

## **Mountaintop Experience, Campus Walkability Index**

### *Instructions & Guide to Walkability/Accessibility Assessments*

#### **Tools:**

1. Mobile Device (iPad, iPhone, etc.)
2. [Campus Walkability Index, Data Collection Sheet](#)
3. [Campus Map](#)
4. Notes (*if needed*)

#### **Task: How to perform an audit on a single street segment?**

#### **Directions:**

1. When arriving at the street segment, note where the segment begins and ends using the data/coordinates on the data collection and the campus map.
2. On a pedestrian-only segment (*e.g. campus walkways*), walk through the segment once, go through the checklist below.
3. Choose the following statement that fits best for the segment and score each indicator from (1-5) on the data collection sheet accordingly.
  - a. *(e.g. If a street segment scores a 3 out of 5 on Indicator AC1 (surface type), put the score in the relevant cell)*
4. On a shared-use segment (*e.g. sidewalks & roads*), walk through the segment keeping note of **both** sides of the street segment, go through the checklist below, and score each indicator from (1-5) on the data collection sheet accordingly.

#### **NOTES:**

- Street segments will vary in length. Scores for these street segments will be similar, but adjust the scores accordingly if one segment is drastically different from the other.
- The time for performing audits will vary depending on the length and complexity of each segment, so generally expect to perform around 10 audits per hour.
- If you encounter an indicator or situation that is ambiguous/unclear, either note it separately or take a picture of that area, and send it to Joe.
- Be as **objective** as possible, if the area seems walkable but scores low on the indicator, follow the criteria to the best of your ability.

## AC1 Indicator: Surface Type

*What material is the surface of the pathway/walkway made out of?*

NOTE: If more than one surface type is present, report the score of the lower ranked surface.



**Score: 1**

Pathway/sidewalk consists of grass, soil, mud, or gravel



**Score: 2**

Pathway/sidewalk consists of bitumen (asphalt)



**Score: 3**

Pathway/sidewalk consists of paving bricks



**Score: 4**

Pathway/sidewalk consists of concrete slabs



**Score: 5**

Pathway/sidewalk consists of continuous concrete.

Source: *Systematic Pedestrian and Cycling Environmental Scan ([SPACES](#))*

## AC2 Indicator: Path Maintenance

*Is the pathway/sidewalk well maintained, meaning that the pathway has an even surface, smooth, with no holes, cracks, weeds, or root intrusions?*



### Score: 1

The path is poorly maintained and has major hazards. There are lots of cracks, bumps, holes, weed intrusions on the surface or between the cracks.



### Score: 3

The path is moderately maintained with some hazards. There are some cracks, bumps, holes, weed intrusions on the surface or between the cracks, but not as many as a poor path.



### Score: 5

The path is well maintained with little to no hazards. There are few cracks, bumps, holes, weed intrusions on the surface or between the cracks.

Source: Systematic Pedestrian and Cycling Environmental Scan ([SPACES](#)), Microscale Audit of Pedestrian Streetscapes ([MAPS](#))

## **AC3 Indicator: Path Continuity**

*Does the pathway form a useful, continuous, and coherent route throughout the campus?*

### **NO – Score: 1**

- The pathway/sidewalk is disjointed and does not form any useful way to any campus destinations.

### **YES – Score: 5**

- The pathway/sidewalk forms a useful, coherent, and direct route to a campus destination.

*Source: Systematic Pedestrian and Cycling Environmental Scan ([SPACES](#))*

## **AC4 Indicator: Gradient**

*How steep is the pathway/sidewalk? Visually assess the slope and gradient of the pathway/sidewalk.*

NOTE: If slope/gradient varies, assess the slope based on the steepest of the street segment.



**Score: 1**

The pathway/sidewalk has a steep slope with a sharp, rapid incline.



**Score: 3**

The pathway/sidewalk has a moderate slope with a medium incline.



**Score: 5**

The pathway/sidewalk is either flat and has no slope, or has a slight, gradual incline.

*Source: Systematic Pedestrian and Cycling Environmental Scan ([SPACES](#))*

## **AC5 Indicator: Temporary Barrier**

*Is there a temporary barrier present on the pathway/sidewalk? This barrier must span the majority of the segment width, such as an obstruction that blocks at least half the path width.*

NOTE: From the PEAT, a temporary barrier is described as a “non-permanent barrier affecting the surface condition, such as water, puddles, ice, snow, mud. Scoring with this indicator may vary depending on the season and climate, but these barriers are temporary in nature and are not fixed infrastructure issues.

### **Many barriers – Score: 1**

- The pathway/sidewalk is greatly obstructed, with at least 5 obstructions throughout the segment.

### **Some barriers – Score: 3**

- The pathway/sidewalk is slightly obstructed, with around 3-5 obstructions throughout the segment.

### **Little/No barriers – Score: 5**

- The pathway/sidewalk has little to no obstruction, with around 0-2 obstructions throughout the segment.

*Source: Path Environmental Audit Tool ([PEAT](#))*

## **AC6 Indicator: Cross Slope**

*What is the slope/gradient across the width of the pathway/sidewalk, in the direction perpendicular to the direction someone would walk or bike in?*

NOTE: If slope/gradient varies, assess the slope based on the steepest of the street segment.



### **Steep cross slope – Score: 1**

- Steep incline exists; pathway/slidewalk is very challenging for older and disabled individuals, and not suitable for wheelchair users.

### **Moderate cross slope – Score: 3**

- Medium incline exists; pathway/sidewalk may be a challenge for an older or disabled individual.

### **Flat/gentle cross slope – Score: 5**

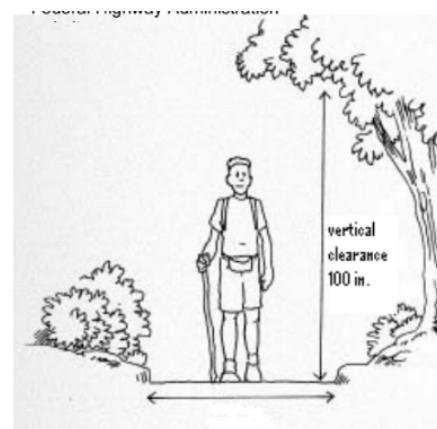
- No incline exists; pathway/sidewalk is flat from side-to-side.

*Source: Path Environmental Audit Tool ([PEAT](#))*

## AC7 Indicator: Sufficient Vertical Clearance

*Is there sufficient vertical clearance for cyclists, pedestrians, and other users to safely pass along the pathway/sidewalk without coming into contact with overhanging vegetation?*

NOTE: This indicator is **not based** on the majority of the segment, meaning that any instances that vegetation (e.g. hanging branches) hangs below the acceptable vertical clearance level should be marked **NO**. Vertical clearance is defined as “the vertical dimension that must be cleared of all tree branches and other obstructions that would otherwise obstruct movement,” at >2.5 meters (100 inches)



### NO – Score: 1

- NO, there is no sufficient vertical clearance

### YES – Score: 5

- YES, there is sufficient vertical clearance.

*Source: Path Environmental Audit Tool ([PEAT](#))*

## AC8 Indicator: Adequate Resting Places

*Are there resting places such as benches, picnic tables, gazebos, outdoor seating areas, or other relevant objects present or near the pathway/sidewalk?*

NOTE: The PEAT manual designates this as any individual structure **intentionally designed** to provide seating, generally around 25 yards of the segment. The MAPS tool does **NOT** count tables or benches of restaurants/cafés for this indicator, as they must be public seating areas.

### NONE – Score: 1

- There are no resting places that exist near the pathway/sidewalk.

### SOME – Score: 3

- Around 1-2 resting places exist near the pathway/sidewalk.

### MANY – Score: 5

- 3 or more resting places exist near the pathway/sidewalk.

*Source: Path Environmental Audit Tool ([PEAT](#)), Microscale Audit of Pedestrian Streetscapes ([MAPS](#))*

## **AE1 Indicator: Trees, Tree Cover**

*How dense is the tree coverage along the pathway/sidewalk?*

NOTE: This indicator addresses average tree height from the SPACES tool by aligning it with the “*shading from tree canopy*” indicator. ([U. Abeysinghe, S. Saparamadu and C. Hewawasam., 2023](#)).



**Score: 1**

The sidewalk/pathway is lined with either small-height trees or no trees at all; Offers little to no cover or shade along the pathway/sidewalk.



**Score: 3**

The sidewalk/pathway is lined with some trees and/or are medium-height; Offers some cover or shade along the pathway/sidewalk.



**Score: 5**

The sidewalk/pathway is lined with many trees and/or are large in height; Offers lots of cover or shade along the pathway/sidewalk.

*Source: Systematic Pedestrian and Cycling Environmental Scan ([SPACES](#))*

## **AE2 Indicator: Greenspace**

*How much greenery (bushes, lawns, gardens, recreational areas, general greenspace, etc.) is present along the pathway/sidewalk?*

NOTE: This indicator follows a similar methodology as AE1, so score segments based on the general presence of greenspace along the segment.

### **NONE/LITTLE – Score: 1**

- Very little or no greenspace exists around the surrounding area of the pathway/sidewalk.

### **SOME – Score: 3**

- Some or moderate greenspace exists around the surrounding area of the pathway/sidewalk.

### **MANY – Score: 5**

- Lots of greenspace exists or there is lots of variety in the surrounding area of the pathway/sidewalk.

## **AE3 Indicator: Maintenance (general)**

*Is the pathway, sidewalk, and/or general streetscape generally maintained well? For example, are trees, verges, gardens, lawns, generally maintained for?*



### **Score: 1**

Pathways, sidewalks, and the general streetscape are not maintained well. Verges/gardens do not look trim, clean, and/or regularly mown.



### **Score: 3**

Pathways, sidewalks, and the general streetscape are somewhat maintained. Verges/gardens slightly look trim, clean, and/or regularly mown.



### **Score: 5**

Pathways, sidewalks, and the general streetscape are well maintained. Verges/gardens look well trimmed, clean, and/or are regularly mown.

*Source: Systematic Pedestrian and Cycling Environmental Scan ([SPACES](#))*

## **AE4 Indicator: Cleanliness**

*Is the pathway or sidewalk generally free of litter, rubbish, graffiti, broken glass, other discarded items and is clean?*

NOTE: This indicator may score differently depending on the season, climate, and other factors.

### **NO/LITTLE – Score: 1**

- There is a large amount of litter, rubbish, broken glass, and other discarded items that exist on the specific street segment.

### **SOMEWHAT – Score: 3**

- There is some or small amount of litter, rubbish, broken glass, and other discarded items that exist on the specific street segment.

### **YES – Score: 5**

- There is very little to no amount of litter, rubbish, broken glass, and other discarded items that exist on the specific street segment.

*Source: Systematic Pedestrian and Cycling Environmental Scan ([SPACES](#))*

## **L1 Indicator: Diversity of Land Use**

*Is there a diverse use of the land/campus along this pathway/segment? Do pedestrians on this pathway/sidewalk have access or are near multiple services and public amenities within the campus?*

NOTE: For audits on the Lehigh University campus, amenities/public services will be classified as 1. Food services, coffee shops, restaurants; 2. Multi-functional centers; 3. Athletic/recreational facilities or fields; 4. Teaching/lab buildings; 5. Administration buildings; 6. Green space; 7. Libraries/book stores; 8. Residence halls/apartments; 9. Parking space.

### **SINGLE USE – Score: 1**

- There is little/no diversity in the land use surrounding the street segment (e.g. *access to only one or zero listed amenities*).

### **SOME/DISPROPORTIONATE USE – Score: 3**

- There is some diversity in the land use surrounding the street segment (e.g. *access to around 2 listed amenities*).

### **EVEN USE – Score: 5**

- Land use is evenly distributed across different amenities surrounding the street segment (e.g. *access to 3+ listed amenities*).

*Source: ([Zhang, X. & Mu, L. 2020](#)). ([Ramakreshnan et al., 2020](#)).*

## S1 Indicator: Lighting

*How well lit is this pathway, sidewalk, and/or street segment? Are there street lighting, lamp posts, or other forms of lighting along the pathway?*

NOTE: The lighting must be sufficient to illuminate most of the pathway/segment for night use.



**Score: 1**

No or very little street lighting exists at all to illuminate the street segment, pathway, or sidewalk.



**Score: 3**

Some street lighting exists, but they either do not cover or illuminate the path fully and/or are widely spaced from one another.



**Score: 5**

Lots of street lighting exists; lighting covers and illuminates the path fully and/or are regularly spaced from one another.

Source: Systematic Pedestrian and Cycling Environmental Scan ([SPACES](#)), Microscale Audit of Pedestrian Streetscapes ([MAPS](#))

## S2 Indicator: Surveillance

*Can other individuals observe pedestrians on the pathway, sidewalk, or segment through passive or functional surveillance?*

NOTE: Passive surveillance includes the ability to observe from a window, veranda, porch, etc., while functional surveillance includes technology like CCTV cameras or blue light systems. If surveillance is observed from at least 75% of the building(s) but lacks surveillance technology, score the segment at a 3.



### Score: 1

Surveillance can be observed from less than 50% of building(s), with little to no visibility of windows, verandas, porches. No functional surveillance technology exists in this segment.



### Score: 3

Surveillance can be observed from 50% to 74% of building(s), with some visibility of windows, verandas, porches. Little surveillance technology exists in this segment.



### Score: 5

Surveillance can be observed from at least 75% of the building(s) with lots of visibility from windows, verandas, porches. Surveillance technology is present in or throughout the segment.

*Source: Systematic Pedestrian and Cycling Environmental Scan ([SPACES](#)), (U. Abeysinghe, S. Saparamadu and C. Hewawasam.. 2023).*

### S3 Indicator: Crossing Aids

*Are pedestrian or crossing aids available to assist in safely crossing busy streets or roads?*

NOTE: Crossing aids include median refuges, traffic islands (*image on the right*), or kerb extensions which minimize the full width of the road and provide safe areas for pedestrians or cyclists to walk.



**NO – Score: 1**

- Crossing aids **do not** exist for pedestrians to cross busy/active streets or roads.

**YES – Score: 5**

- Crossing aids exist for pedestrians to cross busy/active streets or roads, OR the segment/pathway is primarily for pedestrian use.

*Source: Systematic Pedestrian and Cycling Environmental Scan ([SPACES](#))*

### S4 Indicator: Buffer Verge Width

*Does a buffer exist between a sidewalk/pathway and a street/road? If so, how wide is this buffer?*

NOTE: A buffer is defined as an area that separates vehicular and pedestrian zones on the edge of paved roads and are not intended for either use. Examples include grass, trees, or shrubs (*as shown on the right*) but tree plantings, telephone poles, parking meters, bike lanes generally do not count as buffers.

If a buffer only exists on one side of the street, average the scores for both buffers present on the segment.



**No buffer or pathway exists – Score: 1**

- Pedestrians are directly adjacent to roadways, paved roads, and other busy areas.

**Yes, within 1 feet from the curb – Score: 2**

**Yes, between 1-2 feet from the curb – Score: 3**

**Yes, between 2-3 feet from the curb – Score: 4**

**Yes, more than 3 feet from the curb – Score: 5**

- Choose this score if the segment, pathway, or sidewalk is pedestrian-only and is not adjacent to roadways, paved roads, and other busy areas.

*Source: Path Environmental Audit Tool ([PEAT](#)), Microscale Audit of Pedestrian Streetscapes ([MAPS](#))*

## S5 Indicator: Driveway Crossovers

*Are there driveway crossovers where vehicles can suddenly appear on the sidewalk, pathway, or segment?*

NOTE: If few buildings exist on the segment, score the indicator proportionally (*e.g. 1 out of 2 buildings have a driveway = Score: 2*)



**Most buildings have one driveway – Score: 1**

- Score segments a 1 where pedestrians actively share areas with oncoming vehicles/traffic.

**Approximately 50% of the buildings have one driveway – Score: 2**

**Approximately 25% of the buildings have one driveway – Score: 3**

**No driveways exist – Score: 5**

- Score pedestrian-only segments without any vehicles/vehicle crossovers a 5.

*Source: Systematic Pedestrian and Cycling Environmental Scan ([SPACES](#))*

## S6 Indicator: Vehicular Traffic Speed

*What is the maximum speed limit on this set road, pathway, or segment?*

NOTE: If you cannot find a speed limit sign for a segment with vehicles, use the [Waze Map Editor](#) to find the speed limit (*Reported by Waze Users*)

**Speed limit is greater than 45 mph – Score: 1**

**Speed limit ranges from 36 to 45 mph – Score: 2**

**Speed limit ranges from 25 to 35 mph – Score: 3**

**Speed limit ranges from 16 to 25 mph – Score: 4**

**Speed limit is under 15 mph – Score: 5**

- Score pedestrian-only segments without any vehicle presence a 5.

*Source: ([Zhang, X. & Mu, L. 2020](#)). (Table 1, Factor #9)*

## S7 Indicator: Traffic Calming for Pedestrian Safety

*Do devices exist that slow the flow of traffic present along the pathway, segment, or sidewalk?*

NOTE: Some examples of this include chicanes, on street parking, chokers, closures, bump-outs, median barriers, roundabouts, speed cushions, speed bumps, and raised intersections. Adjust the scoring based on the size/proportion of the pathway/segment. *Photo on the left is an example of a raised crosswalk for pedestrians.*



### None exist – Score: 1

- The segment and/or pathway does not have any traffic calming devices for pedestrian safety.

### Few exist – Score: 3

- Few or little traffic calming devices exist on the segment or pathway.

### Many exist – Score: 5

- Multiple traffic calming devices exist, OR the segment or pathway is primarily just for pedestrians.

Source: Path Environmental Audit Tool ([PEAT](#))

## S8 Indicator: Graffiti & Broken Glass

*Does graffiti and/or broken glass present on this segment, pathway, or sidewalk? Graffiti includes any writing, printing, marks, on any surface or structure. Broken glass includes glass visible on the shoulders, sides, as well. (e.g. a single broken glass bottle = some/small amount of broken glass).*

NOTE: This indicator follows a similar methodology as the AE4 indicator.



### NO/LITTLE – Score: 1

- There is lots of graffiti or broken glass present.

### SOMEWHAT – Score: 3

- There is some or a small amount of graffiti or broken glass present.

### YES – Score: 5

- There is very little to no amount of graffiti or broken glass present.

Source: Path Environmental Audit Tool ([PEAT](#)), Microscale Audit of Pedestrian Streetscapes ([MAPS](#))

## T1 Indicator: Presence of a Bus Stop

*Is a bus stop present along this segment, pathway, or sidewalk?*



### NO – Score: 1

- A bus stop does not exist in any part of the segment, pathway, or sidewalk.

### YES, LIMITED – Score: 3

- One bus stop exists and/or is present on only one side of the segment, pathway, or sidewalk.

### YES, MANY – Score: 5

- Two or more bus stops exist and/or are present on both sides of the segment, pathway, or sidewalk.

*Source: ([Zhang, X. & Mu, L. 2020](#)). (Table 1, Factor #9), Microscale Audit of Pedestrian Streetscapes ([MAPS](#))*

## T2 Indicator: Presence of a Bus Stop Shelter

*Does the bus stop provide shelter to people waiting for the bus?*

NOTE: This indicator follows a similar methodology as the T1 indicator.



### NO – Score: 1

- A bus stop shelter and/or stop does not exist in any part of the segment, pathway, or sidewalk.

### YES, LIMITED – Score: 3

- One shelter exists at only one bus stop and/or is present on only one side of the segment, pathway, or sidewalk.

### YES, MANY – Score: 5

- Two or more bus stop shelters exist and and/or are present on both sides of the segment, pathway, or sidewalk.

*Source: Microscale Audit of Pedestrian Streetscapes ([MAPS](#))*

### T3 Indicator: Presence of Bus Stop Seating

*Does the bus stop provide seating to people waiting for the bus?*

NOTE: This indicator follows a similar methodology as the T1 indicator.



#### NO – Score: 1

- Bus stop seating and/or a stop does not exist in any part of the segment, pathway, or sidewalk.

#### YES, LIMITED – Score: 3

- One seating area exists at only one bus stop and/or is present on only one side of the segment, pathway, or sidewalk.

#### YES, MANY – Score: 5

- Two or more bus stops have seating areas and and/or are present on both sides of the segment, pathway, or sidewalk.

*Source: Microscale Audit of Pedestrian Streetscapes ([MAPS](#))*

### T4 Indicator: Presence of Bus Stop Timetable

*Does the bus stop provide a time table to people waiting for the bus?*

NOTE: This indicator follows a similar methodology as the T1 indicator.



#### NO – Score: 1

- A bus stop timetable and/o r stop does not exist in any part of the segment, pathway, or sidewalk.

#### YES, LIMITED – Score: 3

- One timetable exists at only one bus stop and/or is present on only one side of the segment, pathway, or sidewalk.

#### YES, MANY – Score: 5

- Two or more bus stops have timetables and and/or are present on both sides of the segment, pathway, or sidewalk.

*Source: Microscale Audit of Pedestrian Streetscapes ([MAPS](#))*

## **T5 Indicator: Number of Buses at Bus Stop**

*How many bus routes/lines serve this specific bus stop.*

NOTE: For audits on campus, you can find this information on the Lehigh Transit app.

**NONE – Score: 1**

- A bus stop does not exist in any part of the segment, pathway, or sidewalk, or the bus stop does not have any current bus routes/lines.

**ONE – Score: 2**

**TWO – Score: 3**

**THREE – Score: 4**

**FOUR OR MORE – Score: 5**