

CITY of CHEYENNE

ROAD, STREET & SITE

PLANNING DESIGN STANDARDS



2007



Metropolitan Planning Organization



# Table of Contents

**TABLE OF CONTENTS..... I**

**FOREWORD.....VI**

**GLOSSARY .....VII**

**CHAPTER I—INTRODUCTION ..... 1**

1.1 PURPOSE ..... 1

1.2 OBJECTIVE..... 1

1.3 EFFECTIVE DATE..... 1

1.4 APPLICATION ..... 1

1.5 MEANINGS OF “SHALL,” “SHOULD,” AND “MAY” ..... 2

1.6 WAIVERS..... 2

1.7 INNOVATION, NEW TECHNOLOGY AND NON-TYPICAL DESIGN..... 3

1.8 APPEALS ..... 3

1.9 AMENDMENT PROCESS ..... 3

**CHAPTER 2—ROADWAY FUNCTIONAL CLASSIFICATION ..... 5**

2.1 PURPOSE ..... 5

2.2 CLASSIFICATION ..... 5

2.3 OFFICIAL MAPS..... 7

2.4 AMENDMENT PROCESS ..... 7

2.5 AMENDMENT PROCEDURES ..... 8

**CHAPTER 3—TRANSPORTATION IMPACT STUDIES ..... 9**

3.1 PREFACE..... 9

3.2 APPLICANT RESPONSIBILITIES..... 10

3.2.1 Transportation Worksheet ..... 10

3.3 LEVELS OF STUDY ..... 11

3.4 STUDY PARAMETERS ..... 13

3.5 EVALUATION ELEMENTS ..... 15

3.6 PRESENTATION..... 25

3.7 AGENCY REVIEW..... 25

Attachment 3-A—Transportation Worksheet ..... 26

**CHAPTER 4—ACCESS REQUIREMENTS AND DESIGN CRITERIA ..... 30**

4.1 PREFACE..... 30

4.2 PERMITS REQUIRED ..... 30

4.3 ACCESS REQUIREMENTS ..... 32

4.4 SIGHT DISTANCE..... 37

4.5 DRIVEWAY CRITERIA ..... 42

4.6 INTERSECTION DESIGN ..... 46



ROAD, STREET AND SITE PLANNING DESIGN STANDARDS

4.7 LEFT-TURN IN/OUT ACCESS ..... 50

4.8 CHANGES IN LAND USE, ABANDONED DRIVEWAY APPROACHES, AND STREET WIDENINGS ..... 52

**CHAPTER 5—STREET DESIGN ..... 54**

5.1 PREFACE..... 54

5.2 RESPONSIBILITIES ..... 54

5.3 REQUIREMENTS ..... 54

5.4 STANDARDS..... 55

5.5 PRIVATE ACCESS STANDARDS ..... 57

5.6 CUL-DE-SACS/HAMMER HEADS ..... 58

5.7 INTERSECTION DESIGN ..... 59

5.8 STREET LIGHTING ..... 60

5.9 CURB AND GUTTER ..... 61

5.10 ACCEPTANCE ..... 61

ATTACHMENT 5-A—STANDARDS FOR GEOMETRIC DESIGN OF ROADS AND STREETS ..... 63

**CHAPTER 6—STREETScape DESIGN..... 74**

6.1 PURPOSE ..... 74

6.2 APPLICABILITY ..... 74

6.3 MEDIANS ..... 74

6.4 TREE LAWN..... 77

6.5 PLANTING GUIDELINES ..... 80

6.6 PLANTING STANDARDS ..... 81

6.7 IRRIGATION STANDARDS..... 82

6.8 TURF SEEDING STANDARDS ..... 83

6.9 FINE GRADING AND SOIL PREPARATION STANDARDS ..... 86

6.10 STREETScape MAINTENANCE STANDARDS ..... 88

6.11 ESTABLISHMENT MAINTENANCE FOR NEWLY PLANTED TREES ..... 89

**CHAPTER 7—SITE PLANNING ..... 91**

7.1 PREFACE..... 91

7.2 SITE PLANS ..... 91

7.3 STANDARDS..... 92

7.4 PEDESTRIAN FLOWS..... 98

**CHAPTER 8—SIDEWALKS ..... 101**

8.1 PREFACE..... 101

8.2 RESPONSIBILITIES ..... 101

8.3 STANDARDS..... 101

8.4 SPECIFICATIONS ..... 101

8.5 SITE DESIGNS GENERAL CONNECTIVITY REQUIREMENTS ..... 102

8.6 DESIGN FEATURES AND ACCOMMODATIONS FOR PEDESTRIANS..... 106

8.7 PEDESTRIAN CROSSINGS AT HIGH-USE PEDESTRIAN AREAS..... 114

**CHAPTER 9—BICYCLE FACILITIES ..... 122**

9.1 PREFACE..... 122

**TABLE OF CONTENTS**



9.2 CURRENT BIKEWAY PLAN..... 122

9.3 RESPONSIBILITIES..... 122

9.4 BICYCLE PARKING STANDARDS ..... 122

**CHAPTER 10—DRAINAGE ..... 126**

10.1 PREFACE..... 126

10.2 RESPONSIBILITIES..... 126

10.3 REQUIREMENTS..... 126

10.4 STANDARDS..... 127

10.5 RELATED ORDINANCES, REGULATIONS, AND PUBLICATIONS ..... 127

**CHAPTER 11—CONSTRUCTION ZONES ..... 129**

11.1 PREFACE..... 129

11.2 RESPONSIBILITIES..... 129

11.3 APPLICATIONS AND PERMITS..... 130

11.4 STANDARDS..... 130

**CHAPTER 12—TRAFFIC-CONTROL DEVICES ..... 131**

12.1 PREFACE..... 131

12.2 RESPONSIBILITIES..... 131

12.3 STANDARDS..... 131

12.4 EMERGENCY ACCESS LANES ..... 132



**FIGURES**

Figure 4-1 General Access Requirements..... 33

Figure 4-2 Driveway Width, Curb Radii and Access Spacing between Driveways ..... 35

Figure 4-3 Conflicts in Center Left-Turn Lane ..... 37

Figure 4-4 Corner Sight Distance ..... 39

Figure 4-5 Pedestrian Crossing Sight Distance ..... 40

Figure 4-6 Corner Sight Distance for Yield- or No-control Intersections ..... 42

Figure 4-7 Driveway Profile Criteria ..... 43

Figure 4-8 Driveway Length ..... 45

Figure 4-9 Left-turn Bays and Spacing for Unsignalized Intersections and Driveways.. 49

Figure 4-10 Left-turn Access Guidelines ..... 51

Figure 4-11 Left-turn Access Criteria ..... 52

Figure 5-1 Typical cul-de-sac ..... 59

Figure 5-B-1 Principal Arterial Street ..... 67

Figure 5-B-2 Minor Arterial Street ..... 67

Figure 5-B-3 Collector Street without Parking ..... 68

Figure 5-B-4 Collector Street with Parking ..... 68

Figure 5-B-5 Local Street ..... 69

Figure 5-B-5.1 Local Street—Attached Sidewalks Option ..... 69

Figure 5-B-6 Narrow Local Street (Lane)—Used with Alleys Only ..... 70

Figure 5-B-6.1 Narrow Local Street (Lane)—Attached Sidewalks Option, Used with Alleys Only..... 70

Figure 5-B-6.2 Narrow Local Street (Lane)—Attached Sidewalks Option, Used without Alleys ..... 71

Figure 5-B-6.3 Narrow Local Street (Lane)—Used without Alleys..... 71

Figure 5-B-7 Commercial/Industrial Local Street ..... 72

Figure 5-B-8 Rural Road Section ..... 72

Figure 5-B-9 Alleys ..... 73

Figure 6-1 Example of 12' Median Section ..... 77

Figure 6-2 Tree/Streetlight Separations ..... 79

Figure 7-1 Parking Layout Dimensions for 9' Stalls at Various Angles ..... 97

Figure 8-1 Residential Connectivity ..... 102

Figure 8-2 Pedestrian Connections between Developments and between Cul-de- sacs.... 103

Figure 8-3 Commercial Retail Shopping Center ..... 104

Figure 8-4 Residential Apartment ..... 104

Figure 8-5 Office Development ..... 105

Figure 8-6 Office/Industrial Park ..... 105

Various Untitled Graphics to further illustrate listed principles in Sections 8.6-8.7 ..... 106-116

Figure 8-7 Countdown Signal Head ..... 115

Figure 8-8 Guidelines for the Installation of Marked Crosswalks at Uncontrolled Intersections and Mid-block Crossings..... 118

Figure 8-9 Elevated Crosswalk to Refuge Islands..... 118

Figure 8-10 Bulbout/Curb Extension..... 120

Figure 8-11 Modern Roundabout Pedestrian Crosswalk Treatment ..... 121



**TABLES**

Table 2-1 Roadway Classifications ..... 5

Table 3-1 Changes to the Original Proposed Development ..... 13

Table 3-2 Acceptable Maximum Traffic Volumes ..... 17

Table 4-1 Minimum Distance between Intersections and Full-access/movement  
Driveways..... 34

Table 4-2 Minimum Distance between Driveways ..... 35

Table 4-3 Basic Driveway Approach Dimensions for Local Roads ..... 36

Table 4-4 Stopping Sight Distance ..... 38

Table 4-5 Corner Sight Distance at Controlled Intersections and Driveways ..... 40

Table 4-6 Pedestrian Minimum Sight Distance for an Unsignalized Intersection  
and Mid-block Crossings..... 41

Table 4-7 Stopping and Deceleration Adjustment Factors for Highway Grade ..... 41

Table 4-8 Driveway Profile Statistics ..... 43

Table 4-9 Minimum Driveway Length ..... 45

Table 4-10 Speed-change Lane Lengths for Right- and Left-turn Lanes ..... 47

Table 5-1 Minimum Pavement Sections..... 57

Table 5-2 Minimum Back of Curb Radii..... 60

Table 5-A-1 General Design Parameters ..... 62

Table 5-A-2 Roadway Technical Design Criteria ..... 64

Table 6-1 Size and Spacing of Trees ..... 76

Table 6-2 Tree Statistics..... 82

Table 7-1 Parking Layout Dimensions ..... 94

Table 7-2 Stall Layout Elements for Stalls Ranging in Width from 9.0' to 9.5' ..... 96

Table 9-1 Recommended Minimum Bicycle Parking Requirements ..... 125



# Foreword

The original edition of the Road, Street and Site Planning and Design Standards was published in January 1990 with the stated goal, "to assist the planner and designer of the transportation system in doing a better job of sizing and locating the roads and streets in the area, in keeping with the requirements of the other systems." In 2001, the 1990 Standards were updated for Laramie County. This report brings the standards up-to-date and provides uniform design standards for development of transportation facilities in the City of Cheyenne.

The Standards are applicable to public rights-of-way and to private property where access to public rights-of-way is required. They are intended to establish uniform requirements and serve as a design guide for roads, streets, and related public facilities. They should be used in conjunction with the Zoning Ordinance, Subdivision/Development Regulations, International Codes, standard specifications, and other regulatory documents adopted by the City of Cheyenne and applicable state and federal laws and regulations.

This update includes significant changes to Chapter 3: Transportation Impact Studies, Chapter 4: Access Requirements and Design Criteria, and Chapter 5: Street Design. This current update also includes the insert of a new Chapter 6: Streetscape Design. The update has been prepared to be more readable and user friendly. This update includes many new charts, graphics and topics.

These Standards may be amended from time to time to reflect changed conditions, incorporate improved methods or technology or correct errors. Persons who wish to suggest changes for future editions or to point out errors are invited to notify the Cheyenne Metropolitan Planning Organization (MPO) office.





# Glossary

Except as specifically defined herein, all words in these standards shall have the customary dictionary definitions.

Where there is more than one definition for a term, the first one listed is the recommended definition—with two exceptions. The first is “Bicycle,” which should include both the State definition and the first City definition (which indicates at least one wheel must be at least 14 inches in diameter). The second exception is right-of-way, where two definitions are needed to indicate the two completely different meanings of the term.

At the end of many of the definitions, there is a notation in brackets. These refer to the source of the definition and should be interpreted as follows:

- (CC) Lexisnexis. *Cheyenne City Code*. August 2005. Copyright Matthew Bender, Inc. Accessed 3 January 2006. Available from <http://municipalcodes.lexisnexis.com/codes/cheyenne/>; internet.
- (WS) Wyoming State Legislature. *Wyoming Statute*. 1 July 2005. Accessed 3 January 2006. Available from <http://legisweb.state.wy.us/statutes/statutes.htm>; internet.
- (MUTCD) US Department of Transportation, Federal Highway Administration. *The Manual on Uniform Traffic Control Devices*. 2003 ed. Accessed 3 April 2007. Available from <http://mutcd.fhwa.dot.gov/Signs/index.htm>
- (Zoning Ordinance) The Cheyenne Zoning Ordinance. *Cheyenne City Code*, Title 17.
- (Subdivision Regulations) City/County Development Office. *The Cheyenne-Laramie County Subdivision/Development Regulations*. Adopted: 7 July 2000, City; 1 August 2000, County.

## **Access Point:**

A driveway or intersection which provides an entrance or exit to private or publicly owned land from a public street.



**Alley:**

1. A public right-of-way intended to provide access to the rear or side of lots or buildings in urban districts and not intended for the purpose of through vehicular traffic. (CC)
2. A minor thoroughfare, which affords only the secondary means of access to property abutting thereon. (Zoning Ordinance) (Also see **Street**)

**Arterial Street:**

A road or street classified as a Principal Arterial or Minor Arterial on the current edition of the Major Street Plan Official Map.

**Average Daily Traffic (ADT):**

The total traffic volume during a given time period (in whole days greater than one day and less than one year) divided by the number of days in that time period.

**Bicycle:**

1. Every vehicle propelled solely by human power upon which any person may ride, having two tandem wheels, except scooters and similar devices. (WS)
2. Every device propelled by human power upon which any person may ride, having two tandem wheels either of which is more than fourteen inches in diameter. (CC)

**Bicycle Route:**

A system of bikeways designated by appropriate route markers and by the jurisdiction having authority. (MUTCD)

**Bicycle Trail:**

A separate trail or path from which motor vehicles are prohibited and which is for the exclusive use of bicycles or the shared use of bicycles and pedestrians. Where such trail or path forms a part of a highway, it is separated from the roadways for motor vehicle traffic by an open space or barrier. (MUTCD)



**Bikeway:**

Any road, street, path, or way which in some manner is specifically designated as being open to bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes. (MUTCD)

**Board:**

The City of Cheyenne Board of Adjustment, Cheyenne, Wyoming. (Zoning Ordinance)

**Board of Public Utilities (BOPU):**

The City of Cheyenne Board of Public Utilities develops and provides the City of Cheyenne with water and wastewater services.

**Change of Use:**

A change of use constitutes at least one of the following:

1. The use is appreciably different than those permitted in the zoning district in which the use is located.
2. The use is permitted in the zoning district in which the use is located, but requires more parking than the previous use.
3. The use requires a different site design than that existing for the previous use. (Zoning Ordinance)

**Cheyenne Urban Development Area:**

The City of Cheyenne and that part of Laramie County within the Zoned Area as defined by the current edition of the Cheyenne and Laramie County Zoning Ordinance.

**City:**

The City of Cheyenne, Wyoming. (CC, Zoning Ordinance)

**City Traffic Engineer:**

An engineer trained as a traffic engineer and so registered by the Wyoming Board of Professional Engineers.



**City Clerk, Chief of Police or other City Officers:**

The words "City clerk," "chief of police" or other City officers or departments shall be construed to mean the City Clerk, Chief of Police or such other municipal officers or departments, respectively of the City of Cheyenne, Wyoming. (CC)

**City Council:**

The words "City Council" or "Council" shall mean the Council of the City of Cheyenne, Wyoming. (CC)

**Collector Street:**

1. A street or road designed to collect or distribute vehicular traffic from one or more residential or nonresidential areas to or from an arterial street.  
(*Subdivision Regulations*)
2. A road or street classified as a Collector on the current edition of the Cheyenne Metropolitan Planning Organization (MPO) Urban Roadway Functional Classification map.

**Controlled-access Highway:**

Every highway, street or roadway to and from which owners or occupants of abutting lands and other persons have no legal right of access—at such points only and in such manner as may be determined by the public authority having jurisdiction over the highway, street or roadway. [adapted from the WS definition]

**County:**

The County of Laramie in the state of Wyoming. (CC)

**Crosswalk:**

Any portion of a roadway at an intersection or elsewhere distinctly indicated for pedestrian crossing by lines or other markings on the surface. (WS)

**Cul-de-sac:**

A short dead-end street terminating with a vehicular turn-around area. (*Subdivision Regulations*)

**Curb Return:**

The curved or flared portion of a street curb at driveway approaches.



**Designated Bicycle Lane:**

A portion of a roadway or shoulder which has been designated for use by bicyclists. It is distinguished from the portion of the roadway for motor vehicle traffic by a paint stripe, curb, or other similar device. (MUTCD)

**Designated Engineer:**

The person designated by the developer to oversee design and construction of permitted facilities. The Designated Engineer maybe the point of contact between the developer and the City and is licensed by the Wyoming State Board of Registration for Professional Engineers and Professional Land Surveyors to practice engineering in Wyoming.

**Developer:**

The person who petitions the City for approval of a development action.

**Development:**

Any man-made change to real estate including, but not limited to, the construction of buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling. (Zoning Ordinance)

**Development Office:**

The administrative office for current land use, planning and development for the City of Cheyenne. The Development Office is responsible for enforcement of zoning and land-use regulations.

**Drive Approach, Driveway Approach:**

A constructed vehicle access between a road or street and adjacent property.

**Easement:**

A right, liberty, privilege or advantage without profit which the owner of one parcel of land may have in the lands of another. A right in the owner of one parcel of land, by reason of such ownership, to use the land of another for a special purpose not inconsistent with a general property right in the owner. (CC) A permanent or temporary grant of right by a property owner, to the public, a corporation, or other person(s), for the use of a strip or parcel of land for specified purposes. Ownership shall remain with the property owner. (Zoning Ordinance)



**Facilities:**

Water and sewer mains, curbs, gutters, sidewalks, street paving, storm sewers and other public improvements. [adapted from the CC definition]

**Fire Apparatus Access Road:**

A road that provides a fire apparatus route from a fire station to a facility, building, or portion thereof.

**Full-access Driveway:**

A driveway or access point that would allow incoming traffic to enter from both the left and right as well as vehicles to exit to the left or the right.

**Greenway:**

A linear open space established along either a natural corridor, such as a stream valley, or overland along a road or railroad right-of-way converted to recreational use; a natural or landscaped course prepared for pedestrian or bicycle passage. Locally, certain designated strips or linear parks and open space connectors designated by the City of Cheyenne as part of the Greenway System.

**City of Cheyenne:**

The Mayor and Council of the City of Cheyenne.

**Improvement:**

Includes buildings, structures and all facilities of a public nature intended for public use—including but not limited to streets, sidewalks, curbs, gutters, alleys and other public ways, parks, recreational facilities, water, sewage, solid waste disposal and other sanitary systems and facilities, and with respect to the foregoing, such additional facilities or improvements as relate or contribute to the full public use and enjoyment thereof. (WS)

**Intersection:**

1. The area embraced within the prolongation or connection of the lateral curb lines, or, if none, then the lateral boundary lines of the roadways of two highways which join one another at, or approximately at, right angles, or the area within which vehicles traveling upon different highways joining at any other angle may come in conflict. (WS)
2. The junction of an alley with a street or highway does not constitute an intersection. (WS)



**Local Authorities:**

Every county, municipal, and other local board or body having authority to enact laws relating to traffic under the constitution and laws of this state. (WS)

**Local Street:**

A low-volume street or road designed to carry vehicular traffic from residential or nonresidential areas to or from a collector or arterial street. (*Subdivision Regulations*)

**Modern Roundabout:**

A road junction at which traffic streams circularly around a central island after first yielding to the circulating traffic.

**Motor Vehicle:**

Every vehicle which is self-propelled. (WS)

**Official Traffic-control Devices:**

Signs, signals, markings and devices not inconsistent with this act placed or erected by authority of a public body or official having jurisdiction for the purpose of regulating, warning or guiding traffic. (WS) (Official traffic control devices are the subject of the *City Code*.)

**Outfall Point:**

The area or point usually defined as the topographic low of a drainage basin or subbasin.

**Owner:**

The owner of record of a parcel of land, as recorded in the office of the County Clerk. (Zoning Ordinance)

**Parking Lot:**

An area other than a street or alley designated for the parking of five or more motor vehicles. (Zoning Ordinance)

**Parking Space:**

A space specifically designed for the parking of a motor vehicle. [adapted from the Zoning Ordinance definition]



**Pedestrian:**

Any person afoot.

**Pedestrian Vehicle:**

Any self-propelled conveyance designed, manufactured and intended for the exclusive use of persons with a physical disability.

**Person:**

1. A natural person, firm, corporation, partnership, or association, or any combination of the above, or any other legal or commercial entity.
2. A firm, partnership, association of persons, corporation, organization or any other group acting as a unit, as well as an individual, and including agents and employees.

**Planning Commission:**

The Cheyenne/Laramie County Regional Planning Commission.

**Private Road or Driveway:**

Every way or place in private ownership used for vehicular travel by the owner and those having express or implied permission from the owner, but not by other persons. (WS)

**Radius:**

The curved or flared portion of a driveway or street which connects the driveway with the highway or street.

**Regional Detention Facilities:**

Regional detention facilities control run-off from a defined area within a drainage basin and interact with other stormwater management structures in a coordinated regional or basin-wide plan. A regional detention basin implements the prevailing master drainage plan for the drainage basin, and, at the very least, controls the entire major drainage tributary into the pond to provide a beneficial downstream effect. Detention basins which serve less than 250 acres or detain less than 30 acre-feet are not considered regional. The above paragraph is the definition of regional detention facilities unless otherwise defined in the current *Storm Drainage Manual*.

**Right-of-way:**





1. The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian approaching under such circumstances of direction, speed and proximity as to give rise to danger of collision unless one grants precedence to the other. (WS)
2. A general term denoting land that is dedicated and set aside for use by the public.

**Roadway:**

That portion of a highway improved, designed or ordinarily used for vehicular travel, exclusive of the sidewalk, berm, or shoulder. (WS)

**Shared Roadway:**

A roadway which is officially designated and marked as a bicycle route, but which is open to motor vehicle travel and upon which no bicycle lane is designated. (MUTCD)

**Sidewalk:**

That portion of a street—between curb lines (or the lateral lines of a roadway) and the adjacent property lines—intended for pedestrian use. (WS)

**Sidewalk Area:**

That portion of the space lying between the street, roadway or curb line and the property line that is reserved for sidewalks, either existing or proposed. (CC)

**Site Plan:**

A plan of the land showing the existing and proposed features for the property. (Zoning Ordinance)

**State:**

The State of Wyoming. (CC)

**Street:**

1. The entire width between the boundary lines of every way publicly maintained (or if not publicly maintained, dedicated to public use) when any part thereof is open to the use of the public for purposes of vehicular travel. (WS)
2. Any street, avenue, boulevard, road, parkway, viaduct, or other ways for the



movement of vehicular traffic which is an existing federal, state, county, or municipal roadway; or a right-of-way shown upon a plat, heretofore approved, pursuant to law or approved by official action. This way includes the land between right-of-way lines, whether improved or unimproved, and may comprise pavement, shoulders, curbs, gutters, sidewalks, parking areas and other areas within the right-of-way. (Zoning Ordinance)

**Subdivider:**

Any person who lays out any subdivision or parts thereof either for the account of the subdivider or others. (WS)

**Subdivision:**

1. A division of a lot, tract, parcel or other unit of land into three or more lots, plots, units, sites or other subdivisions of land for the immediate or future purpose of sale, building development or redevelopment, for residential, recreational, industrial, commercial or public uses. The word "subdivide" or any derivative thereof shall have reference to the term subdivision—including mobile home courts, the creation of which constitutes a subdivision of land. (WS)
2. The division of a tract or parcel of land into three or more parts for immediate or future sale or building development. (WS) (Cities and Towns)

**Superintendent:**

The Director of the [Wyoming] Department of Transportation. (WS)

**Through Highway:**

Every highway or portion thereof on which vehicular traffic is given preferential right-of-way, and at the entrances to which vehicular traffic from intersecting highways is required by law to yield the right-of-way to vehicles on the through highway in obedience to a stop sign, yield sign or other official traffic control devices. (WS)

**Traffic:**

Pedestrians, ridden or herded animals, vehicles and other conveyances either singly or together using any highway for purposes of travel. (WS)

**Traffic-control Signal:**

Any device, whether manually, electrically, or mechanically operated, by which traffic is alternately directed to stop and permitted to proceed. (WS)



**Traffic Division:**

The traffic division of the police department of the City or, in the event a traffic division is not established, then the police department of the City. (CC)

**Traffic Engineer:**

The Cheyenne City Traffic Engineer, or, if no such person is designated, the Cheyenne City Engineer.

**Tree Lawn**

The landscaped strip between curb and sidewalk.

**Use:**

The purpose for which land is designed arranged or intended to be utilized. (Zoning Ordinance)

**Vacation:**

A process where land owners can have the public interests in roads or rights-of-way removed. Although the right-of-way may have been vacated, the right and interest of private individuals and companies may still encumber the road or right-of-way. What is given up in the vacation process is only the right of the general public to use the vacated road or right-of-way.

**Vehicle:**

Every device, in, upon, or by which any person or property is or may be transported or drawn upon a highway, except devices used exclusively upon stationary rails or tracks. (WS)

**WYDOT:**

The Wyoming Department of Transportation.



# Chapter I—Introduction

## **1.1 PURPOSE**

The purpose of these Standards is to set forth the requirements for developments and improvements that affect roadways, alleys, and easements that apply to future property access. The Standards are based on the State Statutes, City Ordinances and Resolutions which authorize and enable the establishment of rules and regulations to guide and control transportation-related improvements and developments.

## **1.2 OBJECTIVE**

The objective of these Standards is to ensure that plans, policies, regulations and standards are effective, understandable, and meet the needs of the community without creating unnecessary regulation. It is intended that these Standards will serve as a clear, concise and complete guideline for developers, planners, engineers and public officials in planning roads, streets, and related infrastructure.

## **1.3 EFFECTIVE DATE**

The provisions of these Standards are effective on the dates designated in the actions by the City of Cheyenne in adopting these Standards.

Construction (for which building, construction, subdivision, right-of-way, or zoning permits are applied for on or after the effective date of these Standards) shall comply with these Standards. Construction that does not require a permit shall comply with these Standards if work is begun after the effective date of these Standards.

## **1.4 APPLICATION**

These Standards apply to the City of Cheyenne. The Standards are performance based, so they will vary by the type and density of development. The Standards will apply within the municipal boundaries of the City of Cheyenne. These Standards should also be encouraged in the County within the areas that can be provided domestic sewer service by the Cheyenne Board of Public Utilities or the South Cheyenne Water and Sewer District.

The Wyoming Department of Transportation (WYDOT) has full authority for roads on the State Highway System. For roads on the State Highway System, WYDOT policies supersede these Standards. Where WYDOT policies indicate local responsibility, these Standards apply.



## 1.5 MEANINGS OF “SHALL,” “SHOULD,” AND “MAY”

In these Standards, the words "shall," "should" and "may" are used to describe specific conditions. To clarify the meanings intended by the use of these words, the following definitions apply:

- A. Shall:** A mandatory condition. Where certain requirements in the design or application of the standard are described with the "shall" stipulation, it is mandatory that these requirements be met.
- B. Should:** An advisory condition. Where the word "should" is used, it is considered to be advisable usage, recommended but not mandatory.
- C. May:** A permissive condition. No requirement or recommendation is intended.

## 1.6 WAIVERS

If an applicant wishes to seek a waiver from the requirements of these Standards, the applicant shall submit a request to that effect as an attachment or addendum to the permit, site plan, or other application for project approval. When implementation of such innovations would violate mandatory provisions of these Standards, applicants are encouraged to visit the appropriate City officials to discuss the proposed waivers prior to formal submittal of applications in an attempt to resolve waiver issues.

The request for waiver shall state specific reasons why a waiver is necessary and appropriate and include documentation to support such reasons. The request shall address the waiver criteria of this section. Waivers will not be issued for procedural requirements. Separate waiver requests may be required where several waivers are necessary and where the waivers may be approved in whole or in part. Waiver requests shall be submitted to the City County Development Office.

In considering a waiver request, the City Engineer shall determine whether the waiver would meet acceptable standards of practice for engineering, operation and safety. Waivers contrary to the public interest, or which violate local or state laws, shall not be approved.

When a waiver is approved, the City Engineer shall clearly state in writing the reasons for granting the waiver. The approval document shall be included in the permit. The approval may impose conditions on the permit. For example, the permittee may be required to improve, modify, eliminate, or correct the condition giving rise to the waiver when it becomes evident that the reason for the waiver no longer exists. If the waiver is approved and the remainder of the application is in order, and the design meets all other standards and design criteria, the requested action shall be approved.



If a waiver is granted to allow direct highway access where the access proposal cannot meet access code standards, or when the property would be without reasonable access without the waiver, the access permit may contain specific terms and conditions providing for its expiration at such time as the necessity for the waiver no longer exists.

If the waiver request is denied, the City Engineer shall state clearly in writing the reasons for denial, continue to process the application, and may approve the application if it can be approved without a waiver.

The decision of the City Engineer regarding the waiver request shall be included as part of the permit application file.

If the waiver request is not approved, the applicant may appeal the decision under the provisions of Section 1.8 of these Standards.

## **1.7 INNOVATION, NEW TECHNOLOGY AND NON-TYPICAL DESIGN**

These Standards are based on current practice and technology. New developments in materials and methods will provide better and more economical designs and practices. Applicants and designers are encouraged to include innovative procedures, new materials, and improved design methods in facility design. Proposals for innovations and new technology should, when appropriate, be submitted as requests for waivers as described in Section 1.6. Such requests should include as much documentation as possible of the proposed innovations—including reports of tests, documentation of successful use in other jurisdictions, calculations, publications, and any other information that will assist the official to determine if the proposal should be adopted.

## **1.8 APPEALS**

Applicants may appeal a decision of the City Engineer by giving written notice of such appeal on forms provided by and filed with the office of the City Clerk within 30 days of the City Engineer's written decision being appealed. The written notice shall include the specific section(s) of the Standards involved in the appeal request and remedy sought.

Appeals reviewed and acted upon under this Section shall be conducted by the City of Cheyenne Building Code Board of Appeals.

## **1.9 AMENDMENT PROCESS**

*The Road, Street and Site Planning Design Standards may be amended, added to, changed, modified or repealed. The public, the planning commission, or the City*



Council may originate a proposal for a text amendment to this document. All proposals shall be referred to the Planning Commission for public hearing.

All proposals for a text amendment of the *Road, Street and Site Planning Design Standards* shall require a minimum 45-day legal notice prior to the public hearing and shall be processed in accordance with the Administrative Procedures Act (WS, 16-3-103).



# Chapter 2—Roadway Functional Classification

## 2.1 PURPOSE

Functional classification, developed for transportation planning purposes, is the grouping of streets by the character of service they provide. Functional classification has emerged as the primary method of grouping streets. These Standards utilize a functional classification system.

## 2.2 CLASSIFICATION

A working copy of the current functional classification map for the streets in the Cheyenne area is available at the Cheyenne Metropolitan Planning Organization (MPO) Office and the Development Office at 2101 O'Neil Avenue. The functional classifications used in the Cheyenne area are described in the remainder of this section. These classifications are shown in the table below.

**Table 2-1. Roadway Classifications**

<b>Roadway Classifications</b>
Interstate/Freeway
Principal Arterial
Minor Arterial
Collector
Local

In the following discussions of each of the road classifications, the average daily traffic (**ADT**) for each classification is a general description only. The official classifications for individual streets are provided on the functional classification map. Detailed street design requirements and graphical cross sections of these facilities are presented in Chapter 5.

### 2.2.1 Interstate, Freeway and Expressways Principal Arterials

The freeways and expressways in the Cheyenne area are on the Interstate System. Freeways provide for the high-speed movement of large volumes of





traffic with a minimum of interference. This is accomplished through the use of access control, divided roadways, and grade-separated interchanges. Freeways have the inherent characteristic of lower accident rates because of many built-in safety features such as comfortable alignment, easy grades, speed-change lanes, adequate sight distance, and other geometric features that afford a continuous movement of traffic.

Expressways are generally considered an intermediate step between major arterial streets and freeway facilities. Expressways can be expected to accommodate somewhat lower volumes of traffic than are found on freeways and are often used in corridors where anticipated volumes of traffic will need less-than-freeway requirements but more than conventional arterial facilities.

### **2.2.2 Principal Arterials**

Arterials, excluding interstates, are the highest classification of streets. They provide the highest level of mobility at the highest speeds for the longest distances. Access is highly controlled with a limited number of intersections, medians with infrequent openings, and no direct parcel access, depending on use and geographic setting. Existing and future land uses adjacent to principal arterials should be served by other network roadways, service roads and inter-parcel connections. Principal arterials are designed with traffic-volume ranges between 15,000 and 35,000 vehicles ADT.

### **2.2.3 Minor Arterial**

Minor arterials are streets that currently serve higher-speed and higher-volume traffic over medium distances, or are anticipated to serve this kind of traffic within a twenty-five year period. Access is restricted through prescribed distances between intersections and limited direct parcel access. Minor arterials serve major traffic generators and link collector streets with the principal arterials. These streets have a design traffic volume of between 7,500 and 15,000 vehicles ADT. Corridor preservation for future minor arterials including rights-of-way, easements, setbacks, and access limitations should be pursued through the land development process.

### **2.2.4 Collectors**

The collector street system serves intermediate and short-distance travel. Collectors provide a lower level of mobility than arterials at lower speeds. These streets connect local roads to arterials and have more direct access dependent on use and geographic setting. Traffic volumes on such facilities are usually lower than those found on arterial facilities. The design volume for these streets ranges from 1,000 to 7,500 ADT.



### 2.2.5 Local Streets

This is the lowest classification of streets. Local streets provide a high level of access to abutting land but limited mobility. Local streets function primarily to serve local traffic circulation and land access. These streets customarily accommodate shorter trips, have lower traffic volumes, and lower speeds than do collectors and arterials. Streets where design-year traffic volume will be between 0 and 2,500 vehicles per day are considered “low volume” local streets. Narrow local streets (lanes) may be used where the volume will be less than 200 ADT.

For purposes of these Standards, local streets are further classified by adjacent land use and volume for establishment of design criteria.

## 2.3 OFFICIAL MAPS

The official map of the City of Cheyenne consists of existing and/or proposed public streets which are functionally classified as collectors, minor arterials, or principal arterials on the adopted Major Roadway System Plan Map.

## 2.4 AMENDMENT PROCESS

Amendments to the official maps may be proposed either by private or public interests. The amendment, once it has been accurately surveyed with defined location by a person licensed by the Wyoming State Board of Registration for Professional Engineers and Professional Land Surveyors to practice land surveying in Wyoming, shall be submitted to the Laramie County Regional Planning Commission, through the City Planning Office, for review and recommendation to the City of Cheyenne. The Official Map may be amended by extending the lines of proposed new streets or street extensions, widenings, narrowings or vacations. Reasons for amending the Official Map include, but are not limited to:

- A. Request by the City or others to recognize additions which have been previously platted and dedicated to the public that generally align with the proposed improvements identified on the adopted Major Roadway System Plan Map.
- B. Securing alignments of a proposed functionally classified roadway identified on the Major Roadway System Plan Map that are necessary to maintain the integrity of the major roadway system.
- C. Planning or engineering studies which recommend specific changes to the Major Roadway System Plan Map.
- D. Other reasons presented by and through the City Planning Office and/or the Cheyenne MPO.



## 2.5 AMENDMENT PROCEDURES

### 2.5.1 Plan Adjustment

Where the proposed Map amendment differs substantially from the existing Major Roadway System Plan Map, the Plan Map amendment must be channeled through the City Planning Office and the Cheyenne MPO. The Plan Map shall then be reviewed and adopted by the Regional Planning Commission before the City will consider amendments to the Official map.

### 2.5.2 Official Map Adjustment

- A. The applicant and/or agent shall submit a completed application, two (2) original hard-copy maps in standard format, and twenty (20) copies of an accurate survey with a defined location map amendment to the City Planning Office.
- B. Prior to submittal of the application, the applicant and/or agent shall notify adjacent property owners of the pending amendment.
- C. The applicant/agent shall publish a "legal notice" in the local newspaper describing the intent of the amendment at least thirty (30) days prior to the Regional Planning Commission meeting date.
- D. The City Planning office shall forward the map to pertinent agencies for notification and review. The Regional Planning Commission will review the proposed amendment at the Monthly meeting. The Planning Commission meeting constitutes the required Public Hearing.
- E. The Regional Planning Commission will forward its recommendation to the City of Cheyenne with reasons for its decision.
- F. Official Map amendments require an ordinance alteration by the City of Cheyenne. The approved and signed amendment shall be filed with the City Engineer's office or Planning Department, with two (2) mylars recorded at the County Clerk's Office. If the amendment is disapproved, the meeting minutes shall reflect appropriate references on which the action was based. Appeals shall be in accordance with Wyoming Statutes.



# Chapter 3—Transportation Impact Studies

## 3.1 PREFACE

A Transportation Impact Study (**TIS**) is necessary to assess the impact which a new development, change in land use, zone change, or an access modification will have on the existing and proposed transportation system, both at the immediate location and in the general area. The TIS will provide information and guidance as plans are developed and decisions made for the approved plan. Such studies usually include:

- A. The determination of the travel demand generated by a proposed development.
- B. The identification of deficiencies in the existing and proposed transportation systems.
- C. The assessment of pedestrian, bicycle, transit and truck connections.
- D. The identification of improvements necessary to maintain acceptable levels of service:
  1. Examples of vehicular traffic considerations and improvements include: road widenings, turn lanes, acceleration and deceleration lanes, intersection improvements, traffic control, design-speed adjustments, modifications to access points and truck routes.
  2. Examples of pedestrian and bicycle consideration and improvements include: safe, comfortable, and convenient pedestrian services, shorter blocks, tree-lined sidewalks, smaller corner radii, well-defined crosswalks, median refuges, bike lanes, on-street parking and shared-use path connections. Also, design elements that lead to low traffic speeds on local streets should be considered.



## 3.2 APPLICANT RESPONSIBILITIES

### 3.2.1 Transportation Worksheet

A Transportation Worksheet (Attachment 3-A) must be completed and submitted with all applications for development approval, including applications when a site plan is required for a proposed change of use/redevelopment.

*This form is not required with applications for residential projects proposing 25 dwelling units or less and instigating no substantial access changes on a collector or arterial roadway.*

### 3.2.2 Scoping Meeting

After the applicant has completed the "Transportation Worksheet," the applicant shall contact the City Development Department and arrange for a meeting to determine base assumptions and the level of TIS required.

- A. Purpose.** The purpose of the scoping meeting is to determine the parameter for the study of traffic impacts for a specific development project, and to document those parameters. The parameters determined in the scoping meeting represent general agreement between the City and the applicant, but they may not be all inclusive. The City retains the right to require any additional information and/or analysis to complete the evaluation of the proposed development project.
- B. Determination of TIS.** The scoping meeting shall conclude with the City and applicant in mutual agreement with regard to determining the level of detail and extent to which the TIS will need to address each of the following:
1. Study area for the impact analysis.
  2. Other developments within the study area.
  3. Existing intersection counts.
  4. Intersections to be studied in detail.
  5. Background traffic volume forecasts (Buildout: 20 to 25 years).



6. Special analysis needs (non-traditional peak hour volumes for some uses, neighborhood impacts, access-management plans, bicycle, pedestrian and transit connections), and
7. Data availability and requirements.

Conclusions of the scoping meeting will be documented and distributed to the applicant by the city.

### 3.2.3 Preparation of TIS

The responsibility for assessing the transportation impacts associated with an application for development approval rests with the applicant. The City serves in a review capacity. The assessment of these impacts shall be contained within a TIS report as specified herein. Transportation Impact Studies shall be prepared by a qualified traffic engineer who is specialized in the preparation of Transportation Impact Studies and is licensed by the Wyoming State Board of Registration for Professional Engineers and Professional Land Surveyors to practice engineering in Wyoming.

## 3.3 LEVELS OF STUDY

For a Transportation Impact Study, the following levels of analysis apply: (These categories are intended as guidelines and may be revised, when warranted, by the City Traffic Engineer.)

### 3.3.1 No Transportation Impact Required

- A. A TIS is not required for residential projects consisting of less than 50 dwelling units and instigating no substantial access changes on a collector or arterial roadway.
- B. Upon submittal of a Transportation Worksheet (Attachment "A") by the applicant and written acceptance by the Local Entity Engineer, the TIS requirement may be waived if all of the following are satisfied:
  1. Daily vehicle trip-end generation is less than 500 and the peak-hour trip generation is less than 50.
  2. There are no additional access requirements on collectors, arterials, or State Highways.
  3. The increase in the number of vehicular trips for the proposed use does not exceed the trip generation from the existing use by more than 20 peak-hour trips or 200 daily vehicle trip-ends.



4. Any change in the type of traffic to be generated (i.e., the addition of new truck traffic) does not adversely affect the traffic currently planned for, accommodated within, and adjacent to, the property.
5. The scale or use of the proposed development or redevelopment is not likely to cause less-than-acceptable levels of service on the adjacent public streets, accesses, and intersections, and
6. The proposed development or redevelopment is not in the vicinity of a street or intersection with a history of safety and/or accident problems.

### 3.3.2 Transportation Impact Assessment

A Transportation Impact Assessment, in lieu of a more detailed study, will be considered if both of the following requirements are met:

- A. Daily vehicle trip-end generation is between 500 and 1,000, and/or the peak-hour trip generation is between 50 and 100; and
- B. Any new access requests are for local streets.

### 3.3.3 Transportation Impact Study

A full Transportation Impact Study may be required for any development that meets one of the following requirements:

- A. Daily vehicle trip-end generation is greater than 1,000 or the peak-hour trip generation is greater than 100.
- B. Access(es) designated as high-volume driveways (50 peak-hour trips) onto Arterials or State Highways are being requested, and
- C. Where large, complex projects are planned or a project is phased over a multi-year build-out, it may be appropriate to prepare a Transportation Impact Study for the initial land-use action followed by periodic updates for specific phases. The Transportation Impact Study must include overall phasing of improvements to coincide with project phasing. Updates to the TIS shall be submitted with the land-use applications for the specific phases.

### 3.3.4 Revisions or Updates

A revision or update to an approved TIS may be required when previously approved land-use action proposes an expansion, a change to access, or a change in use where new trip generation estimates exceed the original trip-end generation estimates. If the currently approved study was prepared within the



last two years, an amendment letter addressing the changes may be accepted and satisfy the requirements of this guideline. The letter must address: a) an estimate of site trip generation, b) existing site trip generation and c) the differences between anticipated estimates and existing trip generation. If the original study is older than two years and access and trip generation has not changed, then an amendment to the traffic study is required. If the original study is older than two years, and access has changed or trip generation has increased, than an entirely new study will be required by the City Traffic Engineer.

**Table 3-1. Changes to the Original Proposed Development**

	<b>Original Report Is</b>	<b>Access Changed* or Trip Generation Increased</b>	<b>Access Not Changed and Trip Generation Not Increased</b>
1.	Less than 2 Years Old	Letter Amendment Required: Identify and discuss only items that changed.	Letter Documenting Change (No other reports required).
2.	Greater than 2 Years Old	New Study	Letter Amendment Required: 1. New local ground counts. 2. New Trip Generation. 3. New LOS Analysis. 4. Meet all current requirements of this TIS Guideline.

\* Changed access includes proposed new access or refinement of general access locations not specifically addressed in original proposed development.

### 3.4 STUDY PARAMETERS

**A. Summary.** The Summary shall be provided as a condensed, stand-alone document. Use the "Summary of Traffic Impact" sheets included as Attachment 3-A. Maps and tables required or provided in individual sections of the report shall be placed in the Summary in the order described and provided in the text of the report. Individual sections of the report may be referenced only as necessary to document a source of information.

**B. Project Description.** A description of the proposed project will be prepared and will include the type of land use and size of the proposed project (number of dwelling units or building square footage). Any proposed phasing will be discussed; the anticipated completion date will be established. A figure depicting the proposed site plan will also be included, and the proposed vehicular access locations will be described. This figure shall provide the following:

- Surrounding Street Roadway Arterial Classification
- Number of Existing and Proposed Travel Lanes
- Existing and Proposed Street Width
- Existing and Proposed Right-of-way Dimensions





- Existing and Proposed Multi-use Driveways and Site Access Points (with Turning Movements)
- Traffic Control
- Speed Limits
- Existing and Proposed Access
- Sidewalks and Bike Routes, Lanes and Paths
- Cheyenne City Bus Routes and Stops

Similar information for adjacent property shall be provided as well, if available, on the same map. The data presented in this report shall be identical in every respect to the site plan submitted for development approval.

For situations where a site plan does not exist, a prototypical site roadway and access system should be assumed for purposes of the study. Subsequent updates will be necessary when a site plan becomes available.

This section will also include a description of how pedestrian and bicycle travel will be accommodated within the proposed site plan. This section will also identify how access to the Cheyenne Transit Program (CTP) is provided.

**C. Analysis Horizons.** Three study horizons are required for a Master or Full TIS analysis: the existing (current), the short-range (one year after build-out) and the long-range (20 to 25 years, based on current Cheyenne Area Master Transportation Plan). It may be acceptable for the short-range and long-range horizons to be identical for some large projects.

**D. Study Area.** The limits of the transportation network to be studied shall be based on the size and extent of the application for development approval, the existing and future land uses and traffic conditions on and near the site. The exact limits of the study area are to be based on good engineering judgment, and an understanding of existing and future land use and traffic conditions at and around the site. The limits of the study area shall be agreed upon at the scoping meeting.

The concerns related to specific land-use actions on specific studies vary greatly. At a minimum, the factors to be considered for the establishment of limits of the study should include:

#### 1. Transportation Impact Study

- a. All adjacent streets, intersections, and high-volume driveways.
- b. Nearest offsite major intersection(s).
- c. Internal roads, including establishing the road classification.
- d. Pedestrian and bicyclist destinations (existing or imminent) within 1,320 feet of the site; Any pedestrian routes within 1½ mile of a school (residential land uses only), and
- e. Any Cheyenne Public Bus routes and stops.



## 2. Transportation Impact Assessment

- a. All adjacent streets, intersections, and high-volume driveways.
- b. Internal public roads, including establishing the road classification.
- c. Continuity and adequacy of pedestrian and bike facilities, and Cheyenne Public Bus routes and stops adjacent to the site.

**E. Existing and Proposed Uses in Vicinity of Site.** The applicant shall identify existing and anticipated land uses in the general vicinity of the site in order to understand other influences to area traffic patterns. A list of the applicable development approvals shall be included. (This information shall be obtained from the City's records.) Specific attention shall be paid to property adjacent to the site and any undeveloped land in the study area. A map shall be prepared for the project vicinity that graphically depicts the location of approved or proposed developments. Developments within the project study area but in other jurisdictions as well shall also be identified and documented on the map.

**F. Existing and Committed Transportation Improvements.** The applicant shall prepare a map showing the planned surface transportation improvements for the short-term and long-term planning horizons. Committed/funded improvements by the City and previously approved developments shall be identified for the short- and long-term horizon years.

The long-term improvements shall be those documented in the City's Transportation Master Plan and any other long-term improvements adopted through the Cheyenne MPO and/or included in the State Transportation Improvement Program.

The improvements' descriptions shall include the nature of the improvements, their extent and implementation schedule, and the responsible party concerned.

### 3.5 EVALUATION ELEMENTS

Transportation Impact studies shall utilize sound and commonly accepted traffic engineering standards and procedures and shall utilize the latest edition of the Institute of Transportation Engineers (ITE) trip generation rates—unless better information is available or can be obtained at reasonable cost. Traffic studies shall address the following items in sufficient detail (based on the agreed-upon parameters outlined in the scoping meeting) to adequately and accurately represent the traffic conditions and resultant impact of the proposed development request.



**A. Transportation Impact Study.** The key elements of the project impact assessment for a Transportation Impact Study shall include the following evaluations:

- 1. Conformity with the adopted Transportation Master Plan:** The applicant shall identify the roadway improvements within the study area per the City's Transportation Master Plan.
- 2. Existing Traffic Conditions:** The applicant shall provide a description of the existing traffic conditions within the study area and shall include the following:
  - a. Traffic Counts.** A map shall be prepared, which presents a.m. and p.m. peak-hour and daily traffic volumes. These volumes shall be no more than two years old—less if the development is in a high-growth area. The source of existing traffic volume information shall be explicitly stated (City counts, new counts by applicant, County counts, etc.). Summaries of current traffic counts shall be included in the description's appendix.
  - b. Existing Peak-hour and Daily Level of Service.** Existing a.m. and p.m. peak-hour intersection levels of service shall be determined for signalized and unsignalized intersections within the study area based on procedures described in the latest edition of the Highway Capacity Manual. The existing arterials shall also be analyzed based on a daily volume/capacity ratio analysis where the threshold capacities are defined by arterial designation per the following table. Volume/capacity ratios that exceed 1.00 shall be identified. It should be noted that these are general thresholds for planning purposes only, and a supplementary peak-hour analysis shall be considered. These daily volume/capacity ratios shall be recorded on the existing volume map.

Roadway links shall be analyzed. Acceptable maximum traffic volumes allowed for the specific class of roadways are per the following table:



**Table 3-2. Acceptable Maximum Traffic Volumes**

Facility Type	Lanes	Threshold Capacity
Local Residential	2	2,500 (ADT)
Local Commercial/Industrial	2	3,500 (ADT)
Collector	2	7,500 (ADT)
Minor Arterial	2	550 each way (Peak Hour)
Major Arterial	4	1,600 each way (Peak Hour)

It is recognized that some of the City's streets currently experience traffic volumes greater than each roadway's classification design volume. The objective of this analysis is to identify whether the volume (as a point of reference for considering impacts from the proposed development) exceeds the threshold.

- c. **Crash Analysis.** A three-year accident record shall be collected for adjacent roadways and intersections within the study area. Based on existing traffic volumes, an accident rate for accidents per million vehicle mile of travel for links and accidents per million vehicles at intersections shall be calculated by year. Geometric deficiencies for high-accident locations shall be identified.
- 3. Future Traffic Conditions without Proposed Development.** Long-term a.m. and p.m. peak-hour and daily link planning horizon traffic forecasts shall be estimated. The short-term planning horizon is one year after full occupancy. The short-term planning horizon traffic forecast shall be the sum of existing traffic volumes plus cumulative development traffic plus ambient growth. The short-term planning horizon traffic forecasts shall also include cumulative development traffic within the study area. The short-term planning horizon year ambient growth-rate traffic forecasts shall be based on:
- a. Proportion between existing traffic volumes and build-out regional (Wyoming Department of Transportation) model forecasts.
  - b. Extrapolation from historical traffic counts to current counts, and/or
  - c. Planning analysis that considers trends in the area's circulation system through either a proportion or extrapolation estimate.



Whatever method is used to develop the annual growth rate for determining ambient traffic, it is important that the method be documented with sufficient detail to clarify the methodology and replicate the findings.

The map of the committed and funded improvements (for each planning horizon) shall be used as a base for determining short-term and long-term planning horizon levels of service. The applicant may identify improvements that would mitigate unacceptable levels of service under the traffic conditions without the proposed development. In addition to needed improvements, identification of when such improvements are needed is also important. The time that improvements are necessary could be defined by when a traffic threshold is reached or by potential year.

- 4. Trip Generation.** Development traffic shall be analyzed based on the traditional trip generation, distribution, and assignment process described as follows:

- a. Project Trip Generation.** The applicant shall estimate project trip generation (total daily traffic and a.m./p.m. peaks) for interim years and build-out based on the development approval application of number and size of units.

Trip generation shall be calculated from the latest data contained within the Institute of Transportation Engineers' *Trip Generation Report* or other industry publications such as the *ITE Journal*. Data limitations, data age, choice of peak-hour or adjacent street traffic, choice of independent variable and choice of average rate versus statistical significant modification shall be presented and discussed. In the event that data is not available for a proposed land use, the applicant shall conduct a local trip generation study following procedures prescribed in the *ITE Trip Generation Manual* and shall provide sufficient justification for the proposed generation rate. This rate must be acceptable to the City's Engineer.

For shopping centers, trip generation shall be based on both the shopping center trip generation algorithms and the application of trip generation rates to individual land uses. The greater of the two methods shall be used in the analysis.

- b. Adjustments to Trip Generation Rates.** After first generating trips at full ITE rates, trip-making reduction factors may be used. These factors fall into two categories: those that reassign some portion of generated trips to the background stream of traffic, and those that "remove" or "move" generated trips. In all cases, the underlying assumptions of the ITE Trip Generation rates must be specifically described in order for these reductions to be considered and claimed.



The first category of adjustments applies when trips to the proposed development currently exist as part of the background traffic stream, referred to as a pass-by trip. Pass-by percentages identified in the *ITE Trip Generation Manual* or other industry publications may be used.

This traffic must continue to be assigned to site driveways and access points, but is not additive to the background stream of traffic. A technical appendix that illustrates the redirection of pass-by trips is recommended.

The second category of adjustments is for internal site trips, transit use, and TDM (transportation demand management) actions. In general, reductions are not recommended. However, if reductions are claimed, analytic support to show how the figures were derived must be provided. Optimistic assumptions regarding transit use and TDM actions will not be acceptable unless accompanied by specific implementation proposals that will become a condition of approval. Such implementation proposals must have a reasonable expectation of realization within a 5-year period after project initiation.

- c. Trip-generation Budget.** Major concern will occur if the traffic study identifies a trip-generation rate that is less than what ultimately is experienced once the development is built and occupied. Because entitlement has been granted, the impacts of the traffic from underestimating the trip generation is experienced by the community; modifications or improvements, if possible, become the burden of the public. It is recognized that the trip generation process is ultimately dependent on a number of market and social factors; however, it is imperative that the traffic impact study be sufficiently conservative to account for full impact of the proposed development.
- 5. Trip Distribution.** Trip distribution may be based on the WYDOT modeling, market analysis, existing traffic flows, applied census data, and professional judgment. Regardless of the estimates, the procedures and logic for estimating the trip distributions must be well documented. The trip-distribution patterns must be presented for each phase if changes in roadway network, access or land use are proposed.
- 6. Project Trip Assignment.** This section shall present the forecast the traffic assignment based on the development's trip generation estimates and project trip distribution. The traffic forecasts shall be graphically presented and include: a.m. peak-hour, p.m. peak-hour, and total daily site-generated traffic. If trip generation is different for the short-term and long-term planning horizons, both shall be shown on separate graphics. "Pass by" traffic shall be included at driveways and access points.



- 7. Future Traffic Forecasts with the Proposed Development.** The applicant shall present a graphical summary of the short-term and long-term horizon year traffic plus the proposed development traffic for the a.m. peak-hour, p.m. peak-hour, and daily conditions. These volumes shall include turn movements at the key intersections. The base map for this exhibit shall reflect the respective transportation network by planning horizons.
- 8. Future Peak-hour Level of Service and/or Peak-hour Intersection and Driveway Level of Service.** An a.m. and p.m. peak-hour intersection level of service analysis shall be conducted for study-area intersections and driveways. This analysis should be based on procedures established in the most current *Highway Capacity Manual*. Synchro intersection level of service is both acceptable and desirable to assess the impacts of intersection levels of service as part of a system of signalized intersections. Levels of service for signalized intersections shall be based on the signal timings developed for the signal progression analysis. All level of service analysis worksheets shall be included in the Appendix of the submitted study.

The principal objective of the intersection level of service traffic impact analysis is to identify whether the traffic from the proposed project when added to the existing, plus short- and long-term planning horizon traffic will result in a significant impact and an unacceptable level of service. For definition purposes, the threshold for acceptable level of service is C.

Significance is defined as: 1) when the added project traffic causes the level of service to deteriorate below level of service D, or 2) when the short-term or long-term horizon year traffic without the project is below level of service D and the project traffic causes a 2% increase in the volume/capacity ratio or delay.

For unsignalized intersections, the minimum level of service permitted for outbound left turns is E. An analysis of maximum queue length shall also be performed; and if the queue exceeds five vehicles, then a separate left-turn lane with adequate storage shall be provided.

- 9. Appropriateness of Access Locations and Circulation.** The transportation impact study shall address the appropriateness of the proposed access points. This assessment shall be consistent with requirements set forth in Chapter 4 and 5 of the City's *Road, Street and Site Planning Design Standards*. If the proposed access is to be signalized, then a progression analysis using Synchro shall be conducted to insure that the proposed access can be accommodated within the optimum progression along the arterial on which the access is proposed.



- 10. Identification and Location for Turn Lanes or Acceleration/Deceleration Lanes at Accesses or Intersections.** The transportation impact study shall identify recommendations and reasons for acceleration and deceleration lanes—including taper lengths, storage length, and other geometric design requirements per the City's *Road, Street and Site Planning Design Standards*.
- 11. Sight Distance.** The transportation impact study shall provide an evaluation and recommendation for intersection and driveway stopping sight distance and intersection sight distance per the City's *Road, Street and Site Planning Design Standards*.
- 12. Pedestrian and Bicycle Analysis.** As part of the transportation impact study, the applicant's traffic engineer shall provide in sufficient detail the project's proposal to provide pedestrian and bicycle connections within the site to the local off-site pedestrian and bicycle destinations. These destinations include, but are not limited to, schools, parks, local commercial centers, and bike trails. This written and mapped assessment shall describe the directness of the route to and from various parts of the project, the continuity of the pedestrian and bicycle system to reach these destinations and the design elements of the street crossings to assure safe pedestrian and bicycle crossings. If the continuity between the project's pedestrian and bicycle system and that of the off-site destination is incomplete, the applicant shall identify what improvements are necessary to mitigate these continuity or street-crossing impacts. It is further required that if any roadway improvements are proposed, such as adding a left- or right-turn lane, the study should address methods to mitigate the impacts on the pedestrian and bicycle system in these areas—explaining how the routes are to cross these proposed improved streets and intersections. Locations for crosswalks, both internal and external to the site, shall be identified.
- 13. Cheyenne Public City Bus Connections.** The transportation impact study shall contact the Cheyenne Public City Bus Office to determine existing and future bus transit routes and stops within the study area. Specific stops within or adjacent to the site (such as signs, pads, shelters, etc.) shall be identified and proposed improvements. This analysis shall also identify direct and continuous pedestrian sidewalks and pathways to reach these stops from the site.
- 14. Traffic Control.** The transportation impact study shall also provide recommended traffic-control devices for intersections; these may include stop-control and yield-control signs, school flashers, crosswalks, traffic signals





or roundabouts. These recommendations shall be in conformity with the City's *Road, Street and Site Planning Design Standards*, AASHTO and other appropriate professional transportation engineering documents. All proposed signal and stop signs shall require a signal or stop sign warrant analysis per the *Manual on Uniform Traffic Control Devices*. As signal warrants only describe the minimum requirements for considering a signal, a progression analysis shall be conducted to determine that the impact of the new signal can be accommodated without significant impact to the corridor's signal progression.

**15. Progression Analysis for Signalized Intersections.** A progression analysis is required for all projects which propose the addition of a new signal. Whereas the signal warrant analysis identifies the minimum requirements of whether a signal might be warranted, the signal warrant analysis does not determine if the signal can be accommodated in the overall traffic flow of the corridor. Therefore, the acceptability of the signal locations must be demonstrated through a signal progression (time-space) analysis. The analysis shall consider any existing access or intersections or a possible future signal location along the arterial for a distance of at least one mile in each direction of the proposed signal. (This data is available from the city.) The maximum cycle length that will be permitted is 110 seconds. A travel speed of 45 mph on Principal Arterials and 35 mph on Minor Arterials, unless the existing posted speed limit is less, should be used. A Principal Arterial bandwidth of 50% and a Minor Arterial bandwidth of 40% are considered desirable and must be used where existing conditions allow. Where intersections or other accesses have no signals presently, but are expected to have signals, a 60% mainline, and 40% cross-street cycle split should be assumed. Where more detailed information is available from turning movement projections, other split assumptions may be made.

Any access that would reduce the desirable bandwidth if a traffic signal were installed shall be identified. In general terms, that access should remain unsignalized and have turning movements limited by driveway design or median islands, unless the impacts to traffic operation and safety are made even worse by doing so. Distances between signalized intersections (centerline) shall be indicated. Signal progression worksheets (time-space diagrams) shall be included in the Appendix of the submitted study.

If it is determined that the minimum green band is reduced by five percent or less, then the signal would be permitted. If the green band for the arterial is reduced by greater than five percent, then the intersection design will need to be modified or relocated to minimize the impact.



**16. Safety and Accident Analysis.** Existing accident history shall be collected for arterials and intersections within the study area. As part of the transportation impact analysis, the applicant's consultant shall summarize these accidents and calculate accidents per million vehicle miles of travel for arterial links and accidents per million vehicles entering an intersection. As part of the analysis, the consultant shall identify problems that currently exist and how the proposed improvements will mitigate these problems.

**17. Other items as requested by the Local Entity Engineer.** In the initial required scoping meeting with the Local Entity Engineer, specific additional issues might be raised which require further analysis. This section of the report is provided to address those additional concerns which might include cut-through traffic and residential quality-of-life concerns, truck/bus traffic estimates and pavement design, routes to schools, emergency routes, etc.

**B. Transportation Impact Assessment.** At a minimum, the following issues should be considered for submittal in a Transportation Impact Assessment. Requirements for these issues are defined in the above section on Transportation Impact Study requirements.

1. Existing Traffic Conditions:

- a. Traffic Counts,
- b. Traffic Growth,
- c. Crash Analysis,
- d. Peak-hour level of service and/or peak-hour intersection and driveway level of service,
- e. Future peak-hour level of service and/or peak-hour intersection and driveway level of service, and
- f. Appropriateness of access locations.

- 2. Location and requirements for turn lanes or acceleration/deceleration lanes at the access, including recommendations for taper lengths, storage lengths, and other geometric design requirements per Local Entity or WYDOT requirements,
- 3. Sight distance evaluations and recommendations (intersection, stopping, passing),
- 4. Continuity and adequacy of pedestrian and bike facilities within the study area,
- 5. Appropriateness of the existing roadway signing and striping,



6. Other items as requested by the Local Entity Engineer and agreed upon in consultation with the Applicant's Traffic Engineer, and
7. Neighborhood and public input issues.

### C. Mitigation/Alternatives

This section shall describe the location, nature, and extent of all transportation improvements that the applicant recommends to yield reasonable operating conditions in each horizon year with the land-use action approved as requested. For this discussion, the following terms apply:

**Planned:** Improvements that are already planned and have committed funding, including those identified in short-term capital improvement programs by the City, State, or others.

**Applicant Committed:** When existing plus cumulative traffic, with planned and background improvements, results in unacceptable levels of service, the applicant shall identify mitigation measures to offset project impacts.

**Necessary:** Improvements required to mitigate background plus applicant traffic to establish acceptable levels of service, regardless of the amount of traffic contributed by the project.

The reason that "necessary" improvements must be explored is that often the "planned" improvements, plus the improvements that the applicant typically understands and commits to, are not adequate to provide a satisfactory level of service. The applicant shall assure that all practical solutions have been considered when developing the list of "necessary" improvements, so that the resulting operating conditions will approach the accepted level of service.

For purposes of identifying improvement possibilities (either by the applicant, City, or State) necessary to yield an acceptable level of service, the cost of the improvements shall not be considered a limiting constraint within the context of the traffic impact study. However, the goal of the evaluation is to identify cost-effective solutions that yield a reasonable level of service. Extremely high-cost solutions may not be cost-effective, but it is important to at least identify solutions so decision-makers are cognizant of existing options.

The applicant shall provide a scaled drawing of the recommended improvements. One sheet may be used for both interim and long-term design years if all the improvements can be conveniently described thereon. If not, one or more sheets should be completed for each design year.

All recommended improvements shall include right-of-way needs (for roadways), signal or turn-lane improvements (for intersections), and, at a sketch planning level,



cost of the improvement. Also, commitment to the improvement shall be identified, either by local governments, districts, or by the applicant himself/herself (this may include both the “applicant committed” and “necessary” projects). Identification of a project as “not currently committed” may be an appropriate description for many needed projects, including some of those that are “planned.” However, the goal of the recommendations shall be to identify a firm program of improvements that will support the proposed land-use action and background traffic in each design year.

It is further required that all geometric improvements, such as pavement markings, signs, adding through or turn lanes, adding project access and assorted turn lanes, acceleration lanes, and changes in medians, shall be presented in a schematic scaled drawing, preferably on a current aerial map. Sufficient dimensions shall be identified to facilitate review.

### **3.6 PRESENTATION**

Four copies of the traffic study shall be submitted. Reports shall be 8½” x 11” format, with maps no larger than 11” x 17.” Additional copies may be required for large or complex projects. The exact number required should be verified at the scoping meeting.

### **3.7 AGENCY REVIEW**

The local entity can use the findings of the impact study to suggest or require roadway improvements, changes to site design, and/or operational improvements. The applicant shall revise and resubmit the Traffic Study as necessary to address review comments provided to the applicant by a reviewing agency.



### Attachment 3-A—Transportation Worksheet

Project Name: \_\_\_\_\_

Date: \_\_\_\_\_

By: \_\_\_\_\_

Property Address or Legal Description

Title: \_\_\_\_\_

(lot, block, subdivision) : \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Phone #: \_\_\_\_\_

\_\_\_\_\_

Fax #: \_\_\_\_\_

(Existing Zoning) : \_\_\_\_\_

E-mail: \_\_\_\_\_

Developer: \_\_\_\_\_

#### **Part One: All Developments**

Provide the following information, to the best of your knowledge, for all projects:

1. Has a previous Transportation Impact Study (TIS) been prepared for the site?  
Yes \_\_\_ No \_\_\_
2. Are there proposed street intersections included with this development?  
Yes \_\_\_ No \_\_\_
3. Are there existing intersections affected by the development action(s)? Yes \_\_\_  
No \_\_\_  
If yes, which? \_\_\_\_\_
4. What is the proposed year of build-out? \_\_\_\_\_
5. Will the project be phased? If yes, what is the proposed phasing plan? Yes \_\_\_  
No \_\_\_  
\_\_\_\_\_
6. Are there other proposed developments in the study area? \_\_\_\_\_
7. Are there other committed roadway improvements in the area? \_\_\_\_\_
8. Are there proposed roadway improvements to be provided by the Applicant with this project? \_\_\_\_\_
9. Are there bicycle and pedestrian attractions near the development? (Existing or imminent within 1320' of the site. This distance may be increased up to 1.5 miles for residential projects near existing or proposed school sites.) Yes \_\_\_ No \_\_\_



**Part Two: Non-residential Development**

Provide the following information, to the best of your knowledge, for all non-residential projects:

**A. Existing Use:**

1. Description of existing land use: (if none, proceed with Part B): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. Existing building area (square footage) for above use(s): \_\_\_\_\_
3. Number of employees on site each day: \_\_\_\_\_
4. Daily trip ends for employees [multiply line 3 by the number 4]: \_\_\_\_\_
5. Number of customers on site each day: \_\_\_\_\_
6. Daily trip ends for customers [multiply line 5 by the number 2]: \_\_\_\_\_
7. Number of vendors on site each day (include trash, UPS, etc.): \_\_\_\_\_
8. Daily trip ends for vendors [multiply line 7 by the number 2]: \_\_\_\_\_
9. Total vehicular daily trip ends [line 4 plus line 6 plus line 8]: \_\_\_\_\_
10. How many Company Vehicles are used daily: \_\_\_\_\_
11. How many Company Vehicles will be parked on site: \_\_\_\_\_
10. Source of trip generation data (circle one): ITE, business records, traffic engineer, personal estimates, other: \_\_\_\_\_. Attach documentation to support your data.
11. Number of accesses, width, and type of drive surface exiting onto the public street(s) from this property: \_\_\_\_\_
12. Number of pedestrians visiting site each day: \_\_\_\_\_
13. Number of bicyclists visiting site each day: \_\_\_\_\_
14. Do sidewalks exist along all street(s) adjacent to property? Yes \_\_\_ No \_\_\_
15. Is property adjacent to a major collector or arterial street. Yes \_\_\_ No \_\_\_



**B. Proposed Use:**

1. Description of proposed land use: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. Proposed building area (square footage) for above use(s): \_\_\_\_\_
3. Anticipated number of employees on site each day: \_\_\_\_\_
4. Daily trip ends for employees [multiply line 3 by the number 4]: \_\_\_\_\_
5. Anticipated number of customers on site each day: \_\_\_\_\_
6. Daily trip ends for customers [multiply line 5 by the number 2]: \_\_\_\_\_
7. Anticipated number of vendors on site each day: \_\_\_\_\_
8. Daily trip ends for vendors [multiply line 7 by the number 2]: \_\_\_\_\_
9. Total vehicular daily trip ends [line 4 plus line 6 plus line 8]: \_\_\_\_\_
10. Source of trip generation data (circle one): ITE, business records, traffic engineer, personal estimates, other: \_\_\_\_\_. Attach documentation to support your data.
11. Proposed number of accesses onto the public street(s) from this property (does NOT include any existing accesses proposed to remain for use): \_\_\_\_\_
12. Number of existing accesses proposed to remain and be used: \_\_\_\_\_
13. Number of pedestrians visiting site each day: \_\_\_\_\_
14. Number of bicyclists visiting site each day: \_\_\_\_\_
15. Do sidewalks exist along street(s) adjacent to property? Yes \_\_\_ No \_\_\_
16. Property is not adjacent to a major collector or arterial street as show on the City's Master Transportation Plan. Yes \_\_\_ No \_\_\_
17. Is a zone change requested? Yes \_\_\_ No \_\_\_
18. If yes, the existing zone is \_\_\_\_\_ and the proposed zone is \_\_\_\_\_.

If the total new trips (the difference between the daily trip ends calculation for any existing use and the total daily trip ends calculation for any existing use and the total trip ends calculated for the proposed use) is less than 500 and if peak hour and/or daily traffic counts demonstrate that the existing traffic plus the site generated traffic volumes are within the limits by these standards, you (the applicant) may request a waiver of the Transportation Impact Study submitted requirements by signing below.

Signature \_\_\_\_\_ Date \_\_\_\_\_



Transportation Impact Study Required: _____	Transportation Impact Assessment Required: _____	TIS Waived: _____
By: _____		Date: _____

**Part Three: Residential Development**

Fill out the table below and indicate in the table the number of dwelling units or access changes proposed for the type(s) of residential development included in your development. If the number of dwelling units and changes in access are less than the thresholds established above and if peak hour and/or daily traffic counts demonstrate that the existing traffic plus the site generated traffic volumes are within the limits set by City policy, you (the applicant) may request a waiver from the TIS requirement by signing your name below.

Provide the following information, to the best of your knowledge, for all residential projects:

NUMBER	RESIDENTIAL DEVELOPMENT TYPE
	Single-family detached/dwelling units
	Multi-family dwelling units in duplex, triplex, or four-plex structures
	Multi-family dwelling units in structures containing five or more units
	Access changes onto a collector or arterial roadway

Signature \_\_\_\_\_ Date \_\_\_\_\_

Transportation Impact Study Required: _____	Transportation Impact Assessment Required: _____	TIS Waived: _____
By: _____		Date: _____





# Chapter 4—Access Requirements and Design Criteria

## **4.1 PREFACE**

Roadside interference with the movement of traffic affects the efficiency and safety of streets and roads. Most of the interference originates in vehicle movements to and from businesses, residences, other adjacent development, and entering or crossing public streets. Landowners have certain rights of access to adjacent streets. Motor vehicles have a right to safe use of public streets. Pedestrians and bicyclists also have rights to safely travel along and cross these public streets. In order to protect these rights, regulation and control of the location, design, and operation of access points on the public street system is necessary.

Access control regulations standardize, regulate, and control the location, size, type, construction, maintenance, and number of curb cuts, driveway approaches, and intersections. The regulations provide safe and efficient access between streets and adjacent property, safety of traffic in the streets, safety of pedestrians on sidewalks, and alongside rural roads. These Standards are intended to provide consistency in the design of new developments and to maintain a high level of service on roads and streets.

## **4.2 PERMITS REQUIRED**

### **4.2.1 Advice Available**

To determine the extent of technical justification required for all access requests, any permit applicant may consult with the City engineering staff and fire department. It is recommended that this advice be sought prior to submitting any application.

### **4.2.2 Permits Required**

No person shall commence work on the construction, alteration, repair, or removal of any driveway approach, sidewalk, curb and gutter or the paving of any parking strip on any street, road, alley, or other public place in the City Right of Way without a written permit first having been obtained from the City Engineer or Planning Department. Permits shall be issued upon approval of the application by the City's Construction and Traffic Departments and payment by the applicant of any required fees.



### 4.2.3 Application

To apply for a permit, the applicant shall file a written application with the City Construction Department. Such application shall be made on a standard form provided for that purpose. The following information is required to be shown either on the application form or on attachments to the application:

- A. A detailed plan showing the exact location of the abutting property, the exact dimensions and location of existing or proposed driveway approaches and the relevant features adjacent to, across from, and within the limit of the frontage of such property—for example, fire hydrants, signs, sidewalks, poles, street light standards, and control boxes. The plan shall also show locations of access approaches on adjacent properties and properties on opposite sides of streets and intersections.
- B. The location of buildings, loading platforms, or off-street parking facilities being served or to be served by such driveway approaches.
- C. Existing and proposed traffic volumes for access points and adjacent access points and adjacent streets.
- D. Any other information the City may require when they determine that such information is necessary to properly enforce the provisions of these regulations.

### 4.2.4 Permits to Accompany Site Plans

When access points are being revised as part of a project requiring approval of site plans, applications for the site plan, transportation impact study, and the access permit shall be submitted together.

### 4.2.5 Access Waivers

As provided in Section 1.6 of these Standards, waivers of the requirements and regulations of this article may be granted where unusual conditions or strict adherence to these regulations would cause undue and extreme hardship. Decisions on requests for waivers may be appealed under the provisions of Section 1.8 of these Standards.

### 4.2.6 Access to State Highways

Access onto state highways will be subject to the approval of the Wyoming Department of Transportation district engineer (via a WYDOT access permit).



## 4.2.7 Permittee Responsibilities

- A. The permittee shall do all work and pay all costs in connection with the construction of access driveway approaches and their appurtenances on the right-of-way. This cost shall include the cost of any public property, including the roadway surface, damaged during construction.
- B. Any person performing work subject to the provisions of this section shall notify the City Construction Office at least 24 hours in advance of the time when permitted work is to begin.
- C. The cost of relocating any street structure, when necessary, shall be borne by the applicant. Relocation of any street structure shall be performed only by or through the person holding authority for the particular structure involved.
- D. The permittee or contractor shall maintain the safety of the driveway approach construction site, provide adequate barricades and lights at his/her own expense to protect the safety of the public using the adjacent streets or sidewalks, remove all debris, dirt, or other construction material immediately upon completion of work and shall hold the City of Cheyenne harmless and indemnify the City of Cheyenne from any damages incurred by permittee's operations. Such work shall be accomplished in conformance with the current editions of the *Manual on Uniform Traffic Control Devices for Streets and Highways*, and the *City of Cheyenne Manual of Specification and Procedures for Setting-up Traffic-control Devices in Construction and Maintenance Areas*.

## 4.3 ACCESS REQUIREMENTS

### 4.3.1 Direct Access Restricted

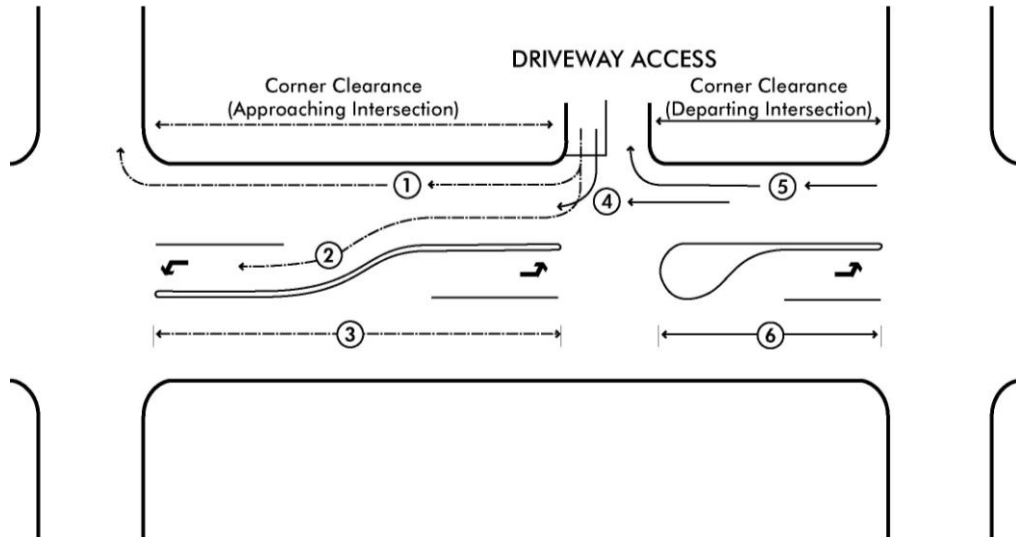
Direct access to individual lots from collectors and arterials is restricted. If a property has frontage on one or more side streets intersecting the arterial, access shall be limited to such side street(s) unless a traffic study approved by the City demonstrates that direct access to the arterial would promote improved traffic operations and/or safety.

### 4.3.2 General Access Requirements

The design, number, and location of access points shall be approved by the City Traffic Engineer. Where necessary, for the safe and efficient movement of traffic, the City Traffic Engineer may require access points to provide for only limited turning movements. Usually, access is dependent on a number of variables as presented in the following figure, General Access Requirements. A key to the graphic is located below the image.



**Figure 4-1. General Access Requirements**



(1) **Right-turn driveway egress** vehicles must not interfere with the right-turn queue at the downstream intersection (i.e., the driveway shall be of sufficient distance back from the intersection so as not to interfere with the maximum right-turn queue as determined by a traffic study).

(2) **Corner clearance** must be of sufficient distance from the downstream intersection to allow right-turn egress sufficient distance to cross any right-turn and through travel lanes and enter the back of the left-turn pocket.

(3) If **left-turn ingress and/or egress** are to be provided, the minimum corner clearance shall equal the length of the back-to-back left-turn pockets plus the bay taper (i.e., the minimum distance as measured from a crosswalk or stop bar for two 150-foot back-to-back left-turn lanes plus a 90-foot bay taper would be 390 feet. Ideally, this distance shall be approximately 600 feet to allow for extended left-turn lanes and a longer taper between left-turn pockets).

(4) **Corner clearance** from an upstream intersection should be of sufficient length to allow the exiting driver to determine whether an approaching vehicle will be traveling through the upstream intersection and to not interfere with the approaching vehicle. The corner clearance must be adequate to allow a vehicle approaching from the upstream intersection sufficient time to stop in the event that a vehicle at the access pulls out into the street.

(5) The **corner distance** should be of sufficient length to allow vehicles to make a right-turn into the access and not significantly impact the vehicles desiring to continue past the driveway.



(6) If **left-turn egress** is to be provided, the minimum corner clearance shall be the sum of the departing intersection left-turn pocket length and bay taper. (On arterials, this minimum distance should be 350 feet.)

### 4.3.3 Full-access Driveway and Intersection Separation Distances on Arterials and Collectors

In order to promote ideal traffic flow and minimize conflicts to the through movements, minimum spacing between intersections and full-access controlled driveways shall be as presented below. It should be noted that these are minimum distances; additional spacing might be necessary based on a traffic study if required by the City Engineer. This traffic study might require a signal progression analysis to determine whether there exists adequate gaps in the through travel flow to accommodate full-access movements and potential queue backups and weaving concerns between the access and the adjacent signalized intersection.

**Table 4-1. Minimum Distance between Intersections and Full-access/movement Driveways (Centerline to Centerline)**

Facility Type	Minimum Distance between Intersections and Full-access/movement Driveways
(1) Principal	660'
(2) Minor	330'
(3) Collector	200'

### 4.3.4 Joint Access on Arterials and Collectors

For adjacent platted lots or developments within the City along arterials and collectors, access shall be provided through shared or joint driveway approaches, access easements, and/or frontage roads. The Development Office may determine, on a case-by-case basis, that a joint access is not appropriate. All parties involved shall sign the Access Permit Application. All access requirements shall be met, except that the “minimum distance from property line” requirement shall not apply.

### 4.3.5 Access Spacing Between Driveways on Arterials and Collectors

When access is allowed from collectors or arterials, each access shall have a minimum separation per the following Table.



**Table 4-2. Minimum Distance between Driveways**

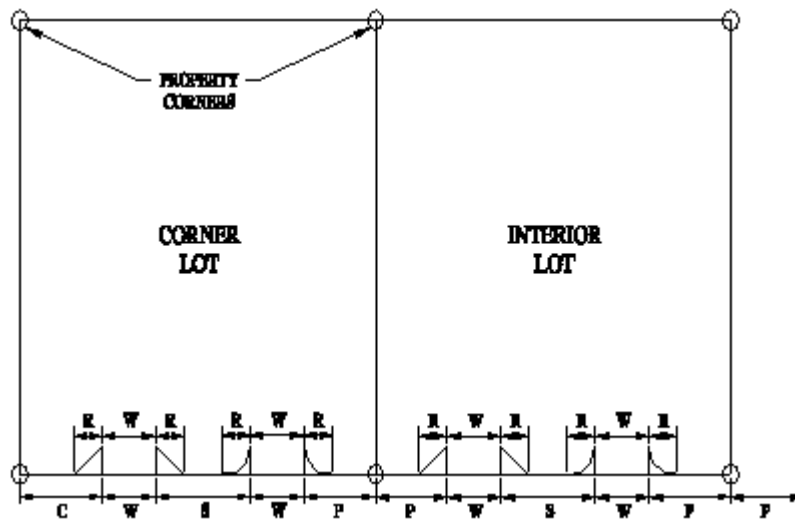
Facility Type	Minimum Distance between Driveways
(1) Principal	660'
(2) Minor	330'
(3) Collector	75'

When speed-change lanes are present, or will be needed in the future, the accesses shall be separated by a sufficient distance so the speed-change lanes, including transition tapers, do not overlap or an equivalent distance if speed-change lanes are not yet built. Access shall not be permitted within a speed-change lane, taper, or ramp. Greater separation may be required to eliminate conflicts or overlaps of center left-turn lanes or speed-change lanes.

### 4.3.6 Driveway Width, Curb Radii and Access Spacing between Driveways on Local Roads

Driveway width, curb radii, and access spacing between driveways on local roads are determined by Figure 4-2 and Table 4-3.

**Figure 4-2. Driveway Width, Curb Radii and Access Spacing between Driveways**



**Table 4-3. Basic Driveway Approach Dimensions for Local Roads**

	Fig. 4-2	Residential	Commercial		Industrial	
			Two Way	One Way	Two Way	One Way
<b>Width</b>						
Minimum	W	10'	30'	12'	40'	12'
Maximum	W	36'	36'	15'	50'	15'
<b>Radii (Curved or Flared)</b>						
Minimum	R	5'	15'		20'	
Maximum	R	10'	25'		50'	
<b>Minimum Spacing</b>						
from Property Line	P	10'	25'		50'	
from Street Corner	C	15'	35'		60'	
between Driveways	S	–	53'		110'	

**Notes to Table 4-3**

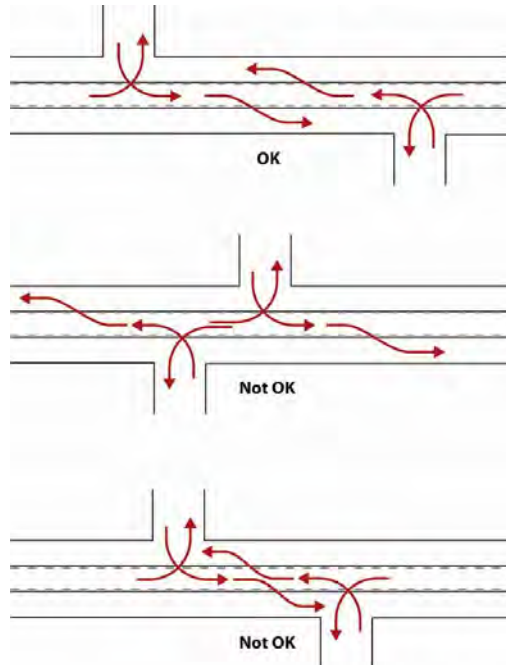
- The driveway approach surface should be paved. However, if the adjacent road has a gravel surface, the driveway approach, if not paved, shall have a minimum of six inches of crushed gravel.
- At driveways with high traffic volumes, such as fast food restaurants and car washes, provision must be made for car storage on the premises to prevent stacking of vehicles on the roadway.
- Where needed and feasible at high-traffic-volume driveways, clearly visible acceleration and/or deceleration lanes should be provided. Except for the driveway served, no other driveway accesses shall be permitted within the limits of the auxiliary lanes.
- Waivers from these dimensions may be approved as provided in Chapter 1 of these standards.
- Where properties have frontage on more than one street, the access will be granted only on the street with the lower functional classification.
- Shared driveways are permitted when fewer accesses onto a road or street would be favorable and, therefore, minimum spacing requirements from property lines would not necessarily apply.
- Businesses that require bigger vehicles such as trucks and semis to enter their property should design it as a two way approach.



### 4.3.7 Avoiding Conflicts in Center Left-turn Lane

When establishing the placement of offset accesses (either driveways or intersections), traffic making left-hand turns into the accesses shall not conflict or compete for the simultaneous use of a center left-turn lane as shown in the following Figure 4-3.

**Figure 4-3. Conflicts in Center Left-turn Lane**



## 4.4 SIGHT DISTANCE

Sight distance is the distance necessary for a vehicle operator to perform expected functions and be able to do so without causing a hazard for the driver or other vehicle operators depending on the specific roadway design and associated design speed of the street. Permits shall not be issued that include any design element or allow any turning movements where the sight distance is less than the stopping distance. The permittee shall maintain adequate, unobstructed sight distance in both directions along the roadway. The sight-distance guidelines and the distances necessary shall be dictated by the tables below. These Standards recognize that sight-distance requirements are a function of speed and that roadway speeds may vary between streets with the same classification. Therefore, coordination with the City's traffic engineer should be made by the permittee to confirm appropriate facility type and speed.

Any potentially obstructing objects such as, but not limited to, advertising signs, traffic-control boxes, electrical boxes, structures, trees, and bushes shall be designed, placed, and maintained at a height not to interfere with the sight





distance needed by any vehicle using the access. Reconstruction of the horizontal and vertical curvature along the roadway and side slopes adjacent to the roadway may be necessary to increase sight distances to meet the minimum sight-distance requirements.

#### 4.4.1 Stopping Sight Distance

Table 4-4 shall be used to determine the required horizontal and vertical stopping sight distance for roadway and street design. The required horizontal and vertical stopping sight distance is measured from the vehicle traveling on the adjacent road or street at a height of 3.5 feet to one foot above the road's center and edge lines. These lengths shall be adjusted for any grade of three percent or greater using Table 4-7.

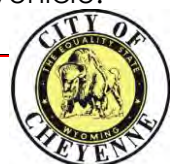
**Table 4-4. Stopping Sight Distance**

Facility Type	Minimum Stopping Sight Distance
(1) Principal	400'
(2) Minor	325'
(3) Collector	275'
(4) Local	150'
(5) Narrow Local	150'
(6) Commercial/Industrial	150'
(7) Alley	150'

#### 4.4.2 Corner Sight Distance at Controlled Intersections and Driveways

Corner sight distance at controlled intersections and driveways is the required distance necessary for a vehicle to make a right-, through, or left-turn into and out of an intersection or driveway without requiring the vehicle making a through vehicular movement to adjust its travel speed by more than 15 percent of the posted speed limit. The design sight distance shall be used unless a design waiver is issued in accordance with Section 1.6 of these Standards. However, in no case shall the sight distance used be less than the minimum stopping sight distance set forth in Table 4-4 and the grade adjustments required in Table 4-7.

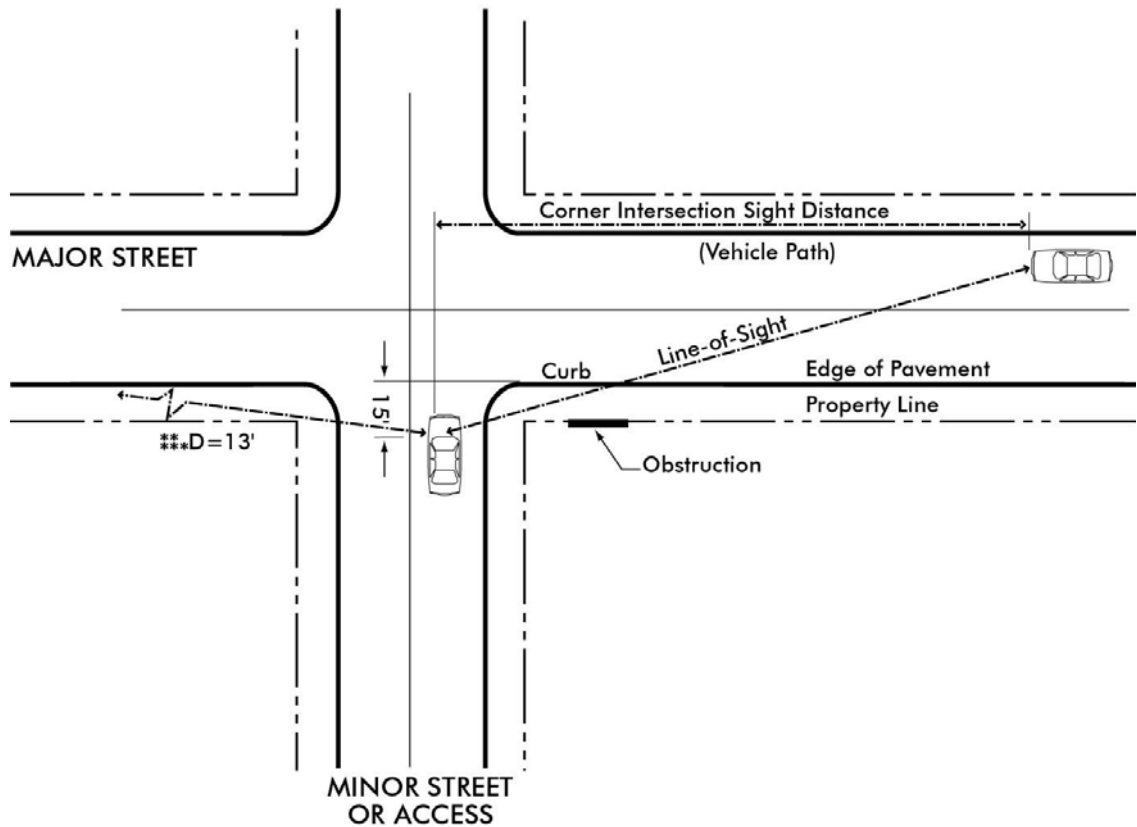
The sight distance triangle is to be determined by a diagonal line drawn fifteen feet back from the roadway along the centerline of the intersection or access to a point on the centerline of the closest lane in either direction. For calculating sight distance consistent with Table 4-5, a height of 3.5 feet shall be used for the driver's eyes at the access location and a height of 4.25 feet for the oncoming vehicle.



These lengths shall be adjusted for any grade of three percent or greater using Table 4-7. This triangular space is to be kept free from all obstructions to vision, including plant materials and vegetation, between the heights of 2.5 and 12 feet above the street grades. Landowners are responsible to maintain this visibility.

As mentioned above, the permittee shall maintain adequate, unobstructed sight distance in both directions from the access. Any potentially obstructing objects such as, but not limited to, advertising signs, traffic-control boxes, structures, trees, and bushes shall be designed, placed, and maintained at a height not to interfere with the sight distance needed by any vehicle using the access. Reconstruction of the horizontal and vertical curvature along the roadway and side slopes adjacent to the roadway may be necessary to increase sight distances to meet the requirements of Table 4-5.

**Figure 4-4. Corner Sight Distance**



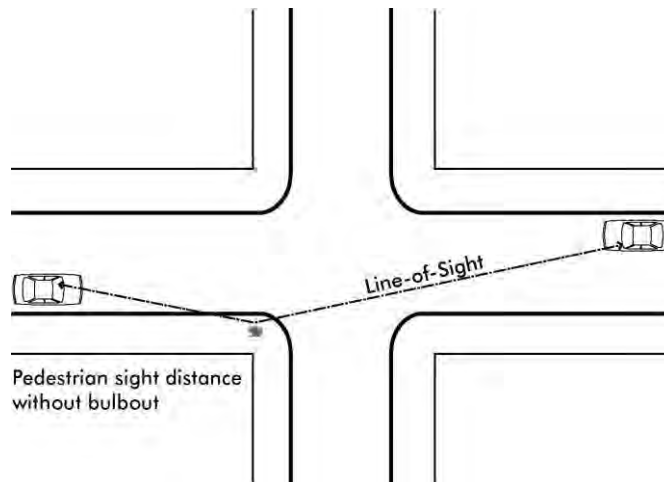
**Table 4-5. Corner Sight Distance at Controlled Intersections and Driveways**

Facility Type	Minimum Corner Sight Distance
(1) Principal	1030'
(2) Minor	830'
(3) Collector	660'
(4) Local	260'
(5) Narrow Local	260'
(6) Commercial/Industrial	260'
(7) Alley	210'

### 4.4.3 Pedestrian Crossing Sight Distance

The minimum pedestrian sight distance for an uncontrolled intersection or mid-block crossing is based on the ability of the pedestrian to have a line-of-sight equal to or greater than the time it takes for the pedestrian to cross the street. This minimum line-of-sight distance enables the pedestrian to be able to judge the distance and speed of an approaching vehicle and determine a safe and acceptable gap in traffic to cross. The minimum sight distance is based on the curb-to-curb width of the street and the speed of the traveling vehicle. A roadway with a raised median of at least six feet provides a midway shelter for pedestrians crossing the street. This median reduces the necessary pedestrian sight distance by half due to the refuge shelter provided, enabling the pedestrian to cross the road in two separate movements.

**Figure 4-5. Pedestrian Crossing Sight Distance**



**Table 4-6. Pedestrian Minimum Sight Distance for an Unsignalized Intersection and Mid-block Crossings**

		6-lane*	4-lane*	2-lane
<b>Roadway Width (ft)</b>		100	76	40
<b>Pedestrian Crossing Time (s)</b>		25	19	10
<b>Vehicle Speed</b>	<b>Minimum Sight Distance</b>			
	45 mph	1650	1250	660
	40 mph	1470	1110	590
	35 mph	1360	1030	540
	30 mph	1100	840	440
	25 mph	920	700	370

\*Note: Distance is reduced by half if a raised median of at least 6 feet is provided.

#### 4.4.4 Sight Distance Adjustments for Highway Grade

The stopping sight distances shown in Table 4-6 and the corner sight distance at controlled intersections and driveways addressed in Table 4-7 shall be adjusted for any grade of three percent or greater using the figures set forth in Table 4-6. Grade is the ratio of the change in elevation to the length of slope. Permittees should multiply the length required in Tables 4-4, 4-5, and 4-6 by the appropriate factor in Table 4-7.

**Table 4-7. Stopping and Deceleration Adjustment Factors for Highway Grade**

Grade	Adjustment Factor
3% to 4.9% Upgrade	0.9
5% to 7% Upgrade	0.8
3% to 4.9% Downgrade	1.2
5% to 7% Downgrade	1.35

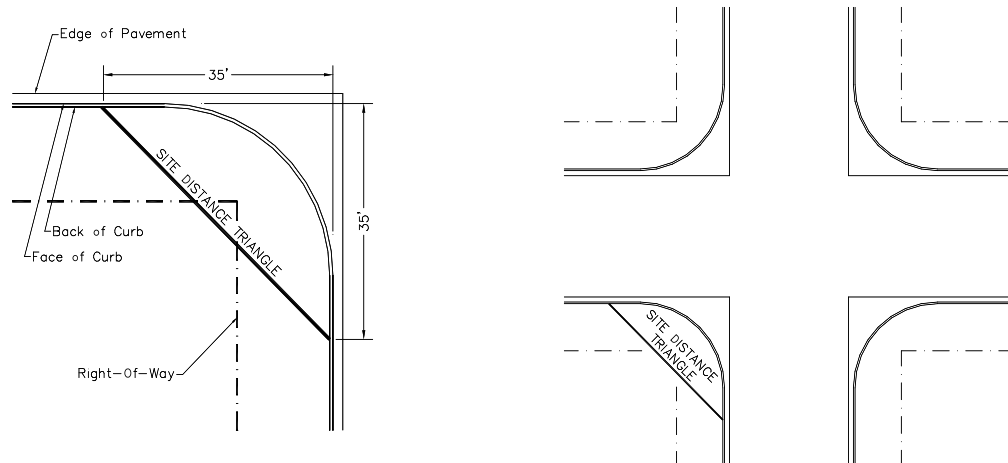
#### 4.4.5 Corner Sight Distance at Uncontrolled Intersections

A triangular space (the "sight-distance triangle") shall be provided across corner lots at uncontrolled intersections for adequate sight visibility. The City Engineer may approve the location of light or sign poles 18 inches or less in diameter in the sight distance triangle if visibility is not obstructed. The sight distance triangle shall be kept free from obstructions to vision between the heights of 2.5 and 12 feet above the street grades. As mentioned previously, landowners are responsible to maintain this visibility. The sight distance triangle is to be determined by a diagonal line



drawn across the lot 35 feet back along the face of curb or edge of pavement from the point of intersection of the curb lines or edges of pavement (see Figure 4-6).

**Figure 4-6. Corner Sight Distance for Yield- or No-control Intersections**



## 4.5 DRIVEWAY CRITERIA

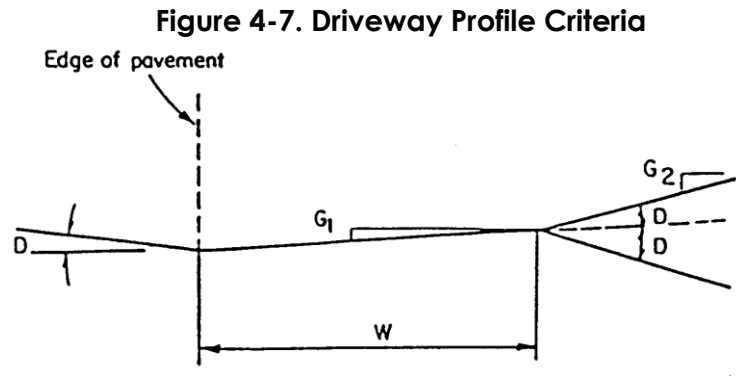
### 4.5.1 General

- A. A permit shall not be issued for access to parking or loading areas that require backing maneuvers in a public street. Single-family residential (including town homes) and duplexes on local streets are an exception.
- B. Access points shall be located so as to minimize hazards to pedestrians and motorists and shall not invite or compel illegal or unsafe traffic movements.
- C. Driveway approach surfaces shall be paved. Exception: If the adjacent road is not paved, the driveway approach may consist of a minimum of six inches of crushed gravel of a gradation approved for road surfaces in lieu of paving.
- D. Access points shall not be constructed in such manner as to create a hazard to any existing street lighting standard, utility pole, traffic-regulation device, or fire hydrant. The cost of relocating any such street structure, when necessary, shall be borne by applicant. Relocation of any street structure shall be performed only by or through the person holding authority for the particular structure involved.
- E. A driveway approach that will handle 500 or more vehicle trips per day shall be classified and constructed as a street intersection unless the City Engineer determines otherwise.



### 4.5.2 Driveway Approach Profiles

- A. Profiles shall be designed to permit entrance and exit maneuvers at safe speeds and provide sufficient underbody clearance for typical passenger cars. Driveway approach profiles shall be designed with the fewest and least severe grade changes possible.
- B. Access approaches in urban areas shall be designed in accordance with the profile limits shown in Figure 4-7.
- C. Profile criteria for various driveway and sidewalk crossings configurations are shown in Standard Drawings of the City of Cheyenne and Board of Public Utilities Construction Standards and Specifications. These standard drawings incorporate the slope criteria of the Americans with Disabilities Act (ADA). These standard drawings are hereby adopted by reference into these Standards. They are available for public inspection at the City of Cheyenne Construction Department.



**Table 4-8. Driveway Profile Statistics**

Driveway Volume	Classification	Max. G-1	Min G-1	Max G-2	Min. W	Max. D*
Low	Local	+4%	+2%	±8%	10'	±10%
Low	Art. or Coll.	+4%	+2%	±8%	25'	±6%
High	All	+4%	+2%	±8%	25'	±6%

\* D is the grade change from G-1 to G-2.

Note: A driveway with peak-hour traffic volume of 30 or more is considered high volume.



## 1. Roadside Topography

Access approaches shall be designed in accordance with the criteria and procedures described in the most recent release of the *Roadside Design Guide* by the American Association of State Highway and Transportation Officials.

## 2. Driveway Approach Construction

- a. Approaches will be inspected prior to construction. The inspection will determine the proper size of the culvert, if applicable, and the approach grade.
- b. Culverts shall have flared end sections at each end.
- c. The driveway approach improvement shall extend at least 20 feet or to the right-of-way line, whichever is greater. In the case of commercial and industrial driveway approaches, permanent pavement is required for at least 50 feet from the edge of the roadway pavement.
- d. The distance from the right-of-way line to the near edge of service pumps, vendor stands, tanks, or private water hydrants shall be a minimum of 15 feet to permit free movement of large vehicles and to insure that they are entirely off the right-of-way when being serviced.
- e. Fixed obstructions shall not be placed within road right-of-way except for approved utility lines and mailbox assemblies or fencing at the right-of-way line. Approach culvert headwalls are prohibited.
- f. A complete design of the intersection shall be submitted to the City before a permit is issued.
- g. Except as indicated above, curb cuts and driveway approach aprons in the right-of-way shall be constructed of Portland cement concrete of a quality and type which is in accordance with specifications of the City of Cheyenne in effect at the time of such work. Curb cuts shall be permitted only with construction of adjoining Portland cement concrete aprons having a minimum depth of six inches for residential and eight inches for commercial developments.

## 3. Reconstruction of Driveway Approaches

Reconstruction of driveway approaches requires a permit as described in this chapter. Reconstructed driveway approaches shall conform to current regulations and the provisions of the Americans with Disabilities Act.



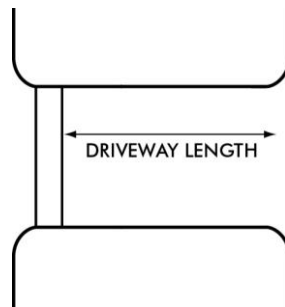
**4. Traffic Signals**

If the traffic study determines there is sufficient traffic (when the area is completely developed) to warrant installation of a traffic signal, traffic shall be consolidated to a single access which can be signalized. The signal shall meet traffic-signal spacing requirements as specified elsewhere in these Standards.

**4.5.3 Minimum Driveway Length**

Primary driveways into mixed-use, commercial and employment centers shall be of sufficient length to allow vehicles to enter the center and not be impacted from on-site conflicts in which traffic backs out onto the street system. An example of this type of conflict is when a vehicle is stopped in the entry driveway waiting for a vehicle to vacate a parking space on a drive aisle perpendicular to the driveway. The greater the peak-hour traffic demand for the center, the longer the driveway must be. The driveway length shall be measured from the back of the sidewalk or the stop bar exiting the site to the first intersection or parking drive aisle. The minimum driveway lengths are as follows:

**Figure 4-8. Driveway Length**



**Table 4-9. Minimum Driveway Length**

Peak Hour Driveway Entering Volume	Unsignalized Minimum Driveway Lengths	Signalized Minimum Driveway Lengths
0-25	25'	75'
25-50	50'	100'
50-75	75'	125'
75-100	100'	150'
100-125	125'	175'
>125	150'	200'





## 4.6 INTERSECTION DESIGN

### 4.6.1 Speed-change Lanes

This Section provides standards for speed-change lanes at access points.

#### A. Requirements

Speed-change lanes shall be installed according to the following criteria.

1. A left-turn deceleration lane and taper with storage length is required for any access with a projected peak-hour ingress turning volume greater than 10 vehicles per hour. The taper length shall be included within the required deceleration length.
2. A right-turn deceleration lane and taper is required for any access with a projected peak-hour ingress turning volume greater than 25 vehicles per hour. The taper length shall be included within the required deceleration length.
3. A right-turn acceleration lane and taper is required for any access with a projected peak-hour right-turning volume greater than 50 vehicles per hour when the posted speed on the adjacent road or street is greater than 40 mph. The taper length will be included within the required acceleration length. A right-turn acceleration lane may also be required at signalized intersections if a free right-turn is needed to maintain an appropriate level of service.
4. Right-turn deceleration and acceleration lanes are generally not required on roadways with three or more travel lanes in the direction of the right-turn.
5. A left-turn acceleration lane with taper may be required when unique location factors such as highway speed and traffic density, access volume, the volume of commercial trucks, the influence of nearby access, existing highway auxiliary lanes close to the access, nearby traffic-control devices, available stopping sight distance, and where other topographic and highway design factors exist that determine the need. A left-turn acceleration lane is generally not required where the posted speed is less than 45 mph, or the intersection is signalized, or the acceleration lane would interfere with the left-turn ingress movements to any other access.



### 4.6.2 Speed-change Lane Design Criteria

Where speed-change lanes are required, they shall be constructed in accordance with the following:

- A. Where two accesses have speed-change lanes that overlap or are in close proximity, a continuous lane shall be established between the accesses to improve roadway consistency and safety and maintain edge continuity.
- B. Speed-change lanes shall be 12 feet wide, exclusive of the gutter pan or shoulder. If the existing through travel lanes are less than 12 feet wide, the speed change lanes may be the width of the widest through lane, but shall in no case be less than 10 feet wide, exclusive of the gutter pan or shoulder.
- C. Table 4-9 shall be used to determine lengths of speed-change lanes. The required length of taper is obtained by multiplying the full lane width by the appropriate ratio as shown in Table 4-9. "Stop Condition" means the vehicle comes to a complete stop or very slow speed prior to making the turn into the access or is stopped before exiting the access onto the street.

For deceleration lanes, a 15 mph turn is normally assumed for a curb return radius only if the radius is 40 feet or greater. A stop condition must be assumed for a curb-cut type access. For an acceleration lane, a stop condition shall normally be assumed at the start of the acceleration.

- D. Additional storage lengths are required for left-turn deceleration lanes. Standards for the additional storage lengths are provided in Section 4.6.4.

**Table 4-10. Speed-change Lane Lengths for Right and Left-turn Lanes<sup>1</sup>**

Design or Posted Speed (mph)	Stop Condition		15 mph Turn		Minimum Accel Lane Taper Ratio <sup>2</sup>	Minimum Decel Lane Taper Ratio <sup>2</sup>
	Accel	Decel	Accel	Decel		
25	100	200	90	150	7.5:1	7.5:1
30	190	235	190	185	10:1	8:1
35	270	275	240	235	12.5:1	10:1
40	380	315	320	295	15:1	11.5:1
45	550	375	480	350	15:1	13:1
50	760	435	700	405	20:1	15:1
55	960	485	910	450	22.5:1	18.5:1



<sup>1</sup> Distances are in feet. These distances apply to both left and right-turn acceleration and deceleration lanes.

<sup>2</sup> Ratio of length of taper to width of lane.

### **4.6.3 Left-turn Bays and Spacing**

Driveways serving high-generation users such as community and regional shopping centers, large industrial plants, major office building complexes, and high-density apartment developments, shall provide for adequate left-turn storage bays.

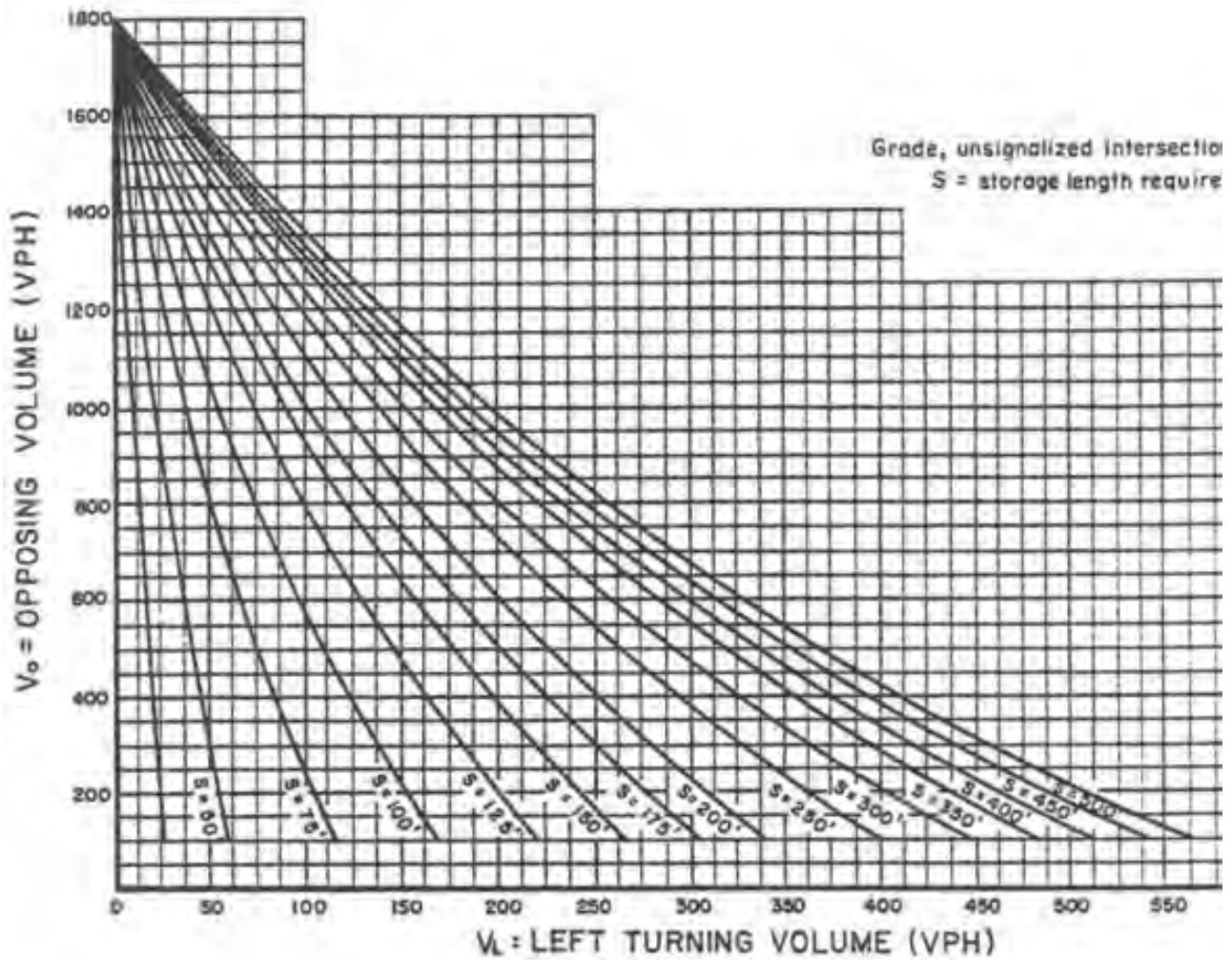
As a general guideline, the minimum left-turn lane length at signalized intersections shall be one foot of length for each p.m. peak-hour left-turning vehicle, forecasted for the 20-year horizon. The minimum left-turn bay shall be designed at 50 feet and increased in increments of 25 feet. When the projected left-turn length reaches 250 feet, signal timing and progression analysis shall be conducted to determine if dual left-turn bays are required. No single left-turn lane shall exceed 350 feet.

The need for and length of left-turn storage bays for unsignalized intersections and driveways shall be determined according to Figure 4-9 and the highest predicted traffic volumes for the next 20 years. The provisions of this section will apply to any access location which requires left-turn storage bay of 50 feet or more as determined according to Figure 4-9.

The requirement for left-turn bays will automatically establish a minimum spacing of successive driveways or intersections which are projected to have left-turn entry or exit access.



Figure 4-9. Left-turn Bays and Spacing for Unsignalized Intersections and Driveways



At driveways with high traffic volumes, for example, fast food restaurants and car washes, provision shall be made for vehicle storage on the premises to prevent stacking of vehicles on the roadway. The required stacking space shall be determined by a traffic analysis provided by the applicant.

Where needed and feasible at high traffic volume driveway approaches, clearly visible acceleration and/or deceleration lanes shall be provided. Except for the driveway served, no other driveway access shall be permitted within the limits of the auxiliary lanes.

Acceleration lanes shall not conflict with the beginning of a right-turn lane. Acceleration lanes shall terminate before the end of the queue (as determined by the traffic study) at a signalized intersection. Acceleration lanes shall terminate not less than 50 feet ahead of an unsignalized intersection. If adequate length of



acceleration lane cannot be provided subject to these constraints, the access will not be permitted.

The basic factors are the distance required for the median taper and the length of the storage bay. If a driveway on a major route is opposite a street, a left-turn bay for the street also should be incorporated. This will further increase the required distance between major driveway approaches or intersections.

The distance of a major driveway, with left-turn channelization from a nearby major intersection which also has left-turn bays, will vary depending on whether the driveway is on the approach or departure side of the intersection with respect to the left-turn lane.

#### 4.6.4 Location Coordination

The location of access to properties on opposite sides of arterial and collector roadways shall be coordinated so they do not interfere with one another. Driveway approaches directly opposite each other are desirable. However, if this is not possible, the resulting "T" configurations shall be spaced a minimum of 100 feet apart on collectors, and 200 feet apart on arterials. This requirement may be modified by the City Engineer based on existing through traffic and the trip generation of the site.

### 4.7 LEFT-TURN IN/OUT ACCESS

The ability to provide full or partial access along a street or highway shall be commensurate with the ability to safely guide vehicles in and out of the driveways through the highway stream, while maintaining acceptable levels of service. The safe operation of an unsignalized intersection is a function of the number of acceptable gaps in the through traffic stream based on 20-year peak-hour forecasts compared to the number of vehicles forecasted to turn left into or out of an access or driveway.

Figures 4-10 and 4-11 provide the guidelines whether left-in only or left-in/left-out access will be considered along an arterial or collector. The guideline is based on the volume of vehicles entering and/or exiting a driveway in relationship to the conflicting volumes along the arterial or collector.

Figure 4-10 depicts the relationship between the left-turn volume, LTV-I for left-turn volumes in and LTV-O for the left-turn volumes out, and the sum of the conflicting volumes,  $V_c$ , for each scenario. Figure 4-10 presents a graph in which the left-turn in and/or left-turn out is compared to its conflicting volume. The access is considered acceptable when the volumes lie below the intersection of the left-turn volume and the sum of the conflicting volumes lie below the guideline. Access is not recommended when this point is above the line.



This guideline should be used in conjunction with supporting *Highway Capacity Manual* unsignalized intersection level-of-service analysis. If left-turn access is proposed for an arterial or collector, an accident analysis may be required by the City's Traffic Engineer.

**Figure 4-10. Left-turn Access Guidelines**

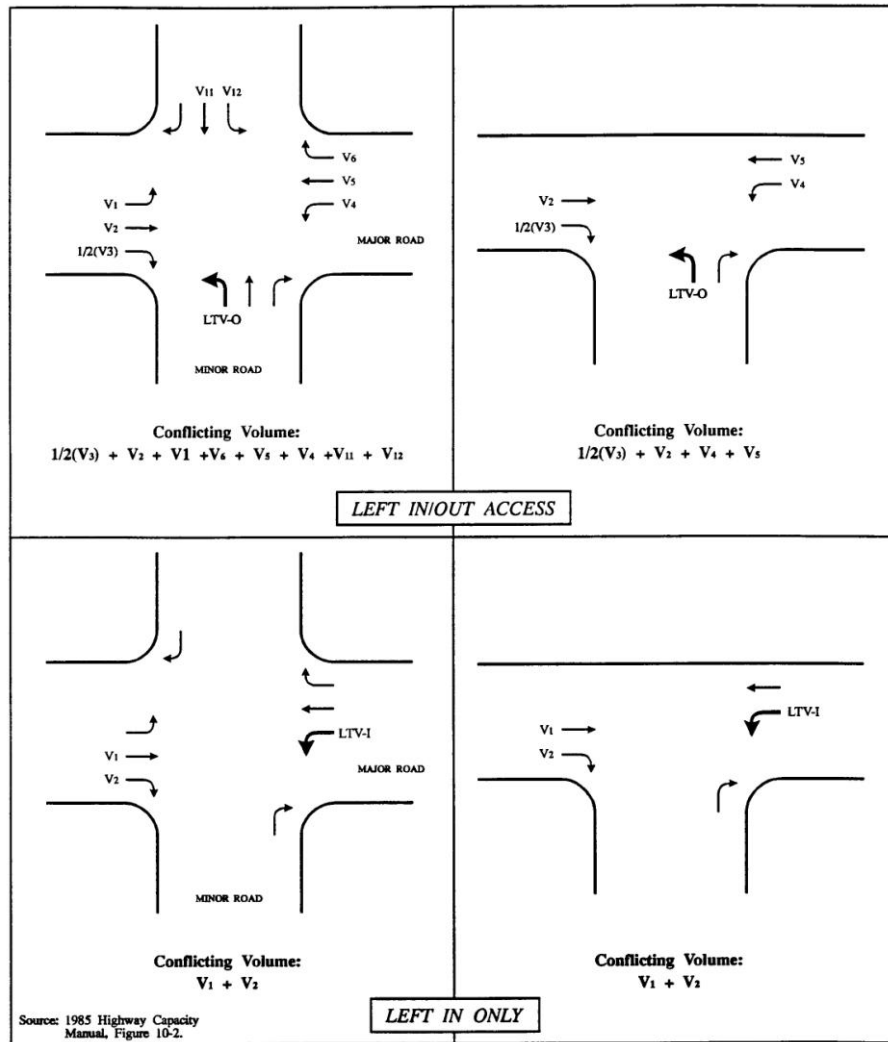
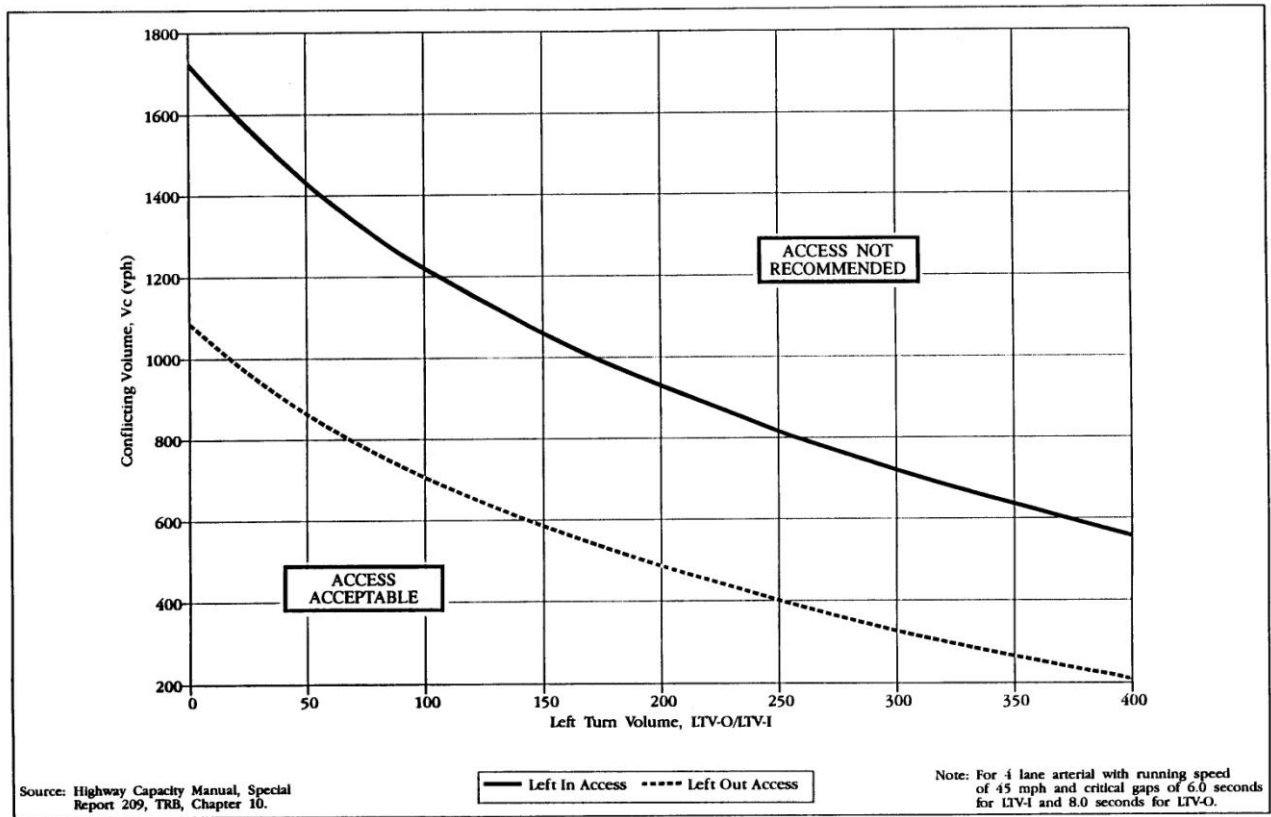


Figure 4-11. Left-turn Access Criteria



## 4.8 CHANGES IN LAND USE, ABANDONED DRIVEWAY APPROACHES, AND STREET WIDENINGS

### 4.8.1 Changes in Land Use

If any significant changes are made or will be made in the use of the property which will affect access operation, traffic volume, turning movements, or vehicle type, the permittee or property owner shall contact the authority which issued the access permit, be it the City of Cheyenne or WYDOT, to determine if a new access permit and modifications to the access are required. It is the responsibility of the property owner and permittee to ensure that the use of the access to the property is not in violation of these Standards. If recorded in the Public Land Records, the terms and conditions of the permit are binding upon all assigns, successors-in-interest, heirs, and occupants.



If a parcel of land with direct access has been in a state of non-use for more than four years, recommencement of access use will be considered a change in use. If the renewed use of the access exceeds its design limitations or is non-conforming with the present code, a new permit shall be required.

The permitting authority, be it the City of Cheyenne or WYDOT, may require an engineering study to establish whether a new permit is required.

#### **4.8.2 Abandoned Driveways**

A driveway approach which has become abandoned or unused through a change of the conditions of which it was originally intended or which for any reason has become unnecessary because of any change to site configuration shall be closed; the owner shall replace any such driveway approach upon the direction of the City Engineer with standard curb, gutter, and sidewalk under the provisions of these regulations.

#### **4.8.3 Street Widening**

When existing streets in built-up areas are widened, access points shall be reconstructed to conform with the criteria set forth in these regulations to the extent practical and feasible.





# Chapter 5—Street Design

## **5.1 PREFACE**

The criteria presented in this section are intended to regulate design of road construction and reconstruction. All roads and streets in the City of Cheyenne, except State highways, shall to be designed in accordance with the standards included or referred to in this Chapter.

## **5.2 RESPONSIBILITIES**

The Cheyenne-Laramie County Subdivision/Development Regulations indicates the responsibilities of the parties concerned with street design and construction.

The subdivider and/or developer is responsible for preparing, designing, processing, submitting, and accomplishing the necessary improvements, as well as the associated paperwork.

The City Engineer is responsible for review of preliminary plats, sketches, and final plats as they relate to engineering considerations, approval of construction plans and specifications, and inspection and acceptance of the constructed work.

Where a street design involves a State Highway in any manner, it is necessary to obtain a permit from the District Engineer of WYDOT.

## **5.3 REQUIREMENTS**

The location of arterial and collector streets shall be governed by the current Official City Map on file at the offices of the Cheyenne MPO at 2101 O'Neil Avenue, and at the offices of the City Clerk and the County Clerk. The location of local streets shall be as required to provide access to abutting property, and in accordance with the provisions of these Standards.

Geometric and structural designs of roads and streets shall be performed by or under the direct supervision of a qualified civil engineer licensed by the Wyoming State Board of Registration for Professional Engineers and Professional Land Surveyors to practice engineering in Wyoming. All documents submitted for approval must bear the seal and signature of the responsible engineer.

Plans shall be submitted for all roads and streets. The geometric design of roads and streets, including the vertical and horizontal alignment, shall be in accordance with the provisions of these Standards, and done with the objective of providing a safe and efficient street system. The basis for geometric design is the current edition



of *A Policy on Geometric Design of Highways and Streets* by the American Association of State Highway and Transportation Officials.

The developer or subdivider is responsible for observations and testing performed on the roadway during construction. The observation and testing shall be done under the supervision of a qualified civil engineer who will sign-off on the project. The testing shall be performed in accordance with the City of Cheyenne and Board of Public Utilities Construction Standards & Specifications.

Record drawings are required for all roads, streets, storm sewer structures, detention facilities, and traffic signals. Upon completion and acceptance of construction, the developer shall provide record drawings to the City showing the as-constructed roads or streets. The City may require the record drawings as a condition for acceptance. The record drawings shall be signed and sealed by a professional civil engineer and contain a statement to the effect that, to the best of the knowledge and belief of the engineer, the record drawings accurately reflect the as-constructed facility. If the specifications were materially altered during construction, the submittal of the record drawings shall include revisions to the specifications.

Submittal of record drawings or revised specifications does not relieve the developer from building the road or street in accordance with the approved plans. Deviations from the proposed plans and specifications should be approved in advance by the City, and the developer assumes the risk of the expense of correcting unauthorized changes.

Other topics related to street design, including traffic studies, drainage, curb and gutters, intersection design, bike lanes, access control, sidewalks, traffic control devices, street lighting, trees, and parking are addressed in other sections of these Standards.

## 5.4 STANDARDS

### 5.4.1 Geometric Design

The standards to be used in geometric design of streets are shown in Attachment 5-A following this Chapter. Table 5-A-1 provides general design parameters. Table 5-A-2 presents roadway technical design criteria.

Minimum right-of-way widths are based on the required width of paving plus an additional width on each side of the paving to accommodate curbs, sidewalks, utilities, and optional vegetation. Right-of-way requirements increase at intersections for arterials and collectors to accommodate additional left- and right-turn lanes. Additional right-of-way may be needed to accommodate slopes and drainage structures. If adequate right-of-way is not provided, the



City Engineer may require dedication of additional right-of-way width and/ or additional auxiliary lanes for arterials and collectors as determined by the local entity.

The minimum centerline radius is based on the application of maximum super-elevation for the indicated design speeds. The controlling factor is the design speed. Therefore, if less super-elevation is used, the radius must be increased.

The angle of intersection of streets should be as close to 90 degrees as possible, and in no case should vary more than 10 degrees from a right angle.

Median design for both physical and painted medians shall be closely coordinated with the City Engineer.

Cross pans (valley gutters across intersections) shall be a minimum of 12 feet wide. A minimum transition of 30 feet shall be made in the street preceding the cross pan to remove the crown. Design speeds shall be maintained across cross pans. In general, cross pans should not be used across arterial or collector streets.

Any geometric design element not addressed in these *Road Street and Site Planning and Design Standards* shall be designed in accordance with the current edition of AASHTO's *A Policy on Geometric Design of Highways and Streets* (the Green Book).

## 5.4.2 Pavement Design

Pavement design shall be in accordance with AASHTO pavement design procedures (*AASHTO Guide for Design of Pavement Structures*, current edition) and shall be based on geotechnical investigations and testing of the subgrade. The pavement design shall provide for a 20-year service life with an equivalent 18 kip axle loading based on projected traffic for the type and density of development proposed. Roadway construction plans submitted for approval shall be accompanied by a pavement-design report. Roadway sections and compaction requirements shall not be less than those specified in the pavement-design report. The pavement-design report shall be prepared under the supervision of, and signed and sealed by a person licensed by the Wyoming State Board of Registration for Professional Engineers and Professional Land Surveyors to practice civil engineering in Wyoming. Any proposed modifications to the approved design shall be submitted for approval. For street improvements of 250 feet or less, the minimum pavement sections may be used in lieu of a design report.

**A. Road Paving Policy.** All new highways, roads, and streets shall be paved.



- B. Pavement Design Report.** For all land development approvals that involve a roadway construction of 250 feet or more, the applicant must provide a preliminary subgrade investigation and pavement-design report that recommends typical pavement structural section based on the known site soil conditions and the valid Traffic Impact Study. The Pavement Design report shall use the Traffic Impact Study to determine equivalent daily load applications (**EDLA**) or equivalent single-axle loading (**ESAL**) for the pavements. However, if the EDLA or ESAL from the Traffic Impact Study are less than the EDLA or ESAL shown on Table 5-1, the EDLA or ESAL from Table 5-1 shall be used. For street improvements of 250 feet or less, the minimum pavement sections may be used in lieu of a design report.
- C. Minimum Pavement Section.** This paragraph provides the minimum acceptable pavement sections for public roadways in Cheyenne. These pavement thicknesses may be used for preliminary planning purposes. Final pavement designs must be based on actual subgrade support test results and the Traffic Impact Study. Table 5-1 lists minimum thicknesses for each roadway classification.

**Table 5-1. Minimum Pavement Sections**

Classification	EDLA	ESAL	Composite Sections <sup>1</sup>		Full Depth Asphalt (Inches)	Portland Cement Concrete (Inches)
			Asphalt (Inches)	Base (Inches)		
Principal Arterial	720.0	5,256,000	6.0	8.0	8.0	8.0
Minor Arterial	270.0	1,971,000	5.0	8.0	7.0	8.0
Nonresidential Collector	113.0	821,000	4.0	8.0	6.0	8.0
Residential Collector	113.0	821,000	4.0	8.0	6.0	8.0
Local	5.0	32,850	3.0	6.0	4.5	8.0
Paved Alley	5.0	292,000	3.0	6.0	4.5	8.0

<sup>1</sup>A composite section can only be used where the R-value of the subgrade soil is 30 or lower or the CBR value is 5 or lower.

## 5.5 PRIVATE ACCESS STANDARDS

All roads or streets constructed within new subdivisions platted pursuant to the Subdivision Regulations shall be public. In some extraordinary cases where there is no public right-of-way, and no feasible means of access to a public right-of-way, it may be necessary for property owners to provide access by means of easements or other agreements and to construct the access road. Such private access will not be constructed, maintained, repaired, or replaced by the City. Private accesses shall meet the requirements of the Cheyenne Fire Department.



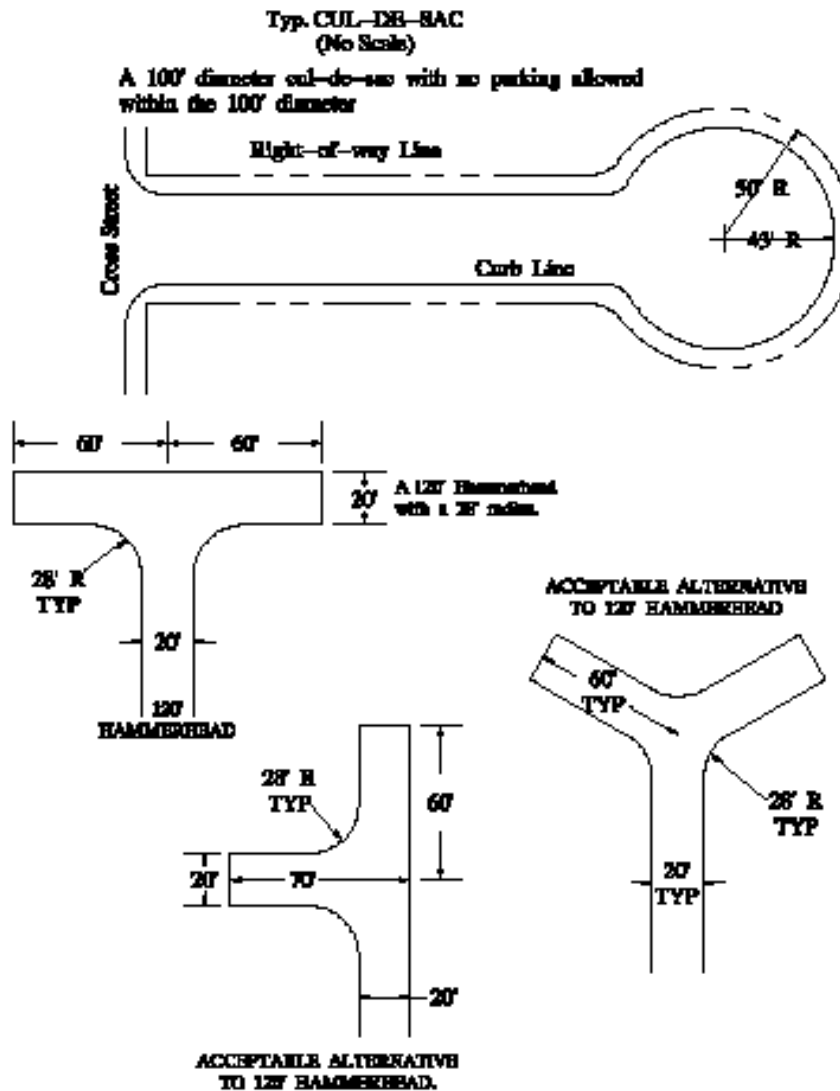
In the event the owners of a private access wish to convert the access to public use and public maintenance, the proposed road shall be dedicated to the public and accepted by the City as provided by law. The road or street shall be constructed at the applicant's expense in accordance with these Standards and the plans, specifications, and construction approved as described above for public streets.

## **5.6 CUL-DE-SACS/HAMMER HEADS**

Cul-de-sacs and hammer heads shall be constructed in accordance with the requirements of the Cheyenne Fire Department for dead-end fire apparatus access roads in excess of 150 feet. Designers of subdivisions containing roads or streets with cul-de-sacs or hammer heads, and where public water supplies are provided, should consult with the water utility and the fire protection provider on the permitted length of dead-end water mains. Standards for emergency access lanes are provided in Chapter 12, Traffic-control Devices.



Figure 5-1. Typical Cul-de-sac



## 5.7 INTERSECTION DESIGN

### 5.7.1 Corner Radii

Corner radii at intersections should satisfy the requirements of the drivers using them to the extent practical and in consideration of the amount of right-of-way available, the angle of the intersection, number of pedestrians, width and



number of lanes on the intersecting streets, and amounts of speed reduction. Minimum back-of-curb radii at intersections shall be as shown in Table 5-2.

**Table 5-2. Minimum Back of Curb Radii**

Type of Intersection	Radii (ft)	Remarks
Local/Local	15	
Local/Collector	25	
Collector/Collector	30	See Note 1 below
Local/Arterial	30	
Collector/Arterial	30	See Notes 1&2 below
Arterial/Arterial	30	See Notes 1&2 below

*Note 1. Radii of 40 ft. or more, and preferably three-centered compound curves or simple curves with tapers to fit the paths of appropriate design vehicles, should be provided where large truck combinations and buses turn frequently. Larger radii are also desirable where speed reductions would cause problems.*

*Note 2. The City Engineer shall require greater radii when there is no parking lane adjacent to the curb.*

### **5.7.2 Speed Change Lanes and Intersection Sight Distance**

The requirements for speed change lanes and intersection sight distance presented in Chapter 4 of these Standards shall apply to street design.

## **5.8 STREET LIGHTING**

The City of Cheyenne utilizes the current edition of *the American National Standard Practice for Roadway Lighting*, published by the Illuminating Engineering Society, as its standard for street lighting. The publication includes recommendations for average maintained horizontal illumination for roadway and walkway classifications by type of area. In addition, all street lighting shall meet the intent of any other City lighting standards in affect at the time.



## 5.9 CURB AND GUTTER

Curb and gutter are generally used for drainage control, but curb can be used for other purposes such as pavement edge delineation, delineation of pedestrian walkways, and aesthetics. Curb or curb and gutter are useful to assist in right-of-way reduction, reduction of maintenance operations, and assistance in orderly roadside development.

### 5.9.1 Standards

The construction of curb and gutter is covered in the *City of Cheyenne and Board of Public Utilities' Construction Standards and Specifications*.

## 5.10 ACCEPTANCE

For purposes of clarifying the City's intent for the construction of an acceptable road, a pre-construction review of the road with the City Engineer is recommended and can be arranged on request.

Upon completion of the road or street, the developer shall request in writing that the road be inspected for acceptance. This request shall include the surfacing material certification, tabulated record of surfacing material delivered to road and invoice of purchased surfacing material. This request shall be made to the City Engineer.

The City Engineer will inspect the constructed road for compliance with these Standards. When the City Engineer determines that the road is in compliance, the road will be accepted for maintenance by the City. Note: The street is to remain the responsibility of the developer for maintenance and safety of the street until it is accepted.





## ATTACHMENT 5-A—STANDARDS FOR GEOMETRIC DESIGN OF ROADS AND STREETS

Table 5-A-1. General Design Parameters

Roadway Designation	(1) Principal Arterial	(2) Minor Arterial	(3) Urban Collector (without Parking)	(4) Urban Collector (with Parking)	(5) Urban Local	(6) Urban Narrow Local (used with alleys only)	(7) Urban Narrow Local (used without alleys)	(8) Urban Commercial/ Industrial	(9) Rural Road Section	(10) Alley
Purpose	Regional	Regional	Access	Access	Access	Access	Access	Access	Access	Access to Rear of Property
Functional Classification	Principal Arterial	Minor Arterial	Collector	Collector	Local Street	Local Street	Local Street	Local Street	Local Street	Alley
Development Perimeter or Internal	Perimeter	Perimeter	Perimeter or Internal	Perimeter or Internal	Internal	Internal	Internal	Internal	Internal	Internal
Intersecting with (#s Refer to Column Headings)	1,2,3,4	1,2,3,4,5,8	1,2,3,4,5,6,7,8,9	1,2,3,4,5,6,7,8,9	2,3,4,5,6,7,8,9,10	2,3,4,5,6,7,8,9,10	2,3,4,5,6,7,8,9,10	2,3,4,5,6,7,8,10	3,4,5,6,7,9,10	3,4,5,6,7,8,9,10
Daily Traffic Volumes	15,000 - 35,000	3,500 - 15,000	1,000 - 7,500	1,000 - 7,500	0 - 2,500	0 - 250	0 - 250	1,000 - 3,500	0 - 250	N/A
Right-of-Way (minimum)	120'	100'	80'	80'	60'	52'	52'	80'	80'	16' min, 24' Com./ Ind.
Minimum Tangent between Reverse Curves	200'	200'	100'	100'	75'	50'	50'	100'	50'	N/A
Minimum Centerline Radius	955'	573'	302'	302'	198'	127'	127'	302'	127'	N/A
Additional Right-of-way at Intersections /Distance	20' / 350'***	20' / 250'	20' / 250'	20' / 250'	N/A	N/A	N/A	N/A	N/A	N/A
Street Width (BC-BC)	76'	48'	36, 48 With Center Left Turn Lane	44'	36'	27'	32'	44'	34'	16'
Number of Travel Lanes	4	2 + Center Left Turn Lane	2	2	2 + Optional Left Turn Lane/No Parking	1	2	2	2	N/A
Median Type	Raised*	Left Turn Lane	None	None	None	None	None	None	None	N/A
Median Width (minimum)	16' (4' At Intersections)	12'	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Parking (Yes/No, number of sides)	None	None	None	Joint Bike and Park Lane	Yes	Yes (One Side)	Yes (Both Sides)	Yes, Shared with Bike	Yes (One Side)	None
Parking Lane Width	N/A	N/A	N/A	11'	8'	7'	6'	Not Striped	N/A	N/A
Shoulder/Bike Lane	6' Shoulder	6' Bike Lane	6' Bike Lane	11' Joint Bike and Park Lane	Optional With No Parking	N/A	N/A	Joint Bike and Park Lane	Min. 5' Shoulder	No
Alley Streetscape	N/A	N/A	N/A	N/A	Optional	Required	N/A	N/A	N/A	N/A
Tree lawn(width)	8'	8'	8'	8'	5'	5'	8'	6'	N/A	N/A
Street Trees (caliper)	1 ½" to 2"	1 ½" to 2"	1 ½" to 2"	1 ½" to 2"	1 ½" to 2"	1 ½" to 2"	1 ½" to 2"	1 ½" to 2"	N/A	N/A
Sidewalk**	6'	6'	5'	5'	4.5'	4.5' - 6'	4.5' - 6'	4.5'	N/A	No
Driveway and Street Access	Limited	Limited	Limited	Limited	Permitted	Permitted	Permitted	Limited	Permitted	Permitted

\* Median landscaping shall include trees, shrubs, ground cover, mulch and irrigation and should incorporate xeriscape methods, whenever appropriate in accordance with the requirements of the City Forester.

\*\* Sidewalks shall be within public right-of-way. Sidewalks should be detached except for redevelopment projects where adequate right-of-way does not exist.

\*\*\* Additional ROW may be required based on design speeds.

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**Table 5-A-2. Roadway Technical Design Criteria**

Roadway Designation	(1) Principal Arterial	(2) Minor Arterial	(3) Urban Collector (without Parking)	(4) Urban Collector (with Parking)	(5) Urban Local	(6) Urban Narrow Local (used with alleys only)	(7) Urban Narrow Local (used without alleys)	(8) Urban Commercial/ Industrial	(9) Rural Road Section	(10) Alley
Design Speed	50 MPH	50 MPH	35 MPH	35 MPH	25 MPH	25 MPH	25 MPH	25 MPH	25 MPH	10 MPH
Speed Limit	35 – 45 MPH	30 – 45 MPH	30 – 35 MPH	30 – 35 MPH	25 MPH	25 MPH	25 MPH	25 MPH	25 MPH	10 MPH
Clear Zone	20'	20'	14'	14'	7'	7'	7'	7'	7'	5'
Design Vehicle	WB - 67	WB – 67	WB - 50	WB - 50	SU - 30	SU - 30	SU - 30	SU - 30	SU - 30	SU - 30
Stopping Sight Distance	400'	325'	275'	275'	150'	150'	150'	150'	150'	150'
Minimum Sight Distance At Driveways and Intersections	1030'	830'	660'	660'	260'	260'	260'	260'	260'	210'
Grade (Maximum/Minimum)	6 / 0.3 Percent	6 / 0.3 Percent	8 / 0.3 Percent	8 / 0.3 Percent	10 / 0.3 Percent	10 / 0.3 Percent	10 / 0.3 Percent	10 / 0.3 Percent	10 / 0.3 Percent	10 / 0.3 Percent
Maximum Super-elevations	0.6	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	N/A
Intersection Spacing	1,320'	660'	330'	330'	200'	200'	200'	150'	200'	N/A
Distance between Signals	2,640 min.	1,320 min.	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Distance between High-volume Driveways and Intersections	660'	330'	200'	200'	150'	75'	75'	150'	75'	N/A
Distance between Driveway Edges	660'	330'	75'	75'	—	—	—	30'	20'	N/A
Distance between Driveway and Street	660'	460'	175'	175'	50'	50'	50'	100'	50'	40'
Minimum Center Line Offset	300'	300'	200'	200'	150'	150'	150'	200'	150'	N/A
Required Curb and Gutter Type	6" Vertical	6" Vertical	6" Vertical	6" Vertical	6" Vertical or Rolled	6" Vertical or Rolled	6" Vertical or Rolled	6" Vertical	23' Drainage Area	N/A
Driveway Approach & Street Configuration	Radial Curb Return	Radial Curb Return	Curb Cut	Curb Cut	Curb Cut	Curb Cut	Curb Cut	Curb Cut	N/A	Curb Cut
Minimum Full Depth HBP Section	8"	7"	6"	6"	4.5"	4.5"	4.5"	6.0"	4.5"	4.5" (paved)
Minimum Composite Section Depths (HBP/ABC)	6" / 8"	5" / 8"	4" / 8"	4" / 8"	3" / 6"	3" / 6"	3" / 6"	4" / 8"	3" / 6"	3"/6.0" (paved)
Utilities	Main lines for water, sewer, and storm drains shall be placed under the street with individual taps running to the property line. Electric, gas, cable television, telephone lines, and other utilities should be placed to the outside edge of the Right-of-Way and under the sidewalk. To the greatest extent feasible, utilities should not encroach on the landscaped tree lawn. Utilities may be placed in easements outside the right-of-way when necessary, and the cross section may be varied if necessary to accommodate utilities.									

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# ATTACHMENT 5-B—ARTERIAL, COLLECTOR AND LOCAL STREETS CROSS-SECTIONS

Figure 5-B-1. Principal Arterial Street

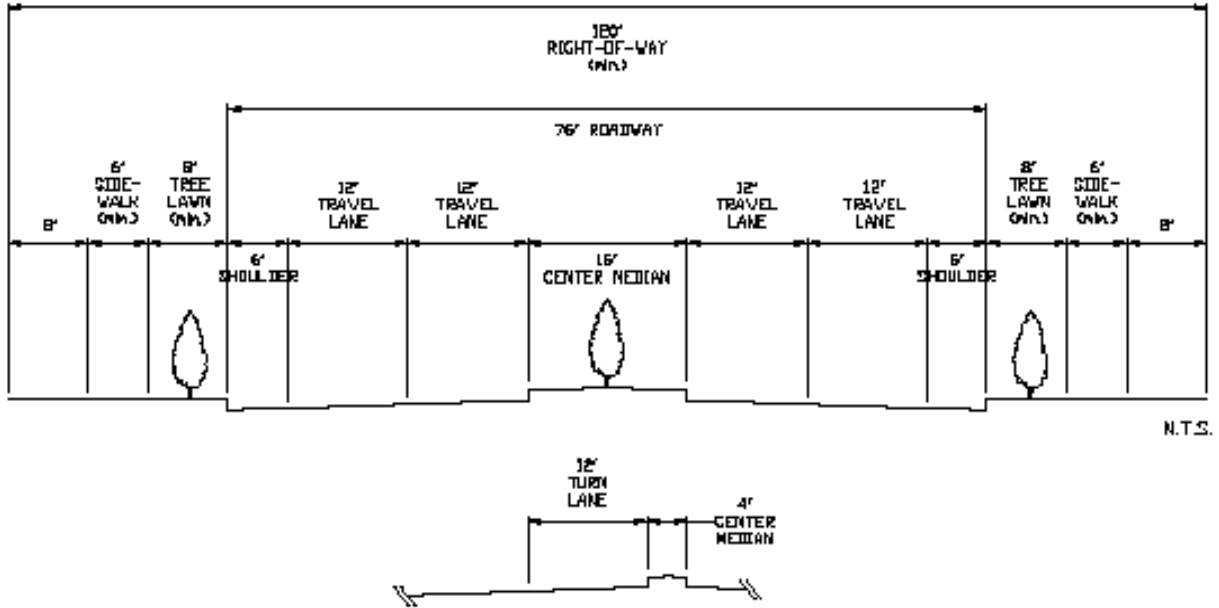
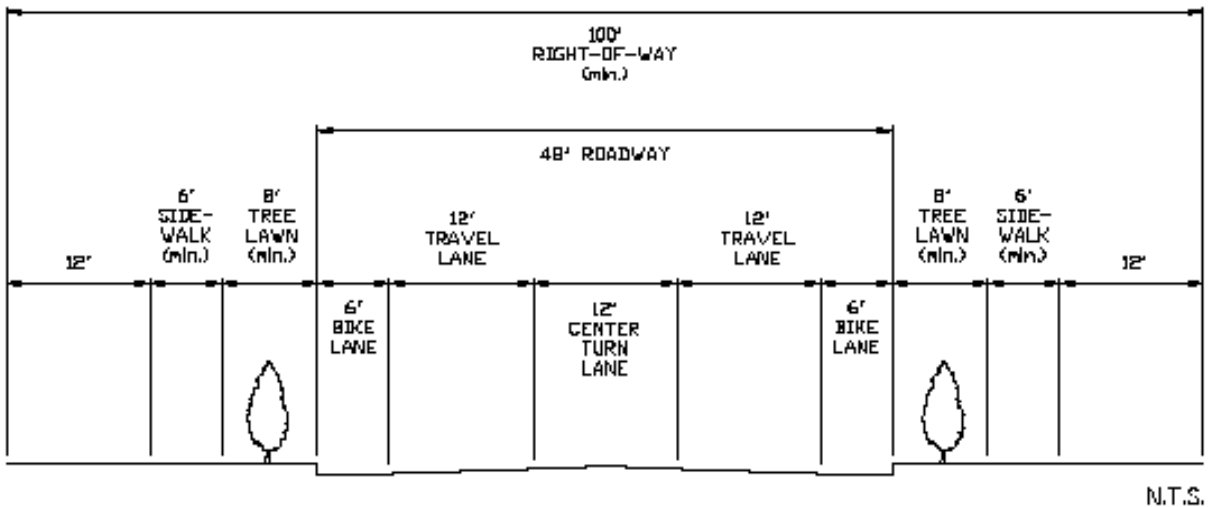


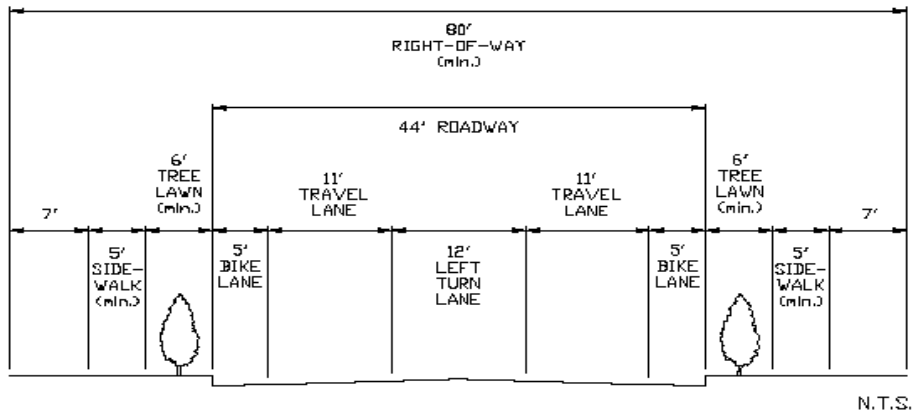
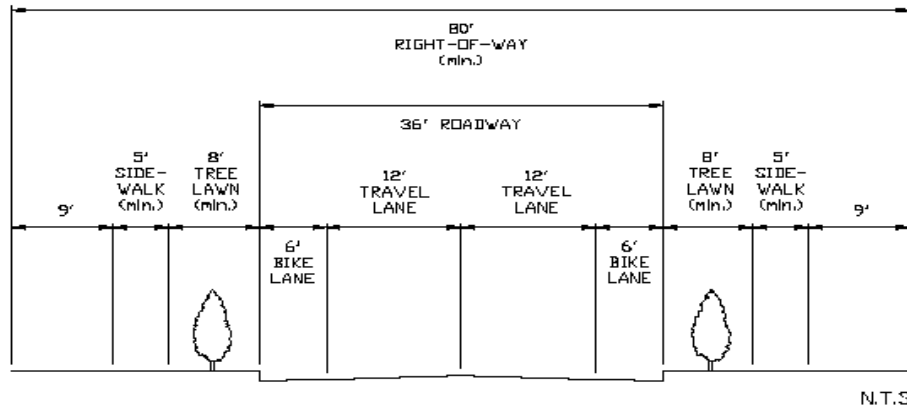
Figure 5-B-2. Minor Arterial Street



Continuous left turn lane as determined by the Local Entity.

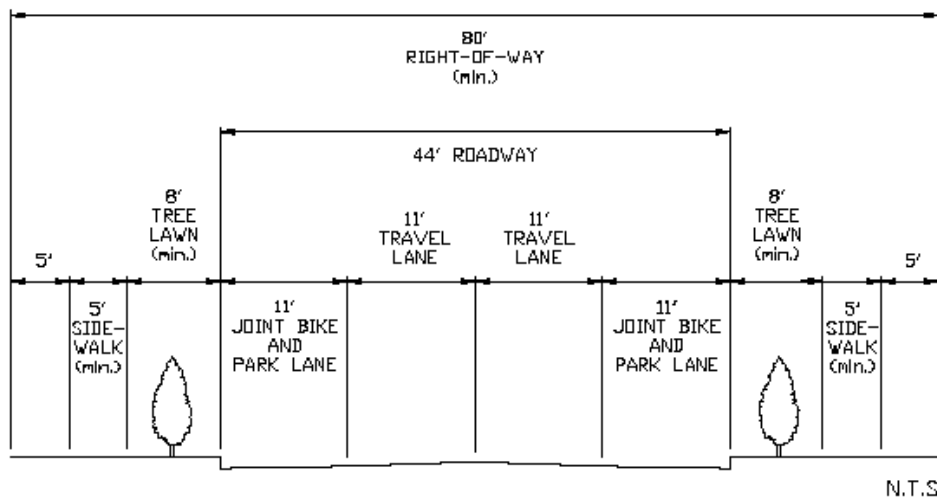


**Figure 5-B-3. Collector Street without Parking**

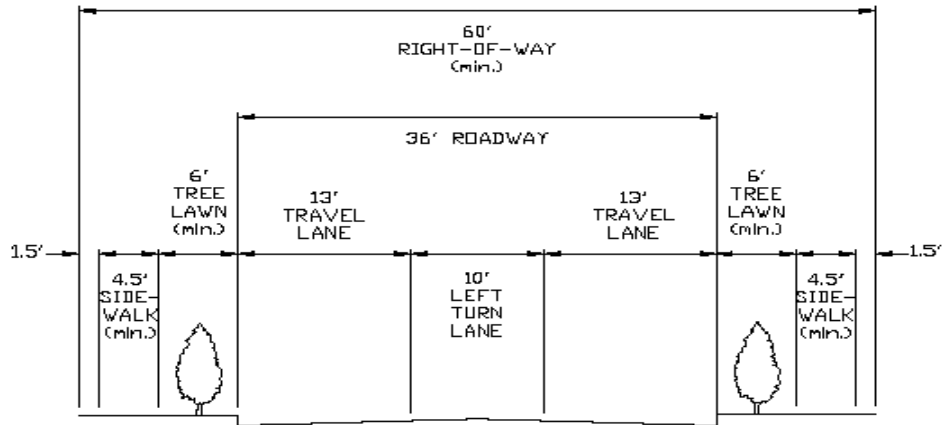
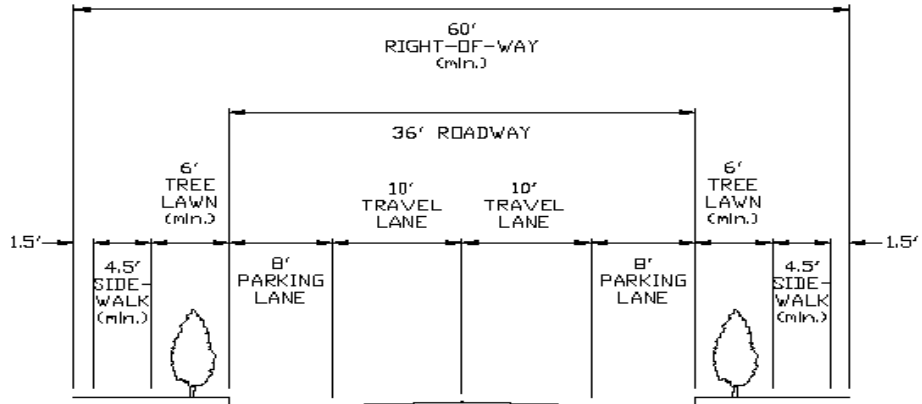


At Intersections, where needed

**Figure 5-B-4. Collector Street with Parking**



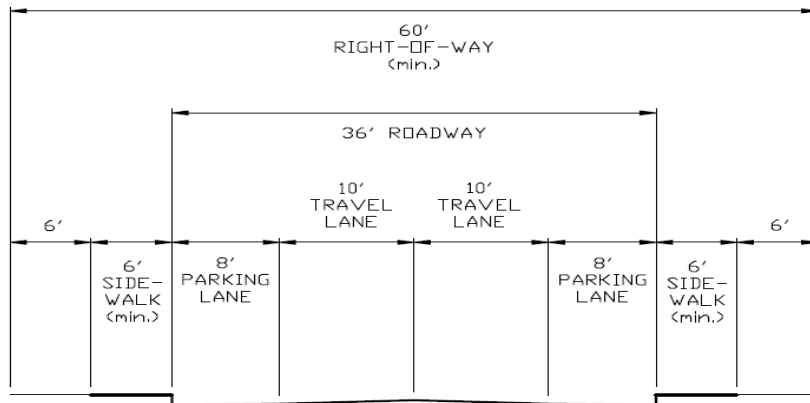
**Figure 5-B-5. Local Street**



N.T.S.

At Intersections, where needed

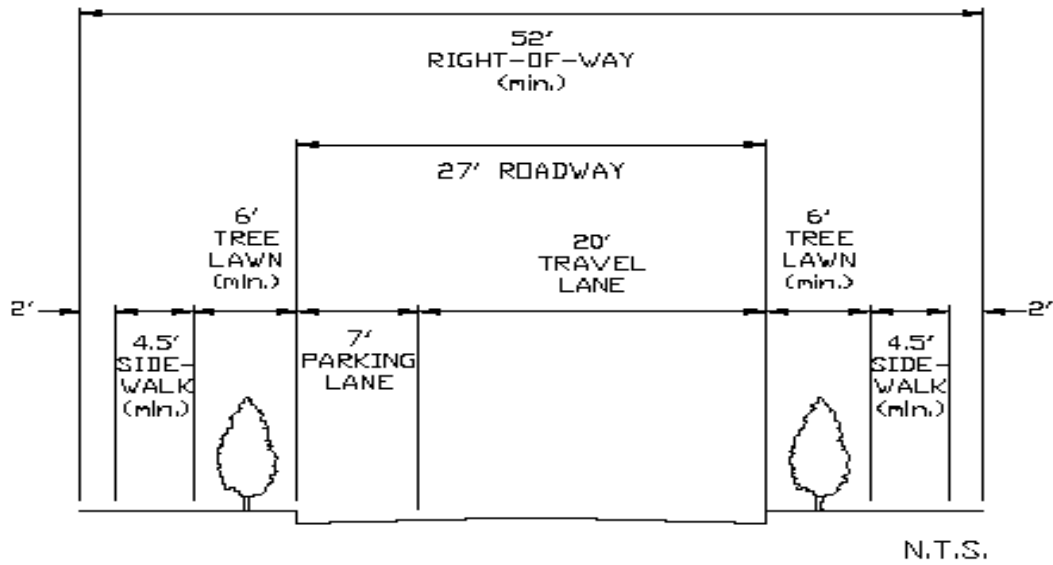
**Figure 5-B-5.1. Local Street Attached Sidewalks Option**



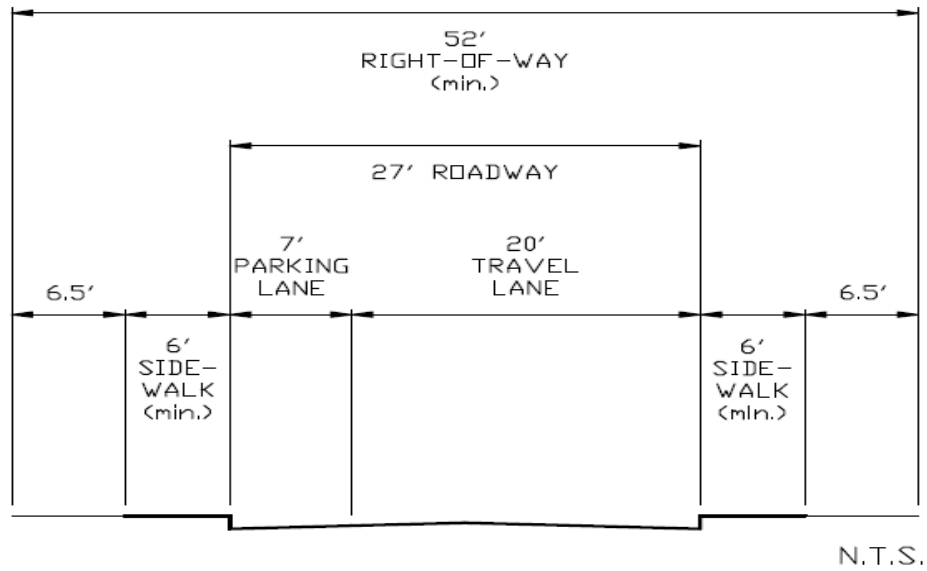
N.T.S.



**Figure 5-B-6. Narrow Local Street (Lane)  
(Used with Alleys Only)**

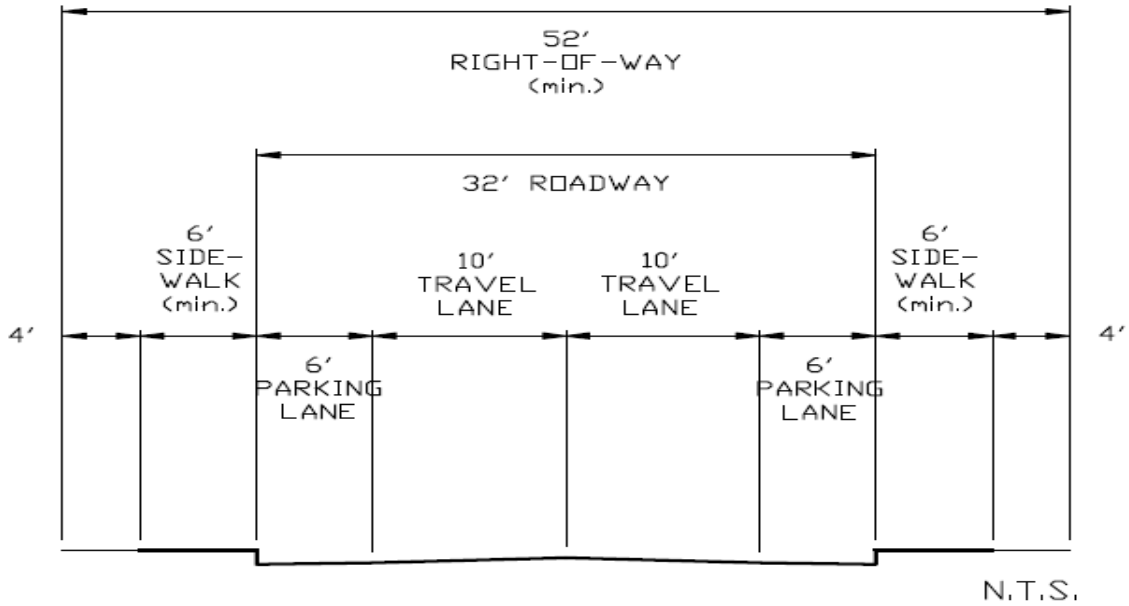


**Figure 5-B-6.1. Narrow Local Street (Lane)  
Attached Sidewalks Option  
(Used with Alleys Only)**





**Figure 5-B-6.2. Narrow Local Street (Lane)  
Attached Sidewalks Option  
(Used without Alleys)**



**Figure 5-B-6.3. Narrow Local Street (Lane)  
(Used without Alleys)**

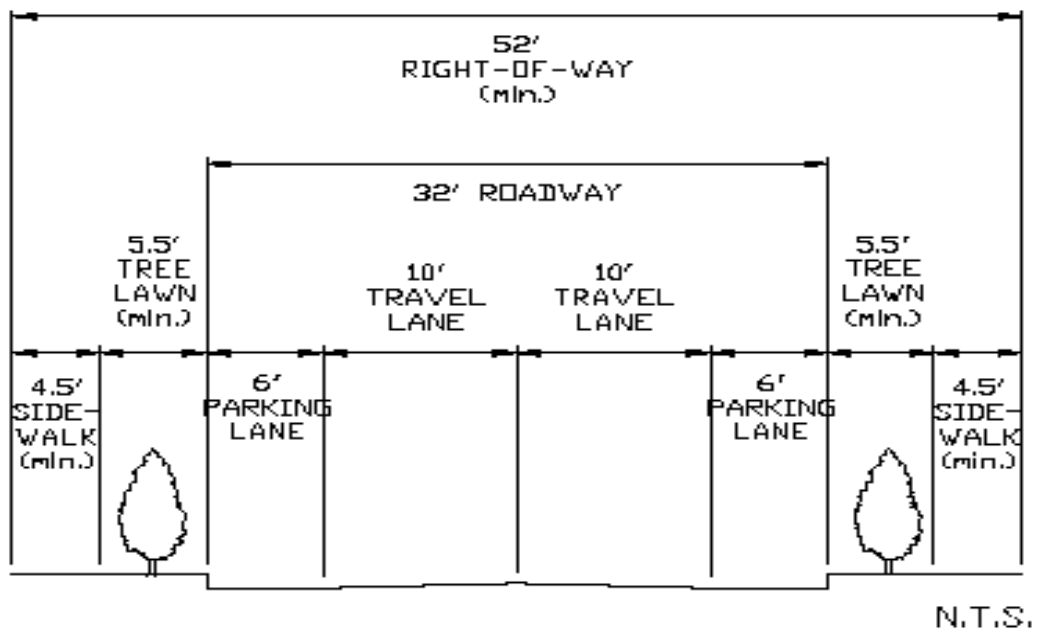


Figure 5-B-7. Commercial/Industrial Local Street

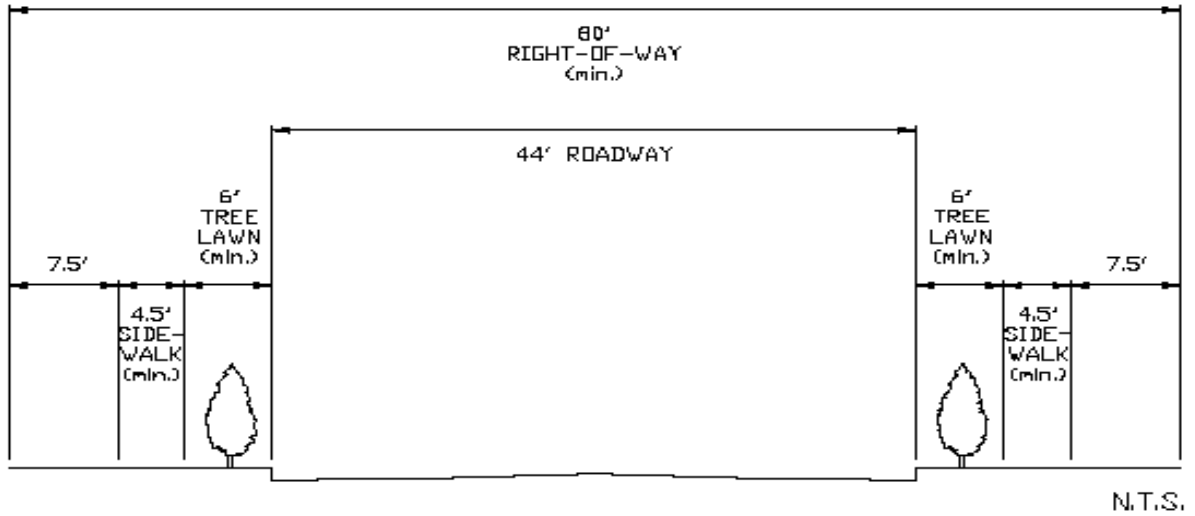
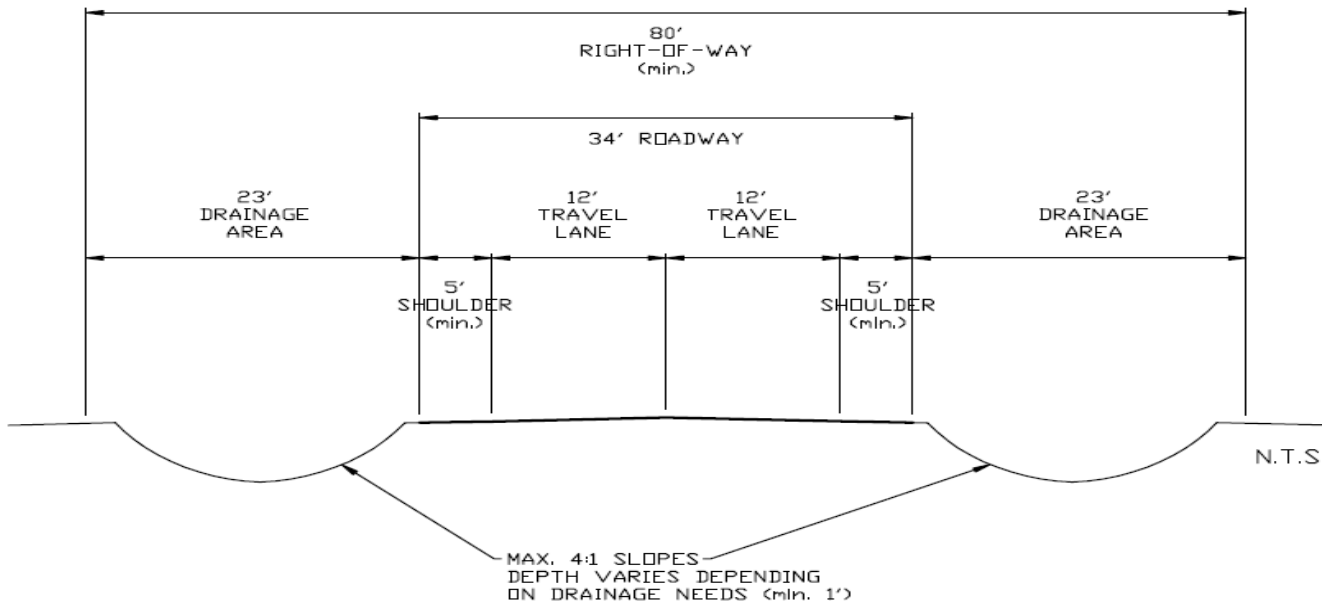


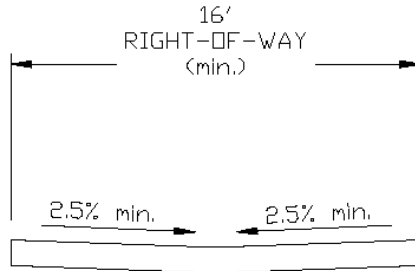
Figure 5-B-8. Rural Road Section



\* FOR USE IN THE RURAL RESIDENTIAL ZONE ONLY

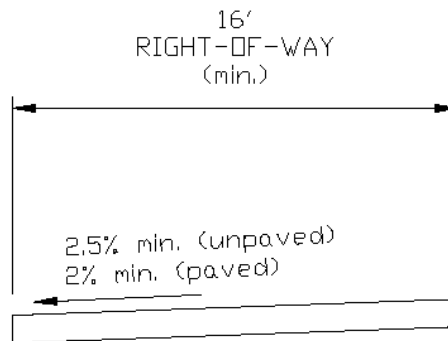


**Figure 5-B-9. Alleys**

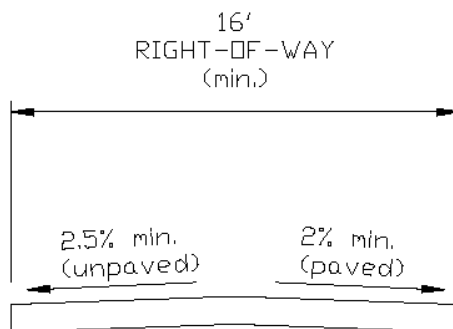


\* shall be paved

**Inverted Crown**



**Straight Grade**



**Normal Crown**



# Chapter 6—Streetscape Design

## **6.1 PURPOSE**

The purpose of the Streetscape Design requirements is to ensure that the quality of the streetscape environment, including medians and tree lawns within the public right-of-way, is attractive, functional and links the public street corridors together through a unified City-wide plan.

## **6.2 APPLICABILITY**

The Streetscape Design requirements are used in the evaluation of new development and redevelopment projects. This Streetscape Document sets forth acceptable standards and practices to meet City designated development requirements. This Streetscape Design requirement is intended to be used by developers and City staff. These requirements apply to projects located within the public right-of-way along arterials, collectors, and local streets. For additional information on related streetscape design, see the City of Cheyenne's current editions of the *Landscape Design Ordinance*, *City Urban Forestry Ordinance*, and *Standard Specifications*.

## **6.3 MEDIANS**

### **6.3.1 Purpose**

The intent of this Section is to require preparation of median landscape plans that ensure significant canopy shading to reduce glare and heat build-up, contribute to visual quality, and continuity within and between developments and along the street corridor, enhance outdoor spaces, reduce erosion and stormwater runoff, and mitigate air pollution.

### **6.3.2 Applicability**

This Section shall apply to the landscaping of all street medians located in the public right-of-way that are installed in connection with an adjoining development or with the improvement to the roadway.

### **6.3.3 General Standard**

All developments or roadway improvements shall submit a median landscape plan that meets or exceeds the standards of this Section.



### 6.3.4 Timing of Median Landscaping

Landscaping of medians shall occur in connection with the adjoining development or with improvement of the roadway as described below.

- A. Arterial Streets.** Landscape development shall occur with the improvement of the roadway.
- B. Non-arterial Streets.** Landscape development shall occur in connection with the adjoining development.

### 6.3.5 Median Planting Design Options

Landscaping shall be based on one of the following styles:

- A. Tree Corridor Style.** Deciduous trees shall be planted in an evenly spaced row. Ornamental trees may be planted in an evenly spaced row at the end of the median where the landscape area narrows. Trees should have variety. Yet, strong contrasts within tree rows should be avoided with repetition or subtle changes in form, size, texture, and color.
  1. Tree plantings shall be made in the center of the landscape area at regular spacings of 25 feet minimum to 40 feet maximum. Shade or ornamental tree plantings shall not occur where the distance between median curbs is less than 7 feet.
  2. Shrubs or groundcover plantings shall be made to provide a homogeneous surface with minimal amount of variation. Plant material shall have a mature height of 18 inches or less. Plantings may be excluded from the ends of medians for maintenance or visibility concerns.
  3. Organic mulch shall be placed at a depth of 3 inches directly on top of the soil surface in all landscape areas. Fabric shall be placed on top soil under mulch as a weed barrier.
  4. Landscape area within the median shall be graded level 3 inches below the edge. Berming or cresting the landscape area is not permitted.
  5. Flowering annual or perennial plants shall be restricted to high visibility areas and may occasionally be used as a landscape element in a section of the street corridor in wider sections of medians. Separate irrigation zones shall be installed for annual beds.



- 6. The tree corridor style is appropriate for medians in any classification of street where the median is at least 7 feet in width.

**B. Variety Combination Style.** Trees and shrubs of several types and forms should be planted. Continuity is not provided by the perpetual repetition of individual elements but by the occasional repetition of a dominant tree form. This continuity may be achieved by planting groups of the same evergreen tree as a repeated form along the street corridor. Plant groups placed between the repetitive dominant tree forms may be in sharp contrast to each other—in terms of size, color, form, and texture—to emphasize visual variety and detail.

Tree selection may be from shade, evergreen or ornamental types. The landscape area of a median must be 12 feet in width if evergreen trees are to be planted. Deciduous trees must be at least 3.5 feet, and evergreen trees 6 feet from the edge of the landscape area. Spacings between trees may vary within the following requirements:

**Table 6-1. Size and Spacing of Trees**

	<b>Canopy Shade Tree</b>	<b>Ornamental</b>
Minimum Size	2.0" Caliper (1.25" Residential Street)	1½" Caliper
Minimum Spacing	25 Feet	20 Feet
Maximum Spacing	40 Feet	30 Feet

### 6.3.6 Arterial Median Protection

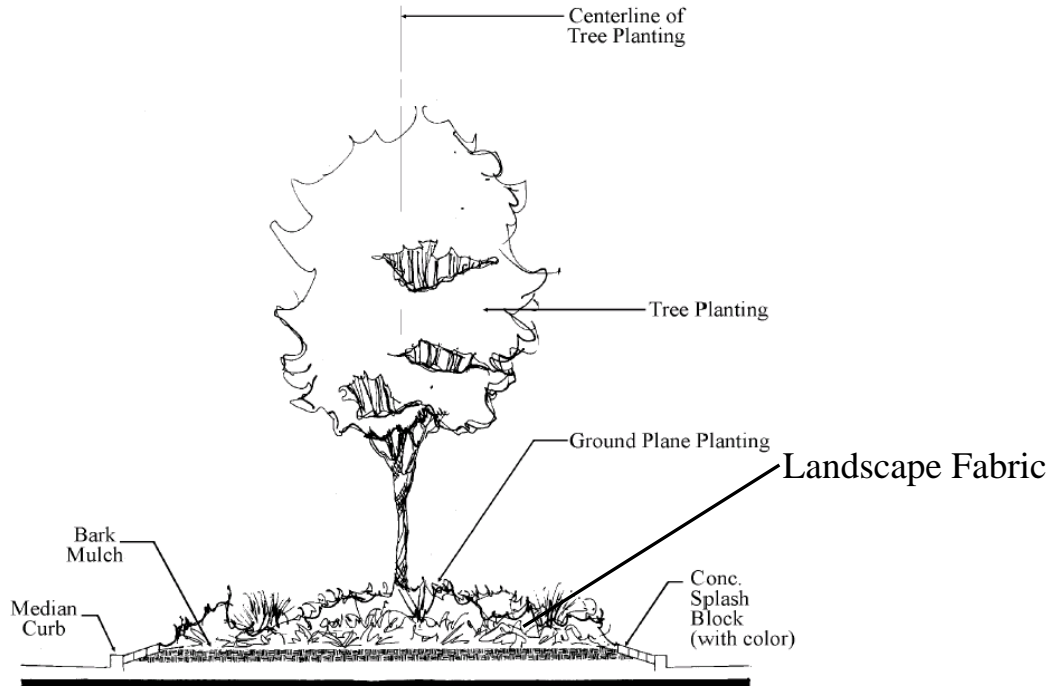
The border of a landscape median in an arterial street shall be raised with a vertical wall or shall include an inclined splash block of a medium-to-dark earth-tone color (see Median Planting detail on following page).

### 6.3.7 Hardscape

Landscape paving shall be used as a median cover wherever a landscape area is not provided. The hardscape may completely cover a median, or part of a median, that is less than 7 feet in width. Landscape paving may be integrated into a tree corridor or variety combination style, but shall not exceed 40% of the area of such a landscaped median. Landscape paving shall be of an aggregate or paver type and of a medium-to-dark earth-tone color.



**Figure 6-1. Example of 12' Median Section**



## 6.4 TREE LAWN

### 6.4.1 Purpose

The intent of this Section is to require preparation of tree lawn landscape plans that ensure significant canopy shading to reduce glare and heat build-up, contribute to visual quality and continuity within and between developments and along the street corridor, enhance outdoor spaces, and reduce erosion and stormwater runoff.

### 6.4.2 Applicability

This Section shall apply to all landscaping located within the public right-of-way on each side of the street in the planting strip between the back of curb and inside edge of sidewalk.

### 6.4.3 General Planting Standard

All developments or roadway improvements shall submit a tree lawn landscape plan that meets or exceeds the standards of this Section.



### 6.4.4 Tree Lawn Planting Design Options

- A. Canopy shade trees shall be planted at 25 to 40 foot intervals (spacing) in the center of all such tree lawn areas whenever the sidewalk is separated from the street by a tree lawn. Whenever the sidewalk is attached to the street, the canopy tree shall be established 2.5 feet behind the sidewalk at 25- to 40-foot spacing.
- B. Ornamental trees shall be planted in substitution of the canopy shade trees where overhead lines and fixtures prevent normal growth and maturity.
- C. The tree lawn ground plane planting design shall consist of turf grass and automatic irrigation system. Xeriscape design principles should be incorporated whenever appropriate. Within the tree lawn, the ground plane should be attractive but not dominant, uniform, uncluttered, and low in height and growth.
- D. Trees must be planted in the center of the tree lawn measured from the front of the sidewalk and back of the curb.
- E. No street tree shall be planted closer to the street than 2.5 feet from the back of the curb.
- F. Larger maturing trees should be placed 40 feet apart and smaller maturing trees (such as in the Variety/Combination Median style) may be placed 20 feet apart. When space is limited or to achieve certain design effect, closer spacings may be considered.
- G. No tree shall be planted closer than 10 feet from any driveway or alley, nor shall a tree be planted in such a manner that its eventual growth cannot be reasonably controlled so as to avoid interference with or obstruction to any improvements installed for public benefit.

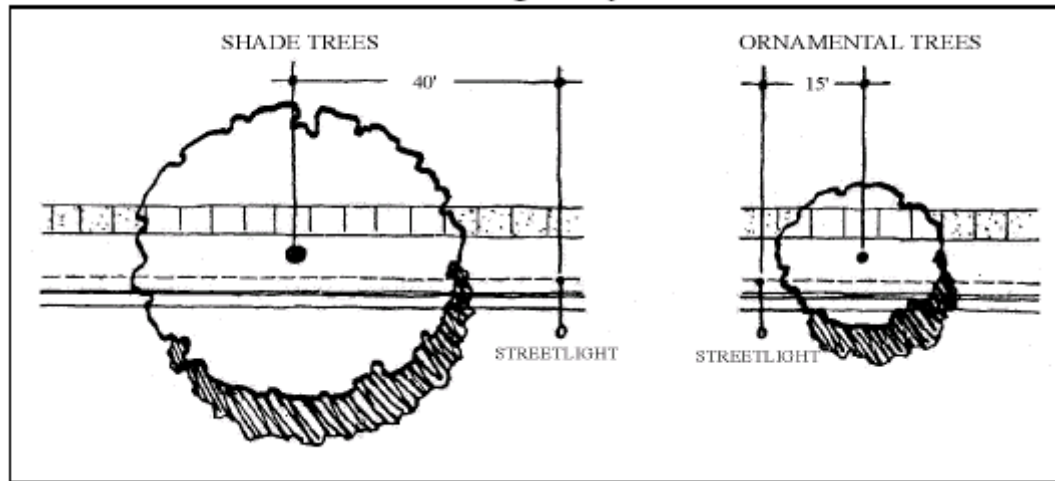
### 6.4.5 Utilities

Landscape and utility plans shall be coordinated. The following list sets forth minimum dimension requirements for the most common tree/utility separations. Exception to these requirements may occur where utilities are not located in their standard designated locations, as approved by the City. Tree/utility separations shall not be used as a means of avoiding the planting of required street trees.

- A. 40 feet between street trees and streetlights. 15 feet between ornamental trees and streetlights. (See figure below.)





**Figure 6-2. Tree/Streetlight Separations**

- B. 10 feet between trees and water or sewer lines.
- C. 4 feet between trees and gas lines.
- D. Street trees on local streets planted within the 8-foot-wide utility easement may conflict with utilities and should be avoided. Hydrants shall be a minimum of 10 feet from all plantings. Additional conduit may be required to protect underground electric lines.

#### 6.4.6 Visual Clearance or Sight Distance Triangle

A visual sight distance triangle, free of any structures or landscape elements greater than 2.5 feet in height shall be maintained at street intersections and driveways, and comply with Section 4.4 of these Standards.

- A. Fences shall not exceed 42 inches in height and shall be of an open design. Fences shall not be permitted in the clear sight triangle described in Section 4.4.2.
- B. Deciduous trees may be permitted to encroach into the clearance triangle provided that the lowest branch of any such tree shall be at least 14 feet from grade.
- C. At the intersection of roadways or vehicular access points, no plant material with a mature height greater than 2.5 feet shall be planted within a sight triangle measuring 35 feet along the boundary of each of the intersecting roadways, measured from the point of intersecting curblines, except where engineering standards indicate otherwise.



## 6.5 PLANTING GUIDELINES

### 6.5.1 Weather, Climate, Soils

Due to severe climate conditions in Cheyenne, consideration of long-term maintenance is an important element of the initial design of any streetscape. Precipitation is limited to 15 inches per year on average, with extreme temperatures in the 90's in the summer and as low as -20 in the winter. As much as one-third of the rain comes in May and June as heavy downpours. Heavy snows in spring and fall may break tree limbs, coming when trees are in leaf. Mild spring and fall weather is broken by sudden frosts.

### 6.5.2 General Planting Considerations

Severe conditions require careful design and selection of vegetation. Suitable plant lists are available at the Botanical Gardens and Urban Forestry websites. Adaptable plants that have proven hardy are recommended wherever possible. Xeriscape methods are advisable, such as grouping plants with similar water demands together and watering higher-demand plants on a different sprinkler schedule while drought-tolerant plants may be watered by rain or bubbler irrigation. Soil preparation is a critical step in all xeriscape.

General planting considerations include the following:

- A. Coordinated tree planting sets a rhythm and pattern for the street. By alternating tree types, a sense of enclosure can be achieved while slower growing trees are established.
- B. Gardens of perennials and annuals should be restricted to high-priority areas for maintenance and safety reasons.
- C. Consider utilizing xeriscape principals for high-traffic, low-maintenance, or otherwise dry or difficult areas.

### 6.5.3 Streetscape Approval

The developer shall contact the City Project Manager, Project Engineer, or Construction Manager before work on any City-maintained streetscape commences.



## 6.6 PLANTING STANDARDS

### 6.6.1 Projects Governed by Planting Standards

- A. Public projects such as streets, medians, and tree lawns shall provide for tree planting as a part of the development process. The landscape plan for such projects shall be approved by the City Forestry Department and must adhere to the design objectives, spacing locations, and other requirements with the City.
- B. Private projects shall provide for street tree planting as part of the development process. Street trees shall be located on the public right-of-way and must adhere to the design objectives, spacing, location, and other requirements of the City. These plantings are meant to work as a cohesive standard with the City's current Landscape ordinance. Exceptions can be made for tree plantings in the right-of-way due to Utility placement and other variations that would be deemed by the City Engineer to make Street Trees in the right-of-way unfeasible.

### 6.6.2 Specific Standards

- A. Existing healthy street trees shall be preserved wherever possible. If a tree is removed, mitigation trees of at least equal value as that of the removed tree shall be provided as determined by the City Forester.
- B. New street trees that are part of a new development project and infill plantings shall be at least 1.5 to 2-inch caliper.
- C. Automatic irrigation shall be provided to all trees, shrubs, and turf per City standards.

### 6.6.3 Size, Type, and Distribution of Tree Species

- A. Public tree planting can be accomplished with container trees, balled and burlapped trees or use of a tree spade. Bare-root plantings are not permitted without written permission as determined by the City Forester.
- B. No single species shall make up more than 50% of the total City tree population. The following requirements are for tree species at any one site:



**Table 6-2. Tree Statistics**

<b>Number of Trees at Site</b>	<b>Maximum % of any 1 Species at Site</b>
10 to 19	50
20 to 39	33
40 to 59	25
60 or more	15

- C. The plant palette listed in Attachment 6-A at the end of this chapter constitutes the official tree species for Cheyenne. Species other than those included in this list shall not be planted as street trees without written permission of the City Forester.

#### **6.6.4 Soil Preparation Requirements**

- A. All utilities shall be located prior to trenching and shall be protected from damage.
- B. Trenching around established trees is prohibited within 10' of trunk.

## **6.7 IRRIGATION STANDARDS**

### **6.7.1 General**

- A. Irrigation systems in any public ROW (which are now or will at some future point be maintained by the City of Cheyenne) must be constructed in accordance with the standards set forth in the current edition of the City of Cheyenne, Parks and Recreation *Standards and Specifications*.
- B. Commercial properties would be advised to utilize commercial-grade irrigation equipment.
- C. The City Engineer reserves the right to require adherence to Irrigation Standards set forth in the City of Cheyenne, Parks and Recreation *Standards and Specifications* on ROW or properties that may have extenuating or special circumstances.
- D. If irrigation system is dedicated to the City then all components including irrigation meter pits and backflow preventers shall be placed in the public right-of-way or an easement dedicated to the City.



## 6.8 TURF SEEDING STANDARDS

### 6.8.1 General

**A. Seed Mix.** Shall be approved by the Project Manager, Project Engineer, or Construction Manager based on the activity to take place, planned irrigation method and maintenance to be performed in the area being seeded.

1. Pre-approved Dryland Mix (for temporary or permanent unmowed and non-irrigated areas):

- 44% Fairway Crested Wheetgrass
- 10% Blue Grama
- 10% Butte Side Oats Grama
- 3% Texoka Buffalograss
- 20% Annual Rye Grass
- 10% Western Wheat Grass
- 3% Critana Wheat Grass

2. Pre-approved Irrigated Seed Mix(for mowed applications):

**Fescue Mix**

- 10% Chewing Fescue
- 10% Creeping Fescue
- 10% Hard Fescue
- 10% Sheep Fescue
- 20% Tall Fescue (Regiment II)
- 20% Tall Fescue (Crew Cut II)
- 20% Tall Fescue (Blade Runner)

**B. Seeded Areas.** Seeding is allowed in Tree Lawns where approved by the City, on side slopes of detention ponds to be maintained by the City, and in some temporary dryland applications. No seeding is allowed in medians. All proposed seeded areas are to be specifically approved by the City and shall be of the latest crop.

### 6.8.2 Submittals

The developer shall submit certificates showing State, Federal or other inspection showing source and origin of materials to the City.

### 6.8.3 Materials

**A. Seed.** Shall be of fresh, clean, new crop seed composed of the varieties approved by the City with tested minimum percentages of purity and



germination clearly labeled on the package. All seed shall be free of *Poa annua* and all noxious objectionable weeds with a maximum crop of .1% and maximum weeds of .1% weeds.

**B. Mulch.**

1. For slopes 30% and less: Native grass straw without weed seed and consisting of grasses as specified for seeded application.
2. For slopes 30% and greater, and inaccessible areas: Hydromulch using Weyerhaeuser "Silva-Fiber" mulch or approved equal. The wood cellulose fiber for hydraulic mulching shall not contain any substance or factor which might inhibit germination or growth of grass seed. It shall be dyed a green color to allow metering of its application.
3. Tackafier use Teratack III, or approved equal.

**C. Netting.** For slopes greater than 30%, use Soil Saver jute netting, or approved equal. Netting to be stapled with No. 11 gauge steel wire forged into a 6-inch long U-shape and painted for visibility in mowed areas. Netting must be placed so it does not cause a problem for mowers.

**D. Fertilizer.** Use a fertilizer with a formula of 18-46-0 on all areas to be seeded.

**E. Inspection.** Inspect finish grade and trim where needed to obtain finish grades of 1 inch below adjacent pavements. Verify positive drainage away from all structures. Verify or complete removal of rock and debris larger than 1 inch from all areas to be seeded.

### 6.8.4 Execution

**A. Fertilizer.** Apply 8 pounds per 1,000 square foot of seeded area and rake lightly into top 1/8 (0.12) inch of soil just prior to seeding operation.

**B. Seeding.**

1. Do not sow seed in windy weather or when ground is frozen or otherwise unfillable.
2. Use Brillion type drill or hydraulic seeding methods. Drill seed in manner such that after surface is raked and rolled, seed has 1/4 (0.25) inch of cover.
3. Hydraulic seeding will be used in areas that are not accessible for machine methods. A hydraulic pump capable of being operated at 100 gallons per minute and at 100 pounds per square inch pressure should be used. The equipment shall have an acceptable pressure gauge and a nozzle adaptable to hydraulic seeding requirements. Storage tanks shall



have a means of agitation and a means of estimating the volume used or remaining in the tank. Do not seed and mulch in the same operation.

**4. Rates:**

- Dryland Mix—30 pounds pure live seed per acre.
- Irrigated Mix—10 pounds per 1000 sq. ft.

**C. Mulching.**

1. Native Grass Mulch: Apply at a rate of 2 tons per acre. Mulch seed beds within 24 hours after seeding.
2. Hydromulching: Wood cellulose fibers must become evenly dispersed when agitated in water. When sprayed uniformly on the soil surface, the fibers shall form a blotter like ground cover which readily absorbs water and allows infiltration to the underlying soil. Cellulose fiber mulch shall be added with the proportionate quantities of water and other approved materials in the slurry tank. All ingredients shall be mixed to form homogenous slurry. Using the color of the mulch as a metering agent, spray-apply the slurry mixture uniformly over the seeded area. Apply with tackafier used at a rate of 120 pounds per acre. Unless otherwise ordered for specific areas, fiber mulch shall be applied at the rate of 2,000 pounds per acre. Hydraulic mulching shall not be performed in the presence of free surface water resulting from rains, melting snow or other causes.

**D. Netting.** Net areas over 30% slope. If contractor fails to net and subsequent soil erosion occurs, contractor shall re-establish finish grade, soil preparation, seed bed and apply netting at no cost to the City of Cheyenne.

**E. Watering.** Immediately after seeding and mulching, water seeded area slightly, but with care so that no erosion takes place and no gullies are formed. Water a minimum of three times a day and keep seeded area moist until turf is established. Sloped areas should be hand watered until turf is established to prevent erosion; water these areas more often but for shorter periods of time.

**F. Clean Up.** Remove all hydromulch and other mulch materials from all plant materials, fences, concrete and other areas except for seed bed.

**G. Protection.** Provide and install barriers as required to protect seeded areas from pedestrian and vehicular damage. Provide signage if needed.

### 6.8.5 Guarantee/Warranty

Warrant seeded areas for consistency and completion of coverage. Re-seed as needed to ensure a successful stand of grass that is acceptable to the City.



Once a vigorously growing stand of grass is achieved with a minimal amount of weeds, the request for Construction Acceptance may be made.

## 6.9 FINE GRADING AND SOIL PREPARATION STANDARDS

### 6.9.1 General

- A. Soils tests conducted by a certified or qualified soils testing lab must be completed and submitted to the City for review; recommendations in the lab reports shall be followed in all cases. Generally this will include soil amendment and fertilizer recommendations; in some cases, all new topsoil will be required.
- B. If the site is undisturbed, topsoil is to be stripped to a 6-inch depth, or to topsoil depth as determined by field inspection. Stockpile and re-spread stripped topsoil over landscape areas after rough grades are established. If site has been disturbed, or sufficient topsoil is not available, topsoil is to be imported to achieve 6-inch depth in all landscaped areas.

### 6.9.2 Submittals

- A. **Soil Amendment.** Submit sample and written confirmation from supplier of material composition including: percent organic matter, salts, nutrient composition and trademark. Sample is to be representative.
- B. **Topsoil.** Submit sample and written confirmation from supplier of material composition including: percent organic matter, salts, and nutrient composition. Sample is to be representative.

### 6.9.3 Materials

- A. **Soil Amendment.** Certified organic material or approved equal. A high quality composted material containing a minimum of 50% organic matter. The mixture shall be free from clay subsoil, stones, lumps, plants or roots, sticks, weed stolons, seeds, high salt content and other materials harmful to plant life. The compost shall be coarsely ground with an even composition and have an acidity in the range of pH 5.5 to pH 7.0. All material shall be sufficiently composted such that no material used is recognizable.
- B. **Topsoil.** Must be taken from a well drained, arable site and shall be reasonably free of subsoil, stones, clods, sticks, roots and other objectionable extraneous matter or debris. No stones or other materials over 2 inches in size shall be allowed. Topsoil shall contain no toxic materials and have an acidity in the range of pH 5.5 to pH 8.5.
- C. **Fertilizer.** Balanced fertilizer with a chemical analysis of 10-25-12.





### 6.9.4 Inspection

- A. Locate all utilities prior to trenching and protect from damage.
- B. Accept rough grading from other contractors per approved plans. Rough grade inspection is to allow for 6-inch minimum depth of topsoil and specified soil amendments as part of the fine grading work.

### 6.9.5 Execution

- A. Protect existing trees, landscaping, existing structures, fences, sidewalks, utilities, paving, curbs, and other features remaining as final work during construction. Contact the City Forester for proper procedures on how to implement tree protection.
- B. Grub and remove unsuitable woody and rock material present in the surface grade.
- C. Take precautions to accommodate proper drainage and flow during and after grading and soil preparation.
- D. Apply herbicide to areas where noxious weed beds have been established and/or where seed mix is to be planted. Herbicide must be applied by certified contractors at the rate recommended by the manufacturer after proper notification has been done in accordance with chemical applicator's standards. Precautions must be taken to avoid drifting of spray onto other properties; spraying shall not be done in breezy conditions. Harm to plant material not designated for herbicide application shall be replaced by the contractor.
- E. Rip to 6-inch depth with agriculture subsoiler in all areas to receive plantings. Contact City Forester regarding acceptable procedures to not disturb existing roots or established trees. Remove all objects greater than 2 inches in diameter.

### 6.9.6 Application

- A. Spread 6 inches topsoil over entire landscaped area, except in the dripline of existing trees, and grade to smooth and even lines. Establish swales and drainage as required per plans.
- B. Evenly distribute soil amendment at rate of 3 cubic yards per 1,000 square feet of area, or 1-inch depth over the entire area to be prepared; alter rate if soils test recommends otherwise. Till amendments into top 6 inches of soil. Compact to a firm, but not hard density (80% of Standard Proctor Density at



2% optimum moisture). Evenly distribute triple superphosphate fertilizer at the rate of 15 pounds per 1,000 square feet; modify type and rate if soils test recommends otherwise.

- C. Trim finish grade elevations adjacent to paved areas to 1 inch below pavement finish grade.

## **6.10 STREETScape MAINTENANCE STANDARDS**

### **6.10.1 Purpose**

The purpose of this section is to ensure a consistent, high-quality appearance for all streetscapes, whether maintained by the City, its agents, or by private developers, businesses, or individuals. Given the high visibility of City streetscapes, the public is able to observe maintenance practices in the field as well as the results of that maintenance. The public perception of a well-maintained landscape is promoted by practices which benefit the health of the landscape materials and achieve a neat, well-cared-for appearance. Quality maintenance is a function of workmanship, funding, and technique. These standards will ensure that all streetscapes are cared for in a manner which reflects the high esteem that citizens have for these important public spaces. Generally, all landscaping shall be maintained in a healthy condition throughout the growing season. A neat and attractive appearance is essential. Irrigation systems, structures, and sidewalks shall be maintained to represent the original integrity of the design and installation.

### **6.10.2 Planting and Maintenance Standards**

The practices of the City of Cheyenne Forestry Department will serve as the standard for planting and maintenance for all trees in the public rights-of-way; Forestry Department standard practices apply whether the work is performed for the City contractually, by the City, or by private entities or individuals.

### **6.10.3 Permit**

As per city code, a permit must be obtained from the City Forestry Division before any planting, pruning, removal, or destruction of any tree, shrub, or hedge in or upon the public right-of-way.

All work requiring a permit shall be conducted in a manner as to cause the least possible interference with or annoyance to others. Pedestrian and vehicular traffic shall be allowed to pass through the work areas only under conditions of safety and with as little inconvenience and delay as possible.



## 6.10.4 Maintenance

Maintenance of ground-level streetscapes shall be the responsibility of the adjacent property owner.

- A. Mowing shall not interfere with the use of streets and sidewalks and shall meet the provisions of the City nuisance and weed ordinance.
- B. Turf should be maintained within the designated planting area, and mulch, either wood or rock, should be free of weeds.
- C. Dead plants should be replaced, clippings and trash removed, and mulch and plants replaced as they diminish and die off.
- D. Landscaped area should be kept as similar to its initial appearance as possible.
- E. Irrigation times and installations should occur per City requirements.

## 6.11 ESTABLISHMENT MAINTENANCE FOR NEWLY PLANTED TREES

### 6.11.1 New Residences

Information regarding street tree planting and maintenance requirements can be obtained from the City Forester's office.

### 6.11.2 Establishment Maintenance Guidelines

- A. Maintain irrigation standards. Newly planted trees require additional irrigation for 2 to 3 years. Particularly during the first year this can exceed water demand of turf. New trees should receive 1 inch of irrigation per week during the first growing season, applied over the root system. Normal turf irrigation is generally adequate (1 inch per week) for the second and third year. 15 inches of supplemental irrigation per growing season is adequate after establishment. Irrigation times should occur per City requirements.
- B. Insure irrigation rates for new trees in turf areas are adequate during establishment even when that is greater than water demand for turf.
- C. Mulch newly planted trees over the root system with 3 inches of organic mulch. Trees in turf zones shall be planted in 4-foot diameter rings.
- D. Inspect new plantings on a regular basis and remove dead, broken and diseased branches.



- E.** Remove sprout growth from stems and root collars early in the growing season.
- F.** Evaluate mulch on an annual basis. Re-mulch trees to maintain a maximum of 3-inch deep mulch cover. Keep mulch 3 inches away from the tree trunk.
- G.** Maintain tree rings in turf zones as weed free.
- H.** Monitor insect and disease levels and control measures implemented when necessary following Integrated Pest Management (IPM) practices.
- I.** Remove all nursery or other tags from plants and landscape materials.
- J.** Remove tree wrap and stakes the next spring season after planting.

**NOTE:** See 'Adopted Species List' available at the City Forestry Department and online at <http://www.cheyennetrees.com/>



# Chapter 7—Site Planning

## 7.1 PREFACE

Proper site planning is an important part of the long-range solution to providing adequate transportation facilities. Transportation planning is generally based on land-use planning, and if land-use planning is not implemented through proper site planning, the transportation plan may be rendered useless.

Since a "site" can be of almost unlimited size, this Chapter includes the topics of annexation, platting, zoning, as well as the drawing of the map referred to as the "site plan." Most of the other Chapters in this *Design Standards Manual* also have some relationship to the subject of Site Planning.

## 7.2 SITE PLANS

### 7.2.1 When Required

A site plan shall be submitted to the Development Office as required by the Zoning Ordinance. Site plans shall adhere to general pedestrian and bicycle connectivity requirements and design features and accommodations as presented in Sections 8.5 and 8.6.

### 7.2.2 Procedure

Upon approval of the site plan, a certificate of review is issued by the Development Office. A certificate of review is required to obtain a building permit.

If a variance is necessary, the application is heard by the City Board of Adjustment.

The Development Office forwards copies of the site plan to all pertinent offices and agencies for their comments. The Development Office reviews the site plan for compliance with the standards set forth in these Standards, the Zoning Ordinance, other City Ordinances or Resolutions and any other adopted plans, resolutions, etc. which are appropriate to the request.



## 7.3 STANDARDS

### 7.3.1 Utility Design

Off-site utilities shall be designed in accordance with the design criteria of the Cheyenne Board of Public Utilities or the South Cheyenne Water and Sewer District.

### 7.3.2 Streets

The arrangements, width, grade and location of all through streets shall conform to the requirements of the City of Cheyenne.

Local streets should be laid out so that their use by through traffic will be discouraged. There should be a minimum of minor streets intersecting major thoroughfares. In areas of new developments, the proposed development shall provide access opportunities for future adjacent development to travel between projects and not require traveling off-site. If the project is infill and/or located adjacent to an existing development, connections with this existing development shall be made to avoid travel off-site. This is particularly critical if the adjacent development provides an internal means of access to schools, parks and commercial shopping. If opportunities for vehicular traffic are not viable, options for pedestrian and bicycle connections should be pursued.

Permanent dead-end streets are prohibited. (For the purpose of this Section, cul-de-sacs are not dead-end streets.) If a dead-end street is temporary, a temporary turn-around easement having a right-of-way radius of 50 feet shall be provided until provisions have been made for the extension of the street.

### 7.3.3 Alleys

Alleys should be provided in commercial and industrial districts. This requirement may be waived where other provision is made for service access and parking adequate for the uses proposed.

The width of alleys shall be 16 feet in residential and 24 feet in industrial and commercial areas. When alleys are provided, they may be designed for the placement of utility lines. Dead-end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate turn-around facilities at the dead-end for alleys greater than 150 feet.

Alleys in new commercial and industrial subdivisions shall be paved. Developments in existing areas generating more than 50 vehicles per day using an alley shall be responsible for paving the alley.



### 7.3.4 Utilities and Easements

Utility facilities (including but not limited to gas, electrical power, telephone, and CATV cables) shall, wherever practical, be located underground throughout the subdivision or development. As far as possible, all utilities shall be placed in the public street or road rights-of-way. Easements shall be provided for all public utilities if utilities cannot be placed in public streets or road rights-of-way.

(Adapted from the City/County Development Office. *The Cheyenne-Laramie County Subdivision/Development Regulations*. Adopted: 7 July 2000, City; 1 August 2000, County.)

Where easements are required, they shall be at least 16 feet wide. Half easements of 8 feet for utilities will be acceptable on the boundary of parallel lots. Half easements will also be accepted on the boundary of lots which are adjacent to streets, alleys, drainage rights-of-way, pedestrian travelways and drainage easements or easements granted for other purposes.

Where a subdivision is traversed by a water course, drainage way, channel or stream, there shall be provided an adequate drainage easement.

In special circumstances where it is not feasible to comply with the provisions of this section, variances may be granted on a case-by-case basis by the City engineer or as provided in Section 1.8 of these Standards.

### 7.3.5 Parking

Parking is an important element in the transportation system, since most vehicles are parked most of the time. Facilities for parking often lag far behind roads and streets. This lack of balance leads to the conclusion that greater resources must be applied to the parking problem. To accomplish this, it is required that adequate parking facilities are constructed as a part of any new development.

To prevent large expanses of asphalt separating businesses from streets, developers are encouraged to locate new buildings closer to streets and to break parking areas up into modules separated by landscaping and other features. No more than 50 percent of the off-street parking area for the entire property should be located between the building and the primary abutting public street. Paved pedestrian access shall be provided between all parking areas and building entrances used for normal access.

- A. Number of Spaces.** "The Zoning Ordinance" contained in Title 17 of the *Cheyenne City Code* indicates minimum parking requirements related to zoning matters. Developments shall provide the minimums as set forth in the "Zoning Ordinance," but not more than 25 percent greater than the



minimum requirement to prevent large expanses of asphalt separating businesses from streets and other site uses.

The "Ordinance" includes space requirements for various uses and presents guidelines for collective parking facilities. It also addresses parking on other properties and lists general parking requirements. There is also information included for specific districts.

- B. Stall Dimensions and Layout.** Tables 7-1 and 7-2 and Figure 7-1 shall be used in the design of parking areas. The standard stall width shall be a minimum of nine feet in low turnover parking areas such as residential areas and employee parking, and nine and one-half feet in higher turnover areas such as commercial retail and mixed use centers.
- C. Circulation.** All internal site circulation shall be contained within the site except as noted below. Use of public streets for internal circulation shall not be permitted except in the case of sites that are bisected by public streets. If a site is bisected by a public street, every reasonable attempt shall be made to minimize the amount of cross-site traffic using the public street and the traffic impact study (if required) shall treat such trips as additional driveway trips for analysis purposes. Public alleys may be used for parking lot circulation in the CBD and similar areas with the approval of the City Engineer.

**Table 7-1. Parking Layout Dimensions**  
(in feet) for 9' x 18.5' Stalls at Various Angles

	Dimension			
		60°	75°	90°
A	Stall width, parallel to aisle	10.4	9.3	9.0
B	Stall length of line	23.7	20.9	18.5
C	Stall depth to wall	20.5	20.0	18.5
D	Aisle width between stall lines	16.0	23.0	26.0
E	Stall depth, interlock	18.5	18.0	18.5
F	Module, wall to interlock	55.0	62.0	63.0
G	Module, interlocking	53.0	61.0	63.0
H	Module, interlock to curb face	52.5	59.5	60.5
I	Bumper overhang (typical)	2.3	2.5	2.5
J	Offset	2.6	0.6	0.0





	Dimension			
		60°	75°	90°
K	Setback	9.3	4.8	0.0
L	Cross aisle, one-way	14.0	14.0	14.0
L	Cross aisle, two-way	24.0	24.0	24.0

**Source:** Adapted from Institute of Transportation Engineers. *Transportation and Traffic Engineering Handbook*. Englewood Cliffs, New Jersey: Prentice-hall, 1982, 650.



**Table 7-2. Stall Layout Elements for Stalls Ranging in Width from 9.0' to 9.5'**

Parking Angle	Stall Width Parallel to Aisle	Stall Depth to Wall	Stall Depth to Interlock	Aisle Width (1)	Module (2)	
					Wall to Wall	Interlock to Interlock
<b>45 deg</b>						
9.0' stall	12.7	19.5	16.5	12	51	45
9.5' stall	13.4	19.5	16.5	11	50	44
<b>60 deg</b>						
9.0' stall	10.4	20.5	18.5	16	57	53
9.5' stall	11.0	20.5	18.5	15	56	52
<b>75 deg</b>						
9.0' stall	9.3	20.0	19.0	23	63	61
9.5' stall	9.8	20.0	19.0	22	62	60
<b>90 deg (3)</b>						
9.0' stall	9.0	18.5	18.5	26	63	63
9.5' stall	9.5	18.5	18.5	25	62	62

**Source:** Adapted from Institute of Transportation Engineers. *Transportation and Traffic Engineering Handbook*. Inglewood Cliffs, New Jersey: Prentice-hall, 1982, 649.

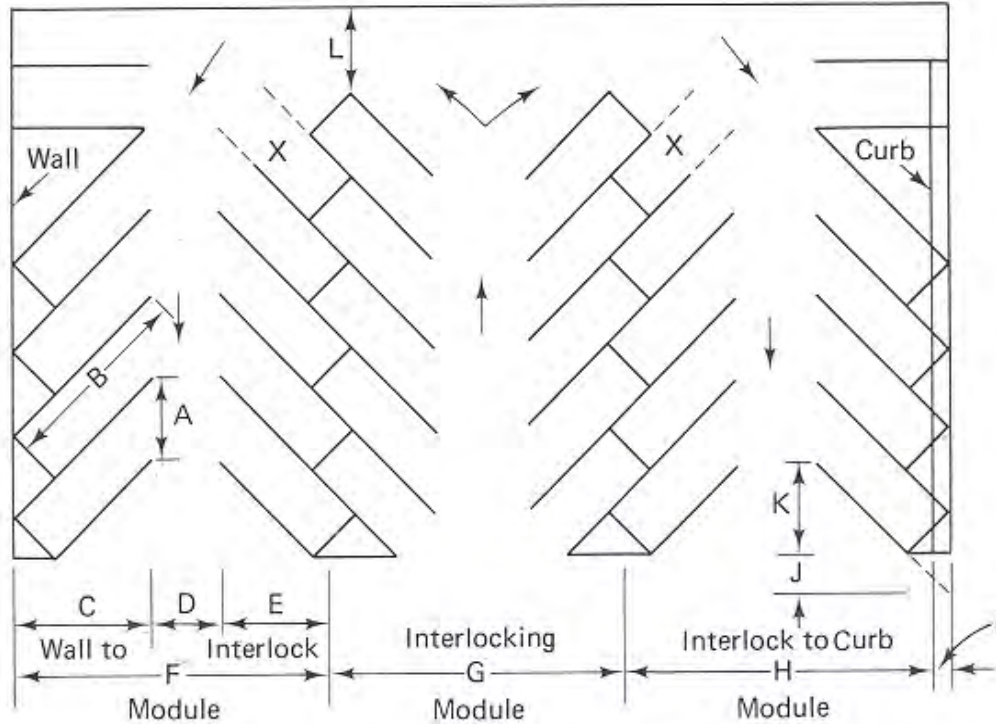
These dimensions are for 18.5' length stalls, measured parallel to the vehicle, and are based on results of a special study to evaluate the effects of varied aisle and stall width for the different parking angles shown. The study was conducted in December 1970 by the Federal Highway Administration and Paul C. Box and Associates (see above citation).

Note 1. Measured between ends of stall lines.

Note 2. Rounded to nearest foot.

Note 3. For back-in parking, aisle width may be reduced 4.0 feet.



**Figure 7-1. Parking Layout Dimensions for 9' Stalls at Various Angles**

X = Stall not accessible in certain layouts

**Source:** Adapted from Institute of Transportation Engineers. *Transportation and Traffic Engineering Handbook*. Englewood Cliffs, New Jersey: Prentice-hall, 1982, 650.

- D. Location of Parking Spaces.** Location of parking spaces behind buildings is encouraged wherever possible for employee and long-term parking. Short-term parking shall be provided within proximity to the use destination or accessible through a logical and/or signed sidewalk which leads to the destination.
- E. Accessible Parking.** The number, locations, dimensions, and signing of accessible parking stalls shall be in accordance with the current ADA Standards for Accessible Design.
- F. Grading and Surfacing.** All parking and loading areas shall be graded for proper drainage. Parking lots in the City shall be paved.

The maximum grade in a parking lot shall not exceed 8 percent. The maximum desirable grade in any direction is 5 percent.

- G. Joint Use of Parking Facilities.** Whenever possible, the parking needs of two or more properties may be consolidated rather than providing independent facilities. Planned Unit Developments such as shopping centers, office and



apartment developments, and similar uses should particularly consider joint parking facilities. Additional information on joint parking is in the "Zoning Ordinance." Guidelines for a study to satisfy the conditions for joint use of parking facilities are indicated in "Guidelines for Preparing a Joint Parking Study," Attachment 7-A following this Chapter.

- H. **Parking Structures.** Designs of parking structures will be evaluated on a case-by-case basis.
- I. **Bicycle Parking.** See Section 9.5 for Bicycle Parking Requirements.

### 7.3.6 Stormwater Detention Facilities

Hydrologic and hydraulic design of stormwater detention facilities shall be designed in accordance with Chapter 10 of these Standards and the current edition of the *Cheyenne Stormwater Management Manual*.

Regional detention facilities will be dedicated to the public and maintained by the City of Cheyenne. Detention facilities for single-family residential developments to be dedicated to the City shall meet minimum standards published by Public Works and/or Parks and Recreation and approved by City Council by Resolution. Detention for other types of development will be located on the development and maintained by the owner.

## 7.4 PEDESTRIAN FLOWS

Safe, convenient, accessible pedestrian access shall be provided on all new developments. The parking and circulation system within each development should accommodate the movement of vehicles, bicycles and pedestrians throughout the proposed development and to/from surrounding areas, safely and conveniently as presented in Sections 9.5 and 9.6. The on-site pedestrian system should provide adequate directness, continuity and street crossing. Walls, fences and barricades should not restrict access to adjacent uses, particularly for public use, such as schools, parks and recreational areas.

To the extent feasible, pedestrian traffic should be separated from vehicles. Where complete separation of pedestrians from vehicles and bicycles is not possible, potential hazards should be minimized by the use of techniques such as special paving, pavement marking, signs, striping, bollards, median refuge areas, traffic-calming features, landscaping, lighting, or other means to clearly delineate pedestrian areas day and night.

Development plans should include site amenities that enhance safety and convenience and promote walking or bicycling as alternative means of transportation. Site amenities may include bike racks, drinking fountains, canopies and benches.



Sidewalks within the site should be located and aligned to directly and continuously connect areas or points of pedestrian origin and destination, and should not be located and aligned solely based on the outline of a parking lot configuration that does not provide such direct pedestrian access. Sidewalks should link street sidewalks with building entrances through parking lots and shall be provided for larger commercial retail and mixed-use centers.

Where it is necessary for the primary pedestrian access to cross drive aisles or internal roadways, the pedestrian crossing should emphasize and place priority on pedestrian access and safety. The material and layout of the pedestrian access shall be continuous as it crosses the driveway, with a break in the continuity of the driveway paving and not in the pedestrian access way. The pedestrian crossing shall be well-marked using pavement treatments, signs, striping, traffic-calming techniques, median refuge areas and landscaping.



## ATTACHMENT 7-A—GUIDELINES FOR PREPARING A JOINT PARKING STUDY

Planning applications where collective or shared parking is contemplated may be required to include parking accumulation studies for existing facilities similar to the proposed uses and for the surrounding uses with which joint parking is being considered. The applicant shall adhere to the following guidelines:

- A. Prepare a scaled drawing indicating the parking areas and the facilities requiring parking in the area.
- B. Determine if shared parking is possible by examining the land-use mix adjacent to the subject site, the size of each use, the type of operation, and, most importantly, the 12- to 24-hour parking demand characteristics of each use.
- C. Conduct the 12- to 24-hour parking accumulation studies for existing facilities similar to those for which reciprocal parking is being requested, and for the surrounding ones with which shared parking is anticipated. Weekly and monthly variations in parking demand must be taken into consideration.
- D. Occupancy factors may be a consideration in determining how well the parking spaces for the existing adjacent uses, with which shared parking is being contemplated, are currently being utilized. These can be determined during the accumulation studies outlined above.
- E. Based on the data for existing similar facilities, the total parking demand for all uses included in the shared parking analysis must be projected for each hour over a 12- to 24-hour period for the most critical day of the week and month of the year. This must include the Thanksgiving-to-Christmas period, if the facilities are affected by this period. This will determine the minimum number of spaces that must be provided.
- F. Based on this analysis, if the maximum number of vehicles accumulated during a 24-hour period for all uses exceeds the number of spaces that were required by the zoning ordinance for all the uses, no reciprocal or shared parking will be permitted.
- G. If the projected peak accumulated demand is lower than the spaces required, elimination of those spaces exceeding the maximum accumulated demand may be considered by permitting shared parking, providing details of an agreement are provided guaranteeing perpetuity of such shared parking arrangements in case of future ownership or tenant changes.



# Chapter 8—Sidewalks

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## 8.1 PREFACE

Sidewalks are integral to the transportation system. Sidewalks shall at least be provided along all streets used for pedestrian access to schools, parks, and shopping areas.

## 8.2 RESPONSIBILITIES

The builder on the lot is responsible for sidewalk construction. Where sidewalks are not directly related to a lot, the construction of sidewalks is the responsibility of the developer. A certificate of occupancy will not be issued until sidewalks required by the approved site plan are constructed and approved.

## 8.3 STANDARDS

Sidewalks shall be provided for any portion of a site which abuts a roadway. All sidewalks shall be in the public right-of-way. Sidewalk width will be as specified in Attachment 5-A of these Standards.

When a sidewalk abuts angled parking such that there will be vehicular overhang, the sidewalk shall be a minimum of six feet in width.

Curb ramps shall be provided wherever an accessible route crosses a curb as per the current ADA Accessibility Guidelines. Driveways shall also be constructed in accordance with current ADA Accessibility Guidelines in order for person in a wheelchair to negotiate the sidewalk.

Where there is adequate right-of-way, the construction of the sidewalk independent of the curb and gutter section is required on arterials and collectors, and recommended elsewhere. The area between the sidewalk and the back of the curb shall be appropriately landscaped.

Sidewalks in the Downtown Development District shall conform to streetscape recommendations set forth in the *Cheyenne Downtown Streetscape Design and Improvement Standards*, available at the Cheyenne MPO Office.

## 8.4 SPECIFICATIONS

Sidewalk construction and removal shall be in accordance with the current *City of Cheyenne and Board of Public Utilities Construction Standards and Specifications*. Curb ramps are illustrated in Standard Drawings of the specifications.



NOTE: The requirements of the Americans with Disabilities Act for sidewalks, curb ramps and protruding objects change from time to time. Persons designing or building sidewalks should verify with the City Engineer that they are using the current criteria.

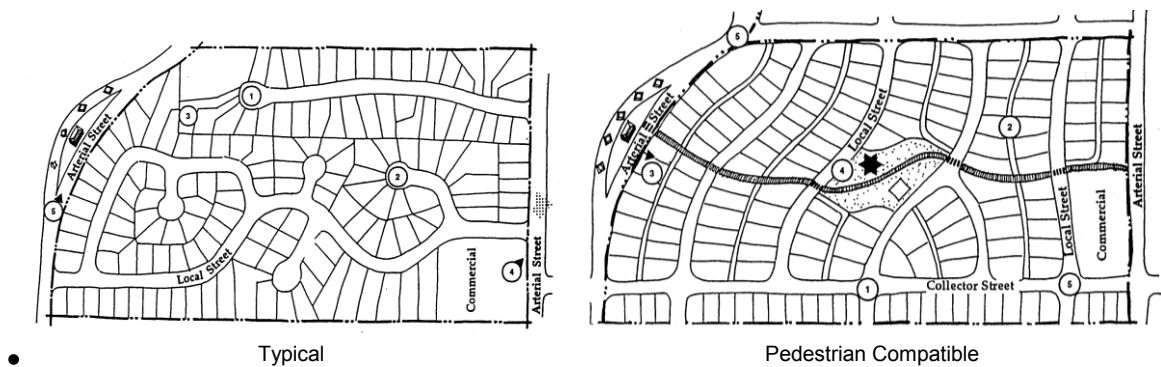
Sidewalks shall be a minimum of 4 inches thick, except where traversed by driveways, in which case the driveway thickness shall govern.

## 8.5 SITE DESIGNS GENERAL CONNECTIVITY REQUIREMENTS

The following sections identify general connectivity standards, features, and accommodations for pedestrians.

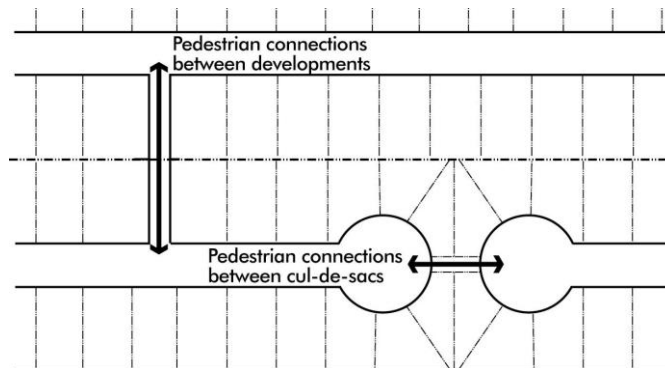
- Safe and convenient pedestrian access from the development site should be provided to existing designated trails or greenways located on or adjacent to the development site.
- On-site connections should be made at points necessary to provide direct pedestrian travel from the development to major pedestrian destinations located within the adjacent neighborhood(s), including but not limited to parks, schools, commercial districts, and transit stops.

**Figure 8-1. Residential Connectivity**



- In order to provide direct pedestrian connections to these adjacent destinations, the City may require additional sidewalks, walkways, or bike paths not associated with a street, the extension of a sidewalk from the end of a cul-de-sac to another street or walkway and/or connections between developments.



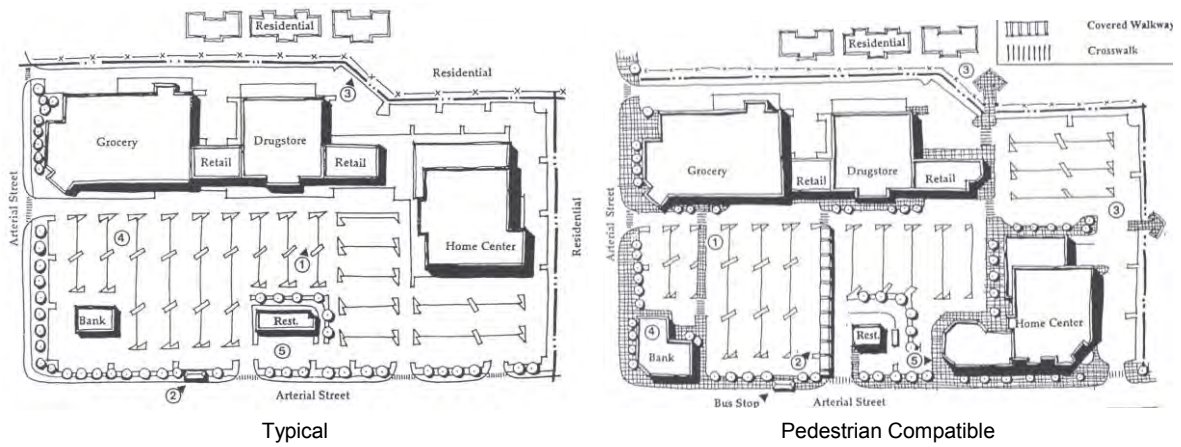
**Figure 8-2. Pedestrian Connections between Developments and between Cul-de-sacs**

- Paths, when built to the standards of the Greater Cheyenne Area Greenway and in 20' public right-of-way, will be maintained by City Parks and Recreation Staff.
- All commercial retail, office, industrial and residential apartment developments should provide for the following design elements:
  - Wide, safe front sidewalk,
  - Direct pedestrian sidewalks to surrounding properties, transit stops, and sidewalks along the surrounding street,
  - Major entry driveways away from front of stores where pedestrians must cross,
  - Canopies in front of stores to offer weather protection, and
  - Pedestrian plazas.

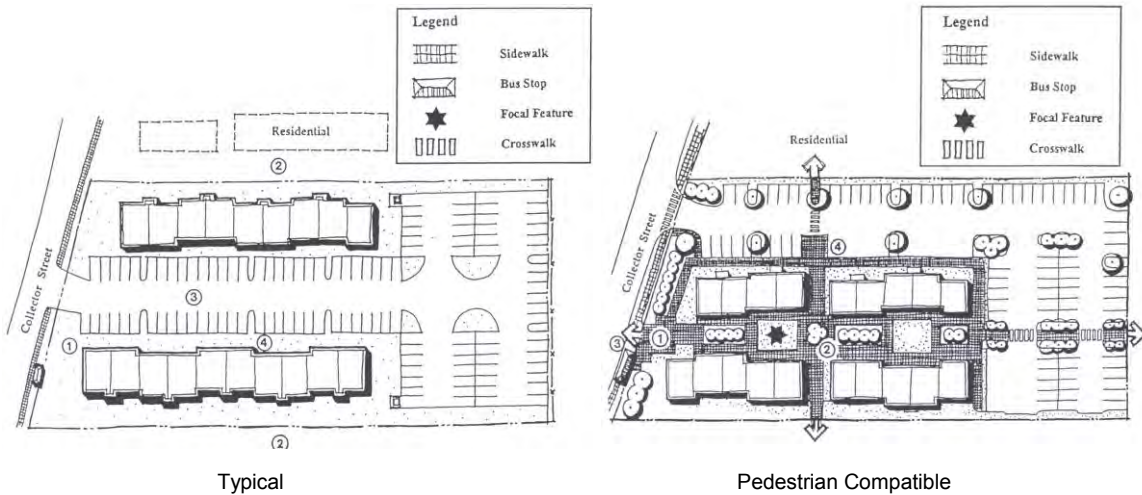
The following exhibits provide examples of typical developments as compared to developments with pedestrian-compatible improvements. These examples illustrate the same development yield for the site, illustrating that good pedestrian connection and development opportunities are compatible and efficient.



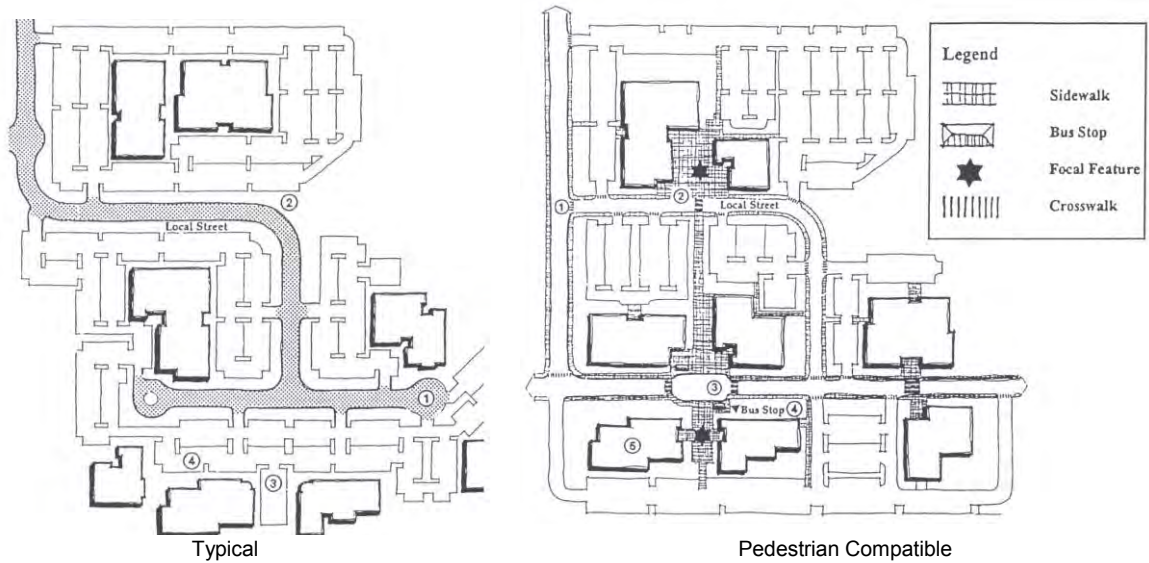
**Figure 8-3. Commercial Retail Shopping Center**



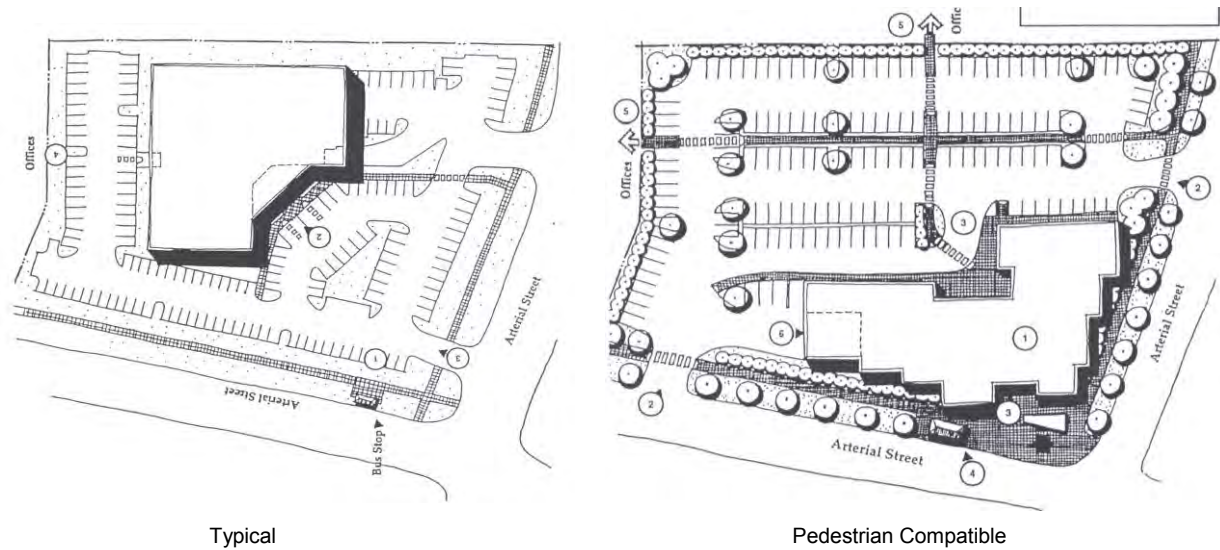
**Figure 8-4. Residential Apartment**



**Figure 8-5. Office Development**



**Figure 8-6. Office/Industrial Park**



- When necessary to assure the public's safety in using on-site or connecting pedestrian sidewalks, the City may require the developer to provide on-site or off-site pedestrian overpasses, underpasses, or traffic signalization. These connections are particularly important for providing pedestrian connections to transit stops, schools and parks.



- Each development should provide and contribute to an on-site system of pedestrian walkways. To the maximum extent feasible, on-site walkways should provide the most direct access route between the intended points of travel. Specifically, pedestrian connections should be provided to and between the following points:
  - The primary project entrance or entrances to each building housing a principal use,
  - Any sidewalk or walkway on adjacent properties that extends to the boundaries shared with the development,
  - Any public sidewalk system along the perimeter streets adjacent to the development site, existing or planned transit stations, shelters, stops and park-n-ride locations, and
  - On-site amenities such as landscape/hardscape, benches, pedestrian lighting.
  
- All on-site and public sidewalks, pedestrian walkways, or trails should have and maintain a minimum unobstructed pathway width of 4.5 to 6 feet as per Chapter 5 Street Design Cross Sections.

## 8.6 DESIGN FEATURES AND ACCOMMODATIONS FOR PEDESTRIANS

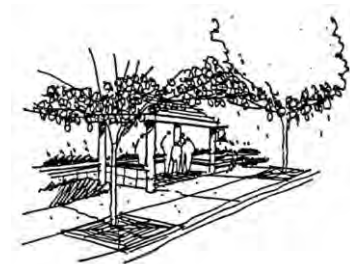
To the maximum extent feasible, the following guidelines should be incorporated in the design of all new developments to ensure safe and convenient pedestrian access into and within the site, with minimum potential for conflict with motor vehicles. These design elements complement the five measures of pedestrian level of service: directness, continuity, street crossings, visual interest and amenity and security.

### 8.6.1 Directness

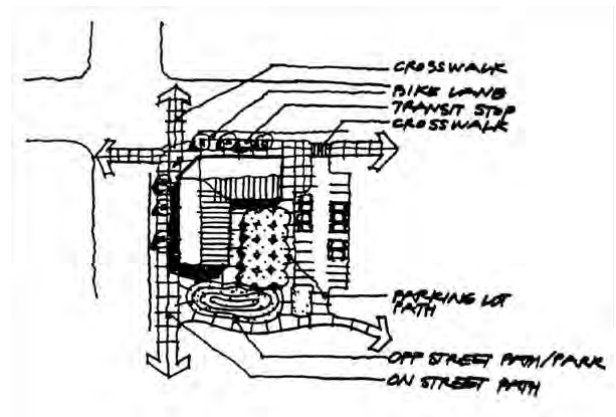
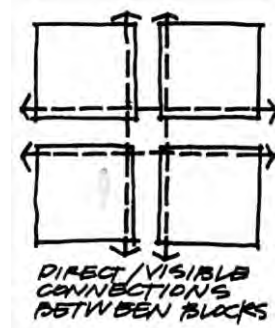
Developers should provide and encourage direct pedestrian connections by adhering to the following guidelines.

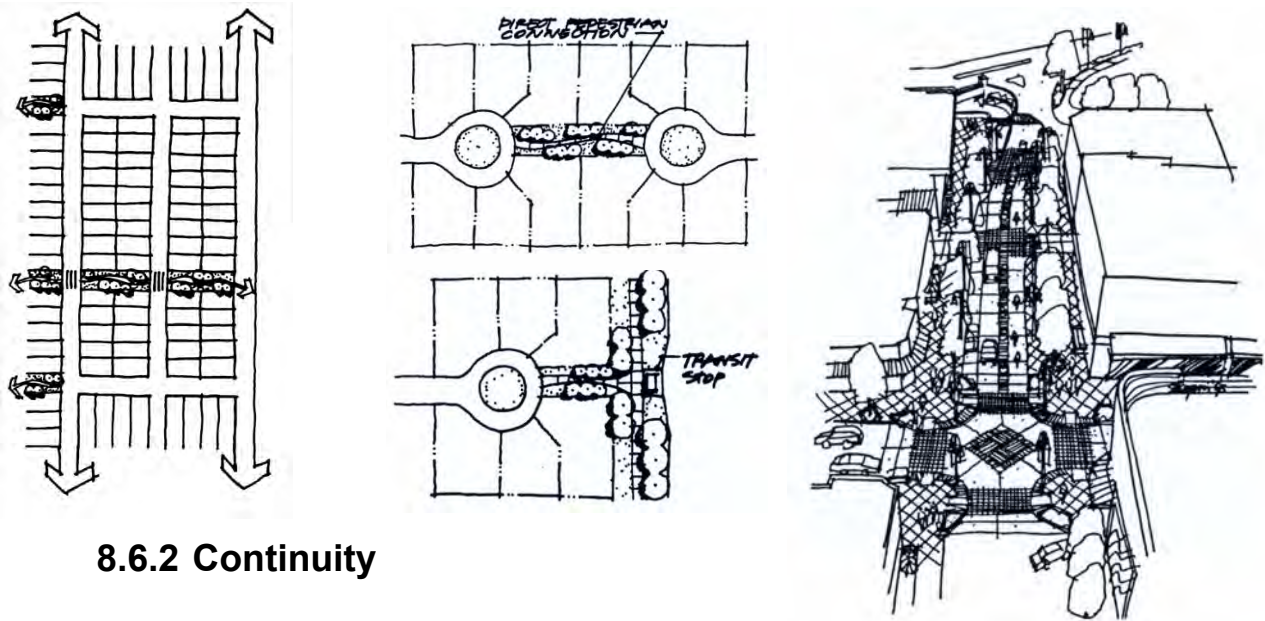
- Provide **direct pedestrian connections** to transit, schools, activity areas, and public facilities.
- Provide **visible connections** to key pedestrian destinations. Align and locate buildings, roadways, and open space so that pedestrians can see their destinations before arriving there.

Provide clearly marked building entries as viewed from the street. Entries from parking lots should be subordinate to those related to the street. Buildings should be sited in ways to make their entries or intended uses clear to pedestrians.



- The location and pattern of streets, buildings, and open space must facilitate direct pedestrian access.
- Use **light fixtures** to provide direct indication for pedestrian traffic. Light fixtures should be of shielded type with flat level lenses when appropriate.
- **Ensure** that sidewalk uses, such as outdoor cafes, in high-use retail pedestrian settings, are **compatible** with **direct pedestrian access** to buildings and other destinations.
- **Avoid barriers that separate** commercial developments from residential development and transit.
- **Locate buildings near street corners** to improve access to bus stop and provide pedestrian connections to neighboring activities.
- Establish appropriate lot patterns that provide direct and visible connection of sidewalks between blocks.
- Provide **direct connection between cul-de-sacs**.
- Ensure appropriate **width** of sidewalks and street crossings to facilitate continuous movement of **two people** comfortably walking **side by side with space for one to pass**.
- Provide clear and direct pedestrian **entries from the street**, not just from parking areas.
- **Minimize and remove** physical obstructions/barriers that impede direct pedestrian access. Provide access through walls, fences, and other obstructing features and elements.



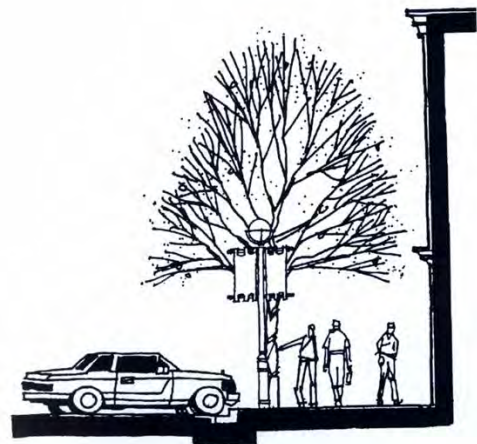


### 8.6.2 Continuity

**Link** schools, neighborhoods, parks, activity centers, and other destinations **with a continuous pedestrian network.**

- Provide a continuous and understandable pedestrian network by incorporating the following facilities, features, and elements:

- Continuous sidewalks on both sides of the street,
- A continuous alignment of building facades near the sidewalk,
- A consistent park strip between the curb and the sidewalk, and
- Consistent street trees.



- Use pedestrian-scaled furnishings, signs, landscaping, and facilities that appear as unified and themed entities in pedestrian networks, areas, and corridors.
- Ensure that sidewalk cafes and other uses/features of the sidewalk area support rather than obstruct a continuous



pedestrian network.

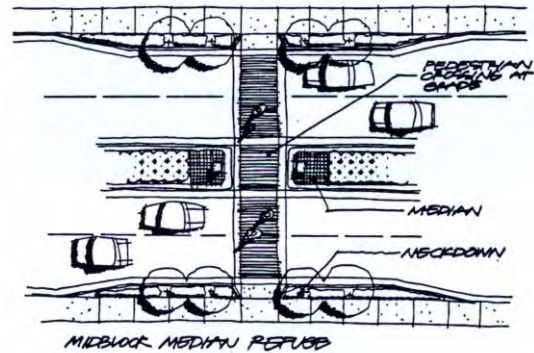
- Provide bridges and crossings over drainages, and other features that are major barriers to a continuous pedestrian network. Design these crossings to minimize out-of-direction travel.

### 8.6.3 Street Crossings

Develop safe, comfortable, and attractive street crossings.

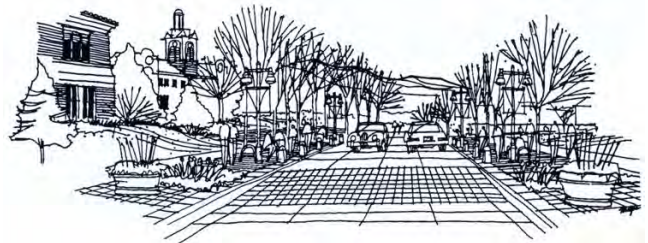
- Develop median refuges to improve the safety and comfort of arterial street crossings.
- Establish standardized street-crossing improvements that include crosswalks, lighting, median refuges, corner sidewalk widenings, sign, signals, and landscaping.
- Develop and design crosswalks that:

- Are well-marked and visible to vehicles,
- Fit and enhance the local urban design context and character, and
- Provide for safety for all age/ability groups.



- Develop civic improvements, including pedestrian-scale elements, landscaping, and sidewalk widenings, which improve the visibility and suggestion of pedestrians at street crossings.

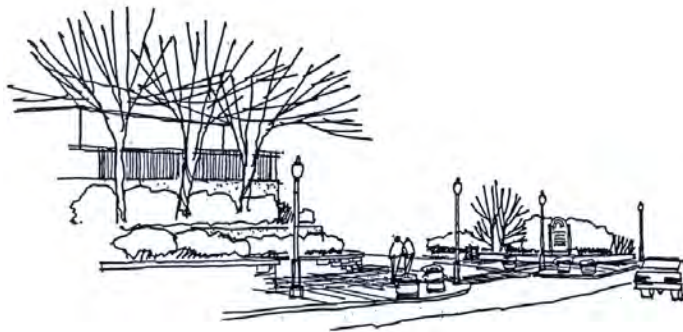
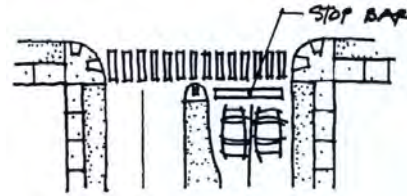
- Develop street-calming improvements to enhance the safety of street crossings.



- Ensure that signals, signs, and street markings have clear vehicular and pedestrian indications for street crossings.
- Ensure that street crossings are lit to reflect the patterns of use.
- Provide automatic pedestrian signal phases at high-demand intersections and pedestrian buttons at low-demand areas.



- Provide for an exclusive pedestrian signal phase to improve safety.
- Install stop bars on all approach legs at signalized intersections.
- Minimize curb radius to:
  - Reduce the speed of right- turning vehicles.
  - Reduce the distance for the pedestrian to cross the street.
- Locate lighting, signal and signage poles so they do not conflict with safe pedestrian circulation.
- Allow access for people of different abilities.

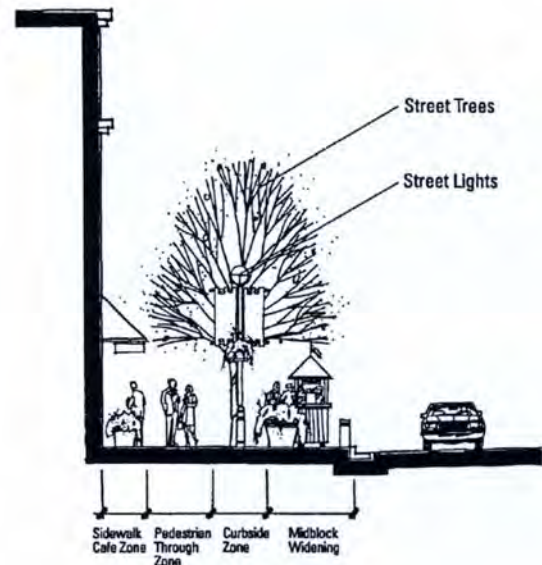


### 8.6.4 Visual Interest and Amenity

Develop comfortable and attractive pedestrian facilities and settings to make an interesting pedestrian network.

#### Pedestrian Facilities and Elements:

- Provide pedestrian-scale improvements that fit the urban context of the area. The color, materials, and form of pedestrian facilities and features should be appropriate to the area where they are located, as well as to the functional unity of the pedestrian network.





- Develop attractive improvements including landscaping, vertical treatments, sidewalk widenings, and furnishings which improve the character and pedestrian scale of the urban environment.
- Incorporate special design features, public art, and site details that can enhance the pedestrian scale of streets and become an urban amenity.
- Develop standardized lighting improvements which enhance the character of the pedestrian environment. Consider the following criteria:
  - i. Varied light spacing and heights to be compatible with site-specific issues.
  - ii. Poles to incorporate pedestrian-scale features such as banners, potted plants, etc.
  - iii. Attractive luminaries to provide an organized and unified appearance throughout the pedestrian network.
    - Use quality materials and design, which will minimize maintenance needs.
    - Maintain pedestrian facilities.
    - To enhance the character of the pedestrian environment and to encourage pedestrian activities along the sidewalks on key streets and corners, prohibit large surface parking lots in these locations.



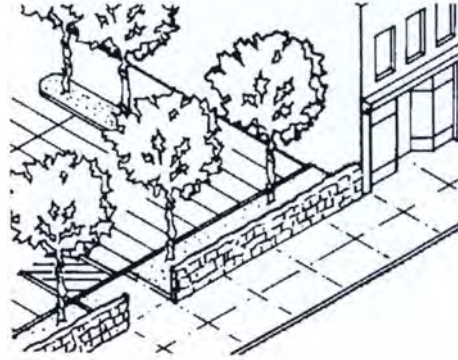
**Landscaping:**

- Develop a continuous edge of deciduous canopy street trees on both sides of the street. Select species that provide shade, shelter, scale and continuity for the pedestrian/ sidewalk environment.
- Develop attractive landscaping by considering the following criteria:
  - Reduce clutter of little plants and disorganized planting.
  - Establish patterns/spacing of street trees to provide formal visual rhythm, a linear edge to, and organization of the sidewalk area.
  - Use trees of similar height and structure to provide a unified image and cohesive character for feature corridors and districts.
  - Use specialty-landscaping themes to help distinguish districts.



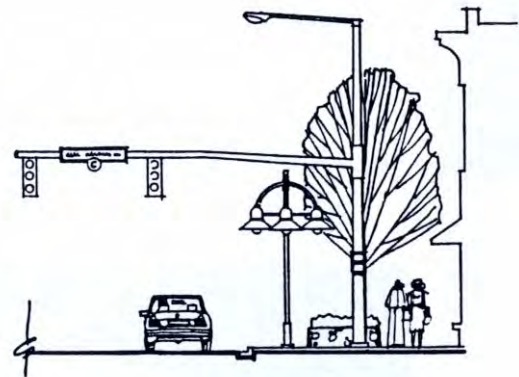
**Use landscaping selectively** to soften the harsh appearance of some buildings and parking lots at the sidewalk edge.

- Construct retaining walls of materials which reduce their apparent scale, like brick or stone, or treated architecturally to create an appropriate scale and rhythm. Hanging or climbing vegetation can soften the appearance of retaining walls. High retaining walls should be terraced down and include landscaped setbacks.
- Design attractive urban open spaces to have a distinctive and definite shape, enclosed by buildings on 2-3 sides so the area feels like an “outdoor room,” which is favored by pedestrians. These spaces must be located in the right places to be useful. Locate at intersections of 2 or more pedestrian routes.
- Screen blank building walls and retaining walls with landscaping, architectural features, or art to enrich the pedestrian environment.



**Buildings:**

- Encourage outdoor cafes and activity areas that provide pedestrian character and human scale to the sidewalk environment.
- Construct windows and other openings that will relieve blank walls, adding visual interest, improving pedestrians' sense of security, and introduce a human scale to building frontages.
- Provide human scale character to the street with appropriate building design and details.
- Incorporate building entry details like porches and recesses, occupied spaces like bay windows and balconies.



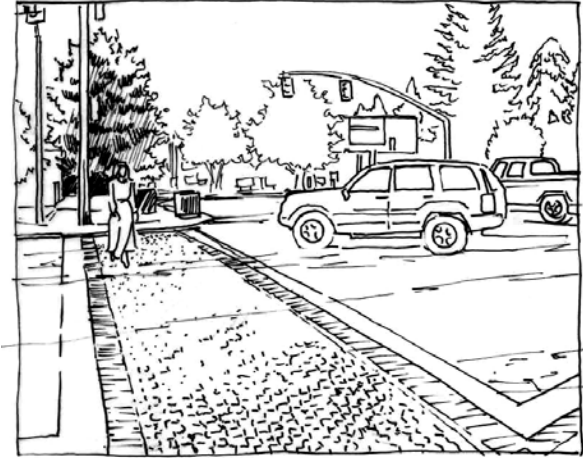
### 8.6.5 Security

- Develop secure pedestrian settings by developing a well-lit inhabited pedestrian network and by mitigating the impacts of vehicles.
- Streets should appear inhabited to the greatest extent possible. New development should accommodate human activity by providing balconies, terraces, and yards for residents' use and interaction. In mixed-use buildings, retail elements like large windows, canopies, and integrated signage add activity by enhancing the shopping experience. Entrances, porches, balconies, decks, and seating should be located to promote pedestrian use of the street edge by providing weather protection, security, and safety.
- Provide clear and direct lines of sight in pedestrian settings to increase feelings of security. Achieve this by minimizing use of shrubs, walls, berms, and other vertical features, which screen lines of sight to pedestrian facilities.
- Provide general illumination for security and visual safety of pedestrian areas and corridors.
- Use lighting fixtures to identify and highlight key pedestrian facilities and elements such as pedestrian intersections, paths, sidewalks, and entrances, while enhancing safety, and security. Provide a desirable and safe pedestrian environment by decreasing glare associated with tall, high intensity street fixtures. Provide indirect light to the sidewalk by lighting elements in the street environment such as trees, walkways, canopies, and entryways. All lighting should be down-directed and should not contribute to light pollution whenever possible.
- Develop physical buffers/edges between sidewalks and streets/parking lots.
- Avoid over-illumination of pedestrian areas, since these create, by contrast, shadowy areas nearby which may be threatening to pedestrians.



## 8.7 PEDESTRIAN CROSSINGS AT HIGH-USE PEDESTRIAN AREAS

The greater the number of lanes that a pedestrian must cross, the greater is the pedestrian's exposure to vehicles. In addition, wider streets tend to carry higher volumes of traffic and higher speeds. Intersections crossing multiple lanes require pedestrian enhancements. If it is determined that the traffic demand warrants additional through or turn lanes, then pedestrian mobility should be evaluated to determine whether additional pedestrian enhancements should be required to offset the traffic impacts on the pedestrian. The following are key intersection street-crossing design elements that should be considered in the guidelines for designing intersections.



**Number of Lanes:** The number of travel lanes to cross is a significant safety factor for a pedestrian crossing the street. When the number of travel lanes increases, it is generally in response to higher traffic volumes. In addition, the pedestrian is exposed for a longer period of time in crossing those additional lanes.

**Lane Widths:** Typically a travel lane is 12 feet. If the lane width is reduced, the time it takes a pedestrian to cross is also reduced. In addition, the narrower travel lane tends to calm or slow traffic, which is of benefit to the pedestrian.

**Parking Lanes:** When parking lanes along a street exist, the pedestrian walk-time to cross the street increases as the pedestrian must first cross the parking lane before beginning to cross the traffic lanes. At intersections, vehicles that make wider, higher-speed turns often use these parking lanes.

**Travel Speed:** Speed is a significant safety factor for a pedestrian trying to cross a street. Factors that might affect speed include minimum cross-street traffic, low number of access points, and geometric design. As mentioned previously, lane widths also contribute to travel speed.

**Crosswalks:** Enhancements to crosswalks, including color, stenciling, and pavement treatment should be considered for all major intersection entryways to mixed-use centers.

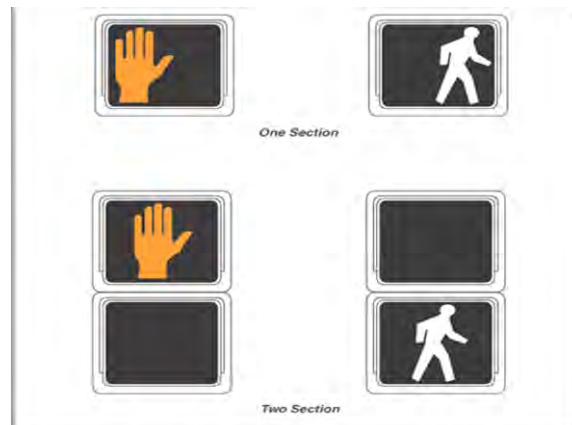
**Signal Indication:** Pedestrian signal heads should be included for all signalized intersections with crosswalks. The heads should be easily visible to the pedestrian.

**Lighting Levels:** The intersection should be well lit so the pedestrian is visible at night.

**Pedestrian Signal Indication and Pedestrian Buttons:** It would be optimal for all activity areas to have designated pedestrian signal phases. Pedestrian push-buttons should be required for all other intersections. The location of the push-button should be easily accessed and not require pedestrians to divert from their travel route. Signals without dedicated walk phases or push-buttons are not acceptable since the only way a pedestrian may ever get a green light is when an automobile on the side street activates the cycle.

**Countdown Signal Heads:** At signal locations that experience a high number of pedestrians, such as at transit stops or universities, where there have historically been a large number of pedestrian accidents, or any other area where pedestrians often cross during the “Do Not Walk” phase, countdown signal heads should be considered to provide additional information about how much time is remaining for being able to cross the street.

**Figure 8-7. Countdown Signal Head**



**Source:** <http://mutcd.fhwa.dot.gov/Signs/index.htm>  
Manual on Uniform Traffic Control Devices by FHWA, U.S. Department of Transportation

**Median Refuge Areas:** Painted medians offer little refuge other than getting out of a lane of traffic. Substantive raised medians of significant width with a cut-through provide some increase in security for the crossing pedestrian. For arterials with four or more lanes, a raised median refuge island should be designed for all intersections and mid-block crossings.

**Amenity:** In pedestrian districts, amenities should include such elements as signing and design features that strongly suggest the presence of a pedestrian crossing.

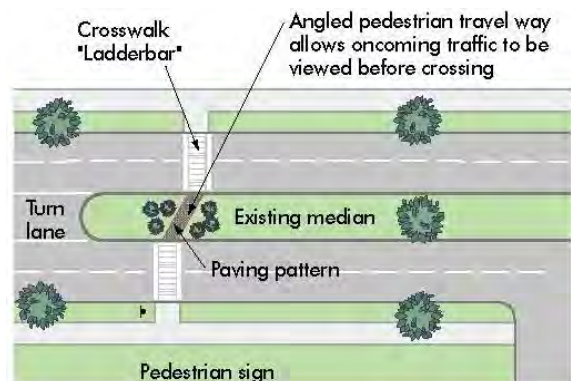
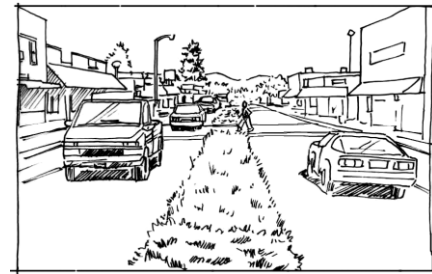


**Line-of-sight Distance:** Sight distance measures the unobstructed view between the motorist and the pedestrian. This can be a problem particularly when a motorist intends to make a left turn under the permissive left-turn phase, and it is difficult to see pedestrians around the opposing left-turn vehicle. Sight distance should be analyzed as a part of all intersection designs.

**Right Turn on Red (Left Turn on Red on One-Way Streets):** One of the greatest increases in pedestrian accidents has been associated with right turns on red lights. Research has determined that an extremely high number of drivers do not stop at the crosswalk before making their turn and, instead, continue on while looking to the left for approaching conflicting vehicles, not to the right for pedestrians in the crosswalk. Some jurisdictions have installed signs that do not permit right turns on red in specific places and circumstances. As part of the traffic study, locations that would experience high pedestrian volumes should be identified. Restricting right turns on red should be at the discretion of the City Traffic Engineer.

### 8.7.1 Mid-block Crossings

Mid-block crossings should be provided where there is an existing or potential pedestrian demand to cross at higher-volume roadways or streets where crossings are greater than 800 feet. Ideally, these crossings should be accommodated with a refuge island. Center crossing islands allow the pedestrian to deal with only one direction of traffic at a time and enable them to stop partway across the street and wait for an adequate gap in traffic before crossing the second half of the street. Where mid-block crossings are installed at uncontrolled locations (i.e., where no traffic signals or stop signs exist), crossing islands should be considered as a supplement to the crosswalk in order for the pedestrian to only cross one direction of traffic at a time.



Providing an angled pedestrian travel way across the median allows oncoming traffic to be better viewed before crossing, further improving safety.

## 8.7.2 Crosswalk Locations and Warrants

From a pedestrian-network perspective, extended distances between intersecting streets make it difficult for the pedestrian to cross the facility. Ideally, a system of grid streets that are around 400 feet in separation would be optimal. This distance would be appropriate for local streets within residential neighborhoods and activity centers. Spacing between intersections on primary arterials and secondary arterials might need to be longer to accommodate the higher volumes of traffic, storage for signals, and signal progression.

The location and frequency of crosswalks along primary arterials, secondary arterials, and collector streets need to be balanced between need, traffic flow, and cost. Whereas an optimum pedestrian environment would have crosswalks at all major activity areas and spaced at 400-foot increments, too great a frequency of crosswalks can create a situation where the typical driver becomes immune to the crosswalk, which might create a safety hazard. The following should be considered when considering locations for crosswalks:

All signalized intersections,

Locations that will attract high pedestrian volumes,

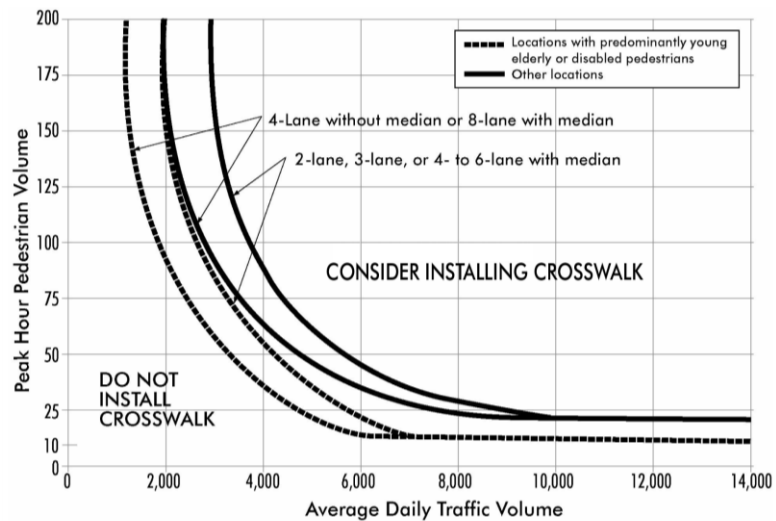
Locations for safety, such as crosswalks to school sites, transit stops or activity areas, and

Mid-block crossings at a minimum of 350 feet from adjacent intersection crosswalks.

In areas that have high volumes of pedestrians crossing a street, pedestrian crosswalks should be installed. The need for these crosswalks is a function of roadway type and pedestrian volumes. Roadway types from collector to primary arterial result in more travel lanes in which the pedestrian is exposed as he/she crosses, higher traffic volumes, and often increased traffic speeds. The following is a guideline as to where unprotected intersection and mid-block crosswalks should be considered based on street width/type and pedestrian volumes.



**Figure 8-8. Guidelines for the Installation of Marked Crosswalks at Uncontrolled Intersections and Mid-block Crossings**



Source: Smith and Knoblauch, AAA Transportation Research Record 1141 as reprinted in the ITE manual, Design and Safety of Pedestrian Facilities

### 8.7.3 Elevated Crosswalk to Refuge Island

In locations where a dedicated right-turn lane is needed as determined by the Traffic Impact Study, the design should consider a raised crosswalk at the height of the curb and a ramp for the vehicles to cross the crosswalk. This resulting design is similar to that of a 10-foot speed table with a six-inch up-ramp, table, and down-ramp.

**Figure 8-9. Elevated Crosswalk to Refuge Islands**



### 8.7.4 Bulbouts/Curb Extensions

In special applications, the City or developer may consider bulbouts to reduce

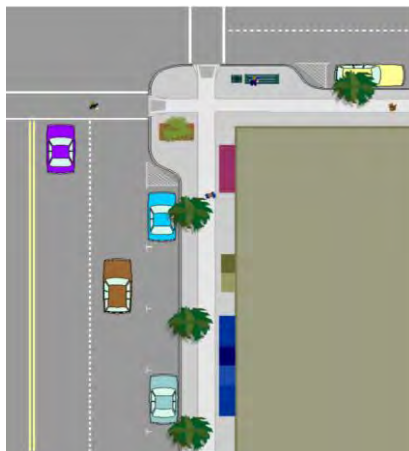




traffic speed and improve pedestrian safety. Bulbouts are simply intersection curb extensions, which extend past the parking lanes, but not into the bicycle or through lanes. The advantages of bulbouts are as follows:

- Bulbouts provide an entry or gateway statement into activity areas or where high volumes of pedestrians are present. As a motorist enters an area where a bulbout is present, the extension provides a clear difference between the arterial function and a local pedestrian activity area.
- Bulbouts enhance the visibility of the pedestrian because they physically permit the pedestrian to be located closer to the travel lanes, especially where parking is permitted, and allow the pedestrian to be seen more easily by the driver.
- Bulbouts constrict traffic flow through reduced lateral clearance. This reduction effects a reduction in travel speed along the corridors and improves safety for both pedestrians and vehicles.
- The bulbout changes the turning radius at the intersection, which reduces turning speed and vehicle and pedestrian conflicts.
- The extension of the bulbout reduces the time it takes pedestrians to cross from curb to curb. This reduction in pedestrian crossing time consequently reduces the time the pedestrian is exposed to moving vehicles.
- Bulbouts change the character of the intersection from automobile-dominant to pedestrian-friendly and multimodal-shared.
- Bulbouts can be an extremely positive visual and aesthetic enhancement. Features such as pedestrian lighting, planters, and benches create a focal point for pedestrian activity and change the character of the intersection from automobile to pedestrian. It should be noted that care must be taken when aesthetically enhancing bulbouts as such enhancements can block sight distances and create accident problems.



**Figure 8-10. Bulbout/Curb Extension**

### 8.7.5 Modern Roundabouts

The use of modern roundabouts as an alternative to conventional stop- and signal-control intersections is becoming increasingly popular in the United States. Studies conducted by the insurance industry have determined that these types of intersections result not only in a significant decrease in automobile traffic at an intersection, but also in a reduction in pedestrian accidents as well.

At a conventional intersection, the pedestrian faces four potential vehicle conflicts:

- Crossing movements on red (typically high-speed, illegal)
- Right turns on green (legal)
- Left turns on green (legal for protected-permitted or permitted left-turn phasing)
- Right turns on red (typically legal)

Pedestrians at roundabouts, on the other hand, face two conflicting movements on each approach:

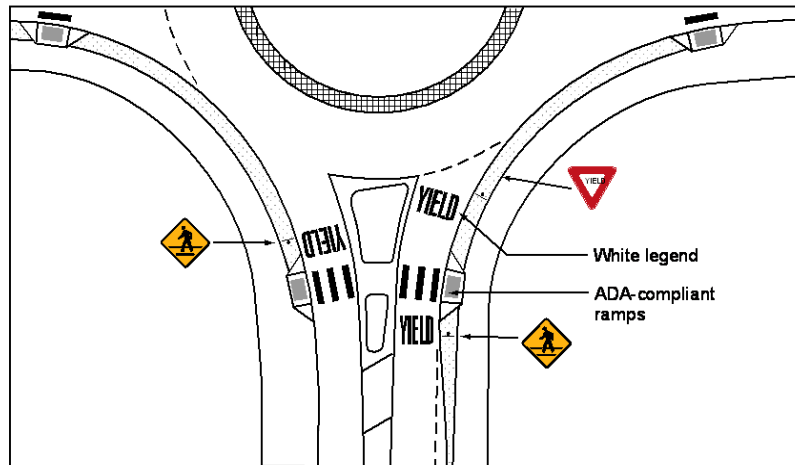
- Conflict with entering vehicle
- Conflict with exiting vehicle

The crossing of the roundabout is relatively simple. The pedestrian waits for a gap in traffic and crosses from the curb to the splitter island that provides protection, and then crosses from the splitter island to the far curb when a gap in traffic occurs. Crossing in two steps reduces the vehicle exposure in half for each segment. In addition, safety is improved because the vehicles are forced to go slower through the roundabout than at a conventional intersection. The modern roundabout pedestrian crosswalk treatment consists of:

- ADA compliant ramps
- Conventional crosswalk striping
- Raised splitter island pedestrian pass-through and refuge
- Pedestrian crossing sign
- Yield street markings
- Yield signs

Typically, the crosswalk is placed approximately one car length from the yield bar to permit the pedestrian to safely walk behind a vehicle that is awaiting a merge into the roundabout when traffic permits.

**Figure 8-11. Modern Roundabout Pedestrian Crosswalk Treatment**



\*All modern roundabouts shall be designed and constructed in accordance with *Roundabouts: An Informational Guide*, published by FHWA (Publication No. FHWA-RD-00-067)



# Chapter 9—Bicycle Facilities

## 9.1 PREFACE

Bicycles are a popular form of transportation in the Cheyenne area. Some bike routes have been signed; shared-use paths are established in some parks, in an extensive greenway system, and in some private developments. The safety of bicycle travel is enhanced by the proper design and location of bicycle facilities. Well-developed shared-use facilities are an increasingly important part of the Cheyenne area's transportation and recreation system.

The term *AASHTO Guide*, as used in this Chapter, refers to the *Guide for the Development of Bicycle Facilities* (American Association of State Highway and Transportation Officials, 1999. Washington DC, author.

## 9.2 CURRENT BIKEWAY PLAN

The current "On-Street Bicycle Plan" and "Greenway Development Plan" are on file at the Office of the Cheyenne MPO, 2101 O'Neil Avenue, Cheyenne, Wyoming. The plans are a part of the transportation plan for the area and are frequently updated.

## 9.3 RESPONSIBILITIES

Developers are encouraged to include bikeways in developments. Bikeways should be indicated on site plans and preliminary plats. Existing and future bike lanes and paths (per the current "On Street Bicycle Plan" and "Greenway Development Plan") within proximity of the development shall be identified, along with a description of how the resident or business employee would safely access these facilities. It is the responsibility of the developer to conform to the standards in this chapter and the requirements for traffic-control devices in the *Manual for Uniform Traffic Control Devices*.

## 9.4 BICYCLE PARKING STANDARDS

### 9.4.1 General

Convenient and secure bicycle parking is necessary at the destination end of a path or route. Inadequate bicycle parking facilities and fear of theft are major deterrents to bicycle transportation. A sufficient supply of effective bicycle parking requires a properly designed rack in an appropriate location for the type of use.



### 9.4.2 Design Standards

Bicycle facilities shall be designed in accordance with Chapter 2 of the *AASHTO Guide*. Traffic control shall be in accordance with the *Manual on Uniform Traffic Control Devices*.

Bicycle parking may be provided in floor-, wall- or ceiling-mounted racks. Racks at each location should:

- Hold the bicycle frame, not just a wheel.
- Allow use of a U-shaped shackle lock.
- Accommodate a wide range of bicycle sizes, wheel sizes and types.
- Be covered with material that will not chip the paint of a parked bicycle with which it comes in contact.
- Not have hazards, such as sharp edges.

To ensure bicycle parking will be used, the bicycle parking should be easy to find, convenient, and secure enough to reasonably safeguard against bicycle theft. Facilities can be located where cycles are already parked.

### 9.4.3 Type and Location

There are many types of bicycle racks and lockers available. Some are suitable for certain situations but not others, and some designs are unsuitable anywhere. There are two general categories of bicycle parking requirements:

- **Long-Term (Class I)** parking is needed where bicycles will be left for hours at a time. It requires a high degree of security and weather protection, with well-designed racks in covered areas, lockers, storage rooms, or fenced areas with restricted access.
- **Short-Term (Class II)** parking is needed where bicycles will be left for short stops. It requires a high degree of convenience (as close to destinations as possible). At least some short-term bicycle parking should be protected from the weather (a portion can be unprotected, since demand tends to increase during fair weather).

### 9.4.4 Visibility

Racks should be highly visible so cyclists can spot them immediately when they arrive from the street. A visible location also discourages theft and vandalism.



### **9.4.5 Security**

Adequate lighting and surveillance is essential for the security of the bicycles and the users. Bicycle racks and lockers must be well anchored to the ground to avoid vandalism and theft.

### **9.4.6 Weather Protection**

A portion of bicycle parking should be protected from the weather (some short-term bicycle parking can be unprotected since bicycle use tends to increase significantly during fair weather, as mentioned previously). This can use an existing overhang or covered walkway, a special covering, weatherproof outdoor bicycle lockers, or an indoor storage area.

### **9.4.7 Clearance**

Adequate clearance is required around racks to give cyclists room to maneuver and to prevent conflicts with pedestrians or parked cars. Racks should not block access to building entrances or fire hydrants.

### **9.4.8 Minimum Bicycle Parking Supply Requirements**

Table 9-1 below provides a guideline for parking spaces per land-use category recommended for new development or property which requires a change-of-use permit.



**Table 9-1. Recommended Minimum Bicycle Parking Requirements**

Type of Establishment	Minimum Number of Bicycle Parking Spaces
Primary or Secondary School	10% of the number of students, plus 3% of the number of employees.
College or University Classrooms	3% of the number of students, plus 1% of the number of employees.
Commercial—Retail or Office	One space per 10,000 sq. ft. of commercial space or 10% of the number of automobile spaces.
Sport and Recreation Center	5% of the number of automobile spaces.
Movie Theater or Restaurant	5% of the number of automobile spaces.
Industrial	2% of the number of automobile spaces.
Multi-unit Housing	1 space per 2 apartments.
Public Transit Stations	Varies, depending on usage.



# Chapter 10—Drainage

## 10.1 PREFACE

Land development increases the ratio of surface area impermeable to rainfall and snowmelt infiltration; therefore, disposal of surface water becomes increasingly important. As a result, drainage studies have become a requirement on almost every development project. The purpose of this Chapter is to provide guidance on drainage requirements.

## 10.2 RESPONSIBILITIES

Appendix A of the *Cheyenne-Laramie County Subdivision/Development Regulations* (City/County Development Office. Adopted: 7 July 2000, City; 1 August 2000, County) provides that:

The primary responsibility for the planning, design and construction of drainage improvements required in conjunction with land development shall be vested in the person or party who is developing the land. The City shall assume the responsibility of coordinating and reviewing proposals for drainage facilities to insure compliance with these regulations and with approved plans.

Compliance with these regulations and with approved plans remains the sole responsibility of the party developing the land and that party's designated professional representative.

## 10.3 REQUIREMENTS

For new developments of 20,000 square feet or larger in total site area, the applicant shall submit—along with the site plan—a detailed drainage study to the City Engineer for approval prior to the issuance of a Certificate of Review. Chapter 4 of *The Cheyenne Stormwater Management Manual* (City Engineer's Office. Cheyenne, WY: City of Cheyenne, April 1985) establishes the requirements for the drainage study.

For developments smaller than 20,000 square feet in total site area the following information shall be provided:

- A. The pre-development storm water run-off volume in cubic feet per second.
- B. The post-development storm water run-off volume in cubic feet per second.





- C. The volume in cubic feet of any proposed retention/detention area, if applicable.
- D. The method which will be used to retain/detain runoff, if applicable. The City Engineer may waive the requirement for a drainage study or runoff information upon determination of the following: that there are no potential drainage problems at the site, the project will not result in an increase in the impermeable area, and that the development is unlikely to create drainage problems.

## 10.4 STANDARDS

Design standards are set forth in the *Stormwater Management Manual* and the *Subdivision/Development Regulations*, and apply to City developments.

## 10.5 RELATED ORDINANCES, REGULATIONS, AND PUBLICATIONS

Several ordinances, regulations, and publications deal with stormwater management. The following is a summary:

*The Cheyenne City Code* provides for floodplain management, adopts Floodplain Management Regulations, and establishes the Surface Water Management Review Board. These sections and the adopted regulations regulate construction in flood hazard areas (Ordinance 3138, adopted 2 March 1994).

*The Cheyenne City Code* states all storm sewer construction shall be under the authority of the City Engineer (Chapter 13.16, Section 13.16.010).

*The Cheyenne City Code* states Contractors constructing storm sewer facilities shall obtain a sewer and water main facility contractor's license in accordance with the City Code (Chapter 13.16, Section 13.16.030).

*City-County Subdivision Regulations* covers drainage objectives, drainage policy and the Drainage Plan, floodway and flood fringe zones, land development, and design standards for rural and urban areas (Section 80.040, 58-59).

The Wyoming Department of Transportation publication, *Rules and Regulations and Policies for Accesses to Wyoming State Highways* (Cheyenne, WY: Wyoming Department of Transportation, March 2005), includes drainage provisions under the Design Requirements. Drainage in highway side ditches shall not be altered or impeded when drainage structures are required unless approved by the Department. The size of the opening and other design features shall be as directed by the Department, and the cost shall be borne by the grantee. The Highway Department implements this provision by requiring a drainage study when one is believed necessary, and will not issue the access permit until the drainage study is approved by the WYDOT Hydraulics Section.



*The Cheyenne Stormwater Management Manual* was issued by the City Engineer's Office. The purposes of the Manual are to identify basic engineering tools that may be used for drainage planning and to construct a systematic mechanism review sequence following existing procedures. The Manual is recommended for use in both hydrologic and hydraulic design. It includes guidance on determining a street's drainage capacity, the carrying capacity of cross pans, and information on storm sewers, inlets, outlets, and detention ponds.

*The City Drainage Project* study (States West Water Resources Corporation. *Original City Drainage Project*. Cheyenne, WY: author, January 1988) describes the storm sewer systems and subsystems, and indicates deficiencies in the existing storm sewer lines. The report includes recommendations for improvements and printouts of the data collected. The report also provides useful data on storm sewer facilities.

*The Cheyenne Drainage Master Plan* (CH2M Hill et al. Cheyenne, WY: author, November 1988) includes a plan to provide 100-year flood protection for high property-damage and life safety hazard areas.



# Chapter 11—Construction Zones

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## 11.1 PREFACE

This Chapter establishes the minimum standards to be used for the protection of the public and of workers during periods when repair or construction necessitates the partial or complete closure of public streets.

Construction or repairs in the street often create hazardous conditions which can result in traffic accidents if proper precautions are not taken. Good traffic control around work hazards in the street are deterrents to such accidents.

The average motorist understands standard traffic-control practices presented in the *Manual on Uniform Traffic Control Devices (MUTCD)*. Control of traffic in construction areas should utilize and be based on the *MUTCD*. When situations of unusual difficulty are anticipated, the City Engineer or the Director of Public Works should be consulted before construction begins.

## 11.2 RESPONSIBILITIES

On State Highways, The Wyoming Highway Department will review and approve work-area traffic-control signing and detour plans. These plans shall conform to the *MUTCD*.

On City streets, the contractor or public agency doing the work to maintain the work area is responsible for the following:

- A. Obtaining permits.
- B. Notifying and coordinating the work with all affected agencies and adjacent property owners.
- C. Installing, maintaining and providing required traffic-control devices.
- D. Removing or covering traffic-control devices when they are not warranted.
- E. Maintaining existing traffic-control devices, keeping them safe and in good condition.
- F. Scheduling and expediting the work to cause the least inconvenience to adjacent property owners and to the general public.



- G. Insuring that all employees working on the street wear clothing approved by the Federal Highway Administration. (Reflective garments should be used during nighttime conditions.)
- H. Patrolling the work area to maintain a safe, efficient and neat project.

### 11.3 APPLICATIONS AND PERMITS

Contractors, public agencies, utility companies and other persons working in the right-of-way shall obtain a street closure permit prior to restricting any traffic from any portion of a public street, alley or sidewalk. This permit is required for a partial or complete closure for a period of one hour or more.

Applications and permits for work on streets within the City are available from the City Traffic Engineering Office, Room 210, 2101 O'Neil Avenue, Cheyenne Municipal Building.

### 11.4 STANDARDS

Standards for traffic control in construction and maintenance areas are included in two publications:

*Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)*, US Department of Transportation, Federal Highway Administration. (current edition). Part VI addresses Traffic Controls for Street and Highway Construction and Maintenance Operations. Part VI includes information on fundamental principles as well as types of traffic-control devices used in construction or maintenance areas.

*Manual of Specifications and Procedures for Setting Up Traffic Control Devices in Construction and Maintenance Areas*, prepared by the Traffic Engineering Department, City of Cheyenne (current edition). This manual is intended to supplement the *MUTCD*, and includes other topics such as flagging and illumination of sites at night.

Work in construction zones shall comply with the relevant provisions of these manuals. Part VI of the *Traffic Control Devices Handbook*, U S Department of Transportation (current edition) augments the provisions for work-zone traffic control described in the *Manual on Uniform Traffic Control Devices*.



# Chapter 12—Traffic-control Devices

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## 12.1 PREFACE

The term traffic-control devices includes all signs, signals, markings, and devices placed on, over, or adjacent to a street or highway by authority of a public body or official having jurisdiction to regulate, warn, or guide traffic.

The purpose of traffic-control devices is to help insure highway safety by providing for the orderly movement of traffic—both motorized and non-motorized—and to provide such guidance and warnings as are needed to insure the safe and informed operation of individual elements of the traffic stream.

## 12.2 RESPONSIBILITIES

In a subdivision, the developer shall be responsible for the construction of the streets, including the traffic-control devices. The developer is also responsible for the installation of street signs.

When a development impacts a street or streets to the extent that a traffic signal or other traffic-control devices are necessary, the developer shall pay all or a proportionate share of the installation. Failure by the developer to pay his/her share may result in the City either limiting turning movements at the location to prevent unsafe movements from occurring or taking other actions to provide for safety at the location.

To facilitate striping of new streets or re-striping of existing streets necessitated by a development, striping plans shall be submitted as part of the construction plans for approval. The striping plans shall utilize the lane widths and other requirements set forth in the previous Chapters of these Standards.

The responsibility for traffic-control devices on State Highways is indicated in the policies of the Wyoming Highway Department contained in the *MUTCD*, cited below.

## 12.3 STANDARDS

Traffic-control devices, including signs and pavement markings which are intended for the purpose of traffic control shall conform to the specifications of the *Manual on Uniform Traffic Control Devices*.



### **12.3.1 Prohibition of Similar Signs**

No sign which in any way resembles or contains parts which resemble any traffic-control device shall be erected, altered, or maintained in any way for any purpose other than traffic control.

### **12.3.2 Installation of Signs, Marking of Hazardous Pipe Ends**

Stop or yield signs, warning signs, and advisory signs (as required by traffic volume) shall be installed as warranted in the *Manual on Uniform Traffic Control Devices*. Hazardous pipe ends shall be marked with a reflectorized vertical steel post.

### **12.3.3 Sign Construction Criteria**

Street name signs shall be furnished and installed at all street intersections of the subdivision by the developer. The street name signs shall be designed and installed in compliance with the current *City of Cheyenne and Board of Public Utilities Construction Standards & Specifications*.

### **12.3.4 Duplicate and Confusing Street Names Prohibited**

Street names which duplicate existing street names, or which are likely to be confused with existing street names, or which have difficult or exotic pronunciation, shall not be used. Street names shall not consist of initials. Street names shall not contain symbols other than letters of the English alphabet and Arabic numerals. Street names shall be subject to the approval of the City Planning Department. Street names in the City of Cheyenne shall also comply with *Cheyenne City Code*. Blank poles are prohibited.

## **12.4 EMERGENCY ACCESS LANES**

Emergency access lanes are required for most large commercial and industrial land uses, and other facilities such as hospitals, schools, and large apartment buildings. Requirements for emergency access lanes are established by the Cheyenne Fire Department. When such lanes are provided, the developer is responsible for the installation and maintenance of the necessary signs and markings to delineate the lanes and prevent parking in them. Signs, at spacings not more than 50', indicating "No Parking, Fire Lane," are required.



Notes:

Notes:



Approved as to  
form only:

*Charles J. Spiker*  
Date: 9-5-07

**ORDINANCE NO. 3778**

**ENTITLED:** "AN ORDINANCE AMENDING THE 2006 ROAD, STREET AND SITE PLANNING DESIGN STANDARDS, AS ADOPTED BY ORDINANCE NO. 3720, APPROVED JULY 24, 2006, TO PROVIDE FOR TECHNICAL CORRECTIONS AND CLARIFICATIONS AND TO RE-TITLE THE DOCUMENT AS THE 2007 ROAD, STREET AND SITE PLANNING DESIGN STANDARDS."

BE IT ORDAINED BY THE GOVERNING BODY OF THE CITY OF CHEYENNE, WYOMING:

Section 1. That Ordinance No. 3720 was approved by the Governing Body of the City of Cheyenne on July 24, 2006, and that Section 5 of said ordinance adopted a document titled "2006 Road, Street and Site Planning Design Standards," referred to and attached as Exhibit A to Ordinance No. 3720.

Section 2. That the City of Cheyenne/Laramie County Regional Planning Commission held a public hearing concerning proposed amendments to the Standards on July 16, 2007, which was appropriately advertised to the public, and that the Commission made recommendations pertaining to certain amendments to the Standards.

Section 3. That the Regional Planning Commission recommended approval of the amendments, referred to collectively as Technical Corrections and Clarifications, listed in Exhibit A attached with this ordinance, at its August 20, 2007 meeting.

Section 4. That the Technical Corrections and Clarifications for the City of Cheyenne 2006 Road, Street and Site Planning Design Standards, referred to and attached with this ordinance as Exhibit A, are hereby approved and, upon effectiveness of this ordinance, will be incorporated as amendments to the existing Standards with said Standards being re-titled as the "2007 Road, Street and Site, Planning and Design Standards."

Section 5. That future amendments or revisions to the 2007 Road, Street and Site Planning Design Standards shall be enacted by ordinance approved by the Governing Body.

Section 6. That this ordinance shall be in full force and effect upon final approval and publication.

FIRST READING:

September 10, 2007

SECOND READING:

September 24, 2007

THIRD AND FINAL READING:

October 8, 2007

(S E A L)

ATTEST:

*Jack R. Spiker*  
\_\_\_\_\_  
JACK R. SPIKER, MAYOR

*Carol A. Intlekofer*  
\_\_\_\_\_  
CAROL A. INTLEKOFER, CITY CLERK

Publish: Wyoming Tribune-Eagle  
October 12, 2007