Bellevue's ADA Sidewalk and Curb Ramp Compliance Program

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ADA Plan Report: www.bellevuewa.gov/accessibility-reports.htm

Introduction

Accessible sidewalks enable people with disabilities to reach their desired destinations in the community and to enjoy the benefits of city services, programs, and activities. Where sidewalks are provided, public agencies are required to ensure that continuous, unobstructed sidewalks are maintained in operable working condition. This guidance is supported by a steady stream of cases interpreting Americans with Disabilities Act (ADA) provisions.

On January 22, 2004, in the case of Barden v. Sacramento, the 9th Circuit Court ruled that sidewalks were a "program" under ADA and must be made accessible to persons with disabilities. Prior to the Barden decision, it was commonly understood that the minimum requirement for achieving program accessibility, in an existing public right-of-way that is not otherwise being altered, is the installation of curb ramps at locations where existing pedestrian walkways cross curbs. The court decision in the Barden case relied upon the language in ADA regulations that requires city ADA Transition Plans to include a schedule for the installation of curb ramps at intersections, holding that this requirement would be "meaningless if the sidewalks between curb ramps were inaccessible." The Barden decision made clear that public entities are required to invest in the repair of public sidewalks and maintain them free of barriers, physical defects and other conditions that may deny pedestrians with disabilities access to sidewalks.

Ignoring the law can be expensive now that it is understood that pedestrian paths are part of the ADA. In 2007, the City of Chicago settled one of the largest ADA cases in history, agreeing to spend $10 million a year for five years on sidewalk accessibility, in addition to the $18 million it spends annually on sidewalk maintenance. Furthermore, poorly maintained pedestrian infrastructure can lead to expensive personal injury lawsuits.

Project Approach

In 2008, the City of Bellevue undertook an ADA sidewalk and curb ramp self-evaluation update to assess its program accessibility responsibilities for existing pedestrian facilities in the public rights-of-way. The project took shape out of a three-phased approach: (i) data collection; (ii) database analysis; and, (iii) barrier ranking. As indicated in Figure 1, the self-evaluation process involved the disability community in the identification of priorities for improving pedestrian accessibility in Bellevue.

Phase 1. Data Collection

The traditional ADA inventory process is time-consuming and imprecise. Most jurisdictions undertaking ADA sidewalk and curb ramp inventory efforts rely on data collectors to choose between a "yes" or "no" response in recording ADA compliance. While this enables jurisdictions to quickly collect data, the "yes/no" clipboard approach does not offer jurisdictions a precise understanding of which areas have the most need.

Figure 1. Visual representation of Bellevue's project approach.

Bellevue determined that a new solution to quickly and accurately document the type, severity, and location of sidewalk and ramp barriers in the City would be most efficient. A number of options were considered for gathering data on its 321 miles of sidewalk and 4,586 curb ramps locations.

City staff learned about inertial profiler systems that have been in use since the 1970s to measure pavement defects. Profilers are typically mounted on motor vehicles and used in both the aerospace and roadway construction industries for measuring smoothness of pavement surfaces on airplane landing strips and the highway system. An interdepartmental team at the City of Bellevue partnered with federal and regional agencies to adapt this profiler technology to the task of inventorying and mapping the degree to which sidewalks and curb ramps in the City's right of way meet ADA standards.

Figure 2. City of Bellevue's ULIP and Segway Human Transporter Equipment.

The technology, developed through a pilot program with the Federal Highway Administration, uses an Ultra-Light Inertial Profiler (ULIP) mounted on a Segway scooter. The device's displacement laser, three accelerometers, optical trigger, distance measurement instrument, and gyroscope are designed to measure the sidewalk surface at a rate of 10,000 records per second. Together, these devices capture highly accurate information about slope and small surface variations that can make a sidewalk difficult to navigate. A tray and handle bar mount support a notebook computer that offers an interactive, real-time display during data collection. The accompanying software produces a text file compatible with the City's Geographic Information Systems (GIS) asset management database.

Bellevue staff worked with colleagues at the Federal Highway Administration and King County to ensure that the resulting technology would be of broad benefit to federal, state, and local government entities. Because it was a new technology, the City of Bellevue sought confirmation that data acquired from the ULIP platform was reproducible and accurate. During the 2007 trial period, Bellevue staff undertook numerous tests comparing grade and cross slope measurements from the ULIP and alternative measurement devices (e.g., digital smart level readings) before a decision was made to employ this technology citywide.

During the 2008 citywide inventory effort, the city employed Quality Assurance/Quality Control (QA/QC) protocol for validation testing of the software and hardware. The ULIP technology's efficacy was confirmed in 2008, when two field technicians were able to inventory the city's entire pedestrian system within a few months' time. One technician operated the ULIP and conducted the sidewalk inventory (321 miles), and a second technician rode a bicycle and used a Topcon GMS-2 handheld GPS receiver to conduct the curb ramp inventory (4,586 locations; of which 1,041 lacked ramp access).

The technical precision offered by Bellevue's approach is identified as a best practice in *ADA Compliance at Transportation Agencies: A Review of Practices* (NCHRP 20-07 Task 249), a National Cooperative Highway Research Program study. The report notes that "[e]fforts such as those at the City of Bellevue, Washington, that rely on the collection of large datasets at extremely fine spatial and temporal disaggregation levels have the potential to significantly automate the identification of non-compliant locations in the field."

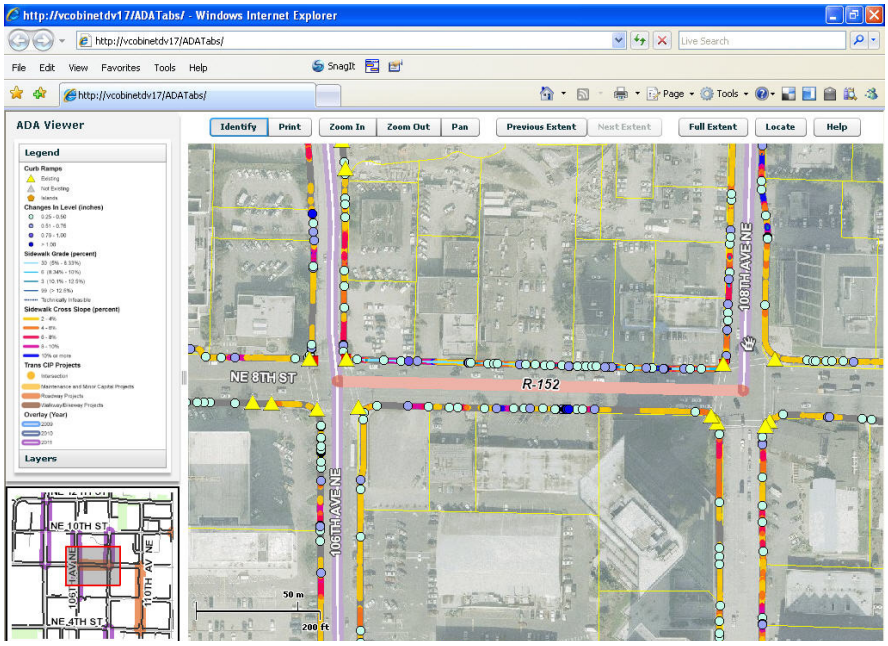

Figure 3. City of Bellevue's web-based ADA mapping viewer interface.

Phase 2. Database Analysis

The City of Bellevue's ADA sidewalk and curb ramp database provides staff with geographic data with both: (i) positional accuracy, the digital representation of how a barrier conforms to the actual location found in the field (better than what is possible with streaming GPS); and, (ii) attribute accuracy, the digital representation of a barrier is represented in a manner consistent with actual conditions found in the field (percent running slope, percent cross-slope, inches of vertical separation, etc.).

Once the field data collection and validity checks were performed, it was necessary for the raw data to be processed so it could be stored in the City's centralized GIS database for analysis and reporting. GIS played a pivotal role in the project from data acquisition (organizing the millions of data points generated during the study) to creating a web-based mapping interface for asset management and compliance monitoring. The resulting ADA sidewalk and curb ramp self evaluation is documented on the City's intranet. This internal web interface maps all non-standard data points related to curb ramp location and compliance rating – at the block face level, including sidewalk obstructions, heaving, running slope, and cross slope. Additional functionality of this geospatial database includes the ability to search and/or turn off certain barrier types and generate reports of the barrier information.

The ADA viewer interface creates a platform from which city staff will retrieve information on ADA barriers in the public right of way, informing the following accessibility programs:

- **New Development:** New development or redevelopment projects must include sidewalks and curb ramps.
- **Citizen Request Program:** Citizens submit requests to have a new curb ramp installed or have an existing curb ramp repaired at any location within the City.
- **Annual Installation, Repair, and Maintenance Program:** The City's Transportation Department repairs sidewalks and installs new curb ramps annually as part of routine maintenance.
- **Street-Related Capital Improvement Projects:** Sidewalks and/or curb ramps are installed and/or repaired in all street-related capital improvement projects (e.g., street widening or other street upgrades).

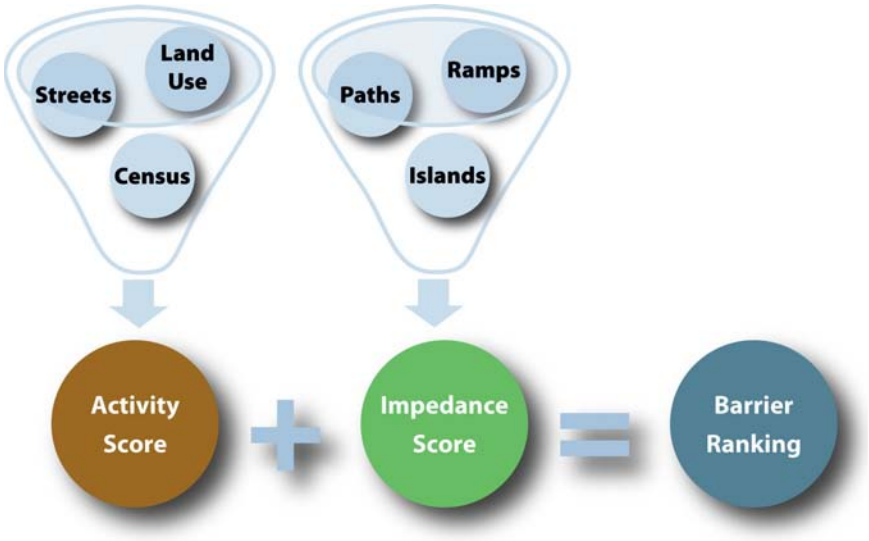

Figure 4. This diagram illustrates criteria influencing the barrier ranking scores. Bellevue used GIS to overlap data layers, each representing one of several characteristics, and determine the cumulative intensity of all characteristics throughout the city.

- **Overlay Construction Projects:** The City includes the installation of curb ramps as part of street overlay projects.
- **Sidewalk Maintenance and Repair Program:** Streets Division personnel clear vegetation and debris from sidewalks adjacent to arterial streets, inspect sidewalks for damage, and when needed, repair walkways.

Phase 3. Barrier Ranking

The ADA tells us which features in the public rights of way are non-standard but it does not tell us which of these non-standard features should be replaced first. After determining which facilities do not meet standards, the City developed a prioritized list of improvement requirements in conjunction with the disability community.

Bellevue's GIS-based barrier ranking analysis results in a combined activity and impedance score for every sidewalk and curb ramp in Bellevue.
A high activity score is representative of areas where pedestrian activity (especially among persons with disabilities) is likely to be greatest, based on demographic, land use, and transportation conditions. A high impedance score is representative of areas where the quality of existing pedestrian infrastructure is poor for persons with disabilities, based on barriers documented in the sidewalk and curb ramp inventory. The key principle here is to assign a high ranking on a needs basis, not necessarily to the sidewalks and curb ramps in the worst condition but rather to those that would provide the most benefit to people with disabilities.

The point values assigned to the various non-standard features in the impedance calculation arose from consultations with members of the disability community in Bellevue. The outreach effort included surveys, focus groups, public meetings, and conversations with residents at sidewalk and curb ramp locations.

The Results

Bellevue's pedestrian facilities are evaluated against a number of ADA standards in the City's Sidewalk and Curb Ramp Self-Evaluation Report. The following are sidewalk cross slope and grade accessibility considerations: (i) maximum grade is 5 percent on continuous runs; (ii) sidewalks adjacent to existing roadways may follow grade of roadway; and, (iii) cross slope shall not exceed 2 percent. Reflected below are some of the findings on cross slope and grade from the inventory effort; more detailed information on these and other ADA considerations are found at www.bellevuewa.gov/accessibility-reports.htm.

- **Sidewalk Cross Slope:** As indicated in Figure 5, over 50 percent of Bellevue's 8 plus percent cross slope measurements are attributable to driveway aprons. This number increases as cross slope values increase, with 70 percent of 10 plus percent cross slope measurements attributable to driveway aprons. Overall, 19 percent of all non-standard cross slope measurements are attributable to driveway aprons constructed like ramps, with steep, short side flares.

Cross Slope Category	Total Length (Miles)	Cross Slope within Driveway Buffer (Miles)	Cross Slope without Driveways (Difference)	% Attributable to Driveways
2-4%	134	18	116	13%
4-6%	49	9	41	17%
6-8%	15	5	10	31%
8-10%	7	4	3	54%
10%+	7	5	2	70%
Total	212	40	172	19%

Figure 5. This table reflects the results of sidewalk cross slope analysis. As reflected, 134 miles or 63 percent of non-standard cross slope measurements are found to have profiles of 2-4 percent.

- **Sidewalk Grade (Running Slope):** According to ADAAG standards, sidewalk grade should not exceed 5 percent. However, grades are often too difficult to control in the sidewalk environment because sidewalks follow the path of the street and the natural topography of the area. Bellevue's GIS database played a pivotal role in determining which of the non-standard sidewalk grade profiles were deemed technically infeasible due to roadway topographic factors. Bellevue staff developed a GIS script that enabled a comparison of every non-standard sidewalk segment to the grade of the adjacent roadway. Adjacent roadway grade profiles were derived from a digital elevation model, a representation of ground surface topography. Criteria were then used to filter out 95 miles of non-standard sidewalk grade locations deemed technically infeasible. Figure 6 reflects those sidewalk segments that are steeper than the grade of the associated roadway.

Grade Category	Length (Miles)	%
5-8.33%	32	82%
8.34-10%	4	10%
10.01-12.5%	2	5%
12.5%	1	3%
Total	**39**	**100%**

Figure 6. This table reflects the results of sidewalk grade analysis. As reflected, 32 miles or 82 percent of non-standard grade measurements are found to have profiles of 5–8.33 percent.

Next Steps

Bellevue's ADA Sidewalk and Curb Ramp Self-Evaluation Report is a comprehensive analysis of the city's existing sidewalk and curb ramp facilities. Data collected from this assessment enables city staff to: (i) determine if a sidewalk or curb ramp meets intended design specifications and guidelines; (ii) catalog feature and maintenance information; (iii) identify portions of sidewalks needing accessibility improvements; (iv) quantify the extent of the work required; and, (v) add pedestrian information to the City's GIS database. The barrier ranking analysis used in this process was the product of a public consultation process, which the City believes reflects the interests of Bellevue residents and responds to the stated needs of people with disabilities in the community.

Figure 7. To comply with the ADA, every state and local government is required to prepare a self-evaluation report to identify program access issues. From this, a transition plan is required with a schedule identifying corrective measures to achieve a barrier free environment.

The development Bellevue's ADA Transition Plan Update relies heavily on the barrier identification and rankings contained in the Sidewalk and Curb Ramp Self-Evaluation. Transportation staff is working to complete the department's transition plan update process by the end of 2009. To do this, key assumptions regarding barrier prioritization, corrective action costs, programming, and supportive policies need to be evaluated and documented. Once completed, the Transportation Department's Transition Plan update for the public rights of way will be integrated into the citywide transition plan that addresses the other key areas of ADA accessibility: access to public facilities and to city programs and services. Completion of the update to the citywide Transition Plan is anticipated in 2010.

Lessons Learned

The following information is intended to assist other local government agencies approaching their ADA compliance program.

1. The ADA, passed in 1990, is a landmark law that prohibits discrimination based on disability. This comprehensive civil rights protection for individuals with disabilities extends not only to physical access at government facilities, programs, and events—but also to pedestrian facilities in public rights of way. Failure to properly manage ADA compliance has prompted action by the Department of Justice and proven costly to many cities due to an increasing amount of litigation.

2. Because agencies at all levels are required to respond to ADA mandates, developing partnerships increases the cost-effectiveness of compliance efforts. The coordinated staffing and funding commitment from the Federal Highway Administration, King County, and the City of Bellevue made it possible to undertake Bellevue's proposal to assess the applicability of inertial profiling technology in identifying existing facilities that limit access for persons with disabilities.

3. As a new technology, the City of Bellevue sought confirmation that data acquired from the Ultra-Light Inertial Profiler (ULIP) platform was repeatable, reproducible, and accurate. Numerous tests were carried out comparing grade and cross slope measurements from the ULIP and alternative measurement devices (e.g., digital smart level readings). Bellevue and FHWA staff undertook a rigorous review of this data before a decision was made to employ this technology in a citywide inventory effort. During the citywide inventory effort, the city employed QA/QC protocol for validation testing of the software/hardware equipment.

4. Bellevue's ULIP is the first technology of its kind that enables jurisdictions to quickly and accurately complete an ADA condition assessment inventory. Bellevue's project is identified as a best practice in *Asset Management Approaches to ADA Compliance* (NCHRP 20-07 Task 249), a National Cooperative Highway Research Program study. Bellevue's ULIP-based approach is distinguished from the efforts of other jurisdictions because actual values for running slope, cross-slope, and vertical separation are captured along sidewalk block faces; as compared to a simplistic "yes-no" compliance determination by field staff quickly traversing a city's sidewalk network.

5. Bellevue's self-evaluation report and transition planning efforts were informed by an extensive public outreach effort that provided a wide range of stakeholders from the disability community with improved access to the decision-making process. This approach to community engagement is consistent with ADA Title II guidance requiring governmental entities to: "Provide opportunity to interested persons and groups to participate in self-evaluation leading to transition plan."

6. GIS played a pivotal role in the project from data acquisition (i.e., organizing the millions of data points generated during the study) to project prioritization (i.e., determining priorities for improvements and displaying the corresponding locations on a variety of mapping interfaces). The result is a mapping interface on the City's intranet that documents all non-standard data points related to sidewalks and curb ramps. The ADA viewer interface creates a platform from which city staff retrieves information on barriers in the public right of way, informing the City's corrective measures on where to make repairs to sidewalks and curb ramps.

7. The City is using the data from the self-evaluation inventory to program needed implementation resources through the ADA transition plan time horizon. A number of mechanisms are in place to make sidewalks accessible to people with disabilities, including sidewalk maintenance, curb ramp retrofit, and pavement overlay programs. In addition, the city incorporates ADA improvements into its capital projects and as permit conditions for development.

8. The rewards of ADA compliance come in many forms, not the least of which is establishing an accessible community that provides the public, including persons with disabilities, with access to the transportation network and independent mobility regardless of age, physical constraint, or income. Pedestrian facilities are an essential part of the community infrastructure that individuals use to gain access to the goods, services, and social contacts that support their day-to-day existence and quality of life. People with disabilities are better able to participate in the community if sidewalks and curb ramps are accessible because it is easier for them to reach their desired destinations.