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SIDEWALK DESIGN IN THE DOWNTOWN AREA OF BACOLOD CITY: AN ASSESSMENT OF PHYSICAL QUALITY, SAFETY, AND SUSTAINABILITY

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ABSTRACT

Sidewalks are essential public infrastructure for safe, inclusive, and sustainable urban mobility, yet their performance may be weakened by discontinuity, obstruction, inaccessible transitions, traffic exposure, and inadequate climate response. This descriptive-assessment study examined sidewalk design in downtown Bacolod City in terms of physical quality, safety, and sustainability and used the findings to formulate preliminary design guidelines. Fifteen purposively selected stakeholders—three each from architecture, urban or environmental planning, local government, sidewalk users, and sidewalk vendors—rated 15 indicators on a four-point condition scale. Their ratings were analyzed descriptively, while researcher field notes, photographs, and comments contextualized recurring conditions. Overall means were poor for physical quality (M = 1.24), safety (M = 1.45), and sustainability (M = 1.25). Width (M = 1.53), vehicle separation (M = 1.73), and crossings (M = 1.53) were fair, but their usefulness was constrained by missing links, obstructions, damaged surfaces, inaccessible transitions, weak pedestrian lighting, hazards, limited shade, drainage problems, and poor cleanliness. The results support corridor-level interventions that first protect a continuous accessible path and safe crossings, then integrate drainage, shade, lighting, materials, maintenance, and management. The findings provide a diagnostic account of the assessed downtown corridors and a basis for subsequent segment-level technical assessment and implementation planning.

Keywords: walkability; sidewalks; pedestrian safety; universal accessibility; sustainable urban design; Bacolod City

INTRODUCTION

Sidewalks are not residual spaces at the edge of roads; they are the most basic layer of a city's pedestrian network. They connect homes, schools, markets, workplaces, government offices, public transport stops, and commercial establishments while supporting physical activity and social interaction. When sidewalks are continuous, accessible, and comfortable, they make short trips possible without dependence on private vehicles and enable streets to function as public spaces rather than solely as traffic corridors. For this reason, the quality of pedestrian infrastructure has become increasingly important amid congestion, climate pressure, road-safety concerns, and the pursuit of healthier urban environments (World Health Organization [WHO], 2023; UN-Habitat, 2013).

The built environment affects whether walking is practical and attractive. Street connectivity, land-use mix, density, destination accessibility, and pedestrian infrastructure have measurable associations with travel behavior (Ewing & Cervero, 2010). At the scale of the sidewalk, however, the decision to walk is shaped by more immediate conditions: whether a path exists, whether it is wide and continuous enough to use, whether its surface is stable, whether vehicles and fixed objects intrude into the walking zone, and whether a pedestrian can cross the street safely. A sidewalk may be present in a cadastral or engineering sense yet fail as pedestrian infrastructure when its effective clear width is reduced by poles, parked vehicles, vendors, drainage openings, construction, abrupt changes in elevation, or deteriorated pavement.

This distinction is especially important in Philippine cities, where walking remains necessary for many short-distance and public-transport-linked trips. Rapid urbanization and mixed roadside activity place competing demands on limited rights-of-way. Where sidewalk provision is incomplete or weakly managed, pedestrians are displaced toward the carriageway and become directly exposed to vehicular conflict. The burden is not evenly shared. Persons with disabilities, older adults, children, caregivers with strollers, people carrying goods, and those with temporary mobility limitations experience barriers that other users may negotiate with difficulty but without complete exclusion. Consequently, sidewalk quality is simultaneously a mobility, safety, accessibility, public-health, and equity concern.

Road safety strengthens the urgency of pedestrian-oriented design. Pedestrians are vulnerable road users because they lack the physical protection available to vehicle occupants. The WHO (2023) identifies safe walking infrastructure, speed management, visible crossings, and separation from motor traffic as important components of a safe-system approach. At the local level, risk is produced not only by traffic volume or driver behavior but also by the design and maintenance of the pedestrian realm. Inadequate lighting, blocked sightlines, faded crossings, missing curb ramps, open drainage structures, unstable surfaces, and paths that terminate without warning can transform routine movement into repeated exposure to preventable danger.

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Sidewalk performance must also be understood in relation to climate. In a tropical city, the presence of a paved strip alone does not create an inviting walking environment. Heat, direct solar exposure, intense rainfall, surface runoff, ponding, humidity, and material weathering influence comfort and long-term usability. Shade trees, arcades, planting or furnishing zones, effective drainage, durable and slip-resistant materials, cleanliness, and routine maintenance help make walking viable across changing weather conditions. Sustainable sidewalk design therefore concerns both environmental contribution and the ability of infrastructure to remain safe, serviceable, and comfortable over time (Global Designing Cities Initiative [GDCI], 2016; UN-Habitat, 2013).

Bacolod City is a major commercial and administrative center in Western Visayas. Its downtown core concentrates public offices, schools, markets, shops, transport activity, religious institutions, and other destinations that generate substantial pedestrian movement. The area also contains an inherited street pattern and dense roadside development in which pedestrian space competes with traffic, parking, utilities, commerce, drainage, and building access. Although pedestrian-friendly initiatives and temporary street activities have drawn attention to walkability, a systematic, locally grounded assessment is necessary to distinguish isolated impressions from recurring design and management problems.

Philippine walkability research reviewed for this study has examined pedestrian needs and walking environments in Metro Manila, while an Asian comparative assessment included Manila within a broader investigation of pedestrian infrastructure and policy (Leather et al., 2011; Mateo-Babiano, 2016). These studies establish the importance of pedestrian conditions but do not provide an indicator-based, multi-stakeholder assessment of sidewalk physical quality, safety, and sustainability in Bacolod City. The present study addresses this specific geographical and methodological gap by generating localized evidence for prioritizing sidewalk deficiencies and translating national accessibility and contemporary street-design principles to the constraints of an established medium-sized downtown district.

The present study addressed this gap by examining the sidewalk and pedestrian-path conditions within downtown Bacolod City. Specifically, it sought to:

1. assess the sidewalks and pedestrian pathways in terms of physical quality, safety, and sustainability;

2. identify recurring deficiencies and risk factors affecting pedestrian continuity, accessibility, safety, environmental comfort, and overall usability; and

3. formulate context-sensitive sidewalk design guidelines based on the assessment findings, stakeholder perspectives, applicable accessibility requirements, and contemporary street-design principles.

Through these objectives, the study contributes localized evidence that may assist local government officials, planners, architects, engineers, residents, students, and future researchers in improving pedestrian infrastructure. The inquiry also aligns with Sustainable Development Goal 11, which calls for inclusive, safe, resilient, and sustainable cities and human settlements (United Nations, 2015).

REVIEW OF RELATED LITERATURE

The study was informed by four complementary bodies of thought: walkability, Complete Streets, universal design, and sustainable urban development. Together they explain why sidewalk performance cannot be reduced to the presence or absence of pavement. A functional pedestrian environment depends on the relationship among route continuity, physical condition, safety, inclusion, environmental comfort, and the management of competing street uses.

Walkability describes the extent to which the built environment supports walking as a safe, convenient, useful, and comfortable mode of movement. Southworth (2005) treats walkability as a product of connected paths, safety, access to destinations, and a pedestrian-scaled environment. Ewing and Cervero’s (2010) synthesis similarly demonstrates that built-environment characteristics influence travel outcomes. At the more immediate streetscape scale, Ewing and Handy (2009) show that apparently qualitative urban-design conditions can be operationalized through observable features. These perspectives justify an assessment that focuses on the actual characteristics encountered by pedestrians rather than relying only on generalized perceptions of the district.

Physical quality is the first foundation of usable sidewalk infrastructure. Adequate width allows pedestrians to pass, walk beside one another, use mobility devices, and move without being forced into traffic. Yet nominal width is less informative than effective clear width. A broad sidewalk can perform poorly when poles, signs, meters, vegetation, parked vehicles, vendors, waste, or open drainage occupy its pedestrian zone. Surface stability and continuity are equally important. Cracks, loose pavers, abrupt level changes, missing segments, and unfinished repairs create hazards and interrupt route legibility. Contemporary street-design guidance consequently separates the sidewalk into functional zones so that frontage activity, through movement, and utilities or furnishings do not compete for the same space (National Association of City Transportation Officials [NACTO], 2013; GDCI, 2016).

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The Complete Streets concept extends this logic from individual facilities to the whole street. A complete street is planned for people of different ages, abilities, and modes rather than for vehicle throughput alone. It provides connected sidewalks, safe crossings, access to transit, appropriate traffic management, and context-sensitive allocation of right-of-way (Smart Growth America, 2023). Its relevance to downtown Bacolod lies in the need to treat sidewalks, intersections, drainage, parking, utilities, and roadside activity as one coordinated system. Repairing isolated pavement sections cannot create a walkable network if routes remain discontinuous, intersections inaccessible, or the pedestrian zone routinely occupied.

Universal design adds an explicit inclusion requirement. Steinfeld and Maisel (2012) argue that environments should be usable by the widest possible range of people without dependence on specialized adaptation. In pedestrian spaces, this principle is expressed through continuous clear paths, manageable slopes, stable and slip-resistant surfaces, curb ramps, tactile information, accessible crossings, sufficient maneuvering space, and the removal of protruding or ground-level hazards. The Philippine legal foundation is Batas Pambansa Blg. 344 (1983) and its Revised Implementing Rules and Regulations (Department of Public Works and Highways [DPWH], 2024), which require accessibility features and unobstructed routes. These provisions shift accessibility from an optional amenity to an essential condition of public infrastructure.

Safety arises from the interaction of design, maintenance, traffic conditions, and user behavior. Sidewalk separation reduces direct pedestrian exposure to moving vehicles, but separation alone is insufficient when crossings are missing, faded, blocked, or disconnected from accessible routes. Lighting should illuminate the pedestrian path rather than merely the carriageway. Visibility requires clear sightlines at intersections and crossings and careful management of parking, vegetation, signs, structures, and roadside activity. Surface defects, open drainage, exposed cables, damaged access covers, and abrupt elevation changes also constitute safety problems even when no moving vehicle is involved. A safe-system perspective therefore anticipates human error and reduces the severity and frequency of conflict through design (WHO, 2023).

Sustainable urban development broadens sidewalk assessment beyond immediate movement and accident prevention. Pedestrian infrastructure supports low-carbon mobility, public health, access to local economic activity, and more efficient use of urban space. Its own sustainability, however, depends on climate responsiveness and lifecycle performance. Shade and greenery can reduce solar exposure and improve thermal comfort; drainage prevents ponding, surface deterioration, and unsafe wet conditions; durable materials reduce repeated repair; and effective cleaning and waste management preserve sanitation and visual quality. These elements are particularly consequential in tropical cities, where heat and intense rainfall can make otherwise passable routes uncomfortable or unusable (GDCI, 2016; UN-Habitat, 2013).

The literature also indicates that professional standards and user experience should inform one another. Technical experts may recognize dimensional, regulatory, and construction deficiencies, while local officials understand implementation constraints and users and vendors experience the everyday operation of the street. The multi-stakeholder assessment was therefore designed to provide complementary informed perspectives for comparison with direct field evidence. Convergence among stakeholder ratings, photographs, and systematic observations strengthened the basis for identifying recurring conditions and design priorities.

From these foundations, the study conceptualized sidewalk design through three interdependent dimensions. Physical quality included width, surface condition, continuity, obstructions, and accessibility features. Safety included lighting, visibility, pedestrian crossings, separation from vehicles, and freedom from hazards. Sustainability included shade, drainage, material durability, cleanliness, and walking comfort. The framework assumed that deficiencies across these dimensions would reduce pedestrian usability and that the identified gaps could be translated into context-sensitive guidelines. This assessment-to-design logic linked empirical conditions to proposed interventions while recognizing that final street configurations must respond to the characteristics of each corridor.

METHODOLOGY

The study employed a descriptive-assessment research design to document and evaluate existing sidewalk conditions and identify design gaps without manipulating the study environment. This design was appropriate because the inquiry concerned observable infrastructure and sought to describe its current performance in a defined urban area. Systematic field observation was combined with stakeholder evaluation so that recorded physical conditions could be considered alongside perspectives derived from design, planning, governance, livelihood, and everyday sidewalk use.

The study was conducted during Academic Year 2025–2026, with data collection completed in May 2026. The locale comprised the downtown core of Bacolod City bounded by San Juan Street, Rosario Street, Lacson Street, and Burgos Street. Sidewalks and pedestrian pathways within these boundaries were included because the area contains mixed commercial, institutional, transport, and public activities and exhibits varied pedestrian conditions. The inquiry focused on assessing existing conditions and formulating design guidelines. The resulting recommendations are intended to inform the subsequent preparation of technical designs, cost estimates, implementation plans, and post-intervention evaluations.

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The operational reporting unit was the named street corridor. The assessment covered sidewalks and pedestrian paths along 16 streets within the defined downtown boundary: Araneta, Luzuriaga, Bonifacio, Gatuslao, Gonzaga, Rizal, Lacson, Burgos, San Juan, San Sebastian, Galo, Ballesteros, Cuadra, Locsin, Rosario, and Nueva Streets. Data collection was completed in May 2026. Corridor-level coverage enabled the study to document recurring conditions across the downtown network and to relate the findings to each street's approximate width, length, activity, and surrounding uses. The corridor was retained as the analytical and reporting scale; the findings accordingly characterize observed problem types and stakeholder assessments across the study area, while subsequent technical inventories may use fixed segments and repeated measurements for construction-level decisions. Fifteen stakeholders were purposively selected because of their knowledge of, responsibility for, dependence on, or regular experience with the pedestrian environment. The sample comprised three architects, three urban or environmental planners, three local government representatives, three sidewalk users, and three sidewalk vendors. This criterion-based composition provided complementary informed perspectives for the descriptive assessment (Etikan et al., 2016).

The principal instrument was a structured sidewalk assessment checklist developed from established walkability, street-design, and built-environment indicators (Ewing & Handy, 2009; Southworth, 2005; NACTO, 2013). The checklist comprised three domains. Physical quality covered sidewalk width, surface condition, continuity, obstructions, and accessibility features. Safety covered lighting, visibility, pedestrian crossings, separation from vehicles, and physical hazards. Sustainability covered shade, drainage, material durability, cleanliness, and environmental or walking comfort. The same indicators supported field assessment and stakeholder evaluation, enabling the researcher to compare ratings with directly documented conditions.

Each indicator was rated on a four-point condition scale: 3 for good, 2 for fair, 1 for poor, and 0 for not present or very poor. Mean scores were interpreted as good from 2.50 to 3.00, fair from 1.50 to 2.49, poor from 1.00 to 1.49, and not present or very poor from 0.00 to 0.99. These thresholds were used as descriptive summaries rather than as evidence of equal psychological intervals or inferential differences among respondent groups. Field notes and photographs supplemented the numerical ratings by identifying the specific form and location of observed deficiencies.

Seven professionals from architecture, environmental planning, landscape architecture, academe, and local government reviewed the checklist for essentiality, clarity, and contextual appropriateness. Content Validity Ratio (CVR) values ranged from 0.14 to 1.00. For a seven-member panel, Lawshe’s (1975) minimum critical CVR is 0.99; therefore, only items with a CVR of 1.00 met that criterion. Values below the threshold were used diagnostically to trigger review and refinement and were not represented as having satisfied the critical CVR. The shade indicator, which received the lowest value, was retained through researcher judgment after wording revision because shade is substantively relevant to tropical pedestrian comfort and climate-responsive street design (GDCI, 2016; UN-Habitat, 2013). A preliminary usability exercise outside the study boundary involved two architects and three sidewalk users, whose feedback led to minor wording and organizational improvements. Procedural consistency during the descriptive assessment was supported through common indicators, instructions, and scoring across respondents and field records.

Before data gathering, relevant institutional and local permissions were secured, the study boundary and observation plan were finalized, and the reviewed checklist was prepared. During fieldwork, the researcher documented width and clear space, surfaces, continuity, obstructions, accessibility features, lighting, visibility, crossings, vehicle separation, hazards, shade, drainage, material condition, cleanliness, and comfort. Photographs and field notes recorded the form and location of observed deficiencies. The 15 stakeholders used the same indicators and four-point scale and, consistent with the evaluation-form instruction and sampling criteria, rated conditions from their observation, experience, and familiarity with the study area. The reported numerical means were derived from the stakeholder evaluation forms. Researcher field observations, photographs, and comments constituted a complementary evidentiary stream used to contextualize, corroborate, qualify, and illustrate the rated problem types. This treatment preserved the distinct contribution of stakeholder assessment and direct environmental documentation.

After data collection, the study used descriptive aggregation and evidence convergence. Stakeholder forms were checked for completeness, coded by participant group, and summarized through arithmetic means for each reported indicator and for the three domains. The four-point scores were treated as ordered condition categories and interpreted descriptively. Apparent variations among stakeholder groups were used only as contextual observations. Field notes, photographs, and comments were organized under the same 15 indicators and reviewed alongside the rating summaries to identify recurring agreement, qualification, and contradiction. The numerical results therefore represent stakeholder-based diagnostic summaries, while the nonnumeric records provide corridor-level context for understanding the reported conditions.

The assessment covered a heterogeneous downtown network comprising major commercial and transport corridors, market-related streets, school and institutional frontages, hospital access, residential-commercial sections, and short connector streets. Road widths were approximately 10 to 20 m, while assessed street lengths ranged from about

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110 m to 980 m. These contextual differences informed the guideline phase because pedestrian demand, transit activity, loading, vending, parking, drainage, utilities, and available right-of-way varied by corridor. The same 15 condition indicators were applied throughout the area to identify recurring deficiencies across the different street functions.

The streets were classified into three planning zones according to observed pedestrian activity. Zone A represented high-activity corridors and included Araneta, Luzuriaga, Bonifacio, and portions of Gatuslao, Gonzaga, and Rizal Streets. Zone B represented moderate activity and included Lacson, Burgos, San Juan, San Sebastian, Galo, Ballesteros, Cuadra, and portions of Gatuslao, Locsin, Gonzaga, Rizal, and Rosario Streets. Zone C represented lower activity and included Nueva and portions of Rosario and Locsin Streets. These descriptive activity categories organized the development of context-sensitive proposals; subsequent pedestrian counts can refine their boundaries and guide detailed capacity decisions.

The guideline-development stage followed an assessment-to-design sequence. Recorded problems were grouped under physical quality, safety, and sustainability. The researcher then identified corresponding interventions and adjusted the proposed sidewalk zones to the reported road width and pedestrian-activity classification of each street. National accessibility requirements and contemporary street-design principles supplied normative references. The process produced preliminary, context-responsive planning and design propositions grounded in the assessment findings. Subsequent project development may refine the proposals through collaborative design review, verified site measurements, engineering analysis, traffic and drainage assessment, cost evaluation, stakeholder consultation, and the approvals appropriate to each corridor.

Prior to implementation, the study underwent internal research ethics evaluation and approval by the Graduate School panel of evaluators. At the time, a separate institutional research ethics review board had not yet been constituted; therefore, the panel itself evaluated the study's compliance with applicable research ethics requirements as part of the proposal review and approval process. Relevant site and local permissions were obtained. Participation in the stakeholder evaluation was voluntary and preceded by information about the study's purpose, procedures, and intended use of the data; participants could decline or withdraw without penalty. Direct identifiers were excluded from the analytical dataset, responses were coded, and collected information was restricted to academic use. Field observation was nonintrusive and focused on public infrastructure rather than identifiable individuals. These safeguards addressed informed consent, withdrawal, confidentiality, anonymity, data minimization, and responsible representation of participant contributions.

RESULTS

Across the three domains, the stakeholder ratings were poor for physical quality (overall M = 1.24), safety (overall M = 1.45), and sustainability (overall M = 1.25). The observation notes, photographs, and stakeholder comments described related problems involving discontinuity, obstructions, inaccessible transitions, damaged surfaces, weak pedestrian-oriented lighting, hazards, limited shade, drainage, and cleanliness. These sources converged at the level of recurring problem types, although the available record did not permit calculation of the proportion of sidewalk segments affected by each condition.

Table 1 presents the complete indicator-level results. Physical quality was poor overall (M = 1.24): width was fair, while surface condition, continuity, accessibility, and freedom from obstruction pulled the domain downward. Safety was also poor overall (M = 1.45), despite fair ratings for crossings and vehicle separation, because lighting, visibility, and hazards remained weak. Sustainability was poor across every indicator (overall M = 1.25), with shade receiving the lowest mean in the domain.

Table 1
Stakeholder Ratings of Sidewalk Conditions by Domain and Indicator

Domain	Indicator	M	Interpretation
Physical quality	Sidewalk width	1.53	Fair
	Surface condition	1.40	Poor
	Continuity	1.13	Poor
	Freedom from obstructions	0.93	Not present/very poor
	Accessibility features	1.20	Poor
Physical quality overall		1.24	Poor
Safety	Adequate lighting	1.20	Poor
	Visibility	1.33	Poor
	Pedestrian crossings	1.53	Fair

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VOLUME 4, ISSUE NO. 10

Domain	Indicator	M	Interpretation
	Separation from vehicles	1.73	Fair
	Freedom from hazards	1.47	Poor
Safety overall		1.45	Poor
Sustainability	Shade	1.13	Poor
	Drainage adequacy	1.27	Poor
	Material durability	1.40	Poor
	Cleanliness	1.20	Poor
	Walking-environment comfort	1.27	Poor
Sustainability overall		1.25	Poor

Note. Scale: 2.50–3.00 = good; 1.50–2.49 = fair; 1.00–1.49 = poor; 0.00–0.99 = not present/very poor. Means summarize the 15 stakeholder evaluations.

Conditions varied across the 16 assessed streets because corridor width, length, surrounding uses, transport activity, pedestrian demand, and available right-of-way differed. Table 2 consolidates the reported dimensions, descriptive activity classifications, planning zones, and the principal conditions used to identify corridor priorities.

Table 2
Street-Corridor Context and Principal Assessment Findings

Street	Width (m)	Length (m)	Activity / zone	Principal finding or planning concern
Araneta	17	514	High / A	Missing and obstructed links; weak accessibility, crossings, lighting, shade, and drainage.
Gatuslao	16–18	788	High–moderate / A–B	Variable capacity; interruptions, utility and vendor conflicts, crossing, drainage, and sanitation concerns.
Luzuriaga	15	520	High / A	Variable width and continuity; utility occupation, uneven transitions, limited waste facilities, reliance on arcades.
Gonzaga	15–17	512	High–moderate / A–B	Discontinuity, obstruction, weak accessibility and crossings, and parking pressure.
Bonifacio	17	110	High–moderate / A	Market, vending, delivery, and parking activity compete with an inadequately defined pedestrian route.
Rizal	17	451	Moderate–high / A–B	Continuity, accessibility, and crossing concerns require integration with its civic and heritage setting.
Lacson	20	970	Moderate / B	Utilities, vegetation, damaged covers, uneven pavement, drainage openings, and parking reduce usable space.
San Juan	13–18	980	Moderate / B	Bridge structures, utilities, and missing links interrupt a mixed commercial, institutional, and residential route.
San Sebastian	15	560	Moderate / B	Missing sidewalk sections and an improperly configured ramp affected by drainage.
Galo	13	410	Moderate / B	School-zone discontinuity, poles, roadway exposure, and crossing quality increase user vulnerability.
Burgos	12–15	380	Moderate / B	Missing links, parked motorcycles, trees, poles, and planting constrain access near hospital functions.
Locsin	15	966	Moderate / B–C	Narrow or inadequate public sidewalks, arcade dependence, obstructions, uneven surfaces, and limited shade.
Ballesteros	15	112	Moderate / B	Short connector with obstructions, uneven pavement, weak accessibility, roadway-oriented lighting, and limited shade.
Cuadra	15	279	Moderate / B	Commercial connector affected by inadequate pedestrian space, parking, utilities, uneven pavement, and weak accessibility.
Rosario	15	600	Low–moderate / B–C	Missing sidewalks, truck and school-zone conflict, stagnant water, weak accessibility, and limited amenities.

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Street	Width (m)	Length (m)	Activity / zone	Principal finding or planning concern
Nueva	10	126	Low / C	No dedicated sidewalk; pedestrians share the narrow corridor with moving and parked vehicles.

Note. Widths and lengths are approximate values reported in the source study. A, B, and C denote the study's high-, moderate-, and low-activity planning zones; mixed labels indicate streets whose portions were assigned to different zones.

Across these corridors, private arcades played an important but unstable role. They supplied shade and sometimes a smoother walking surface where public sidewalks were missing, yet their continuity depended on property frontage and their usable width was reduced by vendors, motorcycles, goods, posts, and changes in floor level. Treating arcades as substitutes for public infrastructure would leave route availability contingent on private control and inconsistent management. The evidence instead supports coordinated frontage agreements, accessible transitions, and enforcement arrangements that preserve movement while recognizing commercial use.

The pattern of obstructions also requires differentiation. Fixed elements such as utility poles, meters, signs, bridge structures, drainage openings, trees, and building projections require design coordination or capital work. Movable or operational obstructions—parked vehicles, motorcycles, refuse, temporary barriers, construction materials, vending, loading, and displayed goods—require regulation, designated space, scheduling, and sustained enforcement. Combining both types under a single obstruction score can conceal the agencies and remedies involved. The photographs and notes were therefore used to distinguish infrastructure redesign from day-to-day street management when deriving the recommendations.

Observed accessibility problems formed a chain rather than isolated defects. Missing curb ramps, absent tactile information, abrupt elevation changes, unstable surfaces, open drains, narrow clearances, blocked approaches, and crossings disconnected from usable sidewalks meant that completing one feature would not necessarily create an accessible trip. The assessment established a corridor-level pattern of barriers suitable for preliminary planning. A subsequent accessibility audit with instrumented slope measurements and the participation of persons with disabilities and technical specialists can determine segment-level compliance and guide detailed corrective work.

Environmental conditions varied, but limited shade and greenery were common outside the public-plaza area and private arcades. Ponding or stagnant water was specifically noted in portions of Araneta, Gatuslao, Rosario, and other corridors, while detached pavers, damaged inlets, refuse, and odor showed how drainage and maintenance affected pedestrian use. Within its descriptive scope, the assessment identified perceived and observable sustainability weaknesses. Subsequent thermal, rainfall, shade-coverage, water-depth, and hydraulic measurements can quantify design performance and inform the detailed specification of permeable surfaces, bioswales, and drainage improvements.

The zone-based proposals generally allocated wider sidewalk corridors to high-activity streets and narrower corridors to moderate- or low-activity streets, while retaining at least a 1.20-m unobstructed route under the Revised Implementing Rules and Regulations of BP 344 (DPWH, 2024). Proposed elements included pedestrian and frontage zones, furnishing or planting strips, curb ramps, tactile paving, accessible signals, improved crossings, pedestrian-scale lighting, trees, permeable pavement, bioswales, stormwater storage, waste facilities, and maintenance. Their final configuration should be selected according to verified right-of-way, property boundaries, utility conflicts, loading demand, emergency access, turning movements, drainage outfalls, soil conditions, maintenance capacity, heritage considerations, and lifecycle costs.

Stakeholder comments repeated many of the same concerns found in the observation record: narrow or obstructed routes, uneven surfaces, weak lighting and visibility, deficient crossings and accessibility, drainage and odor problems, limited shade, waste, and inconsistent maintenance. Architects, environmental planners, and sidewalk users tended to rate conditions lower than local government representatives and vendors. These exploratory variations illustrate how evaluations differed by stakeholder position and indicate the value of retaining technical, administrative, user, and livelihood perspectives during implementation planning.

The diagnostic findings were translated into a preliminary intervention hierarchy. First-priority actions were protection of a continuous unobstructed pedestrian route, closure of missing links, correction of severe surface and drainage hazards, connected accessibility features, and safer crossings at conflict points. Second-priority actions integrated pedestrian-oriented lighting, shade, drainage, durable and slip-resistant materials, cleanliness, and maintenance. Street-specific proposals varied by pedestrian demand and available right-of-way. Before implementation, the proposed dimensions and technologies should be refined through verified site measurements, stakeholder consultation, feasibility and cost assessment, and the engineering and local approval processes appropriate to each corridor.

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DISCUSSION AND ANALYSIS

The findings demonstrate that sidewalk performance in downtown Bacolod is constrained less by a single missing feature than by the cumulative effect of discontinuity, obstruction, weak maintenance, incomplete accessibility, unsafe interfaces, and inadequate climate response. A sidewalk segment may appear adequate when considered only in terms of nominal width or vehicle separation, yet still fail as part of a pedestrian network if it cannot be followed continuously, crossed safely, or used independently by people with different abilities. This explains why the fair rating for width did not amount to an overall finding of satisfactory physical quality.

The distinction between nominal and effective width is central. The observed intrusion of utilities, parked vehicles, signs, meters, vegetation, waste, drainage elements, and roadside activity reduced the portion of the sidewalk actually available for movement. NACTO (2013) and GDCI (2016) address this problem by organizing sidewalks into frontage, pedestrian, and furnishing or buffer zones. Applying this principle in a constrained downtown setting does not necessarily require uniform widening everywhere. It requires protecting a continuous pedestrian clear zone and locating utilities, trees, furniture, loading, vending, and parking so that they do not repeatedly consume it.

Discontinuity magnified the effects of narrowness and obstruction. A single impassable section can undermine an otherwise usable route because pedestrians must detour into traffic or abandon the path. The result supports Southworth's (2005) argument that walkability depends on connected and coherent pedestrian networks rather than isolated design objects. It also reflects the Complete Streets principle that pedestrian access must be considered across the full street and through intersections, not appended after decisions about vehicle movement have already been made (Smart Growth America, 2023).

The observed surfaces and level changes reveal that maintenance is part of design performance. Durable materials alone cannot guarantee usability when installation is uneven, drainage is poor, utility access disrupts the surface, or repairs are left incomplete. The sustainability score for material durability, although the highest in its domain, remained poor and must be interpreted alongside the documented deterioration. Lifecycle planning should therefore connect material selection with subgrade preparation, drainage, construction supervision, utility coordination, inspection, and timely repair.

Accessibility deficiencies show that compliance cannot be achieved by inserting isolated ramps or tactile elements. Universal design requires a continuous chain of access from the sidewalk through crossings and adjoining routes (Steinfeld & Maisel, 2012). A curb ramp is ineffective if it is blocked, excessively steep, disconnected from a clear path, or directed toward a crossing without an accessible landing. Likewise, tactile paving cannot serve its intended purpose if it is absent at decision points, inconsistently arranged, damaged, or terminated at an obstruction. The findings therefore support corridor-level accessibility audits rather than feature-by-feature installation.

The safety results also require contextual interpretation. Fair separation from vehicles suggests that basic curbs or elevated sidewalks existed in some locations, but direct exposure remained where sidewalks were absent, too narrow, or occupied. A protective edge does not resolve risk when a pedestrian must leave the sidewalk to bypass a pole, open drain, parked motorcycle, or terminated segment. In the same way, a painted crossing offers limited protection when its markings are faded, approaches are blocked, sightlines are poor, vehicle speeds are unmanaged, or the crossing is not linked to accessible sidewalks. WHO's (2023) safe-system approach supports the use of complementary measures, including clear crossings, adequate lighting, speed management, visibility, and separation.

Poor pedestrian lighting warrants particular attention because roadway illumination and storefront spill light do not necessarily provide continuous, uniform light at walking level. Dark patches, glare, shadows, and poorly illuminated hazards can reduce personal security and the ability to detect surface defects. Pedestrian-oriented lighting should be planned around the route, intersections, crossings, waiting areas, and changes in level. Its placement must also be coordinated with trees, utilities, and signs so that improvements in one domain do not create obstructions in another.

The sustainability findings show that tropical walkability depends on environmental comfort. Shade obtained the lowest mean in the study, and pedestrians frequently depended on building arcades where public shade was absent. This dependence transfers a public mobility function to private frontage and becomes unreliable when arcades are blocked or discontinuous. Street trees and landscaped buffers can improve thermal comfort and the pedestrian experience, but they require species selection, root-space design, drainage, canopy management, and placement outside the clear pedestrian zone. Shade structures may supplement trees where underground utilities, narrow rights-of-way, or building conditions limit planting.

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Drainage problems connected nearly every assessed domain. Ponding and stagnant water reduced comfort and cleanliness, accelerated material deterioration, created slippery or inaccessible routes, generated odors, and increased the likelihood that pedestrians would avoid the sidewalk. Drainage should therefore be integrated with sidewalk grading, inlet location, covered channels, tree pits, utility access, and maintenance. Infrastructure that is technically present but positioned above the surrounding grade or obstructed by waste cannot perform effectively.

Cleanliness similarly functioned as more than an aesthetic issue. Refuse occupied walking space, clogged drainage, contributed to stagnant water, and reduced perceived care and comfort. Regular cleaning, appropriate waste receptacles, enforcement, vendor coordination, and clear maintenance responsibility are necessary. The higher ratings from vendors and local officials compared with architects, planners, and users may reflect different expectations or exposure, but the small sample does not permit firm conclusions about group attitudes. The more defensible interpretation is that multiple perspectives should be retained during design and implementation because standards, operational constraints, livelihood needs, and everyday use do not always produce identical evaluations.

Taken together, the findings support an integrated guideline rather than a catalogue of disconnected fixes. Priority should be given first to life safety and continuous access: protecting a clear pedestrian path, closing missing links, removing or relocating hazards, providing accessible intersections, improving crossings and visibility, and addressing locations where pedestrians are forced into traffic. The next layer should improve environmental and operational performance through drainage, lighting, shade, durable materials, cleanliness, and maintenance. Street-specific solutions may vary with pedestrian demand and available right-of-way, but the obligation to provide a continuous, safe, and accessible route should remain consistent.

The street-level synthesis clarifies the meaning of the domain averages. A poor physical-quality mean summarized a network containing both minimally passable sidewalks and locations with no dedicated pedestrian facility. Similarly, the fair mean for vehicle separation coexisted with corridors where pedestrians entered the carriageway because a sidewalk ended or was blocked. Aggregation identified broad priorities, while segment-specific evidence is needed to assign agency responsibility, locate the most urgent crossings and drainage interventions, and evaluate the operational effects of proposed widening. The corridor findings and future segment inventory therefore serve complementary planning functions.

The three planning zones provide a useful organizing device but need empirical refinement. High, moderate, and low pedestrian activity should be supported by counts conducted at consistent intervals, including weekday and weekend periods, school and market peaks, and wet- and dry-season conditions. Desire-line mapping should identify where people actually cross or bypass obstructions. Vehicle composition, loading behavior, speed, and turning movements should be recorded alongside pedestrian flows. With those data, sidewalk width and crossing treatment can respond to demonstrated demand and risk rather than to broad activity labels alone.

The proposals also require a governance sequence. Immediate low-cost measures include clearing critical paths, covering dangerous openings, restoring markings, controlling parking at crossings, cleaning drains, and providing protected temporary pedestrian routes around works. Medium-term work includes pavement reconstruction, curb ramps, lighting, organized vending and loading zones, and relocation of selected utilities. Longer-term projects may involve right-of-way reallocation, continuous tree and drainage systems, underground utilities, corridor reconstruction, or shared-street conversion. Staging the work prevents visually attractive but disconnected improvements from preceding urgent safety and accessibility corrections.

Implementation should be evaluated through explicit performance indicators. Before-and-after records should include effective clear width, continuous accessible-route length, number and type of obstructions, crossing distance and visibility, curb-ramp and tactile-feature compliance, pedestrian illuminance, surface defects, ponding duration, shade coverage, pedestrian volumes, observed conflicts, and user experience. Maintenance indicators should record response time, recurrence of blockages, drain-cleaning schedules, pavement repair, and restoration after utility work. These measures would convert the proposed guidelines into a testable improvement program and provide evidence for refinement and wider application.

Equity must remain part of technical prioritization. Routes used by persons with disabilities, older adults, children, market workers, vendors, commuters, hospital users, and low-income pedestrians may warrant intervention even when pedestrian counts are not the highest. Engagement should extend from condition assessment to participatory route audits and prototype review. Vendor and delivery needs should be incorporated through adequate operating space and schedules so that livelihood and commercial functions can coexist with a protected pedestrian route.

Finally, climate-responsive features should be selected and engineered as coordinated systems. Trees require adequate soil volume, rooting space, species and canopy criteria, storm resilience, establishment plans, and placement outside the pedestrian clear zone. Permeable pavement and bioswales require appropriate subgrade or soil conditions, pretreatment, safe edges, overflow routes, drainage connectivity, and planned removal of sediment and waste. Pedestrian lighting requires corridor-specific photometric design, attention to crossings and level changes, and lifecycle maintenance. These considerations are consistent with green-street and pedestrian-lighting guidance and identify the technical work needed to convert the study's planning concepts into safe and maintainable infrastructure (Federal Highway Administration [FHWA], 2006; GDCI, 2016; U.S. Environmental Protection Agency [EPA], 2021).

The study's interpretive scope corresponds to its descriptive-assessment design. The 15 purposively selected stakeholders provided informed professional, governmental, user, and livelihood perspectives, and the four-point means summarize this panel's evaluations. The field assessment was organized by named street corridor and documented recurring physical, safety, and sustainability conditions through notes and photographs. Stakeholder scores and researcher field records were analyzed as complementary evidence streams. The resulting convergence provides a preliminary diagnosis of conditions and priorities within the assessed downtown area. Population-level estimation, formal compliance determination, and construction-level decisions require the next stage of evidence: fixed segment measurements, repeated observations, broader user participation, pedestrian and vehicle data, nighttime illuminance, thermal and drainage assessment, cost and feasibility analysis, and postimplementation evaluation. The present findings and guidelines establish the basis for that work.

CONCLUSION

The downtown sidewalks assessed in this study did not consistently provide a continuous, accessible, safe, comfortable, and sustainable pedestrian network. Physical-quality deficiencies included constrained effective width, damaged and uneven surfaces, missing or interrupted segments, fixed and temporary obstructions, and incomplete accessibility features. Although width received a fair mean rating, the observation record showed that the usable clear path was frequently reduced or eliminated. The physical problem was therefore not simply insufficient dimensions but the failure to protect continuity and pedestrian priority throughout a route.

Safety provision was also incomplete. Separation from vehicles and pedestrian crossings were rated fair, but these features varied in quality and were weakened by blocked paths, poor sightlines, faded or missing markings, inaccessible approaches, and locations where pedestrians had to enter the roadway. Lighting, visibility, and freedom from hazards were poor. The results indicate that safety must be addressed as a coordinated street system involving the sidewalk, crossing, carriageway interface, utilities, maintenance, and traffic operation.

Sustainability was the weakest dimension because every indicator was rated poor. Limited shade, inadequate drainage, deteriorating materials, poor cleanliness, and low walking comfort reduced both immediate usability and long-term infrastructure performance. In Bacolod's tropical context, these conditions make climate responsiveness an essential requirement rather than a secondary amenity.

Stakeholder ratings, observations, photographs, and comments converged on recurring and interconnected deficiencies across the assessed corridors. This convergence supports a corridor- and network-based response that protects a continuous clear path, ensures connected accessibility, reduces exposure to traffic and physical hazards, responds to heat and rainfall, and assigns sustained responsibility for management and maintenance. The context-sensitive guidelines derived from the study provide a preliminary planning framework for segment-level measurement, stakeholder consultation, technical design, feasibility assessment, implementation, and subsequent evaluation.

RECOMMENDATIONS

Table 3 consolidates the recommended response into eight coordinated action areas. The matrix links the assessment evidence with priority interventions and measurable implementation checks so that corridor-level planning can proceed while detailed technical requirements are refined.

Table 3

Assessment-Based Sidewalk Improvement and Implementation Matrix

Action area	Assessment basis	Priority response	Implementation and monitoring
Route continuity and obstructions	Missing links, narrowed clear paths, fixed utilities, parking, vending, and roadside activity.	Protect a continuous pedestrian clear zone; close gaps; relocate or manage obstructions through corridor-specific frontage, furnishing, loading, vending, and parking arrangements.	Record effective clear width, accessible-route length, obstruction type, responsible agency, and response time.

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Action area	Assessment basis	Priority response	Implementation and monitoring
Connected accessibility	Incomplete curb ramps, tactile information, landings, transitions, and links to crossings.	Deliver accessibility as a connected route consistent with the Revised Implementing Rules and Regulations of BP 344 (DPWH, 2024); include persons with disabilities and accessibility specialists in design review and field validation.	Audit slopes, clearances, surfaces, ramps, tactile features, landings, and crossing connections before acceptance.
Crossings and traffic interface	Faded or missing crossings, blocked approaches, weak sightlines, and pedestrian exposure to traffic.	Upgrade crossings according to destinations, demand, conflict, and desire lines; evaluate signals, refuge areas, curb extensions, and traffic calming where appropriate.	Track marking condition, approach clearance, crossing distance, visibility, speeds, conflicts, and safety incidents.
Pedestrian lighting and visibility	Roadway-oriented lighting, dark gaps, glare, shadows, and visual obstruction.	Conduct a pedestrian-lighting audit and provide coordinated illumination at routes, crossings, waiting areas, and level changes.	Measure pedestrian illuminance and document dark gaps, glare, obstruction conflicts, maintenance, and outages.
Surface and drainage performance	Uneven and damaged pavement, open or damaged inlets, ponding, stagnant water, and incomplete repairs.	Coordinate pavement, grades, inlets, covered drains, utility covers, materials, construction protection, and maintenance access.	Record surface defects, ponding depth and duration, drain-cleaning completion, repair response, and restoration after utility work.
Shade and climate comfort	Limited public shade, dependence on private arcades, heat exposure, and constrained planting space.	Develop a connected shade strategy using appropriate trees, planting systems, arcades, or structures while preserving the clear route and utility visibility.	Measure shade coverage, thermal conditions, canopy performance, survival, obstruction conflicts, and maintenance requirements.
Management and maintenance	Waste, vegetation, illegal parking, recurring blockage, utility work, vending, and loading affect multiple domains.	Assign responsibilities, inspection intervals, response standards, and enforcement procedures; provide workable spaces and schedules for livelihood and service functions.	Maintain inspection, cleaning, repair, enforcement, vendor, parking, and excavation-restoration logs.
Pilot implementation and review	Corridors differ in demand, width, land use, transport activity, drainage, utilities, and user vulnerability.	Begin with representative priority corridors; complete verified measurements, consultation, feasibility and cost assessment, technical design, and local approval before wider application.	Use before-and-after measures of width, continuity, accessibility, lighting, drainage, shade, pedestrian activity, user experience, and safety.

Note. Final dimensions, materials, and technologies remain subject to verified site conditions, stakeholder consultation, technical design, feasibility and cost assessment, and applicable local approvals.

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