

# Pedestrian-Bicycle Transition Plan



## Chapter 2

# Inventory & Self-Evaluation

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The  
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Group



### PROCESS

ACHD conducted extensive pre-planning as part of the Pedestrian-Bicycle Transition Plan to ensure the inventory of existing sidewalk and curb ramp facilities was both cost-effective and yielded highly accurate and reliable data for further analysis.

Title II of the ADA requires that ACHD evaluate its services, programs, policies, and practices to determine whether they are in compliance with the nondiscrimination requirements of the ADA. This section describes the data collection process and resulting inventory of sidewalk and curb ramp facilities within the urban areas of Ada County, all

critical elements as part of ACHD's *Self-Evaluation*. The inventory and self-evaluation is described in these sections.

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### GPS-BASED DATA COLLECTION

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#### *TECHNIQUES AND TECHNOLOGY*

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Rather than manually record the sidewalk and curb ramp system with laptop computers or hard-copy tablets, ACHD and The Transpo Group evaluated and confirmed the use of hand-held Global Positioning System (GPS) units to electronically record the necessary system inventory. The GPS data collection method enabled ACHD to eliminate the steps of hard data transcription,

formatting and re-entry for later GIS analysis.

A number of GPS products were considered. It was decided that the *Trimble GeoXT*

provided ACHD with the best hardware and software product to (1) quickly develop and deploy a detailed data collection routine that addresses critical system components, (2) record field data with very high geo-positioning accuracy, and (3) quickly learn and adapt ACHD's data collection capabilities for a variety of agency needs.





The GeoXT's units were equipped with *Terrasync* software for maximum data collection capacity and geospatial GPS accuracy. The *Pathfinder Office* software provided ACHD the ability to efficiently develop the sidewalk/curb ramp inventory template, called a "Data Dictionary," accurately transfer files between desktop computers and the GeoXT units, and accurately *correct* raw data for higher GPS accuracy – a process known as *differential correction*. Once the field data was transferred and geo-corrected, Pathfinder Office also provided routines to convert the raw data into geographic information system (GIS) coverage files. Following the raw data conversion, ACHD was then able to assimilate the sidewalk/curb ramp data with other GIS data in its

GIS program. The Transpo Group used the GIS data inventory for later self -evaluation and planning priority analysis (see *Chapter 3 – Methodology for Prioritizing Pedestrian Projects*).

### DATA DICTIONARY DEVELOPMENT

The Transpo Group developed and tested the Data Dictionary file for use with the GeoXT's to record the necessary sidewalk and curb ramp information. The Data Dictionary was developed to collect pertinent information to identify the location and characteristics of sidewalk and curb ramp features, focusing on ADA-compliance (see ADAAG<sup>1</sup>) based on characteristics fully defined and summarized in *Designing Sidewalks and Trails for Access*.<sup>2</sup> GPS data line features

(GPS recordings for beginning and end points of each line) were developed to record the location of missing sidewalks and the characteristics of existing sidewalks. GPS point features were developed to record the location of missing curb ramps and the characteristics of existing curb ramps. The Data Dictionary was also developed with pre-set scoring values for all sidewalk and curb ramp attributes. These pre-set values helped expedite the GIS evaluation in later steps of the study. **Table 2-1** briefly summarizes the characteristics targeted in the inventory. **Appendix B** includes a full summary of the sidewalk and curb ramp features and attributes that were defined in the Data Dictionary for GPS data collection.

**FIELD APPLICATION**

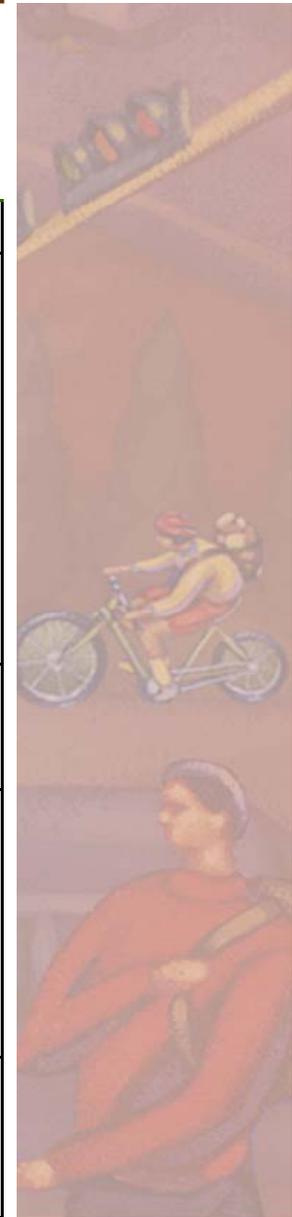
**STAFFING**

The pre-planning for the inventory also included developing estimates of staffing and staffing costs, based on assumed total walking speed, which accounted for data collection time and travel time of the walking inventory. ACHD’s existing GIS inventory of street centerline miles was used to calculate the total staffing need. It was assumed that data collection teams of two staff would walk each side of the street in the inventory effort.

Having no relevant example to determine specific staffing needs for the data collection, ACHD and

**Table 2-1: GPS Data Inventory - Features and Characteristics**

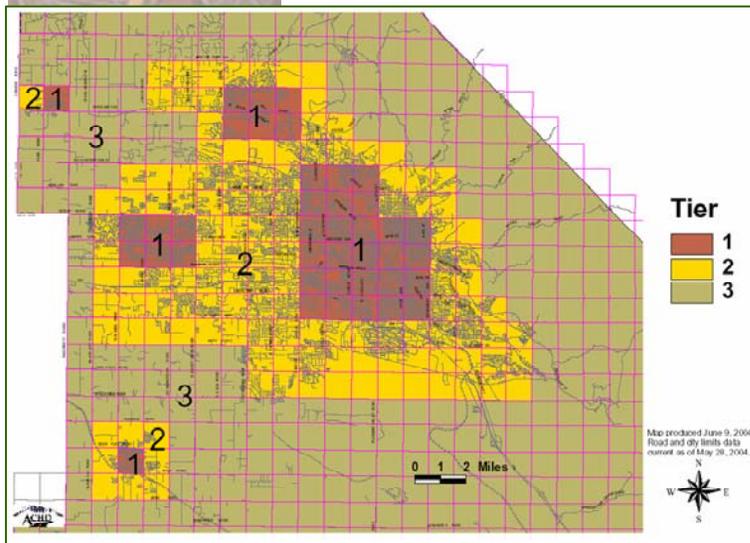
FEATURE	CHARACTERITICS
Sidewalks	Location, width, cross-slope, material, surface condition, presence of heaving/cracking, type and number of fixed obstacles within sidewalk, type and number of movable obstacles located on sidewalk, presence of vertical obstructions, type of street lighting, type and number of driveway crossings, presence and type of buffer between street and sidewalk, presence and type of foliage (trees, shrubs, grasses, etc.), type of street curb
Missing Sidewalks	Location, type and number of fixed obstacles in immediate area of future sidewalk, type of street curb (if any)
Curb Ramps	Location, type, surface condition, material, top landing width and slope, number of ramps at corner, ramp width, ramp slope, ramp cross-slope, slip-resistant surface, sidewalk approach, ramp flare slope, gutter slope, crosswalk connection and alignment, bottom landing width and slope
Missing Curb Ramps	Location, sidewalk surface condition, material, type and number of fixed obstacles in immediate area of future curb ramp, location of nearby street drain





The Transpo Group jointly stratified Ada County into three tiers as part of the inventory pre-planning:

- ◆ Tier 1 – central city areas
- ◆ Tier 2 – suburban/urbanizing areas, including ¼-mile around schools
- ◆ Tier 3 – rural areas



It was determined early on that Tiers 1 and 2 were of critical concern for the Transition Plan, and that Tier 3 could likely wait until such time as additional planning resources were available. Five general factors were used in the preliminary planning to help define the tier boundaries, including proximity to public buildings, large employers, proximity to transit bus routes, proximity to schools, and low income residential area.

There are little urban and pedestrian travel demand activities in the Tier 3 rural areas of Ada County. Immediate data collection efforts were focused on Tiers 1 and 2. The tiered structure was also developed in the event data collection resources for the first year were insufficient to cover all

inventory needs. Tier 1 was selected as the initial priority for year 2004. The pre-planning estimate for total staffing to inventory Tiers 1 and 2 was slightly more than 2,800 hours.

The pre-planning indicated that ACHD had sufficient resources to inventory, at a minimum, Tier 1 during the Summer of 2004. Further, in the event that the data collection rate exceeded pre-planning estimates, ACHD completed pre-planning for contingency to collect as much of Tier 2 that resources would allow in 2004. ACHD solicited and received funding support for data collection from many of the cities within Ada County.

### *STAFF TRAINING*

Based on the pre-planning estimates ACHD hired temporary staff to conduct the walking inventory with the GPS equipment. Four temporary staff was initially hired, two teams of two began data collection in June, 2004. Once hired, The Transpo Group conducted orientation training of the temporary staff. The orientation training included work sessions that fully defined the study purpose and specific sidewalk and curb ramp characteristics to be inventoried. The training also included demonstration of the use of the GeoXT GPS units and application of the Data Dictionary to measure and record specific sidewalk and curb ramp characteristics.

### *DATA COLLECTION*

Temporary staff were each equipped with the GeoXT unit, tape measures (to measure sidewalk and curb ramp dimensions), digital cameras and a *Smart Level* to efficiently and accurately measure sidewalk and curb ramp slopes. Each of the staff was also equipped with orange reflector vests and hats for safety, as well as adequate water and sunscreen to handle summer conditions.

For block sections, the predominant sidewalk characteristic was recorded for the entire block length. For curb ramps, unique and specific curb ramp (or missing curb ramp) characteristics were recorded for each public street corner.

Data collection rates were found to be slower in older neighborhoods with shorter block lengths, which required significantly more data entry to record a higher density of line (sidewalk/no sidewalk) and point (curb ramp) data. Tier 1 data inventory was completed in August, 2004, within 50% of the estimated time and budget to complete. ACHD and The Transpo Group determined that Tier 2 could be inventoried by October, 2004, based on the average data collection rate to complete Tier 1 and committed funding to the study. Further staffing and staff training was required due to change in personnel. Tier 2 data collection commenced in September and was completed in October, 2004.



**Table 2-2 GPS Data Collection Summary**

	TIER 1	TIER 2	Total
<b>Staffing</b>			
Number Data Collection Days:	33	39	72
Number Data Collectors:	4	3	
Person Days:	132	117	249
<b>Data Inventory</b>			
Street Centerline Miles:	569	846	1415
Number Street Corners:	8204	11109	19313
Sidewalk System Miles			
<i>Sidewalks</i>	642	1072	1714
<i>No Sidewalks</i>	396	606	1002
<b>Data Collection Rate</b>			
<i>Miles Per Day (team of 4)</i>	17.2	21.7	19.7
<i>Miles Per Person / Per Day</i>	4.3	7.2	5.7
<b>Staffing</b>			
Total Hours:	1056	936	1992
<sup>1</sup> GPS Data Collection of: (1) Sidewalk & Curb Ramp data per.... <i>US DOT -</i>  (2) Street profile for Bikeway Assessment			

As shown in **Table 2-2**, the GPS data collection rate was almost 20 street miles per day, based on a staff of 4. Individual staff data collection rates averaged 5.7 edge of street miles per day.

Over 1,400 street centerline miles were inventoried within Tiers 1 and 2 of the Ada County urban area. The inventory recorded existing or missing sidewalk characteristics on each side of the street. Over 1,700 miles of existing sidewalks were inventoried, and over 1,000 miles of missing sidewalks were logged<sup>3</sup>. Slightly more than 19,300 street corners were inventoried for the presence and characteristics of existing curb ramps.

The total staffing needed to inventory Tiers 1 and 2 was just shy

of 2,000 hours, well below the pre-planning estimate of 2,800 hours.

### QUALITY CONTROL

Pre-planning for the inventory effort included the identification of regular quality control and evaluation of the GPS raw data. Daily review of the raw GPS data was provided by ACHD Staff. ACHD Staff also conducted daily GPS data conversion, differential corrections, GIS data conversion and database assembly. Weekly review and quality checks of the GPS data was also provided by ACHD. Any data discrepancies or errors, including missing data, were identified and coordinated with temporary staffing to re-inventory problem areas. Only a few streets or areas required secondary data

collection efforts to replace questionable or missing data.

### DATA POST-PROCESSING AND GIS DATA CONVERSION

ACHD GIS staff conducted post-processing of the raw data on a daily basis. By use of *Pathfinder Office*, the raw data was differentially corrected for more accurate data positioning. Differential corrections involves correlating the raw data geo-reference or position measurements (longitude-latitude and elevation) recorded by the GeoXT GPS units, with a fixed, base station reference which is located at ACHD's offices.

The refined data was then converted to GIS format by ACHD GIS Staff. A GIS database of the

sidewalk and curb ramp inventory was sequentially developed based on the daily, individual inventory records from each surveyor.

### DATA SUMMARY

#### SIDEWALKS

#### Existing vs. Missing Sidewalks

Slightly more than 35 percent of the study area streets are missing sidewalk facilities. There are over 1,700 miles of sidewalks within





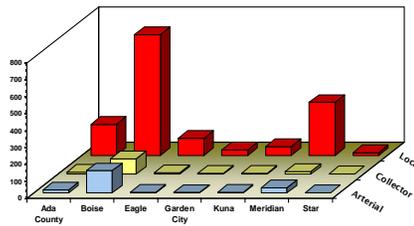
Tiers 1 and 2 of the study area. A small portion of the existing sidewalks are meandering (about 29 miles). Meandering sidewalks have become more popular as part of recent area developments. Most of the region’s sidewalks are located directly next to the curb. Only about 18 percent of the sidewalk system has some form of a buffer that separates sidewalks from the street and curb section.

**Sidewalk Location**

Local streets constitute a predominant share of the total street mileage within the study area. Most of the existing sidewalks are located along local streets. By far, the Boise city area of impact is where most sidewalks are located. However, the Meridian city area of

impact also includes a large portion of existing sidewalks within Ada County. Many of the sidewalks in Meridian are relatively new, as Meridian is the location of a large portion of new development in recent years.

*Sidewalk Location: By Jurisdiction & Street Class*

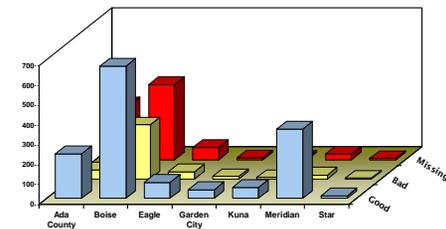


**Sidewalk Condition**

A cursory examination of the sidewalk inventory was undertaken to identify location of sidewalks that likely needed to be replaced (due to significant heaving/cracking

or non-compliant width) or missing sidewalks, by city area of impact.

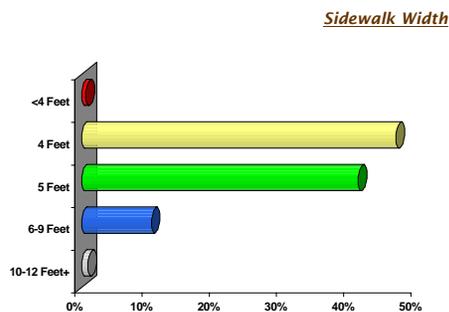
*Sidewalk Condition By Jurisdiction*



Again, the older developed areas have a larger portion of older sidewalks needing repair or new sidewalks. In some cases these areas were developed prior to the current sidewalk design standards and/or site development standards that required sidewalks to be built on both sides of the street. Older Boise neighborhoods are the subject area with a larger number of missing sidewalks and sidewalks in poor condition.

### Sidewalk Width

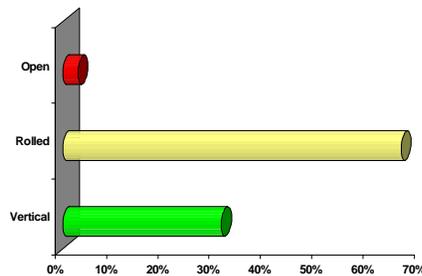
Most of the study area existing sidewalks are at least four feet wide. Many sidewalks are five feet or wider. Only a small percentage of existing sidewalks are less than four feet wide. Not all of the existing sidewalks are free of obstacles that reduce the effective clear width (minimum of four feet), but the fact that the majority of existing sidewalks are at least four feet or wider is an excellent starting point of the Transition Plan.



### Curb Type

On a ratio of about 2 to 1, rolled curbs are the predominant curb type along streets with sidewalks. Vertical curbs are more often found in older neighborhoods and along arterial streets. Rolled curbs appear to be the design of choice for neighborhood streets over the past 10-20 years (see *Local Design Guide*).

Curb Type

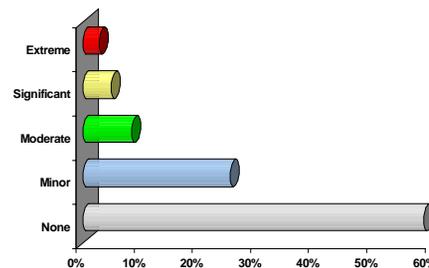


Where sidewalks are present, only a small portion of the adjacent streets are absent of some type of curb within the study area.

### Heaving and Cracking

Sidewalks with significant heaving and cracking can be problematic for pedestrians with limited mobility. Only a small portion of the study area sidewalks have significant or extreme heaving and cracking conditions. Most of these sidewalks are located within older neighborhoods – sidewalks that are fairly old and impacted by significant tree growth and/or deterioration. The majority of the existing sidewalk system in Ada County has little or no heaving and cracking conditions.

Heaving and Cracking

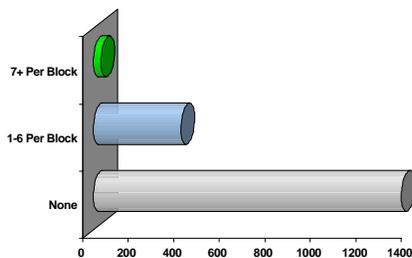




**Obstacles**

The inventory program was developed specifically to identify the location, type and density of fixed and removable obstacles found along existing sidewalks. The majority of existing sidewalks do not have fixed obstacles that reduce the pedestrian clear width of four feet. Those sidewalks with fixed obstacles, the number of obstacles are usually less than seven per street block.

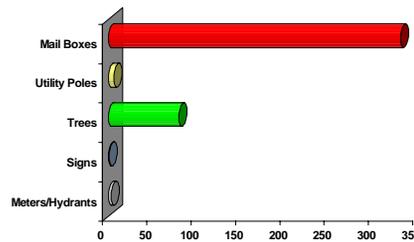
*Miles of Sidewalks with Fixed Obstacles—Density*



Of course the type of fixed obstacle is important. Some obstacles may

be relatively easy and inexpensive to move or remove. Review of the data indicates that mailboxes are the predominant type of fixed obstacle that reduces the sidewalk clear width below four feet. Street trees are also a common occurrence. While utility pole obstacles are less frequent, they are likely the most difficult and expensive fixed obstacle to remove from the sidewalk area.

*Miles of Sidewalks with Fixed Obstacles—Type*

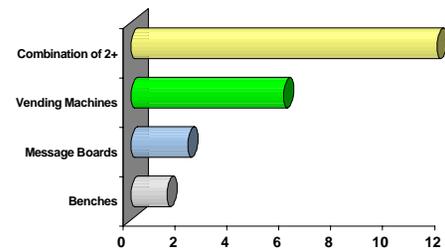


Along arterial and collector streets, particularly in commercial areas, the presence of movable obstacles can also hinder pedestrian travel. A

variety of moveable obstacles were noted in the inventory, including benches with advertising boards, message boards (sometimes referred to as “sandwich” boards), vending machines and others. Sometimes street benches add to the pedestrian environment. Their placement, however, is critical to pedestrian mobility.

Along residential streets a variety of movable obstacles were identified in the inventory. Over 200 miles of existing sidewalks were noted as having some type of movable

*Miles of Sidewalks with Movable Obstacles—Type*

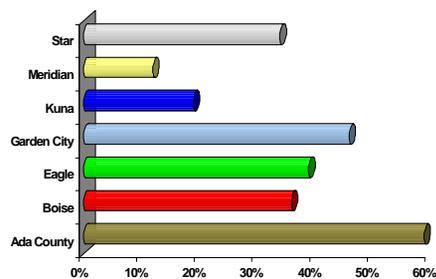


obstacles that hindered pedestrian mobility.

**MISSING SIDEWALKS**

In general, and over the past 10-20 years, ACHD and the local jurisdictions have been ensuring that sidewalks are constructed on both sides of new streets. As a result, newer subdivisions have few missing sidewalks. A greater number of streets with missing sidewalks are located within older neighborhoods.

*Percent Streets Missing Sidewalks By Jurisdiction*

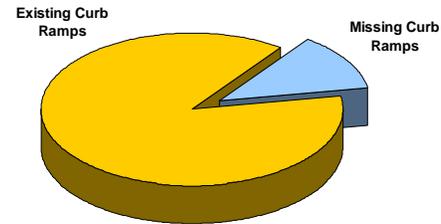


Both Meridian and Kuna have a much lower percentage of missing sidewalks than the county-wide average. Garden City has a much higher percentage than the average. Ada County, because much of the street system is located along undeveloped lands, also has a higher percentage of missing sidewalks. In addition, subdivisions in the unincorporated areas are typically larger-lot by design and are not required to construct sidewalks by County policy.

**CURB RAMPS**

Of the more than 19,300 street corners inventoried along existing sidewalk corridors, only about 12 percent are missing curb ramps. All other corners have some type of curb ramp to assist the mobility-

*Street Corners*



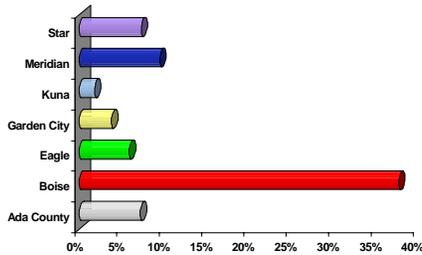
impaired pedestrian when crossing the street.

However, a number of the existing curb ramps are essentially ADA non-compliant. ADA non-compliance can generally mean that: (a) the ramp width is too narrow; (b) the top landing is either missing or too narrow; or, (c) the ramp slope is too steep. The construction of many of the non-compliant ramps preceded enactment of the ADA.



## Chapter 2| Inventory & Self-Evaluation

Percent Corners Missing Curb Ramps by Jurisdiction



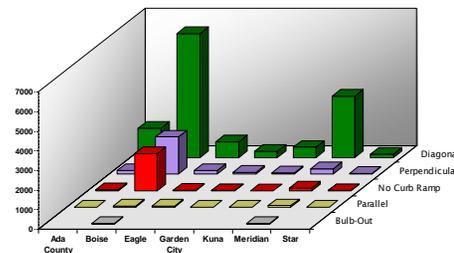
Sidewalks with missing curb ramps are more often found in older neighborhoods. For example, a larger portion of Boise’s street and sidewalk system was constructed when curb ramp standards were not required. Also, a larger percentage of Boise’s network was developed along a grid street system with much short block lengths and a greater intersection density.

### Ramp Type

The majority of curb ramps constructed in the Ada County

study area are diagonal by design, with a single ramp oriented to the center of the street intersection. Perpendicular curb ramps are more often found in the older Boise neighborhoods where older sidewalks were constructed with sidewalk buffer strips. In recent growth areas, most new curb ramps have been constructed to standards with diagonal ramp designs, to align with curb-side sidewalks.

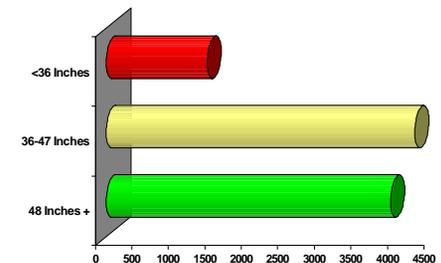
Curb Ramps by Type and Jurisdiction



### Ramp Width

ADA requires that curb ramps be constructed with a minimum width of 3 feet and desired width of 4 feet. Many of the older curb ramps throughout the study area were built with widths well below 4 and sometimes 3 feet. Most of these ramps were constructed to design standards that preceded the ADA. However, they do meet the minimum design width as prescribed by ADA.

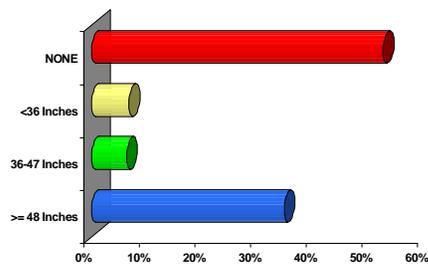
Curb Ramp Width



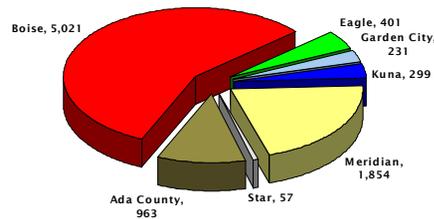
**Top Landing**

ADA requires that a top landing be placed at all curb ramps, four feet wide and a slope not to exceed 2 percent. Even new ramps, recently constructed to existing standards, include top landings, but with slopes that exceed the maximum of 2 percent (see *Local Design Guide*). Many of the system’s ramps are either missing the top landing, the ramp widths are too narrow, or the landing slope exceeds 2 percent.

*Top Landing Width*



*Ramps Missing Top Landing by Jurisdiction*



**ATTRIBUTE INDEX**

To complete the self-evaluation of existing sidewalks and curb ramps a scoring assessment was calculated. Each sidewalk segment and curb ramp in the GIS database was assigned an *attribute index* value for further evaluation in the prioritization of pedestrian improvements (see *Methodology for Prioritizing Pedestrian Projects*). The attribute index enables ACHD to consistently measure and quantify

problematic sidewalks and curb ramps that may pose as obstacles to the mobility-impaired.

**Table 2-3** summarizes the *Attribute Index* scoring values for sidewalks, missing sidewalks, curb ramps and missing curb ramps.

A higher attribute index value reflects a poorer condition of the existing sidewalk or curb ramp. For example, a curb ramp that scores 35 points (out of a possible 35 points maximum for prioritized need) would reflect the following conditions:

Top Landing	Missing
Ramp Width	Less than 3 Feet
Ramp Slope	Exceeds 8.3 %
Surface Condition	Very Poor
Alignment	At Angle with Curb Line
Cross-Slope	Exceeds 2 %
Gutter Slope	Exceeds 2 %





**Table 2-3 Sidewalk/Curb Ramp Attribute Index Values**

	Possible Points
<b>Sidewalks</b>	
Surface Condition	5
Heave & Cracking	5
Width	5
Fixed Obstacles (density)	5
Driveways	5
Curb Type	5
Cross-Slope	5
<b>Total</b>	<b>35</b>
<b>Missing Sidewalk</b>	<b>35</b>
<b>Curb Ramps</b>	
Top Landing Width	5
Ramp Width	5
Ramp Slope	5
Surface Condition	5
Alignment	5
Cross Slope	5
Gutter Slope	5
<b>Total</b>	<b>35</b>
<b>Missing Curb Ramp</b>	<b>35</b>

**SUMMARY**

By successfully deploying the GPS-based data collection effort ACHD was able to fully inventory the critical pedestrian facilities within the Ada County urban areas. The inventory effort was completed within the pre-planning estimates for staffing and schedule, and was successfully formatted and assimilated in ACHD’s GIS database. The *Self-Evaluation* and scoring, summarized in the Pedestrian Attribute Index, provides one of the essential measures from which ACHD analyzes, identifies and prioritizes pedestrian improvements (see Chapter 3).

### *END NOTES:*

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<sup>1</sup> *Americans With Disabilities Act Accessibility Guidelines*, U.S. Access Board, 2002.

<sup>2</sup> *Designing Sidewalks and Trails for Access; Part II – Best Practices Design Guide*, U.S. Department of Transportation, 2002.

<sup>3</sup> *The total edge-of-street miles (existing and missing sidewalk) is slightly less than a doubling of the street centerline mileage total because the street intersection crossing distances were not inventoried.*



