



## TRANSPORTATION PLAN

### TRANSPORTATION PLAN ELEMENTS

#### Land Use and Transportation

Land use is made up of five characteristics: development density, mix of uses, urban form, urban design, and contiguousness of development (where developments are adjacent to each other and/or connected). All of these components have an impact on the number or length of trips on the roadway network. Density is the amount of development within a specific area. Higher levels of density are typically associated with availability of transit and a mix of uses.

A mix of uses can enable more activities to be served by shorter trips. Urban form is established through a pattern of land development and sets the basis for the transportation infrastructure. Urban design offers an opportunity to make properties more accessible for alternative modes, while providing aesthetic benefits. Contiguous development can increase density in an area and reduce travel.

Each of these components is critical to integrating land use patterns and transportation facilities as the strategic framework of the community.

A combination of the five characteristics of land use, as well as the concepts of block configuration, roadway spacing, and access management, if done well, can have a drastic impact on the transportation system operation and character of Casper.

## Mix of Uses

Modern zoning typically results in residential, commercial, and industrial uses not being located close to each other, which promotes the use of the automobile. This increases traffic and makes communities much less friendly for bicyclists and pedestrians. Zoning that promotes a mix of uses and interconnected development can create high-quality, walkable communities that preserve roadway and intersection capacity while increasing opportunities for alternative modes like bicycles and transit (**Figure 4-1**).

FIGURE 4-1. MIX OF USES

Encouraged Land Use Form



Discouraged Land Use Form

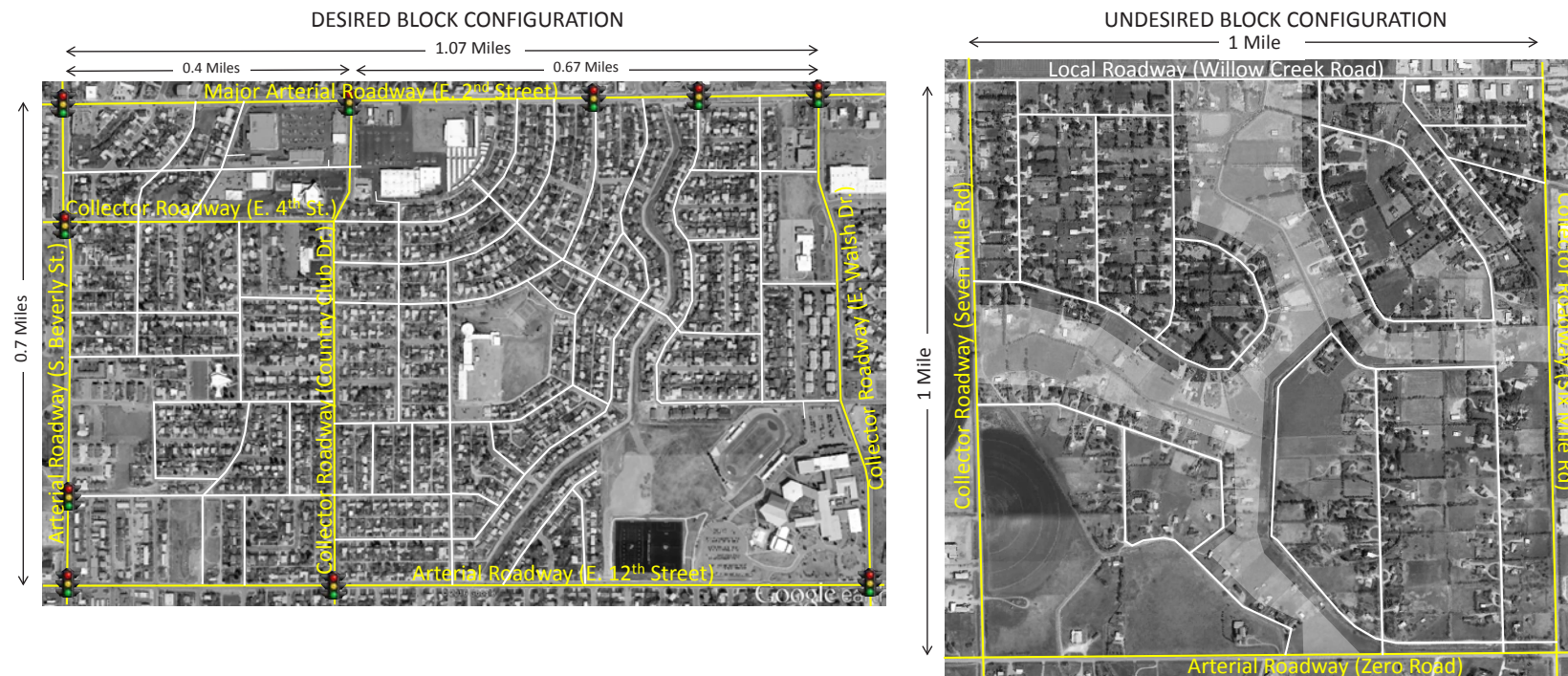


## Block Configuration/Interconnection

Block development, layout, and connectivity can significantly impact motorized and non-motorized traffic movement. When development within a block is comprised of multiple commercial or residential developments that are not connected, traffic from one side of the area must use the collector and arterial roads to access development on the opposite side of the area. Doing so decreases the capacity of the adjacent collector and arterial roads for regional traffic, while increasing congestion on those roads and intersections, making them less safe. Increased congestion can lead to constructing wider roads, creating greater divisions between blocks and neighborhoods, and longer distances for bicyclists and pedestrians to cross. This lack of connectivity also forces pedestrians and bicyclists to travel on high speed, high volume arterial and collector roadways, which often makes them feel less safe.

Conversely, providing a grid of connected local streets within a block, allows alternative ways for both vehicles and pedestrians to access nearby development within the area (**Figure 4-2**). Since this traffic does not have to use the arterial or collector streets, narrower arterial and collector roads are sufficient to handle traffic volumes, and shorten pedestrian and bicyclist crossing distances.

FIGURE 4-2. DESIRED AND UNDESIRED BLOCK CONFIGURATIONS



## Roadway Spacing/Block Size

Implementing appropriate roadway spacing is important to avoid having closely-spaced intersections, which increases delay and congestion. Conversely, having too wide of roadway spacing can force too much traffic to use collector and local roads (**Figure 4-3**, **Figure 4-4**, **Figure 4-5**). One-mile spacing is the accepted standard for urban arterial roadways with a supporting system of collector and local roadways.

Advantages of this urban street network configuration include:

- Local bus service on arterial and collector streets places residents within a reasonable (1/4 mile) walking distance of a bus line.
  - Continuity of collector streets provides an alternative to arterials and serves shorter trips.
  - A reasonable travel distance from a residence to a major street or arterial road reduces the vehicle-miles of travel (VMTs) on local streets and collectors, thereby improving the residential environment and reducing vehicle-pedestrian conflicts on local streets.
- Emergency response time may be improved, as less distance is traveled on local streets and smaller collector roads.
  - It allows for one half mile spacing of signalized intersections, which can provide more efficient traffic flow.
  - It allows local streets to be designed with curves, traffic calming elements, etc. to actively discourage cut-through traffic, while supporting connectivity and continuity of movement for pedestrians and bicycles.

FIGURE 4-3. ROADWAY SPACING, WEST CASPER

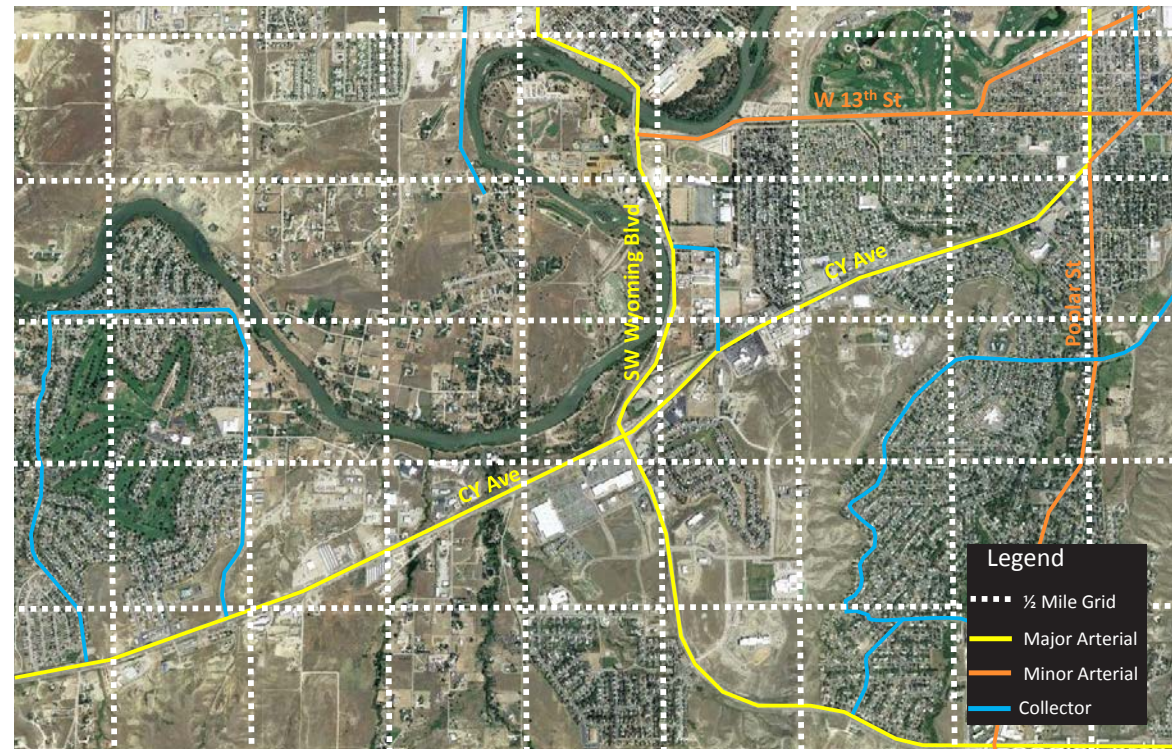


FIGURE 4-4. ROADWAY SPACING, CENTRAL CASPER

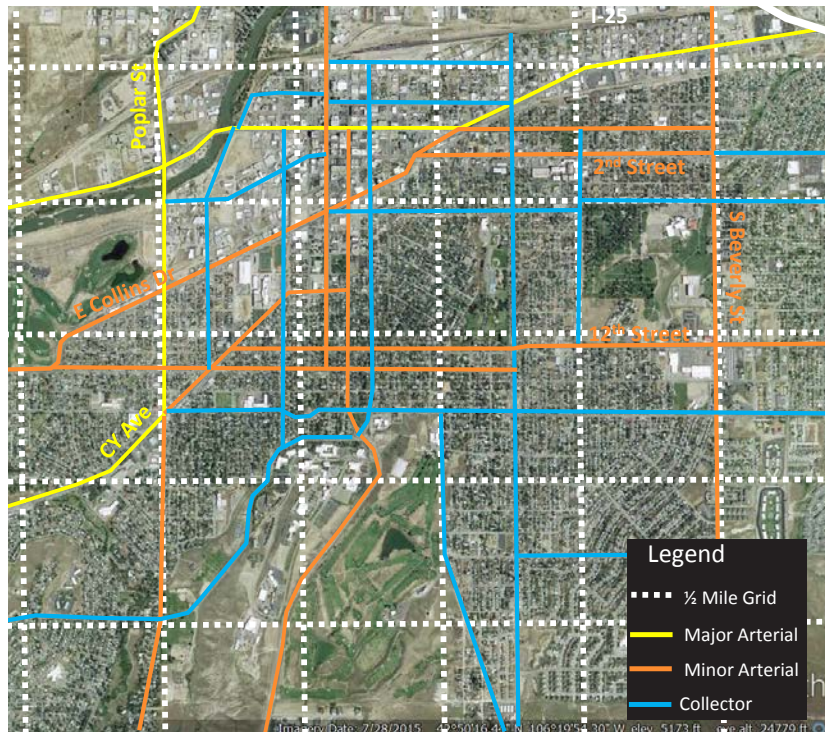


FIGURE 4-5. ROADWAY SPACING, EAST CASPER



Central Casper reasonably complies with these recommended standards with multiple arterial and collector roadways with a system of local roads to support the network and provide alternatives for vehicles, bikes and pedestrians to travel to their destination. However, block sizes within East and West Casper, where new development is occurring, are much larger, and portions of those areas are developing without the support of enough arterials. As a result, higher levels of traffic congestion can be seen in these areas.

## Access Management

Access management is the management of driveways and access points from roads into and through sites. A good access management policy considers the following:

- intersection spacing
- driveway spacing
- cross access/interconnected parking lots
- turn lanes
- medians

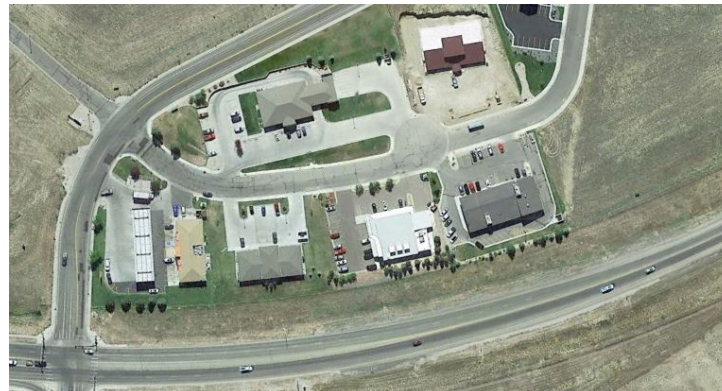
A minimal number of adequately-spaced access points preserves the capacity of the roadway and provides smoother traffic flow on arterial and collector roads. Limiting the number of driveways can also reduce the number of traffic accidents.

FIGURE 4-6. ACCESS MANAGEMENT

Avoid



Promote



### WEST BELT LOOP

An MOU between Casper, Mills, and the County established standards for the expected development to the west. Based on existing issues recommendations and standards for access management and street spacing were established. In August of 2015, Casper, Mills, and Natrona County agreed to the implementation of the West Belt Loop Land Use, Connectivity, and Access Management Plan. This plan was created by the Metropolitan Planning Organization (MPO) to establish standards for the expected development to the west of Casper, particularly along the West Belt Loop.

The example in **Figure 4-6** shows developments on the left that were not required to interconnect, and have individual driveway access. By enforcing these two concepts, development would start to look like the pictures on the right. Support of these two concepts allows for vehicles to stay within the site to access multiple uses, reducing the

impact on the adjacent roadway.

Similarly, medians restrict turning movements on a roadway, which limits the number of conflict points, and preserves the smooth flow of traffic. Medians can retain the flow of traffic, but are not ideal for smaller, lower speed roadways where access to individual parcels is a higher priority.



## AUTO TRIP REDUCTION

The concepts of block configuration, roadway spacing, driveway and intersection spacing, mix of uses, and interconnected development all play a role in reducing the length of vehicle trips and number of vehicles on the roadway. The benefits of reducing automobile trips are numerous and can include the following:

- reduced roadway maintenance costs;
- fewer accidents;
- smaller roadways and intersections (lower construction costs);
- decreased air pollution and carbon emissions;
- fewer conflicts for bicyclists and pedestrians; and
- increased physical activity.

## Auto Trip Reduction

The majority of trips taken in Casper are done by automobile, primarily because of a lack of options for alternative modes. During the summer, biking and walking are potential options for shorter trips, but may require biking in the vehicular travel lane, or walking in grass where sidewalk segments are missing. Year-round, transit exists as an option if origin, destination, and time of travel fall within the location and duration of existing transit routes.

In order to take advantage of the benefits of reduced automobile trips, it is recommended that the improvements listed in the Casper Area Trails, Path, and Bikeway Plan and the Casper Area Transit Development Plan be implemented.

## TRANSPORTATION PRIORITIES

During a transportation workshop, held on December 8, 2016 at Casper City Hall, participants discussed the various elements of a roadway cross section and identified which elements they would prefer on streets of varying functional classification and right-of-way width. Based on input from the participants, the most important elements are sidewalks, bike lanes with appropriate buffering, and trees to mitigate the wind. This is consistent with the Generation Casper transportation survey where residents of the Casper Metro Area stated that “construction of sidewalks, bike lanes, pathways and trails” is their top transportation priority.

## Bike and Pedestrian

The use of alternative modes has become a priority for citizens in the Casper Metro Area, but the existing bike/pedestrian network and the existing Code are not representative of those desires. The City should establish standards for the bike/pedestrian network, including:

- minimum design standards and avoidance of obstructions (i.e. drainage grates and electric poles within the sidewalk/path; sidewalk width and conditions; crosswalks; signage; minimization of roll-over curbs; etc.),

- bike/pedestrian requirements for residential and non-residential development (i.e. sidewalk connectivity through the site, bike parking spaces, etc.),
- typical block sizes, and
- complete street cross sections.

With alternative modes becoming a focus across the country, guiding documents could also include a toolbox of options for innovative solutions to improve the existing network, such as buffered bike lanes, bike boxes, and protected intersections.





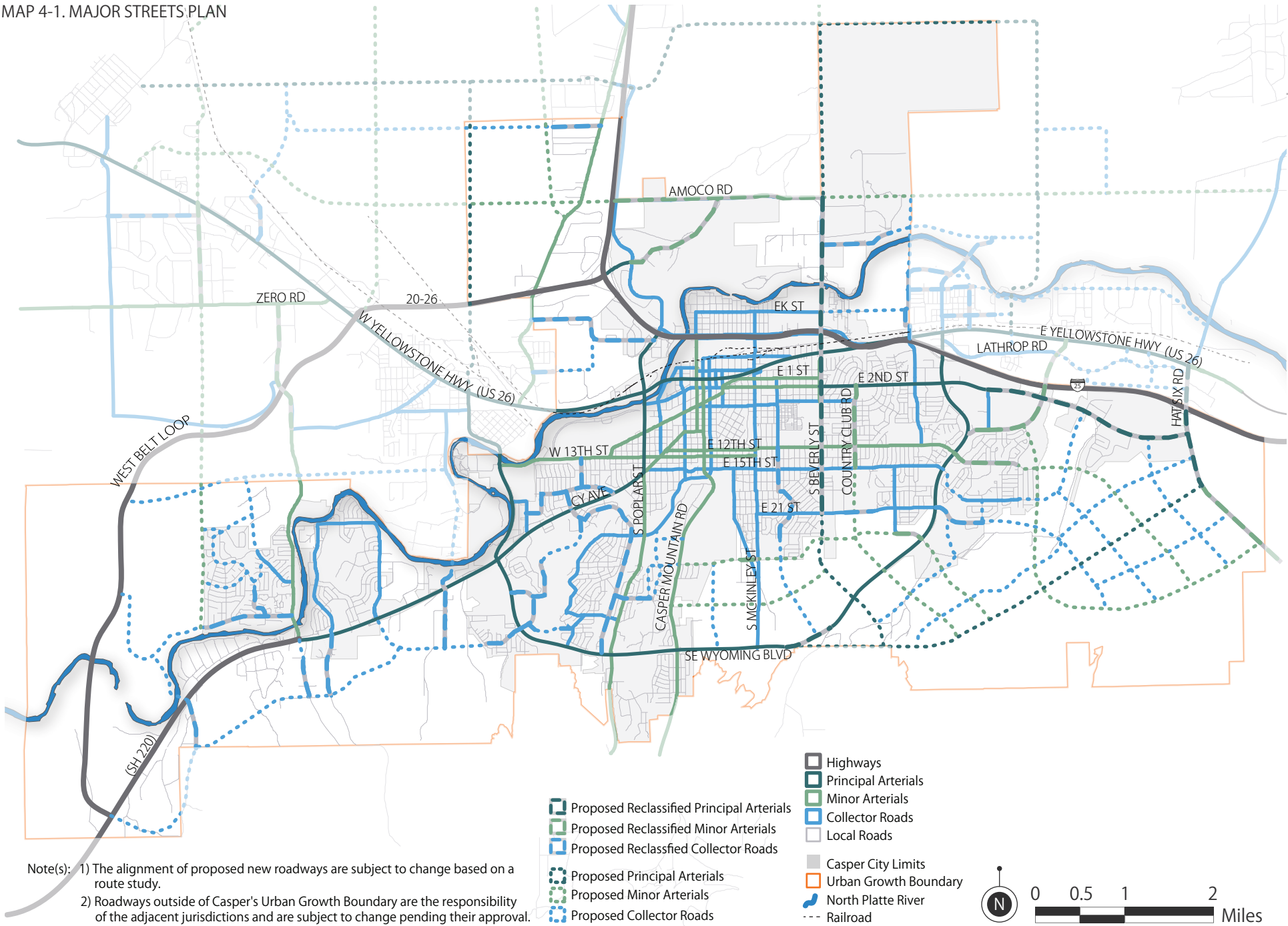
## MAJOR STREETS PLAN

The Major Streets Plan (**Map 4-1**) serves as a guiding map for development of an adequate and properly-spaced network of major roadways (i.e., arterials and collectors) for buildout of Casper within the Urban Growth Boundary (UGB), and to help achieve desired land use patterns and the benefits described in the previous section. It shows where right-of-way should be preserved and provides a framework from which planners can evaluate future infrastructure needs when funding opportunities arise. A Major Streets Plan is especially beneficial when updating the Capital Improvement Plan (CIP) in order to prioritize future planned roadway projects.

Some of the proposed roadways on the Major Streets Plan follow/extend existing roadways, while others are more conceptual in nature, because no roadways or development patterns currently exist in those areas. This generality will allow for minor variation in actual locations and alignment due to steep grades and roadway impacts, that are determined during the completion of a route study. Alternatively, if the conceptual roadway crosses a large parcel, City staff and developer could negotiate the final alignment during development of that parcel, provided adequate spacing standards are followed.

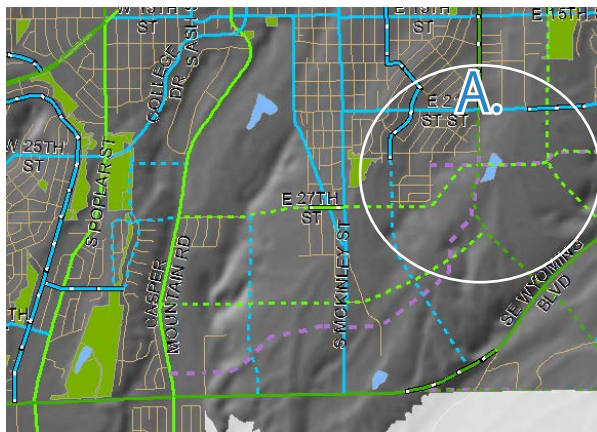
The Major Streets Plan does not identify future local roads since the location of those roadways will be determined by type and density of development to be constructed. However, in order to achieve a transportation network that supports the associated development, it is recommended that the concepts of land use, block configuration, roadway spacing, and access management be fully enforced.

MAP 4-1. MAJOR STREETS PLAN

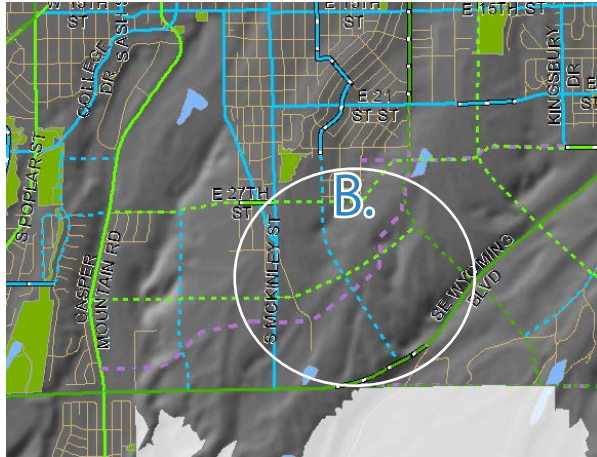


Note(s): 1) The alignment of proposed new roadways are subject to change based on a route study.  
2) Roadways outside of Casper's Urban Growth Boundary are the responsibility of the adjacent jurisdictions and are subject to change pending their approval.

The placement of proposed new roads and reclassification of major roadways in the Major Streets Plan were recommended after considering existing uses, proposed new uses, topography, water infrastructure, public input, and the concepts of roadway spacing and signal spacing identified above. These recommendations also considered the proposed new roadways shown in the MPO's adopted Long Range Transportation Plan (LRTP) and the anticipated access points identified in the West Belt Loop Land Use, Connectivity, and Access Plan. While some of these roadways deviate from the LRTP proposed roadways, this was done to increase connectivity and maintain spacing standards. More specifically, there are three locations that deviate from the LRTP and the justification for modifying each is shown and outlined below. The LRTP roadways are shown in purple, and should be replaced with the proposed roadways shown in blue and green.

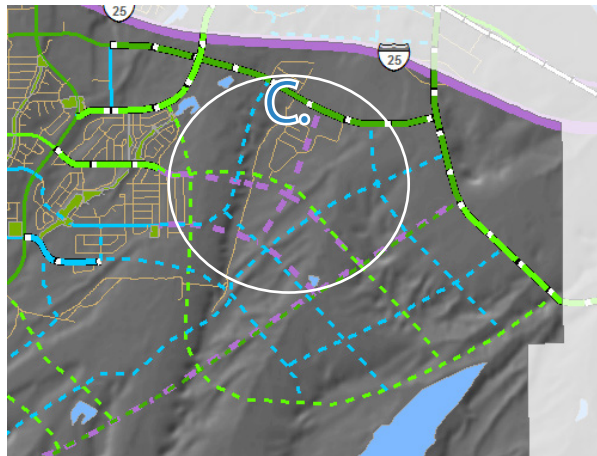


A. The smaller LRTP roadway circled terminates at Sagewood Avenue, a local road. In the interest of adding an additional east/west roadway, and in order to maintain traffic flow on the major roadways, the Major Streets Plan shows this road continuing to the south, then west, to connect to McKinley Street and Casper Mountain Road, which are collector and principal arterial roadways. Because major roadways have higher traffic volumes and speeds than local roads, it is not desirable to have an arterial terminate at a local road.



B. The extension of Beverly Street as shown in the LRTP terminates approximately 660 feet north of the extension of the Casper Mountain Road/SE Wyoming Boulevard intersection. Considering the length and functional classification of this proposed extension, it is anticipated that traffic volumes at the intersection of the Beverly Street extension with Casper Mountain Road will warrant a signal sometime in the future. Placing signals closer than one-half mile can cause challenges with maintaining traffic flow, and accommodating turn lanes and vehicle queues. Therefore, the proposed extension was shifted north to a point approximately one half mile north of the Casper Mountain Road/SE Wyoming Boulevard intersection in anticipation of future signalization.

The consideration of arterial and collector roadway spacing in the vicinity of the Beverly Street extension resulted in additional proposed north/south and east/west roadways. Similar to the reasons for shifting the west end of this roadway, the east end of this road was shifted south, to evenly space the Beverly Street Extension with adjacent major intersections.



C. With the expansion of the Urban Growth Boundary (UGB) in the southeast portion of the city, the Major Streets Plan incorporates a new future roadway network for this area. While creating a grid at one half mile spacing, it was also important to consider the extension of the existing east/west roadway network. In the LRTP, both the Twelfth and Twenty-first Street extensions connected to the SE Wyoming Boulevard extension, and a third road connected those two roads to Second Street. This configuration would result in all of the east/west traffic terminating at two points along the SE Wyoming Boulevard extension, which would likely experience congestion challenges in the future. With the proposed new configuration, there are more major roadways to distribute future traffic. The new configuration is consistent with the recommended arterial and collector spacing (one half mile) in anticipation of potential future signal spacing. Also, both the SE Wyoming Boulevard extension and Hat Six Road have parallel routes to accommodate shorter trips within the area.

## Typical Cross Sections

Other factors that determine how a road functions are the elements within it. Roadway cross sections will always include vehicular travel lanes, include sidewalks, and sometimes include a median, bike lanes, street trees, and/or street lights within the rights-of-way (ROW). A road with wider travel lanes will generally have vehicles traveling at higher speeds, while a road with wide sidewalks, street trees, and street lights, will create a feeling of safety and comfort for pedestrians.

Casperites have stated a desire to have bike- and pedestrian-friendly streets. However, few streets in Casper have bike lanes, and many of the sidewalks are narrow, and/or are right next to the vehicle travel lane. Some examples of typical cross sections are shown in **Figure 4-7**.

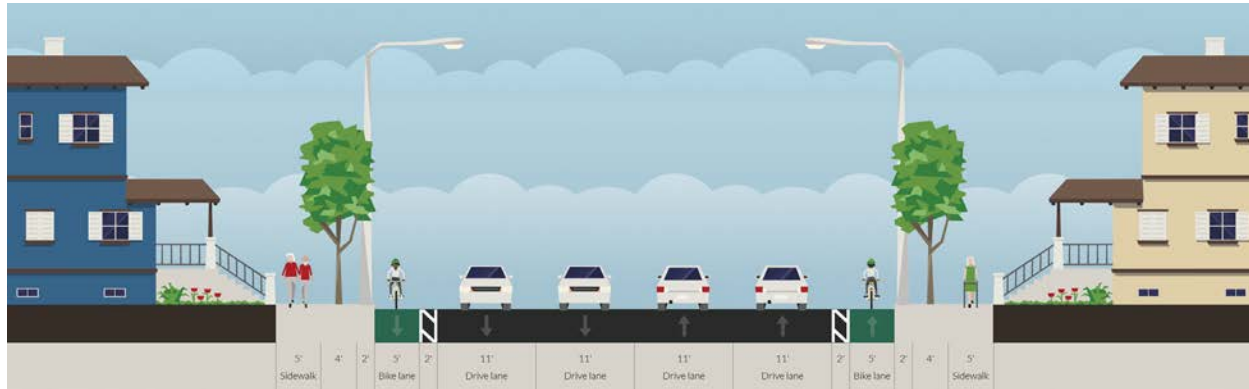
FIGURE 4-7. TYPICAL CROSS SECTIONS

**Arterial Roads: 4-Lane, 100' ROW:** It is preferred that bike lanes be provided on the roads parallel to the arterial; however, if that is not feasible, the buffer should be more significant than on smaller, lower speed roads. If bike lanes can be provided elsewhere, the median could be widened to allow for larger refuge islands when vehicles are turning onto or off of the arterial.

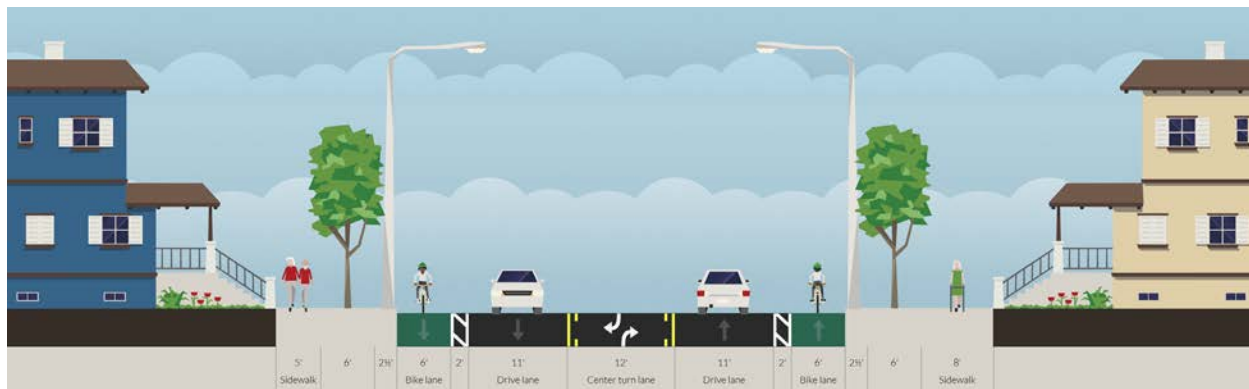


### Collector Roads:

**4-Lane, 80' ROW:** In the case of a four-lane collector roadway, the minimum sidewalk, tree planting area, bike lane/buffer spacing shown above, should be provided.



**2-Lane, 80' ROW:** If on-street parking is desired, the center two-way, left-turn lane can be removed and parking placed between the travel lane and the bike lane. Serving as a buffer for the bikes, the on-street parking would allow the bike lane to be reduced to four feet and still be comfortable for the average biker, thereby allowing for on-street parking on both sides of the road.



### Local Roads:

**Residential, 50' ROW:** Workshop participants stated the need for on-street parking in residential areas. With 28' of pavement, on-street parking could be provided on one side of the road. Alternatively, providing wider travel lanes and no striping would allow for less formal on-street parking that could occur on both sides of the street, as long as cars alternate and provide a continuous 20' pavement for traveling vehicles.

**Commercial, 60' ROW:** Local roads within commercial areas should provide pedestrian amenities. On-street parking may be appropriate where traffic volumes are lower. A dual turning lane reduces the impacts to flow of traffic.



**Urban Center, 80' ROW:** The road should be developed with pedestrian and bicycle amenities to encourage a thriving retail atmosphere. Roads within the urban center should off-set the need for surface parking lots by providing on-street parking. If wider sidewalks were needed to allow for outdoor seating, the tree planting areas may be reduced or the parking on one side of the street could be eliminated.

