SDOT
Seattle Department of Transportation

# Technical Memorandum

**To:** FILE

**From:** SDOT ADA Committee

**Date:** September 15, 2017

**Re**: Accessible Pedestrian Signals (APS) and ADA Compliance

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## ***Overview and Purpose***

Federal requirements and guidance documents are available that provide information on making public right-of-way street crossings accessible to all users. One aspect of providing an accessible street crossing is an Accessible Pedestrian Signal (APS) that includes audible and vibrotactile information for users that are visually and/or hearing impaired.

The documents the City refers to and follows when implementing APS are: Title II of the American Disabilities Act (ADA), the 2011 Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right of Way (PROWAG), and the 2009 Manual on Uniform Traffic Control Devices (MUTCD). The basis for enforcement for the Department of Justice (DOJ) is Title II of the ADA.

While the PROWAG and the MUTCD provide scoping and technical guidelines, Title II of the ADA mandates that state and local government provide "effective communications" to those living with disabilities. This document is intended to summarize the available requirements and guidance documents currently available and relevant to the provision of APS.

## ***Regulations, Standards, and Guidance***

1) **Americans with Disabilities Act Title II Regulations (2010), 28 CFR § 35.160 General.**

   A) (a)(1) A public entity shall take appropriate steps to ensure that communications with members of the public with disabilities are as effective as communications with others.

   B) (b)(1) A public entity shall furnish appropriate auxiliary aids and services where necessary to afford individuals with disabilities an equal opportunity to participate in, and enjoy the benefits of, a service, program, or activity of a public entity.

2) **Proposed Accessibility Guidelines for Pedestrian Facilities in the Public Right-of-Way (PROWAG Draft 2011)**

   A) **Section R209 Accessible Pedestrian Signals and Pedestrian Pushbuttons**

   **R209.1 General.** Where pedestrian signals are provided at pedestrian street crossings, they shall include accessible pedestrian signals and pedestrian pushbuttons complying with sections 4E.08 through 4E.13 of the MUTCD (incorporated by reference, see R104.2). Operable parts shall comply with R403.

**Advisory R209 Accessible Pedestrian Signals and Pedestrian Pushbuttons.** An accessible pedestrian signal and pedestrian pushbutton is an integrated device that communicates information about the WALK and DON'T WALK intervals at signalized intersections in non-visual formats (i.e., audible tones and vibrotactile surfaces) to pedestrians who are blind or have low vision.

**R209.2 Alterations.** Existing pedestrian signals shall comply with R209.1 when the signal controller and software are altered, or the signal head is replaced.

**B) Section R403 Operable Parts**

**R403.1 General.** Operable parts shall comply with R403.

**Advisory R403.1 General.** Operable parts on accessible pedestrian signals and pedestrian pushbuttons (see R209) and parking meters and parking pay stations that serve accessible parking spaces (see R309.5) must comply with R403.

**R403.2 Clear Space.** A clear space complying with R404 shall be provided at operable parts.

**R403.3 Height.** Operable parts shall be placed within one or more of the reach ranges specified in R406.

**R403.4 Operation.** Operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 22 N (5 lbs.) maximum.

**C) Section R404 Clear Spaces**

**R404.1 General.** Clear spaces shall comply with R404.

**Advisory R404.1 General.** Clear spaces are required at operable parts (see R403.2), including accessible pedestrian signals and pedestrian pushbuttons (see R209) and parking meters and parking pay stations that serve accessible parking spaces (see R309.5). Clear spaces are also required at benches (see R212.6) and within transit shelters (see R308.2).

**R404.2 Surfaces.** Surfaces of clear spaces shall comply with R302.7 and shall have a running slope consistent with the grade of the adjacent pedestrian access route and cross slope of 2 percent maximum.

**R404.3 Size.** Clear spaces shall be 760 mm (2.5 ft) minimum by 1220 mm (4.0 ft) minimum.

**R404.4 Knee and Toe Clearance.** Unless otherwise specified, clear spaces shall be permitted to include knee and toe clearance complying with R405.

**R404.5 Position.** Unless otherwise specified, clear spaces shall be positioned for either forward or parallel approach to an element.

**R404.6 Approach.** One full unobstructed side of a clear space shall adjoin a pedestrian access route or adjoin another clear space.

**R404.7 Maneuvering Space.** Where a clear space is confined on all or part of three sides, additional maneuvering space shall be provided in accordance with R404.7.1 and R404.7.2.

**R404.7.1 Forward Approach.** The clear space and additional maneuvering space shall be 915

mm (3.0 ft) wide minimum where the depth exceeds 610 mm (2.0 ft).

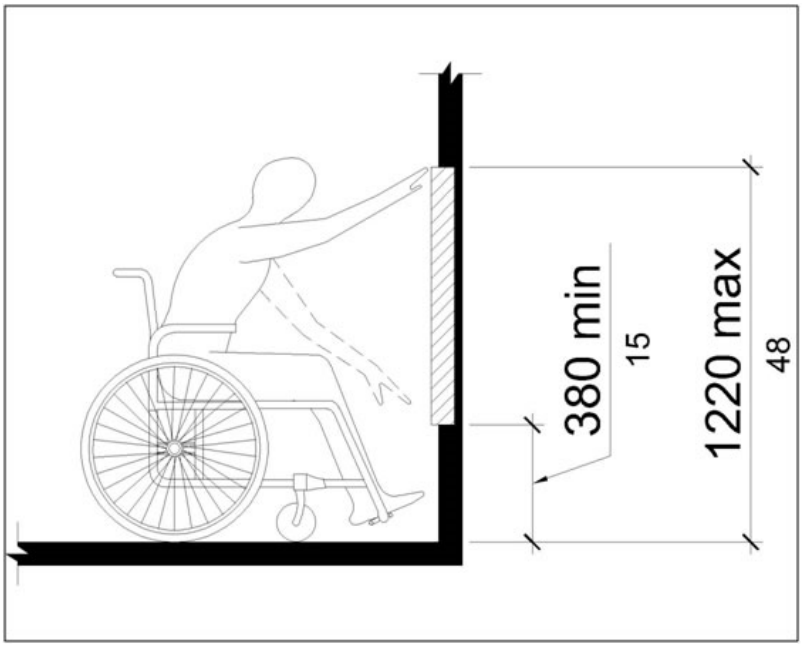
**R404.7.2 Parallel Approach.** The clear space and additional maneuvering space shall be 1525 mm (5.0 ft) wide minimum where the depth exceeds 380 mm (1.25 ft).

**D) Section R406 Reach Ranges**

**R406.1 General.** Reach ranges shall comply with R406.

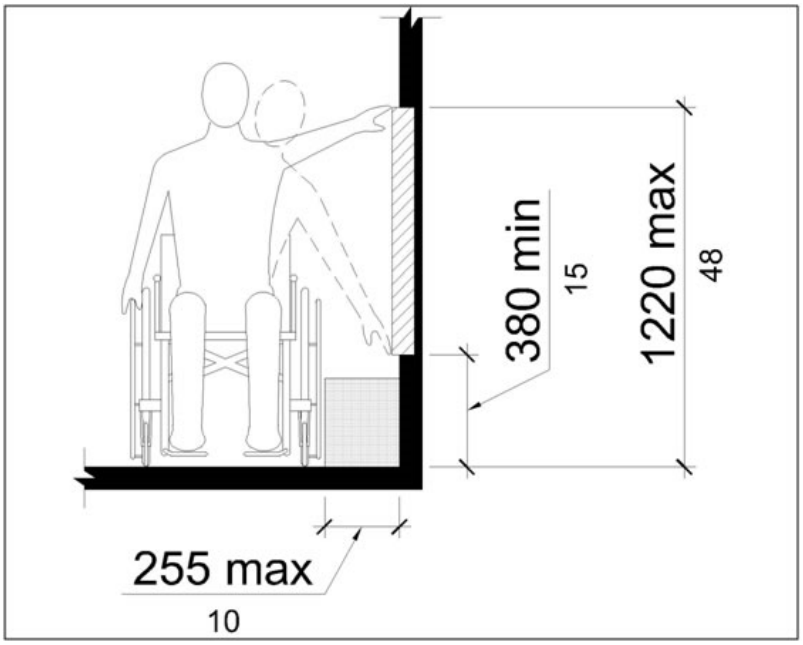
**R406.2 Unobstructed Forward Reach.** Where a forward reach is unobstructed, the high forward reach shall be 1220 mm (4.0 ft) maximum and the low forward reach shall be 380 mm (1.25 ft) minimum above the finish surface. Forward reach over an obstruction is not permitted.

**Figure R406.2 Unobstructed Forward Reach**




**R406.3 Unobstructed Side Reach.** Where a clear space allows a parallel approach to an element and the side reach is unobstructed, the high side reach shall be 1220 mm (4.0 ft) maximum and the low side reach shall be 380 mm (1.25 ft) minimum above the finish surface. An obstruction shall be permitted between the clear space and the element where the depth of the obstruction is 255 mm (10 in) maximum.

**Figure R406.3 Unobstructed Side Reach**




**3) Manual on Uniform Traffic Control Devices (2009)**

**A) Section 4E.08 Pedestrian Detectors**

Option:
01 Pedestrian detectors may be pushbuttons or passive detection devices.

Support:
02 Passive detection devices register the presence of a pedestrian in a position indicative of a desire to cross, without requiring the pedestrian to push a button. Some passive detection devices are capable of tracking the progress of a pedestrian as the pedestrian crosses the roadway for the purpose of extending or shortening the duration of certain pedestrian timing intervals.

03 The provisions in this Section place pedestrian pushbuttons within easy reach of pedestrians who are intending to cross each crosswalk and make it obvious which pushbutton is associated with each crosswalk. These provisions also position pushbutton poles in optimal locations for installation of accessible pedestrian signals (see Sections 4E.09 through 4E.13). Information regarding reach ranges can be found in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" (see Section 1A.11).

*Guidance:*
04 *If pedestrian pushbuttons are used, they should be capable of easy activation and conveniently located near each end of the crosswalks. Except as provided in Paragraphs 5 and 6, pedestrian pushbuttons should be located to meet all of the following criteria (see Figure 4E-3):*

*A. Unobstructed and adjacent to a level all-weather surface to provide access from a wheelchair;*

*B. Where there is an all-weather surface, a wheelchair accessible route from the pushbutton to the ramp;*

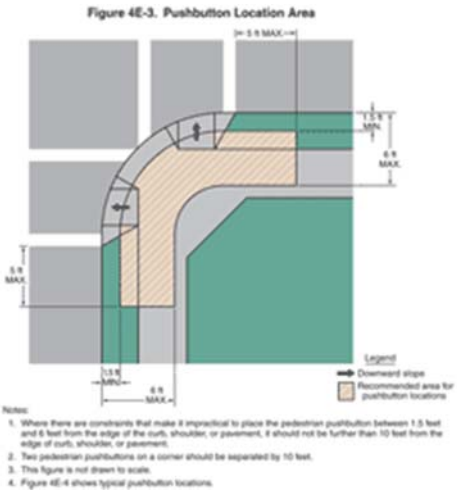
*C. Between the edge of the crosswalk line (extended) farthest from the center of the intersection and the side of a curb ramp (if present), but not greater than 5 feet from said crosswalk line;*

*D. Between 1.5 and 6 feet from the edge of the curb, shoulder, or pavement;*

*E. With the face of the pushbutton parallel to the crosswalk to be used; and*

*F. At a mounting height of approximately 3.5 feet, but no more than 4 feet, above the sidewalk.*

**Figure 4E-3 Pushbutton Location Area**




05 *Where there are physical constraints that make it impractical to place the pedestrian pushbutton adjacent to a level all-weather surface, the surface should be as level as feasible.*

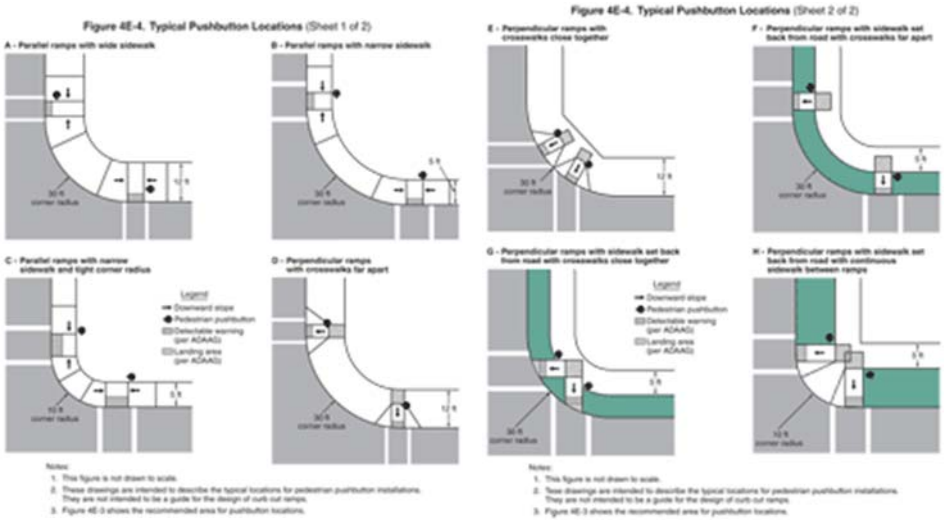
06 *Where there are physical constraints that make it impractical to place the pedestrian pushbutton between 1.5 and 6 feet from the edge of the curb, shoulder, or pavement, it should not be farther than 10 feet from the edge of curb, shoulder, or pavement.*

07 *Except as provided in Paragraph 8, where two pedestrian pushbuttons are provided on the same corner of a signalized location, the pushbuttons should be separated by a distance of at least 10 feet.*

Option:
08 Where there are physical constraints on a particular corner that make it impractical to provide the 10-foot separation between the two pedestrian pushbuttons, the pushbuttons may be placed closer together or on the same pole.

Support:
09 Figure 4E-4 shows typical pedestrian pushbutton locations for a variety of situations.

**Figure 4E-4 Typical Pushbutton Locations (Sheet 1 of 2)**




**Standard:**
10 **Signs (see Section 2B.52) shall be mounted adjacent to or integral with pedestrian pushbuttons, explaining their purpose and use.**

Option:
11 At certain locations, a supplemental sign in a more visible location may be used to call attention to the pedestrian pushbutton.

**Standard:**
12 **The positioning of pedestrian pushbuttons and the legends on the pedestrian pushbutton signs shall clearly indicate which crosswalk signal is actuated by each pedestrian pushbutton.**

13 **If the pedestrian clearance time is sufficient only to cross from the curb or shoulder to a median of sufficient width for pedestrians to wait and the signals are pedestrian actuated, an additional pedestrian detector shall be provided in the median.**

*Guidance:*
14 *The use of additional pedestrian detectors on islands or medians where a pedestrian might become stranded should be considered.*

15 *If used, special purpose pushbuttons (to be operated only by authorized persons) should include a housing capable of being locked to prevent access by the general public and do not need an instructional sign.*

**Standard:**
16 **If used, a pilot light or other means of indication installed with a pedestrian pushbutton shall not be illuminated until actuation. Once it is actuated, the pilot light shall remain illuminated until the pedestrian's green or WALKING PERSON (symbolizing WALK) signal indication is displayed.**

17 **If a pilot light is used at an accessible pedestrian signal location (see Sections 4E.09 through 4E.13), each actuation shall be accompanied by the speech message "wait."**

Option:
18 At signalized locations with a demonstrated need and subject to equipment capabilities, pedestrians with special needs may be provided with additional crossing time by means of an extended pushbutton press.

**Standard:**
19 **If additional crossing time is provided by means of an extended pushbutton press, a PUSH BUTTON FOR 2 SECONDS FOR EXTRA CROSSING TIME (R10-32P) plaque (see Figure 2B-26) shall be mounted adjacent to or integral with the pedestrian pushbutton.**

**B) Section 4E.09 Accessible Pedestrian Signals and Detectors – General**

Support:
01 Accessible pedestrian signals and detectors provide information in non-visual formats (such as audible tones, speech messages, and/or vibrating surfaces).

02 The primary technique that pedestrians who have visual disabilities use to cross streets at signalized locations is to initiate their crossing when they hear the traffic in front of them stop and the traffic alongside them begin to move, which often corresponds to the onset of the green interval. The existing environment is often not sufficient to provide the information that pedestrians who have visual disabilities need to cross a roadway at a signalized location.

*Guidance:*
03 *If a particular signalized location presents difficulties for pedestrians who have visual disabilities to cross the roadway, an engineering study should be conducted that considers the needs of pedestrians in general, as well as the information needs of pedestrians with visual disabilities. The engineering study should consider the following factors:*

*A. Potential demand for accessible pedestrian signals;*
*B. A request for accessible pedestrian signals;*
*C. Traffic volumes during times when pedestrians might be present, including periods of low traffic volumes or high turn-on-red volumes;*
*D. The complexity of traffic signal phasing (such as split phases, protected turn phases, leading pedestrian intervals, and exclusive pedestrian phases); and*
*E. The complexity of intersection geometry.*

Support:
04 The factors that make crossing at a signalized location difficult for pedestrians who have visual disabilities include: increasingly quiet cars, right turn on red (which masks the beginning of the through phase), continuous right-turn movements, complex signal operations, traffic circles, and wide streets. Furthermore, low traffic volumes might make it difficult for pedestrians who have visual disabilities to discern signal phase changes.

05 Local organizations, providing support services to pedestrians who have visual and/or hearing disabilities, can often act as important advisors to the traffic engineer when consideration is being given to the installation of devices to assist such pedestrians. Additionally, orientation and mobility specialists or similar staff also might be able to provide a wide range of advice. The U.S. Access Board (www.access-board.gov) provides technical assistance for making pedestrian signal information available to persons with visual disabilities (see Page i for the address for the U.S. Access Board).

**Standard:**
06 **When used, accessible pedestrian signals shall be used in combination with pedestrian signal timing. The information provided by an accessible pedestrian signal shall clearly indicate which pedestrian crossing is served by each device.**

07 **Under stop-and-go operation, accessible pedestrian signals shall not be limited in operation by the time of day or day of week.**

Option:
08 Accessible pedestrian signal detectors may be pushbuttons or passive detection devices.

09 At locations with pretimed traffic control signals or non-actuated approaches, pedestrian pushbuttons may be used to activate the accessible pedestrian signals.

Support:
10 Accessible pedestrian signals are typically integrated into the pedestrian detector (pushbutton), so the audible tones and/or messages come from the pushbutton housing. They have a pushbutton locator tone and tactile arrow, and can include audible beaconing and other special features.

Option:
11 The name of the street to be crossed may also be provided in accessible format, such as Braille or raised print. Tactile maps of crosswalks may also be provided.

Support:
12 Specifications regarding the use of Braille or raised print for traffic control devices can be found in the "Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG)" (see Section 1A.11).

**Standard:**
13 **At accessible pedestrian signal locations where pedestrian pushbuttons are used, each pushbutton shall activate both the walk interval and the accessible pedestrian signals.**

**C) Section 4E.10 Accessible Pedestrian Signals and Detectors – Location**

Support:
01 Accessible pedestrian signals that are located as close as possible to pedestrians waiting to cross the street provide the clearest and least ambiguous indication of which pedestrian crossing is served by a device.

*Guidance:*
02 *Pushbuttons for accessible pedestrian signals should be located in accordance with the provisions of Section 4E.08 and should be located as close as possible to the crosswalk line furthest from the center of the intersection and as close as possible to the curb ramp.*

**Standard:**
03 **If two accessible pedestrian pushbuttons are placed less than 10 feet apart or on the same pole, each accessible pedestrian pushbutton shall be provided with the following features (see Sections 4E.11 through 4E.13):**

**A. A pushbutton locator tone,**

**B. A tactile arrow,**

**C. A speech walk message for the WALKING PERSON (symbolizing WALK) indication, and**

**D. A speech pushbutton information message.**

04 **If the pedestrian clearance time is sufficient only to cross from the curb or shoulder to a median of sufficient width for pedestrians to wait and accessible pedestrian detectors are used, an additional accessible pedestrian detector shall be provided in the median.**

**D) Section 4E.11 Accessible Pedestrian Signals and Detectors – Walk Indications**

Support:
01 Technology that provides different sounds for each non-concurrent signal phase has frequently been found to provide ambiguous information. Research indicates that a rapid tick tone for each crossing coming from accessible pedestrian signal devices on separated poles located close to each crosswalk provides unambiguous information to pedestrians who are blind or visually impaired. Vibrotactile indications provide information to pedestrians who are blind and deaf and are also used by pedestrians who are blind or who have low vision to confirm the walk signal in noisy situations.

**Standard:**
02 **Accessible pedestrian signals shall have both audible and vibrotactile walk indications.**

03 **Vibrotactile walk indications shall be provided by a tactile arrow on the pushbutton (see Section 4E.12) that vibrates during the walk interval.**

04 **Accessible pedestrian signals shall have an audible walk indication during the walk interval only. The audible walk indication shall be audible from the beginning of the associated crosswalk.**

05 **The accessible walk indication shall have the same duration as the pedestrian walk signal except when the pedestrian signal rests in walk.**

*Guidance:*
06 *If the pedestrian signal rests in walk, the accessible walk indication should be limited to the first 7 seconds of the walk interval. The accessible walk indication should be recalled by a button press during the walk interval provided that the crossing time remaining is greater than the pedestrian change interval.*

**Standard:**
07 **Where two accessible pedestrian signals are separated by a distance of at least 10 feet, the audible walk indication shall be a percussive tone. Where two accessible pedestrian signals on one corner are not separated by a distance of at least 10 feet, the audible walk indication shall be a speech walk message.**

08 **Audible tone walk indications shall repeat at eight to ten ticks per second. Audible tones used as walk indications shall consist of multiple frequencies with a dominant component at 880 Hz.**

*Guidance:*
09 *The volume of audible walk indications and pushbutton locator tones (see Section 4E.12) should be set to be a maximum of 5 dBA louder than ambient sound, except when audible beaconing is provided in response to an extended pushbutton press.*

**Standard:**
10 **Automatic volume adjustment in response to ambient traffic sound level shall be provided up to a maximum volume of 100 dBA.**

*Guidance:*
11 *The sound level of audible walk indications and pushbutton locator tones should be adjusted to be low enough to avoid misleading pedestrians who have visual disabilities when the following conditions exist:*

A. *Where there is an island that allows unsignalized right turns across a crosswalk between the island and the sidewalk.*
B. *Where multi-leg approaches or complex signal phasing require more than two pedestrian phases, such that it might be unclear which crosswalk is served by each audible tone.*
C. *At intersections where a diagonal pedestrian crossing is allowed, or where one street receives a WALKING PERSON (symbolizing WALK) signal indication simultaneously with another street.*

Option:
12 An alert tone, which is a very brief burst of high-frequency sound at the beginning of the audible walk indication that rapidly decays to the frequency of the walk tone, may be used to alert pedestrians to the beginning of the walk interval.

Support:
13 An alert tone can be particularly useful if the walk tone is not easily audible in some traffic conditions.

14 Speech walk messages communicate to pedestrians which street has the walk interval. Speech messages might be either directly audible or transmitted, requiring a personal receiver to hear the message. To be a useful system, the words and their meaning need to be correctly understood by all users in the context of the street environment where they are used. Because of this, tones are the preferred means of providing audible walk indications except where two accessible pedestrian signals on one corner are not separated by a distance of at least 10 feet.

15 If speech walk messages are used, pedestrians have to know the names of the streets that they are crossing in order for the speech walk messages to be unambiguous. In getting directions to travel to a new location, pedestrians with visual disabilities do not always get the name of each street to be crossed. Therefore, it is desirable to give users of accessible pedestrian signals the name of the street controlled by the pushbutton. This can be done by means of a speech pushbutton information message (see Section 4D.13) during the flashing or steady UPRAISED HAND intervals, or by raised print and Braille labels on the pushbutton housing.

16 By combining the information from the pushbutton message or Braille label, the tactile arrow aligned in the direction of travel on the relevant crosswalk, and the speech walk message, pedestrians with visual disabilities are able to correctly respond to speech walk messages even if there are two pushbuttons on the same pole.

**Standard:**
17 **If speech walk messages are used to communicate the walk interval, they shall provide a clear message that the walk interval is in effect, as well as to which crossing it applies. Speech walk messages shall be used only at intersections where it is technically infeasible to install two accessible pedestrian signals at one corner separated by a distance of at least 10 feet.**

18 **Speech walk messages that are used at intersections having pedestrian phasing that is concurrent with vehicular phasing shall be patterned after the model: "Broadway. Walk sign is on to cross Broadway."**

19 **Speech walk messages that are used at intersections having exclusive pedestrian phasing shall be patterned after the model: "Walk sign is on for all crossings."**

20 **Speech walk messages shall not contain any additional information, except they shall include designations such as "Street" or "Avenue" where this information is necessary to avoid ambiguity at a particular location.**

*Guidance:*
21 *Speech walk messages should not state or imply a command to the pedestrian, such as "Cross Broadway now." Speech walk messages should not tell pedestrians that it is "safe to cross," because it is always the pedestrian's responsibility to check actual traffic conditions.*

**Standard:**
22 **A speech walk message is not required at times when the walk interval is not timing, but, if provided:**

**A. It shall begin with the term "wait."**
**B. It need not be repeated for the entire time that the walk interval is not timing.**

23 **If a pilot light (see Section 4E.08) is used at an accessible pedestrian signal location, each actuation shall be accompanied by the speech message "wait."**

Option:
24 Accessible pedestrian signals that provide speech walk messages may provide similar messages in languages other than English, if needed, except for the terms "walk sign" and "wait."

**Standard:**
25 **Following the audible walk indication, accessible pedestrian signals shall revert to the pushbutton locator tone (see Section 4E.12) during the pedestrian change interval.**

**E) Section 4E.12 Accessible Pedestrian Signals and Detectors – Tactile Arrows and Locator Tones**

**Standard:**
01 **To enable pedestrians who have visual disabilities to distinguish and locate the appropriate pushbutton at an accessible pedestrian signal location, pushbuttons shall clearly indicate by means of tactile arrows which crosswalk signal is actuated by each pushbutton. Tactile arrows shall be located on the pushbutton, have high visual contrast (light on dark or dark on light), and shall be aligned parallel to the direction of travel on the associated crosswalk.**

02 **An accessible pedestrian pushbutton shall incorporate a locator tone.**

Support:
03 A pushbutton locator tone is a repeating sound that informs approaching pedestrians that a pushbutton to actuate pedestrian timing or receive additional information exists, and that enables pedestrians with visual disabilities to locate the pushbutton.

**Standard:**
04 **Pushbutton locator tones shall have a duration of 0.15 seconds or less, and shall repeat at 1-second intervals.**

05 **Pushbutton locator tones shall be deactivated when the traffic control signal is operating in a flashing mode. This requirement shall not apply to traffic control signals or pedestrian hybrid beacons that are activated from a flashing or dark mode to a stop-and-go mode by pedestrian actuations.**

06 **Pushbutton locator tones shall be intensity responsive to ambient sound, and be audible 6 to 12 feet from the pushbutton, or to the building line, whichever is less.**

Support:
07 Section 4E.11 contains additional provisions regarding the volume and sound level of pushbutton locator tones.

**Section 4E.13 Accessible Pedestrian Signals and Detectors – Extended Pushbutton Press Features**

Option:
01 Pedestrians may be provided with additional features such as increased crossing time, audible beaconing, or a speech pushbutton information message as a result of an extended pushbutton press.

**Standard:**
02 **If an extended pushbutton press is used to provide any additional feature(s), a pushbutton press of less than one second shall actuate only the pedestrian timing and any associated accessible walk indication, and a pushbutton press of one second or more shall actuate the pedestrian timing, any associated accessible walk indication, and any additional feature(s).**

03 **If additional crossing time is provided by means of an extended pushbutton press, a PUSH BUTTON FOR 2 SECONDS FOR EXTRA CROSSING TIME (R10-32P) plaque (see Figure 2B-26) shall be mounted adjacent to or integral with the pedestrian pushbutton.**

Support:
04 Audible beaconing is the use of an audible signal in such a way that pedestrians with visual disabilities can home in on the signal that is located on the far end of the crosswalk as they cross the street.

05 Not all crosswalks at an intersection need audible beaconing; audible beaconing can actually cause confusion if used at all crosswalks at some intersections. Audible beaconing is not appropriate at locations with channelized turns or split phasing, because of the possibility of confusion.

*Guidance:*
06 *Audible beaconing should only be considered following an engineering study at:*

*A. Crosswalks longer than 70 feet, unless they are divided by a median that has another accessible pedestrian signal with a locator tone;*
*B. Crosswalks that are skewed;*
*C. Intersections with irregular geometry, such as more than four legs;*
*D. Crosswalks where audible beaconing is requested by an individual with visual disabilities; or*
*E. Other locations where a study indicates audible beaconing would be beneficial.*

Option:
07 Audible beaconing may be provided in several ways, any of which are initiated by an extended pushbutton press.

**Standard:**
08 **If audible beaconing is used, the volume of the pushbutton locator tone during the pedestrian change interval of the called pedestrian phase shall be increased and operated in one of the following ways:**

**A. The louder audible walk indication and louder locator tone comes from the far end of the crosswalk, as pedestrians cross the street,**
**B. The louder locator tone comes from both ends of the crosswalk, or**
**C. The louder locator tone comes from an additional speaker that is aimed at the center of the crosswalk and that is mounted on a pedestrian signal head.**

Option:
09 Speech pushbutton information messages may provide intersection identification, as well as information about unusual intersection signalization and geometry, such as notification regarding exclusive pedestrian phasing, leading pedestrian intervals, split phasing, diagonal crosswalks, and medians or islands.

**Standard:**
10 **If speech pushbutton information messages are made available by actuating the accessible pedestrian signal detector, they shall only be actuated when the walk interval is not timing. They shall begin with the term "Wait," followed by intersection identification information modeled after: "Wait to cross Broadway at Grand." If information on intersection signalization or geometry is also given, it shall follow the intersection identification information.**

*Guidance:*
11 *Speech pushbutton information messages should not be used to provide landmark information or to inform pedestrians with visual disabilities about detours or temporary traffic control situations.*

Support:
12 Additional information on the structure and wording of speech pushbutton information messages is included in ITE's "Electronic Toolbox for Making Intersections More Accessible for Pedestrians Who Are Blind or Visually Impaired," which is available at ITE's website (see Page i).