Asset Management for ADA Compliance Using Advanced Technologies

Portland State University
Center for Transportation Studies

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City of Bellevue (WA)

2/20/2009
Presentation Outline

- Key ADA Requirements
- Bellevue ADA Transition Plan
- Curb Ramp Inventory
- Sidewalk Inventory
- Field Validation
- ADAAG Compliance Definition Issue
- Database Analysis
- Roadway Grade Analysis
- Driveway Analysis
- Web-Based Mapping Interface
- Project Prioritization
- ADA Culture of Compliance
Key ADA Requirements
Americans with Disabilities Act (ADA) (Federal Civil Rights Law-July 26, 1990)

Title II – Government Services: Must ensure that individuals with disabilities are not excluded from programs, services, and activities (pedestrian facilities are an example of a program).
Title II Elements

Self Evaluation – 28 CFR 35.105

Public entities shall examine accessibility of its current programs, services, and activities and maintain records of self-evaluation activities for three years.

Transition Plan – 28 CFR § 35.150(d)(3)

- Identify existing facilities that limit access for persons with disabilities.
- Describe methods to make facilities accessible.
- Specify schedule for improving facilities by prioritizing needs of persons with disabilities in existing facilities.
City of Bellevue (WA)

% Population 65+ (Central Puget Sound)

As the population continues to age, the number of people with mobility disabilities is expected to increase.
Bellevue ADA Transition Plan
Sidewalk & Ramp Survey Overview

Absence of level landing

Top Landing

Tactile Warning

Moveable Obstruction

Fixed Obstruction

Heaving

Ramp cross slope

No Ramp

Ramp Transition

Bottom Landing
Guidance for Conducting an ADA Inventory
Numerous Methodologies

U.S. Dept of Justice

<table>
<thead>
<tr>
<th>Curb Ramps</th>
</tr>
</thead>
</table>
| Facility Name: | Community/State Park
| Location: | State
| Numbers: | Texas
| Description: | Record any measurements in the notation when there are problems. Do not check in response for a question if you are uncertain about what constitutes acceptable practice.
| Notes: | A "no" to any question means unacceptable.

Texas DOT

<table>
<thead>
<tr>
<th>DISTRICT INVENTORIES OF PEDESTRIAN ACCESSIBILITY AT INTERSECTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>District Number</td>
</tr>
<tr>
<td>State MW</td>
</tr>
<tr>
<td>City</td>
</tr>
<tr>
<td>County</td>
</tr>
<tr>
<td>Year</td>
</tr>
</tbody>
</table>
| Notes: | A "no" to any question means unacceptable.

Maryland State Highway

<table>
<thead>
<tr>
<th>SHA – ADA CHECKLIST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes/No/NA</td>
</tr>
<tr>
<td>Question: Is the sidewalk width 5 feet (1.5m) or greater for curb cuts? If not, the physical constraint may result in a reduction in sidewalk width?</td>
</tr>
</tbody>
</table>

National Cooperative Highway Research Program (NCHRP), Asset Management Approaches to ADA Compliance, NCHRP 20-07 Task 249.

"Existing laws and regulations provide considerable flexibility regarding the identification of physical obstacles that limit accessibility to individuals with disabilities. In other words, the standard for what constitutes acceptable practice (and, by extension, what could become a best practice) regarding data collection, condition assessment, and programming of needed improvements varies considerably and is subject to interpretation."
Methodology Assessment

Summer 2006. Conducted 2 week assessment with professional staff using equipment for land surveys. Estimated cost in excess of $1M.

Summer 2007. Research partnership agreement with FHWA led to 2 month assessment with student interns using a modified ultra-light, slow-speed inertial profiler (ULIP) mounted on a Segway HT.
Project Partners

Starodub, Inc.

City of Bellevue, Washington

U.S. Department of Transportation
Federal Highway Administration

King County METRO
ADA Transition Plan Process

1. Data Collection
   - Disability Community Participation
   - Prioritized list of physical barriers
   - Cost estimation
   - Funding strategy
   - Implementation schedule
   - Performance monitoring

2. Database Analysis

3. ADA Transition Plan

Disability Community Participation
Curb Ramp Inventory
Curb Ramp Features

- Curb Ramp Features
  - 33'' Min
  - 44'' Preferred
  - Crosswalk
    - 44'' Min
  - Sloping Surface
    - Curb Ramp Width
    - Total Sidewalk Width
    - 4' Min Landing
    - Sloping Surface
    - 8.3% Max
    - 10% Max
    - 2% Max Slope Any Direction
    - Side Flare
    - 3' Min
    - 4' Preferred
  - Crosswalk
Field Documentation

Topcon GMS-2 handheld GPS receiver:

- Equipped with a digital camera, graphic interface, & data entry form.
- Positional accuracy of GPS receiver is 1-3 meters.
- Receiver can load and display ortho-photos enabling field staff to zoom in and create points on specific curb ramps.
- Spatial resolution of ortho-photos is 1 foot per pixel.
# GMS-2 Curb Ramp Data Dictionary

<table>
<thead>
<tr>
<th><strong>Ramp type:</strong> Directional; Perpendicular; Diagonal; Construction; None (indicates no ramp where ramp is needed)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gutter running slope:</strong> Compliant (&lt;5%); Non-compliant (&gt;5%)</td>
</tr>
<tr>
<td><strong>Gutter cross-slope:</strong> Compliant (&lt;5%); Non-compliant (&gt;5%)</td>
</tr>
<tr>
<td><strong>Transition:</strong> Free of heaves, gaps, and obstructions (yes/no)</td>
</tr>
<tr>
<td><strong>Clear space at bottom:</strong> 4’ x 4’ of clear space at the bottom of a diagonal ramp, within marked crosswalk (yes/no)</td>
</tr>
<tr>
<td><strong>Detectable warnings:</strong> 2’ x 4’ yellow panel of truncated domes adjacent to gutter transition (yes/no)</td>
</tr>
<tr>
<td><strong>Marked crossings:</strong> Curb ramp wholly contained within crosswalk markings (yes/no)</td>
</tr>
<tr>
<td><strong>Landing slope:</strong> Landing slope does not exceed 2% in any direction (yes/no)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Landing panel:</strong> None (non-compliant); &gt;= 48 in. (best practices); 36-47 in. (compliant); &lt; 36 in. (non-compliant)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ramp width:</strong> &gt;= 48 in. (best practices); 36-47 in. (compliant); &lt; 36 in. (non-compliant)</td>
</tr>
<tr>
<td><strong>Ramp slope:</strong> &lt;8.3% (compliant); 8.3% - 10% (non-compliant); &gt;10% (non-compliant)</td>
</tr>
<tr>
<td><strong>Ramp cross-slope:</strong> &lt;2% (compliant); 2% - 4% (non-compliant); &gt;4% (non-compliant)</td>
</tr>
<tr>
<td><strong>Ramp flares:</strong> None; &lt;=10% (compliant); 10.1% - 12% (non-compliant); &gt;12% (non-compliant)</td>
</tr>
<tr>
<td><strong>Returned curbs:</strong> None (if no ramp flares); Compliant (ramp is situated such that pedestrians will not walk across returned curbs); Non-Compliant (returned curbs may present tripping hazard)</td>
</tr>
</tbody>
</table>
GMS-2 Sidewalk Data Dictionary

Fixed Obstructions

Narrow Sidewalks
Sidewalk Inventory
Inertial Profilers

Innovations in technology have caused the profiling industry to grow dramatically.

Starodub, Inc. Research and Development of Prototype ULIP funded by FHWA

The ULIP measurements were more accurate than those made at the same site by two commercial light-weight profilers.
ULIPs Technology

ULIPs (sidewalk) is a prototype modification of the ULIP system to:

- estimate grade (running slope) and cross slope of sidewalks
- identify sidewalk faults (heaving)
- time and travel distance synchronized to the data with GPS coordinates
- synchronized with user input “events/features” notes

Sensor box includes a displacement laser (texture/profile/height), three accelerometers (inertial profiling), a gyroscope (pitch, roll, yaw), optical trigger (reference), GPS (general location), and a DMI (travel distance system).

A notebook computer and data acquisition card is used for data capture.
Basic ULIPs Tasks

- Data Acquisition
- Data Processing
- Data Acquisition/Data Processing
- DMI Calibration (Rider Specific)
- Data Processing (Subset Analysis)
- Zeroing the Gyroscope
- Performing a “Radius Adjust” in the “ULIPGEOM” Equation
ULIPs Relative to Surface

DMI Calibration: Determines the wheel circumference for the given tire pressure and rider. This calibrated value is used in determining travel distance and is a key parameter in the “ULIPGEOM” Equation processing of grade (running slope).

Requires rider and tire pressure specific calibration.
ADA Sidewalk Compliance Criteria

Running Slope (Grade) [ADAAG 4.3.7]
- 1:20 (5%) max, if greater, treat as ramp

Cross Slope [ADAAG 4.3.7]
- 1:50 (2%) max, if greater, treat as ramp

Changes in Level (Fault) [ADDAG 4.5.2]
- 1/4 inch max vertical bump
- 1/4 to 1/2 inch beveled at 2:1
- If greater than 1/2 inch, then treat as ramp (12:1 bevel)

Protrusions/Obstructions [ADAAG 4.4.1]
- Max 4” projection between 27” and 80” above surface
- Obstacles limiting clearance width of the sidewalk
Field Validation
Field Validation

Field technicians check the slope and grade of sidewalk segment with smart level for QAQC validation of ULIP data.
Validation Report: Smart Level/ULIP

- ULIPs data consistently follows with the Smart Level’s peaks and troughs at test sites.
- Rise versus Running Distance compared to ADAAG.
ADAAG Compliance Definition Issue
Raw Data Allows for Infinite Re-analysis

Grade and Cross Slope Averaging Window Size:

• In the ULIP Geometry Equation, the user specifies the grade and cross slope window size in feet to be applied in a moving average computation.

• The graph illustrates the effect of moving average window size. The larger the value, the more dampened out the features.
User-Specified Window Size

Window size based on FHWA guidance that grade and cross-slope “should be measured over 2 ft intervals, the approximate length of a wheelchair wheelbase, or a single walking pace.”

- FHWA. Designing Sidewalks and Trails for Access
ADA Sidewalk Compliance Criteria

- Grade (Running Slope)
- Cross Slope
- Faulting
- Protrusions/Obstructions
An accessible route with a running slope greater than 1:20 (5%) is a ramp and shall comply with ADAAG 4.8. (ADAAG 4.3.7)

Running slope is the slope that is parallel to the direction of travel; and a ramp as outlined in ADAAG 4.8:

- Maximum slope 8.33%
- Maximum rise for any run shall be 30”
- Minimum clear width shall be 36”
- Level landings at bottom and top of each ramp
Grade Compliance Criteria

<table>
<thead>
<tr>
<th>Slope</th>
<th>Maximum Rise (inches)</th>
<th>Construction Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1:20 to 1:16 (5% to 6.3%)</td>
<td>30</td>
<td>New const. &amp; modifications</td>
</tr>
<tr>
<td>1:16 to 1:12 (6.3% to 8.3%)</td>
<td>30</td>
<td>New const. &amp; modifications</td>
</tr>
<tr>
<td>1:12 to 1:10 (8.3% to 10%)</td>
<td>6</td>
<td>Modifications only</td>
</tr>
<tr>
<td>1:10 to 1:8 (10%- 12.5%)</td>
<td>3</td>
<td>Modifications only</td>
</tr>
</tbody>
</table>
## Grade (Ramp Type) Classification

<table>
<thead>
<tr>
<th>Grade Type</th>
<th>Slope</th>
<th>Max Rise (in.)</th>
<th>Max Run (ft.)</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt;= 5.0%</td>
<td>0</td>
<td>0</td>
<td>1:20</td>
</tr>
<tr>
<td>30</td>
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<td>30</td>
<td>50</td>
<td>1:20</td>
</tr>
<tr>
<td></td>
<td>5.5%</td>
<td>30</td>
<td>45.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.0%</td>
<td>30</td>
<td>41.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6.5%</td>
<td>30</td>
<td>38.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.0%</td>
<td>30</td>
<td>35.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.5%</td>
<td>30</td>
<td>33.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.0%</td>
<td>30</td>
<td>31.3</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>&lt; 8.33%</td>
<td>30</td>
<td>30.0</td>
<td>1:12</td>
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<tr>
<td></td>
<td>8.33%</td>
<td>6</td>
<td>6.0</td>
<td>1:12</td>
</tr>
<tr>
<td></td>
<td>8.5%</td>
<td>6</td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.0%</td>
<td>6</td>
<td>5.6</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9.5%</td>
<td>6</td>
<td>5.3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>&lt; 10.0%</td>
<td>6</td>
<td>5.0</td>
<td>1:10</td>
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<tr>
<td></td>
<td>10.0%</td>
<td>3</td>
<td>2.5</td>
<td>1:10</td>
</tr>
<tr>
<td></td>
<td>10.5%</td>
<td>3</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11.0%</td>
<td>3</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>11.5%</td>
<td>3</td>
<td>2.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12.0%</td>
<td>3</td>
<td>2.1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt;= 12.5%</td>
<td>3</td>
<td>2.0</td>
<td>1:8</td>
</tr>
<tr>
<td></td>
<td>&gt; 12.5%</td>
<td>&gt;1.5</td>
<td>1.0</td>
<td></td>
</tr>
</tbody>
</table>

Ramp type 1 meets the definition of a ramp (>= 5%) but is not regarded as having a non-standard grade.

Ramp type 30 has a rise of 30 in and run between 30 to 50 ft. (5% >= x <= 8.33%)

Ramp type 6 has a rise of 6 in and run between 6 & 5 ft. (8.33% >= x <= 10%)

Ramp type 3 has a rise of 3 in and run between 2 & 2.5 ft. (10% >= x <= 12.5 %)

Ramp type 99 has a rise greater than 1.5 over 1 ft. (> 12.5 %)
Grade (Ramp Type) Classification

- **Ramp Type 3**: $10.01\% \geq x \leq 12.5\%
- **Ramp Type 30**: $5\% \geq x \leq 8.33\%
- **Ramp Type 6**: $8.33\% \geq x \leq 10\%
- **Ramp Type 99**: $> 12.5\%$
Site was a sidewalk with two successive driveway crossings.
Path Repeatability for Grade

ULIP Grade (4 runs) vs Smart Level

Grade % vs Feet for different runs:
- 1024
- 1026
- 1027
- 1028
- SL
Grade Slope
Ramp Type
- 3
- 6
- 30
- 99
- Compliant Sidewalk

Somerset
Non Standard Grade Slope
ADA Sidewalk Compliance Criteria

Grade (Running Slope)

Cross Slope

Faulting

Protrusions/Obstructions
Sidewalk Cross-Slope

Nowhere shall the cross slope of an accessible route exceed 1:50 (2%). (ADAAG 4.3.7)
ULIPs Path Repeatability for Cross Slope

Site was a sidewalk with two successive driveway crossings.
City of Bellevue
Non Standard Cross Slope

<table>
<thead>
<tr>
<th>Type</th>
<th>% Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2-3%</td>
</tr>
<tr>
<td>2</td>
<td>3-4%</td>
</tr>
<tr>
<td>3</td>
<td>4-5%</td>
</tr>
<tr>
<td>4</td>
<td>5-6%</td>
</tr>
<tr>
<td>5</td>
<td>6-7%</td>
</tr>
<tr>
<td>6</td>
<td>7-8%</td>
</tr>
<tr>
<td>7</td>
<td>8-9%</td>
</tr>
<tr>
<td>8</td>
<td>9-10%</td>
</tr>
<tr>
<td>9</td>
<td>10-11%</td>
</tr>
<tr>
<td>10</td>
<td>11-99%</td>
</tr>
</tbody>
</table>

Compliant Sidewalk
ADA Sidewalk Compliance Criteria

Grade (Running Slope)
Cross Slope
Faulting
Protrusions/Obstructions
Changes in Level

ADAAG 4.5.2

Changes in level up to 1/4 inch may remain vertical.

Changes in level between 1/4 inch and to 1/2 inch are permitted but must be beveled – bevel cannot be steeper than 1:2.

ULIPs Output Reports

Graph shows faults (bumps) along travel distance in field mode.

ASCII text file for Inclusion in City’s GIS

<table>
<thead>
<tr>
<th>Distance (feet)</th>
<th>Time (seconds)</th>
<th>Category (1: &gt;=1/4” &amp; &lt;1/2”, 2:=1/2”)</th>
<th>Bump Height</th>
<th>Casename</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.05</td>
<td>1.58</td>
<td>1</td>
<td>0.27</td>
<td>II3</td>
</tr>
<tr>
<td>7.15</td>
<td>1.61</td>
<td>1</td>
<td>0.26</td>
<td>II3</td>
</tr>
<tr>
<td>7.23</td>
<td>1.63</td>
<td>1</td>
<td>0.28</td>
<td>II3</td>
</tr>
<tr>
<td>7.32</td>
<td>1.64</td>
<td>1</td>
<td>0.25</td>
<td>II3</td>
</tr>
<tr>
<td>11.75</td>
<td>2.65</td>
<td>2</td>
<td>0.90</td>
<td>II3</td>
</tr>
<tr>
<td>12.57</td>
<td>2.84</td>
<td>-1</td>
<td>-0.28</td>
<td>II3</td>
</tr>
<tr>
<td>13.17</td>
<td>2.98</td>
<td>-1</td>
<td>-0.29</td>
<td>II3</td>
</tr>
</tbody>
</table>
Field Validation
ADA Sidewalk Compliance Criteria

Grade (Running Slope)
Cross Slope
Faulting
Protrusions/Obstructions
Pedestrian Zone

The minimum clear width of an accessible route shall be 36 in. (3ft). (ADAAG 4.3.3) [PROWAAC R301.3.1 requires a continuous and unobstructed clear width of 48 in (4ft).]
In pedestrian circulation areas, maximum 4” projection for post or wall mounted objects between 27” and 80” above the surface.
Obstructions in the Pedestrian Zone

Obstacles in the pedestrian zone limit the clearance width of the sidewalk.

Stationary
- Signal Poles
- Fire Hydrants
- Trees
- Utility Poles

Moveable
- Planters
- Street Signs
- Trees
- Furniture
- Mailboxes
Voice Defect Logging

Facilitate logging of sidewalk obstructions & protrusions, driveway locations, accessible pathway issues while operating ULIPs.

Video-logging supported by Sony HDR-SR1 30 GB hard disk drive (10 hours of SD video) linked to Red Hen Systems VMS 300 unit, a GPS encoder.

Red Hen Systems MediaMapper software organizes and links media to precise location within a map.

Mapping environment allows for:

- Video camera controls including search-and-play, search-and-pause, and fast-forward-play
- Moving cursor during video playback indicates location and camera direction
- Ruler for measuring distance
- Zoom-in / zoom-out, pan, center, refresh
Movable Obstructions/Driveways/Protrusions

Key-press events: Time/distance coding of user defined features.
Database Analysis
This map is a graphic representation derived from the City of Bellevue Geographic Information System. It was designed and intended for City of Bellevue staff use only; it is not guaranteed to survey accuracy. This map is based on the best information available on the date shown on this map. Any reproduction or sale of this map, or portions thereof, is prohibited without express written authorization by the City of Bellevue.

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The Equation Shell software provides an interactive graphical environment with real-time display of data collection.
GIS Database Analysis

Obstructions
- Driveway
- Movable
- Vegetation

Cross Slope
- low
- Med
- high

Running Slope
Roadway Grade Analysis
“Because of the constraints imposed by right-of-way width, the pedestrian access route (PAR) is relieved of the slope limits that would apply to an accessible route on a site provided it matches the general grade of the adjacent roadway.”

- Revised Draft Guidelines for Accessible Public Rights-of-Way; R301.4
Digital Elevation Model

- DEM (Digital Elevation Model) data in GIS used to determine grade of streets for this analysis.

- A DEM is a grid in which each cell represents an elevation. The City contracts with private vendors for updated DEM information approx every 2 years.

- For a given section of road, grade is calculated as Rise/Run. In this equation the length of the road section provides the Run. The DEM provides the Rise. This roadway grade value can then be compared with the corresponding sidewalk grade derived from the ULIP, in order to determine technical feasibility.
The GIS script loops through all non-standard sidewalk grade cases. For each location, the sidewalk grade is compared with the grade of the adjacent street (DEM), allowing for identification of sidewalks where high grade values are due to topographic factors. Once this information is recorded for each location, criteria can be defined to filter out locations which are considered “technically infeasible”.

- Roadway: 1%
  - Sidewalk: 10%
  - Non-Standard Running Slope Location

- Roadway: 10%
  - Sidewalk: 10%
  - Compliant due to technical infeasibility
The sidewalk slope does not conform to the roadway slope. The sidewalk is classified as a Ramp Type 30 which has a running slope between 5 and 8 percent over a distance of 30 feet or greater. The road adjacent to it, has a slope of 5 percent.

The road slope where it is greater than 5 percent (red) is deemed technically infeasible according to ADDAG documentation. Sidewalks with adjacent road slopes that are less than 5 percent are identified as non-standard.
Out of the 137.62 miles of non-standard sidewalk, 97.39 miles are considered technically infeasible.

Technically infeasible sidewalks are the areas where the roadway adjacent to the sidewalk is greater than 5 percent.

The 40.23 feasible but non standard miles that are remaining still include driveways.

The final mileage (excluding driveways) is 33.14 miles.
Driveway Analysis
Driveway Standards

- Certain grades and slopes must be maintained.
- 2% cross-slope,
- 8.33% max ramp slopes if used.
Driveway Crossings

Driveway crossings without landings confront wheelchair users with severe and rapidly changing slopes at the driveway flare.
Obstructions
- Driveway (DW)
- Movable
- Vegetation
- Running Slope

Cross Slope
- low
- Med
- high
# Driveway Analysis Findings

<table>
<thead>
<tr>
<th>X Slope Category</th>
<th>Total X Slope Surveyed Length (Mi)</th>
<th>X Slope within Driveway Buffer (Mi)</th>
<th>X Slope without Driveways (Difference)</th>
<th>%Attributable to Driveways</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-3%</td>
<td>78.7</td>
<td>9.9</td>
<td>68.8</td>
<td>13%</td>
</tr>
<tr>
<td>3-4%</td>
<td>58.0</td>
<td>8.4</td>
<td>49.6</td>
<td>14%</td>
</tr>
<tr>
<td>4-5%</td>
<td>32.7</td>
<td>5.3</td>
<td>27.4</td>
<td>16%</td>
</tr>
<tr>
<td>5-6%</td>
<td>17.4</td>
<td>3.4</td>
<td>14.0</td>
<td>20%</td>
</tr>
<tr>
<td>6-7%</td>
<td>9.2</td>
<td>2.5</td>
<td>6.7</td>
<td>27%</td>
</tr>
<tr>
<td>7-8%</td>
<td>5.6</td>
<td>2.2</td>
<td>3.5</td>
<td>39%</td>
</tr>
<tr>
<td>8-9%</td>
<td>4.1</td>
<td>2.1</td>
<td>2.1</td>
<td>50%</td>
</tr>
<tr>
<td>9-10%</td>
<td>3.3</td>
<td>1.9</td>
<td>1.3</td>
<td>59%</td>
</tr>
<tr>
<td>10-11%</td>
<td>2.4</td>
<td>1.6</td>
<td>0.8</td>
<td>67%</td>
</tr>
<tr>
<td>11-99%</td>
<td>4.8</td>
<td>3.4</td>
<td>1.4</td>
<td>71%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>216.4</strong></td>
<td><strong>40.7</strong></td>
<td><strong>175.7</strong></td>
<td><strong>19%</strong></td>
</tr>
</tbody>
</table>
Integrating a level driveway crossing enhances accessibility.
Web-Based Mapping Interface
Grid A: Block Face 123
Total Block Length: 449.79 Feet
Address 171st Ave SE and SE 47th St

Curb Ramps
Curb Ramp ID# | Severity Level
--- | ---
1685 | 9
1687 | 0

Obstruction Count
- Mixed: 0
- Driveway: 1
- Mailbox: 0
- Vegetation: 1

Heaving (Inches) Count
- 0.25 - 0.50 | 1
- 0.51 - 0.75 | 0
- 0.76 - 2.83 | 0

Grade (Less than 5% Roadway)
Ramp Type | Length (FT)
--- | ---
0 (5% <= x <= 8.33%) | 41.05
8 (8.33% <= x <= 10%) | 73.11
3 (10% <= x <= 12.5%) | 0
90 (x > 12.5%) | 0

Ratio to Total Block Length: 25%

City of Bellevue ADA Sidewalk Implementation
Block Face Priority Level:
Surveyed Sidewalk Block

Total Block Length (Ft.)

449.79
Obstructions

<table>
<thead>
<tr>
<th>Obstruction</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fixed</td>
<td>0</td>
</tr>
<tr>
<td>Driveway</td>
<td>1</td>
</tr>
<tr>
<td>Moveable</td>
<td>0</td>
</tr>
<tr>
<td>Vegetation</td>
<td>1</td>
</tr>
</tbody>
</table>
Heaving (Inches)

<table>
<thead>
<tr>
<th>Bump Height</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>¼-1/2 inch</td>
<td>14</td>
</tr>
<tr>
<td>½-3/4 inch</td>
<td>0</td>
</tr>
<tr>
<td>¾ - 1 inch</td>
<td>0</td>
</tr>
<tr>
<td>&gt; 1 inch</td>
<td>0</td>
</tr>
<tr>
<td>Grade Type</td>
<td>Length (Ft.)</td>
</tr>
<tr>
<td>------------</td>
<td>--------------</td>
</tr>
<tr>
<td>30</td>
<td>114.2</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>99</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
</tr>
</tbody>
</table>

*Ratio to total length is the length of the non standard grade type divided by the total length of the block.
<table>
<thead>
<tr>
<th>Cross Slope Type</th>
<th>Length (Ft.)</th>
<th>*Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>100.56</td>
<td>.224</td>
</tr>
<tr>
<td>2</td>
<td>208.64</td>
<td>.464</td>
</tr>
<tr>
<td>3</td>
<td>61.61</td>
<td>.140</td>
</tr>
<tr>
<td>4</td>
<td>25.70</td>
<td>.057</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>.885</strong></td>
<td></td>
</tr>
</tbody>
</table>

*Ratio to total length is the length of the non standard cross type divided by the total length of the block.
## Curb Ramp Criteria

<table>
<thead>
<tr>
<th>Curb Ramp ID</th>
<th>1685</th>
<th>1687</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curb Ramp Type</td>
<td>Perpendicular</td>
<td>Rolled</td>
</tr>
<tr>
<td>Detectable Warning</td>
<td>F</td>
<td>N/A</td>
</tr>
<tr>
<td>Panel Size</td>
<td>&gt;= 48 inches</td>
<td>N/A</td>
</tr>
<tr>
<td>Panel Slope</td>
<td>F</td>
<td>N/A</td>
</tr>
<tr>
<td>Ramp Width</td>
<td>36-47 inches</td>
<td>N/A</td>
</tr>
<tr>
<td>Ramp Run Slope</td>
<td>&lt; 8.3%</td>
<td>N/A</td>
</tr>
<tr>
<td>Ramp Cross Slope</td>
<td>2-4%</td>
<td>N/A</td>
</tr>
<tr>
<td>Marked Crossing</td>
<td>N/A</td>
<td>F</td>
</tr>
<tr>
<td>Surface Obstruction</td>
<td>OK</td>
<td>OK</td>
</tr>
<tr>
<td>Transition</td>
<td>T</td>
<td>N/A</td>
</tr>
<tr>
<td>Returned Curbs</td>
<td>None</td>
<td>N/A</td>
</tr>
<tr>
<td>Deficiency Score</td>
<td>9</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Curb Ramp ID</th>
<th>1685</th>
<th>1687</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gutter Running Slope</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Gutter Cross Slope</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Gutter Cross Categ</td>
<td>2-4%</td>
<td>N/A</td>
</tr>
<tr>
<td>Gutter Running Slope Category</td>
<td>&gt; 8.1%</td>
<td>N/A</td>
</tr>
<tr>
<td>Number of Marked Crossings</td>
<td>1</td>
<td>N/A</td>
</tr>
<tr>
<td>Flares</td>
<td>&gt; 12%</td>
<td>N/A</td>
</tr>
<tr>
<td>Number of Extreme Features</td>
<td>1</td>
<td>N/A</td>
</tr>
<tr>
<td>Warnings</td>
<td>F</td>
<td>N/A</td>
</tr>
<tr>
<td>Diagonal</td>
<td>T</td>
<td>N/A</td>
</tr>
</tbody>
</table>
City of Bellevue ADA Sidewalk Implementation

Block Face Priority Level:

Grid A: Block Face 123
Total Block Length: 449.79 Feet
Address 171st Ave SE and SE 47th St

Curb Ramps
Curb Ramp ID# | Severity Level
---------------|------------------
1665          | 9
1687          | 0

Obstruction
- Count

- Curb: 0
- Driveway: 1
- Medians: 0
- Vegetation: 1

Heaving (Inches)
- Count
- 0.00-0.50: 14
- 0.51-0.75: 0
- 0.76-2.00: 0

Grade (Less than 6% Roadway)

<table>
<thead>
<tr>
<th>Ramp Type</th>
<th>Length (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 (5% &lt; x &lt; 8.33%)</td>
<td>41.05</td>
</tr>
<tr>
<td>6 (8.33% &lt; x &lt; 10%)</td>
<td>73.11</td>
</tr>
<tr>
<td>3 (10% &lt; x &lt; 12.5%)</td>
<td>0</td>
</tr>
<tr>
<td>9 (12.5% &lt; x)</td>
<td>0</td>
</tr>
</tbody>
</table>

Ratio to Total Block Length: 253%

X Slope (Excl. Driveway)

<table>
<thead>
<tr>
<th>Type</th>
<th>Length (FT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (2-3%)</td>
<td>100.55</td>
</tr>
<tr>
<td>2 (3-4%)</td>
<td>200.64</td>
</tr>
<tr>
<td>3 (4-5%)</td>
<td>60.81</td>
</tr>
<tr>
<td>4 (5-6%)</td>
<td>25.70</td>
</tr>
</tbody>
</table>

Ratio to Total Block Length: 0.885%
Project Prioritization
Community Outreach

Outreach Requirements:

- Provide opportunity to interested persons and groups to participate in self-evaluation leading to transition plan. 28 C.F.R. § 35.105(b).

- Make self-evaluation and plan available for public inspection. Specific time frames and information required. 28 C.F.R. § 35.105(c).

In Bellevue there are 725 Access eligible customers. Approximately 10,000 trips taken monthly in Bellevue.
Community Engagement

Parallel Ramp #1317

Please fill shaded features in table with the number corresponding to your comfort level (see scale at right).

<table>
<thead>
<tr>
<th>Curb ramp feature</th>
<th>Comfort Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detectable Warnings</td>
<td></td>
</tr>
<tr>
<td>Landing Panel Slope</td>
<td></td>
</tr>
<tr>
<td>Ramp Running Slope</td>
<td></td>
</tr>
<tr>
<td>Ramp Cross Slope</td>
<td></td>
</tr>
<tr>
<td>Gutter Running Slope</td>
<td></td>
</tr>
<tr>
<td>Gutter Cross Slope</td>
<td></td>
</tr>
</tbody>
</table>

**Rating System**

<table>
<thead>
<tr>
<th>Comfort Level</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very comfortable</td>
<td>1</td>
</tr>
<tr>
<td>Somewhat comfortable</td>
<td>2</td>
</tr>
<tr>
<td>Somewhat Uncomfortable</td>
<td>3</td>
</tr>
<tr>
<td>Very Uncomfortable</td>
<td>4</td>
</tr>
<tr>
<td>Inaccessible</td>
<td>5</td>
</tr>
</tbody>
</table>
Programming of Asset Improvements

Quickly and accurately identify high priority project locations based on spatial proximity to pedestrian attractors.
ADA Culture of Compliance
ADA Title II Compliance Flowchart

Phase I
- Appoint ADA Coordinator
- Statement of Commitment
  - Planning
    - Orient ADA Coordinator
    - Define Structure
    - Recruit compliance team
    - Recruit community participants
    - Refine planning and implementation process
    - Draft and publish public notice
    - Establish grievance procedure
  - Training
    - ADA training
    - Orient to roles

Phase II
- Self Evaluation
  - Employment
    - Nondiscrimination in programs and activities
  - Effective Communication
    - Program and facility accessibility

Phase III
- Modification to Policies and Practices
  - Development of Communications Capacity
- Staff Training
  - Maintenance of Access Features
  - Monitoring
- Program Access Solutions
  - Nonstructural
    - Structural
- Nonstructural Modifications
  - Transition Plan

Participation of Disability Community

Capital Planning
ADA Curb Ramp Upgrades

CITY COUNCIL AGENDA MEMORANDUM

February 17, 2009

Item No. 0(3)

SUBJECT:
Motion to award Bid No. 9014, 2009 ADA Ramp Upgrade and Sidewalk Repair Project, to Dennis R. Craig Construction, as the lowest responsible and responsive bidder, in the amount of $511,622.00 (CIP Plan Nos. PW-M-1 and PW-M-3).

FISCAL IMPACT:
Awarding this bid will obligate the City to $511,622.00 for the repair of concrete curb, gutter and sidewalk, and American with Disabilities Act (ADA) ramp installations/retrofits. This amount is approximately 14.9% under the Engineer’s Estimate. This amount is fully funded through the following programs:

<table>
<thead>
<tr>
<th>CIP Plan No.</th>
<th>Description</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>PW-M-1</td>
<td>Overlay Program</td>
<td>$428,468</td>
</tr>
<tr>
<td>PW-M-3</td>
<td>Curb, Gutter &amp; Sidewalk Rehabilitation</td>
<td>$13,154</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>$511,622</td>
</tr>
</tbody>
</table>

This work is part of the annual Overlay Program (CIP Plan No. PW-M-1) for which the annual budget ranges from $5,065,000 in 2009 to $7,207,000 in 2015. This program addresses major street maintenance such as street overlays, pavement rehabilitations, bridge maintenance, and ADA retrofit work. Sufficient budget exists within the two programs to complete this project.

STAFF CONTACT:
Goran Sparrman, Director, 452-4338
Dave Berg, Deputy Director, 452-6468
Mike Mattar, Design Division Manager, 452-4318
Mike Rodni, Project Manager, 452-4556
Transportation Department

POLICY CONSIDERATION:
The Americans with Disabilities Act (ADA), enacted on July 26, 1990, provides comprehensive rights and protections to individuals with disabilities in the areas of employment, public accommodations, state and local government services, and telecommunications. The goal of the ADA is to assure equality of opportunity, full participation, independent living, and economic self-sufficiency. According to the law, facilities that are altered, such as through the Overlay Program activities, must be designed and re-constructed to be accessible to and usable by people with disabilities (Title 28, Code of Federal Regulations, part 35.151).

The City of Bellevue Comprehensive Plan provides policy support for the 2009 ADA Ramp Upgrade and Sidewalk Repair Program, including TR-26 that focuses on providing for the mobility needs of all citizens and TR-82 that guides the maintenance of our existing non-motorized system.
Keep it Neighborly
CLEAR THE WALKWAY!

In our northwest climate, trees and shrubs grow quickly. Overgrown plants and low-hanging branches can lead to head and eye injuries, or can force pedestrians to walk close to oncoming traffic. To improve the safety of your sidewalk, be sure to:

- Prune trees to a seven foot vertical clearance.
- Prune one foot back from the edge of the sidewalk. The extra space allows your neighbors to use all of the sidewalk space more effectively and safely.
- Sweep away fallen leaves and other debris.
- Trim vegetation obstructing driveways or intersections to increase visibility of pedestrian and street signs.

Be neighborly - keep your sidewalk clear (BCI 14.08.010).

For more information, call the City of Bellevue Transportation Department at (425) 452-8956.

For technical information on how to properly prune, contact Bellevue’s Parks and Community Services Department, Resource Management Division at (425) 452-6855.
Questions/Comments?