Texas Department of Transportation

DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 463-8585

October 28, 2002

Mr. Scott Windley
Technical and Informational Services
Architectural and Transportation
Barriers Compliance Board
1331 F Street NW, Ste. 1000
Washington, DC 20004-1111

Dear Mr. Windley:

On behalf of the Texas Department of Transportation (TxDOT), I would like to thank the U.S. Access Board (Board) for its extensive effort to develop guidelines with specific application to the public rights of way. I agree that practitioners need specific guidance applicable to public right of way projects that recognize the site constraints involved in these types of projects.

Recognizing that no rule of this type will ever satisfy all parties, we believe that, overall, the Board has done a good job of balancing accessibility needs with the real world limitations of restrictive right of way widths, challenging terrain, and other factors. However, some of the draft provisions do cause particular concern for this agency and will be addressed in detail in the comments that follow.

I thank the Board for allowing our representative to serve on the Public Rights of Way Access Advisory Committee and appreciate the opportunity to comment on these important guidelines.

Sincerely,

Amadeo Saenz, Jr., P.E.
Assistant Executive Director
Engineering Operations

Attachment

# Comments and Recommendations *on the* Draft Guidelines for Accessible Public Rights-of-Way

October 2002

**Broad Issues**

Cost is always an issue when new regulations are imposed. TxDOT is already stretching available funding extremely thin and we are only able to fund approximately a third of the needed improvements that have been identified. Some proposals contained in the draft guidelines would require a substantial amount of funds.

Tolerances within the highway construction industry are rarely to the nearest millimeter – and, in some cases, inches are too precise. Highway construction tolerances are not the same as those in architectural design. The Access Board needs to revise the units of measure used throughout these guidelines appropriately based on the item being measured. Examples of excessive precision include the maximum curb ramp length of 4,570 mm and the minimum rise of 1,525 mm for which an elevator is required. This precision is not achievable in the field and TxDOT cannot afford to be held liable if certain measurements are off by as little as a millimeter.

---

**Defined Terms (§1101.3)**

a) **Alteration.** A tremendous amount of clarification is needed related to the term "alteration," as well as the requirements that it triggers. Currently, this term is open to a wide range of interpretation, which is likely to open up public agencies to potential lawsuits. Standard engineering terminology needs to be used to ensure that the requirements are understood and implemented correctly. Either a definition or additional guidance in this area is necessary so that agencies and their staff can be certain that they are meeting the requirements of the ADAAG. Such definition or guidance should utilize terminology more familiar to transportation engineers – such as resurfacing, restoration, rehabilitation and reconstruction.

b) **Barrier.** TxDOT recommends removing this term from the guidelines and replacing it with "edge delineation" or a similar phrase where appropriate. Otherwise, the term needs to be defined. As currently used, the term "barrier" has a different meaning from that commonly understood by transportation engineers, which will lead to confusion regarding what is required or desired.

Transportation engineers will think of longitudinal barriers that are placed along the roadside to shield motorists from obstacles. Examples of barriers include the massive concrete “Jersey” barriers seen often along major freeways and steel W-beam guardrail. These barriers must meet very specific performance criteria to ensure that they can safely contain and redirect errant motor vehicles and are not what we believe you generally intend to require in the pedestrian environment.

c) **Blended Transition.** While discussing the draft provisions with several transportation engineers, it is evident that this term is not widely recognized and needs definition to ensure that the related provisions are properly interpreted.

d) **Cross Slope.** The definition for cross slope is different than that used by the highway design community. Cross slope would generally be used to describe any pavement slope that is perpendicular to the direction of vehicular travel. The term superelevation is only used to describe the increased cross slope that is placed on roadway surfaces in the presence of a horizontal curve, often called “banking”. TxDOT suggests that the two terms not be used interchangeably and that the second sentence under the cross slope definition be stricken.

e) **Pedestrian Access Route.** Refine this definition to state: “An accessible corridor *intended for* pedestrian use within the public right-of-way.” TxDOT does not generally intend for pedestrians to utilize shoulders and could not design shoulders to meet the cross-slope and other requirements contained herein and still meet roadway design engineering criteria.

f) **Roadway.** TxDOT recommends that a definition of “roadway” should be included, to define a roadway as a vehicular travelway, whether on the ground or on a bridge. This is necessary to avoid issues and confusion regarding sidewalks on bridges that have a running slope greater than 5% (1:20). We suggest “The portion of the public way ordinarily used for vehicular travel, shoulder, or parking, inclusive of bridges, but exclusive of the sidewalk or curb."

g) **Running Slope.** Both “grade” and “running slope” are used throughout the guidelines interchangeably. For example, the term “grade” is used in Section 1103.5 when referring to the Pedestrian Access Route, but “running slope” is used in Section 1105.2.3, which refers to crosswalks (which are part of the pedestrian access route). TxDOT recommends removing the term “running slope” from the guidelines and using “grade” consistently, since it is the more common term used by transportation engineers.

h) **Superelevation.** Delete this term since it is not used in the draft rule. If it is retained, it should be correctly defined as “The increased cross-slope on a roadway curve that assists in counteracting the lateral acceleration imposed on traveling vehicles.”

---

**Scoping Provisions (§1102)**

a) §1102.1 and §1102.2.2 – As mentioned briefly under the comments related to defined terms, much clarification is needed on what constitutes a newly built or altered pedestrian way. In the area of signals, some very simple improvements could be misconstrued as an alteration. Clarity is essential for the proper application of these requirements by state and local governments. For example, if an existing signal is re-timed to account for changing traffic demands, does this constitute an alteration? What about changing out the signal lamps to LED displays? More definitive scoping language on a variety of project types is needed to provide clarity for practitioners. We suggest using standard roadway design terminology to clearly communicate to practitioners the scope of ADA improvements necessitated by various types of road projects. Industry standard terminology is generally referred to as the 4R's (resurfacing, restoration, rehabilitation and reconstruction) and preventive maintenance. TxDOT definitions for these terms are as follows:

- Preventive Maintenance - Preventive maintenance for pavements is a relatively light-duty treatment applied before the pavement shows obvious signs of deterioration. These treatments preserve condition and prolong pavement life either by repairing the surface or by preventing intrusion of water into the underlying layers. Some typical preventive maintenance treatments for pavements are: seal coat, thin overlay, crack seal and joint treatment.
- Resurfacing - Resurfacing is the application of an additional surface to an existing base pavement or wearing surface to improve the ride, strength, or safety of the pavement.
- Restoration (2R) - Work proposed to restore the pavement structure, riding quality, or other necessary components to their existing cross section configuration.
- Rehabilitation (3R) - Rehabilitation is work proposed to improve serviceability and extend the service life of existing highways and streets and to enhance safety. Work is usually accomplished within the existing right of way. Work may include the upgrading of geometric features such as roadway widening, minor horizontal re-alignment, and improving bridges to meet current standards for structural loading and to accommodate the approach roadway width.
- Reconstruction (4R) - Work proposed on the approximate alignment of an existing route that meets the geometric criteria for a new facility. Reconstruction includes projects that provide substantial changes in the general geometric character of a highway, such as widening to provide additional through travel lanes, horizontal or vertical re-alignment, etc.

Language should be provided to indicate the level of accessibility improvements necessitated by the scope of various roadway projects. Suggested language might look something like:

- *Preventive maintenance, signal maintenance - no accessibility upgrades required*
- *Resurfacing - curb ramps to eliminate barriers to an existing sidewalk or path*

- *Restoration(2R) - curb ramps to eliminate barriers to an existing sidewalk or path, repair damaged sidewalk or ramps*
- *Rehabilitation (3R) - curb ramps to be installed/upgraded, sidewalk to be widened to provide accessible pedestrian route*
- *Reconstruction (4R) - curb ramps to be installed, sidewalk to be widened to provide accessible pedestrian route, accessible pedestrian signals to be installed at signalized intersections*
- *New construction - Meet ADAAG*

b) §1102.2 – Many improvements within existing public right of way can be accomplished if "additional right-of-way" can be acquired and budgets are unlimited as the explanatory language to this draft rule suggests. The problem is with the amount of time involved in obtaining this right-of-way. Frequently, condemnation of property is necessary for acquisition and this is a lengthy process. With regard to signals, they are frequently installed following one or more crashes in an effort to improve intersection safety. The same is true for some crosswalk installations. Installation of a signal or crosswalk in these situations is a high priority for the public. While we agree that accessibility improvements should be made as a result of this alteration, we need the flexibility to address the immediate need for a signal or crosswalk and, if necessary, defer other improvements until additional right of way can be acquired.

c) §1102.2.1 – Clarify whether "additions to the public right of way" means the acquisition of additional ROW or the addition of a particular feature within an existing ROW. The draft language states that "where the addition connects…" - where does a connection end? For example, if a new signal is installed, it "connects" to the sidewalk so how much of the existing sidewalk is subject to §1102.2.2? The sidewalk connects to curb ramps, they connect to the crosswalk, then to the opposing corner - where does this "connection" end?

d) §1102.3 – There are times when only a short duration closure of a sidewalk is necessary. The draft provision needs to be modified to allow for short duration closures without invoking the requirement for an alternate circulation path. For example, if a utility needs to access their facility by utilizing a manhole in the sidewalk, an alternate path should not be required if the closure only persists for less than 24 hours.

e) §1102.5 – It is possible that, given the ADA requirements for letter size and stroke width for pedestrian pushbutton signs, along with those listed in 1102 of this document, the resulting sign sizes may protrude beyond the 4 inches. In addition, some of the hardware for the pushbutton mechanism may protrude more than 4 inches.

f) §1102.5.1 – The language says 'Objects… shall protrude…'. This makes it sound impossible to have objects that don't protrude. We suggest rewording this sentence.

g) §1102.6 – Combined with §1104.2, this section appears to eliminate the use of diagonal ramps. See comments under §1104.2.

h) §1102.10 – TxDOT suggests that the draft language be revised to also require placement of a contrast strip on the upper approach to stairs.
i) §1102.13 – We believe the embedded reference to 810.2 is incorrect. While it makes sense to refer to 810, section 810.2.3 refers back to section 402 which is inappropriate. It appears that the reference to 402 should be replaced by a reference to §1103.
j) §1102.14 requires one accessible parking space be provided on each block face that includes on-street parking. ADAAG utilizes a table in 4.1.2(5) [now 208.2] which required that 1 in 25 spaces be accessible. This draft rule will require many more spaces - one per block face - even though many block faces may have fewer than 5 spaces. We believe that this proportion is excessive and will result in a severe shortage of spaces available to the general population. Neither §1102.14 nor §1109 appear to include a specific requirement for any van accessible spaces. However §1109.3 appears to require that all angle and perpendicular accessible spaces be van accessible by requiring a 96" access aisle. Still, no van accessible sign is required. We suggest that one in eight parking spaces be required to be van accessible unless parallel parking is provided and less than 14' is available between the normal curb line and the boundary of the public right of way.

---

**Technical Provisions**

§1103 Pedestrian Access Route

a) §1103.3 – A provision is needed to allow limited encroachments into the pedestrian access route, similar to that afforded in 403.5.1.
b) §1103.5 – We support this provision. As mentioned under "defined terms", we believe that "roadway" should be defined to specifically include roadways that are on structures as part of the definition. This draft rule is not clear on whether roadways on bridges are included in this provision. Certainly, grades should be minimized on structures but physical constraints often make this difficult, particularly in alterations. Bridges have to achieve a minimum clearance over the roadway, railroad or waterway they cross, and frequently have to tie into streets at either end of the structure.

   In addition, since the curb ramp is considered part of the pedestrian access route (per Section 1103.2), the ramps will always exceed the grade of the adjacent roadway because they have to provide the transition from sidewalk to roadway. Curb ramps need an exemption from this provision. In also should be recognized that if the roadway is on a grade, that roadway grade will begin while you are still holding the corner basically level to get the landings in. Some amount of "exceeding the roadway grade" may be required just to tie the sidewalk into the landing elevation. Additional language needs to be included to ensure that this condition does not result in a violation of the guidelines.

§1104 Curb Ramps and Blended Transitions

a) §1104.2 – TxDOT suggests revising the language to clearly permit the installation of diagonal curb ramps. Diagonal curb ramps are not included in the draft rule as a type of curb ramp. §1102.6 requires the provision of "a curb ramp… (for) each crossing." The draft rule isn't clear on whether diagonal ramps would still be allowed. It is rumored that diagonal curb ramps would be prohibited by virtue of their omission here. While we recognize the need to provide one curb ramp for each crossing direction whenever possible, there are instances in which a diagonal curb ramp is the only type of installation that is feasible. This is most common where a large corner radius is needed to accommodate the turning movements for large trucks. Since the Manual on Uniform Traffic Control Devices (MUTCD) contains regulatory requirements for the location of the crosswalk markings, it is not always possible to move the crosswalks far enough from the intersection to accommodate individual ramps. In order to comply with the MUTCD, accommodate the expected truck turning movements, and provide for accessibility for pedestrians, the use of diagonal curb ramps is sometimes necessary. Diagonal curb ramps may also be the only available option when adding curb ramps as required under an alteration project, and where underground drainage structures or utilities preclude the placement of individual curb ramps.

   While the PROWAAC report discouraged the use of diagonal (shared) curb ramps, the committee did recognize in the discussion that sometimes intersection geometry precludes the placement of a separate curb ramp for each crosswalk. The committee went on to say that combination of such variables as curb radius, sidewalk width, and furnishing zone width, create situations where shared curb ramps are the only possible alternative. Some of the situations the committee cited are:

- A corner with a radius that is so large that the crosswalks meet at the midpoint of the curve.
- A corner where placing two curb ramps would result in them being located outside the crosswalk markings, or would result in stop bars placed too far back on the side street for driver safety or pedestrian safety.
- An intersection that is skewed, such that two curb ramps will not fit in the acute angle corners.
- An alteration, where the corner has retaining walls, buildings, or other barriers that are technically infeasible to relocate.
- An intersection in which one street has an unavoidably steep grade, and a shared curb ramp at the midpoint of the curb return may have less severe warp than a curb ramp or flush landing closer to the tangent of the steep street.
- An intersection in an area of steep terrain, where both streets are flattened to allow for acceptable crosswalk slopes. It may be feasible to flatten a small intersection area and provide accessible crosswalks leading to a shared ramp. Placement of a pair of curb ramps would necessitate a larger flattened area, resulting in steeper sidewalks between intersections.

b) §1104.2.1 – This section appears to prohibit the use of a directional curb ramp within a curb radius, as shown in Figure X02.4G in the committee report. Where these ramps can be provided without much warping, they provide directionality to visually impaired users and they also work well when a curb ramp to cross the main throughway is not needed.
c) §1104.2.1.3 - The draft language says 'overlap other landings and clear floor or ground space' is permitted but then §1107.2 limits the overlap to 12". This section should be reworded for clarity.
d) §1104.2.1.4 – Current ADAAG requires a flare with a 1:10 maximum slope. We have observed many flares that have been installed with much steeper slopes, on the order of 1:4. These flares appear to function well and pose no tripping hazard. Since the flare is not part of the pedestrian access route, we question why such a flat slope on the flare is needed for accessibility. Flares take up an enormous amount of real estate at each corner. Given that available right of way is usually limited, this requirement appears excessive unless it can be justified by independent research. TxDOT suggests that flares be allowed to have slopes up to 1:4 maximum.

   In addition, the actual way to dimension the flare should be re-evaluated. The PROWAAC recommendation for side flares in their report, *Building a True Community*, was that the flare should be ten times as long as the curb height. This results in the required slope on the flare being measured relative to the grade of the roadway and the cross slope on the curb ramp. It is not logical to require an absolute slope relative to a horizontal plane in a sloping environment such as the public right of way. Based on our suggested 1:4 maximum slope, we suggest the language state that the flare should be four times as long as the curb height.
e) §1104.2.2.1 – The language needs to be clarified to indicate whether the 15' maximum length extension applies to either sloped portion on a parallel ramp (as indicated in the committee report) or to the entire curb ramp combination (two sloped portions plus the lower landing).
f) §1104.2.2.4 – Why is a barrier required regardless of the height of the dropoff when no barrier is required adjacent to a 6" dropoff at the curb/street interface? What type of barrier is recommended in this situation? Please refer to our discussion regarding the use of the term 'barrier' under defined terms.
g) §1104.3.2 - It's not clear whether detectable warnings are required on curb ramps that don't connect to a crosswalk, such as those connecting to parking spaces or within internal streets within a park for example.
h) §1104.3.2 and §1108.2 – It is not clear that detectable warnings are not to be provided at driveway crossings. The committee report was more definitive on this point and we fear that some people will consider driveways as an intersection that requires placement of the detectable warning.
i) §1104.3.3 – In order to address design issues with routing utilities under an intersection, we suggest that a provision be made allowing utility boxes and other access covers with detectable warning covers to be located on the curb

ramp, landings, blended transitions, or gutter areas within the pedestrian access route. While this practice should be discouraged, we simply do not have the available right of way in many locations to comply with this prohibition..

j) §1104.3.7 –While we understand the need for this clear space at the bottom of a diagonal and perpendicular curb ramps, we don't understand the phrase "beyond the curb line." The lower landings of parallel curb ramps and the relatively level design of blended transitions should allow users to line up with the crosswalk and wait for the pedestrian signal nearly at the edge of the street.

§1105 Pedestrian Crossings

a) §1105.2.1 – We recommend that this language be revised to be consistent with the MUTCD, retaining the 72-inch minimum crosswalk width. The draft requirement for a 96-inch crosswalk does not appear to be driven by accessibility needs but rather by pedestrian advocacy. While major metropolitan areas may need this width to handle platoons of pedestrians, that decision is an engineering one made with judgement and considering relevant factors at a specific location and should not be mandated here. Eight-foot wide crosswalks are excessive in many small rural towns where few pedestrians are present. In addition, the additional 24-inches in width will further exacerbate the difficulty of constructing the crosswalk with a maximum 2% cross slope.

b) §1105.2.2 – Since the rules apply to "both marked and unmarked crossings, wherever pedestrian travel across the roadway is not prohibited", creating "tabled areas" will be a requirement for virtually every street/highway intersection.

While we understand the need to minimize the cross slope in crosswalks to make the crossing as accessible as possible, tabling every intersection would violate several engineering principles used for roadway design and would result in roadways that do not comply with the nationally accepted design practice outlined in the *Policy on Geometric Design of Highways and Streets* published by the American Association of State Highway and Transportation Officials (AASHTO). While tabling intersections might be acceptable at the lowest speed ranges common in highly developed urban areas, this practice would not be acceptable on roadways designed to accommodate higher design speeds. Most downtown urban roadways were constructed long ago. The roadways being constructed now are typically more in the suburban areas, as cities continue to grow. In these areas, design speeds are typically higher than in the downtown grid and generally range from 40-50 mph. At those speeds, cars and trucks cannot safely traverse a roadway grade that is leveled at every intersection. Vehicles would be vaulting or "bottoming out" at every intersection. Abrupt profile changes makes driving more difficult and would increase the possibility of rear-end collisions due to vehicles suddenly reducing speeds to traverse the intersection. The department suggests that

the language be revised to require the minimum feasible cross slope that can be achieved for the design speed and the terrain in the area.

To further illustrate our concerns with this requirement, we did a sample design for a street on 5% grade (not uncommon in hilly areas), with cross streets occurring at 500' spacing. That's not uncommon, and is actually longer than the spacing in many areas. Using these conditions, it is impossible to connect the "table" areas at the intersections with a profile that meets a 40 mph design speed (our typical thoroughfare design speed). We ended up with a grade between the intersections of over 8%, and vertical curves that would only meet about a 32 mph design. It should also be noted that in this sample problem, the grade revision resulted in a cut at the low end of approximately 3' and a "hump" at the upper end of approximately 2' in height. These conditions will require acquisition of additional ROW and/or special design of driveways, retaining walls, drainage facilities, etc.

From what we can tell, if we have any grades that go above about 4%, (less if cross streets are more closely spaced) we will not be able to meet both the AASHTO and the ADAAG criteria. The conditions we've described are worsened if (1) the cross street is wider, (2) the cross street spacing is less, or (3) the grade of the main street is greater.

The draft rule would lead to significant costs to redesign and reconstruct existing intersections, including relocating drainage features, raising/lowering adjacent sidewalks, relocating or modifying underground and adjacent above-ground utilities, and constructing retaining walls. For these reasons, and the operational problems described above, we suggest this language be rewritten to read "*Cross slope in crosswalks shall be the minimum possible while still providing a roadway design that meets accepted roadway design criteria."*

c) §1105.3 – Pedestrian Signal Phase Timing.
A primary concern when dealing with pedestrian clearance phases is the effect on efficiency of the intersection. Longer pedestrian phases result in more delay for the opposing street. Another concern is the impact on preemption designs for intersections near railroad crossings. Longer clearance phases can often result in substantially higher costs due to circuitry that may be needed on the rail line for advance train warning.

TxDOT does not support the use of a slower walking speed in calculating pedestrian clearances for all cases. Rather, we suggest that a provision be added which would allow for the use of MUTCD values unless the pushbutton is held down for an extended period of time. This would still allow for the long clearance phases for mobility impaired persons, but not penalize the efficiency of intersection operations for every pedestrian phase served.

Also, the draft language isn't clear as to whether the length of one or both adjoining curb ramps has to be included in the crossing distance calculation.

While it may make sense to include the length of one perpendicular curb ramp since users would wait on the top landing to begin to cross, if the adjoining curb ramp is a parallel curb ramp or a blended transition, the user will be at the edge of the street when the light changes and the additional distance would not be necessary to include in the calculation.

Any increase in delay at signals will diminish efforts by state and local governments to improve air quality as required by the Clean Air Act.

d) §1105.4.1 – If a landing area only has to be 4'x4', why does a median have to be 6' wide to provide refuge? This minimum 6' dimension will be simply impossible to meet in many medians and triangular channelizing islands at intersections.
e) §1105.4.2 – The two foot minimum separation between detectable warnings may not be possible to meet on the above mentioned small channelizing islands. In addition, we would suggest eliminating the exception to this section. Even if the signal is timed for the full crossing, some individuals may require more time to cross. We think it would be more consistent to always provide the detectable warning in the median.
f) §1105.5.3 – We have concerns about the construction and maintenance of elevators in the outdoor environment as required under this section.

The cost for elevator installation would be in the $125,000 range. We think this would be additional cost because either stairs or ramps would still be required for emergency evacuation and we would anticipate using ramps to provide for evacuation for the disabled. We would have to provide electrical power (3 phase 208 service) to each site, telecom service line, a crane, a concrete pit, a concrete slab for the elevator machine room and exterior building finish, i.e., brick, concrete tilt wall, concrete masonry walls, metal panels, or stucco finish. The elevator would be a holeless telescopic twin jack hydraulic elevator machine type, 5'-8" x 5'-0" unconditioned cab, 2500 lb. maximum capacity, travel height of 18'. (greater travel heights available at higher costs). The elevator would meet ADA requirements, having a front and rear entry.

The best of elevators break down and could strand disabled persons in severe weather. Emergency response time to malfunctioning elevators at best could be expected to be an hour or two. Emergency response time during peak traffic and inclement weather conditions could be longer. Elevators would be subject to vandalism to both the operational features of the elevator and the emergency telephone. When the emergency telephone is out of order a person could be stranded on an elevator for an unacceptable amount of time. As the elevator gets older, the down time will become significant. Parking garage elevators are routinely used as bathrooms and have the smell of urine. It could be expected that elevators at these sites would be even worse with the limited traffic at night. In addition, we are extremely concerned about the potential for these elevators to become the

site of criminal activity since they will not be heavily utilized and may be located in remote areas.

Daily inspections would be required to insure adequate service. Daily inspections will take one to two hours depending on the travel time. This would cost about $10,000 per year. Maintenance of the elevators would require service contracts with elevator specialist companies. Routine preventive maintenance service of the elevator would be about $1000 per year. Utilities costs for telephone and electric service would be about $500 per year. It is hard to estimate the cost of service calls. Rough estimates would be zero to $5,000 per year. As the system gets older the cost would go up. In communities where there are no elevator repair companies the cost would be higher. Total maintenance cost would range between $11,500 and $16,500 per year. This does not include rehabilitation cost due to wear out or costs due to major damage caused by vandalism.

A majority of the pedestrian overpasses built in Texas are for providing safe access for students to public schools and the schools, cities, or DOTs bear the brunt of paying for the overpass. In many communities the extra cost of the elevators would prevent pedestrian overpasses from being built. TxDOT recommends the elimination of this requirement. If desired, the Access Board might want to allow elevators to be provided in lieu of ramps but they should not be required.

g) §1105.6.1 – The rule needs to be clarified as to whether vegetation/ landscaping along the roundabout would provide sufficient barrier between the street and the sidewalk. As previously mentioned, the term “continuous barriers” tends to mean roadside hardware such as metal beam guard fence or concrete traffic barrier in the traffic engineering community. We suggest the language be revised to require “separation by landscaping or barriers” instead. In addition the use of come standard roadway barriers at intersections is undesirable due to their height and the resulting impact on sight distance available to drivers. Designers need to make sure that there are no obstructions to between 2’ and 7’ above the pavement (the general guidelines for sight distance obstructions.)
h) §1105.6.2 - Traffic signals should be installed only after a traffic engineering study has been conducted that indicates a traffic signal is warranted. In order to install pedestrian activated crossing signals at each roundabout crosswalk would require the signalization of the roundabout, which defeats the purpose of the roundabout, to control traffic without signals. The MUTCD does not address the signalization of traffic circles. MUTCD signing and marking requirements for traffic signals and roundabouts conflict with each other. A roundabout would be very inefficient if operated as a signalized intersection and would be a poor design decision from a planning standpoint. In addition, drivers are less likely to expect a traffic signal within a roundabout and may not react to it in time for safe pedestrian crossings. Signals that are not operated continuously may catch drivers unaware when they are used,

resulting in low compliance with the signal indication. It is recommended that an alternative to this requirement be investigated.

i) §1105.7 – TxDOT strongly opposes any requirement for traffic signals on slip turn lanes at intersections. In addition, crosswalks are provided at many unsignalized intersections, yet this language appears to require signals for the turn lanes, even when the rest of the intersection is not signalized. Traffic signals should only be installed after a traffic engineering study has been conducted that indicates a traffic signal is warranted.

There is very little discussion given for the draft requirement for the installation of pedestrian signals at turning lanes. TxDOT has an estimated 7,500 traffic signals on our facilities. We estimate that approximately 25% of these intersections have two right turn lanes. The signal for each right turn lane is estimated to add $1250 to the cost of the intersection. Therefore, this provision will cost the state approximately $4,687,500 to implement as these intersections are rehabilitated over the next 10-15 years. It's very difficult to estimate the increased delay cost, and associated degradation in air quality (including in non-attainment areas) that would result from this requirement but we believe it will be significant.

Drivers do not expect to find a traffic signal at a slip lane and may not react to it in time – especially if it is only occasionally activated – for safe pedestrian crossings. It is likely that these signals will give the pedestrian a false sense of safety when stepping out onto the roadway. When activated sporadically, it will also likely result in increased rear-end crashes and, potentially, subsequent impacts with pedestrians. In addition, signals are likely to have significant operational impacts on slip lanes – lowering traffic throughput in these locations – and will effectively negate the advantages they provide at high traffic volume intersections. In addition, any increase in delay at signals will diminish efforts by state and local governments to improve air quality as required by the Clean Air Act.

TxDOT recommends that the Board look into specific traffic and pedestrian volumes or other factors to determine when it would be most beneficial to require these signals.

<u>§1106 Accessible Pedestrian Signals</u>

a) §1106 – If accessible pedestrian signals must be installed (based on the draft language) anytime a pedestrian signal is "altered" (reference §1102.2.2), then TxDOT would have to replace all signals with APS over about a 5-10 year period as pedestrian pushbuttons are replaced due to damage. Based on current pricing for parts and labor, TxDOT estimates that the average cost to retrofit an existing intersection would be approximately $5,000. With approximately 7,500 traffic signals on TxDOT roadways, and over 11,000 signals throughout the state, this represents an additional expense of $39 million for TxDOT and $57 million statewide.

In addition, TxDOT feels that the installation and maintenance of these devices would increase the operation and liability costs to state, county, and city governments considerably. The decision to install these devices should be based on planning and engineering decisions based on a specific need and not made a blanket requirement.

TxDOT currently performs a number of electronic and destructive tests on traffic signal devices placed in the field. We are concerned about adopting a specific type of device before it has been adequately tested for reliability or durability.

b) §1106.2.1 – The term "pedestrian signal devices" generally includes a variety of signal equipment. It appears here that the Board is specifically talking about the location of the push button in the first sentence. We suggest changing the language to read "Pedestrian push buttons shall be located…" The draft rule requires pedestrian push buttons to be a minimum of 10' apart from each other and located within a specified distance of the curb and the crosswalk. These separations will not be possible on small channelizing islands and where right of way is limited at the corner. We suggest adding an exception for these locations.
c) §1106.2.3.1 appears to allow the cuckoo/chirp type of audible signal. We understood from the committee report that there are problems interpreting these signals and suggest that they not be permitted.
d) §1106.4.2 – The requirement for street names to be placed on signs at every pedestrian push button will necessitate the purchase of new equipment by this department and likely by other public agencies responsible for sign placement. Current practice is to place a sign with an arrow at the pushbutton. To minimize the cost of these signs, we make the signs with simply the bar of the arrow and omit the arrowhead. When signs are placed in the field, the arrowhead is stuck onto the sign to indicate the appropriate direction. This allows for bulk production of the signs. The proposed requirement would substantially increase the production time and cost for signs located at pushbuttons. TxDOT anticipates a six month delay in getting a given sign produced for a specific push button. Field crews will be required to make an additional trip to the location to mount the sign or installation of the push button will have to be deferred until the sign is available. Mass production would be impossible since each sign would have a unique name and would have to include tactile characters in compliance with ADAAG 703.2. In addition, 703.2 requires that raised characters be duplicated in Braille.

<u>§1108 Detectable Warning Surfaces</u>

a) §1108.1.1, 1108.1.2 – TxDOT supports the flexibility provided in the draft language for the size and spacing of the truncated domes. This will allow the department to consider products offered by several vendors to achieve compliance.

b) §1108.1.3 – The requirement for visual contrast on the detectable warning is extremely vague with no measurement being required. This is likely to result in much confusion and inconsistency of application across the country. We suggest the Board specify a level of minimum contrast and a simple and reliable method for measuring contrast in the field.
c) §1108.1.4 – Since the draft rule says “24 inches (610 mm) minimum”, we conclude that placing the truncated domes on the entire length and width of the curb ramp as is currently required is acceptable. Is there a maximum dimension that would be desirable due to the impact on wheelchair users? For example, if a curb ramp is twelve feet long to achieve a one foot elevation change, should the detectable warning extend that entire length? Our recollection of this discussion among the PROWAAC was that wheelchair users wanted this provision to be a two foot minimum and maximum dimension.
d) §1108.2 – It is not clear that detectable warnings are not to be provided at driveway crossings. The committee report was more definitive on this point and we fear that some people will consider driveways as an intersection that requires placement of the detectable warning.
e) §1108.2.1 – Language needs to be clarified whether “nearest the curb line” refers to the face of curb or the back of curb. Vertical curbs are typically 6 inches wide at the top of the curb. As the curb height transitions along the flare, the curb becomes part of the gutter at the bottom of the curb ramp. Requiring the detectable warning to begin 6-8” from the curb line (presumably the face of curb) would require the detectable warning to begin 0-2” from the back of the curb. If landscape pavers with the truncated domes are used to achieve the detectable warning, they need to be surrounded by a concrete border to hold them in place. This border is typically 4 inches wide, which would result in the detectable warning beginning approximately 10 inches from the face of curb. We suggest the draft rule be revised to require placement within 10-12 inches of the face of curb extension.

§1109 On-Street Parking

§1109.5 – How far back on a sidewalk from the accessible parking space does this restriction on obstructions apply? (i.e., how far back is "adjacent to...the space"?)

§1111 Alternate Circulation Path

In many cases, there is not enough available space for a parallel pedestrian access route on the same side of the street. Also, there are times that only a short duration closures of a sidewalk are necessary. The MUTCD allows for a pedestrian detour to be set up which would send pedestrians across the street at the nearest possible signalized crossing. In our opinion, this is more than adequate. We recommend that the language in section 1111.3 be changed to read “… on either side of the street” and that engineering judgement be allowed to govern where the agency determines it safe to provide an alternate path.