of such areas.
- Encourage development of neighborhood parks, larger public parks, and recreational facilities by securing suitable park sites within designated growth areas.

- Coordinate and integrate pedestrian and bicycle ways with parks and recreation areas.
- Provide for the preservation of open spaces wherever possible.
- Encourage the establishment of parks adjacent to and in conjunction with any new public schools to make the best use of public funds to develop appropriate joint-use park school amenities.

POPULATION

The study of a community's population is an essential component in the development of a comprehensive land use plan. By understanding the makeup of its population, a community is then better prepared to plan for the future needs of its citizenry. The first section examines the population of Carthage with respect to such factors as population growth, migration trends, and age structure. The analysis of these trends and patterns will make possible a realistic population projection for the City of Carthage.



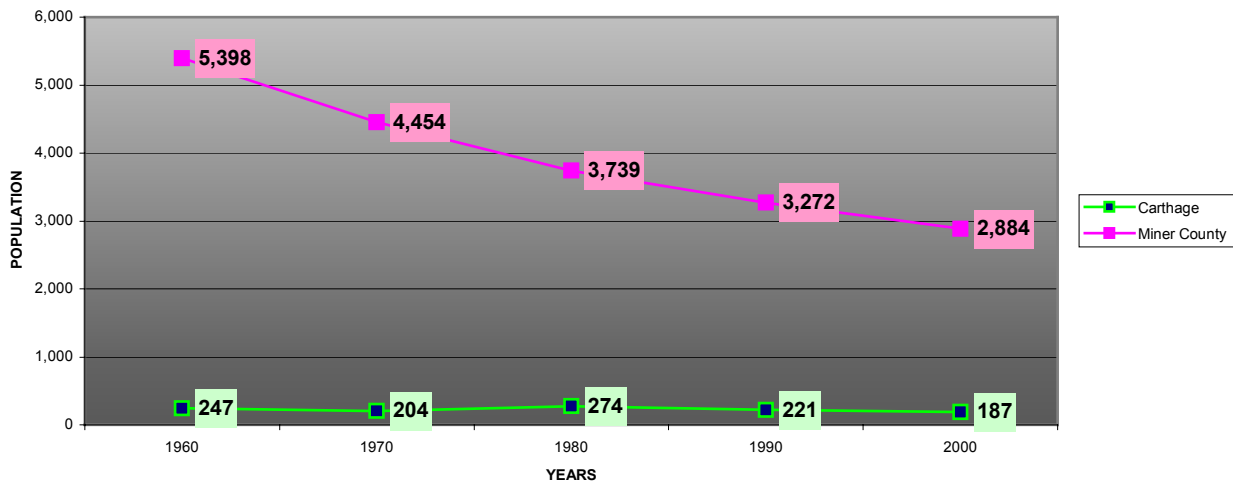
SOURCE: US BUREAU OF THE CENSUS, CENSUS OF POPULATION 1960, 1970, 1980, 1990 AND 2000.

Carthage is a community comprised of 187 residents (2000 Census). Chart 1 provides information on the population trends of Carthage. Since 1960 the community has decreased its population by more than twenty-four percent (60 individuals). Between 1990 and 2000 the community decreased its population by 15.4% (34 individuals).

Chart 2 and Table 1 show Carthage's relationship to the population of Miner County and the other communities within Miner County. Chart 2 indicates that the City of Carthage as well as Miner County have not been able to sustain their respective population bases for the past forty years. This is especially true of its population since 1980. It should also be noted that this trend is not uncommon to all communities and the rural area within Miner County. Between 1990 and 2000 every community, with the exception of Roswell, and the rural area within Miner County experienced population losses.

Between 1990 and 2000, Carthage experienced a decrease of 0.2 percentage points in its respective proportion of Miner County's population. This data continues to support the historical migration patterns, which shift the rural/urban mix of this county.

**Chart 2
City of Carthage and Miner County Population Trends
1960-2000**



OVERALL CHANGE IN POPULATION 1960-2000

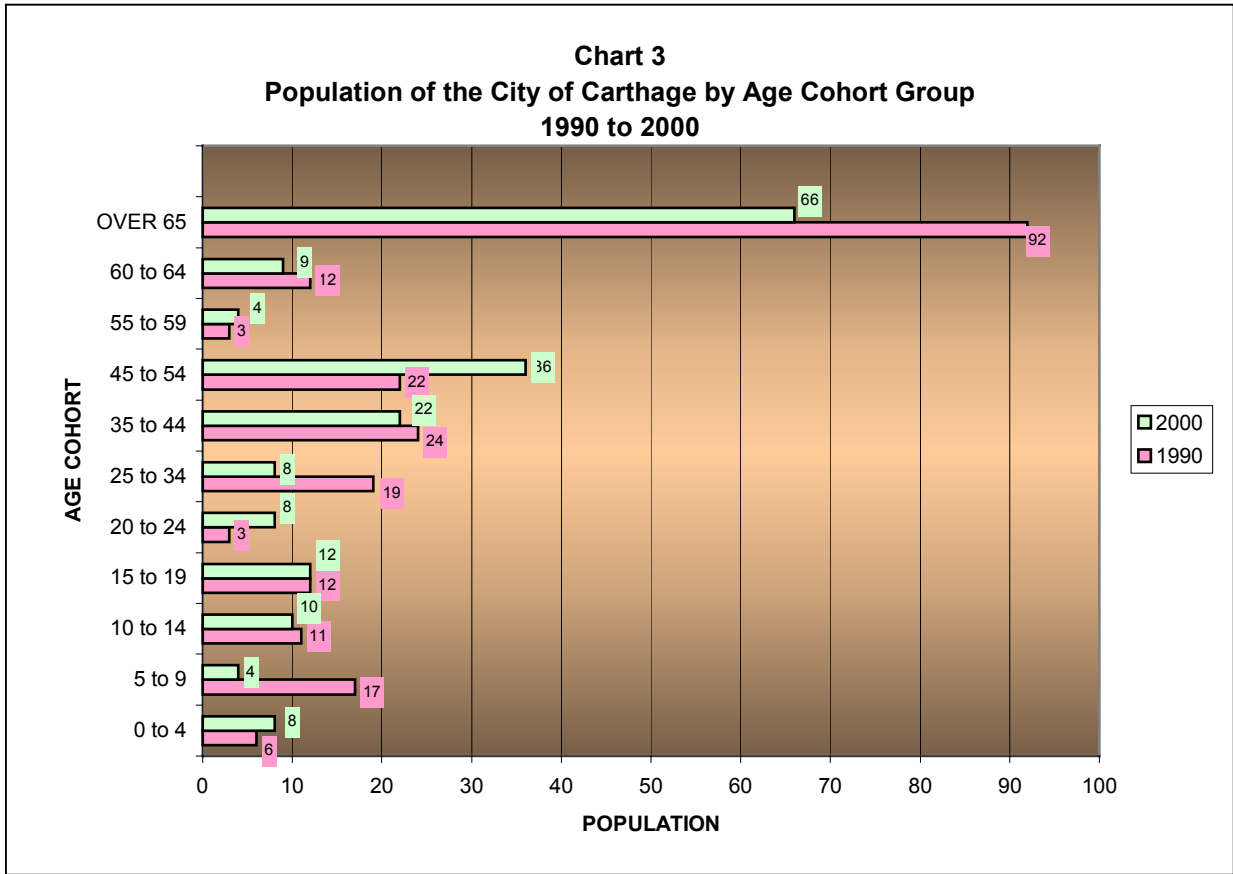
CARTHAGE: -24.3%
MINER COUNTY: -46.6%

**TABLE 1
MINER COUNTY POPULATION ANALYSIS
CARTHAGE, OTHER COMMUNITITES, AND RURAL AREA PROPORTIONS**

	POP 1990	PROPORTION OF MINER COUNTY 1990	POP 2000	PROPORTION OF MINER COUNTY 2000	CHANGE IN PROPORTION 1990-2000
CANOVA	172	5.3	140	4.9	-0.4
CARTHAGE	221	6.7	187	6.5	-0.2
HOWARD	1,156	35.3	1,071	37.1	+1.8
ROSWELL	19	0.6	21	0.7	+0.1
VILAS	28	0.9	19	0.7	-0.2
RURAL	1,676	51.2	1,446	50.1	-1.1
TOTAL	3,272		2,884		

SOURCES: US BUREAU OF THE CENSUS, CENSUS OF POPULATION 1990, 2000.

Chart 3 shows the age distribution of Carthage residents in 1990 and 2000. Several conclusions about Carthage's age distribution trends become apparent after reviewing the 1990 and 2000 Census Statistics. The most notable observation is that Carthage experienced major decreases most of the age cohort groups.



SOURCES: US BUREAU OF THE CENSUS, CENSUS OF POPULATION 1990, 2000

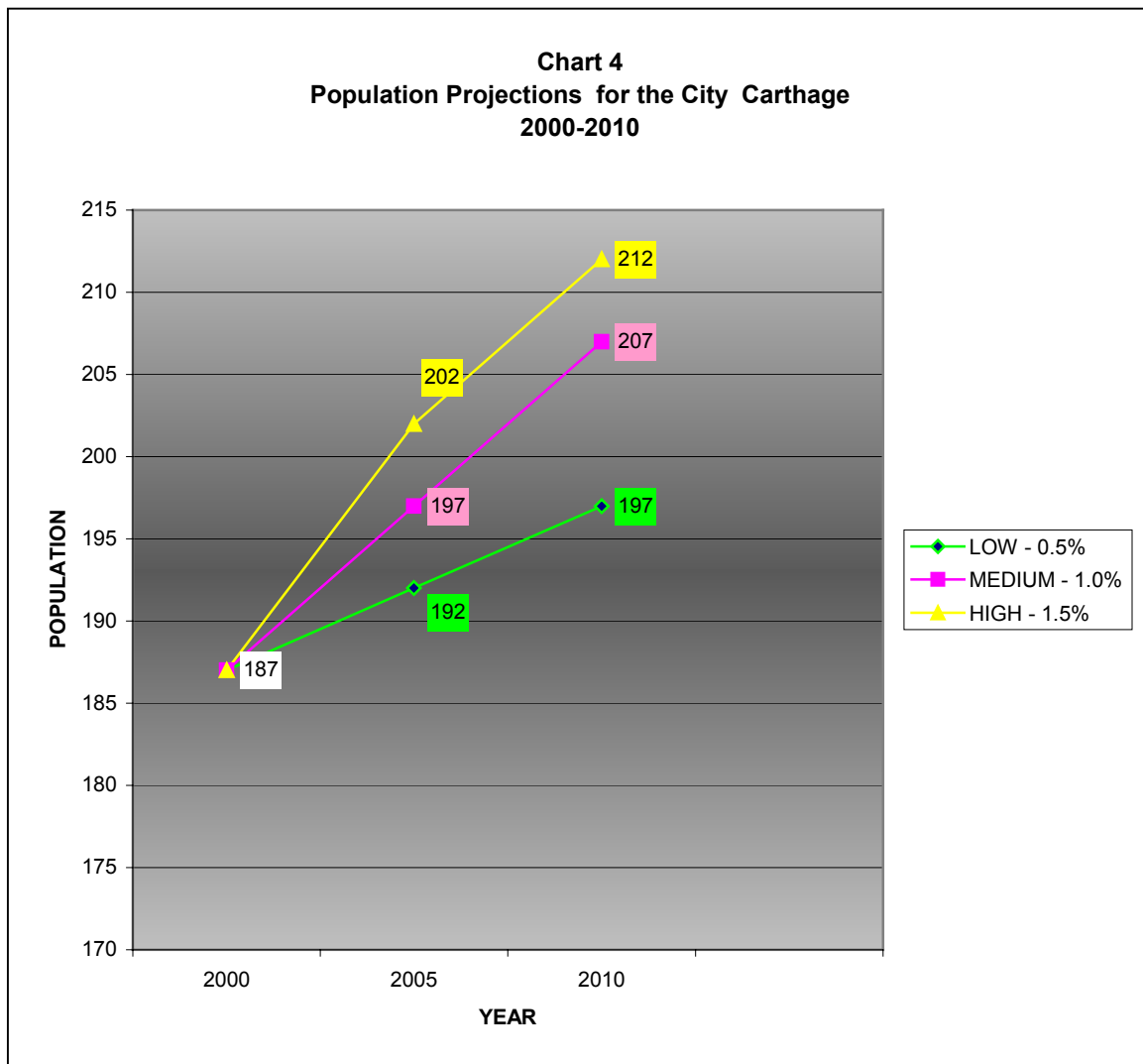
Between 1990 and 2000, the number of Carthage’s children age 0 to 14 decreased by 35.3% (12 individuals). This increase of population was due primarily by the decreases in the 5 to 9 and 10 to 14 year old cohort groups. The increase in the number of individuals in the 0 to 4 age cohort may appear to be a positive statistic. However the minimal growth of this cohort group, a cohort that typically throughout the state did not experience growth, may be attributed to the fertility ratio. Upon examination of the fertility ratio, (the number of children under the age of five compared to the number of women in their childbearing years, ages 15-44) one can see a decrease in Carthage’s potential birthrate. The fertility ratio in 2000 decreased 5.8% (1.7 births per 10 women ages 15 to 44 in 1990 compared to 1.6 births per 10 women in their childbearing years in 1990). It appears that even though there were a greater number of women in their childbearing years in 2000 as opposed to 1990, those women in 2000 were having fewer babies than the women in 1990.

The second observable trend is that of the 27.3 percent (29 persons) decrease in the number of individuals who comprise the 20 to 34 year age group. This is a very common occurrence within the State of South Dakota. The decrease in this cohort group may be attributed to several factors. The first is being that of the “baby boom/baby bust eras”. The individuals who comprise the 25 to 34 age categories in 1990 were the final children born into the baby boom era. Meanwhile, individuals 25 to

34 years old in 2000 were the first children of the baby bust era. Also this age cohort group consistently across the state has historically experienced a very high migration rate. Between 1990 and 2000 the State experienced a loss of 21.6% in the same cohort group.

The third trend is the 26.3% increase in the number of individuals in the 35 to 54 age cohort groups. These individuals were born at the height of the “baby boom”. During the same time frame the State experienced an increase of over 43% in this age cohort group

The final trend is incidence of the number of individuals over the age of 60 decreasing by 27.8 percent (27 persons). Between 1990 and 2000 the State’s population of individuals 65 years of age and older increased by 5.7%. It should be noted that with extended life spans, migration of elderly individuals from rural areas, potential location of elderly services, and the increased number of the baby boomers getting older, the “Graying of Carthage” will continue at a higher pace over the next fifteen years.



The trends of growth in the number of the elderly, individuals having fewer children and the potential in/out-migration of individuals 15 to 34 years old will have an impact on Carthage's potential for future growth. Although past trends have indicated a loss of population, any previous out-migration trends may be reversed with the introduction of new commercial and industrial interests into the area.

Chart 4 exhibits population projections for Carthage. The population projections were based on regression analysis. Carthage's low, medium, and high growth calculations were based upon projections of annual expansion levels of 0.5%, 1.0%, and 1.5% respectively.

It is important to take into consideration that these projections were based upon analysis of U.S. Census Data, which covered a time, span of 40 years. Using the medium projection of 1.0% per year, Carthage could experience a population increase of two (2) individuals per year (resulting in a population of approximately 207 by the year 2010). This projection is slightly higher than housing and economic development trends of recent years.

TRANSPORTATION

A well-conceived transportation system is one of the most important features of a comprehensive land use plan. The transportation plan attempts to program road and street use to prevent congested and unsafe street design. Through long-term planning of designated street types, new developments can be coordinated and potential problems minimized.

STREET CLASSIFICATION AND DESIGN STANDARDS

City streets support diverse volumes of traffic. Thus, before a transportation plan can be implemented, the determination and development of the City's existing street system according to classification must be undertaken. The development of these classifications will be specifically related to the function the street is expected to perform. Developmental expectations are dependent upon the varying amount and type of street traffic.

The following generally recognized hierarchy of street classifications would be used to assist in the development of intermediate and long range transportation needs.

Arterial Streets – Serve as primary circulation routes. These streets generally carry the majority of traffic volume within the City. Their basic function is to facilitate movement of medium and long distance, high-speed traffic between regions outside, and sub-areas within the City with a minimum of impediments. Since arterial streets serve for traffic movement between regions and sub-areas, all direct access to abutting property should be restricted. Further, parallel service roads should be added, where appropriate, to maintain traffic carrying capabilities of the thoroughfare. Miner County Highway 2 (222nd Street) and 425th Avenue are considered arterial streets.

Collector Streets – Form an intermediate category between arterial and local streets. Collectors serve as a link between arterial and local streets by “collecting” traffic from local streets and transferring it to arterial streets. Establishing and properly maintaining collector routes may avoid unwanted and unnecessary traffic on residential streets. Collector streets may further be classified into major and minor collector categories. Main Street is considered a collector.

Local streets – Primarily provide access to abutting properties and traffic within neighborhoods. They are not designed to carry large amounts of through traffic and are primarily characterized by short trip length and low traffic flow. Most streets in Carthage are considered local streets.

Alleys – provide access to rear lots of property and right-of-way or easements for the placement of various utilities. Due to their design, alleys are not designed to carry through traffic.

CITY STREET SYSTEM

Carthage’s street system is generally laid in a rectilinear grid system. The majority of the streets have a seventy-foot right-of-way width. Local streets, with a minimum width of 20 feet, comprise most of the streets in Carthage. The majority of the traffic within Carthage travels Miner County Highway 2 (222nd Street), 425th Avenue, and Main Street.

Approximately thirty-five (35) percent of the community’s streets are paved and in generally good repair. The remaining streets are gravel and all are in some state of repair or upgrade.

Presently, Carthage maintains the existing streets from the General Fund. The City Council reviews the condition of existing streets on an annual basis. Improvements to the transportation system are identified and prioritized according to need and ability to complete the necessary improvements. The City has no plans for paving the remaining gravel streets in the community.

Streets and roads are the most efficient when their design and construction coincide with the intended function they are to fulfill. The importance of uniform design standards for street systems cannot be over emphasized. This is because street systems are affected by hazardous road conditions and traffic volume capacity when standards are not developed and maintained. Suggested design requirements for Carthage’s street system are provided in Table 2.

These standards are generalized and allow for some adjustment in view of local conditions and engineering feasibility at the time of construction.

**TABLE 2
MINIMUM STREET/ROAD RIGHT-OF-WAY**

	RIGHT-OF-WAY WIDTH	PAVEMENT WIDTHS CURB TO CURB
ARTERIAL STREET	100'	60'
COLLECTOR STREET	80'	40'
LOCAL STREET	66'	24'
ALLEYS	20'	20'

Recommendations:

- Regarding the extension of existing streets into new undeveloped areas of the community. The Planning and Zoning Commission recommends that the streets identified on the Major Street Plan Map should be extended as future development warrants. These extensions would ensure the continuance of the existing grid pattern. The Major Street Plan Maps designate where proposed streets should be extended to accommodate future development.
- The City has identified the need to make improvements on Main Street.
- When sections of City streets are planned for reconstruction, the City should also address any necessary water, sanitary sewer, and/or storm sewer improvements and incorporate those costs into the project.
- It is recommended that the City incorporate capital improvements programming practices regarding the City's street system.
- As to expansion of future streets, it is important to state that the City of Carthage believes that future developers may be required to pay for street improvements within a new subdivision.
- The Major Street Plan Map shows the designation of streets by their respective classification. It should be noted that collector and arterial designations have been made for thoroughfare outside the community's corporate limits.

WATER

The City obtains its water from the Kingbrook Rural Water System (KRWS). KRWS has leased the City's water storage and distribution system and individually bills the residents of the community. The City also utilizes a well for standby/emergency purposes. Currently the community uses approximately 30,000/day gallons per day with a peak usage occurring during the summer months. Representatives from KRWS have stated that the rural water system has the capacity to accommodate future development as identified within the projections contained within this report.

The water distribution system consists of three, four, six and eight-inch PVC water lines. The age of the distribution ranges from seventy years to recent construction. KRWS utilizes a 30,000 gallon elevated tower for providing a reserve supply of water in addition to maintaining distribution pressure.

The supply and distribution of water for Carthage appear adequate for the intermediate and long-term future and capacity for future growth does not appear to be a major concern.

Recommendations

- The City will need to continue monitoring its existing distribution lines and storage facilities to insure adequate delivery to the residents of the community.
- Areas that experience poor water pressure should be improved through increased water main sizes or looping projects.
- Due to the twenty percent loss of water within the distribution system, it is recommended that improvements be made to problem water main and service lines that as they are identified.
- There should be a timetable established for the upgrade and or replacement of hydrants, valves, and water mains that are undersized or in poor condition.
- Regarding future development, water mains will need to be extended prior to any development outside of the presently established areas of the community.
- It is recommended that when sections of City streets are planned for reconstruction, the City should also address any necessary water, sanitary sewer, and/or storm sewer improvements and incorporate those costs into the project.
- As to expansion of future water main lines, it is important to state that the City of Carthage believes that future developers may be required to pay for water improvements within a new subdivision.
- It is recommended that the City incorporate capital improvements programming practices regarding the City's water system.
- The Water Facilities Map (see appendix) provides information on the existing water system.

SANITARY SEWER

The existing sanitary sewer collection and treatment system serves domestic users. The collection system was constructed in the 1940's and presently is not experiencing any major operational problems. The system utilizes six-inch to twelve-inch collection

lines to transport wastewater by gravity flow. It should be noted that due to the age and effectiveness of the community's existing collection system, there is potential for the capacity of the collection system to be limited today and in the future due to the incidence of inflow and infiltration into the City's collection lines.

Carthage's existing wastewater treatment facility is located west of the community. The three treatment ponds were constructed in 1974. The existing design of the treatment facility should be able to accommodate any growth projections within this land use plan.

Recommendations

- The City should monitor the condition (by telescoping) and effectiveness of the lines in a timely fashion. This would assist the City in annual maintenance and preparations for future replacement of lines.
- It is recommended that the City update its capital improvement plan for sanitary sewer improvements especially in regard to replacing clay mains as necessary.
- Regarding future development, sanitary sewer collection mains will need to be extended prior to any development outside of the presently established areas of the community.
- It is important to state that the City of Carthage believes that future developers may be required to pay for sewer improvements within a new subdivision.
- It is recommended that when sections of City streets are planned for reconstruction, the City should also address any necessary water, sanitary sewer, and/or storm sewer improvements and incorporate those costs into the project.
- It is also recommended that the City promote development of areas, which would not need to be serviced with a lift station.

With the implementation of the above recommendations and adequate maintenance and replacement of lines which experience infiltration problems, and any future treatment facility improvements the City should be able to accommodate the wastewater collection and treatment need of its citizenry and industry for the near, intermediate and long-term future.

The Sanitary Sewer Facilities Map (see appendix) provides information on the existing sanitary sewer system.

STORM WATER

As Carthage continues to expand and become more urban, the importance of storm water drainage comes to the forefront in the planning process. This is because with

urbanization comes an increase in the amount of impervious surfaces which have a direct impact upon the amount and intensity of storm water runoff.

Fortunately, there are very few developed areas within the community, which have historically experienced drainage and flooding problems. Even though there are no identified floodplains located within the corporate limits, there are areas which could experience inundation with a one hundred-year storm event. Development in these areas should not be encouraged.

Presently, the community utilizes streets, ditches, and other natural drainageways for storm water drainage. To maximize the effectiveness and efficiency of natural floodplains and drainageways, protective-zoning ordinances should be developed, continuously reviewed, and updated. Establishment, maintenance, and enforcement of these criteria are necessary for efficient storm water drainage control.

Recommendations

- It is recommended that development not be in encouraged in areas that experience inundation.
- It is recommended that if the City finds it necessary to develop areas identified as floodplain, the City should develop and stringently follow flood plain regulations within the zoning ordinance. If development is to occur in areas of the identified flood plain, there should be flood-proofing techniques incorporated into the design of the structure and development as a whole.
- As stated previously in the Public Utility and Human Service Goal and Objectives, the City is encouraged to employ an area wide approach in planning utility and drainage systems, which utilize and preserve natural drainage systems.
- If detention ponds are to be utilized to reduce flooding, multiple-use planning of this area should be taken under consideration. Possible uses range from public parks to biking and walking paths. Natural depressions are the most common sites for detention ponds. The design of detention ponds must consider the environmental characteristics and the appearance of the natural drainageways.

EXISTING LAND USE

Where and how a community will develop is influenced by the usage of the community's existing land resources. In order for a future land use plan to properly develop, an understanding of the existing types of land use within the community is necessary. Staff from the First District Association of Local Governments conducted a land use inventory within the study area. Existing land development was categorized into one of five primary land use classifications. They include residential (single-family, multiple-family, or manufactured housing), commercial, industrial, public/quasi – public, and open space/agriculture. It should be noted that Carthage's corporate limits generally consist

of the south ½ of Section 7, the west ½ of the Southwest Quarter of Section 8, the Northeast Quarter of the Northwest Quarter of Section 18, and the Northeast Quarter of Section 18, all of which is located in T108N R57W. The Existing Land Use Maps provide the land area presently developed and being used within each classification.

Residential

Residential land use consists of three residential subcategories (single-family, multiple family, and manufactured home). Residential development is the largest category of existing land use within the City (approximately 38.7 acres). The residential land use area consists primarily of single-family homes organized into neighborhoods. Public and quasi-public facilities such as parks, schools, and churches may be found within these neighborhoods. Residential land usage is further characterized by the minimal amount of the traffic circulation within the neighborhood. In addition to single-family homes within the community, there are two (2) multiple-family residential areas and approximately six (6) manufactured dispersed throughout the community.

Commercial

Carthage has a land use pattern oriented to traditional development of midwestern cities. The community has nearly all of its business uses in the centrally located business district located on Main Street. This central business district contains the City's commercial facilities, governmental offices and public buildings.

Industrial

Currently there are five general industrial areas located throughout the community. These uses are related to the aggregate storage, grain elevator, electrical contracting, manufacturing, and warehousing.

Public/Quasi Public

The public/quasi land use classification consists of facilities provided by public and quasi-public agencies. Carthage's public/quasi-public areas consist of a fire hall, City Offices, post office, library, City campground, State campground, ballfield, utilities, museum, senior citizen center, school/school park, and churches.

Open Space/Agriculture

There are several areas within the corporate limits that are either vacant open spaces or are still in some form of agriculture use.

Existing Land Use Analysis

Comparing the number of acres presently developed (approximately 92) with the estimated urban population (187) indicates that 49 acres of land are required to support

every 100 persons within the study area (Table 3). This ratio is nearly twice the ratio found in other communities in South Dakota that are comparable in size and character to the City of Carthage (Average 25 to 32 acres/100 individuals). The number of homes with a single occupant or absentee owners may explain this disparity.

**TABLE 3
EXISTING LAND USE SUMMARY – CARTHAGE URBAN AREA**

LAND USE	NUMBER OF ACRES	PERCENT OF DEVELOPED AREA	DEVELOPED ACRES PER 100 PERSONS*
SINGLE FAMILY	35.5	38.5	19.0
MULTIPLE-FAMILY	0.8	0.9	0.4
MANUFACTURED HOUSING	2.4	2.6	1.3
TOTAL RESIDENTIAL	38.7	42.0	20.7
COMMERCIAL	3.2	3.4	1.7
INDUSTRIAL	4.0	4.3	2.1
PUBLIC/QUASI-PUBLIC	11.3	12.3	6
PUBLIC RIGHTS-OF-WAY	35.0	38.0	7
TOTAL DEVELOPED AREA	92.2	100	49.3

SOURCE: CITY OF CARTHAGE LAND USE INVENTORY, FALL 2001.

(*) BASED ON ASSUMED URBAN AREA POPULATION OF 187

Table 4 shows the proportionate amount of new urban development that will be required for each of the basic land use categories (i.e. residential, commercial, industrial, and public/quasi-public) in five-year increments for the next ten years.

In each case the numbers reflect gross acres of development, which means an amount for streets and other public rights-of-way is proportionally included with each land use category. Based on current development patterns in the Carthage urban area approximately 35 percent of the total developed area is devoted to streets and public rights-of-way. In projecting future land use needs, this analysis will utilize the generally accepted figure of 25 percent for streets/public rights-of-way. .

Utilizing ratios that took into account the community’s existing ratios of residential development compared to ratios found in other South Dakota communities of similar size and growth pattern, land use need projections were developed for the duration of the planning period. It was determined that approximately five (5) acres of additional land development will be required to serve a population of 207.

It should be noted that these projections are only estimates and therefore are to be used only as a guide. It is very possible that there may be a need for additional acres in any of the designated land uses.

The four land use categories for projecting future land area requirements as shown in Table 4 encompass the full range of land use activities found in the urban area.

**TABLE 4
LAND USE PROJECTIONS FOR CARTHAGE COMPREHENSIVE LAND USE PLAN**

	BASE YEAR 2002	PROJECTIONS		
		2007	2012	TOTAL
TOTAL POPULATION	187	197	207	
POPULATION INCREASE	----	10	10	20
REQUIRED TOTAL LAND (IN ACRES)	92.2	2.3	2.3	4.6
LAND AREA INCREASE (IN ACRES)	----			
RESIDENTIAL ACRES	38.7	1.0	1.0	2.0
COMMERCIAL ACRES	3.2	0.3	0.3	0.6
INDUSTRIAL ACRES	4.0	0.5	0.5	1.0
PUBLIC/QUASI PUBLIC ACRES	11.3	0.5	0.5	1.0
PUBLIC RIGHT-OF-WAY	35.0			

FUTURE LAND USE

To accommodate growth, the future land use plan will address both the fringe and established developed areas of the community. It is unlikely that much of the established developed areas of the City will experience major changes during the planning period. However, redevelopment efforts that improve upon the existing land uses in the older, established areas of the City are encouraged. These efforts may come in the form of rehabilitating existing structures through modernization or from the demolition, removal, and replacement of obsolete structures. It should be stressed that all redevelopment efforts within established areas of the community comply with existing adjacent land uses and/or recommendations of the Planning and Zoning Commission. Since large-scale redevelopment efforts are not expected, many recommendations of the future land use plan will primarily concentrate on the infill areas within the primary development area of the community and those suitable areas adjacent to existing development.

In selecting potential sites for future development, goals and objectives relating to general land use, residential land use, transportation and public utilities were considered. Locational factors used in determining these sites considered issues of compatible adjacent land uses, traffic access and safety, and public utilities topics such as topography and drainage, existing infrastructure and cost efficiency.

Although Carthage is not land locked, there is a limited amount of land available in which the City can be expected to grow. These natural terrain and infrastructural restraints will impact the limited development areas.

Carthage's future land use development is classified into five future land use categories. These include residential, commercial, industrial, public/quasi-public, and open space/agricultural. The Future Land Use Maps identify areas within and outside the community for future development of each land use classification.

Residential

Similar to existing residential areas, the main goal when developing areas for future residential use is to create an area, which provides a strong, cohesive environment that does not intrude upon or mix with industrial or commercial uses. To maintain the lowest public expenditures necessary for developing future residential areas, it is prudent to incorporate relevant school, street, park, and general utility development plans.

As previously stated, the category of multiple-family exists within the Residential Land Use classification. The multiple-family use classification provides areas within the community for medium to high-density neighborhood development. Housing types in the multiple-family use classification would include duplexes, townhouses, condominiums and apartments. Type I manufactured homes on permanent foundations, duplexes and similar multiple units may be placed in most neighborhoods with single family residences since the overall appearance and density of the neighborhood is neither effected nor exceeded. Type II manufactured homes and manufactured home parks will be handled on a case-by-case basis.

Recommendations:

Based upon the previously mentioned locational factors and land use planning policies, it is expected that the following areas be recommended sites suitable for residential land use development within and along the fringes of the corporate limits.

- Presently the City of Carthage feels that it has the existing water and sanitary sewer capacity to accommodate infill residential development. Presently, there are approximately twenty (20) platted lots (with minimum width of fifty (50) feet) with access to water and sanitary sewer, which could be used, for residential development. Even if developers utilized two lots for development, the aforementioned lots will provide an adequate supply of development land through the year 2012 for residential purposes (approximately 10 single-family homes). Also, there are platted and unplatted lots, which could be developed after either water or sanitary sewer extensions, are constructed. If and when the need becomes apparent, the Planning and Zoning Commission has identified several other areas for future residential development. They include:
 - The area adjacent to Buell Street south of County Highway 2;
 - The area south of Dakota Street; and

➤ The area east of Ryther Street.

- Since many of the areas listed above are currently in an open space/agricultural land status, the acquisition of right-of-way and the construction of streets, water, and sanitary sewer services will need to be completed prior to future development. It is recommended that these areas be developed in a pattern that discourages haphazard development. Emphasis should be placed on areas that would require the least amount of public expenditure and avoid leapfrog development
- The Future Land Use Map provides for areas for general residential development. Type I and Type II manufactured homes, manufactured home parks/subdivisions and multiple family projects may be appropriate in various identified future residential land use areas. However, those types of developments will be handled on a case-by-case basis. The Planning and Zoning Commission have identified the following areas as being the most appropriate for the above listed types of residential development.

Commercial and Industrial

Locational factors to consider when planning for commercial and industrial land use development include compatible adjacent land uses, existing infrastructure, topography/drainage, traffic (congestion, access, parking, safety), and in addition - type of commercial/industrial activity.

A well conceived land use policy should consider the development of land use areas designated for various types of industrial usage. Today's commercial and industrial ventures need areas which will afford opportunities for expansion and the provision of quality municipal services.

Recommendations:

These factors were applied to areas within the community. Based upon the above criteria the following areas were selected as sites, which could possibly be designated for future commercial and/or industrial land, use development.

- It is the City of Carthage's intention to preserve the existing business district of the community. Presently there are over twenty-five (25) lots on Main Street available for future commercial uses. Regarding commercial ventures that would require more land than would be available in the existing central business district, there are locations adjacent to Miner County Highway 2, 425th Avenue and Ryther Street that could provide sufficient space for highway commercial development.
- Regarding industrial sites, the City recommends the following land areas may be suitable for either heavier commercial/light industrial uses or heavier industrial uses only after review.

- The area adjacent to County Highway 2 and east of Station Street; and
- The area north of County Highway 2 and between 425th Avenue and Station Street.
- The City Planning and Zoning Commission further recommends that the following occur when developing commercial and industrial sites:
 - Prior to construction, each development project should be subject to a specific site design, review and approval process. This should ensure that the development would have an attractive and uniform architectural design. The arrangement of the on-site buildings should provide for efficient and viable long-term usage. Further, appropriately locating and designing the development's service areas should discourage disruption to on-site circulation or adjacent land use.
 - Vehicular access to highway commercial and industrial areas should be sufficiently set back from intersecting streets with appropriate sight distance maintained at all entry points. Also, to enhance vehicular traffic flow on adjacent streets, strict controls affecting the number and location of accesses to the highway commercial and industrial areas should be established.

Public/Quasi-Public

Presently, the only indicated need of additional designated lands for utility and public/quasi-public uses in the short term include the following:

- The area north of Main Street and west of Buell Street – This area is being addressed for a future fire hall.
- It is also recommended that in future developments, adequate amounts of land should be set aside for public parks.

Open Space

Open space is a desired amenity of the urban environment. Circumstances and conditions under which open space areas should be set aside relate largely to a community's commitment for improving the visual appearance of the City. As a minimum, wetlands, floodway and land areas with 20 percent grade or greater should be protected from extensive urban development, if possible. In addition, there are other areas within and around the community that have a scenic value that enhances the quality of life. These areas should be identified and protected whenever possible. Further, roadway and utility improvements, as well as buildings and signage should be controlled so that they are sensitive to adjacent scenic areas. With appropriate planning and coordination of adjacent development projects, a system of interconnected belts of permanent open space can be created to provide a haven for wildlife, enhance community views and vistas or simply provide a pleasant contrast to the urban scene.

Agricultural

Land areas not expected to be developed within the ten to fifteen-year planning period have been designated as agricultural in the future land use plan. No attempt has been made to project which, if any, of these areas should be permanently maintained for agricultural purposes. The implementation of this plan through zoning and subdivision regulations will help minimize the disturbance of agricultural land and promote a smooth transition to other uses.

Recommendations:

- Multi-lot subdivisions should be limited in the rural area. To achieve this policy objective, the Comprehensive Land Use Plan proposes that agricultural zoning be maintained on all rural land, presently not developed, within the planning jurisdiction.
- The planned orderly development, settlement, and expansion of land areas should be coordinated through accurate ordinances and regulations.

EXTRATERRITORIAL JURISDICTION

Since the future land use plan projects land use designations outside the existing corporate limits, the topic of extra territorial jurisdiction needs to be addressed. State law provides several approaches for cities and counties to jointly deal with future land use. A formal joint jurisdictional agreement between the City and County may be implemented. However, this may add an additional level of bureaucracy to the process. Another approach is to have effective communication between the governing bodies. Coordination with Miner County will be essential if the goals and objectives, and recommendations within this plan are to be realized. Without a coordinated approach, efforts by the City to control scattered development could simply push the problem out beyond the extraterritorial jurisdiction. A high priority should, therefore, be placed on resolving any policy conflicts that might exist between the City and the County.

It should be noted that with the development of the major street plan, all new plats within the planning area are required by SDCL 11-3-6 to be presented to the Carthage Planning and Zoning Commission and City Council, in addition to the County Commission, prior to approval.

Recommendations:

- It is recommended that the lines of communication between the City and County Planning and Zoning Commissions be kept open. This can be accomplished with the use of liaisons on each board.