Memorandum

To: Jeff Wiggins and Sreyoshi Chakraborty

From: Rory Renfro, Kim Voros and Drew Meisel, *Alta Planning + Design*

Date: May 11, 2011

Re: Working Paper #5: Bikeway System Gap Analysis

The purpose of the Bikeway System Gap Analysis is to identify gaps in the existing on-street bikeway and Greenway system. These gaps range from spot gaps (e.g., a location where bike lanes drop upstream from an intersection) to system gaps (areas where no bikeway facilities exist).

Analysis Methodology and Data Considerations

The gap analysis was developed based on field visits and existing available data provided by the City of Cheyenne and Cheyenne Metropolitan Planning Organization (MPO). The review identifies gaps based on the existing and funded on-street street network, shared use paths and greenways. Roadways with wide shoulders that are suitable for cycling but are not officially part of the existing bikeway network are noted as system gaps in several locations. Facility quality was generally discussed in other parts of the existing conditions and needs analysis, though several exceptions were made for arterial and collector roadways designated as shared roadways. Information on existing bikeways was not available for Warren Air Force Base when this study was conducted.

Defining Bikeway Gaps

Bikeway gaps exist in various forms, ranging from short "missing links" on a specific street or path corridor, to larger geographic areas with few or no facilities at all. Gaps are organized based on length and other characteristics and may be classified into five main categories:

- Spot gaps: Spot gaps refer to point-specific locations lacking dedicated facilities or other treatments to accommodate safe and comfortable bicycle travel. Spot gaps primarily include intersections and other areas with potential conflicts with motor vehicles. Examples include bicycle lanes on a major street "dropping" to make way for right turn lanes at an intersection.
- Connection gaps: Connection gaps are missing segments (one-quarter mile or less) on a clearly defined and otherwise well-connected bikeway. Major barriers standing between destinations and clearly defined routes also represent connection gaps. Examples include bicycle lanes on a major street "dropping" for several blocks to make way for on-street parking, or a freeway standing between a major bicycle route and a school.
- Lineal gaps: Similar to connection gaps, lineal gaps are one-quarter to one-half mile long missing link segments on a clearly defined and otherwise well-connected bikeway.
- Corridor gaps: On clearly defined and otherwise well-connected bikeways, corridor gaps are missing links longer than one-half mile. These gaps will sometimes encompass an entire street corridor where bicycle facilities are desired but do not currently exist.

- System gaps: Larger geographic areas (e.g., a neighborhood or business district) where few or no bikeways exist would be identified as system gaps. System gaps exist in areas where a minimum of two intersecting bikeways would be required to achieve the target network density.

Gaps typically exist where physical or other constraints impede bikeway network development. Example constraints may include bike lanes "dropping" at an intersection to provide space for vehicle turn lanes, narrow bridges on existing roadways, severe cross-slopes, or potential environmental impacts associated with wider pavement widths. Traffic mobility standards and other policy decisions may also lead to gaps in a network. For instance, a community's strong desire for on-street parking or increased vehicle capacity may hinder efforts to install continuous bicycle lanes along a major street. Figure 1 presents a theoretical diagram illustrating the five gap types described above.

In some cases, a formalized bikeway itself may represent a gap despite its status as part of a designated network. This condition typically occurs when a corridor (often a major street) lacks the type of bicycle facilities to comfortably accommodate a broader user base, including infrequent or less confident cyclists. Other examples include roadway corridors lacking formalized facilities (e.g., bike lanes) where conditions such as higher vehicle speeds and volumes would otherwise justify greater separation between motorists and cyclists.

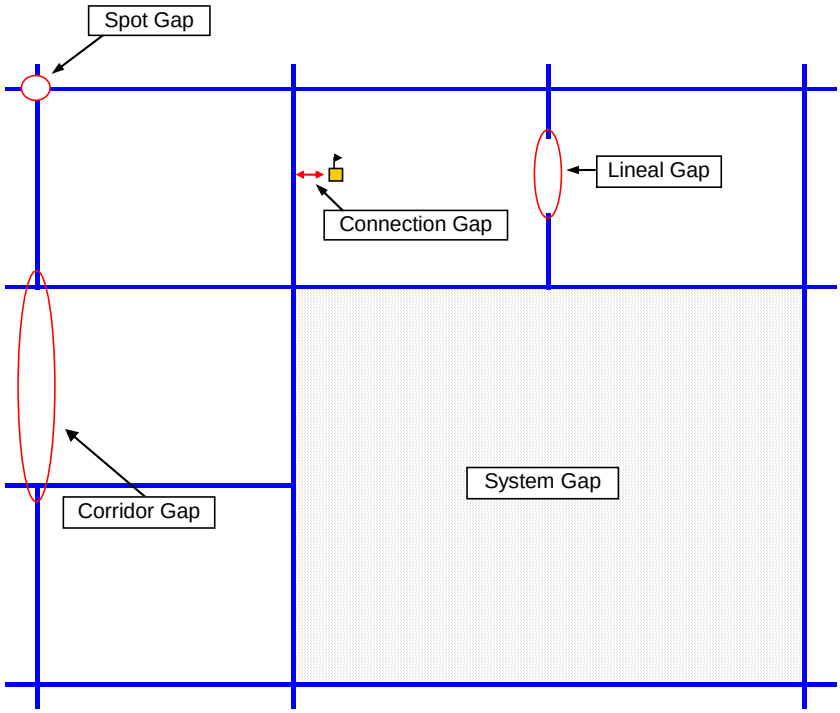

Figure 1. Diagram of Bikeway System Gap Types

Identifying and Addressing Bikeway Network Gaps

Identifying and addressing network gaps can be considered a multi-step process that will last throughout the planning development of the *On-Street Bicycle Plan and Greenway Plan Update*.

This process includes the following steps:

Step 1: Locate and identify network gaps

Step 2: Identify appropriate range of gap closure measure types

Step 3: Determine appropriate location for gap closure measures

Step 4: Determine preferred gap closure measure for each identified gap

Gaps are identified in the Existing Conditions and Needs Analysis project phase (Step 1); the process will be completed during network development.

Findings

The Cheyenne Metropolitan Area already includes many elements of a good bicycling system; however, there are gaps throughout the system that can create uncomfortable cycling conditions. The network gaps shown on Map 1 were identified through field investigation, review of existing planning documents and bikeway system data, analysis of crash history, and feedback from the community through public events.

In general, the best system connectivity exists in the downtown area north of Interstate 80, where the denser street grid and lower traffic speeds and volumes allows cyclists a greater range of route choices. The facilities in this area consist mainly of shared roadways that provide cyclists with a system of established, intermittently signed routes. Despite the relative connectedness of the downtown area, access leading into and out of the central business district is more challenging due to corridor gaps on Pershing Boulevard and Lincolnway, as well as system gaps east of Holliday Park and smaller lineal gaps on East 18th Street, Morrie Avenue, and W 27th Street. Of note are the corridor gaps along Warren and Central Avenues, though existing parallel bicycle routes are available on Pioneer Avenue and Carey Avenue. If developed, these two north/south roads would lead to the existing Evans Avenue Greenway north of downtown and provide greater access to the neighborhoods north of Lions Park. Smaller connection gaps exist west of downtown, between the South Cheyenne Greenway and Parsley Boulevard. A narrow bridge on Parsley Boulevard over Interstate 80 is a spot gap that further restricts north-south travel in this area. A significant impediment to travel west of downtown is the general lack of facilities along and across the I-25 corridor. This has been identified as a corridor gap along most of the corridor, in addition to other corridor gaps identified at important crossing points, such as Missile Drive, and Central Avenue.

Just east of the central business district, between Holliday Park and Hot Springs Avenue, is a large system gap. The density of residential units in the Fairview Heights and Mountain View neighborhoods and network indicate that this area could serve a number of cyclists safely and comfortably on low-speed and low-volume roadways. Several spot gaps exist (e.g., Hot Springs Avenue and Nationway) which restrict travel into and out of this area. Development of a bikeway network and improvements at spot gaps could enhance access between the commercial core and the residential neighborhoods to the east.

One of the main east/west arterials through Cheyenne, Pershing Boulevard, is a long corridor gap in the bikeway network. Pershing Boulevard is one of the few uninterrupted east/west connections through the city. Given the lack of continuous parallel streets to Pershing Boulevard, there are few alternative options available to improve connectivity along this main thoroughfare. Instead, it is likely that Pershing Boulevard or alternative corridors will need to be analyzed further to assess its potential for safe bicycle travel as Pershing Boulevard. Future roadway reconstruction plans do call for extension of the existing eight-foot side path between Converse Avenue and Concord Road, which will enhance bicycle connectivity in the corridor. For travel farther east beyond Pershing Boulevard, Dell Range Boulevard offers the greatest possibility for direct access. However, this potential is limited by a long corridor gap leading up to the archer interchange at I-80.

System gaps blanket the northeast and eastern portions of the Cheyenne Metropolitan Area. Land use in these areas consists mainly of residential housing that is less dense than older neighborhoods, like the Avenues. During the development of several of these neighborhoods (e.g., Mustang Ridge), the installation of bicycle facilities was not a city priority. These neighborhoods do benefit from the existing Dry Creek Greenway and several existing on-street facilities (e.g., Van Buren Avenue), though corridor gaps, such as the one on Dell

Range Boulevard west of College Drive, restrict the system's overall connectivity. Several lineal gaps to the south in the Sun Valley neighborhood further isolate this area.

South of Interstate 80 the street network is less dense. However, the area does boast a comparatively high number of existing greenway trails that provide access to nearby schools (Goins Elementary, Johnson Junior High, and South High School). Filling in a number of connection gaps between Parsley Boulevard and Cribbon Avenue could greatly improve access to these trails from existing neighborhoods. Several of these gaps will be filled with greenway links that are funded, with construction scheduled to occur in the next two to three years.

The Cheyenne Metropolitan Area has a number of roadways with wide shoulders that can accommodate bicycle traffic that are both unmarked and unsigned. Of special note is the area south of Interstate 80 where the inclusion of wide shoulder lanes along College Drive and Campstool Road strongly enhances connectivity of the bikeway network. Other important roadways include Yellowstone Road and Prairie Avenue, both north of the central business district. Formalizing these facilities with signing and marking will enhance overall bicycle system connectivity.

There are a number of spot gaps along existing bicycle facilities. Spot gaps typically occur in the Cheyenne Metropolitan Area at intersections with heavy volumes of right turning traffic or slip lanes that do not require vehicles to stop (e.g., Missile Drive at W 24th Street, Morrie Avenue at E 1st Street, College Drive at Dell Range Boulevard, Pershing Boulevard, 12th Street and South Greeley Highway), along roadways with numerous driveways (e.g., South Greeley Highway, Pershing Boulevard and Lincolnway), and at locations where the on-street facility or greenway do not extend to the intersection. In many situations, application of minimal treatments will result in enhanced system connectivity. Additional spot gaps are marked at locations identified by community members as "problem areas" during public events.

Conclusion

The Bikeway System Gap Analysis identifies opportunities to improve bikeway facility connectivity throughout the Cheyenne Metropolitan Area. The information provided in this analysis will be used to aid in identifying potential priority bikeway network improvement corridors and intersection upgrades. Furthermore, it illustrates that taking advantage of existing wide shoulders on several key roadways—through their incorporation into the bikeway network—would provide substantial benefits to bicyclists. Additionally, Cheyenne's cyclists could benefit from upgrades to the network of designated shared roadways. These and other improvements can help to increase bikeway connectivity and access to downtown, neighborhood parks, greenways, schools, and the other key bicyclist destinations.

Schools

Funded Greenway

Existing Greenway

Existing Shared Use Trail

Existing Bike Lane

Existing Shared Roadway

Urban Development Boundary

Park

MPO Boundary

City of Cheyenne

Note: "Wide shoulders" are not part of the official bikeway system

MPO Boundary

0 1.25 2.5 Miles

Map 1. Draft Bicycle System Gap Analysis

Cheyenne On-Street Bicycle Plan and Greenway Plan Update

Source: Cheyenne - Laramie County Cooperative GIS Program

Date: May 2011

Spot Gap

Connection Gap

Lineal Gap

Corridor Gap

System Gap

0 0.5 1 Miles