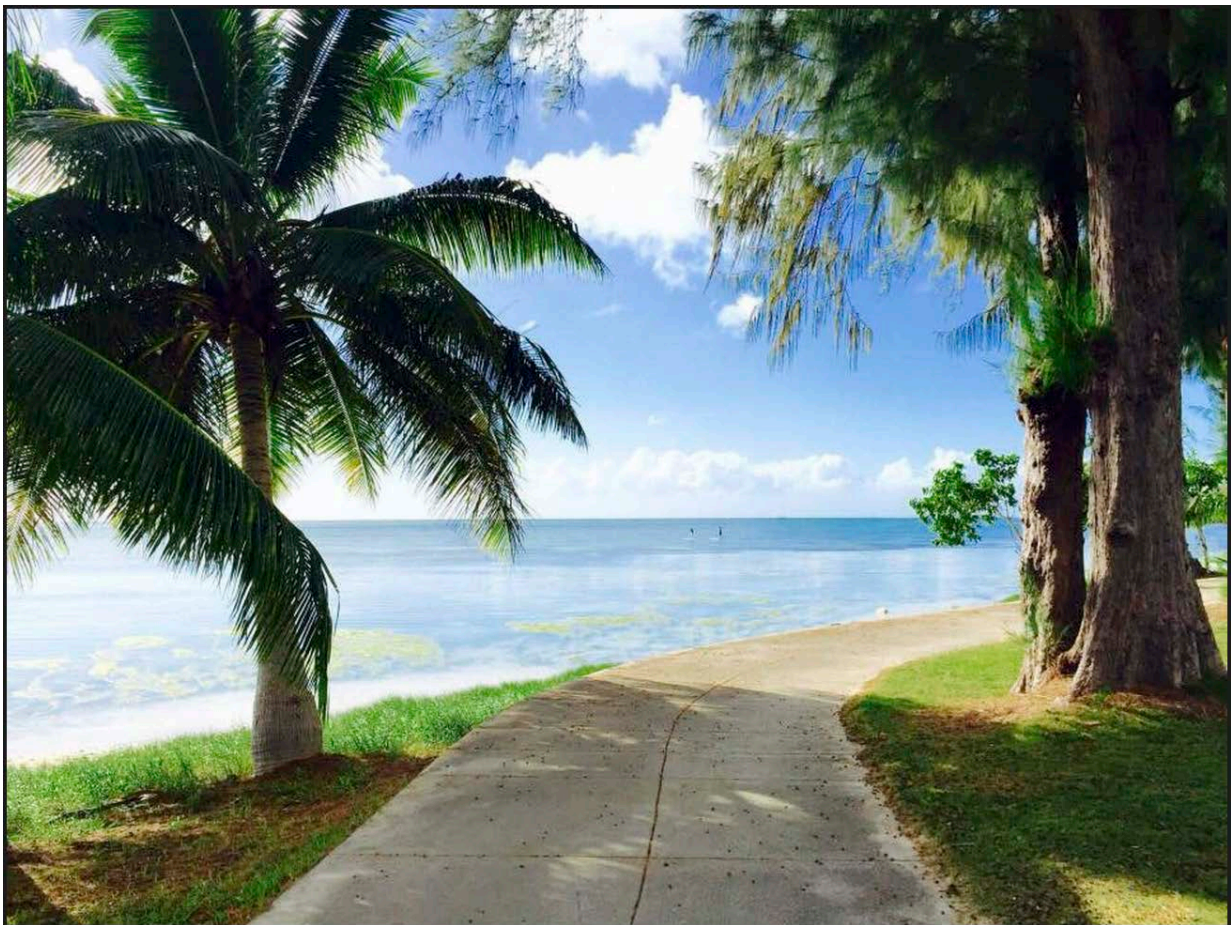




2021

# Availability of Street-Level Supports for Walking in Saipan

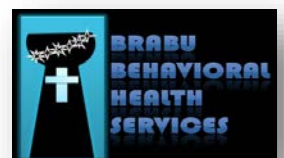
Commonwealth of the Northern Mariana Islands



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**NATIONAL ASSOCIATION OF CHRONIC DISEASE DIRECTORS**  
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## Executive Summary

Non-communicable diseases (NCDs) are a major public health concern in the Commonwealth of the Northern Mariana Islands (CNMI). Risk factors for NCDs are prevalent in the CNMI, including physical inactivity. According to the 2016 CNMI Non-Communicable Diseases and Risk Factor Hybrid Surveillance Report, 33% of CNMI adults reported not having participated in any physical activity or exercise in the past month. Physical activity and more active lifestyles can be encouraged through built environment infrastructure that promote walking.

In June 2021, the Commonwealth Healthcare Corporation (CHCC) NCD Bureau partnered with the National Association of Chronic Disease Directors (NACDD) and the Pacific Island Health Officers Association (PIHOA) to conduct an observational audit of street segments to measure street-level supports and barriers to physical activity using a modified Microscale Audit of Pedestrian Streetscapes-Mini (MAPS-mini) tool.

The NCD Bureau collaborated with the Commonwealth Office of Transit Authority (COTA) to identify a total of 46 sites to adequately represent the proposed bus route system. A 200-meter buffer was created on a map to encompass the land area surrounding each identified site. Segments within each site were then selected for the audit to adequately represent the land area within the buffer. A total of 206 segments were selected for audit. Intersections and crossings of interest were also identified among the 46 sites. A total of 51 crossings were selected for audit.

Seventeen volunteers from the NCD Bureau and the community were trained on the “Saipan MAPS-mini” audit tool during a four-hour training session prior to data collection. These volunteers were given maps of their assigned land areas with labeled segments. After a one-week period of data collection, the volunteers submitted completed audit forms for each of their assigned segments.

Audits were completed on a total of 206 street segments and 51 crossings. Of these segments, 24.3% were residential and 75.7% were commercial.

When safety factors were assessed, it was found that 17.5% of segments had no streetlights, 24.3% had stray dogs present during the audit, and 72.3% had no sidewalks. Of the segments with sidewalks, 78.3% had no buffer between the sidewalk and the road. Of the segments without a sidewalk, 30.7% had no other roadside space to walk. Commercial segments had a higher prevalence of no streetlights compared to residential segments (19.2% vs 12.0%,  $p < 0.05$ ). In addition, residential segments had a significantly higher prevalence of stray dogs present compared to commercial segments (42.0% vs 18.6%,  $p < 0.05$ ).

When physical disorder was assessed, it was found that 41.8% of sidewalks had major trip hazards, such as misalignment, overgrowth, cracks, or an incomplete sidewalk. 46.8% of segments had abandoned buildings or overgrown vacant lots and 18.9% were considered to have some or a lot of litter, as opposed to none or very little.

When functional design was assessed, it was found that 12.6% of segments had access to a park, 24.3% had public transportation access, 18.0% had places to sit, 1.5% had adequate sun coverage, and 1.0% had a designated bike lane.

When crossings were assessed, it was found that 60.0% had no walk signal present, 54.0% had no pedestrian signs present, and 80.0% had no marked crosswalk on the road. Of the crosswalks that were marked, 67.4% were worn or faded to the point they are difficult to see.

The overall walkability score of all street segments evaluated on Saipan was 6.57 (95% CI: 6.25, 6.88) out of 20 possible points. Commercial areas had a higher walkability score (7.10; 95% CI: 6.76, 7.45) than residential areas (4.90; 95% CI: 4.39, 5.41).

The *Step It Up! The Surgeon General's Call to Action to Promote Walking and Walkable Communities* can be used as potential action steps towards improving walkability in the CNMI. Multisectoral partnership will also be key in the NCD Bureau's goal of improving walkability. In determining action steps and implementation strategies, issues such as feasibility, available resources, needs of different sectors, and acceptability on Saipan should be considered.

#### **Potential Action Steps:**

1. Make walking an island-wide priority to improve the economy, the environment, and public health.
2. Design communities that make it safe and easy to walk.
  - Updates to zoning and design guidelines to encourage the development of compact, walkable village centers with essential needs and services.
  - Providing funding and incentives to create more walkable streets by completing sidewalks, crosswalks, and bike lanes, especially to key destinations.
  - Collaborating with public and private partners to add features such as shade trees, lighting, benches, and bus stop shelters.
3. Promote programs and policies to support walking.
  - Promoting community-based walking and walk-to-school programs.
  - Increasing access to community locations for walking such as trails, parks, etc.
  - Working with government and residents to develop policies and programs to reduce or control stray dogs.
4. Provide information and data collected to key stakeholders to improve walkability.
5. Collect more data on how much and where people walk and bike, and how to encourage more.

## Introduction

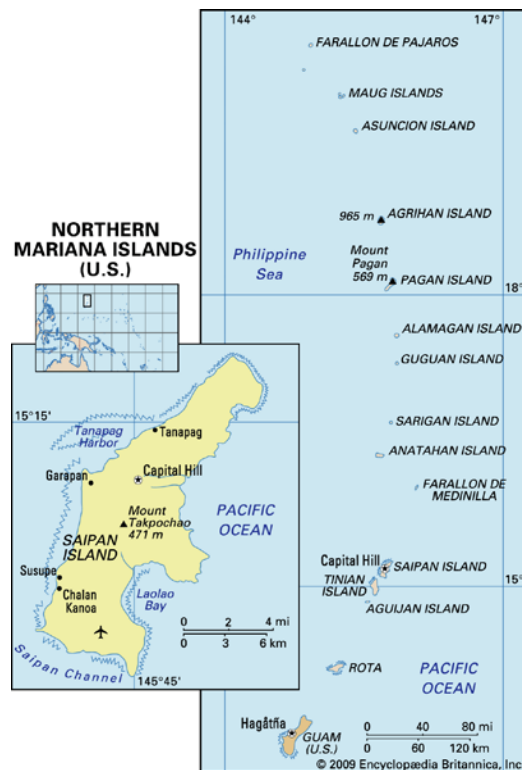


Figure 1. Map of the CNMI and Saipan  
<https://www.britannica.com/place/Northern-Mariana-Islands>

The Commonwealth of the Northern Mariana Islands (CNMI) is a United States commonwealth located in the Pacific. The CNMI consists of 14 islands, of which three—Saipan, Tinian, and Rota—are the main inhabited islands. The total population of the CNMI is 52,263 with 47,565 individuals residing in Saipan, the most populated island<sup>1</sup>. The island of Saipan is approximately 12.5 miles long and 5.5 miles wide (Figure 1). There is great ethnic diversity in the CNMI, with the largest ethnic groups being Asian and Pacific Islander. As of 2017 Saipan was home to 25,885 individuals of Asian descent and 20,984 individuals of Pacific Islander descent<sup>1</sup>. Those of Asian descent were, in order of largest to smallest presence, Filipino (41.2% of the total population), Chinese (7.3%), other Asian (3.2%), Korean (1.4%), and Japanese (0.8%). Those of Pacific Islander descent were, in order of largest to smallest presence, Chamorro and Carolinian (35.5% of the total population), Micronesian (8.6%), and other Pacific Islander (0.4%). The median age of those in the CNMI is 34 years old. The largest five-year age groups in the CNMI are 10-14 years old (10.2%), followed by 5-9 years old (9.8%), and 45 to 49 years old (9.7%)<sup>1</sup>.

With the increased incorporation of Western culture into the CNMI, a number of Non-Communicable Diseases (NCDs) and their risk factors have become more common. In 2016 the CNMI undertook the first population-based NCD household survey, surveying 1,091 individuals ages 18 and older, to assess NCD risk factors and outcomes<sup>2</sup>. Some major findings of the 2016 NCD Hybrid Survey include the following: one out of three (33%) of CNMI adults reported not having participated in any physical activity or exercise in the past month, almost two-thirds (64%) of adults in the CNMI are overweight or obese, almost half (42.3%) of adults in the CNMI perceive their health as fair or poor, over half (56%) of CNMI adults have hypertension, one out of five (17.3%) of CNMI adults have high cholesterol, and 18.7% of adults in the CNMI have diabetes<sup>2</sup>.

The CNMI has an NCD Task Force that works to address the prevalence of NCDs in the CNMI. The lack of physical activity in the CNMI has been identified as a significant modifiable risk factor. One way of addressing this is through increasing walking. Walking is an easily accessible method of exercise that all individuals can engage in as there are no costs or equipment required. Providing individuals with increased opportunities for walking creates an avenue for increased physical activity. Additionally, it can serve as a way for people to commute and a way for community members to engage with one another. Increasing walkability has been shown to accommodate a variety of transportation options, reduce risk to pedestrians, reduce carbon emissions, and encourage health and active lifestyles<sup>3</sup>.

In order to improve walkability, changes to the infrastructure in the CNMI must be addressed. This walkability assessment served as a means to collect data on the current state of walkability in Saipan.

The objective of this project was to gather baseline data on the street-scale design features that support walking on the island of Saipan. This data will be utilized to inform community design and infrastructure decision-making to improve walkability.

## Methods

### Study design and sample selection

This cross-sectional study relied on observational audits of street segments to evaluate the walkability of streets in Saipan, CNMI.



Figure 2. COTA Proposed Route System  
Commonwealth Office of Transit Authority, 2020

Saipan was selected as the focus of this assessment, as the majority of the population in the CNMI lives on this island and it is the official capital of the CNMI. A key aspect of walkability is increasing transportation options for community members. A partnership with the CNMI's public transportation office, the Commonwealth Office of Transit Authority (COTA), was formed to determine assessment sites on the island of Saipan. This partnership was key in identifying sites of interest for site selection. As of 2020, there were two COTA bus routes currently in place and another three routes are proposed to serve the island of Saipan (figure 2). The goal of this partnership was to determine the walkability in each of these routes to assess feasibility and accessibility of the bus stops.

A total of 46 sites were identified to adequately represent the proposed COTA bus route system and were included in the assessment. A sample was developed from all existing bus stops along all COTA routes. Utilizing ArcGIS, a 200-meter buffer was created on a map to encompass the land area surrounding each identified site. Segments within each site were then selected for the audit to adequately represent the land area within the buffer. In addition, segments with a point of interest, such as a school, place of worship, health-related facility, recreational facility, commercial area, or government office, were selected. A total of 206 segments were selected for audit. Intersections and crossings of interest were also identified among the 46 sites. A total of 51 crossings were selected for audit.

All selected segments and crossings were identified utilizing GoogleMaps, coded, and labeled on a map of the specific site. These site maps identifying all segments and crossings were given to assigned volunteers for audit.

### Audit tool

The Microscale Audit of Pedestrian Streetscapes-mini (MAPS-mini) audit tool was selected initially for this project<sup>4</sup>. Also, the MAPS-USVI and MAPS-Guam tool, which were adapted for those jurisdictions were also reviewed for potential modifications<sup>5,6</sup>. Based on feedback from local stakeholders on Saipan, the MAPS-mini tool was modified to be more suitable for Saipan. The audit tool included two forms, one for street segments and another for crossings. The segment form was adapted from the MAPS-Guam tool, which included one land use question from the MAPS-USVI tool. Questions were also added on both forms to adequately capture characteristics of Saipan streets. A final copy of the segment and crossings audit tool is included in this report (Annex 1, 2).

The final “Saipan MAPS-Mini” audit tool included 16 items for street segments and 8 items for crossings. The street segment items collected information on land use, type of area, public park access, public transportation, seating, street lights, building maintenance, bike paths, sidewalks and sidewalk quality, sun coverage, litter, and stray dogs. A total of twenty “points” could be scored for each segment to evaluate “overall walkability”. The crossing items collected information on walk signals, pedestrian signs and signals, curb ramps, marked crosswalks, and crossing visibility. A total of eight “points” could be scored for each crossing to evaluate “overall walkability”.

### Training and data collection

Seventeen volunteers from the NCD Bureau and the community were trained on the “Saipan MAPS-Mini” audit tool during a four-hour training session on June 5, 2021. All volunteers were given a comprehensive training guide (Annex 3). These volunteers were also given maps of their assigned sites with coded and labeled street segments and crossings.

Volunteer auditors were given a one-week period for data collection and could complete their sites based on their availability over the week of June 5 to June 12, 2021. Volunteers completed one audit form for each of their assigned segments and crossings. Volunteers were given one \$20 fuel voucher to compensate for use of their own personal vehicles.

On June 12, 2021, all volunteers met for a debrief meeting and to submit their audit forms. The team provided qualitative feedback on the walkability assessment project, and also completed a formal evaluation.

### Data processing and analysis

All audit forms were initially reviewed during the debrief meeting for completeness. Then, all audit forms were entered into an electronic Microsoft Excel database. These data were then cleaned prior to analysis. For “overall walkability score”, the coded response options for each segment audit item and crossing audit item were totaled.

Descriptive statistics were performed using SAS version 9.4 Chi-square and Fisher’s analyses were performed to determine statistical differences between categorical walkability variables between the two area types (Residential vs. Commercial). Independent T-tests were used to compare mean overall walkability scores between area types. P-values <0.05 were considered to be statistically significant.



## Results

### Sample

A total of 206 segments and 51 crossings were audited. Of these segments, 50 (24.3%) were residential and 156 (75.7%) were commercial.

### Findings

#### Street-Level Safety Hazards

When safety factors were assessed, it was found that 17.5% of segments have no street lights, 24.3% had stray dogs present during the audit, and 72.3% had no sidewalks (figure 3). Of the segments with sidewalks, 78.3% had no buffer between the sidewalk and the road. Of the segments without a sidewalk, 30.7% had no other roadside space to walk. Of the segments with roadside space to walk, 35.4% had overgrown vegetation that restricted walking or biking. Interestingly, commercial segments had a higher prevalence of no streetlights compared to residential segments (19.2% vs 12.0%,  $p < 0.05$ ). In addition, residential segments had a significantly higher prevalence of stray dogs present compared to commercial segments (42.0% vs 18.6%,  $p < 0.05$ ).

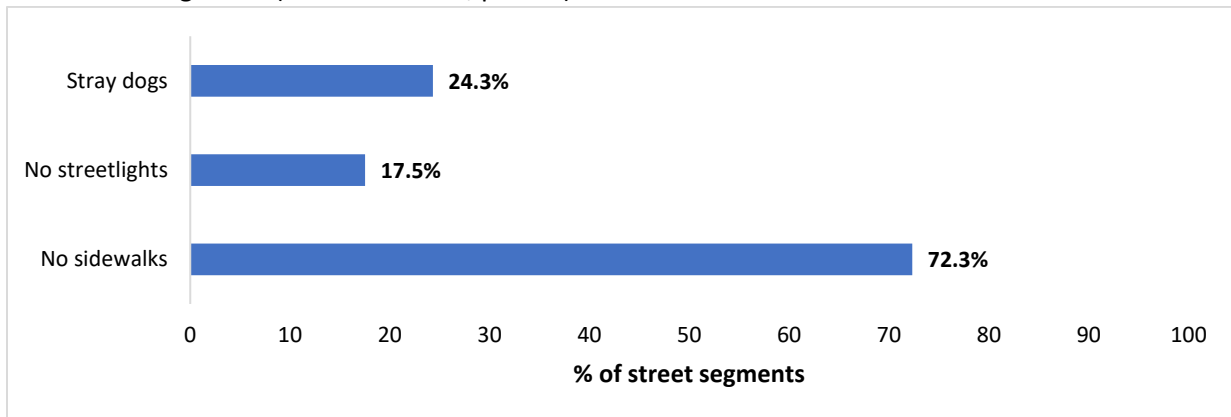


Figure 3. Street-Level Safety Hazards on Saipan, 2021

#### Street-Level Physical Disorder

When physical disorder was assessed, it was found that 41.8% of sidewalks had major trip hazards, such as misalignment, overgrowth, cracks, or an incomplete sidewalk. 46.8% of segments had abandoned buildings or overgrown vacant lots and 18.9% were considered to have some or a lot of litter, as opposed to none or very little (figure 4).

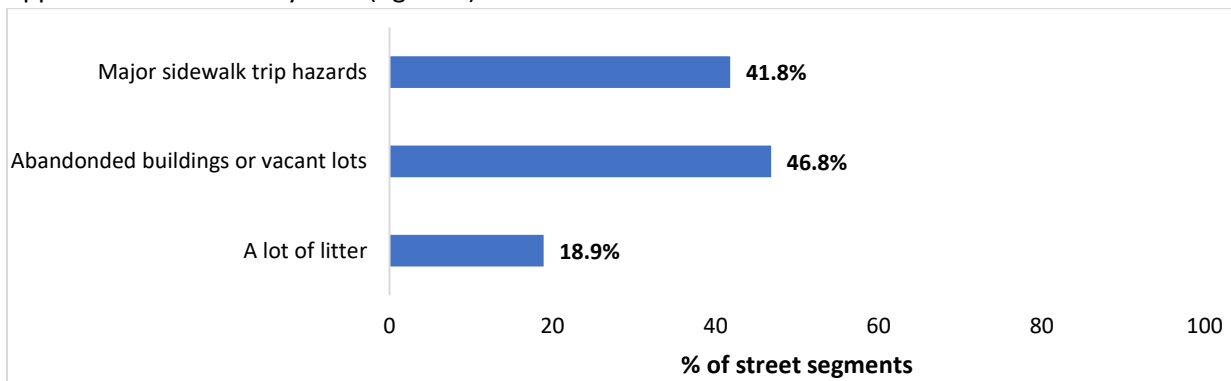


Figure 4. Street-Level Physical Disorder on Saipan, 2021

### Street-Level Functional Design

When functional design was assessed, it was found that 12.6% of segments had access to a park, 24.3% had public transportation access, 18.0% had places to sit, 1.5% had adequate sun coverage, and 1.0% had a designated bike lane (figure 5). There was significantly more public transportation access in commercial areas (30.1%), compared to residential (6.0%) ( $p < 0.05$ ). There were significant sun coverage differences between commercial and residential, with residential areas having a higher percentage of adequate sun coverage (2.0% vs 1.3%,  $p < 0.05$ ).

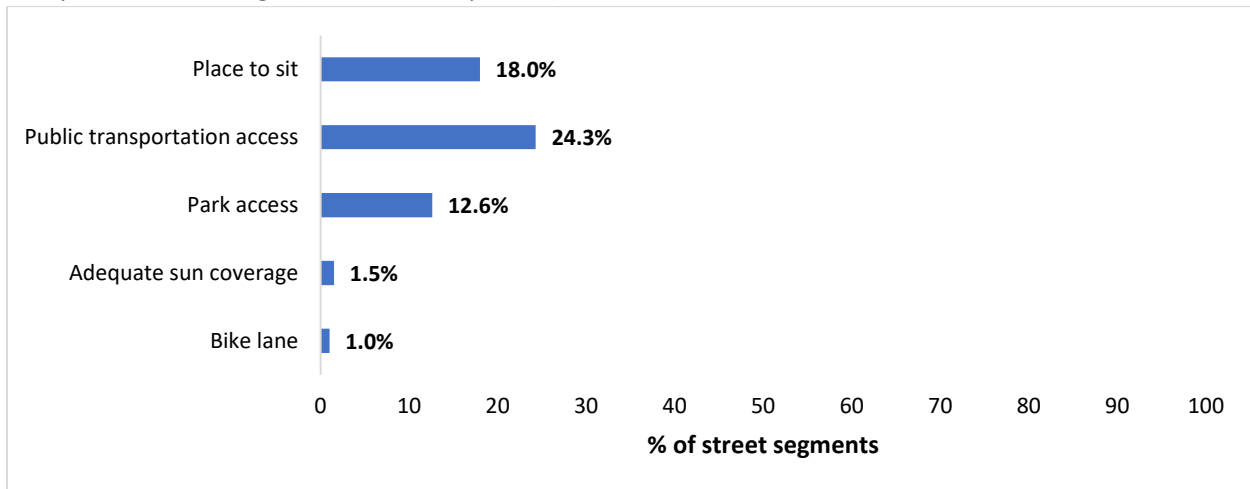


Figure 5. Street-Level Functional Design on Saipan, 2021

### Crossings

When crossings were assessed, it was found that 60.0% had no walk signal present, 54.0% had no pedestrian signs present, and 80.0% had no marked crosswalk on the road (figure 6, table 4). Of the crosswalks that were marked, 67.4% were worn or faded to the point they are difficult to see. When ramps at curbs were assessed, 64.7% had no ramps, 11.8% had only one ramp, and 23.5% had ramps at both curbs. In addition, 84.3% of crossings had overgrown vegetation that restricts roadside access for walking or restricts crossing visibility. Qualitative data collected from the audit tool noted auditor comments in the field, including lack of crosswalk access, high traffic areas, and nonfunctional walk signals. One auditor noted the danger of some crosswalks in high traffic areas, where most cars do not stop.

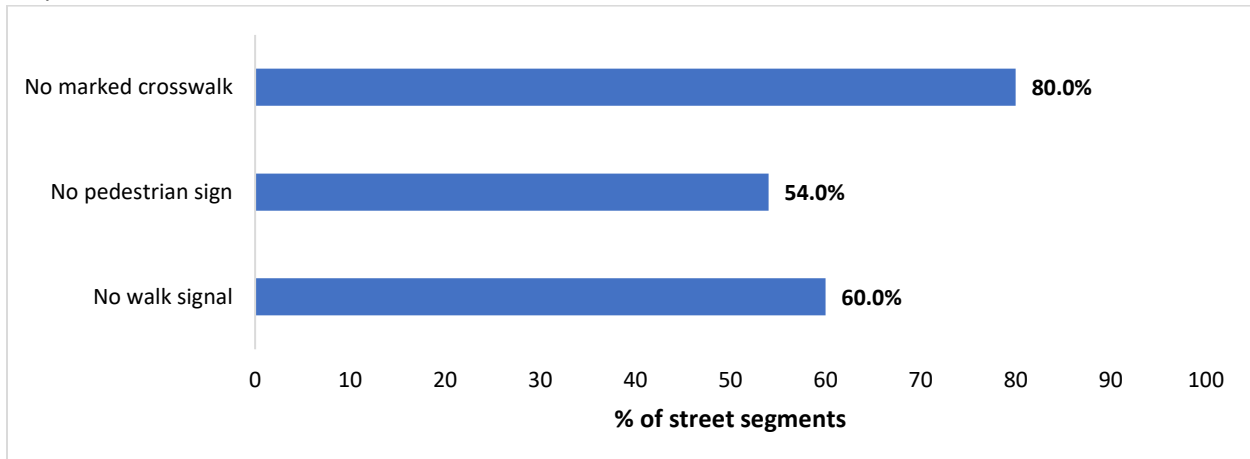


Figure 6. Crossings on Saipan, 2021

### Overall Walkability Scores

The overall walkability score of all street segments evaluated on Saipan was 6.57 (95% CI: 6.25, 6.88) out of 20 possible points (table 3). Commercial areas had a higher walkability score (7.10; 95% CI: 6.76, 7.45) than residential areas (4.90; 95% CI: 4.39, 5.41) ( $p < 0.05$ ) (figure 7). However, there was variation among the segments audited, regardless of segment type (figure 8).

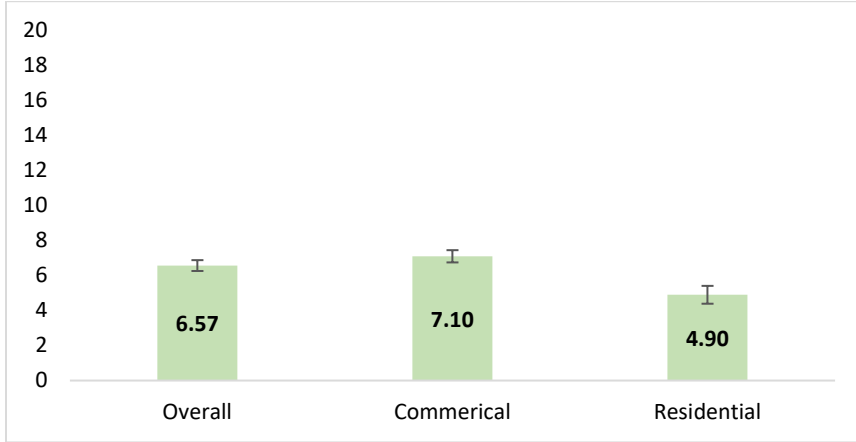


Figure 7. Walkability Scores by Area Types on Saipan, 2021

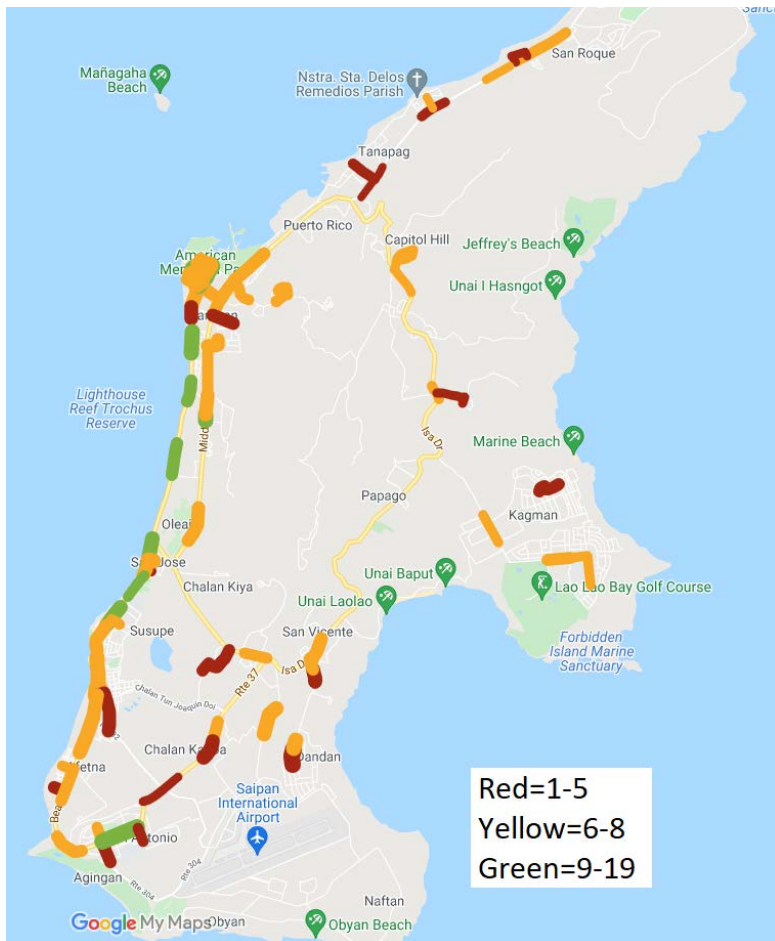


Figure 8. Map of Walkability Scores in Saipan, 2021

## Discussion

### Limitations

The results of this project are subject to limitations. Firstly, due to limited resources, all villages on Saipan were not able to be examined, therefore representative sites were selected to capture the more populated villages. Additionally, auditors were given a one-week period to conduct the assessments. Depending on the time of day, differences may have arisen in audit scores for lighting. The team also noted the presence of stray dogs mostly during the early morning or late afternoon. Hence, those who conducted their assessments in the afternoon would not have noted the presence of stray dogs. Finally, the street segments were audited by seventeen different volunteers. Although a training was conducted to standardize auditing methods, there could have been potential subjective differences between auditors.

### Strengths

This project was a collaborative effort between key stakeholders and volunteer community members. The partnership with COTA was essential in determining key sites for audit, as these sites will need to be walkable to encourage the use of public transit. In addition, the group of volunteers trained were various types of community members, which aided in gaining different perspectives of the project. Volunteers were able to discuss findings and experiences during the debrief meeting. The audit tool was validated and adapted for use on the island of Saipan to accurately and consistently evaluate multiple walkability features. The data collected is the first of its kind for the island of Saipan, which will serve as a baseline and aid walkability partners in improving the built environment.

### Recommendations

Overall, feedback from volunteers was positive. Volunteers felt that the training was effective in preparing them for data collection and ensuring confidence in their skills to collect accurate data. They felt that the audit tool contained an appropriate number of questions and that the data collected will be very useful for Saipan. All volunteers noted that they would assist with the assessment again, if given the opportunity. The following items comments and recommendations were made by volunteers from evaluations and the debrief meeting:

- More awareness about the project is needed in the community
- Use of technology during data collection in the field for efficiency
- Separating options to assess the presence of litter to be more distinct, rather than two general choices, to capture the amount of litter more accurately
- Capturing the adequacy of lighting can be difficult, depending on the time of day. Additional factors that should be considered include light coloring, shading, or brightness.
- It's important to consider the culture of walking in the CNMI and how it is not the "norm"

It would be valuable to conduct this assessment again in the future to monitor progress in improving walkability on Saipan. It may also be worthwhile to expand the assessment to include a greater number of streets in Saipan to capture a more comprehensive picture. In addition, it may be beneficial to conduct this assessment on Tinian and Rota, which are the other two most populated islands in the CNMI. Finally, qualitative assessments from community members could provide essential information about the barriers to walkability that can be assessed, such as culturally relevant information.

## Potential Action Steps

Based on the findings presented in this report, the following are potential steps that the CHCC NCD Bureau could take in partnership with key stakeholders to improve walkability and promote walking throughout the island. These recommendations are based on the *Step It Up! The Surgeon General's Call to Action to Promote Walking and Walkable Communities*<sup>7</sup>. In determining action steps and implementation strategies, issues such as feasibility, available resources, needs of different sectors, and acceptability on Saipan should be considered.

**1. Make walking an island-wide priority to improve the economy, the environment, and public health.**

In order to make Saipan more walkable, it is essential that the CHCC NCD Bureau work in collaboration with key partners in various sectors throughout Saipan. Benefits from improving walkability can be seen in many different sectors. The CHCC NCD Bureau must share the results of this assessment with these stakeholders to form partnerships to collaborate on improving walkability on Saipan. This can be done through the current efforts of the CNMI NCD Task Force and the CNMI Planning and Development Advisory Council, specifically under the leadership of the Built Environment Task Force.

**2. Design communities that make it safe and easy to walk.**

This must be done through collaboration with key sectors after the development of a comprehensive action plan to increase walking and walkability on Saipan. Some key strategies can include:

- Updates to zoning and design guidelines to encourage the development of compact, walkable village centers with essential needs and services.
- Providing funding and incentives to create more walkable streets by completing sidewalks, crosswalks, and bike lanes, especially to key destinations. Currently, 72.3% of street segments on Saipan don't have sidewalks, 80.0% of crossings don't have marked crosswalks, and only 1.0% of street segments have bike lanes.
- Collaborating with public and private partners to add features such as shade trees, lighting, benches, and bus stop shelters. Currently, only 1.5% of street segments have adequate sun coverage, 17.5% of street segments have no streetlights, and only 18.0% of street segments had a place to sit.

**3. Promote programs and policies to support walking.**

Programs and policies that supporting walking are essential to a comprehensive approach to make Saipan a more walkable island. Programs and policies include:

- Promoting community-based walking and walk-to-school programs.
- Increasing access to community locations for walking such as trails, parks, etc.
- Working with government and residents to develop policies and programs to reduce or control stray dogs. Stray dogs can be a barrier to walking motivation. During this audit, volunteers found that 24.3% of street segments had stray dogs present during their assessment.

**4. Provide information to encourage walking and improve walkability.**

Data gathered during this assessment should be shared widely to raise awareness on the walkability challenges on Saipan. Additionally, sharing this information should be used as an opportunity to educate stakeholders and community members on the benefits of physical activity, specifically through walking. It is essential that local professionals be trained on how they can promote walking and improve walkability through their professional roles. This

includes training on not only creating physical changes to the community, but also changing perceptions and reducing stigma around walking.

**5. Collect more data on how much and where people walk and bike, and how to encourage more.**

Walkability assessments could be considered for routine surveillance to monitor progress of walkability on Saipan. Additionally, more comprehensive data, or qualitative data could be considered. It would be valuable to know more about barriers and incentives to walking on Saipan.

# Acknowledgements

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## Tables

**Table 1.** Overall walkability characteristics of segments audited in Saipan, 2021

Segments (N=206)	
Characteristic	%
<b>Land Use</b>	
Single family homes	42.2%
Multi-family homes	24.0%
Retail & services	53.4%
Commercial offices or manufacturing	58.3%
Parks, open space, recreational facilities	22.8%
Schools, college, educational facilities	16.0%
Places of worship	9.2%
Gaming	9.2%
<b>Segment Type</b>	
Residential	24.3%
Commercial	75.7%
<b>Access to Park</b>	
0	86.9%
1	12.6%
2 or more	0.5%
<b>Public transit stops</b>	
0	75.7%
1	20.4%
2 or more	3.9%
<b>Places to sit</b>	
No	82.0%
Yes	18.0%
<b>Street lights</b>	
None	17.5%
Some	42.2%
Ample	40.3%
<b>Abandoned buildings or overgrown lots</b>	
No	53.2%
Yes	46.8%
<b>Bike lane</b>	
No	99.0%
Painted line	1.0%
Physical barrier	0.0%
<b>Sidewalk</b>	
No	72.3%
Yes	27.7%



<b>Sidewalk: major trip hazards</b>	
None	58.2%
Any	41.8%
<b>Sidewalk: buffer</b>	
None	78.3%
Yes	21.7%
<b>Roadside walking access</b>	
No	30.7%
Yes	69.3%
<b>Overgrown vegetation restrictions</b>	
No	64.6%
Yes	35.4%
<b>Walkway coverage</b>	
0-25%	80.1%
26-75%	18.5%
76-100%	1.5%
<b>Litter</b>	
None of very little	81.1%
Some or a lot	18.9%
<b>Stray dogs</b>	
No	75.7%
Yes	24.3%

**Table 2.** Walkability characteristics of segments audited in Saipan, by segment type, 2021

	<b>Residential (N=50)</b>	<b>Commercial (N=156)</b>	<b>p-value*</b>
<b>Access to park</b>			
None	92.0%	85.3%	0.0827
1	8.0%	14.1%	
2	0.0%	0.6%	
<b>Public transit stops</b>			
None	94.0%	69.9%	<b>0.0022*</b>
Any	6.0%	30.1%	
<b>Places to sit</b>			
No	90.0%	79.5%	0.0919
Yes	10.0%	20.5%	
<b>Street lights</b>			
None	12.0%	19.2%	<b>0.0341*</b>
Some	58.0%	37.2%	
Ample	30.0%	43.6%	
<b>Abandoned buildings or overgrown lots</b>			
No	53.1%	44.9%	0.3163
Yes	46.9%	55.1%	
<b>Bike lane</b>			
No	100.0%	98.7%	0.5782
Painted line	0.0%	1.3%	
<b>Sidewalk</b>			
No	80.0%	69.9%	0.1636
Yes	20.0%	30.1%	
<b>Roadside walking access</b>			
No	38.6%	28.2%	0.629
Yes	61.4%	71.9%	
<b>Walkway coverage</b>			
0-25%	74.0%	82.1%	<b>0.0337*</b>
26-75%	24.0%	16.7%	
76-100%	2.0%	1.3%	
<b>Litter</b>			
None or very little	80.0%	81.4%	0.8247
Some or a lot	20.0%	18.6%	
<b>Stray dogs</b>			
No	58.0%	81.4%	<b>0.0008*</b>
Yes	42.0%	18.6%	

\*Chi-square, Fisher's analysis

**Table 3.** Total Walkability Scores of segments audited in Saipan, by segment type, 2021

	Average Walkability Score (95% CI)	p-value
<b>Overall (N=206)</b>	6.57 (6.25, 6.88)	-
Residential (N=50)	4.90 (4.39, 5.41)	<0.001
Commercial (N=156)	7.10 (6.76, 7.45)	

**Table 4.** Crossing characteristics of segments audited in Saipan, 2021

Crossing (N=51)	%
<b>Walk Signal</b>	
Present	40.0%
Not present	60.0%
<b>Flashing light signal</b>	
Present	15.7%
Not present	84.3%
<b>Pedestrian signs</b>	
Present	46.0%
Not present	54.0%
<b>Ramp at the curbs</b>	
No	64.7%
Yes, one curb only	11.8%
Yes, at both curbs	23.5%
<b>Marked crosswalk</b>	
Present	20.0%
Not present	80.0%
<b>Worn or faded crosswalk</b>	
Yes	67.4%
No	32.6%
<b>Overgrown vegetation restriction</b>	
Yes	84.3%
No	15.7%

## Appendices

### Appendix 1: Data collection form, segment

Segment: Saipan Walkability Assessment, 2021

Segment ID: \_\_\_\_\_

Date (MM/DD/YYYY): \_\_\_\_/\_\_\_\_/\_\_\_\_

Auditor ID#s: \_\_\_\_\_; \_\_\_\_\_; \_\_\_\_\_

Start Time: \_\_\_\_\_: \_\_\_\_\_ AM/PM End Time: \_\_\_\_\_: \_\_\_\_\_ AM/PM

Starting Point: \_\_\_\_\_ Ending Point: \_\_\_\_\_

S1.	Mark all of the following land uses (types of structures or land) seen along this segment:	
a.	Housing – single family homes	<input type="checkbox"/> No <input type="checkbox"/> Yes
b.	Housing – multi-family buildings	<input type="checkbox"/> No <input type="checkbox"/> Yes
c.	Retail & services (stores, banks, restaurants, etc.)	<input type="checkbox"/> No <input type="checkbox"/> Yes
d.	Commercial, offices, or manufacturing	<input type="checkbox"/> No <input type="checkbox"/> Yes
e.	Parks, open space, recreational facilities	<input type="checkbox"/> No <input type="checkbox"/> Yes
f.	Schools, college, educational facilities	<input type="checkbox"/> No <input type="checkbox"/> Yes
g.	Places of worship	<input type="checkbox"/> No <input type="checkbox"/> Yes
h.	Gaming (poker room, casino)	<input type="checkbox"/> No <input type="checkbox"/> Yes
S2.	Type of segment	<input type="checkbox"/> Residential(0) <input type="checkbox"/> Commercial(1)
S3.	How many public parks are present?	<input type="checkbox"/> 0(0) <input type="checkbox"/> 1(1) <input type="checkbox"/> 2 or more(2)
S4.	How many public transit stops are present? (include clearly marked bus stops)	<input type="checkbox"/> 0(0) <input type="checkbox"/> 1(1) <input type="checkbox"/> 2 or more(2)
S5.	Are there any benches or places to sit? (include bus stop benches but not private seating like restaurant seating)	<input type="checkbox"/> No(0) <input type="checkbox"/> Yes(1)
S6.	Are street lights installed?	<input type="checkbox"/> None(0) <input type="checkbox"/> Some (wide spacing)(1) <input type="checkbox"/> Ample (regularly spaced)(2)
S7.	Are there abandoned buildings or overgrown vacant lots?	<input type="checkbox"/> No(1)

		<input type="checkbox"/> Yes(0)
S8.	Is there a designated bike lane? (do not include sharrows or shared lane markings)	<input type="checkbox"/> No(0) <input type="checkbox"/> Painted line(1) <input type="checkbox"/> Physical barrier(2)
S9.	Is a sidewalk present? <i>If no, skip to S12</i>	<input type="checkbox"/> No(0) <input type="checkbox"/> Yes(1)
S10.	Are there poorly maintained sections of the sidewalk that constitute major trip hazards? (e.g. misalignment, cracks, overgrowth, incomplete sidewalk)	<input type="checkbox"/> None(1) <input type="checkbox"/> Any(0)
S11.	Is a buffer present on the sidewalk? (count any buffer area on a segment as “yes” regardless of length)	<input type="checkbox"/> None(0) <input type="checkbox"/> Yes(1)
S12.	If there is NO sidewalk, is there a place to walk on the side of the road (such as a dirt path)? <i>If no, skip to S14</i>	<input type="checkbox"/> No(0) <input type="checkbox"/> Yes(1)
S13.	If there is a place to walk on the side of the road (not a sidewalk), is there overgrown vegetation that restricts walking or biking?	<input type="checkbox"/> No(1) <input type="checkbox"/> Yes(0)
S14.	What percentage of the length of the sidewalk/walkway is covered by trees, awnings, or other overhead coverage?	<input type="checkbox"/> 0-25%(0) <input type="checkbox"/> 26-75%(1) <input type="checkbox"/> 76-100%(2)
S15.	Rate the extent of litter	<input type="checkbox"/> None or very little(1) <input type="checkbox"/> Some or a lot(0)
S16.	Presence of stray or unleashed dogs	<input type="checkbox"/> No(1) <input type="checkbox"/> Yes(0)

Appendix 2: Data collection form, crossing

Crossing: Saipan Walkability Assessment, 2021

Segment ID: \_\_\_\_\_

Crossing ID: \_\_\_\_\_

Date (MM/DD/YYYY): \_\_\_\_/\_\_\_\_/\_\_\_\_

Auditor ID#s: \_\_\_\_\_; \_\_\_\_\_; \_\_\_\_\_

Start Time: \_\_\_\_\_: \_\_\_\_\_ AM/PM End Time: \_\_\_\_\_: \_\_\_\_\_ AM/PM

Crossing Description: \_\_\_\_\_

C1.	Is a pedestrian walk signal present?	<input type="checkbox"/> No(0) <input type="checkbox"/> Yes(1)
C2.	Is a pedestrian flashing light signal present?	<input type="checkbox"/> No(0) <input type="checkbox"/> Yes(1)
C3.	Are there any pedestrian signs present?	<input type="checkbox"/> No(0) <input type="checkbox"/> Yes(1)
C4.	Is there a ramp at the curbs?	<input type="checkbox"/> No(0) <input type="checkbox"/> Yes, one curb only(1) <input type="checkbox"/> Yes, at both curbs(2)
C5.	Is there a marked crosswalk?	<input type="checkbox"/> No(0) <input type="checkbox"/> Yes(1)
C6.	Are any of these crosswalks worn or faded to the point that they are difficult to see?	<input type="checkbox"/> No(1) <input type="checkbox"/> Yes(0)
C7.	Does overgrown vegetation restrict roadside access for walking/biking or restrict corner/crossing visibility?	<input type="checkbox"/> No(1) <input type="checkbox"/> Yes(0)
C8.	Any other comments?	

## Appendix 3: Walkability Audit Training Guide



**Microscale Audit of Pedestrian Streetscapes (MAPS) Mini Modified Saipan Version**

### **Training Manual and Picture Guide**

**Developed by: Carrie Geremia and Kelli Cain**

**Modified by: Dr. Haley Cash and Hannah Isabel Shai (June 2021)**



## Field Procedures: Segment

The segments will be identified to you on your map in your assigned site. Please be sure to validate the segment using GoogleMaps on your phone. You should audit only the sides of the road and crossing that is marked on your map. Begin at the beginning of the segment and audit until you reach the crossing, then evaluate the crossing.

Always work in pairs. You may walk or drive your segment, or both. If you choose to drive, one partner should be driving and the other should be observing. If walking, be sure to wear your project shirt and use caution with oncoming traffic.

Begin by completing the first part of the form:

Segment ID: \_\_\_\_\_ *This is indicated on your map and tracking sheet.*

Date (MM/DD/YYYY): \_\_\_/\_\_\_/\_\_\_ *This is the date of the survey.*

Auditor ID#s: \_\_\_\_\_; \_\_\_\_\_; \_\_\_\_\_ *Enter IDs for all auditors (there should be at least 2)*

Start Time: \_\_\_\_\_:\_\_\_\_\_ AM/PM *Enter times of survey start and stop*

End Time: \_\_\_\_\_:\_\_\_\_\_ AM/PM

Starting Cross-street: \_\_\_\_\_ *This is where you start the survey*

Ending Cross-street: \_\_\_\_\_ *This is where you end the survey*

*\*If there is no street name, just enter "no name"*



After you have completed the entire audit, double-check your form for completeness. Then, store your forms in a secure location. These will be submitted during the debrief session. Be sure to keep track of your completed segments within your site.



Survey Field Guide: Segment

S1.	Mark all of the following land uses (types of structures or land) seen along this segment:	
a.	Housing – single family homes	<input type="checkbox"/> No <input type="checkbox"/> Yes
b.	Housing – multi-family buildings	<input type="checkbox"/> No <input type="checkbox"/> Yes
c.	Retail & services (stores, banks, restaurants, etc.)	<input type="checkbox"/> No <input type="checkbox"/> Yes
d.	Commercial, offices, or manufacturing	<input type="checkbox"/> No <input type="checkbox"/> Yes
e.	Parks, open space, recreational facilities	<input type="checkbox"/> No <input type="checkbox"/> Yes
f.	Schools, college, educational facilities	<input type="checkbox"/> No <input type="checkbox"/> Yes
g.	Places of worship	<input type="checkbox"/> No <input type="checkbox"/> Yes
h.	Gaming (poker room, casino)	<input type="checkbox"/> No <input type="checkbox"/> Yes

Decide whether the segment consists of any of the listed land uses. Mark all that you see along the entire segment.

S2.	Type of segment	<input type="checkbox"/> Residential(0) <input type="checkbox"/> Commercial (1)
-----	-----------------	--

Decide whether the segment predominantly consists of residential housing or commercial buildings. If the segment is evenly split, choose “commercial”.



Residential

Commercial

S3.	How many public parks are present?	<input type="checkbox"/> 0(0) <input type="checkbox"/> 1(1) <input type="checkbox"/> 2 or more (2)
-----	------------------------------------	--

A public park should only be counted if it can be accessed along the route walked. Do not count parks beyond the route even if they can be seen from the route.



S4.	How many public transit stops are present? (include clearly marked bus stops)	<input type="checkbox"/> 0(0) <input type="checkbox"/> 1(1) <input type="checkbox"/> 2 or more (2)
-----	---	--

Include clearly marked COTA stops.



S5.	Are there any benches or places to sit? (include bus stop benches but not private seating like restaurant seating)	<input type="checkbox"/> No (0) <input type="checkbox"/> Yes (1)
-----	--	---

Tables or benches outside of restaurants do not count as places to sit. These must be public seating areas.



S6.	Are street lights installed?	<input type="checkbox"/> None (0) <input type="checkbox"/> Some (wide spacing) (1) <input type="checkbox"/> Ample (regularly spaced) (2)
-----	------------------------------	--



None



Some (wide spacing)



Ample (regularly spaced)

S7.	Are there abandoned buildings or overgrown vacant lots?	<input type="checkbox"/> No (1) <input type="checkbox"/> Yes (0)
-----	---	---



S8.	Is there a designated bike lane? (do not include sharrows or shared lane markings)	<input type="checkbox"/> No (0) <input type="checkbox"/> Painted line (1) <input type="checkbox"/> Physical barrier (2)
-----	--	---

**Painted bike lane**



**Bike lane separated from traffic**



**Sharrow**



S9.	Is a sidewalk present? <i>If no, skip to S12</i>	<input type="checkbox"/> No (0) <input type="checkbox"/> Yes (1)
-----	--	---

Count any sidewalk along a segment, whether short or long.



No sidewalk



Sidewalk

S10.	Are there poorly maintained sections of the sidewalk that constitute major trip hazards? (e.g., misalignment, cracks, overgrowth, incomplete sidewalk)	<input type="checkbox"/> None (1) <input type="checkbox"/> Any (0)
------	--	---

A major trip hazard increases the likelihood of tripping due to a raising or lowering in the walkway. A hazard could be due to plants, roots, slippery moss, or general erosion. A major trip hazard would require pedestrians to look down to avoid tripping.

**Examples of major trip hazards**



S11.	Is a buffer present on the sidewalk? (count any buffer area on a segment as “yes” regardless of length)	<input type="checkbox"/> None (0) <input type="checkbox"/> Yes (1)
------	---	---

A buffer separates vehicular and pedestrian zones parallel to the edge of paved roads. They often occupy space between traffic lanes and walking paths that is not intended for either vehicular traffic or walkers. Any buffer on a segment, no matter how long, will be counted.



No Buffer



Tree Buffer



Grass Buffer

S12.	If there is NO sidewalk, is there a place to walk on the side of the road (such as a dirt path)? <i>If no, skip to S14</i>	<input type="checkbox"/> No (0) <input type="checkbox"/> Yes (1)
------	--	---



S13.	If there is a place to walk on the side of the road (not a sidewalk), is there overgrown vegetation that restricts walking or biking?	<input type="checkbox"/> No (1) <input type="checkbox"/> Yes (0)
------	---	---



S14.	What percentage of the length of the sidewalk/walkway is covered by trees, awnings, or other overhead coverage?	<input type="checkbox"/> 0-25% (0) <input type="checkbox"/> 26-75% (1) <input type="checkbox"/> 76-100% (2)
------	---	---

“Coverage” is the percent of the length of walkway covered by trees, awnings, or other structures providing shade. It does not need to cover the entire width of the sidewalk.

**0-25% coverage**



**26-75% coverage**



**76-100% coverage**



S15.	Rate the extent of litter	<input type="checkbox"/> None or very little (1) <input type="checkbox"/> Some or a lot (0)
------	---------------------------	--



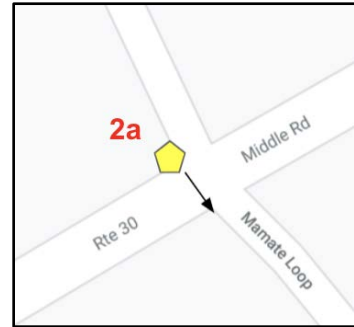
S16.	Presence of stray or unleashed dogs	<input type="checkbox"/> No (1) <input type="checkbox"/> Yes (0)
------	-------------------------------------	---



Field Procedures: Crossing

The associated crossing will be identified to you on your map in your assigned site. Please be sure to validate the segment using GoogleMaps on your phone. You should audit only the crossing that is marked on your map. Begin at the beginning of the segment and audit until you reach the crossing, then evaluate the crossing.

Always work in pairs. You may walk or drive your segment, or both. If you choose to drive, one partner should be driving and the other should be observing. If walking, be sure to wear your project shirt and use caution with oncoming traffic.



Begin by completing the first part of the form:

Segment ID: \_\_\_\_\_

*This is indicated on your map and tracking sheet.*

Crossing ID: \_\_\_\_\_

*This is indicated on your map and tracking sheet.*

Date (MM/DD/YYYY): \_\_\_\_/\_\_\_\_/\_\_\_\_

*This is the date of the survey.*

Auditor ID#s: \_\_\_\_\_; \_\_\_\_\_; \_\_\_\_\_

*Enter IDs for all auditors (there should be at least 2)*

Start Time: \_\_\_\_\_:\_\_\_\_\_ AM/PM

End Time: \_\_\_\_\_:\_\_\_\_\_ AM/PM

*Enter times of survey start and stop*

Crossing description: \_\_\_\_\_

*Provide a brief description of the crossing assessed.*

After you have completed the entire audit, double-check your form for completeness. Then, store your forms in a secure location. These will be submitted during the debrief session. Be sure to keep track of your completed segments and crossings within your site.



Survey Field Guide: Crossing

C1.	Is a pedestrian walk signal present?	<input type="checkbox"/> No (0) <input type="checkbox"/> Yes (1)
-----	--------------------------------------	---

Pedestrian walk signals provide some indication for the pedestrian to know when to walk or don't walk.



C2.	Is a pedestrian flashing light signal present?	<input type="checkbox"/> No (0) <input type="checkbox"/> Yes (1)
-----	--	---



C3.	Are there any pedestrian signs present?	<input type="checkbox"/> No (0) <input type="checkbox"/> Yes (1)
-----	---	---



C4.	Is there a ramp at the curbs?	<input type="checkbox"/> No (0) <input type="checkbox"/> Yes, one curb only (1) <input type="checkbox"/> Yes, at both curbs (2)
-----	-------------------------------	---

**No ramp**



**Ramp**



C5.	Is there a marked crosswalk?	<input type="checkbox"/> No (0) <input type="checkbox"/> Yes (1)
-----	------------------------------	---

A marked crosswalk is a designated point on a road at which some means are employed to assist pedestrians wishing to cross. They are designed to keep pedestrians together where they can be seen by motorists, and where they can cross most safely with the flow of vehicular traffic. Pedestrian crossings are often at the intersections, but may also be at other points at busy roads that would otherwise be dangerous to cross.



C6.	Are any of these crosswalks worn or faded to the point that they are difficult to see?	<input type="checkbox"/> No (0) <input type="checkbox"/> Yes (1)
-----	--	---



C7.	Does overgrown vegetation restrict roadside access for walking/biking or restrict corner/crossing visibility?	<input type="checkbox"/> No (0) <input type="checkbox"/> Yes (1)
-----	---	---



C8.	Any other comments?
-----	---------------------

Leave any general comments that you may have regarding your experience or observations while assessing this crossing.

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