

Northwest Cheyenne

INFRASTRUCTURE AND DEVELOPMENT PLAN

February 1999

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I. Introduction

A. Background and Purpose

The purpose of this document is to develop a vision, land use, and transportation plan for Northwest Cheyenne as part of a 10-year action plan. The purpose of the action plan is to recommend a strategy to improve identified problems and create the desired climate for development of the study area.

B. Planning Process

The Cheyenne Area Transportation Planning Process (ChATPP) retained the planning firm of Balloffet and Associates Inc. to prepare the plan. The process involved (1) preparing a vision of what Northwest Cheyenne should be in the future, (2) identifying issues and opportunities, (3) determining what types of land uses are desirable, (4) determining the infrastructure needs and capabilities of the study area, and (5) identifying specific projects and actions that are needed to provide a high quality of life for existing and future residents of the area.

The involvement of citizens in the planning process was an important part of developing the plan. A Steering Committee with representation from both the City and County sections of the study area met seven times with members of the consulting team and ChATTP staff. In addition to the involvement of the Steering Committee, two public meetings were held in the study area during preparation of the Plan.

II. Existing Conditions and Trends Inventory and Analysis

This chapter provides a brief summary of the factors affecting development in the Northwest Cheyenne Study Area (study area). These factors include jurisdictional boundaries, existing and planned land use, zoning, infrastructure and services, transportation facilities, economic and demographic condition, and existing plans and policies.

A. Existing Plans and Policy Review

A review of existing and in-progress plans and policies, which address all or part of the study area, was completed during the initial phase of the Plan. As part of each review, the analysis included a plan description and its relevance to the Northwest Cheyenne Infrastructure and Development Plan. The existing plans and policy review are included in Appendix A.

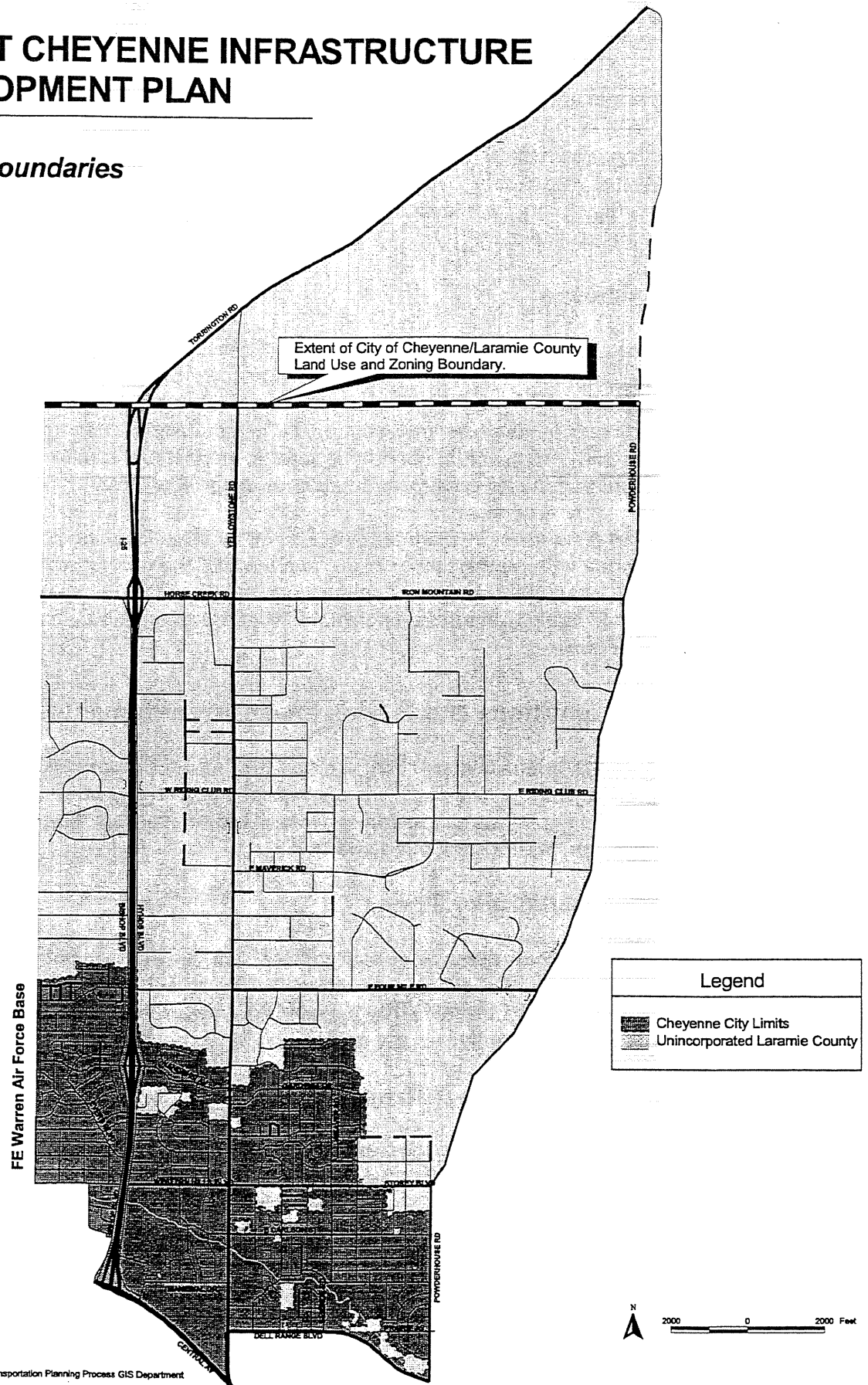
B. Political and Ownership Patterns

The study area is located within Laramie County, Wyoming, and encompasses approximately 14.7 square miles (9,409 acres). Unincorporated Laramie County comprises the majority of the study area with approximately 7809 acres (83 percent of the study area). The City of Cheyenne encompasses the remaining 1601 acres in the southern portion of this area (17 percent of the study area). The current City Limits are located on Map 2-1.

The City of Cheyenne and Laramie County share a common jurisdictional boundary for zoning and future land uses. This boundary is located one mile north of Iron Mountain Road. Therefore, all

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Map 2-1
Jurisdictional Boundaries



properties in the study area south of this boundary are assigned a zoning district and future land use classification. This Cheyenne Area Planning Boundary encompasses approximately 7,761 acres (82.5 percent of the study area). The remaining 17.5 percent of the area is located outside of the planning boundary, and Laramie County does not designate land uses and zoning outside of urban areas.

In general, the provision of most community services, such as water, sewer, and electricity, is contingent on whether the area is located within the City of Cheyenne. For example, water and sewer service area boundaries are generally located within Cheyenne City limits, while areas located in unincorporated Laramie County or enclaves do not receive sewer and water service. The fragmentation of city and county lands in the southern portion of the study area has led to problems in the provision of community services.

C. Existing and Planned Land Use

1. Existing Land Use

Existing land uses are illustrated on Map 2-2 and were determined by analyzing Cheyenne and Laramie County land use, subdivision, and address data, which was modified by examining 1994 aerial photography (provided by ChATPP). Table 2-1, Existing Land Uses, provides a summary of the amount of each land use in the study area.

Cheyenne City limits establish a clear boundary in the study area between the variety of land uses and densities found within the City and the lower density residential and agricultural uses located in unincorporated Laramie County. Since more than 80 percent of the study area is unincorporated, very low-density residential, low-density residential, and agriculture land uses dominate the area. Very low-density residential uses (one dwelling unit per 5 acres or more) total more than 814 acres (8.7 percent of the study area). Low density residential uses (lots between 4 units per acre and less than 5 acres) make up nearly 1597 acres in the study area (17.0 percent). The area extending from Cheyenne City limits to Iron Mountain Road consists primarily of very low density and low-density subdivisions and large vacant/agricultural lands. A few homes are located north of Iron Mountain Road, but a majority of this area (3750 acres, or 39.9 percent of the study area) is dedicated for agricultural uses.

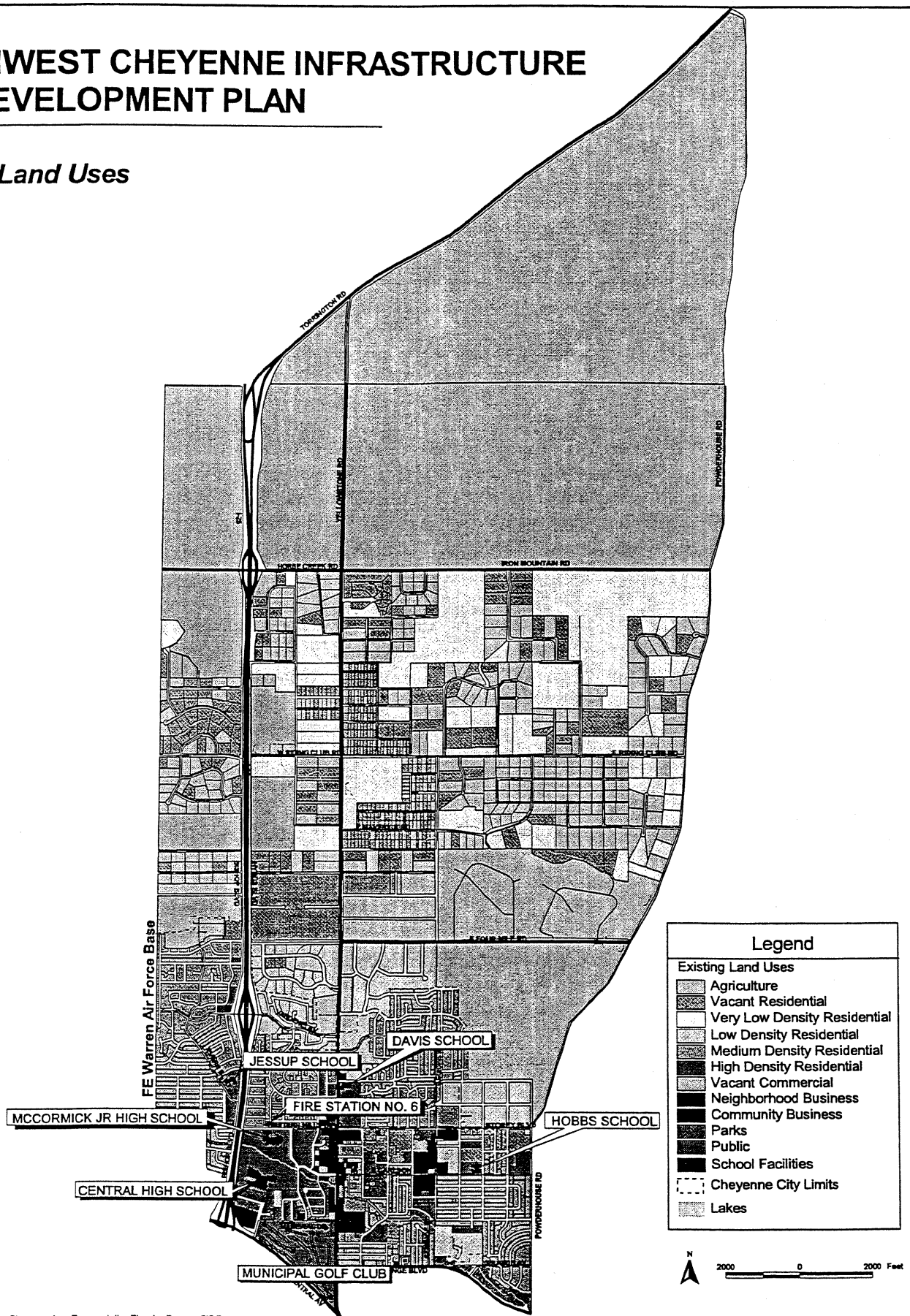
Medium density residential uses are the primary land use in the study area within the City limits, encompassing 695.7 acres (7.4 percent of the study area). High-density residential developments are located primarily south of Western Hills/Storey Boulevard, in proximity to Yellowstone Road. In all, high-density residential developments total 104 acres (1.1 percent).

Although residential uses occupy most of the area, significant portions of the Dell Range/Yellowstone commercial corridor are located in the southern end of the study area. More specifically, community commercial uses make up 71 acres in the study area and are located primarily along Yellowstone Road and at the intersection of Weaver Road and E. Carlson Street. The only neighborhood commercial development consists of convenience stores located at the northwest and northeast corners of the I-25 and Vandehei Avenue Interchange.

Important public uses are also located in the study area. The City Municipal Golf Course occupies the southwestern portion of the study area and totals more than 71 acres. Just north of the golf

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Map 2-2 Existing Land Uses



course is the large 68-acre school district property that houses Central High School and McCormick Junior High School. Jessup, Davis, and Hobbs Elementary Schools are also located in the study area. Fire Station Number 6 is located along Western Hills Avenue between Hynds Boulevard and Yellowstone Road. In all, more than 169 acres (1.8 percent) of public uses are located within the study area. Several parks, including Smalley Park, are located along the flood hazard in the southern portion of the study area. Existing parks total approximately 29 acres in the study. It should be noted that the planned Western Hills Neighborhood Park will be located at the northwest corner of Brittany Drive and Bishop Boulevard.

Table 2-1, Existing Land Use		
Existing Land Use	Area (acres)	Percent of Total Study Area
Community Business	71	0.8
Neighborhood Business	1	0.01
Very Low Density Residential (5 acre lots or greater)	814	8.7
Low Density Residential (Lots between 4 units per acre and less than 5 acres)	1597	17.0
Medium Density Residential (4 to 8 units per acres)	696	7.4
High Density Residential (More than 8 units per acre)	104	1.1
Park	29	0.3
Public (schools, other)	169	1.8
Right-Of-Way	1493	15.9
Total Developed	4975	52.8
Agriculture/Open Lands	3750	39.9
Vacant Commercial	20	0.2
Vacant Residential	664	7.1
Total Undeveloped	4434	47.2
Total Land Use	9409	100

2. Existing Zoning

The Cheyenne and Laramie County Zoning Ordinance, 1998 assigns zoning districts for all development within the City of Cheyenne and a portion of Laramie County. Zoning districts cover more than 82.5 percent of the study area. These zoning classifications are displayed on Map 2-3, and the total land area of each zoning district and its percentage in relation to the study area are presented in Table 2-2. In general, higher intensity, urban zoning districts are located within the City, while low intensity, rural zoning districts are located in unincorporated Laramie County. The Agricultural and Rural Estate, Agricultural Residential, and Agricultural Districts each make up more than percent 20 of the study area. The Agricultural District (A-2) occupies all of the zoned area north of Iron Mountain Road and a large area at the southeast corner of the study area. This district comprises approximately 1951 acres, or 20.7 percent, of the study area. This district is intended for agricultural uses and single-family residential lots 20 acres or larger. The Agricultural and Rural Estate District (A-1) comprises approximately 1902 acres of the study area (20.2 percent) and allows for all agriculture uses and single-family residential lots five acres or larger. However, smaller lots or tracts platted and recorded with the County Clerk prior to May 5, 1989 may be developed upon if adequate water and sewer services are provided. The Agricultural Residential District (AR) is located south of Iron Mountain Road and is generally located along I-25, Yellowstone Road, and portions of Riding Club Road and covers approximately 2089 acres (22.2 percent of the study area). This district has the same residential requirements as the A-1 district; however, agricultural uses are limited and only accessory agricultural uses are permitted.

Low-density residential districts are the predominant zoning districts within the City. The Low Density Residential - Established District (LR-1) is intended for areas established with primarily low density residential uses and accounts for 466 acres (5 percent), and the Low Density Residential - Developing District (LR-2) occupies 359 acres (3.8 percent). Both low-density residential districts require a minimum single-family lot size of 9,000 square feet. The Medium Density Residential - Established District (M-1) has a minimum lot size of 7,000 square feet for single-family development, while the Medium Density - Developing District (M-2) requires a minimum of 6,000 square feet per unit. The M-1 and M-2 districts cover 289 acres (3.1 percent) and 184 acres (2.0 percent), respectively. High Density Residential - Established Districts are in a number of areas south of Storey Boulevard and make up approximately 44 acres (0.6 percent). This district allows for single-family residential developments at a minimum of 5,000 square feet per unit (8 units per acre) as a use by right. In addition, townhomes and duplexes are uses requiring administrative approval and have a minimum lot area of 2,500 square feet per unit (approximately 17 units per acre). Multi-family uses require Board approval and can be developed at a 1,600 square feet per unit minimum (approximately 27 units per acre).

The Mixed-Use with Residential Emphasis District (MUR) is primarily intended for medium density residential developments and, to a lesser degree, commercial uses. The study area contains 41 acres (0.4 percent) of the MUR district. The Mixed Use with Business Emphasis Districts (MUB) are found in areas that are in the process of evolving into a mix of commercial and residential uses, where the dominant use is changing to business. MUB districts occupy 6.7 acres in the study area (0.7 percent). Mixed-use districts tend to be located in the City and east of I-25. The one exception located in the County is an 18-acre MUR area situated north of East Four Mile Road.

The majority of the business districts are located within Cheyenne along Yellowstone Road, Storey Boulevard, and at the intersections of Central Avenue and I-25 and Vandehei Avenue and I-25.

However, a few Community Business Districts (CB) are found in unincorporated Laramie County. These rural CB Districts are located east of Yellowstone Road between East Four Mile Road and Iron Mountain Road, and none have been developed for commercial uses.

Table 2-2, Zoning		
Zoning	Area (acres)	Percent of Total Study Area*
A-1 (Agricultural and Rural Residential)	1902	20.2
A-2 (Agricultural)	1951	20.7
AR (Agricultural Residential)	2089	22.2
AD (Airport District)	1	0.0
CB (Community Business)	106	1.1
LR-1 (Low Density Residential - Established)	466	5.0
LR-2 (Low Density Residential - Developing)	359	3.8
MR-1 (Medium Density Residential - Established)	289	3.1
MR-2 (Medium Density Residential - Developing)	184	2.0
HR-1 (High Density Residential - Established)	44	0.5
MUR (Mixed Use with Residential Emphasis)	41	0.4
MUB (Mixed Use with Business Emphasis)	67	0.7
NB (Neighborhood Business)	15	0.2
P (Public)	235	2.4
PUD (Planned Unit Development)	16	0.2
Total Cheyenne Planning Area (Defined Zoning)	7764	82.5
Total Undefined Zoning*	1645	17.5
Total Zoning	9409	100

Source: City of Cheyenne GIS Department

*The remaining 17.5 percent of the area is located outside of the planning boundary, and Laramie County does not designate zoning outside of urban areas.

More than 106 acres (1.1 percent) of the Community Business District are located in study area. Community business areas include retail uses that serve several neighborhoods. The Neighborhood Business District (NB) is intended for neighborhood business and offices. The few Neighborhood Business Districts total approximately 15 acres (0.2 percent of the study area), and are located along Yellowstone Road between Storey Boulevard and East Four Mile Road, and at the northwest corner of the I-25 and Vandehei Avenue Interchange.

The public zoning district occupies a significant portion of the study area within the City and includes the Municipal Golf Course, the large school district property, elementary schools, and several parks in the area. This district occupies approximately 235 acres (2.4 percent of the study area).

3. Planned Land Use

The 1991 Cheyenne Area Development Plan (Plan) is the current comprehensive land use document for the Cheyenne Development Area. Thus, it sets out a community vision, analyzes economic and community conditions, establishes goals and policies which will assist in reaching this vision, and outlines an implementation strategy to realize these goals and policy. The planning horizon for the Plan was ten years. The primary focus of the Plan was to ensure that future land uses are linked with future roadways.

Future land uses are located on Map 2-4. Similar to the zoning classifications displayed on Map 2-2, the higher intensity, urban land uses are located within the City, while low intensity, residential uses are located north of the City in unincorporated Laramie County. The Plan has several policies that are related to the study area. The Plan calls for the intensification of the Dell Range/Yellowstone commercial corridor area, particularly along Yellowstone Road and Storey Boulevard in the study area. Low-density residential areas are called for north of the Cheyenne City limits and extend primarily to Iron Mountain Road. Agricultural uses are called for north of Iron Mountain Road.

D. Infrastructure and Services

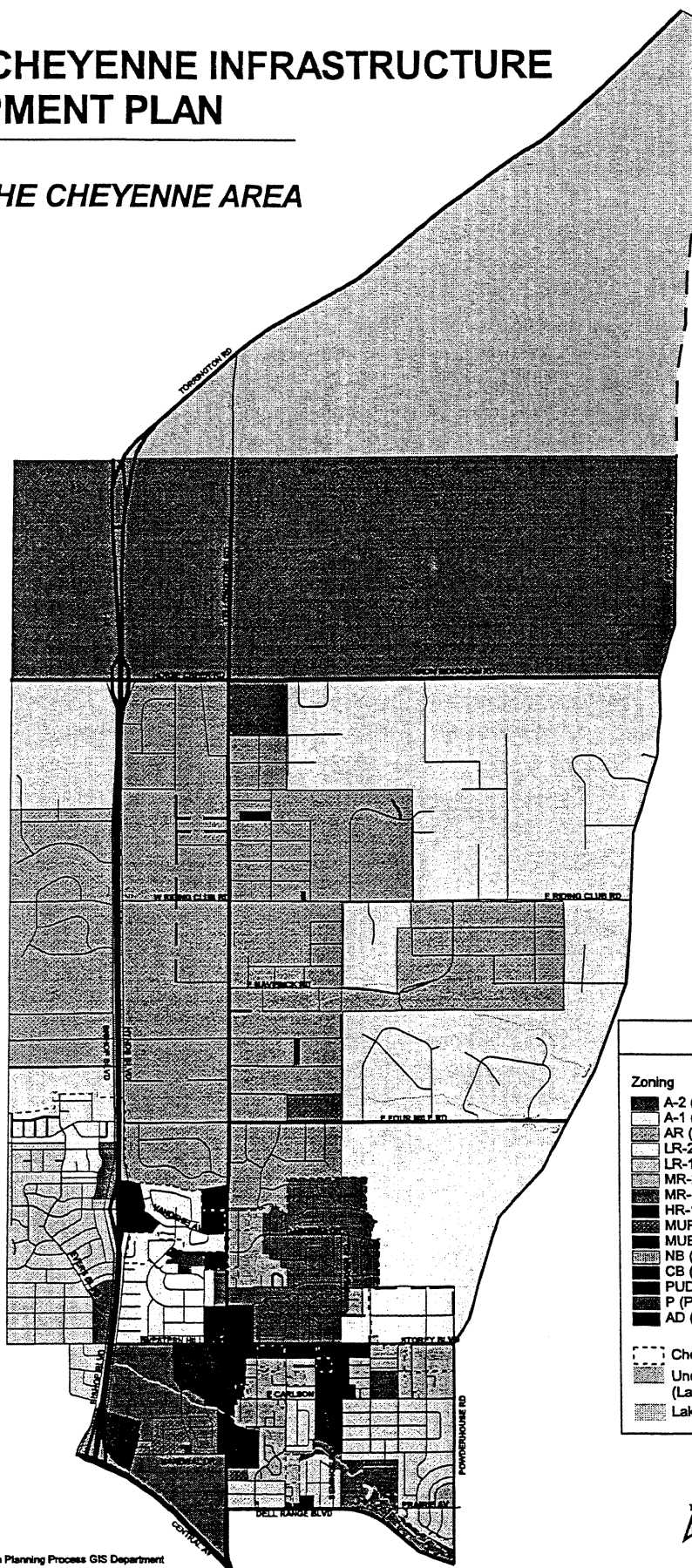
1. Water Utilities

The Cheyenne Municipal Water System is operated through the Board of Public Utilities (BPU) which services the City of Cheyenne, F.E. Warren Air Force Base, and the South Cheyenne Water and Sanitation District. The BPU service area and water line information for the study area is shown on Map 2-5. The majority of this study area is outside the city limits and is not served by the BPU. These areas in North Cheyenne use individual wells for drinking water and irrigation purposes.

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Map 2-3 ZONING WITHIN THE CHEYENNE AREA

FE Warren Air Force Base



Legend

Zoning

- A-2 (Agriculture)
- A-1 (Agriculture and Rural Estate)
- AR (Agriculture Residential)
- LR-2 (Low Density Res. Developing)
- LR-1 (Low Density Res. Established)
- MR-2 (Medium Density Res. Developing)
- MR-1 (Medium Density Res. Established)
- HR-1 (High Density Res. Established)
- MUR (Mixed Use Residential Emphasis)
- MUB (Mixed Use With Business Emphasis)
- NB (Neighborhood Business)
- CB (Community Business)
- PUD (Planned Unit Development)
- P (Public)
- AD (Airport District)

- Cheyenne City Limits
- Undefined Zoning (Laramie County)
- Lakes



2000 0 2000 Feet

2. Water Supply

The report Cheyenne Water Supply Master Plan, prepared by Black and Veatch in July 1994 for the Wyoming Water Development Commission and the Cheyenne Board of Public Utilities, addresses the future water supply needs of the current BPU service area and the unincorporated area north of the city limits. This master plan states that the major impediments to providing water service to this unincorporated area are: financing of the improvements, including a local distribution system, and the establishing a local entity to "champion" the project. The BPU has started to implement some of the objectives stated in the master plan. The most recent improvement to the water supply system in the BPU service area is the addition of raw water supply for irrigation. Users of the raw water include Cheyenne Country Club, F.E. Warren Air Force Base, Airport Golf Course, and Lions Park in the Northwest Parks Complex. The use of raw water in these areas reduces potable water demands for irrigation. This water conservation measure was a necessity for the City of Cheyenne, since its oldest water treatment plant, the Round Top Water Treatment Plant, will be retired in the year 2001. This plant currently provides 8 million gallons per day (mgd).

3. Groundwater Issues

The groundwater resource in this area is the Tertiary aquifer, which consists of the Ogallala, the Arikaree, and the White River Formations. The average depth to the water table is 100 feet. Groundwater level changes in Northwest Cheyenne have been documented by the State Engineer's Office and are greatest in the portion of the study area located north of the city limits to Iron Mountain Road. The decline in water levels in this area has been in the 20-30 foot range. Concern over declining water levels and future residential growth prompted the study entitled North Cheyenne Master Plan. States West Water Resources Corporation prepared this study in July 1993 for the Wyoming Water Development Commission. This master plan was intended to be used as a guide for future development and improvement alternatives for the residents of North Cheyenne. The study area for the North Cheyenne Master Plan is bordered by Dell Range Blvd., F.E. Warren Air Force Base, and Iron Mountain Road and extends east to Section 1 of Township 14 N Range 66 West.

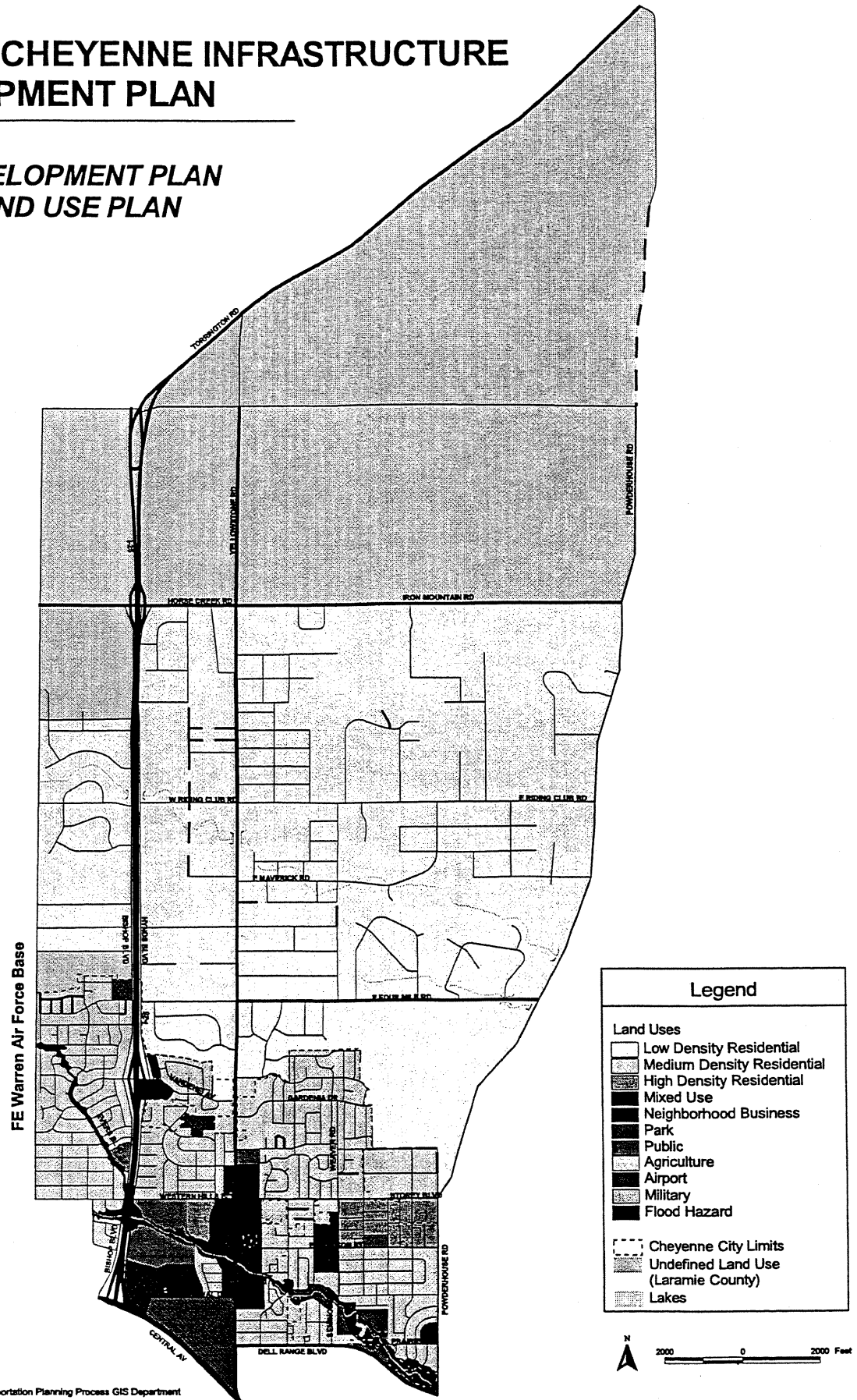
Other problems addressed by the master plan include: possible degradation of the quality of water due to the infiltration of septic tank effluent into the water table, and the deterioration of existing wells. A deteriorating well does not adversely affect the water supply, but will cause a decreased yield which could be mistaken for a declining water table.

This master plan indicated there would be problems with groundwater levels and quality in North Cheyenne if the number of wells and septic tanks continued to increase according to expected projections. The plan projections included lot sizes that were as small as 2-1/2 acres; at the time the plan was developed, the minimum lot size for obtaining a septic permit was one acre.

Currently, the minimum lot size for permitting a septic system is five acres. Thus, the numbers estimated by the master plan for future wells and septic systems may be conservative. Developments in the Agricultural Residential Zoning District, which normally require a minimum lot size of five acres, may be reduced to ½ acre, if they are connected to an approved community or public water and sewer system. Similarly, developments in the Agricultural and Rural Residential Zoning District require a minimum lot size of five acres, except that a lot or tract platted

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Map 2-4 CHEYENNE DEVELOPMENT PLAN 1993 FUTURE LAND USE PLAN

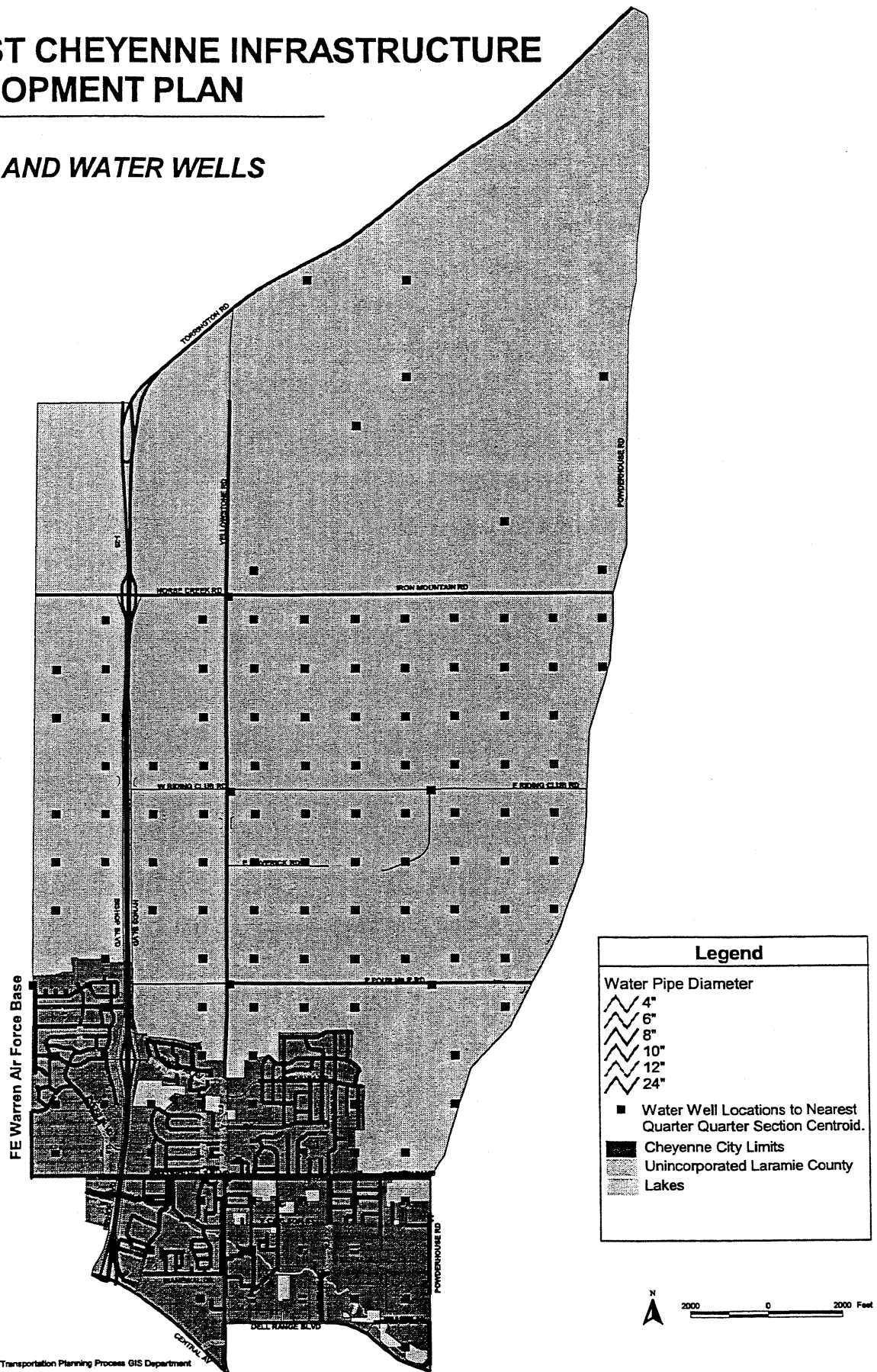


prepared by
BALLOFFET
& Associates, Inc.

Sources: Cheyenne Area Transportation Planning Process GIS Department

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Map 2-5 WATER LINES AND WATER WELLS



and recorded with the Laramie County Clerk prior to May 5, 1987 may be used as a building site if adequate provisions can be made for water and sewer. If both public water and sewer systems are not provided to these areas, which comprise the majority of the study area, the lot sizes will be limited to five acres or larger. From the State Engineer's perspective, decreasing water levels in the area is not an immediate problem, with this limitation on minimum lot size in North Cheyenne. At this time, the groundwater supply has not reached a critical state with regard to demand or water quality (Source: Wyoming Water Development Commission, March 1998). Developments requiring on-site water supply and wastewater treatment will continue to be evaluated and approved on a case-by-case basis. According to the master plan, if groundwater supply and quality become a problem for the residents of North Cheyenne, BPU would provide cost-effective service.

4. Sanitary Sewer

The sanitary sewer collection system and wastewater treatment plants are under the jurisdiction of the Cheyenne BPU. The existing sewer lines in the Study Area are located on Map 2-6. The majority of the study area is outside of the sewerable boundary of the BPU, similar to the case of water supply. The sewerable boundary is based on elevation: on the north side of the boundary, flow is to the north, or away from the sewage treatment plants, while flow inside the boundary is south toward the treatment plants. Gravity sewer lines cannot serve any areas outside the boundary. Those not serviced by the BPU are on individual septic tank/leach field systems. According to the BPU Wastewater Treatment and Collection Systems Master Plan (June 1995), the estimated unsewered population is 4,500 people.

There are two wastewater treatment plants serving the BPU sewerable area – Crow Creek WWTP and Dry Creek WWTP. The Crow Creek WWTP is currently running at capacity at 4 mgd and the Dry Creek WWTP is nearing its capacity of 7 mgd. The BPU is currently planning the construction of an additional treatment train at the Dry Creek WWTP to accommodate increased wastewater flows. The planned expansion will alleviate peak capacity problems due to increased development within the Dry Creek basin, but is not intended for increasing the BPU service area. The Wastewater Treatment and Collection Systems Master Plan recommended the construction of a separate treatment facility in North Cheyenne at Child's Draw. The most cost-effective treatment facility would be an aerated lagoon or a constructed wetland treatment system. Either system would require a detailed study of the impacts of effluent discharge on Child's Draw since this would be the receiving stream. This recommendation is contingent on whether Child's Draw is a suitable receiving stream. As in the case of water supply, a public sewer system for North Cheyenne is cost prohibitive. The population density of this area doesn't allow for a cost-effective public collection and treatment system, and the cost per resident would be extremely high. As long as Laramie County allows for septic system use in the area, septic systems will continue to be the chosen means of waste treatment in North Cheyenne.

There are residences within the city limits that still have septic systems. However, current regulations do not permit construction of new septic systems within the city limits. If an existing septic system fails, the owner will be required to connect to city sewer service.

5. Water and Sewer Systems in Subdivisions

Recent legislation addresses proposed water and sewer systems in subdivisions. The amendment relates to the state subdivision application process. Subdivision Statute W.S. 18-5-306 Amendment

requires an evaluation of whether any proposed drinking water system is dependable and has sufficient quality and quantity. The Subdivision Statute also requires an evaluation of whether a proposed wastewater system is adequately designed. In addition, it requires confirmation that the new system will not adversely impact the use of the aquifer for disposal downgrading or the use of the aquifer within the subdivisions (Source: Wyoming Department of Environmental Quality - Water Quality Division).

6. Drainage

Existing Storm Sewer lines in the study area are shown on Map 2-7. Also indicated on the map are the 100- and 500-year flood hazard areas. The two drainage basins in the study area are Child's Draw and Dry Creek. Child's Draw is a stream with infrequent flow, flowing in a southeasterly direction, with small tributaries joining it in the study area. Dry Creek has a drainage area of 14.6 square miles and the main stem flows for approximately 9 miles in a southeasterly direction. The City of Cheyenne has adopted a Drainage Master Plan for Dry Creek as of November 1988. The master plan shows the drainage basin and presents potential flood problem areas within the Dry Creek Basin. A series of storm sewer pipes, open channels, and culverts serve the urban areas within the Dry Creek basin. A drainage study was completed in 1993 by the USGS and prepared for Laramie County for the Child's Draw stream. This study states that urbanization of the North Cheyenne area has altered hydrologic conditions and flow paths in the Child's Draw basin. The changes in conditions are attributed to home and road construction that has increased runoff due to soil compaction and from impervious surfaces. The re-routing of natural flow paths at foundations, driveways, road embankments, and culverts have also occurred in the area. Any development in these rural areas would require an evaluation of the drainage impacts from construction, and any problems would have to be mitigated appropriately with culverts, ditches, and detention ponds.

E. Transportation Facilities

1. Transportation Network

The Northwest Cheyenne transportation network is depicted in Map 2-8. Interstate 25, Yellowstone Road, and Powderhouse Road are the primary north/south corridors in the study area. I-25 is a controlled access freeway serving a variety of trip types ranging from interstate travelers to regional commuters. Diamond interchange access/egress is available to the Northwest study area at Horse Creek Road, Vandehei Avenue, and Central Avenue. Hynds Boulevard and Bishop Boulevard are frontage road collectors running parallel to the freeway on the east and west, respectively. Yellowstone Road is a principal arterial ¼ mile east of I-25 that likely serves localized trips between area residences and business/retail outlets.

Primary arterial roads serving east/west travelers are Horse Creek Road, Four Mile Road, Dell Range Boulevard, and Central Avenue. Some of the minor arterial and collector roads such as Riding Club Road, Western Hills Boulevard, Storey Boulevard, and Vandehei Avenue, also serve east/west travel. I-25 is a barrier to east/west travel with crossings limited to interchange locations making Central, Vandehei, and Horse Creek the primary access points to western areas and F.E. Warren Air Force Base.

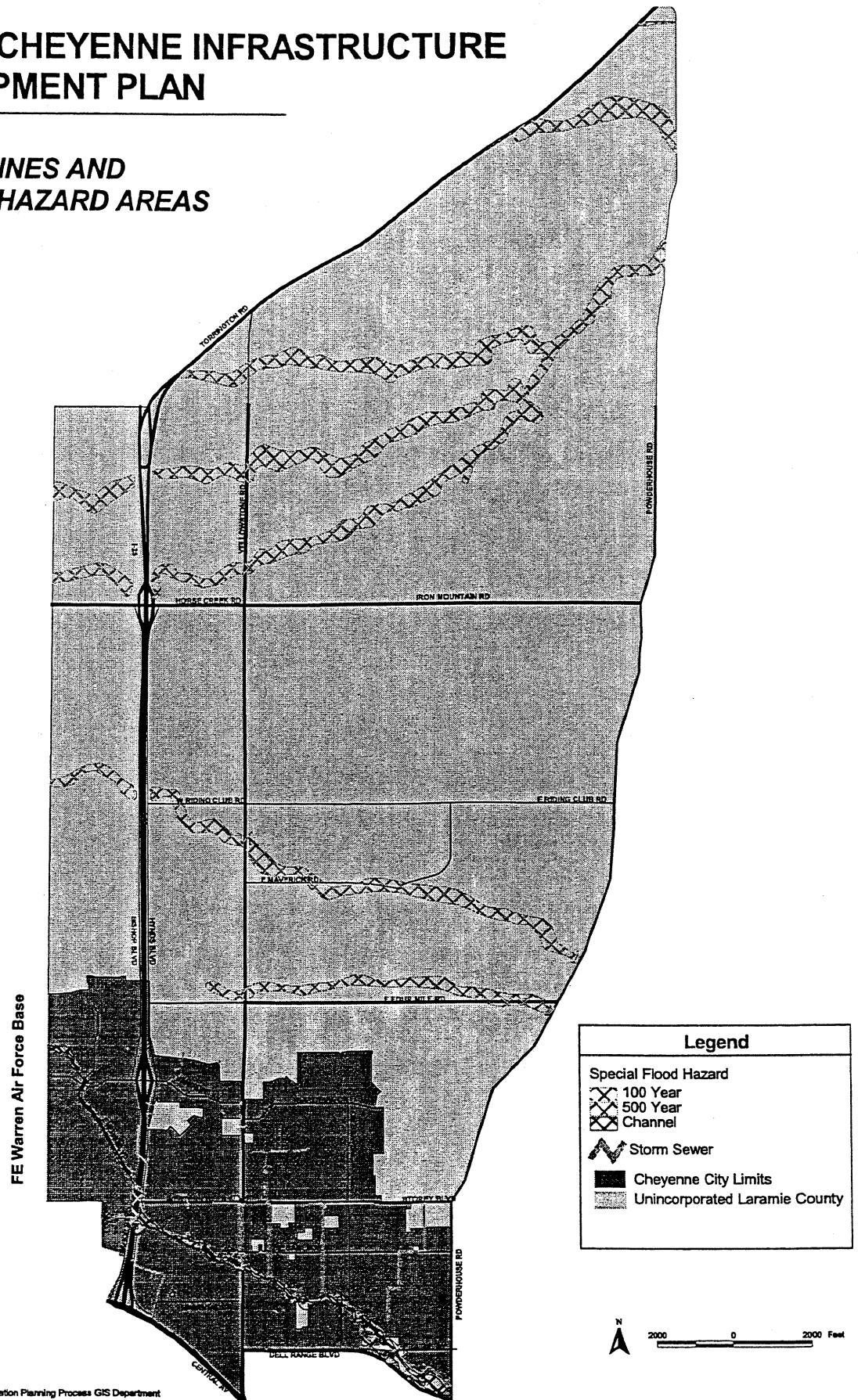
Map 2-6
SEWER LINES AND SEWERABLE AREA



Sources: Cheyenne Area Transportation Planning Process GIS Department

NORTHWEST CHEYENNE INFRASTRUCTURE AND DEVELOPMENT PLAN

Map 2-7 STORM SEWER LINES AND SPECIAL FLOOD HAZARD AREAS



2. Traffic Volumes

Map 2-9 depicts average daily traffic volumes experienced on northwest area roadways. Most roads in the northern portion of the study area carry fewer than 5,000 vehicles per day. Traveling southward toward downtown Cheyenne, traffic volumes generally increase to levels that can exceed 10,000 vehicles per day. In the southernmost portion of the study area, Dell Range Boulevard, Yellowstone Road, and Central Avenue experience the highest traffic levels (approximately 30,000 average daily vehicles) in the study area and experience traffic congestion regularly. In fact, Yellowstone Road, south of Dell Range, had the highest daily traffic count of 35,000 daily vehicles. People living in residential neighborhoods along Vandehei Avenue have expressed concerns about rising traffic volumes on this residential collector street. This increased traffic is likely a combined effect of increased military base activity, residential development in the Northwest study area, and limited east/west highway crossing points.

3. Traffic Accidents

The 1996 Annual Accident Report reports the highest number of accidents citywide (2010) for that year since WYDOT began tracking accidents in 1984. The report also points out that most accidents (1889 of 2010 total accidents) occur at intersections. In the Northwest study area, most accidents occur along Yellowstone Road; 25 accidents occurred at the intersection of Yellowstone and Central – the second highest number of accidents in the entire region. Other accident locations in the study area are Yellowstone and Dell Range (12 accidents), Dell Range and Prairie (9 accidents), Yellowstone and Carlson (7 accidents), and Yellowstone and Storey (4 accidents). It should be noted that these accident areas experience the highest average daily traffic volumes in relation to other study area facilities, which in part explains the higher incidence of accidents.

4. Transit

The Cheyenne Transit Program (CTP) is the transit provider that operates a five-route bus system that operates within city limits. This service is composed of circulator style routes serving each quadrant of the city. All routes converge in the downtown area so patrons can transfer between routes and access other areas. Buses operate from 6:30 a.m. to 6:30 p.m. under flexible schedules that allows the bus line to deviate from routes to offer “door to door” service.

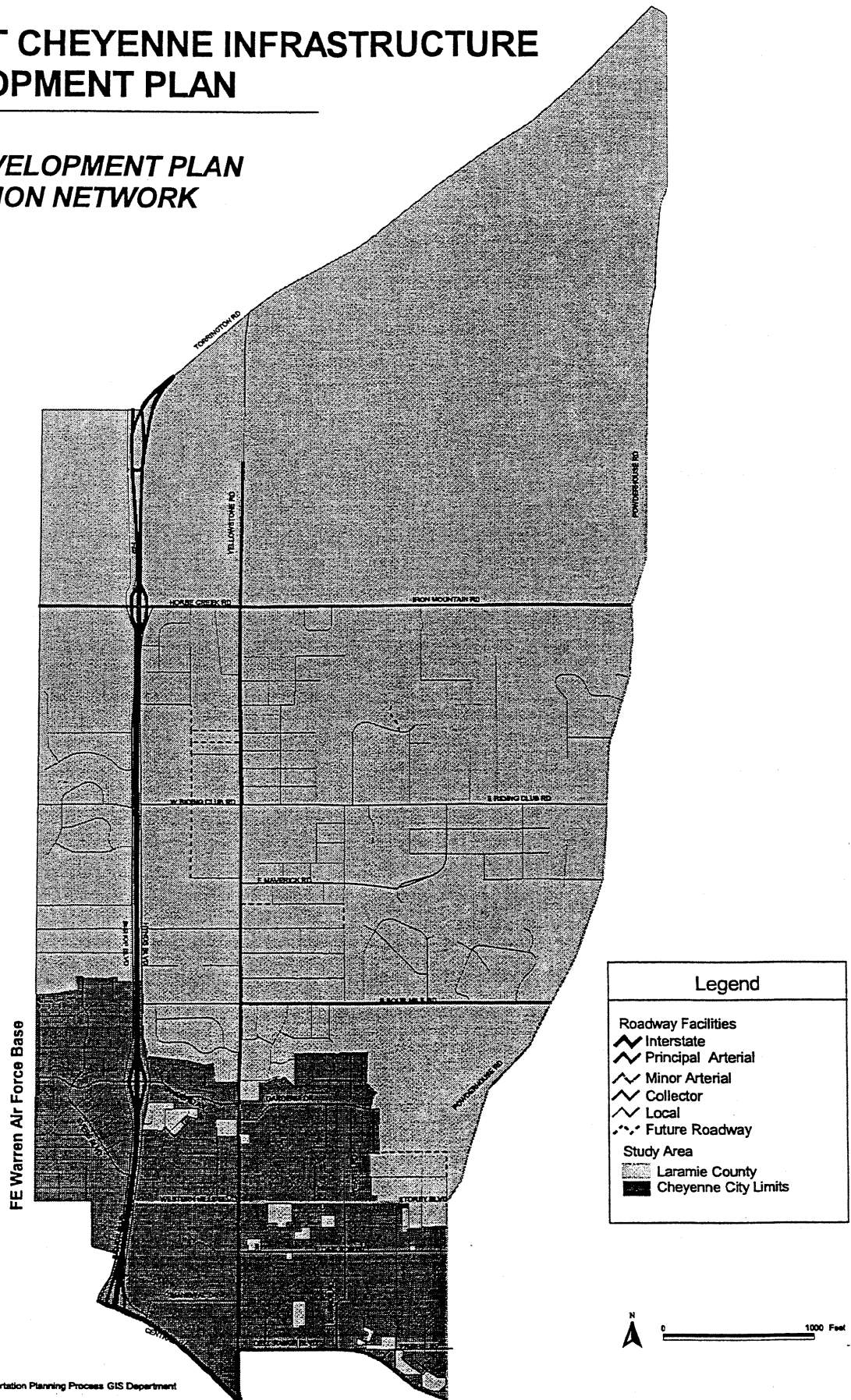
The Yellow Route provides service in the Northwest area using Dell Range, Powderhouse, Weaver, Storey, and Yellowstone as the primary travel corridors. Transfers between the Yellow and Green Routes can be made on Dell Range Boulevard, east of Powderhouse. Transfers to all other routes from the Yellow Route are available at various locations in the downtown area.

5. Transportation Improvements

Short- and long-term transportation improvements for Northwest Cheyenne are documented in the Transportation Improvement Program (1997 – 2000) and the Cheyenne Area Master Transportation Plan. In addition, three other documents – Innovative Finance Analysis, Transportation Improvements Programming Process, and 1997 Project List Update – provide recently updated lists of transportation projects.

NORTHWEST CHEYENNE INFRASTRUCTURE AND DEVELOPMENT PLAN

MAP 2-8 CHEYENNE DEVELOPMENT PLAN TRANSPORTATION NETWORK

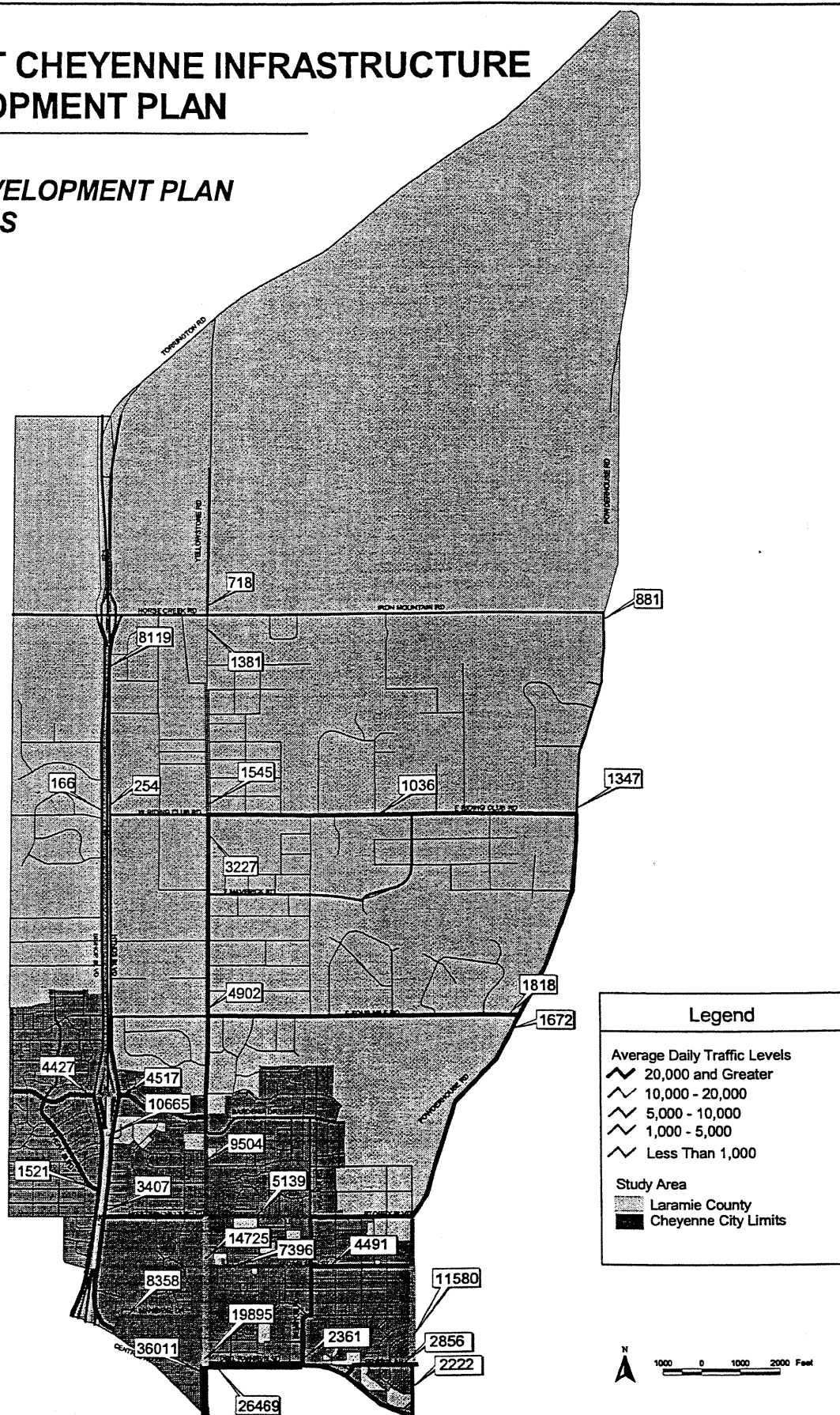


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BALLOFFET
& ASSOCIATES, INC.

Sources: Cheyenne Area Transportation Planning Process GIS Department

NORTHWEST CHEYENNE INFRASTRUCTURE AND DEVELOPMENT PLAN

MAP 2-9 CHEYENNE DEVELOPMENT PLAN TRAFFIC LEVELS



prepared by
BALLOFFET
& Associates, Inc.

Sources: Cheyenne Area Transportation Planning Process GIS Department

In the short-term, scheduled transportation improvements are limited to pavement overlays, chip seal, and miscellaneous concrete projects. There are no capacity improvement projects scheduled in the study area. Pavement overlays are scheduled for Montclair from Weaver to East End and Willshire Drive from Weaver to Gardina. The southern portion of Powderhouse Road from Dell Range to Storey is scheduled for chip seal improvement.

Long-term improvements are scheduled for Storey Boulevard, Yellowstone/Dell Range, and Powderhouse/Dell Range/Airport Parkway. High priority projects include the extension of Storey Boulevard between Sycamore and College with reconstruction of the Powderhouse/Storey Intersection, and an access management study of the Yellowstone/Dell Range area. Reconstruction of Prairie Avenue between Dell Range and Hoy is a medium priority project, and the Powderhouse/Airport Parkway underpass is identified as a low priority project.

F. Economic and Demographic Conditions

The study area is located entirely within the Cheyenne urbanized area, and the City and its urbanized area have experienced steady growth since the 1990 census. In 1990, the population for the City of Cheyenne was approximately 50,008. The most recent estimate of the City's population was conducted in 1997, and the estimated population for the City was 54,391 persons – an average annual increase of 1.21 percent since 1990. The estimated population for the Cheyenne urbanized area in 1990 was 66,719. The population for the whole urbanized area was estimated to be 73,233 persons in 1997 – an average annual increase of 1.34 percent since 1990.

Population growth within the Northwest Cheyenne study area has grown at a higher rate than the rest of the City. According to the same 1990 census data, the population for the study area was estimated to be 10,431 persons (see Map 2-10). By analyzing the transportation analysis zones (TAZs) developed by the City, the current estimated 1997 population for the study area was 13,651 persons – an average annual increase of 3.92 percent since 1990. Much of this growth has occurred in the very low density and low density subdivisions north of the City limits and south of Iron Mountain Road (see Map 2-11).

Employment has also increased steadily within the study area. In 1990, approximately 1,564 jobs were located in the study area (see Map 2-12). The estimated number of employees in the study area as projected by City 1997 TAZ data was 1,949 (see Map 2-13).

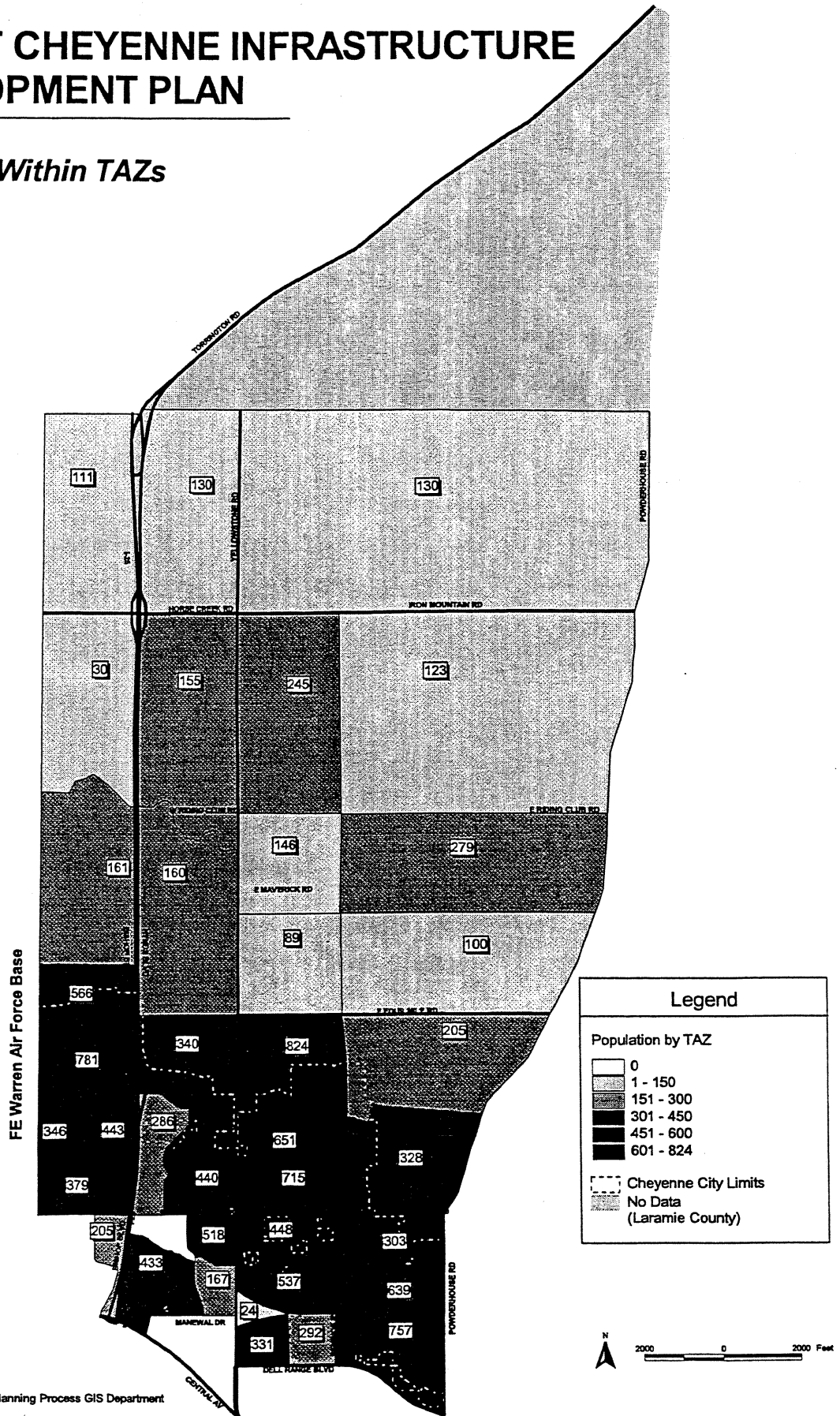
Map 2-10
1990 Census Population By Neighborhood



NORTHWEST CHEYENNE INFRASTRUCTURE AND DEVELOPMENT PLAN

Map 2-11

1997 Population Within TAZs

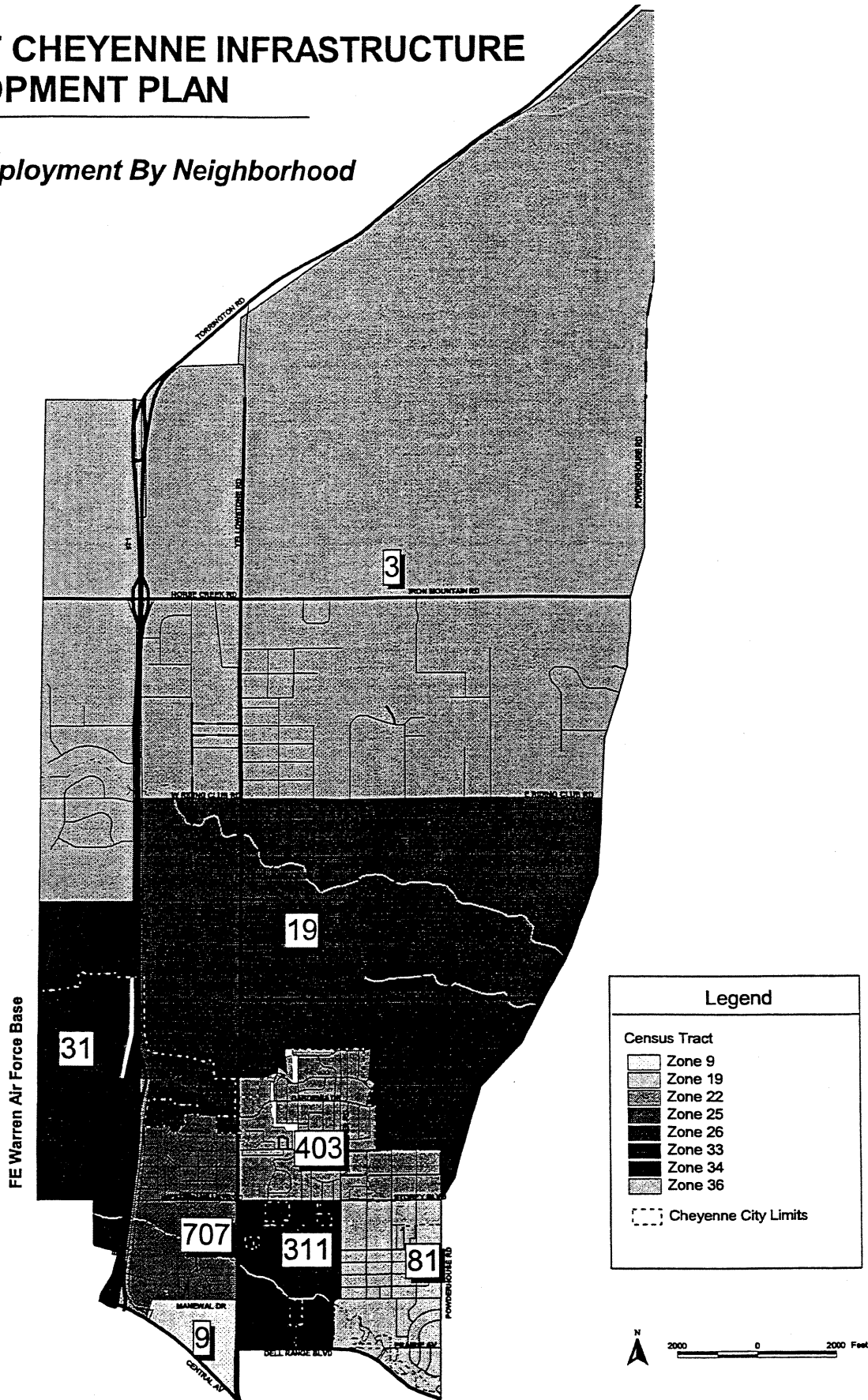


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Sources: Cheyenne Area Planning Process GIS Department

NORTHWEST CHEYENNE INFRASTRUCTURE AND DEVELOPMENT PLAN

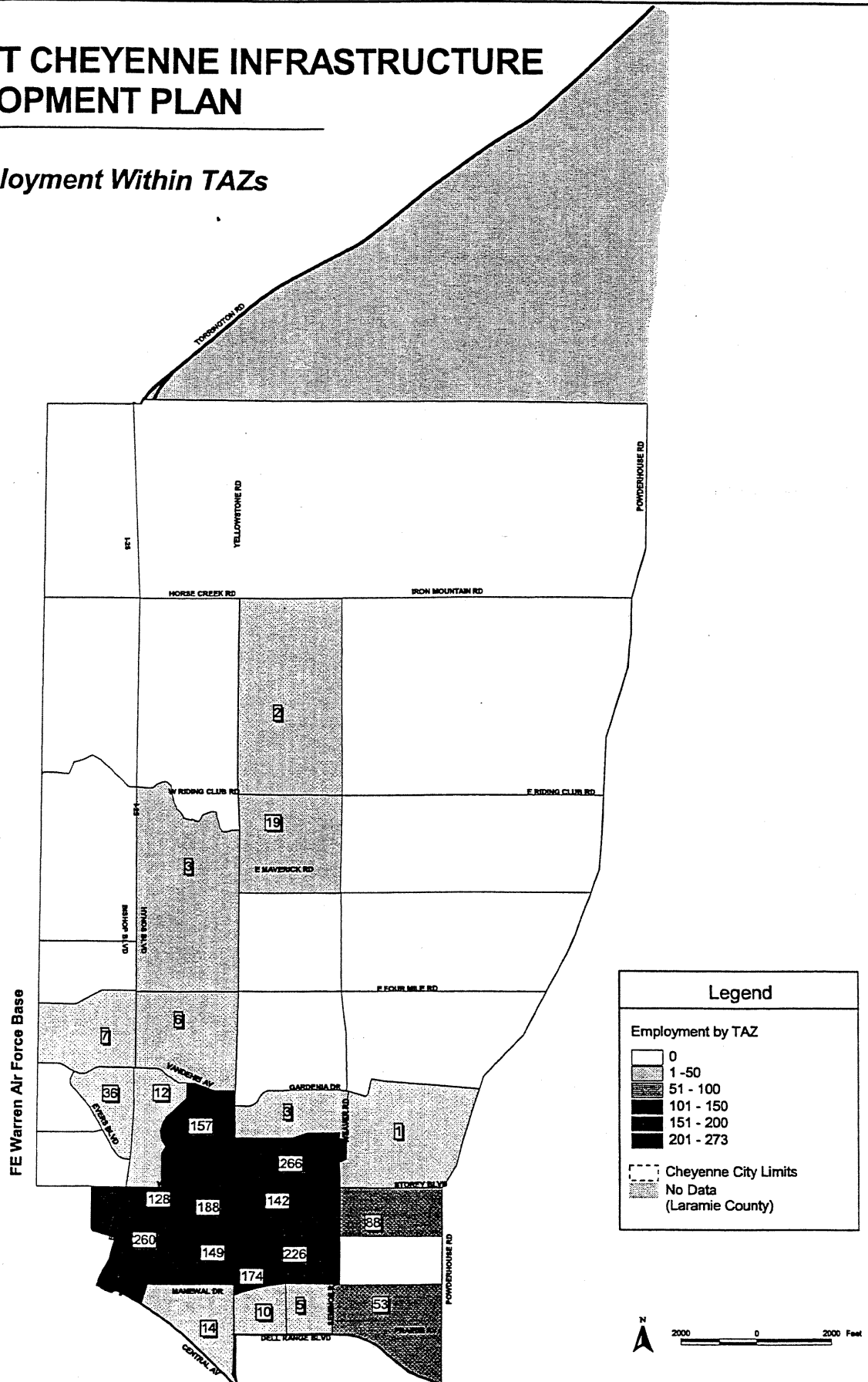
Map 2-12
1990 Census Employment By Neighborhood



NORTHWEST CHEYENNE INFRASTRUCTURE AND DEVELOPMENT PLAN

Map 2-13

1997 Total Employment Within TAZs



G. Composite Planning Influences Analysis

This section provides a brief summary of the planning issues and opportunities that will influence the development of the Infrastructure and Development Plan. These are also illustrated graphically on Map 2-14.

1. Community Activity Area

The southwest corner of the study area provides opportunity for the enhancement of an existing Community Activity Area. This area currently includes Central High School, McCormick Junior High School, and the Municipal Golf Course, which could potentially be connected by a developing greenway system.

2. Commercial Corridor Development

A significant portion of the Yellowstone/Dell Range Commercial Corridor is located within the study area. These areas are identified on the map along Yellowstone between Western Hills and Vandehei, along Storey between Yellowstone and Weaver, and along Weaver between Storey and to just south of East Carlson. These areas have the potential for additional commercial development to further enhance and strengthen the already established commercial districts.

3. Water and Sewer Services Areas

The lack of water and sewer services outside of the City of Cheyenne has limited, and will continue to limit, the amount and the density of development north of Four Mile Road. This is due to the fact that the provision of infrastructure in this area is currently cost prohibitive. On-site water wells and septic systems are utilized in areas outside of the City, where water and sewer services are not provided. There has been growing concern regarding possible degradation of water quality and declining water levels of the Tertiary aquifer. The possible degradation of water quality has contributed to infiltration of septic tank effluent into the water table, and the decline of water levels could be the result of deteriorating water wells.

4. Significant Undeveloped Areas

Over 40 percent of the lands outside the City limits are undeveloped. Although high-density development is not an option in the study area north of Four Mile Road, there is an opportunity for very low-density development. Laramie County allows unserved land to be developed at a minimum of five acres per lot. Three significant undeveloped areas exist within the study area and are depicted on Map 2-14. The first area is the land on either side of I-25 between Four Mile Road and Iron Mountain Road; the second area is north of the City limits, south of Four Mile and west of Powderhouse; and the third area is North of Iron Mountain Road.

5. High Traffic Volumes

Map 2-14 identifies several roads within the study area that are experiencing high traffic volumes. Some of these roads are Yellowstone Road, Dell Range Boulevard, Powderhouse Road, Central Avenue, and Vandehei Avenue.

6. Vandehei I-25 Interchange

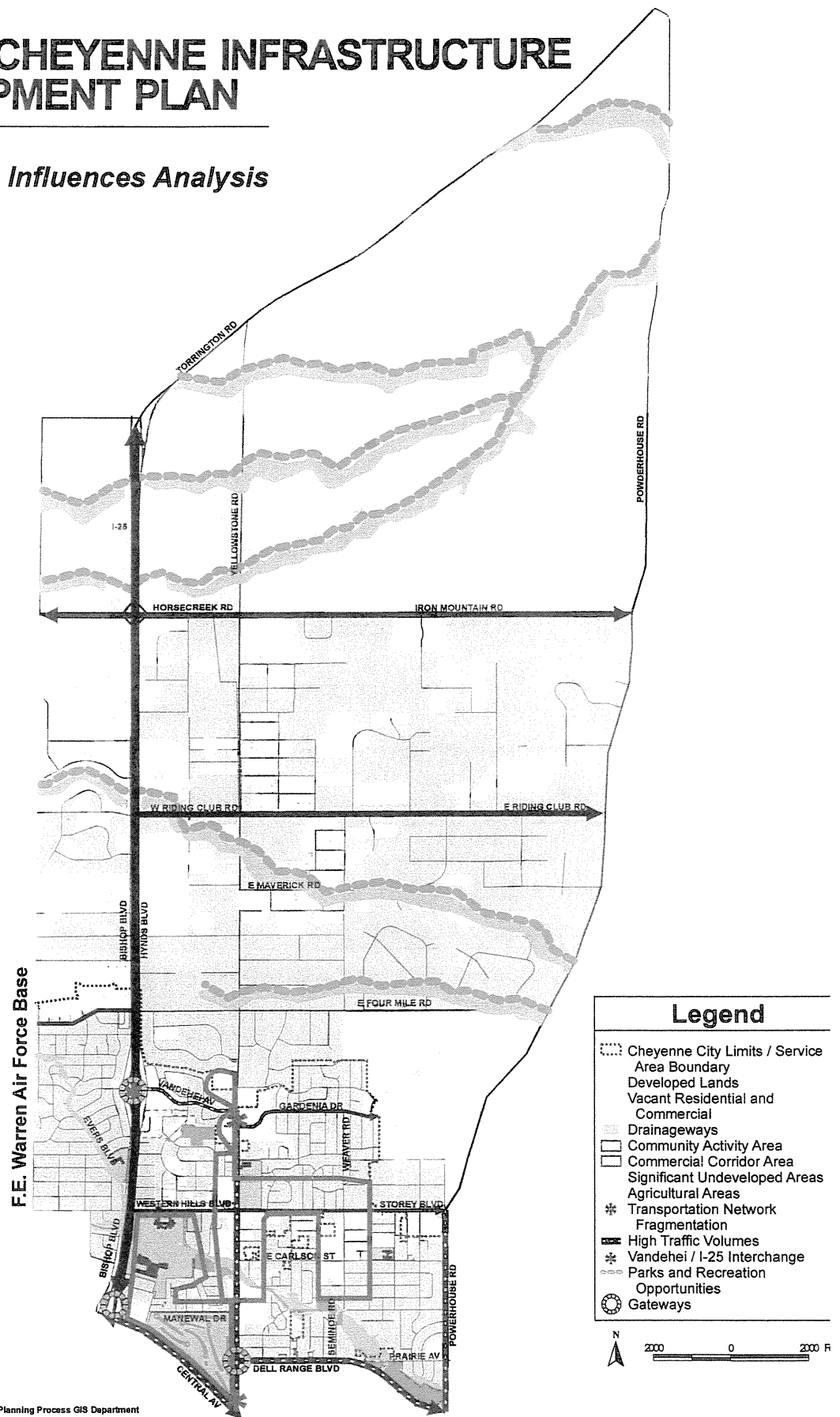
Vandehei is a collector street and experiences a considerable amount of traffic from the interchange. Vandehei also runs through a residential neighborhood, creating conflicts between transportation needs and residential neighborhood needs.

Parks and Recreation Opportunities

An insufficient number of parks are provided for residents within the study area. An opportunity to develop an interconnected system of greenways as well as creating a linear park in the existing drainage areas between Four Mile Road and Iron Mountain Road has been identified on Map 2-14.

NORTHWEST CHEYENNE INFRASTRUCTURE AND DEVELOPMENT PLAN

Map 2-14 Composite Planning Influences Analysis



prepared by
BALLOFFET
& Associates, Inc. Sources: Cheyenne Area Transportation Planning Process GIS Department

III. Vision and Goals

The Northwest Cheyenne Infrastructure and Development Plan vision and goals lay a framework for the area, representing an imagined future that the community can identify with and strive toward. The **vision** captures a shared image of what citizens want their community to become within the next 15-20 years, fostering a positive sense of place and community. The **goals** help to move the community toward realizing the vision. Goals are not tied to specific dates or targets, but are enduring to provide a general direction for more refined policy and objectives.

A. Community Vision

The greater Northwest Cheyenne area will have three distinct, yet united districts that complement and support each other. The first district will be a compact, higher density, urban area located within the City limits. This district will serve as a focal point and the center of activity for the Northwest Cheyenne area. It will provide commercial centers, schools, recreation facilities, and other activity centers that encourage the community to congregate and interact.

The second district, which generally includes the area north of Four Mile Road and south of Iron Mountain Road, will be more rural in nature providing low density, single-family housing. This district will provide a few stores for convenience shopping but will largely rely on the commercial areas in the urban district.

The third district, comprising the study area north of Iron Mountain Road, will primarily support very low density, single-family residences as well as agricultural uses. Clustering of development will be encouraged in this district, where adequate water and sewer services can be provided, to preserve open lands.

Neighborhoods, community areas, streets, and gateways will be attractive places in the greater Northwest Cheyenne area. Residents will identify with their community and take pride in the fact that they live in this distinct area of Cheyenne. The quality of life for area residents will be high due to well-balanced land use, an efficient transportation network, and quality community services.

B. Community Goals

The community goals for Northwest Cheyenne are organized into six categories:

- 1. Land Use and Development**
- 2. Transportation**
- 3. Infrastructure**
- 4. Community Form and Design**
- 5. Community Services**
- 6. Recreation and Open Space**
- 7. Special Use Areas**

These categories have been organized to make it easier to translate the goals into specific strategies over time. Most of the goals have implications that overlap into other categories.

The goals reinforce existing plans and policies, as well as establish new directions and ideas, which have been collected from the Cheyenne Area Transportation Planning Process (ChATPP) and the Steering Committee as part of the process of developing the Northwest Cheyenne Infrastructure and Development Plan.

1. Land Use and Development

Goal 1 Promote sound and orderly development that will enhance the greater Northwest Cheyenne area.

- | | |
|---------------|---|
| Objective 1.1 | Through the consideration of land character, available services, and infrastructure, develop and adopt a land use plan that defines where development is feasible, and at what density. |
| Objective 1.2 | Establish the various density districts in the land use plan to ensure that compact, high density development occurs within the City limits, low density residential between 4 Mile Road and Iron Mountain Road, and very low residential/ clustered densities beyond Iron Mountain Road. |
| Objective 1.3 | Revise current zoning codes to support district density policies. |
| Objective 1.4 | Develop a permitted land uses agreement with the County regarding unzoned land north of Iron Mountain Road. |

Goal 2 Improve contiguity between the City land and the County pockets that occur within it by annexing County pockets where appropriate

- Objective 2.1 Conduct an inventory and analysis of the County pocket areas, detailing what their various issues are and what types of improvements or changes are desired to improve contiguity.
- Objective 2.2 Develop agreements with Laramie County that address the various improvements and changes desired for the County pockets, and considers annexation where appropriate.

Goal 3 Provide a complete range of conveniently-located commercial services for residents.

- Objective 3.1 Continue to develop and strengthen the commercial corridors along Yellowstone and Dell Range.
- Objective 3.2 Allow convenience-type stores to establish at any existing or new interchanges along I-25.
- Objective 3.3 Provide the opportunity to allow some neighborhood-oriented commercial uses such as nurseries, riding clubs, and feed stores, where appropriate.
- Objective 3.4 Explore the possibility of creating limited commercial opportunities at the Powderhouse Road/Storey Boulevard intersection and/or the Powderhouse Road/Four Mile Road intersection.

2. Transportation

Goal 4 Provide a balanced, efficient, and safe transportation system.

- Objective 4.1 Mitigate increasing traffic volumes on principal streets such as Yellowstone Road, Dell Range Boulevard, Powderhouse Road, Central Avenue, Vandehei Avenue, and Storey Boulevard.
- Objective 4.2 Develop strategies that improve north-south and east-west connections and traffic flow based on what is best for the overall traffic pattern of the region.
- Objective 4.3 Improve area intersections that present potential hazards.
- Objective 4.4 Continue to assess potential options regarding existing and potential I-25 interchanges within the area.

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| Objective 4.5 | Create a system of bicycle paths, bicycle lanes, and detached sidewalks that provide access to schools and other important areas. |
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3. Infrastructure

Goal 5	Provide safe and cost-effective water, wastewater, and drainage infrastructure to the area.
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| Objective 5.1 | Identify in the land use plan areas where potential provision of water and sewer services is both physically and economically feasible. |
| Objective 5.2 | Continue to provide and maintain safe operating septic systems at the appropriate density in areas not appropriate for sewer services. |
| Objective 5.3 | Continue to provide and maintain safe operating water wells at the appropriate density in areas not appropriate for water services. |
| Objective 5.4 | Ensure that development requiring on-site water supply and wastewater treatment will not adversely affect groundwater levels or quality. |
| Objective 5.5 | To ensure protection from flooding, develop a drainage study that details the various drainage systems in the study area, what types of development are permitted within their vicinity, and how they should be managed. |

4. Community Form and Design

Goal 6	Preserve the rural integrity of the land that buffers the rural districts from the urban district of Northern Cheyenne.
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| Objective 6.1 | Designate corridors along Iron Mountain Road, I-25, and northern Yellowstone Road as special rural preservation districts. |
| Objective 6.2 | Identify and designate appropriate Buffer Areas between the rural districts and the urban district that would help preserve the distinction between these two types of areas. |
| Objective 6.3 | Encourage landowners to maintain the rural character of the designated Buffer Areas. |

Goal 7 Create contiguity and flow between residential neighborhoods when in the best interest of the overall community.

Objective 7.1 Require developers of new neighborhoods to consider the structure and design of existing neighborhoods when developing plans.

Objective 7.2 Encourage existing neighborhoods to develop strategies to resolve covenant and contiguity conflicts.

Goal 8 Enhance the appearance of the area's principal arterials and gateways.

Objective 8.1 Develop a design concept for the State's scheduled improvements and beautification of Central Avenue between I-25 and 8th Avenue.

Objective 8.2 Develop strategies to acquire funding that would provide for roadway improvements and beautification.

Objective 8.3 Develop enhancement techniques for the following travel corridors:

- Yellowstone Road from Central Avenue to Four Mile Road
- Dell Range Boulevard from Yellowstone Road to Powderhouse Road
- Central Avenue from Hynds Boulevard to Yellowstone Road
- Powderhouse Road from Dell Range to Four Mile Road
- Storey Boulevard from Hynds Boulevard to Powderhouse Road.

Consider concepts that could potentially serve as noise buffers as well, especially at Vandehei.

Objective 8.4 Develop gateway design concepts for I-25 and Central Avenue, I-25 and Vandehei Avenue, and Dell Range Boulevard and Yellowstone Road.

5. Community Services

Goal 9 Provide adequate community facilities such as schools, libraries, police, and fire protection to area residents.

- Objective 9.1 Identify the current needs for community facilities within area districts and neighborhoods and rank them according to priority.
- Objective 9.2 Develop funding strategies for the improvement of existing community facilities as well as the provision of new community facilities.
- Objective 9.3 Designate sites, when and where appropriate, for future community facilities in the land use plan.

6. Recreation and Open Space

Goal 10 Create a balanced system of neighborhood parks for the community.

- Objective 10.1 Create incentives for future developers to designate land as parks and open space.
- Objective 10.2 Develop a design concept for an interconnected system of parks, greenways, and trails in the land use plan.
- Objective 10.3 Develop financial strategies to provide for an interconnected system of parks, greenways, and trails.
- Objective 10.4 Work with Laramie County School District Number 1 to explore the possibility of a shared school/park area for the north Study Area.

Goal 11 Preserve open lands within the County.

- Objective 11.1 Encourage clustering in new development areas where appropriate.
- Objective 11.2 Explore opportunities to designate and preserve open space areas within the County.
- Objective 11.3 Protect sensitive areas such as wetlands, riparian areas, and wildlife habitat from development.

Goal 12 Preserve the agricultural activities within the County.

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| Objective 12.1 | Identify and designate lands that are most suitable for agricultural activities in the land use plan. |
| Objective 12.2 | Develop policies that discourage rural subdivisions from locating on lands designated most suitable for agricultural activity. |
| Objective 12.3 | Create financial incentives for agricultural landowners to ensure that various agricultural activities continue to be economically profitable. |
| Objective 12.4 | Ensure that current zoning continues to allow and encourage a broad range of acceptable agricultural uses in appropriate areas. |

7. Special Use Areas

Goal 13 Continue to cooperate with the Cheyenne Airport and F.E. Warren Air Force Base to monitor each other's plans and avoid potential conflicts.

- | | |
|----------------|--|
| Objective 13.1 | Continue to communicate with the Cheyenne Airport Authority to ensure that residential development does not conflict with flight patterns. |
| Objective 13.2 | Continue to cooperate with F.E. Warren Air Force Base to ensure that future development plans are coordinated. |

IV. Land Use Plan

The Land Use Plan is the physical framework of the Northwest Cheyenne Area Plan. It describes proposed land uses and displays their appropriate locations. It is the product of an extensive review of existing conditions and trends, the composite planning influences analysis, and discussions with citizens and Steering Committee members. The Land Use Plan is intended to physically represent the vision and goals for the planning area. The vision and goals emphasize and strengthen the unique pattern of land uses within each district and encourage new land uses that will compliment and support the entire Northwest Cheyenne area. The vision and goals identified three districts in the Northwest Cheyenne area, the Urban Core District; the Rural Residential District; and the Agricultural District. Map 4-1 illustrates the Land Use Plan and displays the distinct character of each district. Table 4-1 identifies the land uses by each district.

A. Description of Proposed Land Uses

The following is a description of the land use categories contained in the Northwest Cheyenne Plan.

1. Agriculture

Areas designated for Agriculture are to maintain their existing natural state or agricultural or ranching uses, while allowing for limited residential development. Residential developments are proposed to develop at a minimum average density of 1 dwelling unit per 10 acres, with clustering of dwellings on lots smaller than 10 acres permitted as a means of preserving open space.

2. Residential Land Uses

The residential land use classifications were determined in response to compatibility with existing and proposed development, site constraints, availability of public services, impact on the local and regional traffic system, proximity to and impact upon community facilities, and market trends.

a. Very Low Density Residential

Very Low Density Residential areas are primarily intended for large lot single family detached development and will have a minimum lot size of 5 acres. Developments served by a community or public water and sewer system may have a minimum lot size of 1 acre.

b. Low Density Residential

Low Density Residential areas will consist of single-family detached dwelling units with a minimum of 4 units per acre, provided that a community public water and sewer system serves the development. Developments served by only city water may develop at 2.5 acres per lot. Those areas not served by public water and sewer facilities shall have a minimum density of 1 unit per 5 acres.

c. Medium Density Residential

Medium Density Residential areas are designated for condominiums, townhouses and duplexes, small lot single family, and other similar types of dwelling units. This designation allows between 4 to 8 units per acre.

Map 4-1
Land Use Plan



d. High Density Residential

High Density Residential areas are designated for apartments, condominiums, townhouses and duplexes, and similar higher density residential types of dwelling units. This designation includes residential areas with densities of more than 8 units per acre.

3. Business Commercial

Business Commercial areas in the study area tend to serve either neighborhood or community retail needs and provide a variety of uses. The design of business commercial areas should provide convenient access, and efficient and safe pedestrian and commercial circulation. Building materials, landscaping, and scale of buildings and signs should contribute to the local character of the neighborhood or area in which they are located.

a. Community Business

Community Business areas are designated for retail centers and businesses that serve several neighborhoods. Permitted uses include retail stores, shops, eating establishments, banks, supermarkets, businesses, and professional offices.

b. Neighborhood Business

Neighborhood Business areas are intended for the establishment of convenience retail which primarily serve the surrounding neighborhoods.

4. Public

Public areas are intended to contain uses related to general community services such as schools, colleges and universities, water and sewage treatment facilities, City and County government buildings, public libraries, post offices, police and fire stations, and hospitals.

5. Parks & Open Space

Public Parks are intended to provide for the active and passive recreation needs of the community. Where possible, the City and County will locate and design parks to take advantage of natural features or amenities and place parks adjacent to schools to provide play areas for children and neighborhood residents. Neighborhood parks and community parks are located within the study area. Neighborhood parks serve residential neighborhoods within a $\frac{1}{4}$ to $\frac{1}{2}$ mile radius to serve a population of up to 5,000 residents. Such parks may range in size from 5 to 20 acres and average 1.0 to 2.0 acres per 1,000 residents. Community Parks are intended to provide intense recreational facilities and/or be an area of natural quality for outdoor recreation. Community Parks serve several neighborhoods within a 1 to 2 mile radius. These parks are larger than 25 acres and average 5.0 to 8.0 acres per 1,000 residents.

Publicly or privately owned Open Space areas are intended to remain in a natural, undeveloped state. Open Space may be used as a buffer between conflicting land uses and as a means to preserve natural areas and prominent views. Open Space may include areas within the 100-year floodplain in order to protect property from flood damage, and to preserve the riparian habitat and wildlife associated with the area. In general, open space is not developed into areas for active

recreation, but may include minor improvements, such as trails and parking areas. Trails may link together other parks and open space areas to form a comprehensive system.

B. Land Use Districts

1. Urban Core District

a. Overall Description

The Urban Core District primarily consists of the area south of East Four Mile Road and west of Powderhouse Road. The majority of this district is developed and the land use pattern is generally well established. Residential uses with urban densities, commercial centers, and significant public uses characterize this district.

b. Key Features

The Plan calls for the eventual urban level development of an approximately 325-acre vacant area located in the northeast portion of the district. The bottom two thirds of this area are intended for medium density residential (approximately 181 acres); while the top third is intended for low density residential (approximately 142 acres). A small neighborhood business is also identified at the southwest corner of the Powderhouse Road/Four Mile Road intersection.

Developments within this district must have water and sewer service in order to develop at urban densities. Thus, developments within the Urban Core District must either be annexed by the City of Cheyenne, or included in a public or private sewer and water district.

The Plan conceptually illustrates the location of a recommended neighborhood park to serve residents in the areas east of Yellowstone Road, north of Storey Boulevard, west of Powderhouse Road, and south of East Four Mile Road. At full development, this area would have approximately 7,000 residents, thus requiring a 14-acre park to match a neighborhood park standard of 2 acres per 1,000 residents, which is in accordance with the 1992 City of Cheyenne Parks and Recreation Facilities Master Plan.

Another priority of the Plan is to improve continuity between existing land uses and the vacant county pockets located throughout the district. The Plan calls for the annexation of these pockets in order to provide necessary urban infrastructure and services. Specific improvement to sidewalks, the streets network, drainage, water and septic systems will create continuity throughout the area and improve the area's appearance.

The Plan also calls for actions to promote and enhance the Yellowstone/Dell Range commercial corridor. Improvements to the commercial area's physical environment will be implemented to better serve the needs of pedestrians as well as motorists. Improvements to the area's sidewalk system will be implemented to connect focal points of pedestrian activity such as transit stops, street crossings, building entry points, and parking areas. Additional objectives for enhancing the area include the following:

- ♦ Mitigate traffic congestion for area residents and all who use the intersection by adding an additional lane on Dell Range to serve as a turn lane on to Yellowstone;

- ♦ Create an attractive gateway to the Dell Range commercial district with landscaping and buffering; and
- ♦ Develop an open space area to serve as a buffer and a transition to the Yellowstone Addition neighborhood.

2. Rural Residential District

a. Overall Description

The Rural Residential District generally includes the area north of Four Mile Road and south of Iron Mountain Road. The district primarily consists of low and very low-density single family residential housing units. Vacant parcels are located throughout this district with significant vacant lands found along I-25.

b. Key Features

Responding to the community's desire to preserve the rural character of this district and recognizing the area's development limitations due to the lack of water and sewer service, future residential areas will develop at very low densities (1 unit per 5 acres). The provision of water and sewer services will likely remain cost prohibitive during the 20 year planning horizon. However, in the event that such services are provided in the area, the minimum lot area may be reduced to 1 acre.

The Plan calls for neighborhood business uses at the southeast intersection of I-25 and Iron Mountain Road to support the surrounding residential developments, and serve trade from I-25.. Limited rural type neighborhood-oriented commercial uses such as nurseries, riding clubs, and feed stores may be allowed in special cases in other areas of this district, provided that such a need can be demonstrated and has full support by the surrounding residents. Also included on the Plan is a Community Commercial area at the southwest corner of I-25 and Iron Mountain Road.

The Plan will preserve the rural integrity and of the land buffering major rural roads in the district, by designating corridors along Iron Mountain Road, and I-25 north of East Four Mile Road and Yellowstone Road north of East Four Mile Road as rural preservation districts. The rural preservation district will limit the type and intensity of development along these corridors forming a greenway buffer (areas located within a rural preservation district will be subject to additional development standards, including increased setbacks, parking limitations, and landscape standards).

The rural preservation district places limitations on commercial development along the corridors, but may permit commercial development at nodes around major intersections, for instance the I-25 and Iron Mountain Road intersection, leaving the remainder of the corridors free of commercial development.

Table 4-1, Land Uses Within Each District

Land Use by Acre	Urban Core District	Rural Residential District	Agriculture District
Community Business	129	0*	0
Neighborhood Business	3	20	0
Agriculture/Rural Residential	0	0	3419
Very Low Density Residential (5 acre lots or greater)	0	3081	0
Low Density Residential (Lots between 4 units per acre and less than 5 acres)	578	0	0
Medium Density Residential (4 to 8 units per acres)	740	0	0
High Density Residential (More than 8 units per acre)	135	0	0
Parks & Open Space	63	0*	0
Public	157	0*	0
Total Land Use	1805	3101	3419

* Potential proposed areas are not included.

3. Agriculture District

a. Overall Description

The Agriculture District includes lands in the study area north of Iron Mountain Road. A majority of the district is dedicated for agricultural uses, although a few homes are located throughout the area. The area currently lacks commercial services, parks, and schools.

b. Key Features

The Plan encourages the preservation of agricultural uses in the area and allows for limited single family residential development at an overall density 1 unit per 10 acres. Lot sizes may be less than 10 acres, in order to encourage the protection of open space or agricultural lands, provided that the overall density of a proposed development parcel does not exceed 1 dwelling per 10 acres. Open space corridors may be developed into a linear park trail system to provide recreational opportunities and pedestrian links to parks, schools, and neighborhoods in the area. Lands to be dedicated for open space and trail corridors may be included within overall density calculations.

Laramie County School District Number 1 has determined that an elementary school is needed to serve the growing number of students in the rural areas north of Cheyenne. The Plan encourages the School District to place the elementary school in the study area. In addition, the study area north of East Four Mile Road lacks a neighborhood park. An opportunity exists to create a school/park area that could be used by the school during the day and open to the public when school is not in session. This school/park could serve as the focal point for the district and could be connected to the linear park trail system.

V. Transportation Plan

The primary objective of this transportation plan is to address the circulation needs for Northwest Cheyenne. This analysis includes the freeway and interchange system and the future circulation needs for Northwest Cheyenne.

In consultation with the public and the steering committee, a number of specific issues and problem areas were identified that required analysis and resolution.

A. Regional Facilities

1. I-25 Interchange Location

An analysis was performed to determine the effects that different interchange and overpass configurations/scenarios would have on the Northwest Area Transportation Network. The Wyoming Department of Transportation modeled twenty-six different interchange/overpass scenarios (Figure 5-1). A preliminary level of analysis determined that six of these scenarios were feasible. The following six alternatives were carried forward for a detailed analysis:

- 1) Existing condition
- 2) Existing condition with an additional overpass at Four Mile
- 3) Interchanges at Vandehei, Four Mile, Riding Club, and Iron Mountain
- 4) Replace the Vandehei interchange with one at Four Mile Road
- 5) Overpass at Vandehei and an Interchange at Four Mile
- 6) Construct traffic calming features to Vandehei Avenue

will not allow for an interchange at both Four Mile Road and Vandehei Avenue; therefore, the interchange at Vandehei Avenue would have to be eliminated.

A link level volume to capacity (v/c) ratio and corresponding level of service (LOS) analysis was performed for the current year and the twenty year forecast traffic volumes for each of these six alternatives. The six alternatives produced different isolated traffic volumes and associated level of service outcomes. Overall the levels of service remained high over the entire network (Figure 5-2) with the exception of the areas that are currently experiencing congestion problems, and continue to worsen for the twenty year projected traffic volumes under all six scenarios (Appendix B-1). In summary, the location of the interchange or overpass does not have any significant advantages or disadvantages for the transportation network as a whole. In addition, it was determined that moving the interchange from Vandehei Avenue to Four Mile Road would not meet the Federal Highway Administration's criteria for interchange spacing. Therefore, there are no other compelling reasons to change the existing interchange/overpass configuration.

2. Existing Vandehei Interchange Deficiencies

There are a number of existing problems associated with the existing Vandehei interchange. These problems are summarized below:

- The current interchange configuration results in substantial vehicular delay at the on and off ramps.

- Existing volume and delay conditions are very close to meeting signal warrant requirements at the on and off-ramps.
- Storage requirements for left turning vehicles from Vandehei to I-25, or to the frontage roads, will be insufficient when signalized.
- The bridge deck is in need of structural rehabilitation.
- A substantial increase in accidents over the last 3 years (1994 to 1997) has occurred during this time. There were a total of 32 accidents, with 7 injuries and 2 fatalities; 56% of these accidents occurred at a ramp or service road intersection (As delays and congestion increase, gaps in traffic are decreased, and drivers may accept a smaller gap to attempt turns, resulting in more accidents).
- The bridge deck is 28' wide and is insufficient to provide space for vehicle breakdowns, bike shoulders, or sidewalks.
- A 4' wide sidewalk exists on only one side of the bridge structure. No handicap ramps are provided, and no barrier exists between the sidewalk and the roadway.

3. Vandehei Interchange Improvements

A recent Wyoming Department of Transportation feasibility study has recommended two alternatives for solving these problems. The first alternative is for improvements with conventional geometry, and the second is based on improvements that utilize modern roundabouts as part of the solution. Below is a brief description of the two alternatives (Figure 5-3).

- **Deck Replacement with Diamond Interchange:**
 - Width: 58' width includes 3 lanes plus 8' shoulders and a 6' sidewalk on the north side.
 - Delay: 20 seconds average delay
 - Signalization: Required
- **Deck Replacement with Modern Roundabout Interchange:**
 - Width: 46' width, 2 lanes plus 8' shoulders and 6' sidewalk on the north side
 - Delay: 8 seconds average delay
 - Signalization: Not Required

Modern Roundabout vs. Diamond Interchange: A comparison of the modern roundabout versus the conventional Diamond interchange geometry alternative concluded the following:

Better Overall Safety: The safety experience of several modern roundabouts in the United States has been reported in a paper entitled, "Modern Roundabouts and Traffic Crash Experience in the United States," presented to the Transportation Research Board. This and other research overseas found substantial safety benefits from modern roundabouts. The

primary benefits include a substantial reduction of injury accidents, the virtual non-existence of fatalities, and overall reduction in accident rates.

Pedestrian safety is often a point of concern and a reason for not considering the use of modern roundabouts. Recent research has found that properly designed modern roundabouts are safer for pedestrians than signalized intersections. This safety advantage has been attributed to the slower traffic speed at roundabouts and the division of the pedestrian crossing into two stages, from the near-side wheelchair ramp out to the splitter island, and then from the splitter island to the far side wheelchair ramp.

At each stage the pedestrian has to look in only one direction to cross a one-way traffic stream, while traffic is slowing as it approaches the yield line.

Another advantage of the modern roundabout intersection is that it assigns equal priority to each leg of the intersection and therefore delay for all movements through the intersection is substantially reduced. This has advantages for our recommended plan to divert traffic from Vandehei to Four Mile Road via Hynds Boulevard. Vehicles turning to and from Vandehei Avenue to Hynds Boulevard will not be delayed while waiting for signals or gaps.

The modern roundabout design completed by WYDOT has many desirable components that will produce a properly operating roundabout. However, a few design issues that may adversely affect the proper operation of the roundabouts were identified.

Given the sensitive nature and newness of this traffic control method in the United States, we have concluded that it is best to utilize the most accurate software available and designers with substantial experience with high capacity modern roundabouts. Therefore, we recommend a peer review of this roundabout interchange by a roundabout design firm with substantial and quantifiable experience with modern roundabouts and the software program RODEL.

B. Local Facilities

1. Vandehei Avenue

The public outreach effort identified traffic volume and speed problems on Vandehei Avenue east of I-25. Vandehei Avenue is a connection point to the Interchange and therefore plays a significant role for the transportation system.

Vandehei Avenue is a collector roadway with on-street bike lanes and has ample capacity for future traffic. However, increased traffic volume will act as a barrier and further divide the residential neighborhood that surrounds this street, reducing opportunities for bikes and pedestrians to easily cross this roadway.

A cost per user analysis was performed comparing the cost of a new interchange at Four Mile Road versus the costs of applying a traffic-calming plan to Vandehei Avenue. The traffic calming scheme was designed to slow speeds along Vandehei Avenue, and therefore divert some of the traffic volume away from this street (Figure 5-4). The costs associated with a new interchange at Four Mile Road include construction, right-of-way, business and residential takings.

Based on a trip assignment and directional distribution analysis, a new interchange at Four Mile Road would divert 2,200 vehicles per day, and the construction of traffic calming features on Vandehei Avenue would divert 1700 vehicles per day. With an estimated cost of \$7.5M for a new interchange versus \$0.5M for traffic calming features on Vandehei Avenue, the cost per trip diverted equals \$3,500 and \$300, respectively (Figure 5-5). In summary, a new interchange at Four Mile Road will cost ten times what the traffic-calming alternative would cost to obtain the same benefits. Therefore, the traffic-calming scheme is recommended to solve the traffic speed and volume problem on Vandehei Avenue.

2. Hynds Boulevard and Four Mile Road Improvements

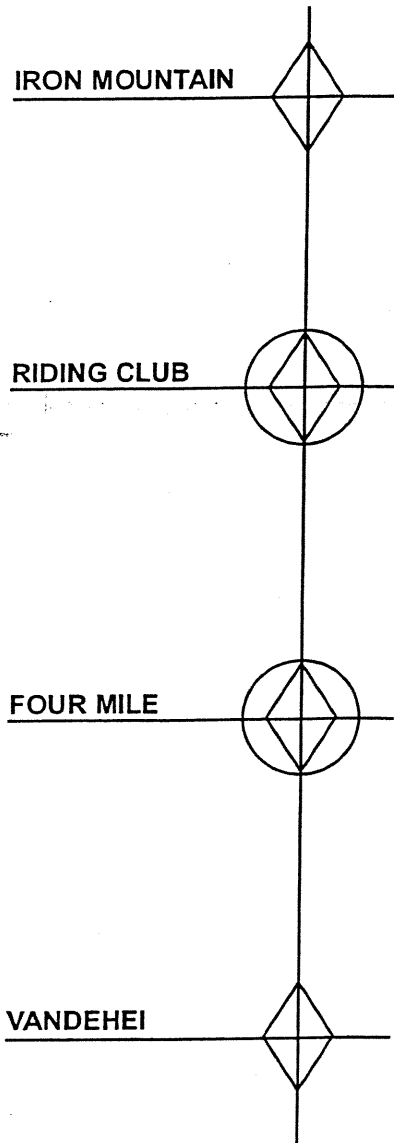
The section of Hynds Boulevard between Yellowstone and Four Mile Road and the section of Four Mile Road between Hynds and Yellowstone provide a critical link for the preferred transportation plan's objective to divert traffic away from Vandehei Avenue. Therefore, it is recommended that these sections of roadway be widened by approximately 16' to provide 12' travel lanes and an 8' shoulder on both sides of the streets. These improvements should be completed concurrently with the traffic calming improvements to Vandehei Avenue (Figure 5-6).

3. Gardenia/Vandehei Intersection

The Master Street Plan shows Vandehei and Gardenia aligned with each other. This intersection does not meet signal warrants with current traffic volumes or the projected twenty-year traffic volumes (Figure 5-7). Therefore, the need or efficiency gained by aligning the two streets to provide signalized traffic control is not realized. Furthermore, these two streets have sufficient separation between them for proper intersection design and operation, and two "T" intersections are safer than one "cross" intersection.

Figure 5-1

I-25 Interchange/Overpass Evaluation



	Alternative	Vandehei	Four Mile	Riding Club	Iron Mtn.
Alternatives Carried Forward	1	X			X
	2	X	0		X
	3	X	X	X	X
	4		X		X
	5	0	X		X
Calming	6	X			X
	7	X		X	X
	8		X		X
Interchanges	9	X	X		X
	10			X	X
	11	0	0	0	X
Overpass	12	0	0		X
	13	0		0	X
	14		0	0	X
	15		0		X
	16	0		0	X
Interchange & Overpass	17	X	0	X	X
	18	X	0	0	X
	19	0	X	X	X
	20	0	X	0	X
	21	0	0	X	X
	22	X	0		X
	23	0	X		

X = Interchange

0 = Overpass

Figure 5-2

2017 Volumes and Level of Service

BASE CONDITION (ALT #1)

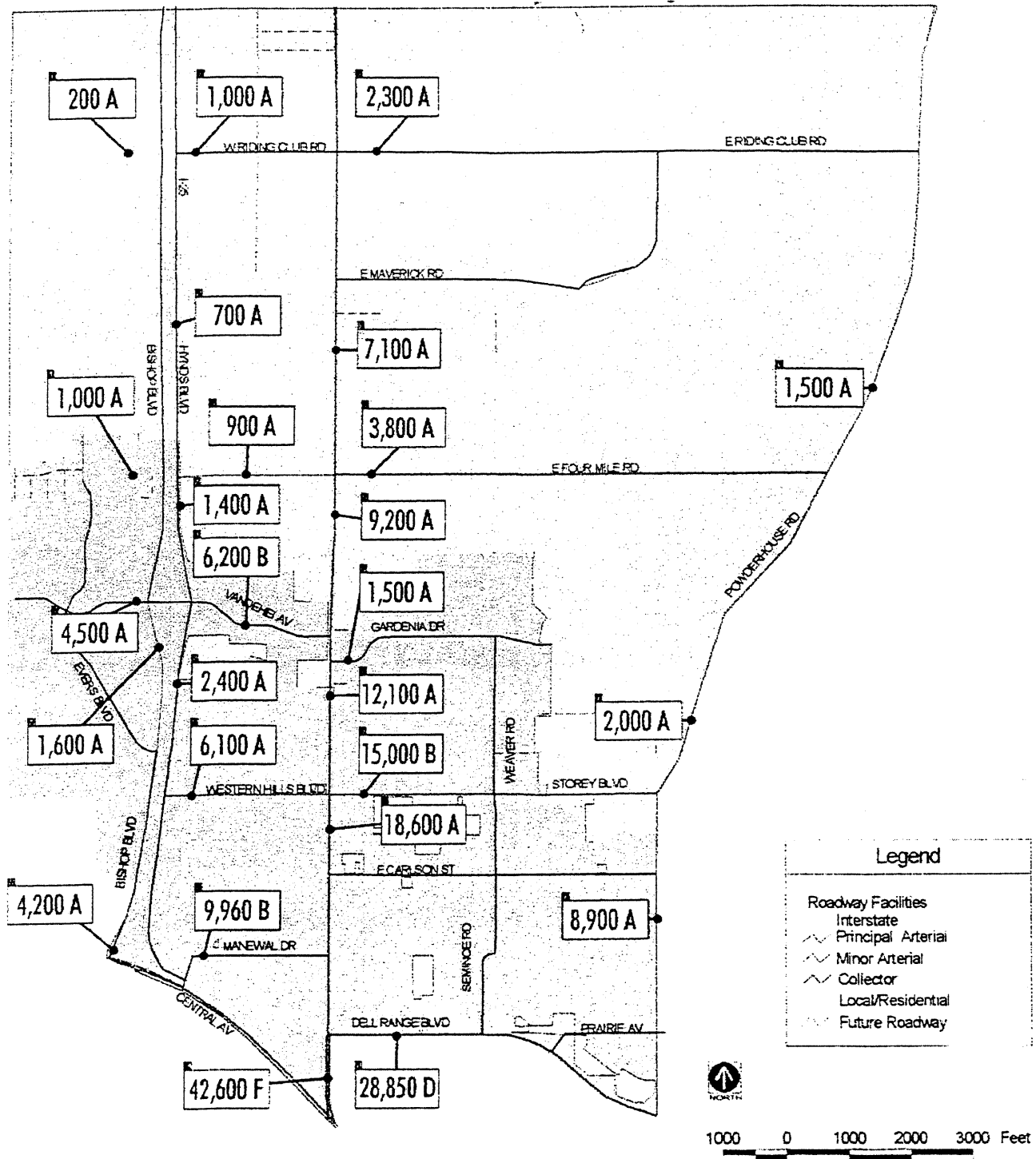
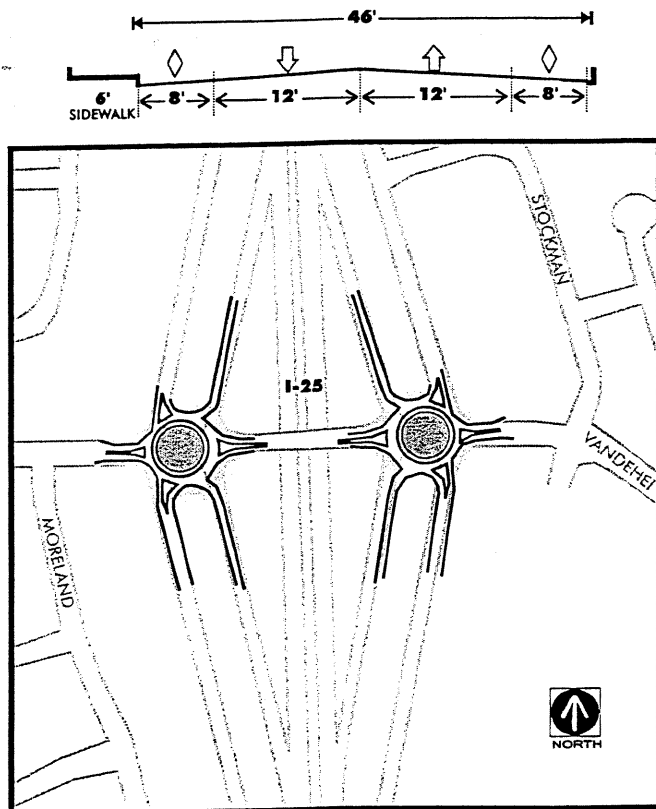


Figure 5-3

Vandehei Interchange Comparison and Recommendation

MODERN ROUNDABOUT

- 8 Second Average Delay
- Reduced Congestion
- Serious Accidents are Substantially Reduced
- Safer for Pedestrians
- No Signal Installation or Maintenance



DIAMOND

- 20 Second Average Delay
- Traffic Signals Required

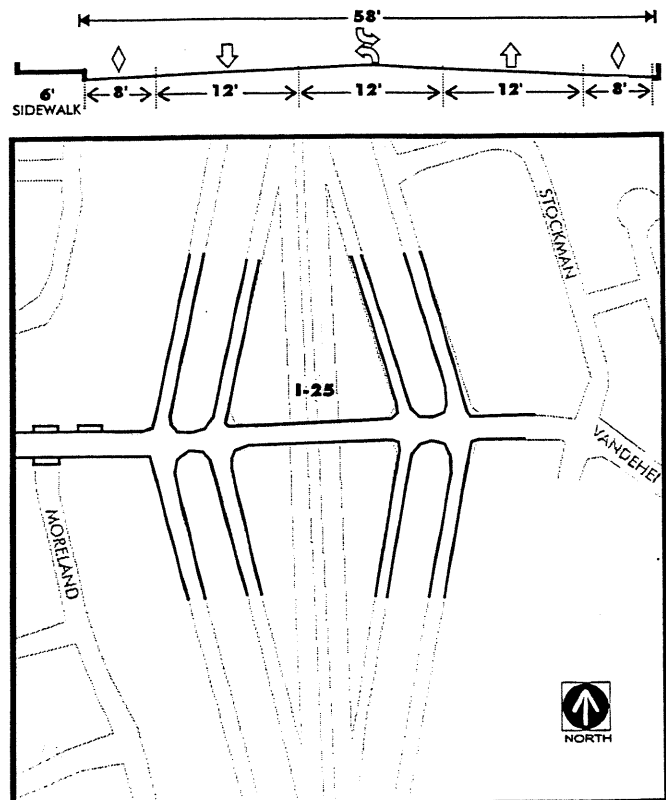


Figure 5-4

Vandehei Avenue Traffic Calming Plan

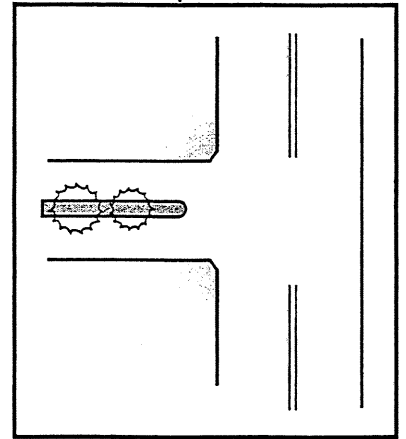
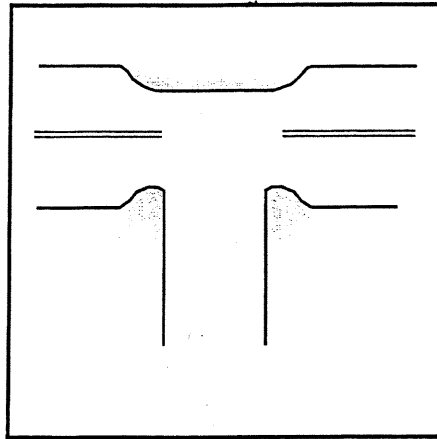
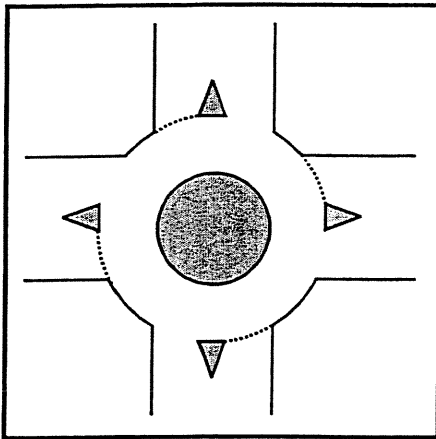
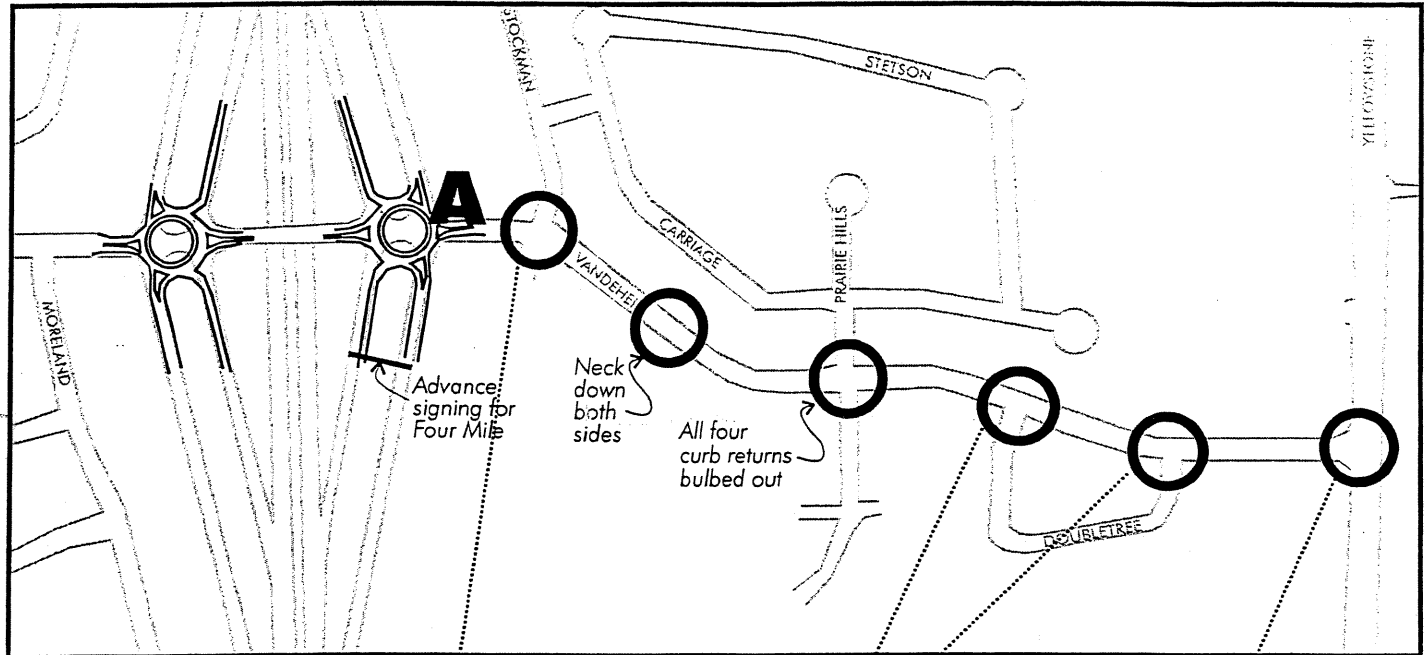
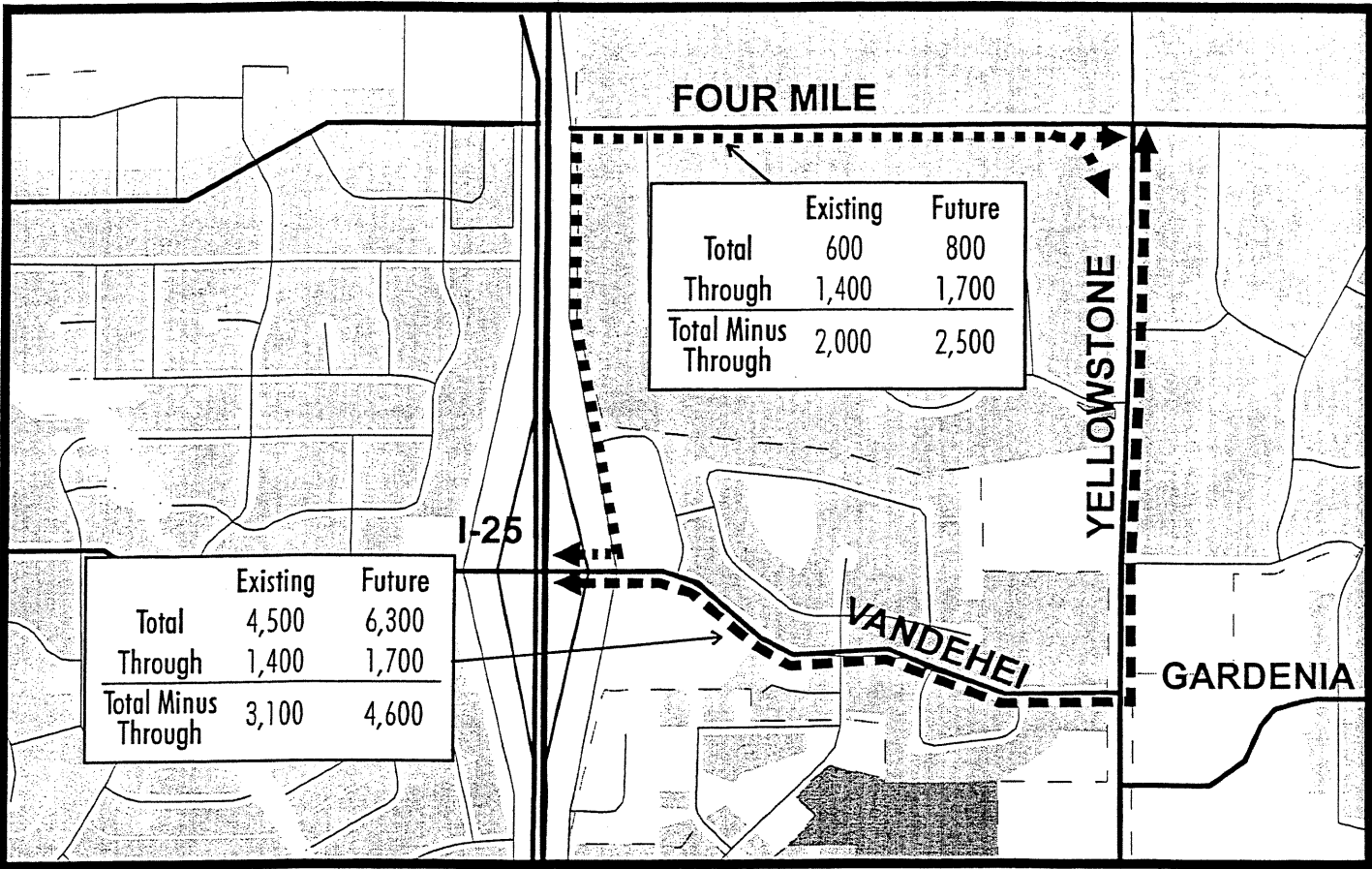


Figure 5-5

Trip Diversion with Traffic Calming



	EXISTING NETWORK	NEW INTERCHANGE	NEW OVERPASS	TRAFFIC CALMING
2017 VOLUMES	6,200	4,000	5,800	4,600
TRIPS DIVERTED		2,200	400	1,700
COST		\$7.5M	\$2.75	0.5M
COST PER TRIP		\$3,500	\$6,900	\$300

Figure 5-6

Four Mile, Hynds, Vandehei Improvements

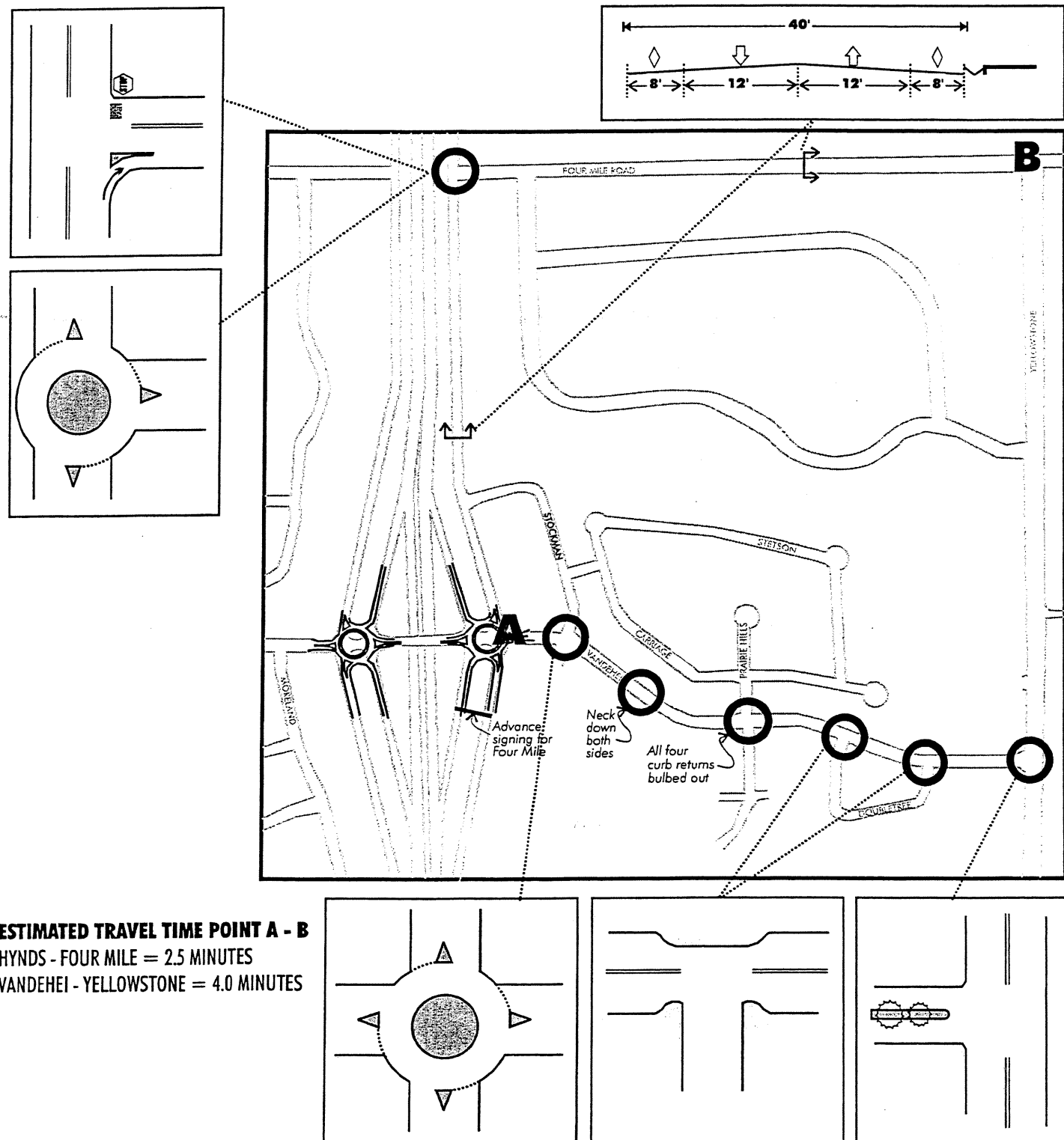
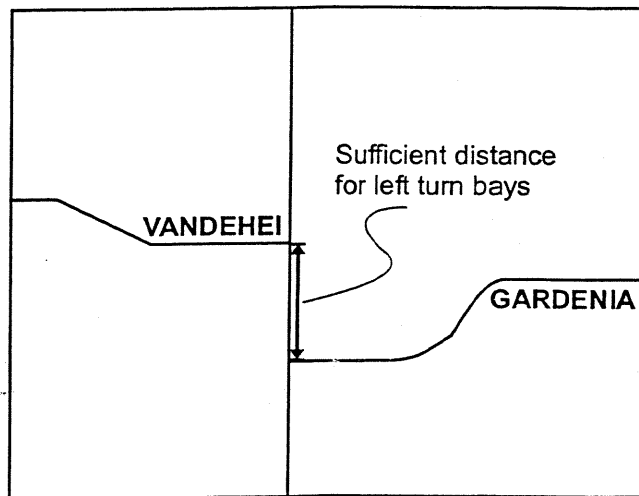


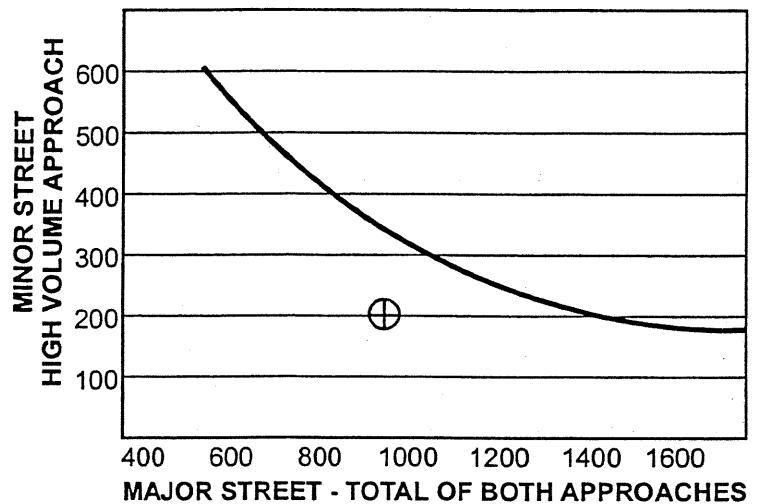
Figure 5-7

Vandehei/Gardenia Intersection Evaluation

ALIGNMENT

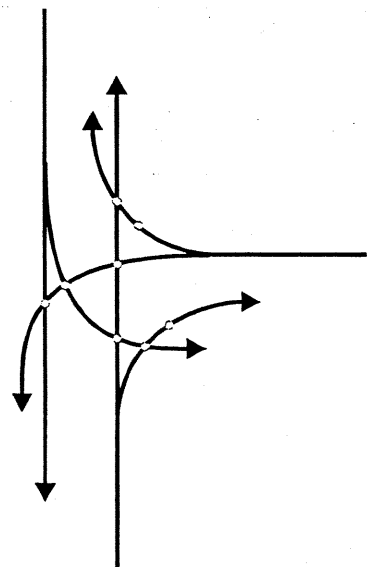
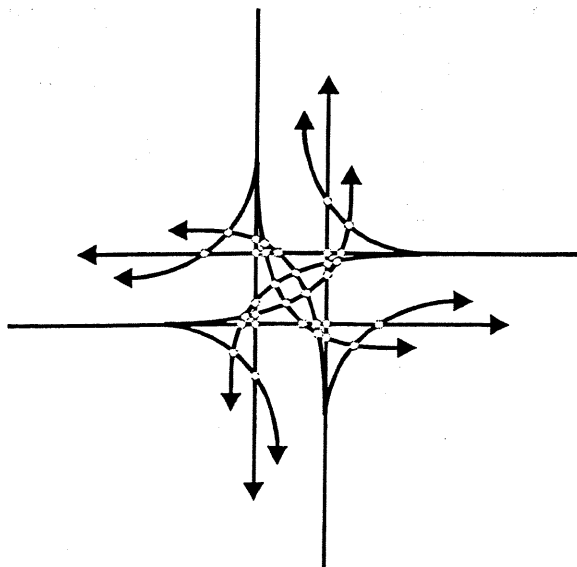


PEAK HOUR VOLUME WARRANT



- Signal Warrants Are Not Met
- Less Than 8% of the Total Traffic on Vandehei at Yellowstone Has Eastbound Trips To and From Gardenia
- Through Movements Are Not Significant
- Separation Will Provide Better Level of Service and Safety

INTERSECTION CONFLICTS DIAGRAM



VI. Action Plan

This section describes the components of the Transportation and Land Use “Action Plan” for the Northwest Cheyenne Area Land-Use and Transportation Study.

A. Land Use Action Plan

The Land Use Action Plan identifies actions by public and private entities as well as capital improvement projects that are required in order to implement the Land Use Plan. When possible the costs of improvements, responsible entities, and potential sources of funding are addressed.

1. Annexation and Improvements to County Enclaves

The City should consider annexing County enclaves and provide incentives that encourage infill development at urban densities and standards. Particular emphasis will be placed on vacant County enclaves. The City will conduct a preliminary inventory and analysis of the County enclaves, identifying issues and required improvements. In general though, the County enclaves will require improvements to sidewalks, the streets network, drainage, water and septic systems

Preliminary studies shall be the responsibility of the City, while the City and potential developers should share the capital improvement costs involved in the development or redevelopment of the County enclaves. Several potential sources of funds to assist in the financing of improvements are available to the City and developers. Federal public infrastructure funds for low and moderate income families and redevelopment of blighted areas are available through Community development funds and the Community Block Grant Program (CDBG). The Wyoming Community Development Authority (WCDA) serves as the State Public Housing Authority and provides financial assistance in the rehabilitation, redevelopment and construction of low-income housing.

The Wyoming State Department of Environmental Quality has a revolving fund of low interest loans that may be available for sanitary system construction and improvements. Similar revolving funds may be also be available for water system improvements. The Environmental Protection Agency and the State of Wyoming may assist in the environmental cleanup of enclaves that pose a threat to the health and welfare of the community.

The City of Cheyenne may also offer several funding mechanisms, including: identifying enclaves as special improvement districts; developing a revolving fund of low interest loans to developers for infrastructure improvements; and classifying the enclaves as redevelopment opportunity zones that allow for more flexible development requirements and higher densities. In addition, the City should aggressively target enclaves for the allocation of future capital improvement funds.

2. Enhancements to the Yellowstone and Dell Range Commercial Corridor

The Plan calls for actions to promote and enhance the Yellowstone/Dell Range commercial corridor. Improvements to the commercial area’s physical environment will be implemented to better serve the needs of pedestrians as well as motorists. Improvements will be made to the area’s sidewalk system to connect focal points of pedestrian activity such as transit stops, street crossings, building entry points and parking areas. Additional improvements, to be completed in

coordination with the airport's long-range plan for the land at Dell Range and Yellowstone, includes the construction of a turn lane from Dell Range to Yellowstone, creation of an attractive gateway to the Dell Range commercial district, and development of an open space buffer and transition to the Yellowstone Addition neighborhood.

3. Annexation and Provision of Services to New Urban Density Development

The Plan calls for the eventual urban density development of an approximately 325-acre vacant area located southwest of East Four Mile Road and Powderhouse Road. In order to develop at urban densities, water and sewer services must be provided and the City should consider annexing the area. According to the BPU, further investigation will be required to determine the most effective means of providing City wastewater treatment and water services to the new development area. This investigation should analyze whether the current wastewater treatment plants serving the BPU sewerable area – Crow Creek WWTP and Dry Creek WWTP – will be able to provide for additional urban development or whether improvements to these plants are required. The study should also target the optimal location for a sewer lift station and accompanying service lines. Developers will pay for preliminary studies and provision of services.

4. New Neighborhood Park

The Plan calls for a new 10 to 14-acre Neighborhood Park in the vicinity of the new urban density development located southwest of East Four Mile Road and Powderhouse Road. The average cost for a new neighborhood park in Cheyenne is estimated to be approximately \$32,500 per acre. Thus, the new park would cost approximately \$325,000 to \$455,000. However, this cost could be reduced if the land is dedicated to the City. The 1992 City of Cheyenne Parks & Recreation Facilities Master Plan recommends that the City institute a policy for neighborhood park land acceptance and development when associated with new residential developments, dedicating easements and rights-of-way for underserved areas needing a neighborhood park.

In addition, a master park plan should be prepared as a means to develop specific costs, types and quality of improvements, phased implementation, and to determine available operations and maintenance resources. The park will be developed in conjunction with the new residential development.

5. Designate Rural Preservation District Overlay Zone Along Northern I-25 and Yellowstone Road and Iron Mountain Road

The Plan designates a rural preservation district overlay zone along the portions of I-25, Yellowstone Road, and Iron Mountain Road north of East Four Mile Road. This overlay district limits the type and intensity of development by implementing more stringent landscaping requirements, increased setbacks, and parking limitations. Developments within 100 feet of each corridor will be included in the overlay district. The Cheyenne and Laramie County Zoning Ordinance and Subdivision Ordinance would require revisions to include this overlay district.

6. Reduced Lot Sizes North of Iron Mountain Road

The area's current Agricultural (A-2) zoning designation requires a minimum of 1 dwelling unit per 20 acres in the agricultural areas north of Iron Mountain Road. Acknowledging the recent trend to develop homes north of Iron Mountain Road, the Plan has reduced the minimum lot size to 1 unit

per 10 acres in an effort to reduce the amount of agricultural land consumed by single development and to limit the eventual sprawl of homes north of Torrington Road. The Cheyenne and Laramie County Zoning Ordinance would require revisions to the Agricultural (A-2) zoning district to reduce the minimum required lot size.

7. Designate Drainageways North of Iron Mountain Road as Open Space

The Plan designates Drainageways north of Iron Mountain Road as an open space overlay zone to restrict development and protect natural areas. Areas within the overlay zone will remain in their natural state or may include minor improvements, such as trails. The Cheyenne and Laramie County Zoning Ordinance would require revisions to include this overlay district. The overlay district would encourage developers to build away from drainageways to create an interconnected system of open space. The open space within the overlay district will be dedicated to the County in the form of a drainageway/conservation easement, allowing for public access to the Drainageways and trails. Developers will be responsible for costs associated with the construction and maintenance of trails.

Table 6-1 Northwest Cheyenne Land Use Action Plan

Project Identification	Action	Cost	Time Table	Responsible Entity
County Enclaves	Consider annexing County enclaves and provide incentives to developers to encourage infill development	To be determined case-by-case	1-5 years	City and County and Developers
Dell Range Boulevard/ Yellowstone Road Intersection	Develop and landscape gateway to Dell Range Commercial district and transition to Yellowstone Addition neighborhood	To be determined	Concurrent w/ Airport Long Range Plan	City and Airport
Yellowstone and Dell Range Commercial Corridor	Improve corridor's street and sidewalk system and enhanced landscape standards.	To be determined	1-5 years	City and County
New (325 Acre) Urban Development Area South of East four Mile Road and West of Powderhouse Road	Annex and provide urban level services. Determine the most effective means of providing City wastewater treatment and water services	Preliminary studies to determine costs	Preliminary Studies: 1-5 years	City and Developers
			Services provided concurrently with development of area	
New Neighborhood Park	Develop a 10 to 14 acre neighborhood park to provide for residents of area southwest of the intersection of East Four Mile Road and Powderhouse Road	\$325,000 to \$455,000	Concurrent with development of area	City and Developers
Corridors Along I-25, Yellowstone Road, and Iron Mountain Road, North of East Four Mile Road	Establish rural preservation district overlay zone along corridors to preserve rural integrity of area. (Requires zoning and subdivision code revisions).	Minimal costs	Implement now	County
Residential Development North of Iron Mountain Road	Revise current zoning and subdivision ordinances to reduce minimum lot size to 10 acres per dwelling unit.	Minimal costs	Implement now	County
Drainageways North of Iron Mountain Road	Designate drainageways as an open space overlay zone to restrict development and protect natural areas. Dedicate open space as a drainage/conservation easement.	Minimal costs	Implement now	County

B. Transportation Action Plan

The primary objective of the Transportation Action Plan is to provide an implementation checklist for development of a balanced, efficient, and safe transportation network that addresses the circulation requirements for the Northwest area of Cheyenne. This action plan addresses the freeway and interchange system, arterial roadway circulation, and specific problem areas. The Transportation Action Plan includes planning level estimates of costs and identifies the responsible entity for recommended improvements.

1. Transportation Issues

a. Interchange Location

The existing I-25/Vandehei interchange bridge structure is in need of rehabilitation and widening to accommodate pedestrians and bicycle facilities. The public has questioned improvements to the current interchange because of traffic volume and speed problems on Vandehei Avenue, and the fact that Vandehei Avenue does not continue east of Yellowstone. In contrast, Four Mile Road, which is one half mile to the north, does provide a continuous roadway to the east. Relocating the interchange to Four Mile Road was believed to provide a direct connection to the interstate from the east and reduce traffic volumes on Vandehei Avenue.

One objective of this study was to analyze what effects various interchange alternatives would have on the transportation system, and to determine if there are compelling reasons to relocate this interchange based on projected traffic volumes. In order to determine what effect these six alternatives would have on the Northwest Cheyenne transportation network, a "link level" volume to capacity (v/c) ratio and corresponding level of service (LOS) analysis was performed.

Overall, each alternative produced high levels of service throughout the study area, with the exception of Yellowstone between Central Avenue and Dell Range. This location is currently experiencing congestion problems, and will continue to deteriorate under all six scenarios.

Based on the analysis it was determined that the location of the interchange or overpass would not significantly change traffic volumes within the study area. Furthermore, it was determined the cost per trip would be significantly less to improve the existing interchange rather than construct a new interchange. Therefore, it is recommended that the existing Vandehei interchange location remain where it is.

b. Vandehei Interchange

The Wyoming Department of Transportation identified deficiencies with the Vandehei interchange and plans improvements to mitigate the deficiencies. These improvements include widening pedestrian and bicycle facilities, structural rehabilitation, and capacity improvements. These safety and capacity improvements will allow the interchange to provide high levels of service.

Two alternatives for solving these deficiencies were identified. One alternative utilizes conventional geometry with stop signs or traffic signals at the intersections, and the other alternative uses a modern roundabout configuration at the intersections.

A comparison of the modern roundabout alternative versus the conventional diamond interchange geometry determined that the modern roundabout interchange alternative will provide higher levels of service and greater safety. In addition, the roundabout alternative has significant advantages over the conventional interchange geometry since it will divert traffic away from Vandehei to Four Mile Road via Hynds Boulevard, following the Transportation Plan recommendation. This advantage results primarily from the fact that the modern roundabout intersection does not assign priority to any given leg of the intersection. Therefore, the delay for all movements through the intersection is substantially reduced.

Given the sensitive nature and newness of this traffic control method in the United States, the design must be very accurate. A peer review of this roundabout interchange is recommended. A design firm with substantial experience designing high capacity modern roundabout interchanges should perform this review.

Cost: \$375,000 - \$425,000
Time: 1-5 years
Responsible Entity: WYDOT

c. Vandehei Avenue, East of I-25

Vandehei Avenue is a collector roadway with one travel lane in each direction plus bicycle lanes. The public outreach effort identified traffic volume and speed problems on Vandehei Avenue, which is adjacent to residential land uses. Concern was also raised regarding increased future traffic volume, which will further divide the residential neighborhood and reduce the opportunities for bicycles and pedestrians to easily cross this roadway.

It was found that moving the interchange to Four Mile Road may reduce traffic on Vandehei Avenue, but this is a very expensive solution and there would be geometric problems at the new location.

The preferred cost-effective solution is to construct traffic calming features on Vandehei Avenue. These traffic-calming improvements will provide the desired effect of diverting traffic away from Vandehei to Hynds Boulevard and Four Mile Road, and slow traffic on Vandehei Avenue.

Cost: \$350,000 - \$500,000
Time: Concurrent with Interchange Improvements
Responsible Entity: City of Cheyenne

d. Hynds Boulevard from Vandehei to Four Mile

This section of roadway provides a critical link for the preferred plan's objective to divert traffic away from Vandehei Avenue. Therefore, it is recommended that this section of road be widened to accommodate increased traffic volume and bicycles concurrently with the Vandehei Avenue traffic calming improvements described previously.

Cost: \$100,000
Time: Concurrent with Vandehei Avenue Improvements
Responsible Entity: WYDOT

e. Four Mile Road from Hynds to Yellowstone

Four Mile Road is identified as a two lane arterial roadway on the Master Street Plan. Improvements to this portion of roadway are very important to the proper operation of the preferred plan's objective to divert traffic away from Vandehei Avenue. Therefore, it is recommended that these improvements be completed concurrently with the traffic calming improvements to Vandehei Avenue.

Cost: \$115,000
Time: Concurrent with Vandehei Avenue Improvements
Responsible Entity: County

f. Frontage Roads

The frontage roads, Hynds and Bishop, serve an important role in the transportation system for this area. Therefore, it is recommended that these roads be retrofitted with bike lanes on both sides of the street. Also, sidewalks on one side of the road would be desirable if sufficient right-of-way width is available. Another design concept that would serve the needs of pedestrians and bicyclists, and which might be cost effective and desirable from a user perspective, is an 8'-10' wide combination bicycle / pedestrian facility that is detached from the roadway. This type of facility could be placed on only one side of the roadway, saving the costs of widening the street while still providing the desired pedestrian and bicycle facilities. However, particular care must be used at the street crossings to promote safe crossings.

Cost: \$100,000 - \$500,000
Time: 3-7 years
Responsible Entity: WYDOT / City

g. Gardenia \ Vandehei Avenue Intersection

The Master Street Plan shows Vandehei and Gardenia aligned with each other. This intersection does not meet signal warrants with current traffic volumes or the projected twenty-year traffic volumes. Therefore, the need or efficiency gained by aligning the two streets to provide signalized traffic control is not realized. Furthermore, these two streets have sufficient separation between them for proper intersection design and operation, and two "T" intersections are safer than one "cross" intersection. It is recommended that these two streets remain in their current alignment.

This conclusion is further supported by the fact that Gardenia Avenue currently serves a residential area and provides direct access to the homes via driveways (residential loading). The street design identified in the Master Street Plan would result in direct negative impacts to those residents. The recommended discontinuous design for Gardenia Avenue will discourage cut through traffic.

Cost: \$100
Time: Now
Responsible Entity: Developer

h. Powderhouse Connection

The question was raised regarding the impacts of extending Powderhouse North of Iron Mountain to connect with U.S. 85. Based on the Wyoming Department of Transportation traffic analysis model with the Powder House connection, traffic increases from 1100 to 3100 south of Iron Mountain, and from 600 to 2700 north of Iron Mountain. Powder House is planned to be a two lane arterial street in the Master Street Plan and, therefore, will accept the projected traffic volumes while still providing high levels of service.

It should be noted that this model did not show major reductions in traffic anywhere else in the study area that would warrant the Powderhouse connection. However, the Powderhouse Connection would provide improved access to U.S. 85, and should be considered as the area develops.

Cost:	\$200,000 - \$300,000
Time:	When development occurs North of Iron Mountain
Responsible Entity:	County, Developers

i. Street Connectivity

Historically, cities developed their street system on a grid pattern. Since World War II, development patterns have favored discontinuous curve-linear street systems with many cul-de-sacs. The advantages of discontinuous winding roadways are low volume safe streets. However, disadvantages of this type of street layout include increased vehicle miles traveled (VMT), excessive loading of the arterial street system, and lack of pedestrian and bike connectivity which contributes to increased automobile use.

It is recommended that street connectivity be planned for in all new development proposals. The hierarchy of streets for new development is dependent on the type, density, and location of the development. Collector streets should be connected to the arterial street system at not less than one quarter mile spacing. It is recommended that these connections be made as a "T" type intersection with proper spacing. In most cases this will preclude the need for signalization and provide safer intersections.

The street system for all new developments should be designed to provide the desired connectivity. Proper design of the connectivity is essential for precluding undesirable traffic patterns such as cut-through or excessive volumes on existing or future streets. This can be accomplished by requiring a traffic impact study for all new developments. The traffic impact study should address the needs of the entire area as well as the proposed development. This will ensure a transportation network that works for the entire northwest area, and not just the proposed development.

Cost:	Variable
Time:	Concurrent with new development
Responsible Entity:	City, County, Developers

j. Bicycle Connections

The Northwest area has two important projects that provide critical links for completing the “Cheyenne Greenway Bike System”. The Prairie Avenue Reconstruction Project, and the Seminole Road and Weaver Road Reconstruction Project.

The driving force behind both of these projects is storm water drainage improvements for the entire area. Both of these projects are under study by a drainage committee.

These two projects will provide underpasses for two roadway crossings for the Dry Creek section of the Greenway. These projects will allow the “Cheyenne Greenway Bike System” to provide high level of service and greater safety for its users.

Cost: \$100,000 - \$915,000
Time: 5-8 years
Responsible Entity: City of Cheyenne

k. Access Control Plan

It is recommended that an access control plan be completed for Yellowstone Road. The major goal of an access control plan is to improve safety, decrease hazards and congestion, and increase or protect roadway capacity (the ability of a roadway to accommodate vehicles). Another component of the access control plan could be used to address landscape and pedestrian needs to improve the “pedestrian friendliness” and overall aesthetics of Yellowstone Road.

Cost: \$10,000 - \$15,000
Time: 1-3 years
Responsible Entity: City of Cheyenne

l. Yellowstone Road: Central Avenue to Dell Range

Capacity problems currently exist on this section of Yellowstone Road, and it fails under all alternatives for the future traffic condition. The Wyoming Department of Transportation has planned capacity improvements to Central Avenue, including the re-design of the Central Avenue Yellowstone Intersection.

It is recommended that the Central Avenue improvements include the widening of Yellowstone between Central and Dell Range and be completed concurrently to accommodate existing and future traffic.

Cost: To Be Determined
Time: Concurrently with Central Avenue Improvements
Responsible Entity: City of Cheyenne / WYDOT

Table 6-2 Northwest Cheyenne Transportation Action Plan

Project Identification	Action	Cost	Time Table	Responsible Entity
Vandehei Interchange Improvements	Re-construct Interchange Over-crossing utilizing Modern Roundabout geometry at on / off ramps	\$375,000 - \$425,000	1 – 5 years	Wyoming Department of Transportation (WYDOT)
Vandehei Avenue from I-25 to Yellowstone	Design and Construct Traffic Calming Features	\$350,000 - \$500,000	Concurrent with Interchange Improvements	City of Cheyenne
Hynds Boulevard from Vandehei to Four Mile Rd	Widen to provide additional capacity	\$100,000	Concurrent with Vandehei Avenue Improvements	County, WYDOT
Four Mile Road from Yellowstone to Hynds	Retrofit to accommodate Pedestrians and Bicycles	\$ 115,000	Concurrent with Vandehei Avenue Improvements	County
Frontage Roads, Hynds and Bishop (Central to Four Mile)	Retrofit to accommodate Bicycles	\$300,000 - \$600,00	3 – 7 years	City, WYDOT
Gardenia \ Vandehei Intersection	Revise Master Street Plan to show current offset	\$100	N/A	Developer
Powderhouse Connection North to U. S. 85 (Torrington Rd)	Connect Powderhouse Road from Iron Mountain North to U.S. 85	\$270,000	When development occurs North of Iron Mountain	County, Developers
Street Connectivity Bicycle Connections	Promote Multiple Access Opportunities	\$0	Require Traffic Impact Studies with new development 5 – 8 years	City, County, Developers City of Cheyenne
	Complete The Seminole Road and Weaver Road Reconstruction Project	\$300,000 - \$915,000		
Yellowstone Road from Central to Gardenia	Complete The Prairie Avenue Reconstruction Project	\$100,000 - \$825,000	1-3 years	City of Cheyenne
	Prepare an Access Control Plan for Yellowstone Road	\$10,000 - \$15,000		
Yellowstone from Dell Range to Central	Widen	To be determined	Concurrently with WYDOT Yellowstone / Central Improvements	City / WYDOT

Appendix A

List of Reviewed Plans and Reports

1. F.E. Warren Air Force Base General Plan, August 1996.
2. Cheyenne Area Development Plan, An Update, 1992.
3. Laramie County Comprehensive Plan 1982.
4. Cheyenne Area Master Transportation Plan, 1994.
5. Innovative Finance Analysis, Transportation Improvement Programming Process, and 1997 Project List Update, 1997.
6. Cheyenne Area Interstate Interchange Report, 1996.
7. Cheyenne Area Transportation Planning Process (ChATPP) Transportation Improvement Program Annual and Three Year Element, For Fiscal Years Fiscal Years 1997-2000, 1997.
8. Cheyenne Water Supply Master Plan, Level 1, Volumes 1-3, 1994.
9. North Cheyenne Master Plan Level 1 Project 1993.
10. Wastewater Treatment and Collection Systems Master Plan, 1995

1. **F.E. Warren Air Force Base General Plan, August 1996.**

Owner/Sponsor: United State Air Force

Date: August 1996

Report Type: Master Plan

Location: F.E. Warren Air Force Base, northwest of the City of Cheyenne

Description: The General Plan (GP) provides an understanding of the essential characteristics and capabilities of the Base and assesses potential for development. It will be used as the basis for all future development within F.E. Warren AFB. The General Plan consists of several chapters: Goals and Objectives; Findings and Recommendations; Installation and Vicinity Profiles; Component Plan Overview; Composite Constraints and Opportunities; Infrastructure; Land Use; and Capital Improvements Program.

Relevance to Northwest Cheyenne Infrastructure and Development Plan:

F.E. Warren AFB houses the 90th Missile Wing and is one of the City's largest employers. Several findings and recommendations identified in the General Plan may affect the development of housing and transportation facilities in Northwest Cheyenne. First, the General Plan found that no major mission changes or population fluctuations are anticipated in the foreseeable future at the Base. However, more than 900 families are on the waiting list for Base housing, with waiting periods of six months to two years, and a housing study found a shortfall of 429 housing units on the Base. In addition, it found that the demand for affordable housing in Cheyenne exceeds the demand. It recommended that the Base and City work together to resolve this problem.

The General Plan also recommends the opening of the North Gate to provide direct access via Central Avenue to the Capehart Housing and new Junior Enlisted Housing Areas, and other facilities in the northern part of the base. However, the current Security Police (SP) staffing level was not adequate, at time of publication, to support this proposal.

2. Cheyenne Area Development Plan, An Update, 1992

Owner/Sponsor: Adopted by Cheyenne City Council and the Laramie County Board of Commissioners.

Date: 1992

Report Type: Comprehensive Plan

Location: Cheyenne Urban Boundary, as established by the U.S. Census Bureau. The Urban Boundary also includes the F.E. Warren Air Force Base.

Description: The 1991 Cheyenne Area Development Plan updates the 1982 Cheyenne Area Development Plan. The 1991 Cheyenne Area Development Plan is the equivalent of a "comprehensive" or "master plan" as specified by state law. Thus, it sets out a community vision, analyzes economic and community conditions, establishes goals and policies which will assist in reaching this vision, and outlines an implementation strategy to realize these goals and policy. The planning horizon for the Plan was ten years. The primary focus of the Plan was to ensure that future land uses are linked with future roadways.

The 1991 Cheyenne Area Development Plan cited several factors compelling the City to update and revise the 1982 Plan. Several of these factors include the following:

- Reduction in people employed in the energy industry and the exodus of these people seeking employment in different areas. Thus, instead of stressing a need to control growth resulting from the energy development "boom," the 1991 Plan emphasized the need to find means to pull the State and local economy out of this economic down-turn and the resulting loss of tax base. In addition, a national shift in focus in the military, affecting F.E. Warren AFB, pointed towards a small decline in the positive economic impact of the Base on the community.
- Revisions in the zoning ordinance and other developmental regulations created changes in both definitions concerning land use and in land use boundaries.
- Need to reevaluate policies concerning floodways and the preservation of environmentally sensitive lands.
- Methods of solid waste disposal and declining groundwater problems in the northern areas of the community will affect development in the City.

Relevance to the Northwest Cheyenne Infrastructure and Development Plan:

Issues and Goals

- **Housing:** Most of the recent residential development has occurred in the northern and eastern portions of the Cheyenne Urban Boundary. Most of the residential development in North Cheyenne are on large lots and these homes are significantly more expensive than the average home in Cheyenne. This trend toward residential growth in the northern section of Cheyenne can strain the capacity of existing public facilities and services, such as roadways. Ground water problems also exist in the area of the North Cheyenne ranchettes. The Plan also

expressed a shortage of rental housing in the city.

- Commercial: Although residential land uses make up most of the northwest study area, significant portions of the Dell Range/Yellowstone commercial corridor area are located in the southern end of the study area. The Plan called for the intensification of commercial uses this area to meet the needs of residents in this high growth area. It stressed the need to improve the flow of traffic through the area and other improvements to other public facilities to achieve non-disruptive and quality development.
- Transportation: The Plan addressed the need to improve the transportation facilities throughout Northern Cheyenne. More specifically, the concentrated commercial growth along the Dell Range/Yellowstone corridor and the development of residential neighborhoods adjacent to this corridor has created traffic flow problems that need to be addressed.

Significant Policies Related to Northwestern Cheyenne:

- Rural Residential Development: The current pattern of large-lot subdivision development occurring in Northwest Cheyenne strains the ability of the County to provide services such as road maintenance and fire and police protection. The Plan encourages the clustering of housing in rural subdivisions to more efficiently provide roads and other public services. Policy making should also consider ensuring sufficient groundwater in rural areas and in particular, North Cheyenne.
- Annexation Policies: A compact city configuration is a priority.
- Agricultural Land Policies: Concentrating urban development in the urban service area in order to reduce encroachment on agricultural lands.

3. Laramie County Comprehensive Plan

Owner/Sponsor: Laramie County Planning Advisory Committee

Date: 1982

Report Type: County Comprehensive Land Use Plan

Location: Laramie County

Description: The Comprehensive Land Use Plan presents goals and policies related to future land development in the County. It does not define specific land uses in the county nor suggest uses on a map, instead it was intended to be used as an advisory tool for Laramie County Commissioners, land owners and developers, and local officials to direct the way development will occur in the County. At the time of this report, the County was in the process of updating this Plan, thus the 1982 Plan was still the official land use policy document for the County.

Major policies identified in the Comprehensive Land Use Plan include the following: Public Services; Water Supply; Agricultural Lands; Water Quality and Sewage Disposal; Erosion Control; Maintenance of Livestock in Subdivisions; Scenic Resources; Wildlife and Ecosystems; Rights-of-Way; Floodplains; Quality of Construction; Land Use; Multiple-Family Development; Industrial and Commercial Development; Junk and Salvage Yards; Cooperation Between Local Governments; Mobile Homes; Lot Sizes; and Public Information.

Relevance to the Northwest Cheyenne Infrastructure and Development Plan:

Since much of the Northwest Cheyenne area is located outside of Cheyenne City limits, recommendations for such areas in the Northwest Cheyenne Plan should be consistent with the policies set forth in the Laramie County Comprehensive Land Use Plan. Particular focus should be placed on policies that are related to the availability of services, preservation of important agricultural lands, preservation of scenic and natural resources, protection from natural and man-made hazards, location, type, and intensity of land use, and cooperation between local governments.

In general, approval of developments within the County is contingent on the demonstration that adequate public services, such as road maintenance services, police services, fire and emergency services, solid waste, water, and wastewater can be provided. Where possible, the County emphasizes coordination with municipalities plans that identify areas for urban level by limiting low-density development in those areas, in order to encourage the types of growth the municipality desires and to more efficiently provide public services.

The appropriate location and intensity of rural subdivisions is a fundamental objective of the Plan. The clustering of rural subdivisions is encouraged in areas within reasonable distance from the City and priority for rural subdivisions shall be given to areas where available government services have the capacity to adequately supply the proposed development. Rural subdivisions are discouraged in areas that are most suitable for agricultural use. In addition, new rural subdivisions outside of municipal water supply boundaries would have to provide well water. The availability of water is an issue and new developments may infringe upon supplies currently used for agriculture, residential, and other uses. The Plan calls for all sewage disposal systems and domestic water wells

throughout the County to be located and designed to avoid contamination of wells and ground water and to function properly. Although the County encourages clustering of rural subdivisions, the intensity of septic systems in close proximity to each other may contaminate water wells. In many cases, the proper design and location of wells and septic systems can overcome this problem. One possible solution would be to provide a common water distribution system.

Residential subdivisions are generally better suited in lands already developed or in close proximity to developed area, where jobs and services are more readily available "leap frog" developments place a strain on the County to provide services and reduce the agricultural production capacity of the area.

4. Cheyenne Area Master Transportation Plan

Owner/Sponsor: Cheyenne Area Transportation Planning Process (ChATPP)

Date: 1994

Report Type: Long range regional transportation plan

Location: Cheyenne Area

Description: The Cheyenne Area Master Transportation Plan is the long-range transportation plan for the Cheyenne Area. It provides comprehensive examination of the existing transportation system and identifies the multi-modal transportation needs over the next twenty years. The Plan includes the following elements: Area Bikeway and Pedestrian Plan, Transit Plan, Roadway Plan, Aviation Plan, and Freight and Rail Plan.

Relevance to the Northwest Cheyenne Infrastructure and Development Plan: An analysis of specific conditions and recommendations for the study area and knowledge of the entire Cheyenne Area's transportation network will be vital to the development of the Development Plan. Chapter Six, Proposed Twenty-Year Projects, listed several projects located within the study area which needed construction or reconstruction. However, the Twenty-Year Project List was updated in the Innovative Finance Analysis, Transportation Improvement Programming Process, and 1997 Project List Update.

5. Innovative Finance Analysis, Transportation Improvement Programming Process, and 1997 Project List Update

Owner/Sponsor: Cheyenne Area Transportation Planning Process (ChATPP)

Date: December 15, 1997

Report Type: Short and Long Range Transportation Plan

Location: Cheyenne Area

Description: Update of the twenty-year list of road and street transportation improvement projects previously identified in the Cheyenne Area Master Transportation Plan in 1994.

Relevance to the Northwest Cheyenne Infrastructure and Development Plan: This report ranks each project as a high, medium, or low priority. High priority projects are those targeted for implementation within five years. Many of these projects are located entirely or partially within the study area. The following attached tables include these projects within the study area.

Table 1. City of Cheyenne Projects			
H= High, M= Medium, L= Low			
Priority	Project Name and Location	Estimated Cost	Potential Jurisdiction or Funding
H	Storey Blvd. Extension and construction between Sycamore and College including the reconstruction of the Storey Blvd. And Powderhouse intersection.	\$4,500,000	1%/SFLB
H	Yellowstone and Dell Range access management study/improvements.	\$500,000	1%
M	Prairie Avenue reconstruction between Dell Range and Hoy with drainage improvements at Dry Creek Greenway separation.	\$500,000	1%
M	Semirole/Weaver/Melton reconstruction with Dry Creek drainage improvements and Greenway grade separation.	\$600,000	1%
M	Weaver and Dry Creek reconstruction and improvement Greenway underpass	\$600,000	1%
L	Weaver Road reconstruction between Storey and Gardenia with a cul-de-sac off Willshire at the top of the hill.	\$850,000	
L	Powderhouse/airport Parkway underpass construction between Airport Parkway and Dell Range/Powderhouse intersection.	\$25,000,000	
L	Gardenia construction between Weaver and Powderhouse		Developer
L	Gardenia construction between Yellowstone and Volar.		Developer

Table 2. Laramie County Projects			
H= High, M= Medium, L= Low			
Priority	Project Name and Location	Estimated Cost	Potential Jurisdiction or Funding
H	Ridge Road reconstruction between Carla and Riding Club Road: Riding Club reconstruction between Yellowstone and Ridge. 1997.	\$3,500,000	SC-CFM/SFLB

Table 3. Wyoming Department of Transportation Projects			
H= High, M= Medium, L= Low			
Priority	Project Name and Location	Estimated Cost	Potential Jurisdiction or Funding
H	Various maintenance projects on all state highways in the area (Approximately \$1,000,000 per year)	\$20,000,000	FED/STATE
H	Vandehei Interchange resurface and structure widening of I-25 from milepost 13.64 to 17.6. FY1998.	\$8,505,000	FED/STATE
H	Dell Range Blvd. To the I-25/Central Ave. interchange access improvement. (Consideration for this access improvement will be sensitive to the Airport Golf Course).	N/A	FED/STATE
M	Torrington U.S. 85 Interchange on I-25 reconstruction.	\$4,000,000	FED/STATE
L	Riding club Road construction of I-25 interchange.	\$2,000,000	FED/STATE

6. Cheyenne Area Interstate Interchange Report

Owner/Sponsor: Wyoming Transportation Department

Date: May 1, 1996

Report Type: Interchange Report

Location: Cheyenne area

Description: The report evaluates the need for four interchanges proposed in the long range Major Roadway Systems Plans for the Cheyenne community. It analyzes existing conditions, expected twenty-year growth in the area, the potential impact of each proposed interchange, and presents recommendations based on this evaluation. More specifically, the report (1) evaluates the efficiency of the existing interstate facilities in the City and adjacent public roadways to handle existing and forecasted twenty-year traffic; (2) evaluates the potential transportation system management type improvements which might be of value in conjunction with the utilization of the Interstate System; (3) examines whether the proposed interchanges will have an adverse impact upon safety and use of the Interstate System; (4) evaluates the relationship of the proposed interchanges with the anticipated twenty-year growth of the City; and (5) tests whether these proposed interchanges will be in sync with the specific improvements proposed in the targeted in the Innovative Finance Analysis, Transportation Improvement Programming Process, and 1997 Project List Update.

Relevance to the Northwest Cheyenne Infrastructure and Development Plan:

One of the proposed interchanges is located within the study area: I-25 and Riding Club Road. The report found that the Riding Club interchange would primarily serve and enhance the growth of the community on the western side of F.E. Warren AFB. The study determined that the Riding Club interchange, while not needed in the short-term, will alleviate some of the proposed traffic congestion that is forecasted to occur along the existing interchanges serving central and north Cheyenne within the next twenty years.

7. **Cheyenne Area Transportation Planning Process (ChATPP) Transportation Improvement Program Annual and Three Year Element, For Fiscal Years Fiscal Years 1997-2000**

Owner/Sponsor: Cheyenne Area Transportation Planning Process (ChATPP)

Date: June 6, 1997

Report Type: Short Term Transportation Improvement Program

Location: Cheyenne Area

Description: The ChATPP (1997-2000) Transportation Improvement Program (TIP) identifies all federally, state, and local funded transportation projects that are anticipated for funding in the Cheyenne area during the fiscal years 1997 - 2000. This multi-modal program includes improvements to highways, transit, airport, and non-motorized facilities and facilities. Projects listed in this TIP were listed in the Master Transportation Plan and listed as a high priority. The TIP further prioritizes these projects based on their relative importance and establishes the appropriate year for project initiation. Next, the TIP evaluates the economic feasibility of the project. In addition, the TIP includes work planned by the Cheyenne Board of Public Utilities (BPU).

Relevance to the Northwest Cheyenne Infrastructure and Development Plan: This report provides information on the type, location, and timing of proposed improvements that will occur partially or entirely within the study area. Significant projects include improvements to I-25 and E. Riding Club Rd. These projects are contained in the enclosed tables.

Table 1 Fiscal Year 1997-98 Highest Priority Federally Funded Projects For The Cheyenne Urban Area					
Project	Agency	Federal Funds	State Funds	Local Funds	Total Funds
Riding Club Road	WYDOT/County	\$792,000	\$1,038,832	\$78,192	\$1,909,024
I-25 Reconstruction	WYDOT/County	\$6,963,890	\$541,110		\$7,505,000

Table 2 Fiscal Year 1997-98 Highest Priority State and Local Funded Projects For The Cheyenne Urban Area				
Project	Agency	State Funds	Local Funds	Total Funds
I-25 Repair	WYDOT	\$233,000		\$233,000

8. Cheyenne Water Supply Master Plan, Level 1, Volumes 1-3

Owner/Sponsor: Wyoming Water Development Commission and the Cheyenne Board of Public Utilities

Date: July 1994

Report Type: Long Range Metropolitan Water Supply Master Plan

Location: Cheyenne Area

Description: The Cheyenne Water Supply Master Plan is a long-range Level 1 water supply master plan for the Cheyenne Board of Public Utilities (BPU). The purpose of the report is to guide the BPU in developing strategies related to future water supply, treatment, and distribution systems. It includes the BPU service area and areas that may be included in the service area by the year 2004. The primary water source for the area originates in the Crow Creek drainage system and 38 wells, which are used primarily in the summer. Most of the Cheyenne distribution area is served by gravity, except for the northern portions of the service area, which are served by the Western Hills and Monterey pumping stations.

Relevance to the Northwest Cheyenne Infrastructure and Development Plan: The plan identifies the water supply service needs of the northwestern Cheyenne area. Please refer to the enclosed table.

Table 1-10 Recommended Improvement Mains			
Year when main is needed	Size (in)	Length (ft.)	Probable Const. Cost (\$)
North Cheyenne – Upper Zone			
Year 2004 (1)	12	<u>30,593</u>	<u>1,285,000</u>
subtotal		30,593	1,285,000
Year 2020	12	<u>36,153</u>	<u>1,518,000</u>
subtotal		36,153	1,518,000
North Cheyenne – Lower Zone			
Year 2004	12	26,868	1,348,000
	16	5,352	385,000
	20	<u>1,077</u>	<u>97,000</u>
		33,297	1,831,000
subtotal			
Year 2020	12	<u>35,787</u>	<u>1,568,000</u>
subtotal		35,787	1,568,000

(1) Assumes Tank Site

9. North Cheyenne Master Plan Level 1 Project

Owner/Sponsor: Wyoming Water Development Commission

Date: July 1993

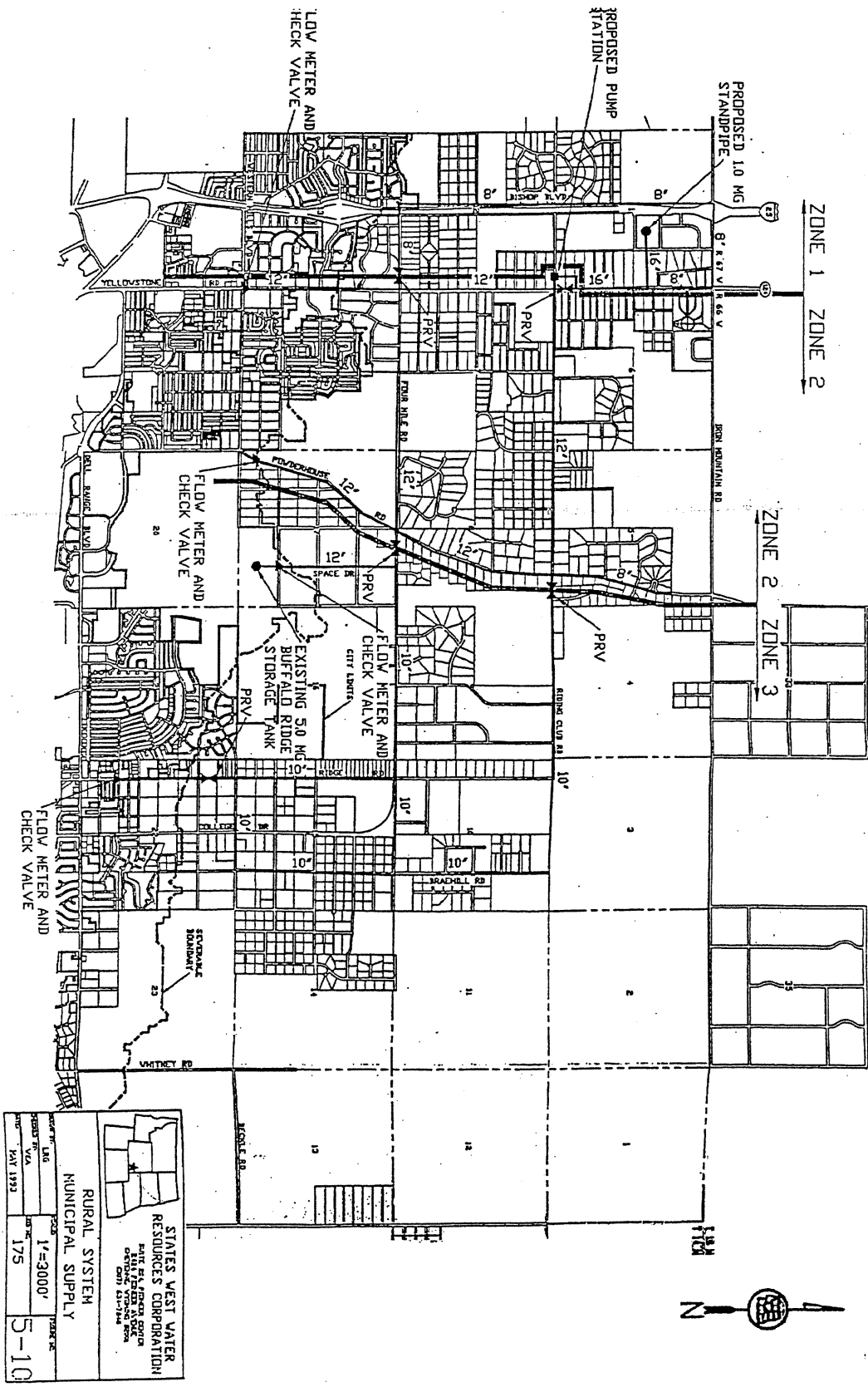
Report Type: Water Supply Master Plan

Location: Cheyenne Area

Description: The study developed a water supply master plan for the North Cheyenne area. Current area residents are not provided community water and sewer service. Water is obtained from wells drilled into the underlying aquifer, and sewage is disposed into private septic systems. The study area is bounded by Warren AFB to the west, Dell Range Boulevard to the south, Iron Mountain Road to the north, and extends one mile east of Whitney Rd.

Relevance to the Northwest Cheyenne Infrastructure and Development Plan: The report identified three problems related to groundwater supplies in North Cheyenne. The primary problem is declining water levels in the aquifer system underlying the area attributed to use by existing and new residents. This area is experiencing a two- percent annual growth rate. Another problem is degradation of water quality by septic systems and other human activities. It is estimated that 30 percent of the water pumped from the aquifer will eventually return through septic tanks as recharge. Thus, if the current supply system is not changed continued development in the area might cause problems in the area. A third problem is the physical deterioration of wells.

The report recommends a rural distribution system with water supply from the City of Cheyenne is the best water supply system. The estimated cost for the entire main distribution system is \$5,000,000. The enclosed map identifies the location of proposed pump stations and water mains in the study area. If this supply system is not determined to be feasible or affordable, then a recharge program utilizing excess water from the City of Cheyenne should be considered. The cost of such a system would be approximately \$2,750,000.



10. Wastewater Treatment and Collection Systems Master Plan

Owner/Sponsor: Cheyenne Board of Public Utilities (BPU)

Date: June 1995

Report Type: Infrastructure Master Plan

Location: Cheyenne Area

Description: The study determines the collection and treatment system improvements necessary to meet future growth needs and National Pollutant Discharge Elimination System (NPDES) permit limits. In addition, the study determines the cost of these improvements. The study area for the Master Plan is identical to the planning area boundary used in the 1994 Cheyenne Water Supply Master Plan. This area includes North Cheyenne, which is the largest unincorporated population center not served by the BPU. In general, the North Cheyenne area boundary extends from the FE Warren Air Force Base to the west, Cheyenne City limits to the south, Christensen Road to the east, and one mile north of Iron Mountain Road to the north. The area encompasses over 30 square miles. The area consists of primarily large-lot homes that currently use individual septic systems for wastewater treatment and disposal.

The Plan evaluated issues affecting growth in the study area to determine future collection and treatment system needs. The Cheyenne-Laramie County Regional Planning Office (RPO) provided current and future land-use projections for 1990 and 2040. The RPO projections estimated that the City and surrounding area will grow at approximately 1.0 percent per year. Much of this growth, approximately 70 percent, is anticipated to occur in the incorporated and unincorporated North Cheyenne area. Hence, the projected growth rate for Northern Cheyenne is approximately 2.0 percent.

Relevance to the Northwest Cheyenne Infrastructure and Development Plan: Although most of the projected growth is expected to occur in North Cheyenne, only a portion of this area is expected to hook-up to the BPU sewer system. Table 1-2 in the Plan presents the expected future population in the area and the portion of the population anticipated to connect to the BPU system. Relevant portions of this table are included below.

Table 1-2 Future Population				
Area Population	Year			
	1995	2000	2010	2020
North Cheyenne				
Sewered Area ⁽¹⁾	-	432	1,362	1,648
Unsewered Area	4,554	4,938	5,638	6,982
Total	4,554	5,370	7,000	8,630

(1) Values reflect only the portion of the North Cheyenne population that is north of the Dry Creek Basin sewerable boundary and are assumed to connect to the public sewer system.

As in the past, septic systems will continue to provide wastewater management in unsewered areas. However, the study found potential wastewater management problems in the North Cheyenne area. Additional development north of the present waste water service area, together with declining groundwater levels, have raised concerns about the impact of large numbers of septic systems on the quality of groundwater. The Plan recommends the collection of wastewater from areas with concentrated development to avoid potential problems. It is anticipated that large lot residential developments will continue to use septic systems.

Table 5-3 from the Plan, which is attached to this document, presents the recommended sewers for North Cheyenne. This table includes the recommended phasing for construction, length and diameter of lines, and anticipated project costs. It should be noted that the Plan did not officially recommend these improvements in the Master Plan due to uncertainties related to cost, timing, and destination of sewer line.

TABLE 5-3
RECOMMENDED SEWERS FOR NORTH CHEYENNE⁽¹⁾

Stage	Reference ⁽¹⁾	Length	Diameter	Probable Project Costs ⁽²⁾
		(ft)	(in.)	(\$)
1	1	11,830	12 ⁽³⁾	574,000
1	2	6,730	12 ⁽³⁾	323,000
1	3	2,700	12 ⁽³⁾	130,000
1	4	4,810	12	232,000
1	4	3,080	10	135,000
1	5	2,540	10	111,000
Subtotal Stage 1		31,690		1,505,000
2	6	3,090	10 ⁽³⁾	124,000
2	6	2,980	10 ⁽³⁾	119,000
2	7	3,670	10 ⁽³⁾	147,000
2	7	2,350	10	103,000
2	8	2,210	8	89,000
Subtotal Stage 2		14,300		582,000
3	9	11,700	10 ⁽³⁾	468,000
3	10	8,270	10	364,000
3	11	2,390	8	92,000
3	12	3,350	8	135,000
Subtotal Stage 3		25,710		1,059,000
TOTAL NORTH SYSTEM		71,700		3,146,000

⁽¹⁾Reference numbers are keyed to Figure 5-10.

⁽²⁾Costs are referenced to December 1994 (ENR-BCI = 3110) and include 20 percent for contingencies and 15 percent for engineering. No inflationary allowances are included in the above cost opinions.

⁽³⁾Future parallel sewers will be required.

NOTE: North Cheyenne Collection System Facilities not Included in Recommended Improvements.

North Cheyenne WWTP

12 3, 8"

11 3, 8"

10 3, 10"

9 3, 10"

8 2, 8"

7 2, 10"

6 2, 10"

5 1, 10"

4 1, 10-12"

3 1, 12"

2 1, 12"

1 1, 12"

10 1, 10"

25

27

19

Four Mile Road

Perry Old Road

Appendix B

1997 Alternative Comparisons

Street Name	Link Description	Daily Capacity	Functional Classification	#1 - Base Condition			#2 - Additional Overpass at Four Mile			#3 - Additional Interchange at Four Mile and Riding Club			#4 - Four Mile Interchange nothing at Vandehei			#5 - Four Mile Interchange Overpass at Vandehei		
				A.D.T.	V/C	LOS	A.D.T.	V/C	LOS	A.D.T.	V/C	LOS	A.D.T.	V/C	LOS	A.D.T.	V/C	LOS
Riding Club Road	W. of I-25	10,000	Collector	200	0.02	A	250	0.03	A	700	0.07	A	200	0.02	A	200	0.02	A
Riding Club Road	E. of I-25	10,000	Collector	600	0.06	A	500	0.05	A	1800	0.18	A	800	0.08	A	800	0.08	A
Riding Club Road	E. of Yellowstone	10,000	Collector	1600	0.16	A	1600	0.16	A	1700	0.17	A	1600	0.16	A	1600	0.16	A
Brittany Drive	W. of I-25	5,000	Local	700	0.14	A	500	0.10	A	2500	0.50	A	3000	0.60	B	3200	0.64	B
Four Mile Road	E. of I-25	10,000	Principle Arterial	600	0.06	A	1200	0.12	A	2350	0.24	A	3300	0.33	A	2900	0.29	A
Four Mile Road	E. of Yellowstone	10,000	minor arterial	2800	0.28	A	2900	0.29	A	3100	0.31	A	3300	0.33	A	3200	0.32	A
Vandehei Ave.	W. of I-25	15,000	Collector	3700	0.25	A	3500	0.23	A	2500	0.17	A	500	0.03	A	1800	0.12	A
Vandehei Ave.	On Overpass	15,000	Collector	6800	0.45	A	6000	0.40	A	4100	0.27	A	0	0.00	A	3100	0.21	A
Vandehei Ave.	E. of I-25	15,000	Collector	4100	0.27	A	3200	0.21	A	2600	0.17	A	1300	0.09	A	2200	0.15	A
Gardenia	E. of Yellowstone	5,000	Collector	900	0.18	A	900	0.18	A	800	0.16	A	800	0.16	A	900	0.18	A
Western Hills Blvd	E. of Western Hills	24,000	Minor Arterial	4300	0.18	A	3200	0.13	A	4200	0.18	A	4000	0.17	A	4300	0.18	A
Storey Blvd	E. Yellowstone	24,000	minor arterial	5900	0.25	A	5900	0.25	A	5800	0.24	A	5600	0.23	A	5900	0.25	A
Manewal Drive	Western link	15,000	Collector	8300	0.55	A	8300	0.55	A	8300	0.55	A	8300	0.55	A	8300	0.55	A
Yellowstone Road	S. of Dell Range	36,000	Principle Arterial	35,700	0.99	E	35600	0.99	E	34800	0.97	E	35300	0.98	E	35200	0.98	E
Yellowstone Road	S. of Storey Blvd.	36,000	Principle Arterial	13,200	0.37	A	13000	0.36	A	12200	0.34	A	12200	0.34	A	12700	0.35	A
Yellowstone Road	S. of Gardenia	36,000	Principle Arterial	8,400	0.23	A	8200	0.23	A	7500	0.21	A	8800	0.24	A	7900	0.22	A
Yellowstone Road	S. of Four Mile	36,000	Principle Arterial	7,200	0.20	A	6500	0.18	A	5100	0.14	A	5300	0.15	A	5200	0.14	A
Yellowstone Road	S. of E. Maverick Rd.	36,000	Principle Arterial	4,600	0.13	A	2800	0.08	A	3400	0.09	A	3600	0.10	A	3700	0.10	A
Hynds Blvd	S. of Vandehei	10,000	Collector	1900	0.19	A	1900	0.19	A	1900	0.19	A	800	0.08	A	1700	0.17	A
Hynds Blvd	N. of Vandehei	10,000	Collector	500	0.05	A	1000	0.10	A	600	0.06	A	2100	0.21	A	900	0.09	A
Hynds Blvd	N. of Four Mile	10,000	Collector	400	0.04	A	1000	0.10	A	400	0.04	A	900	0.09	A	900	0.09	A
Bishop Blvd	N. of Central	10,000	Collector	4200	0.42	A	4200	0.42	A	4200	0.42	A	6000	0.60	B	4900	0.49	A
Bishop Blvd	S. of Vandehei	10,000	Collector	1300	0.13	A	1200	0.12	A	1200	0.12	A	400	0.04	A	1000	0.10	A
Dell Range	E. of Yellowstone	36,000	Principle Arterial	26470	0.74	C	25480	0.71	C	25480	0.71	C	26550	0.74	C	26500	0.74	C
Central	On Overpass	15,000	Principle Arterial	10900	0.73	C	10800	0.72	C	10800	0.72	C	12600	0.84	D	11300	0.75	C

2017 Alternative Comparisons

Street Name	Link Description	Daily Capacity	Functional Classification	#1 - Base Condition			#2 - Additional Overpass at Four Mile			#3 - Additional Interchange at Four Mile and Riding Club			#4 - Four Mile Interchange nothing at Vandehei			#5 - Four Mile Interchange Overpass at Vandehei		
				A.D.T.	V/C	LOS	A.D.T.	V/C	LOS	A.D.T.	V/C	LOS	A.D.T.	V/C	LOS	A.D.T.	V/C	LOS
Riding Club Road	W. of I-25	10,000	Collector	200	0.02	A	250	0.03	A	600	0.06	A	200	0.02	A	200	0.02	A
Riding Club Road	E. of I-25	10,000	Collector	1,000	0.10	A	800	0.08	A	2,600	0.26	A	1,200	0.12	A	1,200	0.12	A
Riding Club Road	E. of Yellowstone	10,000	Collector	2,300	0.23	A	2,200	0.22	A	2,600	0.26	A	2,300	0.23	A	2,300	0.23	A
Brittany Drive	W. of I-25	5,000	Local	1,000	0.20	A	500	0.10	A	4,200	0.84	D	4,000	0.80	C	3,000	0.60	B
Four Mile Road	E. of I-25	10,000	Principle Arterial	900	0.09	A	1,800	0.18	A	3,700	0.37	A	5,100	0.51	A	4,200	0.42	A
Four Mile Road	E. of Yellowstone	10,000	minor arterial	3,800	0.38	A	4,200	0.42	A	4,700	0.47	A	5,100	0.51	A	4,700	0.47	A
Vandehei Ave.	W. of I-25	15,000	Collector	4,500	0.30	A	4,300	0.29	A	2,800	0.19	A	800	0.05	A	1,900	0.13	A
Vandehei Ave.	On Overpass	15,000	Collector	9,800	0.65	B	8,600	0.57	A	5,500	0.37	A	0	0.00	A	3,800	0.25	A
Vandehei Ave.	E. of I-25	15,000	Collector	6,200	0.41	A	5,800	0.39	A	4,000	0.27	A	2,450	0.16	A	3,650	0.24	A
Gardenia	E. of Yellowstone	5,000	Collector	1,500	0.30	A	1,500	0.30	A	1,500	0.30	A	1,500	0.30	A	1,500	0.30	A
Western Hills Blvd	E. of Western Hills	24,000	Minor Arterial	6,100	0.25	A	4,000	0.17	A	5,800	0.24	A	5,500	0.23	A	5,900	0.25	A
Storey Blvd	E. Yellowstone	24,000	Minor Arterial	14,900	0.62	B	14,500	0.60	B	14,200	0.59	A	13,600	0.57	A	14,300	0.60	A
Manewal Drive	Western link	15,000	Collector	9,960	0.66	B	10,790	0.72	C	9,960	0.66	B	10,375	0.69	B	10,624	0.71	C
Yellowstone Road	S. of Dell Range	36,000	Principle Arterial	42,600	1.18	F	42,600	1.18	F	41,400	1.15	F	41,800	1.16	F	41,900	1.16	F
Yellowstone Road	S. of Storey Blvd.	36,000	Principle Arterial	18,600	0.52	A	18,400	0.51	A	17,300	0.48	A	17,600	0.49	A	17,900	0.50	A
Yellowstone Road	S. of Gardenia	36,000	Principle Arterial	12,100	0.34	A	11,600	0.32	A	10,600	0.29	A	12,000	0.33	A	11,000	0.31	A
Yellowstone Road	S. of Four Mile	36,000	Principle Arterial	9,200	0.26	A	8,400	0.23	A	6,700	0.19	A	6,900	0.19	A	6,800	0.19	A
Yellowstone Road	S. of E. Maverick Rd.	36,000	Principle Arterial	7,100	0.20	A	6,300	0.18	A	5,100	0.14	A	5,500	0.15	A	5,500	0.15	A
Hynds Blvd	S. of Vandehei	10,000	Collector	2,400	0.24	A	2,400	0.24	A	2,100	0.21	A	1,100	0.11	A	2,100	0.21	A
Hynds Blvd	N. of Vandehei	10,000	Collector	1,400	0.14	A	1,500	0.15	A	1,000	0.10	A	3,300	0.33	A	1,800	0.18	A
Hynds Blvd	N. of Four Mile	10,000	Collector	700	0.07	A	1,500	0.15	A	700	0.07	A	1,300	0.13	A	1,300	0.13	A
Bishop Blvd	N. of Central	10,000	Collector	4,200	0.42	A	4,200	0.42	A	4,200	0.42	A	6,300	0.63	B	5,100	0.51	A
Bishop Blvd	S. of Vandehei	10,000	Collector	1,600	0.16	A	1,600	0.16	A	1,600	0.16	A	500	0.05	A	1,300	0.13	A
Dell Range	E. of Yellowstone	36,000	Principle Arterial	28,850	0.80	D	26,700	0.74	C	26,580	0.74	C	26,900	0.75	C	26,732	0.74	C
Central	On Overpass	15,000	Principle Arterial	13000	0.87	D	13100	0.87	D	13000	0.87	D	15010	1.00	F	13600	0.91	E

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Appendix C

Preliminary Costs of Street Improvements

These costs are estimated bid prices and do not include drainage, engineering or contingencies. It is recommended the prices be increased 25% for engineering and contingencies.

Sidewalk (4')		\$9.00/LF
Sidewalk (10')		\$22.50/LF
Grading & Shaping		\$1.00/LF
Paving: 24' wide existing street and 16' of widening for frontage roads and Four Mile Road	4" HBP overlay	\$0.75/SF \$18.00/LF
	6" full depth HBP	\$1.13/SF \$18.00/LF

The probable opinion of costs for improvements to the frontage roads and to Four Mile Road is estimated to be \$46.00 per LF for 16' of widening, and a 4' sidewalk on one side of the street. The cost will be reduced to \$41.50 per LF if a 10' wide pedestrian / bicycle combination path is used instead of widening the street to accommodate the bike lanes. Total costs for Hynds Boulevard and Four Mile Road are \$97,000, \$122,000 respectively. Total costs for Hynds Boulevard and Four Mile Road utilizing the ped/bike combination facility are \$87,000 and \$110,000 respectively.

We have estimated the traffic calming features to Vandehei Avenue to cost approximately \$500,000, including landscaping

RESOLUTION NO. 990302-07

ENTITLED: "A RESOLUTION ADOPTING THE NORTHWEST CHEYENNE
INFRASTRUCTURE AND DEVELOPMENT PLAN AS AN UPDATE TO THE
CHEYENNE AREA DEVELOPMENT PLAN - 1992 FOR THE NORTHWEST
CHEYENNE AREA."

WHEREAS, the Wyoming Statutes, 15-1-503 and 18-5-202, allows cities and counties to prepare and adopt master plans to guide the growth and development of an area and the CHEYENNE AREA DEVELOPMENT PLAN - 1992 was prepared and adopted by the governing body of the City of Cheyenne and the Board of Commissioners for Laramie County as the comprehensive or master plan for the development of the Cheyenne area in accordance with the requirements of those statutes; and

WHEREAS, the CHEYENNE AREA DEVELOPMENT PLAN - 1992 is a dynamic document and is meant to be amended as needs of the community change or as planning in greater detail is conducted and the Wyoming Statutes, 15-1-503(b) and 18-5-202(b), anticipate and provides for these plan amendment changes; and

WHEREAS, the CHEYENNE AREA DEVELOPMENT PLAN - 1992 is to be amended in the same manner and process as required for the comprehensive plan; and

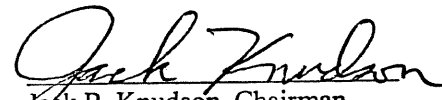
WHEREAS, an amendment, THE NORTHWEST CHEYENNE INFRASTRUCTURE AND DEVELOPMENT PLAN was prepared with citizen involvement and was discussed in detail at two advertized public meetings within the area encompassed by the plan during its development and further that the notice of the amendments to the CHEYENNE AREA DEVELOPMENT PLAN - 1992 was advertised on December 18, 1998 and January 10, 1999 for the public hearing held by the Regional Planning Commission on January 19, 1999; and

WHEREAS, the Regional Planning Commission held a public hearing on January 19, 1999 and accepted public comments and did recommend this plan as the update for this area to the Governing Body of the City of Cheyenne and the Board of Commissioners for Laramie County for adoption.

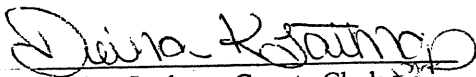
NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COMMISSIONERS FOR LARAMIE COUNTY, WYOMING, THAT:


THE NORTHWEST CHEYENNE INFRASTRUCTURE AND DEVELOPMENT PLAN is adopted as an amendment to the CHEYENNE AREA DEVELOPMENT PLAN - 1992 for the Northwest Cheyenne Area and supersedes or replaces the specifics of the existing CHEYENNE AREA DEVELOPMENT PLAN - 1992 for that area and that the City and County Planning staffs are to incorporate the text and mapping into the next update of the Cheyenne Area Development Plan.

PRESENTED, READ, AND ADOPTED ON THIS 2nd DAY OF March, 1999


Jack B. Knudson, Chairman
Laramie County Commissioners

(SEAL)
ATTEST:


Debbye Lathrop, County Clerk

Received And Approved
As To Form Only
By The County Attorney
 2/22/99

Received And Approved
As To Form Only
By The County Attorney

RESOLUTION NO. 3983

FORM ONLY:
MB Butler
DATE: 2-1-9

ENTITLED: "A RESOLUTION ADOPTING THE NORTHWEST CHEYENNE INFRASTRUCTURE AND DEVELOPMENT PLAN AS AN UPDATE TO THE CHEYENNE AREA DEVELOPMENT PLAN - 1992 FOR THE NORTHWEST CHEYENNE AREA."

WHEREAS, the Wyoming Statutes, 15-1-503 and 18-5-202, allows cities and counties to prepare and adopt master plans to guide the growth and development of an area and the CHEYENNE AREA DEVELOPMENT PLAN - 1992 was prepared and adopted by the governing body of the City of Cheyenne and the Board of Commissioners for Laramie County as the comprehensive or master plan for the development of the Cheyenne area in accordance with the requirements of those statutes; and

WHEREAS, the CHEYENNE AREA DEVELOPMENT PLAN - 1992 is a dynamic document and is meant to be amended as needs of the community change or as planning in greater detail is conducted and the Wyoming Statutes, 15-1-503(b) and 18-5-202(b), anticipate and provides for these plan amendment changes; and

WHEREAS, the CHEYENNE AREA DEVELOPMENT PLAN - 1992 is to be amended in the same manner and process as required for the comprehensive plan; and

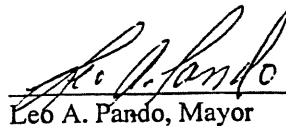
WHEREAS, an amendment, THE NORTHWEST CHEYENNE INFRASTRUCTURE AND DEVELOPMENT PLAN was prepared with citizen involvement and was discussed in detail at two advertized public meetings within the area encompassed by the plan during its development and further that the notice of the amendments to the CHEYENNE AREA DEVELOPMENT PLAN - 1992 was advertised on December 18, 1998 and January 10, 1999 for the public hearing held by the Regional Planning Commission on January 19, 1999; and

WHEREAS, the Regional Planning Commission held a public hearing on January 19, 1999 and accepted public comments and did recommend this plan as the update for this area to the Governing Body of the City of Cheyenne and the Board of Commissioners for Laramie County for adoption.

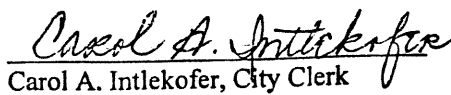
NOW, THEREFORE, BE IT RESOLVED BY THE GOVERNING BODY OF THE CITY OF CHEYENNE, WYOMING, THAT:

THE NORTHWEST CHEYENNE INFRASTRUCTURE AND DEVELOPMENT PLAN is adopted as an amendment to the CHEYENNE AREA DEVELOPMENT PLAN - 1992 for the Northwest Cheyenne Area and supersedes or replaces the specifics of the existing CHEYENNE AREA DEVELOPMENT PLAN - 1992 for that area and that the City and County Planning staffs are to incorporate the text and mapping into the next update of the Cheyenne Area Development Plan.

PRESENTED, READ, AND ADOPTED ON THIS 22nd DAY OF February, 1999


Leo A. Pando, Mayor

(SEAL)
ATTEST:


Carol A. Intlekofer, City Clerk

