ADA TRANSITION PLAN

for

Sidewalks & Pedestrian Ramps

Prepared for

MIAMI LAKES
Growing Beautifully

Town of Miami Lakes
6601 Main Street
Miami Lakes, FL 33014

LUIS A. SILVA
LICENSE
No. 76875
9/15/15
STATE OF
FLORIDA
PROFESSIONAL ENGINEER

Final

SEPTEMBER 2015

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CORPORATION
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1 INTRODUCTION

The Town of Miami Lakes (Town) is located in northwest Miami-Dade County Florida. The Town encompasses approximately 6.8 square miles (6.4 square miles of land; 0.4 square miles of water). The largest land use in the town is residential comprising approximately 40% of Miami Lakes' total land area of 4,363 acres. Other principal land uses are light industrial and office parks comprising 13% of the land area, and lakes and canals, which constitute about 11% of the Town. The Town is approximately 94% built out, with only a small portion of the land remaining vacant and undeveloped. The Town is home to approximately 30,000 residents in over 10,000 housing.

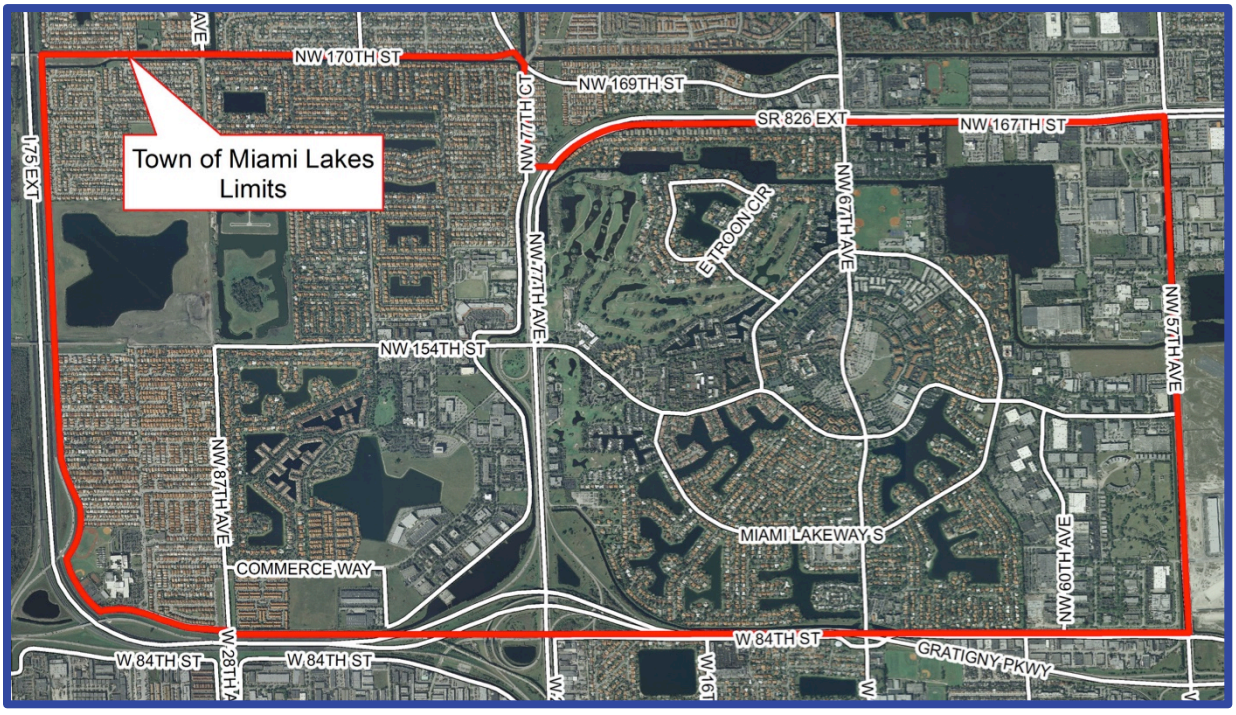


Figure 1 – Town of Miami Lakes Limits

The fundamental goal of Title II of the Americans with Disabilities Act (ADA) is to ensure access to civic life by people with disabilities. Title II applies to State and local government entities, and protects qualified individuals with disabilities from discrimination on the basis of disability in services, programs, and activities provided by State and local government entities. Title II extends the prohibition on discrimination established by Section 504 of the Rehabilitation Act of 1973, as amended, 29 U.S.C. 794, to all activities of state and local governments regardless of whether these entities receive financial assistance from the Federal government. This requirement extends not only to physical access at government facilities, programs, and events, but also to pedestrian facilities in public rights-of-way.

Additionally, the ADA requires that any public agency with more than 50 employees prepare a Transition Plan setting forth the steps necessary to make its facilities accessible to persons with disabilities. The Transition Plan identifies barriers that prevent persons with disabilities from accessing programs and activities and identifies methods to provide equivalent access to the maximum extent feasible. In 2015, the Town of Miami Lakes, along with Aluces Corporation, performed an ADA sidewalk and pedestrian ramp self-evaluation and prepared a corresponding Transition Plan to identify accessibility barriers to its existing pedestrian facilities within the Town's public rights-of-way.

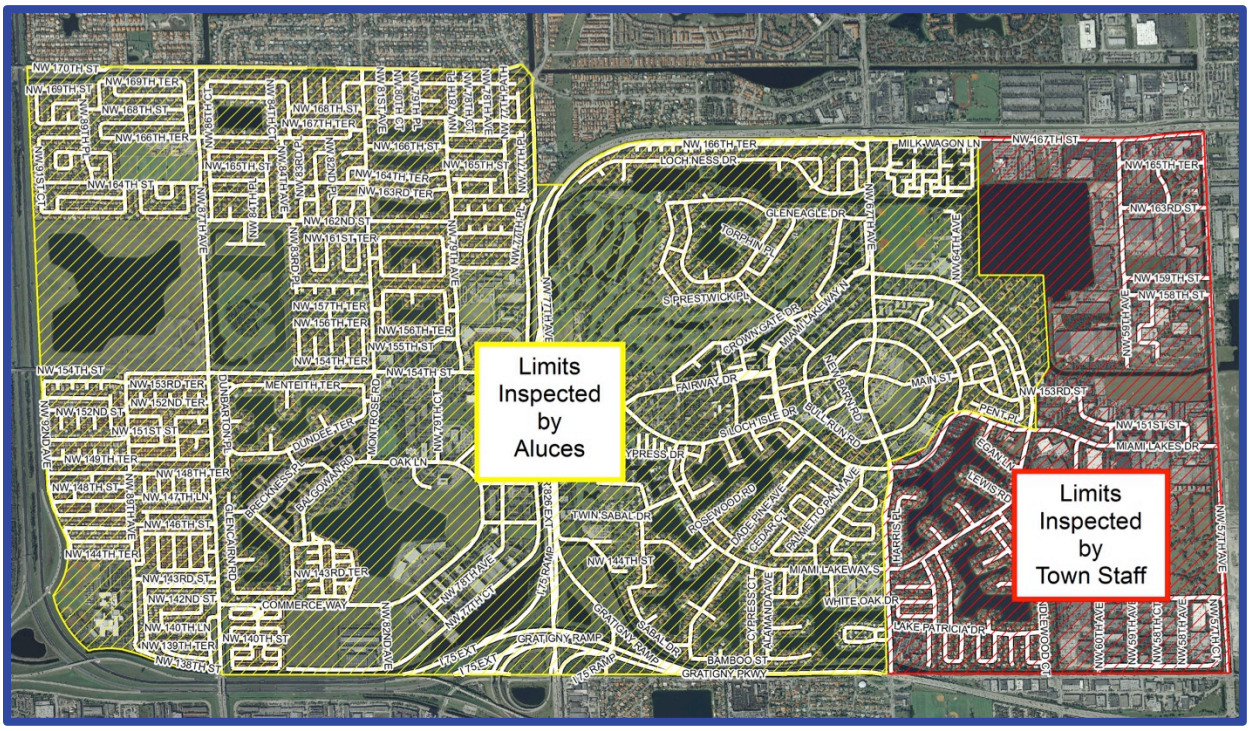


Figure 2 - Areas Inspected by Aluces/Town of Miami Lakes

The sidewalk and pedestrian ramp self-evaluation audit performed within the public right-of-way included an assessment of:

- Sidewalks
- Pedestrian ramps

The evaluation excluded:

- Public right-of-way within properties that access government offices, medical facilities, downtown core areas, school zones, residential areas, etc.,
- Access to public buildings (permit/licensing offices, public meeting rooms, etc.)
- Rest areas, parks, shared use trails
- Bus boarding and alighting areas

This ADA Transition Plan for sidewalks and pedestrian ramps documents the methodology used to collect data throughout the Town; the field data collected from the self-evaluation audit; the recommended corrective actions needed to remedy noted accessibility barriers; a barrier ranking and prioritization; an implementation schedule for the corrective actions with construction costs; and identifies the Town official responsible for the implementation of the plan.

Additionally, this ADA Transition Plan recognizes that the Town has limited funds and cannot immediately make all sidewalks and pedestrian ramp facilities fully accessible. As such, this ADA Transition Plan accounts for yearly budgetary allocations that feed into the implementation schedule for making the required ADA access modifications. The Town reserves the right to update the barrier ranking and prioritization to allow flexibility for accommodating community requests, petitions for reasonable modifications from persons with disabilities, and changes in Town programs.

2 PROJECT APPROACH / METHODOLOGY

The ADA self-evaluation audit was performed with the following approach: data collection, data analysis, and barrier ranking. The following subsections detail the project approach and methodology used for the completion of the self-evaluation audit.

2.1 Data Collection

The data collection process entailed physically inspecting the pedestrian facilities within the Town's public right-of-way for:

- Sidewalks
- Pedestrian ramps

The accessibility barrier field audit included the following considerations for each facility:

- Sidewalks
  - Missing sidewalk
  - 36-inch minimum width (32 inches at locations with above-ground obstruction less than 24 inches in length)
  - Excessive cross slope of more than 2%
  - Excessive longitudinal/running slope of more than 5%
  - Heaving with offset greater than ½ inch (see Note 1 below)
  - Gaps/cracks greater than ½ inch in width
  - Drop-off greater than 6 inches
  - Damaged sidewalk with utility box
- Pedestrian ramps
  - Missing pedestrian ramp
  - Curb issue
  - Misaligned ramp
  - Missing detectable warning
  - Excessive cross slope of more than 2%
  - Excessive longitudinal/running slope of more than 1:12
  - Heaving with offset greater than ½ inch (see Note 1 below)
  - Gaps/cracks greater than ½ inch in width
  - Drop-off greater than 6 inches
  - 36-inch minimum width
  - Missing landing

➢ Note 1 – 2010 ADA Standards for Accessible Design specifies a trip hazard as any vertical trip hazard (heave) of ¼ inch or more. However, Aluces identified heaves greater than ½ inch for this Transition Plan. Heave and crack deficiencies below

½ inch were not collected due to the estimated number of instances exceeding the approximate ½ inch threshold which would have resulted in a transition schedule that exceeded well beyond 10 years.

Each deficiency was digitally logged in a GIS database with the following information:

- Date of capture
- GPS location of deficiency with horizontal position accuracy
- Digital Image of deficiency
- Type of deficiency
- House/property number of closest property to the deficiency
- Number of flags affected
- Recommended solution or repair method

The data collection process was performed using a handheld portable data collection device with GPS capabilities having a typical horizontal positional accuracy of ±3 to 10 meters depending on cloud cover and signal strength; a 24-inch smart level accurate up to 1/10th of a degree; and a handheld measuring device. When a deficiency was noted, the operator logged the date, time, location of the deficiency, captured a picture of the deficiency, populated the required fields detailing the deficiency, and proposed remedial action required to remedy the deficiency. The data collected is referenced in **Appendix B - Table of Points** and **Appendix C - Pictures & Detail Per Incident**.

2.2 Deliverables

With this Transition Plan, all collected data was provided to the Town in a Microsoft Excel spreadsheet along with an associated GIS shapefile for geographic reference of the data collected through this project. All associated digital images were also provided to the Town. The Town is responsible for management of the spreadsheet in order to track the progression of the remedial actions performed to bring the Town into compliance with ADA requirements.

A summary of the number of instances per accessibility barrier is detailed in Table 1.

Table 1 – Summary of Number of Deficiency Instances

Type	Deficiency	Instances	# Flags/Ramps
Sidewalk	Width < 32-inch (with obstruction)	7	11
Sidewalk	Utility Lid Crack or Heave > 1/2 inch	175	214
Sidewalk	No detectable warning	20	34
Sidewalk	Missing	1	2
Sidewalk	Longitudinal slope > 5%	3	6
Sidewalk	Heave > 1/2 inch	2,683	4,181
Sidewalk	Heave and Crack > 1/2 inch	419	1,591
Sidewalk	Drop-off > 6 inches	19	57

Table 1 – Summary of Number of Deficiency Instances

Type	Deficiency	Instances	# Flags/Ramps
Sidewalk	Cross slope> 2%	127	700
Sidewalk	Crack > 1/2 inch	1,528	2,773
Ramp	No landing	14	24
Ramp	No detectable warning & Heave > 1/2 inch	18	23
Ramp	No detectable warning	398	794
Ramp	Missing	173	338
Ramp	Misaligned ramp	2	5
Ramp	Longitudinal slope > 1:12	2	2
Ramp	Heave > 1/2 inch	4	4
Ramp	Heave and Crack > 1/2 inch	4	5
Ramp	Curb issue	2	2
Ramp	Crack > 1/2 inch	29	31
		5,628	10,797

It should be noted that the accessibility barriers logged through this audit are a snapshot in time and that the accessibility barriers noted may worsen or additional accessibility barriers may develop over time.

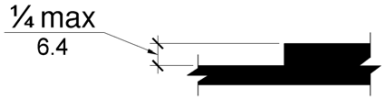
2.3 Sidewalk & Pedestrian Ramp Applicable Design Criteria

The following subsections detail the sidewalk and pedestrian ramp design criteria detailed in the 2010 ADA Standards for Accessible Design (2010 ADA Standards) and typical design standards. These are general excerpts that govern the major components of the audited facilities and are not intended to be all-encompassing. All designs and modifications must be implemented with a full understanding of the requirements set forth in the 2010 ADA Standards.

2.3.1 Sidewalk Design Criteria

The following excerpts from the 2010 ADA Standards describe the acceptable criteria for the design and construction of ADA compliant sidewalks:

- 303 Changes in Level
  - 303.2 Vertical. Changes in level of ¼ inch (6.4 mm) high maximum shall be permitted to be vertical.
    - Figure 303.2 Vertical Change in Level



- 403 Walking Surfaces
  - 403.3 Slope. The running (longitudinal) slope of walking surfaces shall not be steeper than 1:20. The cross slope of walking surfaces shall not be steeper than 1:48.
  - 403.5.1 Clear Width. Except as provided in 403.5.2 and 403.5.3, the clear width of walking surfaces shall be 36 inches minimum. (EXCEPTION: The clear width shall be permitted to be reduced to 32 inches minimum for a length of 24 inches maximum provided that reduced width segments are separated by segments that are 48 inches long minimum and 36 inches wide minimum.)
  - 403.6 Handrails. Where handrails are provided along walking surfaces with running slopes not steeper than 1:20 they shall comply with 505.

2.3.2 Pedestrian Ramp Design Criteria

The following excerpts from the 2010 ADA Standards describe the acceptable criteria for the design and construction of ADA compliant pedestrian ramps:

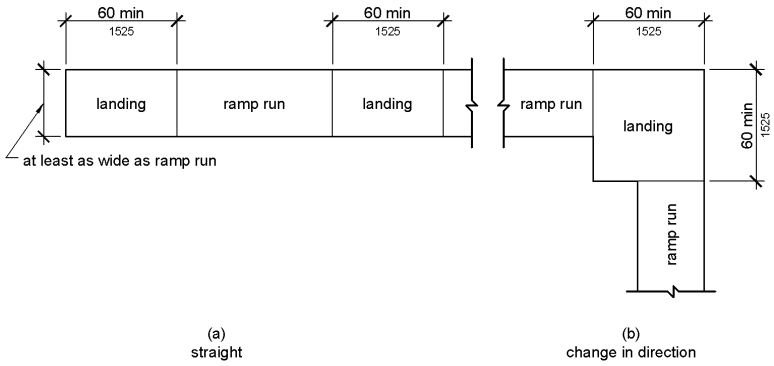
- 405 Ramps
  - 405.2 Slope. Ramp runs shall have a running slope not steeper than 1:12. (EXCEPTION: In existing sites, buildings, and facilities, ramps shall be permitted to have running slopes steeper than 1:12 complying with Table 405.2 where such slopes are necessary due to space limitations.)
    - Table 405.2 Maximum Ramp Slope and Rise for Existing Sites, Buildings, and Facilities

Slope (see *Note 1*)	Maximum Rise
Steeper than 1:10 but not steeper than 1:8	3 inches (75 mm)
Steeper than 1:12 but not steeper than 1:10	6 inches (150 mm)

Note 1: A slope steeper than 1:8 is prohibited.

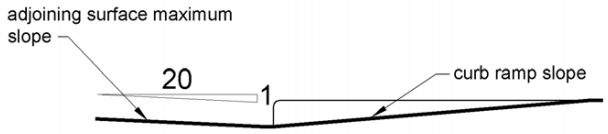
  - 405.3 Cross Slope. Cross slope of ramp runs shall not be steeper than 1:48.
  - 405.5 Clear Width. The clear width of a ramp run and, where handrails are provided, the clear width between handrails shall be 36 inches minimum. (EXCEPTION: Within employee work areas, the required clear width of ramps that are a part of common use circulation paths shall be permitted to be decreased by work area equipment provided that the decrease is essential to the function of the work being performed.)
  - 405.6 Rise. The rise for any ramp run shall be 30 inches maximum.
  - 405.7 Landings. Ramps shall have landings at the top and the bottom of each ramp run. Landings shall comply with 405.7.

- Figure 405.7 Ramp Landings

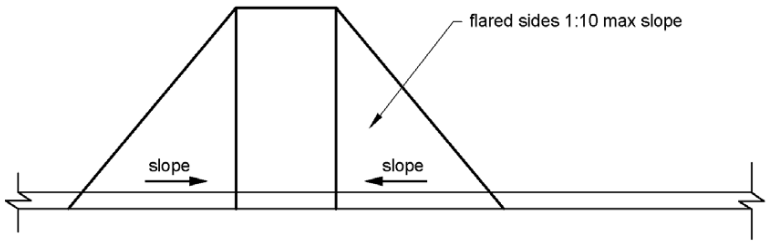


  - 405.7.1 Slope. Landings shall comply with 302. Changes in level are not permitted. (EXCEPTION: Slopes not steeper than 1:48 shall be permitted.)
  - 405.8 Handrails. Ramp runs with a rise greater than 6 inches shall have handrails complying with 505. (EXCEPTION: Within employee work areas, handrails shall not be required where ramps that are part of common use circulation paths are designed to permit the installation of handrails complying with 505. Ramps not subject to the exception to 405.5 shall be designed to maintain a 36-inch minimum clear width when handrails are installed.)

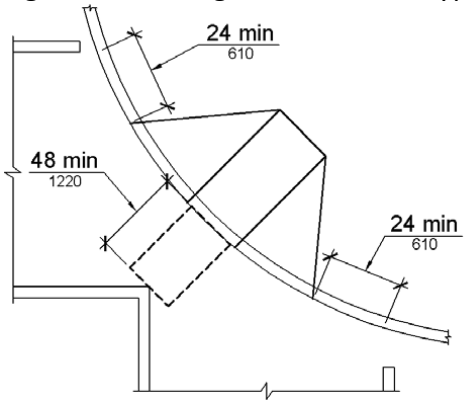
- 406 Curb Ramps
  - 406.2 Counter Slope. Counter slopes of adjoining gutters and road surfaces immediately adjacent to the curb ramp shall not be steeper than 1:20. The adjacent surfaces at transitions at curb ramps to walks, gutters, and streets shall be at the same level.
    - Figure 406.2 Counter Slope of Surfaces Adjacent to Curb Ramps



  - 406.3 Sides of Curb Ramps. Where provided, curb ramp flares shall not be steeper than 1:10.
    - Figure 406.3 Sides of Curb Ramps



- 406.4 Landings. Landings shall be provided at the tops of curb ramps. The landing clear length shall be 36 inches minimum. The landing clear width shall be at least as wide as the curb ramp, excluding flared sides, leading to the landing. (EXCEPTION: In alterations, where there is no landing at the top of curb ramps, curb ramp flares shall be provided and shall not be steeper than 1:12.)
- 406.6 Diagonal Curb Ramps. Diagonal or corner type curb ramps with returned curbs or other well-defined edges shall have the edges parallel to the direction of pedestrian flow. The bottom of diagonal curb ramps shall have a clear space 48 inches minimum outside active traffic lanes of the roadway. Diagonal curb ramps provided at marked crossings shall provide the 48 inches minimum clear space within the markings. Diagonal curb ramps with flared sides shall have a segment of curb 24 inches long minimum located on each side of the curb ramp and within the marked crossing.
  - Figure 406.6 Diagonal or Corner Type Curb Ramps



2.3.3 Detectable Warning Systems

The 2010 ADA Standards describe the detectable warning systems as a "standardized surface feature built in or applied to walking surfaces or other elements to warn of hazards on a circulation path." Additionally, the placement of detectable warnings on pedestrian ramps is provided by Florida Department of Transportation's (FDOT) Design Standard Index 304, included in **Appendix F - Design Aids**, which defines the acceptance criteria as:

- Color and texture shall be complete and uniform
- 90% of individual truncated domes shall be in accordance with the Americans with Disabilities Act Standards for Transportation Facilities, Section 705
- There shall be no more than 4 non-compliant domes in any one square foot
- Non-compliant domes shall not be adjacent to other non-compliant dome
- Surfaces shall not deviate more than 0.10 inch from a true plane

In general, most detectable warning systems are located at pedestrian ramps and along sidewalks that intersect driveways with sufficient volume such as those located by commercial/industrial centers or other facilities with numerous daily trips to the facility. A sample of a detectable warning system is shown in Figure 3.

Figure 3 - Detectable Warning System

2.4 Recommended Corrective Actions

The following subsection details the most common methods available to address the facility accessibility issues identified during the field assessment. The recommended remedial actions are intended to provide feasible and cost effective solutions to bring the sidewalks and pedestrian ramps throughout the Town into compliance with the 2010 ADA Standards. As with all construction activities, the Town should maintain direct oversight over all remedial actions performed to ensure proper implementation and adherence to ADA Standards.

The most common accessibility barriers noted within the Town, per the 2010 ADA Standards, are shown in Table 2 and Table 3. Table 2 and Table 3 also present a listing of recommended solutions in order of preference. The order of preference is based on cost, disruption in service, and longevity of the solution. For example, even though it is slightly more inexpensive to perform sidewalk grinding in places with heaves, sidewalk grinding does not address the underlying cause of most heaves and may require further grinding at a later date. Additionally, other corrective actions, such as patching and ramping, have a short life span due to the difficulty of bonding fresh concrete to already cured concrete. Taking into account these considerations, the preferred solution for most accessibility barriers was to demolish and

replace the existing facility thus allowing for crews to remedy the underlying cause of the condition, address the deficiency, resetting the life-cycle of the facility at that location, and avoiding the issue of possibly having to address a similar condition at the same location within a short period of time.

Table 2 – Sidewalk Accessibility Barriers & Recommended Solutions

Deficiency	Recommended Solution
Missing	Construct Sidewalk
Width < 32-inch (with obstruction)	Construct Sidewalk
Cross slope> 2%	Flag Replacement
Longitudinal slope > 5%	Flag Replacement
Heave > 1/2 inch (See Note 1)	Preferred: Flag Replacement
	Alternative 1: Sidewalk Grinding
	Alternative 2: Patching & Grinding
Crack > 1/2 inch	Preferred: Flag Replacement
	Alternative 1: Crack Repair
Heave and Crack > 1/2 inch	Flag Replacement
Utility Lid Crack or Heave > 1/2 inch	Flag Replacement
No detectable warning	Install Detectable Warning
Drop-off > 6 inches	Install handrail

Table 3 – Pedestrian Ramp Accessibility Barriers & Recommended Solutions

Deficiency	Recommended Solution
Missing	Construct Ramp
Misaligned ramp	Construct Ramp
No detectable warning	Install Detectable Warning
No detectable warning & Heave > 1/2 inch	Preferred: Flag Replacement & Install Detectable Warning
	Alternative 1: Install Detectable Warning & Sidewalk Grinding
Heave > 1/2 inch (See Note 1)	Preferred: Construct Ramp
	Alternative 1: Ramp Grinding
	Alternative 2: Patching & Grinding
Crack > 1/2 inch	Preferred: Construct Ramp
	Alternative 1: Crack Repair
Heave and Crack > 1/2 inch	Construct Ramp
Longitudinal slope > 1:12	Construct Ramp
Curb issue	Construct Ramp
No landing	Construct Ramp

Table 2 & Table 3 Notes:

1. 2010 ADA Standards for Accessible Design specifies a trip hazard as any vertical trip hazard (heave) of ¼ inch or more. However, Aluces identified heaves greater than ½ inch for this Transition Plan. Heave and crack deficiencies below ½ inch were not collected due to the estimated number of instances exceeding the approximate ½ inch threshold which would have resulted in a transition schedule that exceeded well beyond 10 years.

2.4.1 Patching and Ramping for Heaves

Patching and ramping is considered to be a quick and temporary repair method for addressing sidewalks heaves of less than ½ inch. This method uses concrete or asphalt to build a small fixed ramp on sidewalks and pedestrian ramps with heaves less than ½ inch. Ramping refers to the distance of the concrete or asphalt that is poured in order to maintain the allowable longitudinal or cross slope of the sidewalk or pedestrian ramp and address the accessibility barrier. Figure 4 shows an example of patching and ramping. New concrete typically adheres best to existing concrete by adding a bonding agent to the mix or by placing a bonding agent prior to placing the new concrete patch.

Figure 4 - Patching and Ramping

Patching and ramping is not a preferred remedial solution due to its typically short lifespan that is associated with the bond strength of the patch to the existing concrete and the ramped section's susceptibility to cracking and chipping. Additionally, concrete or asphalt patching on sidewalks and pedestrian ramps can be considered unattractive and can result in negative feedback from residents.

However, for emergency situations, Town staff can quickly perform patching and ramping, at a nominal cost, in order to address an immediate concern until a more permanent repair can be performed.

2.4.2 Crack Repair

Crack repair is a repair method that can be done using the following materials on sidewalks and pedestrian ramps with cracks less than ½ inch:

- Concrete crack filler materials - typically labeled as "concrete crack seal" or "concrete crack filler" and are easily dispensed into the crack
- Epoxy crack filler materials - comes as a two part mix that has a high bond strength to existing concrete but usually is meant for smaller width cracks
- Asphalt cold patch materials – a polymer-modified cold mix asphalt that is available in small bags and does not require special machinery or heating of the asphalt mix
- Low cost Portland cement patching materials - requires the use of a special additives before applying the Portland cement mix in order to enhance the chemical bond of the Portland cement mix to the existing concrete

These materials can be used to fill cracks less than ½ inch and are usually the quickest and most inexpensive option available to repair cracks. This repair method typically requires preparing

the crack by slightly widening the crack in order to expose the surface of the crack from the top to the bottom so that the filler material has more surface area to securely adhere to.

This method can also be used for cracks greater than ½ inch although the longevity of the repair will, in most cases, be short due to the severity of the condition and the fact that the underlying cause of the deficiency may not be easily addressed without a full removal of the existing facility. Although this method can be quickly performed for emergency repairs at a relatively low initial cost, their appearance is not typically uniform with asphalt cold patch having the most noticeable difference in appearance (black for cold patch versus light to medium grey for concrete).

However, for emergency situations, Town staff can quickly perform crack repair, at a nominal cost, in order to address an immediate concern until a more permanent repair can be performed.

2.4.3 Concrete Grinding

Concrete Grinding is a technique that uses a concrete scarifier machine to grind down the raised side of two joining sections or flags of concrete. The scarifier usually has an attached vacuum to contain the generated concreted dust. Smaller grinds and finishing is performed using a dry hand grinder. The completed grind is usually squared off at the back to allow for a clean and uniform appearance. The finished surface usually appears lighter in color and the aggregate typically shows on the surface.

Concrete grinding is possible on height differentials of up-to two inches in ideal conditions. However, grinding more than one-inch of existing concrete thickness can make the concrete flag susceptible to cracking due to the reduction in thickness of the flag. Additionally, grinding equipment can gouge, pit, chip, and/or crack the surface of concrete sidewalks and pedestrian ramps. Concrete grinding is not recommended for hard to reach areas, such as locations with bollards, fire hydrants, light poles, walls, and fences. It is important to note that concrete grinding should be done in a manner that the grinded area does not exceed the allowable longitudinal and cross slopes.

This method does not address the underlying cause of the deficiency, which may not be easily addressed without a full removal of the existing facility. Additionally, special attention must be taken in order to see if the concrete grinding exposes gaps or cracks that are wider than ¼ inch that would result in a deficiency that would either require a crack repair or a flag replacement.

2.4.4 Construct Sidewalk / Flag Replacement

Sidewalk replacement or new construction is the most acceptable solution in terms of eliminating the ADA accessibility barrier and providing a method for addressing the underlying

cause of most of the issues present. Construction of a new sidewalk or replacement of flags is recommended when:

a. No sidewalk exists
b. Sidewalk has:
    i. Heaves greater than one inch
    ii. Cracks greater than ½ inch
    iii. Unacceptable longitudinal or cross slope
    iv. Unacceptable clear width (widening required)
    v. Damaged utility (MDWASD, FPL, or other) box or adjoining flag
c. Concrete grinding has already been performed at the same location
d. Recurring issues in the same location require addressing underlying cause
e. Deficiency can be attributed to an obvious underlying issue which will cause a recurrence/worsening of the deficiency

In general terms, the construction of a new sidewalk or replacement of an existing sidewalk flag or section typically requires the following steps:

a. Demolish and excavate to remove existing concrete sidewalk or existing vegetation and to ensure that sufficient depth is available for sub-base preparation (4 to 6-inch depth) and a minimum uniform slab depth can be maintained (4 to 6-inch thickness).
b. Address any underlying causes of the observed deficiency such as root intrusion, improper sub-base/inferior soils, and improper backfilling of utility service connections. Additional site excavation/preparation may be required to properly address the issue.
c. Prepare sub-base by compacting to 95% percent of AASHTO T99 density.
d. Secure formwork. Forms must also have a depth equal to the depth of concrete being poured against them.
e. No concrete should be poured until the subgrade is properly prepared and the forms are set and inspected.
a. Use Class I concrete with a minimum compressive strength of 3,000 psi. The pour must be fresh concrete and should be poured evenly and must be evenly distributed, tamped, and spaded until entire surface is covered and no voids remain.
b. Finish the concrete surface and maintain all ADA requirements for horizontal and vertical slopes. The newly poured sidewalk shall be broomed perpendicular to the forms to produce an even textured surface.
c. Score joints every five linear feet of sidewalk (typ.) by cutting to a depth of no less than 1.5-inches in depth. The joints must be straight, perpendicular, and at

right angles to the centerline of the sidewalk. Additionally, joints shall not create gaps greater ¼ inch.

d. Allow the concrete to cure for no less than 12-hours.
e. Remove formwork no less than 12 hours after final pour.
f. After construction is completed all disturbed adjacent areas, including adjacent cut and fill areas, shall be repaired as required to blend into the existing adjacent areas and to return to the site to preexisting conditions.

Coordination with utility owners must also be done prior to construction of sidewalks where utility box or lids are present is critical. For example, Miami-Dade Water and Sewer Department (MDWASD) has water meter boxes that must be purchased from MDWASD and an inspector must approve the installation.

Appendix F - Design Aids includes typical details for sidewalk construction.

2.4.5 Replace / Construct Pedestrian Ramp

Pedestrian ramp replacement or new construction is the most acceptable solution in terms of eliminating the ADA accessibility barrier and providing a method for addressing the underlying cause of most of the issues present. Construction of a pedestrian ramp or new construction is recommended when:

a. No pedestrian ramp exists
b. Flag replacement required due to:
    i. Heaves greater than one inch
    ii. Cracks greater than ½ inch
    iii. Unacceptable longitudinal or cross slope
    iv. Unacceptable clear width (widening required)
c. Concrete grinding has already been performed at the same location
d. Recurring issues in the same location require addressing underlying cause
e. Deficiency can be attributed to an obvious underlying issue which will cause a recurrence/worsening of the deficiency

In general terms, the construction of a new pedestrian ramps or replacement of an existing pedestrian ramps requires the same steps as for sidewalks with the exception of the limits of the repair/improvement, the criteria with regards to dimensions and slopes, and the requirement of installing detectable warnings where not present.

2.4.6 Installation of Detectable Warning Systems

A large percentage of the audited pedestrian facilities within the Town do not have detectable warning systems that comply with the guidance from the 2010 ADA Standards and FDOT Standard Index 304. The missing locations were mostly located at pedestrian ramps at street

crossings. The most feasible solution for resolving this deficiency is to utilize detectable warning matts that can be adhered to an existing concrete surface using either an epoxy bonding agent or the matts pre-applied adhesive and a mechanical attachment using anchors drilled into the concrete. It should be noted that the concrete must be in good condition with no cracks or preexisting seams and the surface must be thoroughly cleaned to maximize adherence.

Figure 5 - Detectable Warning Installation

Appendix F - Design Aids includes typical details of detectable warnings and sidewalk curb ramps.

2.4.7 Root Barrier

In addition to meeting the 2010 ADA Standards, new sidewalk and pedestrian ramp designs should consider methods to extend longevity of the facility. In the Town of Miami Lakes, tree roots play a major role in creating accessibility barriers on sidewalks by raising flags and creating heaves and/or cracks. Therefore, when trees are adjacent to sidewalks being replaced, it is recommended that root pruning be performed, as needed, and root barriers be installed. Root barriers are physical barriers typically made of a thick plastic membrane at least 18-inches tall that does not allow a trees roots to travel horizontally at a shallow depth and affecting the structure adjacent to the tree.

A sample root barrier detail is included in **Appendix F - Design Aids**. **Appendix F – Design Aids** also includes the Miami-Dade County Landscape Manual, Ninth Edition, which provides an illustrative guidance to the Miami-Dade County Landscape Code. It should be noted that root pruning is a task that should be consulted with a certified arborist and performed with adequate care so that the tree's root system is not damaged.

2.4.8 Handrail

Drop-offs are defined as steep or abrupt downward slopes that can be perilous to pedestrians. The Town has various locations where drop-offs greater than six inches exist directly adjacent to sidewalks. These drop-offs can be generally shielded through the use of railings or fences that prevent pedestrians from accidentally traveling beyond the safety of the sidewalk and into the drop-off. The installation of handrails will often require removing the existing section of sidewalk in order to provide an adequate base for installing the handrail anchors and railing and adding an extended floor surface to prevent wheelchair casters or crutch tips from slipping off the surface, as stated in the ADA Standards. **Appendix F - Design Aids** includes Figure F-1, which provides sketch of a typical handrail and corresponding sidewalk design.

2.5 Planning-Level Construction Unit Costs

For the purposes of the corrective actions identified within this Transition Plan, the planning-level costs were estimated for the most common corrective actions previously described in **Section 2.4**. The Town provided unit costs for services currently under contract for performing certain repairs. The costs provided by the Town are as follows:

- **Flag Replacement** – (applies to new construction of sidewalks) Average unit cost to replace one flag of sidewalk or pedestrian ramp (assuming one flag = 5 ft x 5 ft):
  - $43.10 per square yard (4 inches thick) = approximately $120 per flag
  - $55.20 per square yard (6 inches thick) = approximately $155 per flag
- **Concrete Grinding** – Unit cost for concrete grinding of sidewalk or pedestrian ramp (assume for one flag: one inch in height and 5 ft width):
  - $30.50 for 1:10 slope per inch ft = approximately $155 per flag
  - $31.50 for 1:12 slope per inch ft = approximately $160 per flag

Other costs that were not provided by the Town for alternate repair methods such as patching and ramping and crack sealing. However, for comparative purposes, the following are estimated costs for each:

- **Patching and ramping** – (assume 1 inch high x 5 ft width x 1 ft long): $70
- **Crack repair** – (assume ½ inch crack x 5 ft width x 4 inches high): $40
- **Construct ramp** – (assume 10 ft long x 4 ft wide x 6 inches thick & includes cost of installing a new detectable warning): $550 (this cost does not include any repairs to sidewalk adjacent to proposed ramp)

Table 4 provides a summary of the corrective actions detailed in this Transition Plan, including planning-level estimated unit costs.

Table 4 – Summary of Sidewalk/Pedestrian Ramp Accessibility Barriers & Recommended Corrective Actions

CORRECTIVE ACTION	REFERENCED SUBSECTION	UNIT PRICE	LONGEVITY OF CORRECTIVE ACTION	ADDRESS UNDERLYING CAUSE	COMMENTS
Patching & Ramping *(for heaves only)*	2.4.1	$70/flag	Short term	No	• Quick repair • Issues with bonding of materials • Patch/ramp susceptible to cracking and delamination • Unable to expose and address underlying cause of deficiency
Crack Repair *(for cracks only)*	2.4.2	$40/flag	Short term	No	• Quick repair • Issues with bonding of materials • Unable to expose and address underlying cause of deficiency
Concrete Grinding @ 1:12 (See Note 1) *(for heaves only)*	2.4.3	$160/flag	Medium term	No	• Quick repair • Unable to expose and address underlying cause of deficiency • Chipping of flags can occur
Construct 6 inch thick Sidewalk / Flag Replacement (See Note 1) *(for all accessibility barriers)*	2.4.4	$155/flag	Long term	Yes	• Multiple day installation • Requires closing of the facility for a minimum of one day • Cost of root pruning and root barrier installation not included in this cost • Cost of stabilizing subgrade included in this cost
Construct 6 inch thick Ramp (See Note 1) *(for all accessibility barriers)*	2.4.4	$550/ramp	Long term	Yes	• Multiple day installation • Requires closing of the facility for a minimum of one day • Cost of root pruning and root barrier installation not included in this cost • Cost of stabilizing subgrade included in this cost

Table 4 Notes:

1. Preferred corrective action. This cost was used for the planning and scheduling of activities in this Transition Plan.

Additional corrective actions identified for other accessibility barriers are included in Table 5.

Table 5 – Summary of Other Deficiencies & Recommended Corrective Actions

CORRECTIVE ACTION	REFERENCED SUBSECTION	UNIT PRICE	LONGEVITY OF CORRECTIVE ACTION	ADDRESS UNDERLYING CAUSE	COMMENTS
Install Handrail *(assumed 10-foot installed length; for vertical drops greater than 6")*	2.4.8	$1,000/flag	Long term	Yes	• Requires reconstructing the sidewalk to meet minimum post embedment and clearances • Must maintain 48 inch clear zone throughout length
Install detectable warning (based on 4' x 2')	2.4.6	$300/flag	Long term	Yes	• Requires preparation of concrete surface • Must be bonded and mechanically attached to surface • Must not be placed over cracks and seams in concrete
Install root barrier (5' x 1.5') *(for use in combination with construction of sidewalk located near trees and does not include cost of root pruning, if needed)*	2.4.7	$200/flag	Long term	Yes	• May require root pruning by a certified arborist • Associated root pruning must not damage tree • Minimum 18 inch embedment adjacent to sidewalk • Utilities must be properly identified prior to excavation and installation

Table 4 and Table 5 are intended to be planning-level summaries of the corrective actions available to the Town. The specific items within these tables may vary depending on negotiated contract prices or bid prices procured by the Town. Additionally, these tables are not intended to account for all of the variables that may affect construction cost and feasibility of the proposed solutions.

2.6 Town of Miami Lakes Yearly Budgetary Allocations

The Town's yearly budgetary allocation for addressing accessibility barriers is currently between $200,000 and $300,000 for 2015. For the purposes of this Transition Plan, a yearly allocation of $250,000 was used for scheduling remedial actions throughout the Town. As stated in **Section**

2.5, 6-inch thick sidewalks and 1:12 grinding were assumed as typical corrective actions for planning-level cost estimating purposes of this Transition Plan. Using the unit costs in Table 4 and Table 5 and the number of instances per corrective action, this Transition Plan's total estimated implementation cost was determined to be $2,030,460 as detailed in Table 6. Assuming the Town allocates the full $250,000 per year for implementing the corrective actions identified in this Transition Plan, it will take 9 years to repair the currently identified accessibility barriers. Additionally, this does not account for accessibility barriers that continuously present themselves throughout the Town's pedestrian facilities.

Table 6 – Transition Plan Estimated Implementation Costs

Corrective Action (Repair Method)	Instances	# Flags/Ramps	Unit Price	Cost
Construct Sidewalk	8	13	$155/flag	$2,015
Flag Replacement	2,382	5,597	$155/flag	$867,535
Sidewalk Grinding	2,553	3,868	$160/flag	$618,880
Construct Ramp	230	411	$550/ramp	$226,050
Install Detectable Warning	418	828	$300/flag	$248,400
Install Detectable Warning & Sidewalk Grinding	18	23	$460/flag	$10,580
Install handrail	19	57	$1,000/flag	$57,000
Totals	**5,628**	**10,797**	**-**	**$2,030,460**

3 BARRIER RANKING

Aluces analyzed the data collected and developed a prioritization methodology in order to rank the accessibility barriers observed throughout the Town. The prioritization process entailed delineating areas throughout the Town adjacent to facilities where the pedestrian traffic is considered to be greatest. The pedestrian traffic areas were prioritized as follows:

Priority 1 – Area within 500 ft from edge of a public school
Priority 2 – Sidewalks & pedestrian ramps along bus routes
Priority 3 – Area within 300 ft from edge of commercial retail centers
Priority 4 – Area within 100 ft from local government office/facility, hospital, library, and park
Priority 5 – Other

These priorities were scored as follows:

Priority 1 – 1000
Priority 2 – 100
Priority 3 – 10
Priority 4 – 1
Priority 5 – No Score

This would allow for roadways that fall within multiple priority areas to be scored higher than those that fall within only fewer priority areas. The following is an example of this initial prioritization step:

Roadway X: Falls within Priority 1 and Priority 3 areas – Score 1010
Roadway Y: Falls within Priority 1 and Priority 2 areas – Score 1100
Roadway Z: Falls within Priority 2 and Priority 3 areas – Score 110

Initial ranking of sample roads:

1. 1100 - Roadway Y
2. 1010 - Roadway X
3. 110 - Roadway Z

The second step in the prioritization process involved the density of the deficiencies noted within a section of roadway. The deficiencies were grouped per section of roadway in order to avoid multiple mobilization efforts when multiple deficiency instances existed. Furthermore, the total number of deficiencies were summed within a particular section of roadway using GIS.

The density of the deficiencies present was then determined using the number of deficiencies divided by the length of the roadway segment and multiplied by 100.

This prioritization process focused the ranking on those areas with the highest potential for pedestrian traffic and on the density of accessibility barriers within a section of roadway to allow repair teams to address the maximum number of accessibility barriers in the shortest period of time.

The required installation of handrails was given the highest priority over other corrective actions. Installing handrails should be performed prior to implementing the other priorities in order to remove the excessive drop-offs identified, which can be perilous to pedestrians, even to those without disabilities.

Appendix E – Maps of Ranked Streets provides figures showing the relative location of the ADA accessibility barriers identified along a section of road, the house number of the properties bordering that road, and an aerial image of the reference area.

4 IMPLEMENTATION SCHEDULE

Since it is not financially feasible to immediately remove all accessibility barriers within the Town, a detailed implementation schedule was developed. This tool provides the Town with a tool to systematically schedule and address the accessibility barriers identified through this assessment. This implementation schedule was developed using the yearly allocation budget of $250,000 identified in **Section 2.6** for addressing accessibility barriers and the prioritization methodology described in **Section 3**.

The Implementation Schedule proposed is intended to guide the Town in scheduling the remedial activities. The Town reserves the right to modify the schedule in order to allow flexibility in accommodating community requests, petitions for reasonable modifications from persons with disabilities, coordination with capital improvement projects, such as a roadway reconstruction, funding constraints and opportunities, or other warranted situations.

The Implementation Schedule is included in **Appendix D – Table of Ranked Streets & Implementation Schedule**.

A summary of the Implementation Schedule is provided in Table 7. Excluding additional accessibility barriers that present themselves.

Table 7 - Implementation Schedule Summary

Year	Annual Expense
1	$ 250,550
2	$ 250,575
3	$ 251,140
4	$ 251,750
5	$ 251,650
6	$ 250,115
7	$ 250,260
8	$ 250,830
9	$ 23,590
Total	**$ 2,030,460**

5 TOWN OF MIAMI LAKES ADA COMPLIANCE COORDINATOR

The Town's Director of the Public Works Department is the designated ADA Compliance Coordinator and is responsible for implementing and maintaining the Transition Plan relative to improving ADA compliance for pedestrian access in the Town's public rights-of-way. The current contact is:

Elia Nuñez, PE
Director of Public Works
Town of Miami Lakes
6601 Main Street
Miami Lakes, FL 33014
(305) 364-6100 Ext 1129
(305) 512-7129 Direct
nuneze@miamilakes-fl.gov

The Town encourages the public to notify the Town's ADA Compliance Coordinator of suspected ADA compliance issues. The Town's Compliance Coordinator will update the Town's records accordingly.

It is the responsibility of the Town's ADA Compliance Coordinator to maintain the Town's ADA accessibility barrier spreadsheet in order to track the remedial activities associated with this Transition Plan as they are completed. Additionally, periodic self-audits should be performed every 5 years to confirm the completion of accessibility improvements.

6 REFERENCES

U.S. Department of Justice (2010), *2010 ADA Standards for Accessible Design*. www.ADA.gov.

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DeepRoot Green Infrastructure, LLC (2014), *UB 18-2 Specifications 18" DeepRoot Tree Root Barrier*. www.deeproot.com.

Miami-Dade County Department of Planning and Zoning (2010). *The Landscape Manual, Ninth Edition*. http://www.miamidade.gov/zoning/code-landscape.asp.