



INTERNATIONAL
WELL
BUILDING
INSTITUTE™

THE **WELL** COMMUNITY STANDARD™ PILOT

The premier global standard for supporting health and well-being through inclusive, integrated and resilient communities.

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Acknowledgments

The International WELL Building Institute (IWBI) acknowledges the work of the following IWBI technical staff that developed and created the WELL Community Standard™: Tsega O. Abera; Ethan Bourdeau; Rachel Gutter; Soyoung Hwang; Dusan Licina; Michelle Martin; Vienna McLeod; Anja Mikic; Nathan Stodola; Gayathri Unnikrishnan; Emily Winer; Rose Winer.

IWBI is also grateful for the input and insight provided by the following Working Group members:

- Arup
- Gale International
- Hart Howerton
- HKS, Inc.
- Issy Coeur de Ville
- McLennan Design
- Shanghai EXPO UBPA Business Development Co., Ltd. and SRIBS
- Tropicana Field Conceptual Master Plan Project in St. Petersburg, Fla.
- U.S. Green Building Council
- Water Street Tampa

Finally, IWBI would like to thank the following Subject Matter Experts for the feedback they provided:

- Air: Eric Liberda, PhD
- Water: Eric Liberda, PhD
- Nourishment: Joyce S. Lee, FAIA, LEED Fellow, President IndigoJLD, Director, Penn Urban Health Lab, Former Chief Architect, NYCOMB; Dr. Karen Lee, MD, MHSc, FRCPC, President & CEO, Dr. Karen Lee Health + Built Environment + Social Determinants Consulting; Alice H. Lichtenstein, D.Sc.; Andrew Rundle, DrPH
- Light: Darcie Chinnis, PhD; Nancy Clanton, Clanton & Associates; Chad Groshart, LEED AP BD+C; Dane Sanders, Clanton & Associates; April Stevenson, Clanton & Associates
- Fitness: Joyce S. Lee, FAIA, LEED Fellow, President IndigoJLD, Director, Penn Urban Health Lab, Former Chief Architect, NYCOMB; Dr. Karen Lee, MD, MHSc, FRCPC, President & CEO, Dr. Karen Lee Health + Built Environment + Social Determinants Consulting; Guoha Li, DrPH, MD; Andrew Rundle, DrPH
- Temperature: Dr. Elisaveta Petkova
- Sound: Durand Begault, PhD, FAES; Charles Salter, PE
- Materials: Margaret Whittaker, PhD, MPH, CBiol, FRSB, ERB, DABT, ToxServices LLC
- Mind: Rhiannon Corcoran, Professor of Psychology and Public Mental Health at the Institute of Psychology Health and Society, University of Liverpool; Chris Garvin, AI LEED AP BD+C, Managing Partner, Terrapin Bright Green; Guoha Li, DrPH, MD; Kathleen C. Thomas, PhD, Senior Research Fellow, Cecil G. Sheps Center for Health Services Research, University of North Carolina at Chapel Hill
- Community: Rhiannon Corcoran, Professor of Psychology and Public Mental Health at the Institute of Psychology Health and Society, University of Liverpool; Dr. Robert Fullilove; Joyce S. Lee, FAIA, LEED Fellow, President IndigoJLD, Director, Penn Urban Health Lab, Former Chief Architect, NYCOMB; Guoha Li, DrPH, MD; Lourdes Rodriguez, DrPH

EXECUTIVE SUMMARY

Over the last decade, green building rating systems and standards have made significant strides toward the market transformation of the building industry, resulting in a rapid expansion of both green building and planning as well as environmentally conscious building practices throughout the world. Through its WELL Community Standard™ pilot, the International WELL Building Institute™ (IWBI™) aims to elevate human health to the forefront of building and design practices and deliver cutting-edge health and well-being interventions at the district-scale - that are not only better for the planet, but also for people.

- 01 The WELL Building Standard™ (WELL v1) launched in October 2014 and is the first standard to focus exclusively on the health and wellness of the people in buildings.
- 02 The WELL Community Standard expands this work beyond a single building and into entire districts.
- 03 IWBI's programs are made up of performance metrics, design strategies and policies that can be implemented by the owners, designers, engineers, contractors, users and operators of buildings and communities.
- 04 The WELL Building Standard and the WELL Community Standard were developed by integrating scientific and medical research and literature on environmental health, behavioral factors, health outcomes and demographic risk factors that affect health with leading practices in building design and management.



TABLE OF CONTENTS

06	INTRODUCTION
08	USING THE WELL COMMUNITY STANDARD
18	CERTIFICATION STEPS
24	FEATURE MATRIX
30	CONCEPTS
31	AIR
49	WATER
71	NOURISHMENT
93	LIGHT
115	MOVEMENT
149	THERMAL COMFORT
167	SOUND
179	MATERIALS
195	MIND
223	COMMUNITY
251	INNOVATION
258	APPENDICES
	APPENDIX N1: BREASTFEEDING SUPPORT
	APPENDIX N2: PUBLIC SPACES OF ASSEMBLY
	APPENDIX F1: USE CATEGORIES
	APPENDIX F2: CYCLIST INFRASTRUCTURE
	APPENDIX F3: PHYSICAL ACTIVITY RECOMMENDATIONS
	APPENDIX MA1: REGULATIONS, GUIDELINES AND EQUIVALENTS
	APPENDIX MI1: OUTDOOR CHILD PLAY SPACES
	APPENDIX C1: HEALTH IMPACT ASSESSMENT (HIA) SCREENING
	APPENDIX C2: HEALTH IMPACT ASSESSMENT IMPLEMENTATION
269	GLOSSARY
274	REFERENCES

INTRODUCTION



Comprehensive and interdisciplinary approaches are necessary to meaningfully address complex issues related to human health and well-being. Many factors of the physical environment have a significant impact on day-to-day health, happiness and productivity. A growing body of research supports these claims but much more needs be done to translate research into practice. IWBI's standards marry best practices in design and construction with evidence-based medical and scientific research—harnessing buildings and communities as vehicles to support human health and well-being.

The WELL Community Standard aims to impact individuals not just within the walls of their home or workplace, but throughout the public spaces where they spend their days. A WELL community is designed to support health and well-being across all aspects and areas of community life. The vision for a WELL community is inclusive, integrated and resilient, with a strong community identity fostering high levels of social interaction and engagement. Resources in a WELL community—natural, human and technological—are used effectively, equally and responsibly to meet the community's current and future needs and priorities.



PRINCIPLES OF THE WELL COMMUNITY STANDARD

IWBI follows the below principles with the goal that the WELL Community Standard is:

01

Evidence-based: There is a coherent body of research offering consistency in findings across the field supporting the WELL program.

02

Broadly relevant: The interventions proposed are feasible and relevant across many applications.

03

Equitable: The standard provides its benefits in a way inclusive of all demographic and economic groups.

04

Transparently developed: The standard draws upon the expertise of established leaders in the scientific and engineering fields and offers multiple opportunities for stakeholder engagement.

05

Resilient: The standard is responsive to advances in scientific knowledge and technology, continually able to integrate innovation and adapt to a changing climate.



USING THE WELL COMMUNITY STANDARD

The WELL Community Standard is in its pilot stage, so there remains some flexibility in the interpretation of the requirements. Over the course of its existence as a pilot, IWBI will use information and feedback gathered from pilot projects and industry experts to further refine and enhance the WELL Community Standard. The certification process is administered by Green Business Certification Inc. (GBCI). See the WELL Certification Guidebook for more details.

THE WELL COMMUNITY STANDARD
IS ORGANIZED INTO THE FOLLOWING CONCEPTS:

1. **AIR:** ambient air quality; strategies to reduce traffic pollution; strategies to reduce exposure to pollution.

2. **WATER:** drinking water quality; public water sanitation; facilities provisions; strategies for managing contaminated water on a systems scale; strategies to promote drinking water access.

3. **NOURISHMENT:** fruit and vegetable access, availability and affordability; policies to reduce the availability of processed foods; nutritional information and nutrition education; food advertising and promotion; food security; food safety; strategies to support breastfeeding.

4. **LIGHT:** maintained illuminance levels for roads and walkways; strategies for limiting light pollution and light trespass; glare and discomfort avoidance.

5. **MOVEMENT:** environmental design and operational strategies to reduce the risk of transportation-related injuries; mixed land use and connectivity; walkability; cyclist infrastructure; infrastructure to encourage active transportation; strategies to promote daily physical activity and exercise.

6. **THERMAL COMFORT:** strategies to reduce heat island effect; policies to deal with extreme temperatures; policies to manage sun exposure and ultraviolet risk.

7. **SOUND:** noise exposure assessment; planning for acoustics; techniques to reduce sound propagation; hearing health education.

8. **MATERIALS:** strategies to reduce exposure to hazardous chemical substances in cases of uncontrolled/accidental release and contaminated sites; strategies to limit use of hazardous chemicals in landscaping and outdoor structures.

9. **MIND:** access to mental health care, substance abuse and addiction services; access to green spaces.

10. **COMMUNITY:** health impact assessments; policies that address the social determinants of health; health promotion programming; policies that foster social cohesion, community identity and empowerment; crime prevention through environmental design; policies and planning for community disaster and emergency preparedness.




FEATURES, PARTS AND REQUIREMENTS

The ten concepts in the WELL Community Standard are comprised of 110 features.

Every feature is intended to address specific aspects of the health and well-being of community members. Each feature is divided into parts and then further into requirements. Features and parts are named, and features also have unique three-letter codes for use in shorthand. Except when occasionally specified, all parts of a feature must be completed in order to achieve the feature. Each part describes which of its constituent requirement(s) must be achieved for compliance.

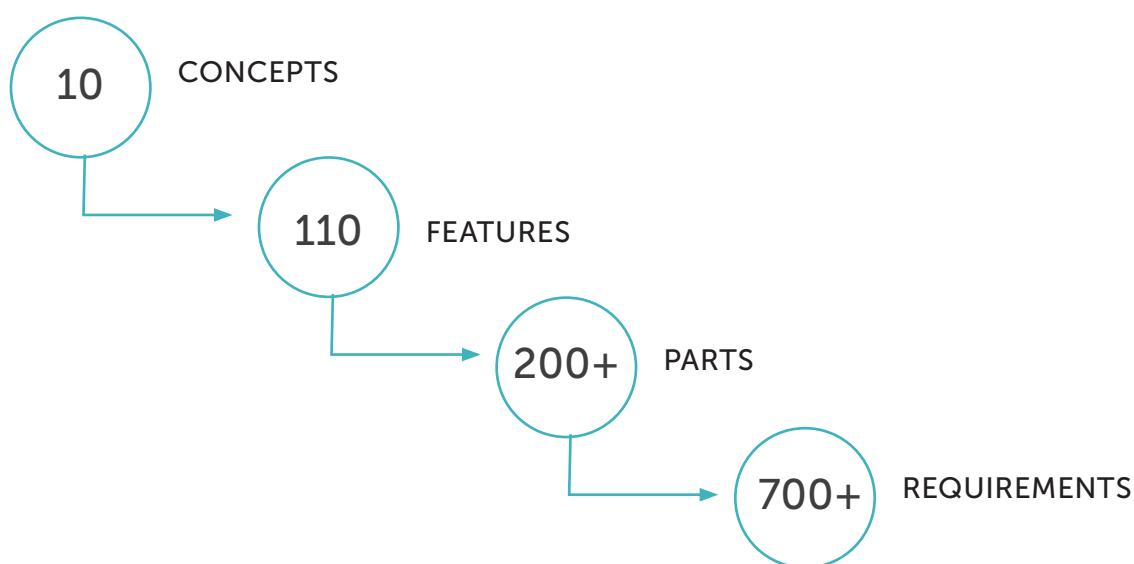


Figure 1: Organization of the WELL Community Standard.

Parts and features can be either:

- > **Design** strategies that require specific zoning, construction or geography.
- > **Policies** that apply to ongoing practices, rules or schedules.
- > **Performance**-based strategies that mandate thresholds for environmental conditions and therefore are affected by both design and operation.

These designations are useful for project teams to consider when scheduling and undertaking the planning, construction or expansion of a community.

Features are also categorized by whether or not they are mandatory for certification:

- > **Preconditions** (P after the feature name) are mandatory for all levels of WELL Certification: Silver, Gold or Platinum. Failure of a single precondition will prevent a project from becoming certified.
- > **Optimizations** (O after the feature name) are selected by projects in a flexible pathway toward certification.

ALTERNATIVE ADHERENCE PATHS

WELL allows for innovative, alternative solutions for meeting requirements to be submitted through the alternative adherence path process.

Project teams may propose an alternative for any requirement of WELL by submitting a completed alternative adherence path (AAP) to IWBI for review. Proposals must meet the intent of the requirement and be supported by cited scientific, medical or industry research.



SCORING

The WELL Community Standard has three levels of certification, each with a minimum point threshold.

LEVEL	MINIMUM POINTS
Silver	50
Gold	60
Platinum	80

Figure 2: Certification levels.

Preconditions do not contribute points since they are required to achieve any level of certification. Projects accumulate points through achieving optimizations, which are worth 1 point each. Thus, all optimizations in total are worth 100 points.

Projects may also earn up to 10 points for Innovation (see more detail on these features, on page 166). Finally, projects with buildings certified by healthy or green rating systems may earn up to 30 points (see Certified Buildings, below).

In addition to reaching the necessary number of points, projects must achieve at least one optimization in each concept.

WELL COMMUNITY STANDARD: COMMUNITY SEALS



Silver



Gold



Platinum

EXAMPLE PROJECT SCORES

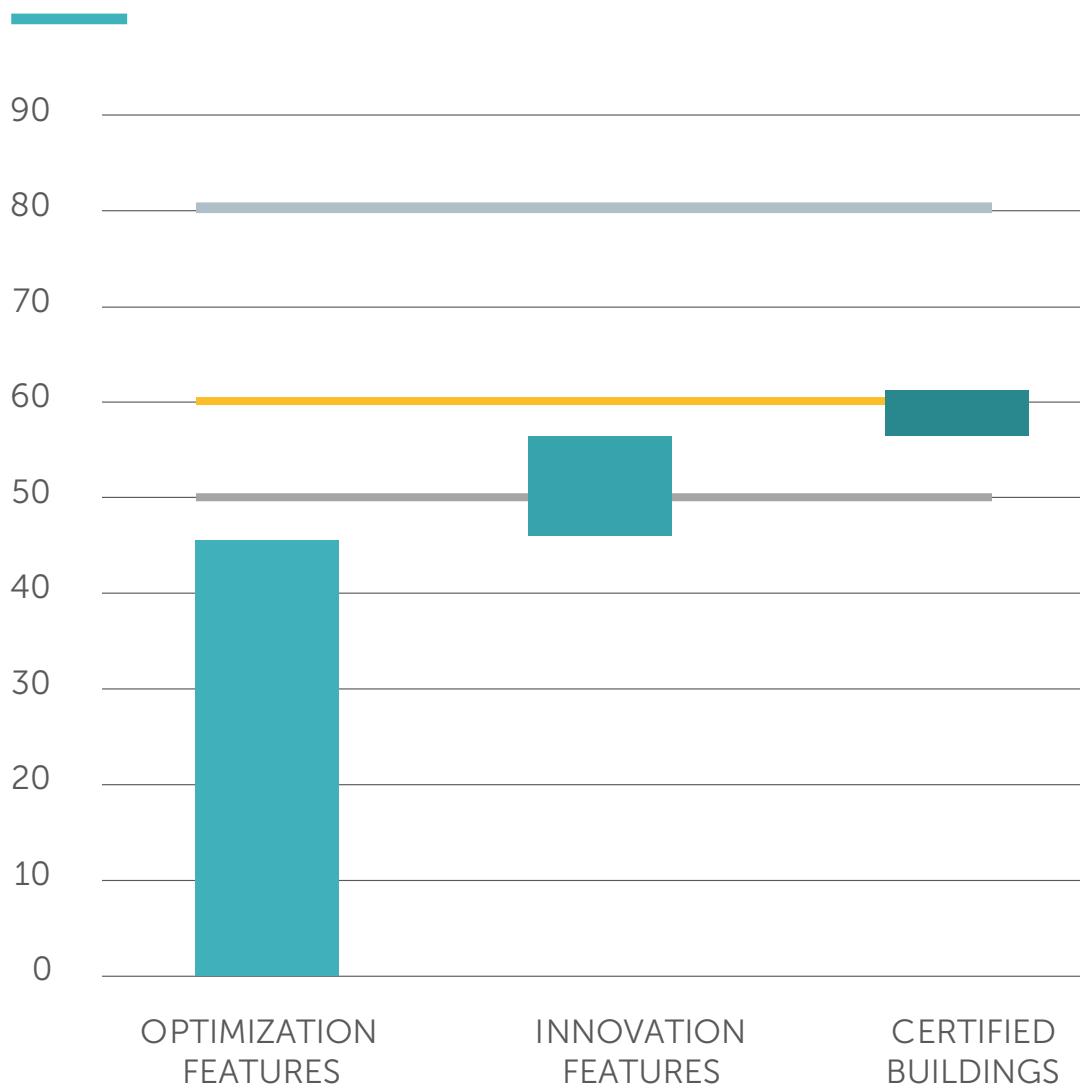


Figure 3: WELL Certified communities require 50 points for Silver, 60 points for Gold and 80 points for Platinum. This example project has achieved Gold through a combination of optimizations, innovations and certified buildings.

CERTIFIED BUILDINGS

In general, the features of the WELL Community Standard do not address the design or conditions within buildings, but rather the way in which they interact with each other in the landscape. Nevertheless, we spend about 90% of our time in buildings,¹ and the way that they are designed, constructed and maintained impacts the way we sleep, what we eat and how we feel.

To ensure that all parts of the community are addressed as spaces that hold the potential to deliver health and wellness benefits, WELL Community Certification requires some buildings to be certified under a qualifying health and wellness building standard, and provides projects the opportunity to earn additional points for going above the minimum. Because planetary health and human health are inextricably connected, WELL standards aim to be interoperable and synergistic with green rating systems, and therefore WELL Community Certification offers points for buildings certified under green rating systems as well.

Requirements

Figure 4 presents criteria for health and wellness and green rating systems that qualify for points under WELL Community Certification. The current list of programs approved to count for health and wellness and green building certification is available on the IWBI website. Early stage review or design awards ("precertifications") for health and wellness or green rating systems, such as WELL D&O, are considered acceptable to count for points under initial WELL Community Standard certification. However, all buildings must be fully certified by WELL Community Standard recertification. Project teams or standard bodies may suggest additional options for IWBI to evaluate, and when approved, those options will be added.

Health and wellness and green rating systems must meet the following criteria:

Inclusion Criteria	Health & Wellness	Green
Third-party reviewed	✓	✓
Viewable online at no-cost	✓	✓
Transparent development, rating, and scoring processes	✓	✓
Encompasses minimum number of topics	6	3
Evidence-based	✓	✓
Demonstrates leadership and innovation	✓	
Post-occupancy or -construction evaluation of on-site indoor environmental quality (IEQ) conditions	✓	✓

Figure 4: Inclusion criteria for health and wellness and green rating systems.

Scoring

All projects must contain at least one health and wellness certified building.

For new developments, health and wellness certified buildings must represent at least 15% of total building count or total gross building area (to project's benefit) that is owned, operated or managed by the project owner. Existing communities pursuing WELL Certification are not held to this 15% requirement. Existing communities are defined as developments with over 50% of total floor area constructed by time of registration.

Both new and existing communities with health and wellness certified buildings earn points as shown in Figure 5.

CERTIFIED BUILDINGS	POINTS AWARDED
• as percent of all buildings owned, operated or managed by project owner within community project	
• based on either building count or on gross building area, to project's benefit	
30% (in a minimum of three different buildings)	3
40% (in a minimum of four different buildings)	5
50% (in a minimum of five different buildings)	8
60% (in a minimum of six different buildings)	13
70% (in a minimum of seven different buildings)	21
80% (in a minimum of eight different buildings)	30

Figure 5: Points awarded for health and wellness building certification.

Additionally, all projects earn one point for each certified building within the project boundary *not* owned, operated or managed by the project owner, provided the total number of points awarded for health and wellness certified buildings does not exceed 30.

Finally, projects may earn one point for each building certified under a qualifying green rating system, up to a maximum of 10 points. In addition, the combined points awarded for green and healthy certified buildings cannot exceed 30 points. Green and healthy building certifications may be combined to earn points, and doubly certified buildings count in both categories. For the purpose of counting buildings, a building is considered a "certified building" if at least 75% of its total area is certified.

For example, consider the following project, where all buildings are owned by the project owner:

- > WELL Certified buildings: five, totaling 500,000 ft²
- > LEED-certified buildings: two, totaling 1,000,000 ft²
- > Total buildings within project boundary: 15, totaling 10,000,000 ft²

In this project, 33% of the buildings by count (though just 5% by area) are certified with a health and wellness standard, exceeding the base eligibility requirements and earning the project three points. The two LEED-certified buildings earn an additional two points in the green rating system category, for a total of five.

PROJECT SCOPE AND BOUNDARIES

The project must define the boundaries of the WELL community, which may contain public infrastructure areas as well as future proposed or existing infrastructure, buildings and landscapes. It may also involve renovations or expansions to existing developments, infill developments or new construction. The boundaries may include land and buildings under separate ownership or management. Project owners may use their discretion to determine project boundaries; however, once selected, the certification requirements must be applied consistently across the premises, including to properties under separate ownership (unless indicated otherwise in the standard).

Throughout the WELL Community Standard, many features make reference to percentages and proportions related to a total. For example, "75% of all parking spaces" or "all (minimum one) outdoor drinking water fountains located in public use areas." In these and other cases, the standard is meant to govern spaces and conditions within the project boundary unless otherwise indicated. For example, the operations of parking spaces nearby but outside of the project boundary would not affect the calculations.

ELIGIBILITY REQUIREMENTS

To qualify for registration for the WELL Community Standard, projects must meet at least two of the following conditions:

- > **Planned daytime** or nighttime population of 500 people or more.
- > **Planned total floor** area of 50,000 m² [538,000 ft²] or more.
- > **Planned total building** count of 10 or more.
- > **Total land** area of two hectares [five acres] or more.

In addition, the WELL Community Standard is designed for integrated, mixed-use developments. Therefore, projects must also include at least two of the following:

- > **Multifamily residential:** at least one building with five or more dwelling units.
- > **Office and/or retail:** at least one space, employing a total of at least five people.
- > **Public use recreation or leisure, accessible from dawn to dusk:** of at least 0.4 hectare [1 acre], composed of one or more spaces each at least .02 hectares [.05 acres].

PROJECT CONTROL

Some features may mandate design or rules in areas that are outside of a project's control. For example, a project owner may not be able to alter the timing of pedestrian walk signals or the color quality of streetlights. Large-scale developments require the collaboration of many Parties, however IWBI recognizes that, in some cases, projects may not be able to make changes to certain aspects of the public realm. In these cases, projects may apply for exemptions to certain parts of features by documenting how existing regulations or land/asset ownership prevents completion of those features.





CERTIFICATION STEPS

STEP ONE: PROJECT REGISTRATION

The path to certification begins with registration at wellcertified.com.

At this point, the project is assigned a WELL coaching contact from IWBI, who can provide technical support and answer questions about the WELL Certification process.



STEP TWO: WELL D&O AND DOCUMENTATION REVIEW

When a project submits documentation, it is assigned a WELL reviewer from the certification body, GBCI, who is responsible for reviewing the project's documentation and performance data to ensure compliance with the WELL Community Standard's requirements.

Submission for documentation review is possible only after project construction and occupancy. Projects that wish to target an interim award prior to project completion can pursue WELL D&O, an optional review based on documents that reflect planned conditions (see WELL D&O, below). The WELL Community Standard does not mandate a specific threshold of construction completion prior to certification. However, the project must meet all eligibility requirements (e.g., minimum size) and the conditions required within all features pursued at the time documentation is submitted for review (e.g., access to a grocery store).

Feature review: Projects must submit documentation in accordance with the type required for each feature (e.g., professional narrative, policy document, letter of assurance). For performance-based features, see Step Three: Performance Verification.

For some features (for example, Movement Network Planning (MNP)), projects must gather information and make planning decisions based on it. During review of these features, GBCI makes no assessment of the data quality or sufficiency; rather, GBCI evaluates whether or not a project has a plan to consider this data and to take proactive steps and actions based upon it.

Healthy and/or green buildings: At the point of documentation review, all buildings the project intends to use as certified buildings for the purpose of eligibility and point-earning must have a valid certification status, as described previously in Certified Buildings.





Community narrative: Lastly, projects submit a community narrative, which details the mission and goals of the WELL community; the stakeholders and other key players involved; and the expected timelines and schedules for various types of development. The narrative must describe how health and wellness:

- > Are given top priority.
- > Become integral to infrastructure.
- > Become integral to culture and operations in the district.
- > Are incentivized through the inclusion of health and wellness certified buildings.
- > Are considered inclusive of all potential residents, employees and visitors to the development.

WELL D&O: District-scale projects take place along an extended timeline. Therefore, projects wishing to demonstrate their commitment to health and wellness prior to the completion of construction and documentation review may pursue WELL D&O, an optional interim award that can communicate progress toward WELL Certification.

For WELL D&O, projects submit similar documents for review of design- and policy-based features as during documentation review, except that these documents may represent anticipated conditions and future operations of the project rather than those in place. In addition, projects must submit a narrative describing strategies the project will employ to meet any performance-based features. Projects must also identify which buildings in the master plan will be pursuing a health and wellness and/or green building certification. With this information, projects submit the quantity of buildings targeting certification, which must at least meet the minimum thresholds. Finally, projects must submit a draft of the community narrative.

While WELL D&O can be a helpful way for projects to communicate their progress, the award does not guarantee nor imply certification will be awarded. For more information about WELL D&O, please see the WELL Certification Guidebook for the WELL Community Standard. WELL D&O involves additional fees.



STEP THREE: PERFORMANCE VERIFICATION

Following successful documentation review, projects are able to collect performance data for the necessary features in the Air and Water concepts. The water quality tests for the features Drinking Water Quality (WQT), Public Water Additives (WAD) and High Quality Drinking Water (WQO) are one-time samples of the current conditions at project completion. The air quality tests for the features Fundamental Air Quality (AQU), Long-Term Air Quality (LTA), Enhanced Long-Term Air Quality (LTE), Short-Term Air Quality (STA) and Enhanced Short-Term Air Quality (STE) take place over a 12-month period, but this may commence (if the project desires) prior to the completion of construction or of documentation review. Data that is already collected for the community at the municipal level, such as from a public air quality monitoring station, may be used as long as it meets the parameters for performance data collection. GBCI will review the provided performance data and the method of data collection against the feature requirements.

For more information, please refer to the Performance Verification Guidebook for the WELL Community Standard.





STEP FOUR: CERTIFICATION AND RECERTIFICATION

After successful review of performance data, the project achieves WELL Certification. WELL Certification under the WELL Community Standard is valid for five years.

To maintain certification status, projects must attest at recertification that all designs, operations and policies used to achieve certification still exist, and submit new documentation to show that any altered conditions still meet the features previously awarded. To demonstrate the quality of on-site conditions, projects must also submit new performance data reflecting current conditions.

Project scores may change at the time of recertification if additional improvements have been made or if policies or programs have been discontinued. Projects may submit evidence of achievement of additional optimization features to improve their certification level at this time. Conversely, it is possible for the project's certification to be revoked or downgraded if sufficient features are no longer met.

If the project is constructed in phases, the owner may choose to pursue certification for a single phase. Then, the project may include additional phases to also be evaluated at the time of recertification under a single expanded boundary.

WELL COMMUNITY STANDARD

FEATURES AND OTHER OPPORTUNITIES FOR POINTS

CERTIFICATION REQUIREMENTS:

01 ALL PRECONDITIONS

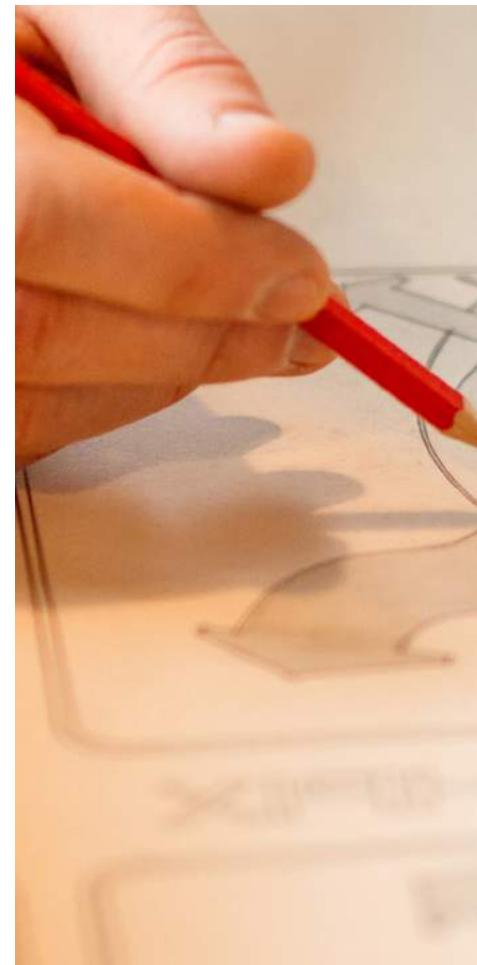
02 1+ OPTIMIZATION IN EACH CONCEPT

03 MINIMUM SIZE REQUIREMENTS

04 MINIMUM HEALTHY BUILDING CERTIFICATION

05 THE FOLLOWING POINTS:

- > Silver: 50-59
- > Gold: 60-79
- > Platinum: 80+



FEATURE MATRIX

AIR

KEY	WELL FEATURE	POINTS
AQU	Fundamental Air Quality	p
SMK	Smoking Ban	1
SMO	Outdoor Smoking Ban	1
LTA	Long-Term Air Quality	1
LTE	Enhanced Long-Term Air Quality	1
STA	Short-Term Air Quality	1
STE	Enhanced Short-Term Air Quality	1
SEP	Pollution Source Separation	1
PRK	Parking Restrictions	1
LEV	Low Emission Vehicles	1
AED	Air Quality Education	1
TOTAL POINTS		10



WATER

KEY	WELL FEATURE	POINTS
WQT	Drinking Water Quality	p
WAD	Public Water Additives	1
PWT	Periodic Water Quality Testing	1
WQO	High Quality Drinking Water	1
WAC	Drinking Water Access	1
FAC	Sanitary Facilities Provision	1
WFS	Water Feature Sanitation	1
LEG	Legionella Control	1
SWA	Stormwater Management	1
OVF	Overflow Water Management	1
TOTAL POINTS		9



NOURISHMENT

KEY	WELL FEATURE	POINTS
SUP	Supermarket Access	P
FRU	Fruits and Vegetables	1
HFO	Healthy Food Procurement	1
FAD	Food Advertising	1
NED	Nutrition Education	1
AGR	Urban Agriculture I – Provision	1
AGP	Urban Agriculture II – Promotion	1
FAF	Food Affordability	1
FSE	Food Security	1
FSA	Public Food Inspection Information	1
BRE	Breastfeeding Support	1
TOTAL POINTS		10

LIGHT

KEY	WELL FEATURE	POINTS
LMP	Lighting Master Plan	P
LCS	Lighting Control Schedule	1
EMI	Community-Wide Emittance Caps	1
LCT	Obtrusive Light Control	1
LTR	Light Trespass Mitigation for Sleep	1
SVI	Visibility Facilitation	1
RLI	Right-Of-Way Lighting	1
LEX	Lighting for Exteriors	1
MLI	Mass Transit Lighting	1
TOTAL POINTS		8

MOVEMENT

KEY	WELL FEATURE	POINTS
MIX	Mixed-Use Development	P
MNP	Movement Network Planning	1
WAK	Walkability	1
PED	Pedestrian-Scale Design	1
PDS	Enhanced Pedestrian Environments	1
CYC	Cyclist Infrastructure	1
BPK	Bicycle Parking	1
CYS	Enhanced Cyclist Environments	1
BSH	Community Bicycle Share	1
TRA	Mass Transit Infrastructure	1
TRN	Mass Transit Support	1
WAY	Community Wayfinding	1
PAS	Physical Activity Spaces	1
PRG	Activity Programming	1
PET	Pet Support	1
TOTAL POINTS		14



THERMAL COMFORT

KEY	WELL FEATURE	POINTS
EXT	Extreme Weather Warnings	P
HET	Urban Heat Adaptation: Community Support	1
HPE	Urban Heat Adaptation: Public Education	1
CLD	Urban Cold Adaptation: Community Support	1
CPE	Urban Cold Adaptation: Public Education	1
HIM	Urban Heat Island Mitigation	1
VEG	Urban Vegetation and Green Spaces	1
WAT	Urban Water Bodies	1
SUN	Personal Sun Exposure	1
TOTAL POINTS		8

SOUND

KEY	WELL FEATURE	POINTS
SOU	Sound Planning	P
SMP	Community Sound Mapping	1
PLN	Planning for Acoustics	1
ORD	Noise Ordinance	1
NLV	Noise Level Limit	1
HEA	Hearing Health Education	1
TOTAL POINTS		5

MATERIALS

KEY	WELL FEATURE	POINTS
HWM	Hazardous Waste Management	P
WST	Waste Stream Management	1
REM	Site Remediation and Redevelopment	1
CRE	Construction Remediation	1
ODS	Outdoor Structures	1
PES	Landscaping and Pesticide Use	1
HAZ	Hazard Communication	1
TOTAL POINTS		6





MIND

KEY	WELL FEATURE	POINTS
AMH	Access to Mental Health Services	P
CRI	Mental Health Crisis Support	1
ABU	Substance Abuse and Addiction Services	1
ARK	Substance Abuse and Addiction Services for At-Risk Populations	1
ALC	Alcohol Environment	1
RDR	Responsible Driving	1
IPV	Support for Victims of Interpersonal Violence	1
SGR	Integration of Streetscape Greenery	1
CHI	Outdoor Child Play Spaces	1
GRE	Restorative Green Spaces	1
BLU	Restorative Blue Spaces	1
BLT	Restorative Built Spaces	1
SCE	Preservation of Scenic Views	1
TOTAL POINTS		12

COMMUNITY

KEY	WELL FEATURE	POINTS
VIS	Community Visioning	P
HIA	Health Impact Assessment Screening	1
HII	Health Impact Assessment Implementation	1
SOC	Social Spaces	1
PUB	Public Spaces	1
SAN	Sanitation	1
CHW	Community Health and Wellness	1
CHR	Community Health Resilience	1
PRI	Access to Primary Healthcare	1
EDU	Educational Opportunity	1
HOU	Fundamental Housing Quality	1
EQU	Housing Equity and Affordability	1
DIG	Digital Connectivity	1
ENG	Civic Engagement	1
PRE	Preservation and Rehabilitation	1
CEL	Celebration of Place	1
ART	Public Art	1
SAF	Community Confidence	1
POC	Post-Occupancy Surveys	1
TOTAL POINTS		18

TOTAL POINTS FROM OPTIMIZATIONS	100
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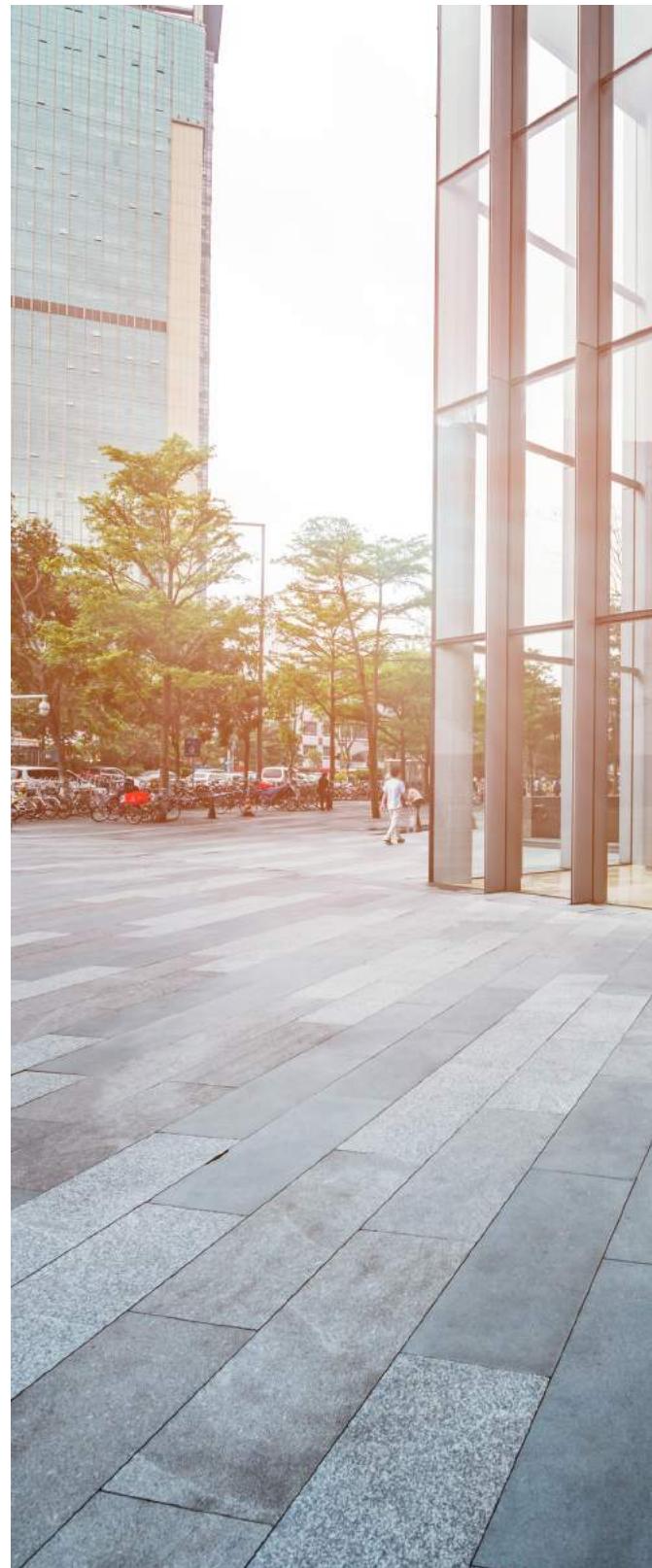
INNOVATION

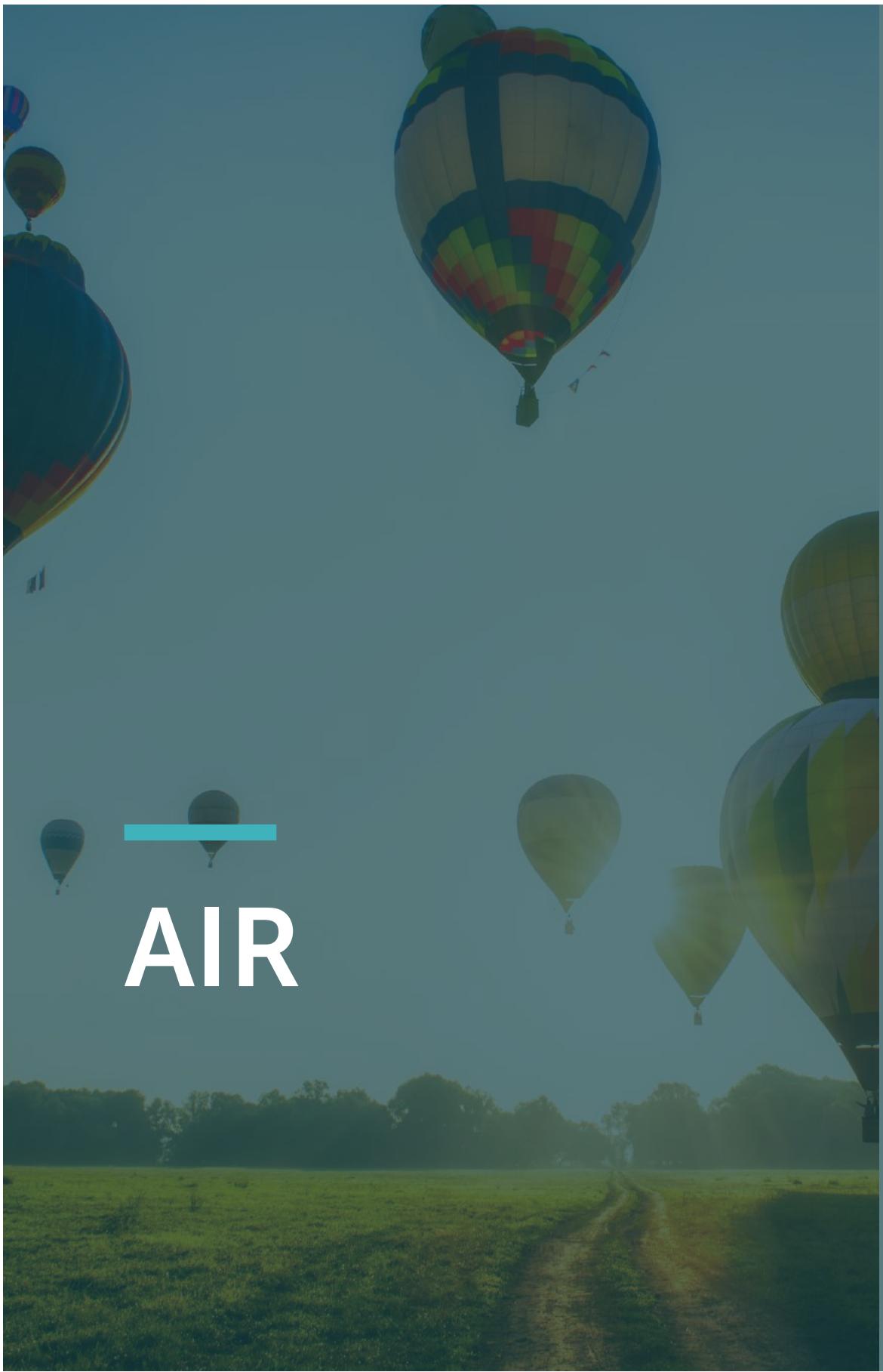
KEY	WELL FEATURE	POINTS
GND	Green Rating Systems	10
INP	Planning for Health	≤ 10
INV	Innovate WELL	≤ 10
WLP	WELL Accredited Professional	1
TOTAL POINTS FROM INNOVATION		10

CERTIFIED BUILDINGS

CERTIFICATION	POINTS	
Health/Wellness Rating Systems	≤ 30	
Green Rating Systems	≤ 10	
TOTAL POINTS FROM CERTIFIED BUILDINGS		30

TOTAL POINTS AVAILABLE	140
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AIR



AIR BACKGROUND



Clean air is a critical environmental determinant of human health. Poor ambient air quality is the number one environmental cause of premature mortality, contributing to 200,000 premature deaths annually in the United States alone and approximately seven million, or one in eight, premature deaths worldwide.^{2,3}

Globally, outdoor air quality is impacted by many sources, including pollution from traffic, construction, agricultural activity and combustion sources. In addition, the global transition away from agrarian societies to more peri-urban and urban megacenters, poses unique challenges for environmental health and air quality. As the link between human activity, air pollution and human health becomes clearer, a push for cleaner energy and better pollution control has emerged out of necessity, and many cities around the world are epicenters for these forward-thinking solutions. In developed nations, pollution control technologies and federally enforceable limits have made tremendous progress in protecting the health of the public. In addition, the Clean Air Act (CAA), a federally enforceable U.S. standard, has saved an estimated two trillion dollars in health care costs in the U.S. since it was implemented in 1963.⁴ The CAA regulates the six major pollutants, known as criteria pollutants, that have been shown to be of great concern for human health: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), ozone (O₃), particulate matter (PM₁₀ and PM_{2.5}) and sulfur dioxide (SO₂).⁵



The success of the CAA and other related programs has led to both the adoption and implementation of similar regulations in countries around the world, as well as the development of ambient Air quality guidelines (AQGs) by the World Health Organization (WHO).⁶ In order to meet requirements regulating these pollutants, major sources of emissions, such as the transportation industry, face increasingly stringent regulations in developed countries.⁷ Increasingly, evidence suggests that the transportation industry poses major challenges for environmental quality and is linked to poor health outcomes.^{8,9}

According to the WHO, exposure to ambient air pollution is associated with adverse health outcomes including stroke, heart disease, lung cancer and both chronic and acute respiratory diseases, including asthma.¹⁰ The evidence indicates that when air quality is addressed at

the community level, positive health indicators, such as lung function and lung capacity, improve significantly.¹¹ The link between air pollution and poor health outcomes is well established, and so too is the effectiveness of mitigation strategies. At the local level, limiting combustion sources, reducing vehicle idling time and encouraging shared vehicle or public transportation use are a few ways to reduce air pollution and limit exposure to environmental contaminants.¹²⁻¹⁴ Long-term changes in ambient air quality require a concerted effort at the local, regional and national levels.¹⁰ By implementing solutions intended to directly affect the quality of air in communities, communities can provide an environment in which people can thrive.



AQU

FUNDAMENTAL AIR QUALITY | P

The WHO defines air pollution as contamination of indoor or outdoor air by chemical, physical or biological agents that alter the natural qualities and characteristics of the air.¹⁵ Air pollution poses one of the leading environmental threats to population health around the globe, and as communities continue on a path of rapid urbanization and industrialization, these threats have never been more important.¹⁶ In 2014, an estimated 92% of the global population lived in an area that failed to meet the Air quality goals AQGs established by the WHO.¹⁰ Thus, addressing air pollution on a global scale has emerged as one of the most pressing issues; global initiatives such as the Sustainable Development Goals include improved ambient air quality as performance indicators including the health, cities and energy goals.¹⁷

While recognizing that sources of pollution can be regional sources outside the control of a local community, there are still many methods within a project's control to reduce local air pollution. For example, including trees and other vegetation throughout the urban landscape of a community has been shown to positively affect ambient air quality.¹⁶

INTENT

To promote health and well-being by recognizing communities with good air quality, or to employ strategies to reduce ambient air pollution.

SPECIAL

Only one of the following parts is required to satisfy this feature.

Part 1: Base Air Quality Standard**VERIFICATION:** Performance Test

> Area-level measurements for the following pollutants meet the listed limits, when analyzed over a one-year period:

- a. Annual average PM_{2.5} less than 35 µg/m³.⁶
- b. Annual average PM₁₀ less than 70 µg/m³.⁶
- c. Annual fourth-highest daily average 24-hour concentration (99th percentile) PM_{2.5} less than 75 µg/m³.⁶
- d. Annual fourth-highest daily average 24-hour concentration (99th percentile) PM₁₀ less than 150 µg/m³.⁶
- e. Highest 8-hour average ozone less than 240 µg/m³ (122 ppb).⁶
- f. Highest 8-hour average carbon monoxide less than 14 mg/m³ (12 ppm).

OR

Part 2: Silver Certification Cap**VERIFICATION:** None necessary

> The following requirement is met and certification condition applies:

- a. The project achieves 3 points within the Air concept of the WELL Community Standard. The following features outside of the Air concept may also count toward this total:
 - Feature SGR—Integration of Streetscape Greenery
 - Feature GRE—Restorative Green Spaces
 - Feature VEG—Urban Vegetation and Green Spaces
- b. The project is limited to Silver level of certification under the WELL Community Standard, no matter how many optimizations are achieved.

OR

Part 3: Gold Certification Cap**VERIFICATION:** None necessary

> The following requirement is met and certification condition applies:

- a. The project achieves 6 points within the Air concept of the WELL Community Standard. The following features outside of the Air concept may also count toward this total:
 - Feature SGR—Integration of Streetscape Greenery
 - Feature GRE—Restorative Green Spaces
 - Feature VEG—Urban Vegetation and Green Spaces
- b. The project is limited to Gold level of certification under the WELL Community Standard, no matter how many optimizations are achieved.



SMK

SMOKING

BAN | O

According to the WHO, smoking is the single greatest preventable cause of death with nearly 6 million deaths attributed annually to tobacco smoke and smoking, of which nearly 600,000 deaths are due to secondhand smoke.¹⁸ The WHO estimates that nearly 80% of the 1 billion smokers around the world reside in low- and middle-income countries.¹⁸

When indoor smoking bans are implemented, a significant reduction in hospitalizations for acute coronary-related illness, heart attack and COPD is observed.¹⁹⁻²¹ However, despite the well-documented public health benefits, only about 1.3 billion people, or 18% of the global population, are protected by smoke-free legislation.¹⁸

INTENT

To discourage smoking and protect nonsmokers from environmental tobacco smoke in indoor environments.

Part 1: Building Interiors

VERIFICATION: Annotated Documents—Policy Document

- > Smoking and use of **e-cigarettes** is prohibited in all buildings (including garages) owned, operated, or managed by the project owner except:
 - a. Detached homes.
 - b. Retail stores, restaurants, and bars with a designated smoking area. All such smoking areas must have distinct ventilation from other buildings or tenants (if any).



SMO OUTDOOR SMOKING BAN | O

Smoking has been linked to many serious health consequences, including cancer, heart disease, chronic obstructive pulmonary disease (COPD) and complications during pregnancy.²² Furthermore, exposure to secondhand smoke, which contains more than seven thousand toxic chemicals, has been linked to numerous health outcomes in infants and children, including asthma, respiratory and ear infections, and sudden infant death syndrome, and is associated with heart disease, lung cancer, and stroke in adults.²²

INTENT

To discourage smoking and protect nonsmokers from environmental tobacco smoke in outdoor environments.

Part 1: Building Surroundings

VERIFICATION: Annotated Documents—Policy Document

- > Smoking and use of e-cigarettes is prohibited within 7.5 m [25 ft] of the following locations related to buildings owned, operated, or managed by the project owner:
 - a. Building entrances.
 - b. Operable windows.
 - c. Building air intakes.

Part 2: Outdoor Activity Areas

VERIFICATION: Annotated Documents—Policy Document

- > Smoking and use of e-cigarettes is prohibited in the following locations owned, operated or managed by the project owner:
 - a. Parks, recreational areas, pedestrian plazas and parking lots.²³
 - b. Entertainment facilities.²³



LTA

LONG-TERM

AIR QUALITY | O

Particulate matter can contain elemental and organic carbon, salts, mineral and metal dust, ammonia and water, which coagulate into tiny solids and globules. Both human-made (anthropogenic) and natural sources emit particulate matter or gaseous components that react in the air to form particulate matter.²⁴ Particulates vary in size, shape, density and chemical composition and for measurement purposes, are generally designated as PM_{2.5} (2.5 µm and smaller) PM₁₀ (10 µm and smaller, including PM_{2.5}). Long- and short-term exposure to these particles has been linked to numerous cardiorespiratory diseases and excess mortality.^{6,16,25,26} The WHO's air quality guidelines (AQGs) offer global guidance on thresholds and limits for key air pollutants that pose health risks.⁶ The guidelines indicate that by reducing particulate matter (PM₁₀) pollution from 70 to 20 µg/m³, air pollution-related deaths could be reduced by roughly 15%.⁶

Exposure to ambient air with elevated nitrogen dioxide (NO₂) levels has been shown to aggravate respiratory disease, especially asthma, and increase susceptibility to respiratory infection.²⁷ Furthermore, nitrogen dioxide and other nitrogen oxides react readily with other airborne pollutants to form particulate matter and ozone, both of which are harmful to health.²⁷ Elevated ozone is particularly threatening for individuals with asthma, young children, older adults and people who work outdoors, and is linked to a variety of health outcomes including chest pain, throat irritation, airway inflammation, lung tissue damage and risk of death from respiratory causes.^{28,29}

The particulate matter limits proposed here are part of a WHO strategy of incrementally lowering air pollution across the globe, referencing the Interim target-2 in the AQG.⁶ The nitrogen dioxide limit is derived from the U.S. Environmental Protection Agency's (EPA) National Ambient Air Quality Standard.³⁰



INTENT

To recognize projects with higher-quality long-term conditions than exist in many parts of the world and where people are not exposed to extreme levels of ambient air pollutants.

Part 1: Particulate Matter

VERIFICATION: Performance Test

> Area-level measurements for the following pollutants meet the listed limits, when analyzed over a one-year period:

- a. Annual average PM_{2.5} less than 25 µg/m³.⁶
- b. Annual average PM₁₀ less than 50 µg/m³.⁶

Part 2: Inorganic Gases

VERIFICATION: Performance Test

> Area-level measurements for the following pollutant meet the listed limits, when analyzed over a one-year period:

- a. Annual average nitrogen dioxide less than 100 µg/m³ (53 ppb).³⁰



LTE ENHANCED LONG-TERM AIR QUALITY | O

The limits proposed here correspond to WHO's Air Quality Guidelines.⁶

INTENT



To recognize projects with especially low average levels of air pollution.

Part 1: Enhanced Particulate Matter

VERIFICATION: Performance Test

- > Area-level measurements for the following pollutants meet the following listed limits, when analyzed over a one-year period:
 - a. Annual average PM_{2.5} less than 10 µg/m³.⁶
 - b. Annual average PM₁₀ less than 20 µg/m³.⁶

Part 2: Enhanced Inorganic Gases

VERIFICATION: Performance Test

- > Area-level measurements for the following pollutant meets the listed limit, when analyzed over a one-year period:
 - a. Annual average nitrogen dioxide less than 40 µg/m³ (21 ppb).⁶



STA

SHORT-TERM

AIR QUALITY | O

The particulate matter and ozone limits proposed here are part of a WHO strategy of incrementally lowering air pollution across the globe referencing Interim targets.⁶ The nitrogen dioxide and carbon monoxide limits correspond to WHO's Air Quality Guidelines.^{6,31}

INTENT

To recognize projects with higher-quality short-term conditions than exist in many parts of the world and where people are not exposed to extreme levels of ambient air pollutants.

Part 1: Particulate Matter

VERIFICATION: Performance Test

> Area-level measurements for the following pollutants meet the listed limits, when analyzed over a one-year period:

- a. Annual fourth-highest daily average 24-hour concentration (99th percentile) PM_{2.5} less than 50 µg/m³.⁶
- b. Annual fourth-highest daily average 24-hour concentration (99th percentile) PM₁₀ less than 100 µg/m³.⁶

Part 2: Inorganic Gases

VERIFICATION: Performance Test

> Area-level measurements for the following pollutants meet the listed limits, when analyzed over a one-year period:

- a. Highest 8-hour average ozone less than 160 µg/m³ (82 ppb).⁶
- b. Highest 1-hour average nitrogen dioxide less than 200 µg/m³ (106 ppb).⁶
- c. Highest 8-hour average carbon monoxide less than 10 mg/m³ (9 ppm).^{30,31}



STE ENHANCED SHORT-TERM AIR QUALITY | O

The particulate matter, ozone and carbon monoxide limits proposed here correspond to the WHO's air quality guidelines and the sulfur dioxide limit is from the EPA's National Ambient Air Quality Standards.^{6,30}

INTENT

To recognize projects with especially low peak levels of air pollution.

Part 1: Particulate Matter

VERIFICATION: Performance Test

- > Area-level measurements of the following pollutants meet the listed limits, when analyzed over a one-year period:
 - a. Fourth highest daily average (99th percentile) PM_{2.5} less than 25 µg/m³.⁶
 - b. Fourth highest daily average (99th percentile) PM₁₀ less than 50 µg/m³.⁶

Part 2: Enhanced Inorganic Gases

VERIFICATION: Performance Test

- > Area-level measurements of the following pollutants meet the listed limits, when analyzed over a one-year period:
 - a. Highest 8-hour average ozone less than 100 µg/m³ (51 ppb).⁶
 - b. Highest 24-hour average carbon monoxide less than 7 mg/m³ (6 ppm).³¹
 - c. 99th percentile of 1-hour daily maximums of sulfur dioxide less than 200 µg/m³ (75 ppb).³⁰



SEP

POLLUTION SOURCE SEPARATION | O

Ease-of-use and convenience has led to construction of homes, businesses and schools near major roads and highways. However, combustion sources including automobiles are major sources of gaseous pollutants such as carbon monoxide and nitrogen dioxide and create conditions for the synthesis of other pollutants, such as ozone.³² While proximity to major roadways provides easy access to places and amenities that are integral to everyday life, it also is correlated with the prevalence of multiple health issues, including hypertension, renal dysfunction and leukemia.³³⁻³⁶ The effects of living near a roadway go beyond individual health, and affect the health of the next generation. For example, data shows that mothers who live near roadways are at increased risk of preterm birth and low birth weight.^{37,38}

These findings generally report continuously decreasing risk as distance increases from 50 m [164 ft] to 1 km [0.6 mi].³²⁻³⁸ In particular, locations greater than 90 m [300 ft] from highways have lower concentration of ultrafine particulate matter.³⁹

INTENT

To reduce the population exposure of pollutants within the project by creating a buffer between transportation pollution sources and sensitive and active populations.

Part 1: Traffic Separation

VERIFICATION: Annotated Documents—Map

> The building and land use cases listed below are more than 90 m [300 ft] from roads with a speed limit greater than 65 km/hr [40 mph]:

- a. At least 75% of dwelling units, measured by unit count.
- b. At least 75% of outdoor recreation and congregation areas greater than 0.6 hectare [1.5 acre] including plazas, parks, beaches and playgrounds, measured by acreage.
- c. 100% of schools, grades K–12 (elementary, middle, high schools).



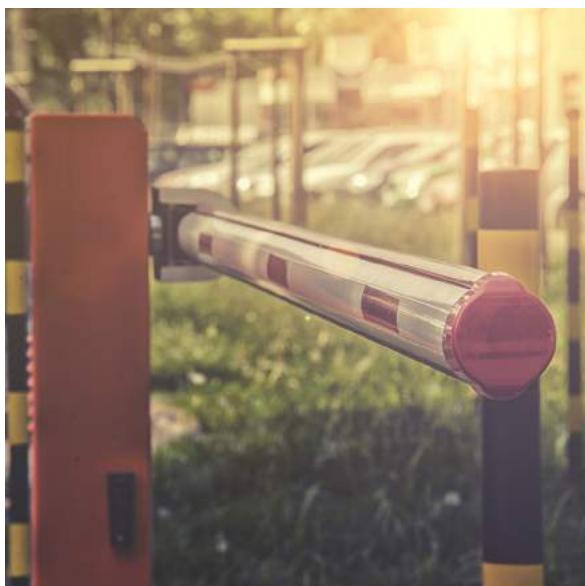
PRK

PARKING

RESTRICTIONS | O

Emerging research suggests that increased parking supply may be associated with lower walking and transit use, as it promotes more opportunities for sedentary modes of travel such as driving.^{40,41} Case-based evidence suggests that eliminating or restricting the availability of parking in communities increases opportunities for other, less-polluting modes of transportation and interventions, such as parking fees, have been shown to reduce automobile use.^{41,42}

Policy and design strategies at the community scale that limit parking access must be supplemented with adequate alternative-transportation opportunities. Potential alternatives include investment in pedestrian and cyclist infrastructure such as sidewalks and bicycle lanes, which have been associated with increased walking and cycling, and providing on-site bicycle parking, which is associated with increased probability of cycling to the workplace.⁴²⁻⁴⁹ Furthermore, access to mass transportation opportunities also discourages reliance on personal motor vehicles and encourages more active forms of transportation that are less burdensome on ambient air quality.⁴² For more information on solutions to support active transportation, walkability and bikeability, please refer to the Movement concept.



INTENT

To encourage active transportation and discourage vehicle use by restricting on- and off-street parking.



Part 1: Allocated Parking

VERIFICATION: Annotated Documents—Map and/or Policy Document

- > At least two of the following parking restrictions are in place:
 - a. In new residential buildings, at-grade building frontages that face the pedestrian circulation network are free of parking facilities.
 - b. In new residential and commercial office buildings, parking facilities do not exceed the minimum number of spaces required by code or law.
 - c. At least 5% of on-street parking spaces are designated for carpool or shared-use vehicles.
 - d. Public use bike parking is available in a number of spaces equal to 5% of on-street parking spaces. Bike parking may be designated on sidewalks, in an on-street space (such as a traditional vehicle parking space or pedestrian zone), in a bike share station or some combination.

Part 2: Real Cost of Parking

VERIFICATION: Annotated Documents—Policy Document

- > At least 75% of all parking spaces (including private, dedicated lots, but not including driveways) use one of the following systems:
 - a. **Unbundle** the cost of parking from the affiliated activity, and separately charge at least 50% of the market rate for parking.
 - b. Provide **cash in lieu of free parking** worth at least 50% of the market rate for parking.



LEV

LOW EMISSION VEHICLES | O

The transportation sector is one of the leading sources of air pollution.¹⁶ Transportation-derived pollution can be mitigated either by reducing the distance driven by vehicles or by reducing the amount of pollution each vehicle generates. For example, since the EPA's Amendments to the Clean Air Act in 1990 to regulate mobile and stationary sources of pollution, sulfur dioxide levels have fallen in the U.S. by 79%, even as vehicle miles traveled has grown by 40%.^{4,50} By transitioning away from gasoline and diesel whenever possible, emissions can be further reduced and air quality further improved.¹⁶

The areas near freight transportation centers often have especially high levels of air pollution. For example, in Hong Kong, over one third of all respirable particulate matter and nitrous oxides emissions and over half of all sulfur dioxide emissions are from ships servicing ports.⁵¹ The engines on the trucks and ships often remain running while being loaded and serviced to keep auxiliary systems operating. To eliminate the need to run the engine in these cases, the port or other facility can provide electrical power, HVAC, and any other services directly to the stationary vehicles and vessels through what is known as shore power. By eliminating the need for additional local sources of combustion, air quality can be improved at the local level.^{52,53}

INTENT

To reduce the emissions by promoting low- or no-emission vehicles and allowing larger vehicles to use electric power while stationary.



Part 1: Low Emission Vehicles

VERIFICATION: Letters of Assurance—Policy Document and/or Map

> The following requirements are met:

- a. At least two electric vehicle charging stations are present at all parking lots and garages that contain at least 400 spaces.
- b. Priority parking is available for low-emission vehicles rated at a minimum green score of 45 on the American Council for an Energy Efficient Economy (ACEEE).⁵⁴ Number of priority parking spaces is equal to disabled/accessible parking spaces and they are located within 30 m [100 ft] of each other. Spaces with electric vehicle charging stations may be counted in this number
- c. At least 75% of **light duty vehicles** operated by the project are rated at a minimum green score of 45 on the American Council for an Energy Efficient Economy (ACEEE).⁵⁴

Part 2: Stationary Vehicle Electrification

VERIFICATION: Letters of Assurance—Electrical Plan and Policy Document

> All ship berths (cargo and passenger ships) and truck stops (if any) meet the following requirements:

- a. Provide electric “shore power” to docked ships and parked trucks.^{52,53}
- b. Implement policies requiring docked and parked vehicles to turn off their diesel engines.^{52,53}





AED

AIR QUALITY EDUCATION | O

For individuals to make informed decisions about daily outdoor activities, near real-time information regarding air quality at both the area and local levels can help mitigate exposure risks. Mixed-media messaging designed to inform residents about the potential environmental health risks they face in their community may help individuals make more informed decisions about engaging in outdoor activities.⁵⁵

Education can also combat exposure to pollutants indoors. For example, radon is a carcinogenic radioactive gas that is the leading cause of lung cancer among nonsmokers, responsible for about 21,000 deaths per year in the U.S. alone.²⁷ By increasing the use of home radon testing, residents are made more aware of the risks of radon and are less likely to ignore mitigation strategies.^{55,56}

INTENT

To inform community members about ambient air quality in order to encourage them to modify their activities based on conditions and to reduce risk of radon exposure.

Part 1: Air Quality Monitoring

VERIFICATION: Annotated Documents—Policy Document

- > Air quality alerts meet the following requirements:
 - a. Daily air quality data is measured in real time, or forecasted one day ahead.
 - b. Air quality data, including at least ozone and PM2.5 levels, is readily available, at no cost to the public, and includes mixed-media messaging capable of reaching a majority of the occupants within the project when air quality alerts are in place.

Part 2: Radon Test Promotion

VERIFICATION: Annotated Documents—Policy Document

- > A radon risk communication program is in place that:
 - a. Communicates the local risk for presence of radon and identifies potential areas of likely exposure.⁵⁷
 - b. Outlines measurement methods and prevention measures.⁵⁷



WATER BACKGROUND



Clean drinking water is essential for maintaining health and preventing disease. More than two-thirds of the human body is comprised of water, accounting for a major component of cells, as well as the medium for the transport of nutrients and waste throughout the body.⁵⁸ Additionally, water helps to regulate internal body temperature and serves as a shock absorber for the brain and spinal cord. The National Academies of Medicine recommends that women consume approximately 2.7 liters [91 oz] and men 3.7 liters [125 oz] of water per day from all sources, including drinking water, other beverages and food.⁵⁹ These amounts are appropriate to offset what leaves the body through respiration, perspiration and excretion, aiding in the removal of toxins, by-products and other waste.

Despite being an integral part of human physiology, water is vulnerable to contamination by biological, chemical and radioactive pollutants. Drinking water contamination is a major public health issue, with many people receiving water that has been exposed to potentially harmful levels of biological, chemical and mineral contaminants. The World Health Organization (WHO) and United Nations Children's Fund (UNICEF) report that as of 2015, 663 million individuals still lacked access to safe drinking water worldwide.⁶⁰ The WHO defines safe drinking water as "water that does not represent any significant risk to health over a lifetime of consumption, including different sensitivities that may occur between life stages."⁶¹ Contaminants such as lead,



arsenic, glyphosate, atrazine and microbes that are naturally occurring or inadvertently introduced into the water can pose serious health threats.^{61,62} Unfortunately, treatment and distribution systems meant to keep drinking water safe can also be a potential source of contamination.⁶³ For example, chlorine and chloramine, which are commonly added to water to kill pathogenic organisms, can lead to the formation of disinfectant by-products such as trihalomethanes and haloacetic acids, as well as N-nitrosodimethylamine, which may lead to cancer and other adverse health effects when exposure occurs at levels above U.S. Environmental Protection Agency (EPA) standards.⁶⁴ Finally, pharmaceuticals, personal care products and other emerging contaminants are increasingly finding their way into water supplies, yet the health effects remain largely unknown.⁶⁵

An issue facing communities around the world is the availability of clean water for use in basic sanitation.⁶⁶ Lack of basic sanitation has been shown to cause diarrhea, with more

than 500,000 diarrheal deaths being attributed to contaminated drinking water each year.⁶⁷ Globally, diarrheal diseases account for 4% of all deaths and 5% of health loss to disability.⁶⁸ When both clean water and basic sanitation facilities are available for use, diarrhea and mortality associated with diarrheal diseases is greatly diminished.⁶⁹⁻⁷³

Humans need water every day to hydrate and cleanse the body, prepare foods and perform many other functions. However, the quality of the water that fills and sustains us is dependent on many factors. Often the water source that serves a community is in an area outside of the jurisdictional control of the community. It is important, therefore, to take every effort possible to protect watersheds and aquifers to prevent contamination, while also following up with periodic testing to maintain high quality.



WQT

DRINKING WATER QUALITY | P

Drinking water sources such as lakes, rivers, springs and reservoirs are prone to contamination from natural sources as well as human activities. Two properties of water—turbidity and total coliforms—serve as indicators for the possible presence of many harmful contaminants. High turbidity can provide food and shelter for germs while the presence of coliform bacteria suggests the presence of more dangerous pathogens, including bacteria, viruses and protozoa.^{74,75} Exposure to these pathogens through water containing coliforms can lead to adverse gastrointestinal effects such as diarrhea, vomiting, nausea and cramps.⁷⁶

Water, especially downstream from industry, may also contain dissolved metals. Exposure to even minute amounts of certain metals such as lead and mercury has been linked to developmental delays and deficits in learning abilities in children as well as high blood pressure and kidney problems in adults.^{77,78} Additionally, organic pollutants from industrial activities such as polychlorinated biphenyls (PCBs) and vinyl chloride have been associated with a range of adverse health effects, including cancer, immune deficiencies and nervous system difficulties.^{79,80} Lastly, in areas within the watershed of agricultural land, pesticides and herbicides can enter the public water supply. For example, consumption of water polluted with atrazine and glyphosate has been linked to kidney, thyroid, gastrointestinal and reproductive effects.^{76,81-83}

INTENT

To provide healthy drinking water without high concentrations of pollutants or risk factors for bacteria.

Part 1: Sediment

VERIFICATION: Performance Test

> Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

- a. Turbidity of the water sample is less than 1.0 NTU.⁷⁶

Part 2: Microorganisms

VERIFICATION: Performance Test

> Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

- a. Total coliforms (including *E. coli*) are not detected in the water sample.⁸⁴

- d. Polychlorinated biphenyls less than 0.0005 mg/L.⁸⁴

- e. Vinyl chloride less than 0.002 mg/L.⁸⁴

- f. Toluene less than 0.15 mg/L.⁸⁷

- g. Xylenes (total: m, p, and o) less than 0.5 mg/L.⁶¹

- h. Tetrachloroethylene less than 0.005 mg/L.⁶¹

Part 3: Dissolved Metals and Metalloids

VERIFICATION: Performance Test

> Water from all (minimum one) outdoor drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

- a. Lead less than 0.01 mg/L.⁶¹
- b. Arsenic less than 0.01 mg/L.⁸⁴
- c. Antimony less than 0.006 mg/L.⁸⁴
- d. Mercury less than 0.002 mg/L.⁸⁴
- e. Nickel less than 0.012 mg/L.⁸⁵
- f. Copper less than 1.0 mg/L.⁸⁴

Part 4: Organic Pollutants

VERIFICATION: Performance Test

> Water from all (minimum one) outdoor drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

- a. Styrene less than 0.0005 mg/L.⁸⁶
- b. Benzene less than 0.001 mg/L.⁸⁶
- c. Ethylbenzene less than 0.3 mg/L.⁸⁶

Part 5: Herbicides and Pesticides

VERIFICATION: Performance Test

> Water from all (minimum one) outdoor drinking water fountains located in public use areas that are owned, managed or operated by the project owner meets the following limits:

- a. Atrazine less than 0.001 mg/L.⁸⁷
- b. Simazine less than 0.002 mg/L.⁶¹
- c. Glyphosate less than 0.70 mg/L.⁸⁴
- d. 2,4-Dichlorophenoxyacetic acid less than 0.07 mg/L.⁸⁴

Part 6: Fertilizers

VERIFICATION: Performance Test

> Water from all (minimum one) outdoor drinking water fountains located in public use areas meets that are owned, managed or operated by the project owner the following limits:

- a. Nitrate less than 44 mg/L (less than 10 mg/L nitrogen).⁸⁴



WAD

PUBLIC WATER ADDITIVES | O

Certain chemicals are intentionally added to public water supplies to promote health.^{75,76} For example, chlorine or chloramine may be added to water to act as disinfectants, and fluoride may be added to prevent tooth decay.^{88,89} Although the addition of small amounts of these chemicals is beneficial for public health and safety, excessive exposure can lead to adverse effects, including fluorosis (aesthetic mottling of the teeth), stomach discomfort and eye and skin irritation.^{75,88} In addition, chlorine can react with naturally present organic matter to form disinfectant by-products (DBPs), such as trihalomethanes (THMs) and haloacetic acids (HAAs), which have been linked to cancer and kidney damage.⁶⁴

INTENT

To provide drinking water with adequate measures of disinfection without high concentrations of disinfectants and to promote dental health.

Part 1: Disinfectants

VERIFICATION: Performance Test

> Water from all (minimum one) outdoor drinking water fountains located in public use areas meets the following limits:

- a. Residual chlorine is present but at a concentration less than 4 mg/L.⁸⁴
- b. Residual chloramine is present but at a concentration less than 4 mg/L.⁸⁴

Part 2: Disinfectant By-products

VERIFICATION: Performance Test

> Water from all (minimum one) outdoor drinking water fountains located in public use areas meets the following limits:

- a. Total trihalomethanes less than 0.08 mg/L.⁸⁴
- b. Total haloacetic acids less than 0.06 mg/L.⁸⁴

Part 3: Fluoride

VERIFICATION: Performance Test

> Water from all (minimum one) outdoor drinking water fountains located in public use areas meets the following limits:

- a. Fluoride between 0.7 and 4.0 mg/L.⁸⁴





PWT

PERIODIC WATER QUALITY TESTING | O

Changing industrial practices and temporal variations in temperature, pH and weather may affect the leaching rate of inorganic metals into drinking water sources. Further, the detection of coliforms often indicates that the water source is contaminated and should be investigated for suitability of human contact (including consumption). Where possible, routine testing can help to detect any large variations in the contaminants present in water and help to maintain consistency in water quality.



INTENT

To maintain up-to-date knowledge of local water conditions and to prepare strategies for addressing unacceptable conditions.

Part 1: Testing for Microorganisms

VERIFICATION: Annotated Documents—Operations Schedule

> Water from all (minimum one) outdoor drinking water fountains located in public use areas is tested quarterly (with reports submitted annually to IWBI) for the presence of the following:

- a. Total coliforms (including *E. coli*).

Part 2: Testing for Inorganic Compounds

VERIFICATION: Annotated Documents—Operations Schedule

> Water from all (minimum one) outdoor drinking water fountains located in public use areas is tested quarterly (with reports submitted annually to IWBI) for the presence of the following dissolved metals or metalloids:

- a. Lead.⁶¹
- b. Arsenic.⁶¹
- c. Mercury.⁶¹
- d. Copper.⁶¹

Part 3: Water Data Records

VERIFICATION: Annotated Documents—Operations Schedule

> A written policy is provided specifying:

- a. Detailed enforcement strategies for monitoring and keeping record of water quality parameters listed in part 1 and part 2 of this feature, including full data from field inspections or laboratory results where appropriate.

Part 4: Water Data Response

VERIFICATION: Annotated Documents—Operations Schedule

> A detailed plan for dealing with unacceptable water conditions is provided, including:

- a. Plans for immediate public notification upon identification of hazardous conditions, such as warning notices sites within the project boundary.
- b. Plans for action and remediation of unacceptable conditions.



WQO

HIGH QUALITY DRINKING WATER | O

Access to clear, good-tasting water helps to promote proper hydration throughout the day, encouraging water consumption and reducing reliance on bottled water.

Common contaminants such as aluminum, sodium and chlorides can affect the taste as well as the appearance of water. These more aesthetic concerns are monitored through non-mandatory National Secondary Drinking Water Regulations (NSDWRs) that establish secondary maximum contaminant levels (SMCLs), set by the EPA to help public water systems maintain the taste, color and odor of the drinking water. For example, high levels of sodium can cause water to become salty, and chlorides can give water an unpleasant mineral taste, both situations increasing the likelihood that individuals will turn to bottled water or other beverages. Meanwhile, aluminum and manganese can discolor water, potentially causing community members to mistakenly believe that water from the public system is not safe to drink.

By maintaining the highest level of water quality, communities can better promote tap water consumption.

INTENT

To provide drinking water without high concentrations of substances that could affect its taste and appearance.

Part 1: Drinking Water Taste Properties

VERIFICATION: Performance Test

> Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or maintained by the project owner meets the following limits:

- a. Aluminum less than 0.2 mg/L.⁸⁴
- b. Chloride less than 250 mg/L.⁸⁴
- c. Manganese less than 0.05 mg/L.⁸⁴
- d. Sodium less than 270 mg/L.⁹⁰
- e. Sulfate less than 250 mg/L⁸⁴
- f. Iron less than 0.3 mg/L.⁸⁴
- g. Zinc less than 5 mg/L.⁸⁴
- h. Total Dissolved Solids less than 500 mg/L.⁸⁴





WAC

DRINKING WATER ACCESS | O

Access to clean, palatable drinking water in public spaces is essential for supporting the hydration needs of the community and a critical component of healthy spaces. By promoting access to potable drinking water, communities can provide a healthier alternative to sugar-sweetened beverages and other high-sugar drinks, such as fruit juices, while also encouraging proper hydration. Preventing dehydration, especially in activity-oriented public spaces or during warmer months, is important for the health of the community, as even mild dehydration can result in headache, dry skin and disruptions in physical and cognitive performance.⁹¹ Drinking water availability and promotion is also associated with improved childhood obesity outcomes.^{92,93} Access to drinking water further supports active lifestyles, making drinking water fountain placement around parks, playgrounds and recreational areas important.^{94,95} Additionally, drinking water fountains and water bottle-refilling stations can help reduce dependency on single-use plastic water and beverage bottles and the associated negative environmental impacts.



INTENT

To encourage public drinking water consumption and to reduce the consumption of less-healthy beverage alternatives.

Part 1: Drinking Water Fountains

VERIFICATION: Annotated Documents—Letters of Assurance and Map

> The following requirements are met in public use spaces owned, managed or contracted by the project owner:

- a. Drinking water fountains are available with at least one fountain per 800 m [0.5 mi] radius.
- b. Drinking water fountains are available at least every 1.6 km [1.0 mi] on all designated walking and/or running routes.
- c. All newly installed drinking water fountains are available for use year-round.
- d. All newly installed drinking water fountains are universally designed.

Part 2: Hydration Stations

VERIFICATION: Annotated Documents—Letter of Assurance and Map

> The following requirements are met in public use spaces owned, managed or operated by the project owner:

- a. Water bottle-refilling stations are present in high-traffic outdoor public spaces, including parks, playgrounds and outdoor recreational activity spaces.⁹⁶
- b. All newly installed drinking water fountains are designed for water bottle-refilling.⁹⁷

Part 3: Drinking Water Fountain Maintenance

VERIFICATION: Annotated Documents—Operations Schedule

> Water from all (minimum one) drinking water fountains located in public use areas that are owned, managed or operated by the project owner include the following:

- a. Regular cleaning schedules for mouthpieces, protective guards and collection basins to prevent lime and calcium buildup.⁹⁸
- b. Regular cleaning schedules for outlet screens and aerators to remove debris and dust.⁹⁸



FAC

SANITARY FACILITIES

PROVISION | O

Population-wide sanitation can be better upheld if meaningful and supportive provisions are in place for all community residents to use. Providing community members with access to public facilities promotes population-wide improvements in wellness, comfort and sanitation, and enhances the livability and accessibility of communities and participation in public life.⁹⁹

INTENT

To promote community-wide hygiene through the provision and maintenance of public facilities.

Part 1: Public Facilities

VERIFICATION: Annotated Documents—Map

- > The following requirements are met:
 - a. At least one public use restroom within 1 km [0.6 mi] of each park 4,000 m² [1 acre] or larger.
 - b. At least one public use restroom per 4 hectares [10 acres] of project size.

Part 2: Restrooms Access

VERIFICATION: Annotated Documents—Letters of Assurance

- > Public use restrooms owned, managed or maintained by the project owner meet the following requirements:
 - a. Allow dawn-to-dusk year-round access for all potential visitors.
 - b. Provide alternatives if the facility is closed for more than one week.

Part 3: Handwashing Promotion

VERIFICATION: Annotated Documents—Letter of Assurance and/or Operations Schedule

> Public use restrooms owned, managed or maintained by the project owner meet the following requirements:

- a. Include at least one sink with a handwashing basin.
- b. Include signage at the sink promoting proper hand-washing technique using soap and water for a minimum of 20 seconds.¹⁰⁰
- c. Provide fragrance-free non-antibacterial soap.¹⁰¹
- d. Provide disposable paper towels (air dryers are not forbidden).¹⁰²

Part 4: Sanitary Materials

VERIFICATION: Annotated Document—Operations Schedule

> The following are provided at all public use restrooms owned, managed or maintained by the project owner:

- a. Sanitary pads or tampons.
- b. Infant changing table.
- c. Syringe drop box.

Part 5: Facilities Maintenance

VERIFICATION: Annotated Documents—Operations Schedule

> The cleaning plan for all public use restrooms owned, managed or maintained by the project owner includes the following:

- a. The Cleaning Equipment and Training section of Table A4 in Appendix C in the WELL Building Standard.
- b. A list of approved product seals with which all cleaning, disinfection and hand hygiene products must comply in accordance with the Cleaning, Disinfection and Hand Hygiene Product section in Table A4 in Appendix C in the WELL Building Standard.
- c. A list of high-touch surfaces and schedule of sanitization or disinfection as specified in the Disinfection and Sanitization section in Table A4 in Appendix C in the WELL Building Standard.
- d. A cleaning schedule that specifies the extent and frequency of cleaning, including the Entryway Maintenance section of Table A4 in Appendix C in the WELL Building Standard.
- e. Dated cleaning logs that are maintained and available to all occupants.



WFS

WATER FEATURE SANITATION | O

Public interactive water features and fountains are aesthetic uses of water that are commonly integrated into the social parts of community settings. These features often contribute to the enjoyment of a public space, and along with access to natural bodies of water, they offer a physical point of engagement and a center of congregation for community members. Given that public use water features, fountains and natural water bodies encourage interaction and potentially service a large, transient population, it is vital to maintain their sanitary condition to prevent the spread of infection or disease.



INTENT

To maintain sanitary conditions in man-made and natural public bodies of water.

Part 1: Natural Water Bodies

VERIFICATION: Annotated Documents—Operations Schedule

> Bodies of water, if any, where a large number of people are expected to swim (not including swimming pools or artificially created bodies of water) are tested (with reports submitted annually to IWBI) with the following parameters:

- a. Publicly accessible inland waters: total coliforms (including *E. coli*) do not exceed 500 cfu/100 mL.¹⁰³
- b. Publicly accessible coastal and transitional waters: total coliforms (including *E. coli*) do not exceed 250 cfu/100 mL.¹⁰³
- c. Water sampling occurs at minimum every two weeks.¹⁰³

Part 2: Water Quality Limits

VERIFICATION: Performance Test

> The following limits are met for public interactive water features or fountains:

- a. Free available chlorine: 3.0 to 5.0 ppm; or Bromine: 5.5 to 7.5 ppm.¹⁰⁴
- b. Cyanuric acid in outdoor facilities: 20 ppm.¹⁰⁴
- c. Cyanuric acid in indoor facilities: 0.0 ppm.¹⁰⁴
- d. pH level: 6.5-9.5.

Part 3: Supply and Circulation System Design

VERIFICATION: Annotated Documents—Professional Narrative

> The following requirements are met for public interactive water features or fountains:

- a. The initial water supply of all water features is potable water.¹⁰⁴
- b. The water distribution system is protected by a high-hazard backflow preventer.¹⁰⁴
- c. Hose bibs are protected with a vacuum beaker.¹⁰⁴
- d. Filter backwash water or drainage water is treated as wastewater and disposed of accordingly.¹⁰⁴

Part 4: Maintenance and Sanitation Records

VERIFICATION: Annotated Documents—Operations Schedule

> Projects provide a written policy specifying that the following records pertaining to any public use interactive water features or fountains are kept for a minimum of three years, including full data from field inspections or laboratory results, where appropriate:

- a. Date of construction of the water feature.¹⁰⁴
- b. Daily chemical log.¹⁰⁴
- c. Chlorine test results.¹⁰⁴
- d. Bromine test results.¹⁰⁴
- e. Cyanuric acid test results.¹⁰⁴
- f. pH test results.¹⁰⁴
- g. Any supplemental water treatment.¹⁰⁴
- h. Routine maintenance schedule and log.¹⁰⁴
- i. Preventative maintenance schedule and log.¹⁰⁴
- j. Documentation of methods for determining turnover rates.¹⁰⁴
- k. Manufacturer's instructions for operation of disinfection equipment.¹⁰⁴
- l. Manufacturer's instructions for operation of chemical control equipment.¹⁰⁴
- m. Manufacturer's instructions for operation of the chemical feed system.¹⁰⁴



LEG

LEGIONELLA

CONTROL | O

Municipal water systems represent a critical point for water purification and treatment. Freshwater and untreated groundwater sources can be contaminated with various bacteria that can contribute to waterborne and airborne diseases if introduced into water supplies. Of particular concern is *Legionella*, a species of bacteria that can be transmitted via waterborne aerosol inhalation to cause respiratory disease. In mild forms, *Legionella* can lead to Pontiac fever, and in more severe forms it can result in Legionnaires' disease, a potentially fatal type of pneumonia.¹⁰⁵ A key measure to protecting against Legionnaires' disease is preventing systems from promoting the growth of the bacteria.¹⁰⁶

INTENT

To minimize the risk posed by *Legionella* by promoting awareness and planning at the building level.



Part 1: Risk Management Plan

VERIFICATION: Annotated Documents—Professional Narrative

> A point-by-point narrative describes strategies for addressing *Legionella*, including the below-listed ones for all buildings owned, managed or operated by the project owner that use water-based cooling or heating systems:

- a. Formation of a team for *Legionella* management.¹⁰⁷
- b. Water system inventory and production of process flow diagrams.¹⁰⁷
- c. Hazard analysis of water assets.¹⁰⁷
- d. Identification of control locations.¹⁰⁷
- e. Establishment of control limits and planned corrective actions.¹⁰⁷
- f. Monitoring with maintenance and control measures.¹⁰⁷
- g. Documentation, verification and validation of procedures.¹⁰⁷

Part 2: *Legionella* Awareness

VERIFICATION: Annotated Documents—Professional Narrative

> All buildings not owned, managed or maintained by the project owner that use water-based cooling or heating systems, meet the following:

- a. Building engineer or management body is provided with guidelines to minimize *Legionella* risk, such as "Developing a Water Management Program to Reduce *Legionella* Growth & Spread in Buildings."¹⁰⁸



SWA

STORMWATER MANAGEMENT | O

Stormwater runoff refers to rainfall or snowmelt that runs over the ground and gathers natural and human-made pollutants such as sediment, metals, oils, nutrients, bacteria and viruses.^{109,110} Impervious (nonporous) surfaces often found in urban environments such as roads, parking lots, rooftops and compacted soils reduce infiltration of the water into the ground and thereby increase the amount of runoff.^{111,112} When not properly managed, stormwater can overwhelm sewage systems and potentially flood streets and buildings with water and associated contaminants. In severe events, this flooding can lead to infrastructural damage.¹¹¹

INTENT

To curtail the release of untreated storm runoff water into the natural water system.

Part 1: Low Impact Development

VERIFICATION: Annotated Documents—Professional Narrative

> A narrative describes strategies across the entire project for preventing the off-site discharge of untreated water from all (minimum one) rainfall events up to and including the ninety-fifth percentile storm event that incorporates one or more of the following:

- a. Rain gardens, bioretention and infiltration planters.¹¹³
- b. Porous pavements.¹¹³
- c. Vegetated swales and bioswales.¹¹³
- d. Green roofs.¹¹³
- e. Trees and tree boxes.¹¹³
- f. Pocket wetlands.¹¹³
- g. Reforestation/revegetation using native plants.¹¹³
- h. Protection and enhancement of riparian buffers and floodplains.¹¹³
- i. Rainwater harvesting.¹¹³



OVF

OVERFLOW WATER MANAGEMENT | O

In some circumstances, stormwater runoff from the first hour of a moderate- to high-intensity storm can contain a greater concentration of pollutants than that found in raw sewage.¹¹⁰ Further, stormwater may eventually be carried back into streams, rivers and reservoirs, thus risking contamination of these water sources.¹¹¹ One of the best ways to manage this problem and prevent overflow events and environmental contamination is to address water management through infrastructural solutions that treat water from storms and sewage water separately.

INTENT

To curtail the release of untreated sewage into the natural water system during rainstorms.

Part 1: Sewer Separation

VERIFICATION: Annotated Documents—Professional Narrative

> One of the following requirements is met:

- a. Sanitary sewage and stormwater are consistently conveyed through separate pipes.¹¹⁴
- b. All combined sewer systems (CSS) are separated into discrete stormwater and sanitary sewer systems with stormwater outfalls designed to discharge into receiving water bodies.¹¹⁴
- c. Combined sewer systems have sufficient treatment and retention capabilities to avoid any overflow events.



NOURISHMENT



NOURISHMENT BACKGROUND



Poor nutrition is a major contributor to and modifiable risk factor of numerous preventable chronic diseases.¹¹⁵ Dietary patterns around the world are influenced by a complex mixture of personal, cultural and environmental factors, including the **local food environment**. The local food environment encompasses the type and density of food retail outlets, including grocery stores and food service outlets, and the consistent availability of healthy, wholesome foods at these venues. Fortunately, various planning, policy and organizational strategies exist that can effectively encourage individuals to improve their dietary patterns by leveraging the built environment in which they live, study, work and play.

Global dietary patterns are undergoing a nutrition transition characterized by both qualitative changes in foods consumed as well as increasing quantities of consumption.¹¹⁵ Since the 1960s, global and regional per capita food consumption (kcals) has been steadily increasing, while simultaneously being mirrored by a shift toward more energy-dense and less nutrient-dense foods.¹¹⁵ Global consumption of meat, vegetable oils, dairy and eggs and sugar has increased, while consumption of cereals and grains has leveled off.¹¹⁶ Conversely, fruit and vegetable consumption has been stymied by rapid urbanization that is typically accompanied by increased importation of processed foods (energy dense) from industrialized countries.¹¹⁷ Additionally, urbanization and changing consumer habits have led to significant increases in the number of people buying and eating food prepared outside of the home.¹¹⁸

Foods that are prepared away from home are generally provided in portions that contain more calories and saturated fat; contain fewer nutrient-dense foods such as vegetables, fruits and whole grains; and are associated with higher rates of overweight and obesity.¹¹⁹

The relationship between the local food environment, dietary behaviors and excess body weight gain is mediated by the food retail outlets and food options available in communities.

Increased healthy food retail outlet density is associated with a lower body mass index (BMI) while supermarket availability is associated with meeting dietary recommendations.¹²⁰ There is also evidence that exposure to an unhealthy food environment with many fast food outlets and unhealthy food choices may be associated with poorer quality diets and excess body weight.¹²¹ The typology of these food outlets and the food options available at these locations can have a significant influence on the health and wellness of community members as well as their risk for excess body weight gain, a public health problem that has worsened over the last several decades. Worldwide, obesity has more than doubled since 1980, and in 2014 more than 1.9 billion adults, or 39% of the world's population, were considered overweight, 600 million adults (13%) were considered obese and 41 million children under the age of five were considered overweight or obese.¹²² At the same time, more than 500 million people in over 76 countries are food insecure—an economic and social condition of limited or uncertain access to nutritionally adequate food—with the share of the population that is food insecure projected to surpass 15% in 2025.¹²³

Obesity and food insecurity are global health issues that greatly increase the risk for other health problems. Obesity places adults at a higher risk of non-communicable, diet-related chronic diseases including cardiovascular disease, diabetes, musculoskeletal disorders and some cancers, with childhood obesity increasing these risks in adulthood.¹²² **Food insecurity** is also associated with adverse health outcomes and cardiovascular risk factors, including hypertension, dyslipidemia and diabetes.¹²⁴ Reliance on low-nutrient, energy-dense foods can lead to excess body weight gain in food-insecure individuals. In more vulnerable populations such as children, food insecurity is linked to an increased risk of asthma and, in seniors, food insecurity further limits activities of daily living.¹²⁵

The local food environment of communities is inextricably linked to dietary behaviors and food choices. Addressing the broader food context of communities requires reconsidering the distribution and density of various food outlets and options and how the local food environment can work more equitably and effectively to support healthier dietary patterns for populations.^{126,127} A variety of planning and policy strategies within the built environment exist to help increase access to healthy food options, enable residents to make more informed dietary choices and allow communities to support good nutrition.



SUP SUPERMARKET ACCESS | P

Supermarket access is a critical component of the local food environment. Supermarkets and full-service grocery stores not only offer the greatest variety of fruit and vegetables, including fresh, frozen, dried and canned options, but they also have the lowest prices when compared to smaller grocery stores and convenience stores.¹²⁸ Research suggests that increased availability and density of supermarkets is associated with a lower BMI, smaller waist circumference and increased ability to meet the Dietary Guidelines for Americans, specifically the recommended amount of fruits and vegetables.^{120,129} Moreover, communities with greater access to supermarkets have lower rates of diabetes and diet-related deaths, and individuals living in a community with at least one supermarket consume up to 32% more fruits and vegetables than individuals living in a community without one.^{130,131} Eliminating transportation barriers by planning mass transit routes around community food needs or through implementation of a supermarket or grocery shuttle that provides a direct ride to the store can further promote equitable food access.

INTENT

To improve community nutritional status by enabling equitable access to supermarkets and grocery stores.



Part 1: Supermarket Location

VERIFICATION: Annotated Documents—Map

> An existing or planned supermarket or grocery store with a **produce section** meets one of the following proximity requirements:

- Located within an 800 m [0.5 mi] **walk distance** of at least 75% of dwelling units.
- Located within a 400 m [0.25 mi] walk distance of at least 50% of dwelling units.¹³²

Part 2: Supermarket Connectivity

VERIFICATION: Annotated Documents—Map

> An existing or planned supermarket or grocery store with a produce section within the project boundary is accessible via at least one of the following:

- Bicycle lane within 400 m [0.25 mi] of the store entrance.¹³²
- Mass transit stop within 400 m [0.25 mi] of the store entrance and connected by a pedestrian pathway up to the store entrance.¹³³
- Supermarket or grocery store shuttle provided at no-cost.¹³⁴





FRU

FRUITS AND VEGETABLES | O

Fruits and vegetables are critical components of a healthy eating pattern, yet most individuals around the world do not consume the daily recommended five servings (400 g) of fruits and vegetables.¹¹⁵

Insufficient fruit and vegetable intake is attributable to 14% of gastrointestinal cancer deaths, 11% of ischemic heart disease deaths and 9% of stroke deaths globally.¹³⁵ In addition to permanent retail food stores, farmers' markets, produce stands and mobile carts can serve as useful supplements to supermarkets and grocery stores in communities working to cultivate a BMI-healthy food environment through increased access to fruits and vegetables. Although they typically have lower accessibility and frequently higher costs, farmers' markets require less investment in infrastructure and can increase access to fresh, local and organic produce.¹³⁶ Additionally, **community supported agriculture (CSA)** members also report consuming more and a greater variety of fruits and vegetables.¹³⁷ In addition to supporting public health and local food systems, both farmers' markets and CSA programs can help foster a sense of community and enhance the potential for social integration in public spaces.



INTENT

To promote year-round access to fresh and/or locally sourced produce within a walk distance of where residents live or work.

Part 1: Fruit and Vegetable Sources

VERIFICATION: Annotated Documents—Map

- > At least two of the following existing or planned fruit and vegetable sources are located within an 800 m [0.5 mi] walk distance of at least 75% of dwelling units or a 400 m [0.25 mi] walk distance of at least 50% of dwelling units:
 - a. Small fruit and vegetable stand or mobile cart that is open at least five days a week and operates year-round.⁹⁶
 - b. Farmers' market that is open at least once a week and operates for at least four months of the year.¹³²
 - c. CSA share distribution point within the project boundary that is available to and has resource capacity to deliver fruit and vegetable shares to residents at least twice a month, for at least four months of the year.¹³²
 - d. Other fruit and vegetable source that provides fresh and/or locally sourced produce year-round.



HFO

HEALTHY FOOD PROCUREMENT | O

Healthy food procurement or purchasing policies can be adopted by local governments, organizations, institutions and companies to provide healthier food options and make a positive impact on community health.¹³⁸ Typical healthy procurement policies may include nutritional standards that limit the number of calories, salt or sugar in food and beverage offerings, require the provision of fruits and vegetables or prohibit the purchase of certain foods and beverages. Some policies also support the local economy by setting additional local purchasing or sustainability requirements.

INTENT

To increase the offering of healthier food and beverage choices in vending machines and concession stands.

Part 1: Healthy Vending

VERIFICATION: Annotated Documents—Policy Document

- > Foods and non-alcoholic beverages sold in vending machines owned, operated or managed by the project owner adhere to one of the following:
 - a. Existing local healthy procurement policy.
 - b. National Alliance for Nutrition and Activity's Model Beverage and Food Vending Machine Standards.¹³⁹
 - c. Healthy procurement policy in compliance with Feature 39 Processed foods in the WELL Building Standard v1.

Part 2: Healthy Concessions

VERIFICATION: Annotated Documents—Policy Document

- > Foods and non-alcoholic beverages sold in concession stands owned, operated or managed by the project owner adhere to one of the following:
 - a. Existing local healthy procurement policy.
 - b. General Services Administration's Standard Criteria for Food Selection Guidelines in Concessions.¹⁴⁰
 - c. Healthy procurement policy in compliance with Feature 38 Fruits and vegetables and Feature 39 Processed foods in the WELL Building Standard v1.



FAD FOOD ADVERTISING | O

Billions of dollars are spent annually on food marketing and advertising around the world.¹⁴¹ While some advertisements are aimed at nutritious options, the overwhelming majority promote highly processed products including sugar-sweetened beverages, breakfast cereals and fast foods. Much of this marketing targets audiences susceptible to deceptive campaigns, such as children and youth, thereby encouraging and normalizing the consumption of suboptimal food choices that are high in saturated fats, *trans* fats, added sugars or sodium from an early age.¹⁴² Within communities, food advertising can be found on billboards, posters and mass transit, and is associated with an increased probability of soda consumption and obesity.¹⁴³ Limiting advertising cues for unhealthy foods and providing the opportunity for nutrition-positive marketing can encourage individuals to make healthier food choices while also discouraging the consumption of highly processed foods.

INTENT

To limit unhealthy food marketing and advertising and promote a healthy food environment.

Part 1: Healthy Eating Promotion

VERIFICATION: Annotated Documents—Professional Narrative

- > A point-by-point narrative describes how food advertising is addressed within the project boundary, including the following leading concerns:
 - a. Limiting the marketing and advertising of foods and beverages on building facades, streetscaping, bulletin boards, etc.
 - b. Promoting local supermarkets, grocery stores, farmers' markets, CSA share distribution points and/or fruit and vegetable stands.





NED

NUTRITION EDUCATION | O

Nutrition education is an important tool in improving individual dietary habits, food choices and health literacy. Research shows that nutrition education programs are effective in helping individuals make healthier food choices and increasing at-home fruit and vegetable consumption, particularly among individuals participating in food assistance programs.^{144,145} Providing on-site educational opportunities at farmers' markets or community gardens can positively impact children's willingness to try new vegetables and increase vegetable taste ratings.¹⁴⁶ Higher nutrition knowledge is also significantly associated with healthy eating patterns in adults. Adults with the highest nutrition knowledge are almost 25 times more likely to meet the dietary recommendations for fruit, vegetable and fat intake compared to adults with the lowest nutrition knowledge.¹⁴⁷ Similarly, promotion and provision of drinking water is associated with increased water consumption among children in schools, and promotion and education of city tap water is a common theme among healthy planning initiatives.^{93,94}

INTENT

To enhance individual nutrition knowledge and promote water consumption through educational opportunities.



Part 1: Nutrition Education Programming

VERIFICATION: Annotated Documents—Policy Document

- > At least one of the following educational opportunities is available year-round and at no cost at public use locations:
 - a. Monthly nutrition education classes.
 - b. Monthly cooking demonstrations.
 - c. Monthly gardening or agriculture classes.



Part 2: Drinking Water Promotion

VERIFICATION: Annotated Documents—Map

- > Drinking water is promoted through water-positive messaging that includes at least one of the following:
 - a. Public art or community mural.
 - b. Artistically designed drinking water fountains.^{148,149}
 - c. Informative or educational decals at drinking water sources.
 - d. Signage that identifies location of drinking water fountains.



AGR

URBAN AGRICULTURE | PROVISION | O

Urban agriculture, including local, community-sustained agriculture, provides greater opportunities for involvement in food production and increased access to healthy produce, including fruits, vegetables and herbs. Participants in community gardening projects have higher fruit and vegetable intake, are more socially engaged and have a lower likelihood of consuming less nutritious food options, such as sugar-sweetened beverages or processed sweets.¹⁵⁰ These benefits can extend beyond the individual gardener, with participation in community agriculture also associated with increased household fruit and vegetable intake.¹⁵¹ Beyond the nutritional benefits, gardening can also help fortify social cohesion, increase physical activity, provide on-site educational opportunities and increase perceptions of community safety.¹⁵²



INTENT

To improve access to fresh produce and increase community involvement by providing the space, infrastructure and tools for on-site food production.



Part 1: Urban Agriculture Space

VERIFICATION: Annotated Documents—Map

> Permanent and accessible **urban agriculture** space of at least 1 m² [10 ft²] per dwelling unit is allocated within an 800 m [0.5 mi] walk distance of all dwelling units through one or more of the following:

- a. Community garden.¹³²
- b. Edible landscaping, with labeled plants and signage containing harvesting guidelines.¹⁵³
- c. Small farm or orchard
- d. Private garden.⁹⁶
- e. Rooftop garden.

Part 2: Urban Agriculture Support

VERIFICATION: Annotated Documents—Operations Schedule

> An urban agriculture governance and management plan is in place that addresses the following:

- a. Management and maintenance of urban agriculture spaces.
- b. Training and educational opportunities available for garden users.
- c. Provision of planting support for gardens or farms, such as fencing, water systems, secure garden tool storage and other garden bed enhancements.¹⁵³



AGP

URBAN AGRICULTURE II

PROMOTION | O

The benefits of urban agriculture extend beyond improving access to fresh produce or livestock and increasing community involvement. Recognizing the various health, environmental and economic benefits of urban agriculture, local governments have acted to incentivize urban agriculture policies in order to encourage the transformation of private, vacant or undeveloped land for public benefit. The City of New York and New York State, for example, provide a one-year tax abatement of \$4.50 per square foot of green roof per building, while the city of San Francisco passed an urban agriculture incentive ordinance to promote urban agriculture spaces and educational opportunities at the sites through a new tax credit.^{154,155} Policies and regulations that support the integration of urban agriculture into the community landscape have the potential to positively impact the social, physical and economic growth of communities everywhere.¹⁵⁶

INTENT

To encourage the integration of urban agriculture through policies or incentives.

Part 1: Policies to Support Urban Agriculture

VERIFICATION: Annotated Documents—Professional Narrative

- > A point-by-point narrative describes how the project promotes current and future integration of urban agriculture through at least one of the following:
 - a. Policies for unused or vacant land owned by the project owner being allocated to urban agriculture.
 - b. Policies that enable urban agriculture in underutilized spaces, such as rooftops.



FAF

FOOD AFFORDABILITY | O

Food affordability can serve as an immense barrier to food access for many individuals and households. In order to create a more equitable and affordable food environment, communities can expand purchasing assistance opportunities in local grocery stores and farmers' markets by increasing the acceptance of **Electronic Benefit Transfer (EBT)** and financial incentive programs. These programs can benefit both the consumer and the seller, with research showing that acceptance of EBT results in almost doubled daily sales revenue and a significant increase in produce purchased compared to markets without EBT.¹⁵⁷ Acceptance of assistance programs may help decrease barriers to fruits and vegetable access, increase produce purchases and consumption and promote a healthier, better-nourished community.

INTENT

To support affordable food and fruit and vegetable access at various food retail outlets.

Part 1: Affordable Food Access

VERIFICATION: Annotated Documents—Policy Document

- > All supermarkets and grocery stores with produce sections within the project boundary accept at least one the following:
 - a. Electronic Benefit Transfer (EBT) payments.
 - b. Other programs that enable affordable monthly food access.

Part 2: Affordable Fruit and Vegetable Access

VERIFICATION: Annotated Documents—Policy Document

- > Farmers' markets and/or community-supported agriculture (CSA) shares accept at least one of the following for the purchase of fruits and vegetables:
 - a. Electronic Benefit Transfer (EBT) payments.¹⁵³
 - b. Healthy food incentive programs, such as Health Bucks offered in New York City.¹⁵⁸
 - c. CSA restaurant subsidy programs.¹⁵⁹
 - d. Senior farmers' market coupon programs.¹⁶⁰
 - e. Other programs that enable fruit and vegetable access.



FSE

FOOD SECURITY | O

Food insecurity is an economic and social condition of limited or uncertain access to nutritious food.¹²³ Individuals who face food insecurity are disproportionately affected by diet-related chronic diseases including hypertension and other cardiovascular risk factors and have poorer diets than the general population.¹²⁴ By increasing access to nutritious foods to those in immediate need, communities can reduce or even prevent the negative health effects associated with food insecurity. Through targeted food drives and other forms of community engagement, healthier food options can be supplied to local food banks to help increase access to nutritious foods and provide a greater diversity of food options for those experiencing transient food insecurity or hunger. Additionally, investments in local agriculture have been shown to significantly increase food availability and can further support food security.¹⁶¹

INTENT

To address food insecurity among local populations and to promote community resiliency.

SPECIAL

Only one of the following parts is required to satisfy this feature.

Part 1: Community Food Support

VERIFICATION: Annotated Documents—Policy Document

> The project allocates a minimum of one dollar per dwelling unit (minimum \$1,000 USD) per year to one of the following:

- Local hunger relief organization.
- Local community garden or food production resource.

OR

Part 2: Community Food Drive

VERIFICATION: Annotated Documents—Policy Document

> An annual food drive or programming event with targeted food donations is held and meets the following requirements:

- Healthy and nutritious food donations are promoted and encouraged.
- All donations benefit the project or local populations in need of assistance (as demonstrated by available food insecurity data).





FSA

PUBLIC FOOD INSPECTION INFORMATION | O

Food quality is a public health necessity, with 68% of reported foodborne illness outbreaks in the U.S. originating from a food service setting.¹⁶² Restaurant grading and public posting programs have been implemented in some communities, resulting in increased public awareness of restaurant cleanliness and quality, as well as incentivizing food establishments to uphold and maintain sanitary measures and hygiene practices. In New York City, for example, 88% of surveyed residents reported considering health Department ratings in their dining decisions, underscoring the value of the rating systems in reassuring patrons regarding foods consumed away from home.¹⁶³ Most importantly, implementation of a restaurant grading system has been shown to reduce the overall risk of foodborne disease. The Los Angeles restaurant hygiene grading and posting system, for example, was associated with an approximate 13% decrease in the number of foodborne-disease hospitalizations, further reinforcing the potential public health benefit of this intervention.¹⁶⁴



INTENT

To mitigate foodborne illness and increase consumer knowledge of food inspection results by requiring restaurants to display letter grades or sanitary inspection reports.



Part 1: Restaurant Ratings

VERIFICATION: Annotated Documents—Policy Document

- > Food service establishments owned, operated or managed by the project owner within the project boundary have at least one of the following prominently displayed on-premises and clearly visible to customers entering the establishment:
 - a. Scoring or letter grading system issued by the local health Department.¹⁶⁵
 - b. Publicly available food hygiene or sanitary inspection report by the local health Department.



BRE

BREASTFEEDING SUPPORT | O

Breastfeeding is widely recognized as the best source of nutrition to support optimal growth and development of infants. The WHO, UNICEF and American Academy of Pediatrics recommend **exclusive breastfeeding** during an infant's first six months of life as it is associated with reduced risk of infections, type 2 diabetes and childhood obesity.¹⁶⁶⁻¹⁶⁸ Continued breastfeeding beyond this period has benefits as well, since breast milk offers nutritional benefits that aid in child growth and development.¹⁶⁹ For mothers, breastfeeding can help reduce both postpartum weight retention and also the risk of breast and ovarian cancer.^{170,171} In 2011, the Surgeon General of the U.S. Department of Health and Human Services declared support for breastfeeding in communities as a public health goal.¹⁶⁶ Supportive environments that provide nursing mothers with the space and resources for breastfeeding can help promote breastfeeding and in turn promote the health of mothers and their children. Educational strategies can also help relay the value of breastfeeding and allow families to make well-informed decisions.

INTENT

To create a supportive breastfeeding environment through the provision of space, amenities and educational opportunities.

Part 1: Breastfeeding Facilities

VERIFICATION: Annotated Documents—Map

> A lactation or nursing room that meets the requirements in Appendix N1 or a **mobile lactation station** is available at the following locations:

- a. 50% of **public spaces of assembly** (Appendix N2) that are owned, operated or managed by the project owner.
- b. 20% of buildings that are owned, operated or managed by the project owner.

Part 2: Breastfeeding Empowerment

VERIFICATION: Annotated Documents—Map and/or Policy Document

> At least one of the following requirements is met:

- a. Breastfeeding information, resources or instruction classes are offered at a community center or other public use space within the project boundary.¹⁷²
- b. Breastfeeding information, resources or instruction classes are offered through a partnership with a local or regional breastfeeding support organization or group.¹⁷²
- c. Designated meeting or programming space for peer support groups is available in an easily accessible location within the project boundary.¹⁷³
- d. A resource directory of local breastfeeding facilities or lactation support services that are available to new mothers is publicized and offered in print or online.¹⁷⁴
- e. A hospital or birthing center located within the project boundary or within an 8 km [5 mi] radius has achieved Baby-Friendly® designation.¹⁷⁵

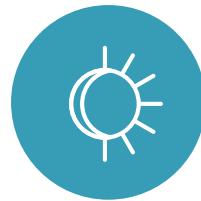




LIGHT



LIGHT BACKGROUND



The advent of a long-lasting, economical lamp in 1879 greatly facilitated the ability for people and communities to harness the power of light.¹⁷⁶ Since its inception, electric lighting has become nearly ubiquitous, and since the 1970s trends show increased usage at night, leading to what is now known as light pollution.¹⁷⁷ Light pollution is defined as excessive, misdirected or obtrusive electric light at night that interferes with starlight in the form of reflection, glare or trespass.¹⁷⁸ While this may seem like a mild inconvenience, or perhaps progress in some instances, the complex interplay of physiology, over-stimulation and habitat disruption caused by nighttime lighting in excess has been shown to adversely affect both humans and animals.¹⁷⁹⁻¹⁸⁷

Light is a visible form of electromagnetic radiation, bordered in the spectrum by ultraviolet radiation at shorter wavelengths and infrared at longer wavelengths. Light enters the eye and stimulates photoreceptors on the retina: rods, cones and intrinsically photosensitive retinal ganglion cells (ipRGCs). These cells absorb light and send it as information in the form of electrochemical signals to different parts of the brain. Depending on the cell activated and the part of the brain it communicates to, light can facilitate vision, have direct impacts on alertness or mood and act as a zeitgeber: an environmental cue that tells the body what time of day it is. A master clock that lives in a part of the brain called the suprachiasmatic nucleus (SCN) uses that light information to then synchronize physiological functions across the body's various tissues and organs

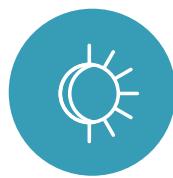


with roughly 24-hour cycles called **circadian rhythms**. While several zeitgebers exist that regulate the body's circadian rhythms, light is one of the strongest of cues.

Disruptions to these cycles are associated with neuro-inflammation, breast cancer, sleep disorders and metabolic dysfunction.^{185,188,189} This is because multiple physiological processes are regulated in part by the variance and interplay of hormones involved in circadian rhythms.^{181,190} Specifically, chronic, inappropriate exposure to certain intensities and wavelengths of light at night is associated with adverse health outcomes, both acute and potentially long lasting. The theoretical basis for that association further raises the question of if poorly controlled ambient light in the form of light pollution or light trespass—which may be diffuse yet still represents light that reaches the eye at night—is associated with certain health outcomes. There is some epidemiological evidence that suggests this may be the case; studies that

use satellite imagery find associations between community light pollution and rates of disease in the corresponding population.^{180,181,184-187}

Overall, light in the community serves many important purposes; it can be used to promote visibility and security and to help us maneuver around obstacles and danger. There are also cultural and social elements of lighting: it can activate a space, creating an inviting environment and contributing to a greater sense of community and neighborhood identity. When properly designed and implemented, lighting at night can provide many functional and cultural benefits, including obstacle detection and injury avoidance, perceived safety, crime reduction, promotion of increased physical activity, social cohesion and community pride.¹⁹¹⁻¹⁹⁸ No matter the intended use, lighting often serves multiple functions at once, and should be planned to maximize benefits and to reduce light pollution, light trespass and adverse health outcomes.



LMP

LIGHTING MASTER PLAN | P

Within any given community there are many and varied functions that lighting can serve—all critical and often aligned, but at other times in conflict. Good lighting design provides appropriate light to achieve specific activities with the desired aesthetics without contributing to excessive light use or creating uncomfortable glare. Lighting can facilitate visibility and maneuverability, and encourage engagement with the space—all positive outcomes of good lighting design.^{199,200} On a community scale, however, planners must also consider the way each individual light source and activity area contributes to and makes up the total amount of light used in the community.



INTENT

To promote an overarching plan for light across the entirety of the community prior to development as a tool to determine appropriate limitations on lighting and plans for existing lighting that may not be easily changed.

Part 1: Light Zone Map

VERIFICATION: Annotated Documents—Professional Narrative

> One of the following requirements is met:

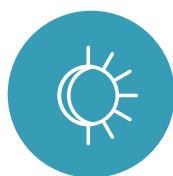
- a. If prior to development: the entirety of the project is categorized according to the **lighting zones** defined by the Joint IDA-IES Model Lighting Ordinance (MLO) or by IES/ASHRAE 90.1-2013, Table 9.4.2-1 or any updated versions of the text.^{192,201}
- b. If an existing community: lighting zones as defined by the Joint IDA-IES MLO or by IES/ASHRAE 90.1-2013, Table 9.4.2-1 or any updated versions of the text are overlaid onto the entirety of the project, as coordinated with census information, development density and any other relevant metrics such as dwelling units per acre.^{192,201}

Part 2: Lighting Goals

VERIFICATION: Annotated Documents—Professional Narrative

> A point-by-point narrative outlines lighting goals for specific activity areas and across the entirety of the community, including a consideration of the following:

- a. Pedestrian, cyclist and vehicular conflicts.¹⁹³
- b. Security and crime prevention.¹⁹³
- c. Light pollution and trespass.¹⁹³
- d. Inclusion of lighting for social and aesthetic purposes.¹⁹³
- e. Daytime appearance of luminaires.¹⁹⁴
- f. Minimum horizontal **illuminance** targets in all public areas, including all building exteriors and pathways.
- g. Minimum vertical illuminance targets in all public areas, including all building exteriors and pathways.
- h. Color quality of lighting, including consideration of maximum allowable **Correlated Color Temperature (CCT)** and minimum allowable **Color Rendering Index (CRI)** of lights.



LCS

LIGHTING CONTROL SCHEDULE | O

It has long been established that light pollution has adverse ecological effects, disrupting the nighttime environment for many species.¹⁷⁹ Light pollution also affects humans, most obviously by obscuring the view of the night sky, but some epidemiological studies suggest correlations between light at night and light pollution with rates of breast cancer and obesity.^{180,181,184-188,195} However, communities require light at night for a number of reasons, ranging from increasing social activity to addressing safety concerns. Minimizing the use of light at night therefore must be weighed against other considerations that require light and should encompass a broad approach that looks at specific areas or times at which lighting use can be safely minimized.

INTENT

To reduce unnecessary lighting
by adjusting light output in
preparation of anticipated
changes in activity.

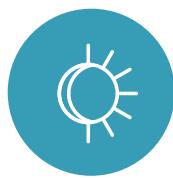
Part 1: Lighting Curfew Hours

VERIFICATION: Annotated Documents—Operations Schedule

> Except as required by code and excluding cases of outdoor lighting where only one luminaire is present, lights are motion-activated, are in use for a 24-hour establishment or event or are in use for signage for safety or navigation purposes, a project-wide lighting curfew time is established after which point the following requirement is met:

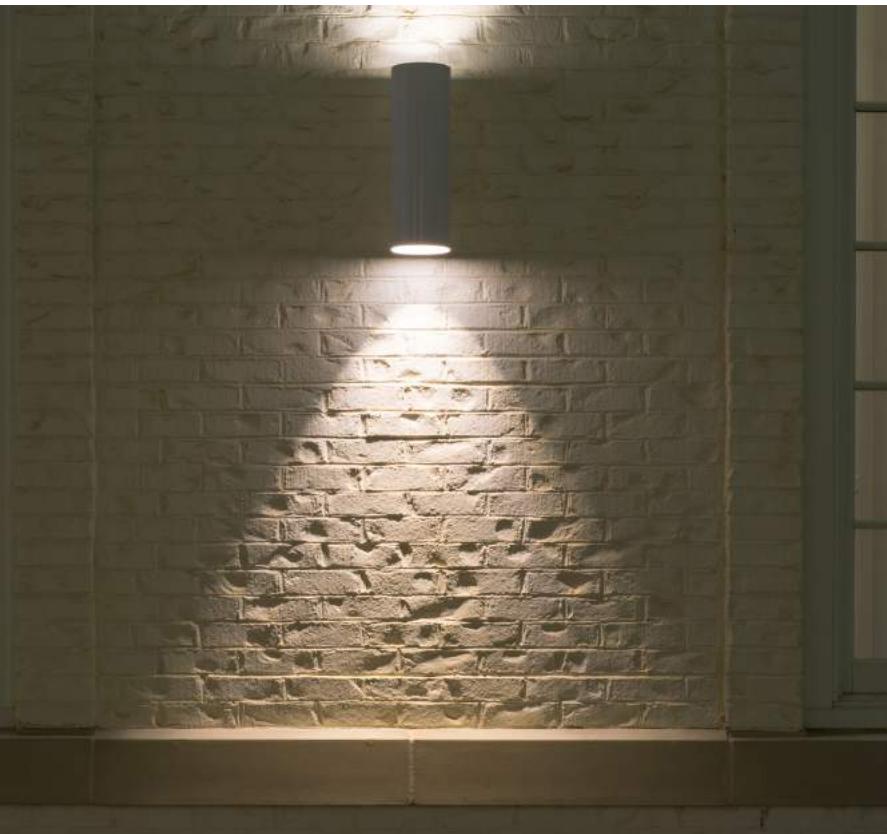
- a. Total outdoor luminaire **lumens**, as measured across the entirety of the project, are reduced by at least 30% (including by dimming or switching off lights).¹⁹²





EMI COMMUNITY-WIDE EMITTANCE CAPS | O

One way to reduce light pollution and avoid overlighting is by placing restrictions on the total contribution of light allowable across a community. The cumulative light output of a community considers all the varied applications of light within the community. A consideration of light in such a holistic view allows the community to be aware of the total light output and provides a lens for balancing light use and understanding where limitations may be safely and appropriately placed, as well as where the use of light is critical to achieve lighting goals.



INTENT

To set lumen limits for residential and non-residential areas in order to put a cap on the total contribution of light at night from the community.

Part 1: Non-Residential Lumen Limits

VERIFICATION: Professional Narrative—Lighting Designer or Architect

> For all non-residential outdoor lighting, one of the following requirements is met:

- a. The allowed total installed initial luminaire lumens per site, excluding right-of-way lighting, does not exceed the limits established in Table A of the Joint IDA-IES MLO.¹⁹²
- b. The allowed total installed initial luminaire lumens per site, excluding right-of-way lighting, does not exceed the limits established in Table B of the Joint IDA-IES MLO, with no more than two additional lumen allowances in Table B.
- c. The maximum vertical illuminance does not exceed the limits established by Section IV Option B of Joint IDA-IES MLO.



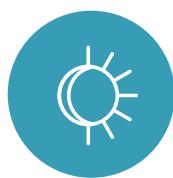
Part 2: Residential Lumen Limits

VERIFICATION: Professional Narrative—Lighting Designer or Architect

> In residential areas, the following requirement is met for all outdoor lighting:

- a. The allowed total installed initial luminaire* lumens per site, excluding right-of-way lighting, does not exceed the limits established in Table G of the Joint IDA-IES MLO per lighting zone and lighting application as appropriate with the luminaire's shielding.¹⁹²

*The total installed initial luminaire lumens is calculated as the sum of the initial luminaire lumens for all luminaires.



LCT

OBTRUSIVE LIGHT CONTROL | O

Obtrusive light may refer to glare or any stray light that is outside of the light needed for the intended task. It can include light pollution and sky glow, which can obscure views of the night sky, and light trespass, which can project light beyond intended boundaries. A community may employ several strategies related to light source choice and luminaire installation (e.g., shielding, limiting lumen emittance, implementing curfew hours) to restrict obtrusive light, and depending on the kinds of activities intended to take place in each space, more stringent restrictions can be applied.

INTENT

To curtail the amount of obtrusive light by setting limits on the amount of uplight, backlight and glare acceptable for specific lighting zones regarding a luminaire classification system, or by strategies such as shielding.

Part 1: Non-residential Properties

VERIFICATION: Annotated Documents—Professional Narrative

> The following requirement is met for at least 75% of exterior luminaires (excluding lighting within public right-of-way or easement and ornamental street lighting) in non-residential properties with defined property lines. Public areas should consider the nearest residential or commercial property line as the property line for compliance purposes:

- The luminaire's BUG rating does not exceed that which is outlined as appropriate per lighting zone in the Joint IDA-IES MLO.¹⁹²

Part 2: Residential Properties

VERIFICATION: Annotated Documents—Professional Narrative

> For all exterior luminaires in residential areas, one of the following requirements is met:

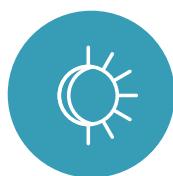
- Shielded such that no light emits at or above 90° above nadir.
- Allowed total initial luminaire lumens per site, excluding right-of-way lighting, does not exceed the limits established in Table G of the Joint IDA-IES MLO per lighting zone and lighting application as appropriate with the luminaire's shielding.¹⁹²

Part 3: Right-of-way Areas

VERIFICATION: Annotated Documents – Professional Narrative

> 75% of exterior luminaires within the public right-of-way or easement meet the following requirement:

- Shielded such that no light emits at or above 90° above nadir with the exception of **ornamental street lighting**, which adheres to the uplight control requirements of Table H of the Joint IDA-IES MLO per lighting zone.¹⁹²



LTR LIGHT TRESPASS MITIGATION FOR SLEEP | O

Light trespass refers to light that is incident upon an adjacent property that it is not intended to illuminate. Unintended stray light could therefore contribute to annoyance or discomfort. This is of concern in residential areas, hotel rooms, shelters or any other place where a person may sleep where light trespass could contribute to delays of sleep onset or disrupt slumber throughout the night.¹⁸⁰

INTENT

To reduce light trespass into adjacent spaces in ways that may prevent the onset of sleep or disrupt sleep throughout the night.

SPECIAL

Only one of the following parts is required to satisfy this feature.

Part 1: Protected Dwelling Units

VERIFICATION: Annotated Documents—Professional Narrative

> One of the following requirements is met for all luminaires adjacent to any dwelling units that are currently occupied or already built and intended for occupation:

- a. Fully shielded to prevent light from directly penetrating windows of dwelling units.
- b. Otherwise designed in ways related to the luminaire or via other non-luminaire design solutions to prevent light from directly penetrating windows of dwelling units.

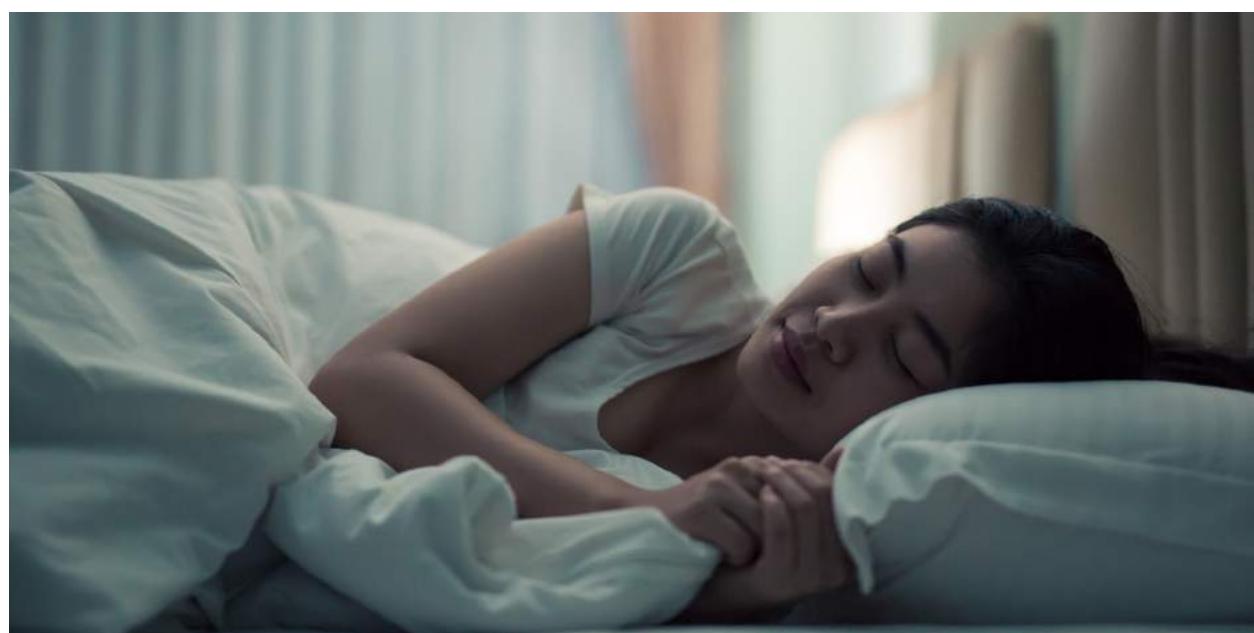
OR

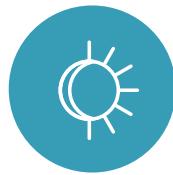
Part 2: Residential Trespass Avoidance

VERIFICATION: Annotated Documents—Professional Narrative

> All outdoor luminaires in residential areas meet one of the following requirements:

- a. BUG rating no more than B2-U2-G2.²⁰²
- b. USGBC's LEED v4 ND: Built Project, Light pollution reduction credit's Option 2. Calculation method, Table 2. Maximum percentage of lumens above horizontal, by lighting zone.²⁰²





SVI VISIBILITY FACILITATION | O

Beyond providing basic ambient illumination, there are other elements of lighting that can have an impact on the ability of light to accurately render the scene to the viewer. Depending on the color of clothing, for example, a pedestrian may be more or less visible to drivers. A light source with good color-rendering abilities therefore may aid in viewers' ability to perceive colors in the environment more accurately, on top of potentially contributing to aesthetics. Further, there may be certain spots that require higher lighting levels to allow proper visibility. When providing for such spaces, it is still important to consider a balance between providing lighting for visibility while limiting exposure to high levels of blue-content light at night.

INTENT

To facilitate enhanced visual acuity by providing high-quality lighting for exterior environments while limiting blue-biased light at night, and supporting that colors are rendered accurately.

Part 1: Color Rendering Index

Verification: Letters of Assurance—Lighting Designer or Architect

- > The following requirement is met for 75% or more of the exterior light sources on roadways and pedestrian paths:
 - a. CRI (average of R1 through R8) of 70 or higher.¹⁹⁴

Part 2: Correlated Color Temperature

VERIFICATION: Letters of Assurance—Lighting Designer or Architect

> The following requirement is met for 75% or more of the exterior luminaires on roadways and pedestrian paths:

- a. CCT between 2700K and 3000K.¹⁹⁴

Part 3: Roadway Signage

VERIFICATION: Letters of Assurance—Lighting Designer or Architect

> The following requirement is met as allowable by code for all roadway signage that does not use reflective materials:

- a. Achieves a maintained vertical illuminance of 200 lux [18 fc].²⁰³
- b. Employs downlighting strategies to illuminate signage.

Part 4: Signage Luminance Limits

VERIFICATION: Annotated Documents—Lighting Designer or Architect

> Luminance levels for digital and internally illuminated signage do not exceed the following limits per lighting zone:

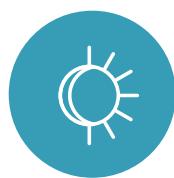
- a. LZ0: no digital or internally illuminated signage.
- b. LZ1: 100 cd/m².
- c. LZ2: 200 cd/m².
- d. LZ3: 300 cd/m².
- e. LZ4: 500 cd/m².

Part 5: Signage Distraction Mitigation

VERIFICATION: Letters of Assurance—Lighting Designer or Architect

> The following requirements are met for all digital and internally illuminated signage:

- a. Controls provide dimming abilities.
- b. Copy movement or image changes are restricted or limited to reduce driver distraction.
- c. Digital signage in residential areas provides a transition time between images of two seconds.



RLI

RIGHT-OF-WAY LIGHTING | O

Meeting lighting requirements on roadways is of particular importance to public health: traffic injuries are the leading cause of death worldwide for persons aged 15 to 29 years old, and in total an estimated 1.24 million road deaths occur every year.²⁰⁴ Worldwide, there are more than 270,000 pedestrian fatalities every year.¹⁹⁶ Lighting can clearly have an impact on driving conditions and pedestrian visibility, and improved lighting at night can create a clearer environment for pedestrians and drivers.²⁰⁵ It is important not just to make sure that there is an adequate amount of light at night on roadways but also to balance visibility and glare.¹⁹⁷ This means meeting horizontal and vertical illuminance recommendations, which are designed to provide enough light to facilitate vision, and maintaining the uniformity range of light to reduce dark spots in between luminaires that may present challenges for navigation and visibility.



INTENT

To promote visibility and navigation by facilitating adequate and uniform lighting conditions for visibility on pathways and immediately adjacent spaces, which may thereby also promote greater opportunities for activity and community engagement.

Part 1: Roadways and Pedestrian Paths

VERIFICATION: Annotated Documents—Professional Narrative

> Lighting for all roadways and pedestrian paths within the project boundary meets the maintained average, minimum illuminance and uniformity recommendations as appropriate for each application based on pedestrian activity levels of at least one of the following:

- a. IES-ANSI RP-8-14 or any updated versions of the text.¹⁹⁷
- b. BS 5489-1:2013 or any updated versions of the text.²⁰⁶

Part 2: Crosswalks

VERIFICATION: Annotated Documents—Professional Narrative

> One of the following requirements is met:

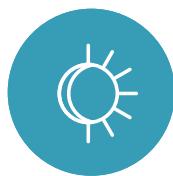
- a. Crosswalks maintain a vertical illuminance on the plane facing approaching traffic and on the plane facing the intersection of 21 lux [2 fc] at 1.5 m [5 ft] above grade.²⁰⁷
- b. Vertical illuminance levels comply with IES DG-19-08 for Roundabout Lighting based on the street classification and pedestrian volume.²⁰⁶

Part 3: Veiling Luminance Ratios

VERIFICATION: Annotated Documents—Professional Narrative

> One of the following requirements is met:

- a. For roadways of medium to high driving speeds, such as all highways and freeways: **veiling luminance ratio** of 0.3.²⁰⁸
- b. For roadways of low driving speeds, such as all alleys, residential roads, pedestrian streets, roads in school zones and bicycle lanes: veiling luminance ratio of 0.4.²⁰⁸



LEX

LIGHTING FOR EXTERIORS | 0

Meeting exterior lighting requirements improves visibility for the users of the outdoor spaces. Good lighting design encourages use of exterior areas after dark by creating a comfortable and **inviting ambience**. An area that is not lit properly can pose an impediment to the occupants by making it difficult to spot obstacles in their path and can lead to accidents. It is important to avoid light trespass and obtrusive lighting while designing for these areas. However, exterior lighting can also have benefits by encouraging members of the community to interact in common spaces, facilitating social interaction.

INTENT

To improve maneuverability and visibility in exterior spaces and encourage occupants to utilize the areas to promote opportunities for community members to come together.



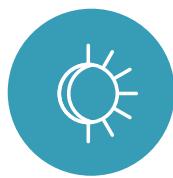


Part 1: Public Exteriors

VERIFICATION: Annotated Documents—Professional Narrative

> Lighting for all public exteriors in the project meet the maintained vertical and horizontal illuminance and uniformity recommendations per lighting zone as appropriate of at least one of the following:

- a. IES RP-33-14 or any updated versions of the text.¹⁹³
- b. IES Lighting Handbook 10th Edition, Table 26.2, or any updated versions of the text.²⁰⁹
- c. BS 5489-1:2013 or any updated versions of the text for public amenity areas and BS EN 12464-2:2014 or any updated versions of the text for outdoor work places.^{206,210}



MLI

MASS TRANSIT LIGHTING | O

Meeting standard lighting requirements supports adequate visibility for people to perform basic tasks and accurately perceive the environment. Regardless of the specific luminaires or design layouts adopted by any given community, as a basic offering a community must provide adequate lighting for visibility so that community members can easily navigate a space, particularly in mass transit areas. Promoting mass transit use can also have other community benefits, by potentially encouraging more physical activity and reducing reliance on individual car use, thereby improving air quality on a community scale.^{211,212}



INTENT

To encourage frequent and safe use of mass transit in communities by promoting adequate lighting for visibility at interior and exterior locations.

Part 1: Interior Stops

VERIFICATION: Annotated Documents—Professional Narrative

> The following average horizontal illuminance levels are met at grade per area type at all interior mass transit stops, as allowable by local code:

- a. Station platforms: 430 lux [40 fc].²¹³
- b. Stairs, elevators and escalators: 270 lux [25 fc].²¹³
- c. Mechanical rooms and bathrooms: 215 lux [20 fc].²¹³

Part 2: Exterior Stops

VERIFICATION: Annotated Documents—Professional Narrative

> The following average horizontal illuminance levels are met at grade per area type at all exterior mass transit stops, as allowable by local code:

- a. Station platforms, covered: 75 lux [7 fc].²¹³
- b. Station platforms, uncovered: 43 lux [4 fc], with a minimum maintained illuminance of 21 lux [2 fc] at the platform edge.²¹³
- c. Passenger loading areas (e.g., "kiss and ride") and bicycle stands: 54 lux [5 fc].²¹³
- d. Bus-loading zones: 75 lux [7 fc].²¹³
- e. Outdoor entrances to stairs, elevators and escalators: 108 lux [10 fc].²¹³

Part 3: Pedestrian Crossings

VERIFICATION: Annotated Documents—Professional Narrative

> For exterior pedestrian crossings that intersect trackways, one of the following is provided at night within a 30 m [100 ft] radius of the crossing, as allowable by local code:

- a. 1.5 times trackway illumination.²¹³
- b. Horizontal illumination of 13 to 18 lux [1.2 to 1.7 fc] at grade.²¹³



MOVEMENT BACKGROUND



The Centers for Disease Control and Prevention (CDC) defines fitness as “the ability to carry out daily tasks with vigor and alertness, without undue fatigue, and with ample energy to enjoy leisure-time pursuits and respond to emergencies.”²¹⁴ Based on this definition, fitness is comprised of several domains including cardiorespiratory power and endurance, skeletal power and endurance, strength, flexibility, balance, movement speed, reaction time and body composition.²¹⁴ Regular physical activity not only improves these domains of fitness but can also have a profound positive impact on health and well-being including reduced risk of chronic diseases such as cardiovascular disease, type 2 diabetes and some of the most common and deadly cancers; reduced risk of premature mortality; improved weight control; enhanced muscle and bone strength; better mental health and well-being; and improved ease of activities of daily living, especially among older adults.^{215,216}

Despite well-established and widely disseminated guidelines (Appendix F3), physical inactivity is highly prevalent worldwide, with 23% of adults failing to meet international activity guidelines established by the World Health Organization (WHO).²¹⁶ In general, more women than men fail to meet international activity guidelines, a gap that is more evident in low- and middle-income countries.²¹⁶ Among adolescents (11–17 years), 78% of boys and 84% of girls fail to meet WHO physical activity recommendations.²¹⁶ Inactivity is also a concern among older age groups.²¹⁷ In an analysis of data from the U.S., researchers found that the prevalence of inactivity increases with age



from 25.4% in older adults aged 50–64 years to 35.3% among those aged 75 years and above.²¹⁸ In addition, people are becoming increasingly sedentary, which poses independent and serious consequences for health beyond insufficient (or low) physical activity levels.²¹⁹

Physical inactivity is linked to numerous chronic diseases and conditions, including obesity and diabetes.^{222,220} Additionally, the WHO notes that individuals who are insufficiently active have a 20 to 30% higher risk of mortality compared to those who meet international recommendations.²¹⁶ The economic burden, including both direct and indirect costs, of physical inactivity is also substantial. Based on representative data from 142 countries, it is estimated that health care spending and productivity losses (direct and indirect costs) attributed to physical inactivity cost the global economy \$67.5 billion in 2013.²²¹ By region, these estimates ranged from \$0.6 billion in Africa to about \$26 billion in North America.²²¹ When isolating indirect costs, in 2013 alone, premature deaths attributed to physical inactivity resulted in nearly \$14 billion in productivity losses around the world.²²¹

The built environment has increasingly come under focus as an important driver of physical activity and active living. According to the WHO, common barriers to physical activity linked to

the built environment include fear of crime and violence in outdoor spaces, traffic and safety concerns, poor air quality and a lack of “activity-centric” infrastructure, such as parks, activity spaces and streets designed for active transportation.²¹⁶ Design strategies, operational policies and programs can actively (e.g., activity programming in a local park) and passively (e.g., neighborhood connectivity, walkability, access to public transportation) promote active lifestyles and discourage sedentary behaviors. In addition, strategies that address community design, infrastructure and operational policies that are associated with physical activity not only make community members more active but also make communities more socially viable, more economically prosperous and more ecologically sound.²²²

Collectively, the design and operation of the built environments constitute powerful and sustainable interventions that promote more active ways of living across the lifespan. The potential impact of improving physical activity behaviors is profound. In a seminal 2012 study published in *The Lancet*, researchers estimated that “if inactivity were not eliminated, but decreased instead by 10% or 25%, more than 533,000 and more than 1.3 million deaths, respectively, could be averted every year.”²²³



MIX

MIXED-USE DEVELOPMENT | P

Land use policies that promote diverse uses (mixed-use) and proximity to those uses, in concert with other community-scale active design strategies, can help foster more livable and active communities.²²⁴ Land use policies are increasingly recognized for their role in creating the conditions that allow healthy communities to flourish.²²⁵ Mixed-use developments are associated with physical activity and specifically, higher levels of walking and biking.^{224,226-231} In addition, mixed-use developments are associated with lower body weight and obesity and are considered an important determinant of mobility and physical activity levels among older populations.^{40,232} Research suggests that individuals significantly increase walking for recreation and transportation, reduce total time spent on mass transportation and reduce automobile travel time after moving to a neighborhood with greater land use mix.²³³ Greater land use mix is also associated with various co-benefits including the presence of neighborhood green spaces, an improved sense of community and reductions in isolation, stress and crime.²²⁷

INTENT

To encourage a high degree of and proximity to mixed-uses to create a more compact, connected and active community.



Part 1: Land Use Mix

VERIFICATION: Annotated Documents—Map

> The following requirements are met:

- a. At least 50% of dwelling units are located within a 400 m [0.25 mi] **walk distance** of at least four use categories defined in Appendix F1.¹³² For projects with no dwelling units, at least four use categories defined in Appendix F1 are present within the project boundary.
- b. At least 75% of dwelling units are located within an 800 m [0.5 mi] walk distance of at least four use categories defined in Appendix F1.



MNP

MOVEMENT NETWORK PLANNING | O

Decades of car-centric transportation planning policies and development have continued to prioritize automobiles on the streets of communities and discouraged and even displaced more active modes of transportation.^{47,234} Today, road traffic injuries are among the leading causes of mortality worldwide, with more than 1.2 million deaths attributed to road traffic injuries each year, half of which are among pedestrians, cyclists and motorcyclists.²⁰⁴ In addition, substantial inequalities exist across and within countries where those who are socioeconomically disadvantaged experience an unjust burden of motorist, cyclist and pedestrian-related traffic injuries.^{204,235} By placing people-centric design at the forefront of transportation planning, communities can reframe how they assess and develop transportation policies in order to encourage active transportation, improve physical activity levels and reduce the risk of injuries among roadway users.^{236,237}

Transportation planning for relevant stakeholders involves a multistep, cross-disciplinary process of data collection, analysis, goal setting, prioritization, programming toward specific performance-based outcomes and monitoring and evaluation.²³⁸ Common data collected during a transportation assessment include local crash rates for pedestrians, cyclists and motor vehicles; existing and/or planned roadway characteristics; exposure data, including traffic volume, and roadway miles traveled; streets with speeds above 40 km/h [25 mph]; mode share, including user counts and average trip length; and needs and concerns of community members.^{238,239}



INTENT

To assess transportation networks and impact transportation planning using data-driven processes.

Part 1: Transportation Analysis

VERIFICATION: Annotated Documents—Professional Narrative

> A point-by-point narrative demonstrates an assessment of the following:

- a. Locations throughout the project boundary with existing and/or potential transportation safety issues and potential contributing factors based on available data.
- b. Potential evidence-based countermeasures and their feasibility of implementation.
- c. Inter-sectoral policies and/or relationships that could impact transportation planning for the project.
- d. The long-term impact of advanced transportation technologies (e.g., autonomous vehicles) and mass transportation systems (e.g., metro, bus rapid transit, light rail).
- e. Community transportation safety needs and concerns.



Part 2: Transportation Safety Plan

VERIFICATION: Annotated Documents—Professional Narrative

> One of the following is met:

- a. The findings from Part 1: Transportation Analysis have impacted transportation planning within the project master plan.
- b. For projects that do not have purview over the transportation network, the findings from Part 1: Transportation Analysis have been shared with the local Department of Transportation (or equivalent), including a summary of proposals made and an explanation of why the project was unable to incorporate transportation safety elements into the project master plan.



WAK

WALKABILITY | O

Many elements of the built environment impact pedestrian activity, including land use mix, residential density, intersection density, transit stop density, population density and the ratio of retail to residential building floor area.^{45,240-245} In addition, the ways in which streets are designed and planned can have an impact on many aspects of community vitality, including pedestrian activity and health, social cohesion, crime prevention, the micro and macro economies and environmental sustainability.^{47,239} Walkable communities are associated with higher moderate-to-vigorous activity levels, where some research shows that residents who live in a high- compared to low-walkability neighborhood achieve nearly 800 more steps per day, on average.^{44-46,230,246} Additional evidence shows that walkable neighborhoods are associated with lower levels of sedentary behavior, diabetes, obesity and depression.^{46,241,244,245} Notably, the benefits of walkable communities appear to be most beneficial for individuals with the lowest physical activity levels, a population also at the highest risk for poor health outcomes.^{44,247}



INTENT

To provide connected, walkable and accessibly designed streets and pathways to foster physical activity.

Part 1: Walkable Design

VERIFICATION: Annotated Documents—Map

> At least one of the following requirements is met:

- a. **Street segments** intersect at least one other street segment (excluding **alleys**) every 80–100 m [262–328 ft].^{40,239}
- b. Minimum **street connectivity index** of 1.4.²⁴⁸
- c. Minimum of 54 intersections per km² [140 intersections per mi²].¹³²
- d. Minimum Walk ScoreTM of 70.²⁴⁹

Part 2: Pedestrian Pathways

VERIFICATION: Annotated Documents—Map

> The following requirement is met:

- a. 90% of the circulation network block length has continuous sidewalks or **all-weather pathways** present on both sides.¹³²

Part 3: Accessible Design

VERIFICATION: Annotated Documents—Letter of Assurance

> At least one of the following requirements is met:

- a. All newly constructed pedestrian pathways are compliant with local accessible design laws and/or standards.
- b. The project commits to upgrade at least 50% of the existing pedestrian paths to be compliant with local accessible design laws and/or standards.

Part 4: Pedestrian Pathway Maintenance

VERIFICATION: Annotated Documents—Policy Document

> A policy is in place that addresses and identifies the following:

- a. A maintenance commitment and responsible entities for inspection and maintenance of pedestrian pathways and applicable pedestrian infrastructure including:
 - Minor repairs (e.g., repairing surface cracks or uneven surfaces).²⁵⁰
 - Major repairs (e.g., breaking ground).²⁵⁰
 - Snow and/or ice removal, as applicable by climate.²⁵⁰



PED

PEDESTRIAN-SCALE DESIGN | O

Pedestrian-scale design draws upon design strategies that consider the **pedestrian perspective and experience** by designing the transportation network to invite pedestrian activity and support safety. Pedestrian-scale design can positively impact the user experience, increase pedestrian activity and can address important community elements such as **street connectivity**, accessibility, comfort and safety.^{224,239,251,252} Furthermore, interventions that consider the pedestrian experience can also contribute to a sense of place, especially when embedded with the cultural and historical values of each unique community.²³⁹

In a systematic review conducted by the CDC, researchers identified several evidence-based design strategies that can be used to improve the pedestrian experience, including street lighting, sidewalk continuity, crosswalk safety (e.g., center islands or raised crosswalks) and **pedestrian-scale aesthetics** (e.g., **landscaping**).²²⁴ Additional pedestrian-friendly strategies, such as active façades and street furnishings, are outlined in evidence-based guidelines such as *Active Design: Shaping the Sidewalk Experience* and are supported by peer-reviewed literature.^{252,253}

INTENT

To create an active, engaging and inviting pedestrian environment through pedestrian-scale amenities and the **articulation of street-facing façades** to encourage physical activity.



Part 1: Active Façades

VERIFICATION: Annotated Documents—Architectural Drawings

> The articulation of street-facing façades, for buildings owned, operated or managed by the project owner, are designed such that no more than 40% or 15 m [50 ft] (whichever is less) is blank, and incorporate at least two of the following:

- a. Street-level windows, which allow visibility into the space.
- b. Window display cases.
- c. Murals or other artistic installations.
- d. Biophilic and other landscape elements.
- e. Mixed building textures, colors and/or other design elements.

Part 2: Active Streets

VERIFICATION: Annotated Documents—Map

> The following requirement is met:

- a. No more than 20% of the circulation network block length (measured in linear meters) is faced directly by at-grade commercial garages or service bay openings (alley and other service ways are excluded from block-length calculations).¹³²

Part 3: Street Furnishings

VERIFICATION: Annotated Documents—Map

> At least two of the following are present at regular intervals along at least 75% of the total existing and/or planned block length (driveways and service entryways are exempt from block length calculations):

- a. Permanent and/or movable seating furniture.²⁵²
- b. Trees, planters and/or other landscaped/biophilic elements.^{252,254}
- c. Natural (e.g., landscape elements such as trees) or man-made shading devices intended to block direct sunlight and glare.^{252,254}
- d. Artistic installations.



PDS

ENHANCED PEDESTRIAN ENVIRONMENTS | O

Nearly 25% of the 1.2 million annual road traffic deaths on the world's roads are among pedestrians.²⁵⁵ Successful planning programs, such as Vision Zero, implemented in places including New York City and Sweden, are built on the premise that no traffic fatality is acceptable, and have been shown to be successful at saving lives.^{256,257} Pedestrian safety strategies fall into three broad categories: (i) separation of pedestrians from other roadway users, such as pedestrian over- and/or underpasses;^{234,258,259} (ii) improved visibility of pedestrians, such as high-visibility crosswalk markings;^{47,239,260} and (iii) reduced vehicular speeds, such as traffic-calming design strategies.^{234,239,250,258,259,261-263}

For places such as NYC that have committed to Vision Zero action plans, locations that have implemented Vision Zero design strategies such as neighborhood slow zones, street markings, street lighting and safety engineering at intersections, have observed a decrement in pedestrian fatalities at twice the rate compared to locations that do not implement these strategies.^{255,256}

INTENT

To improve pedestrian infrastructure and encourage physical activity through evidence-based safety countermeasures.



Part 1: Pedestrian Safety**Countermeasures****VERIFICATION: Annotated Documents—
Map and/or Professional Narrative**

> A point-by-point narrative demonstrates that the transportation network includes design and/or policy strategies that address each of the following categories:

- a. Separation of pedestrians and other roadway users.
- b. Visibility of pedestrians.
- c. Management of vehicular speed.





CYC CYCLIST INFRASTRUCTURE | O

Cycling as a mode of active transportation is on the rise. In the U.S. alone, the number of workers who regularly commute via bike increased from about 500,000 to nearly 800,000 from 2001 to 2012, and in New York City specifically, cycling trips increased by nearly 50% from 2009 to 2014.^{264,265} In other cities, such as Amsterdam, trips have increased more than 40% since the 1990s.²⁶⁶ Research shows that the collective health benefits of cycling, such as lower risk of obesity, far outweigh the risks, such as increased exposure to air pollution and increased risk of traffic accidents.^{40,267}

Ecological studies, surveys and focus groups provide evidence that a variety of built environment elements have a positive impact on cycling behavior, including high intersection density, greater land use mix, greater population density, presence of bicycle signage, traffic calming interventions and aesthetics.^{268,269} Investment in basic cyclist infrastructure, such as **designated bicycle lanes** or **shared bicycle lanes**, has been shown to increase cycling and **quality-adjusted life years (QALYS)** at little added cost (\$1,297 USD per QALY per person).⁴⁷⁻⁴⁹ Other benefits of cyclist infrastructure include revenue for local businesses and improved real-estate values, multimodal transit corridor use and increased cyclist visibility, comfort and safety.^{48,270} Maintenance of this infrastructure is also an important consideration for ridership as many cities fail to maintain bicycle lanes, especially during snowy and icy conditions.²⁷¹

INTENT

To provide a network of designated, connected and easily accessible bicycle lanes that are regularly maintained in order to encourage cycling.

Part 1: Bicycle Lane Geography

VERIFICATION: Annotated Documents—Map and/or Policy Document

> At least one of the following requirements is met:

- a. Project boundary has a minimum Bike Score™ of 50.²⁷²
- b. 75% of all buildings are within 400 m [0.25 mi] cycling distance of an existing or planned (with funding commitments) bicycle network that connects riders to at least 10 diverse uses that are within a 4.8 km [3 mi] cycling distance.¹³²
- c. 50% of all buildings are located on streets with an existing or planned (with funding commitments) bicycle network that connects riders to at least 10 diverse uses that are within a 4.8 km [3 mi] cycling distance.¹³²
- d. Projects commit to bicycle lane conversion by the time of recertification (with funding commitments):
 - 10% of **conventional bicycle lanes** are converted to **separated bicycle lanes** or **protected bicycle lanes**.
 - 25% of streets with a shared lane environment (i.e., include no designated bicycle lane) are converted to include a conventional, separated or protected bicycle lane(s).

Part 2: Bicycle Lane Geometry

VERIFICATION: Annotated Documents—Map

> All cyclist infrastructure meets the following requirements:

- a. Bicycle lane width is designed to the maximum width allowable by local code.
- b. Buffer strategies (examples provided in Appendix F2) are used where possible and are designed to the maximum width allowable by local code.

Part 3. Bicycle Lane Maintenance

VERIFICATION: Annotated Documents—Policy Document

> A policy is in place that addresses and identifies the following:

- a. A maintenance commitment and entities responsible for inspection and maintenance of bicycle lanes and applicable infrastructure for cyclists including the following:
 - Minor repairs (e.g., repairing surface cracks or uneven surfaces).²⁷⁰
 - Major repairs (e.g., breaking ground).²⁷⁰
 - Snow and/or ice removal, as applicable.²⁷⁰



BPK

BICYCLE PARKING | O

Bicycle parking facilities are a key supportive element to ridership. These facilities should be **visible, accessible and secure**; have adequate lighting; and be protected from weather when possible.²⁷³ Bicycle parking facilities fall into two broad categories, **short-term** and **long-term parking**, and their placement requires considerations of current and potential user groups and their needs along with existing and planned public and private infrastructure.^{274,275}

Research suggests that lack of secure bicycle parking options is one of the leading reason cyclists do not bike to the workplace.^{275,276} Experts highlight that incorporating bicycle parking opportunities requires little additional space; for example, a 4.3 x 1.8 m [14 x 6 ft] space could store up to 12 bicycles in some cases.²⁷⁵ A systematic review on this topic found that parking facilities were associated with increased perceptions that cycling to work was convenient and thus increased likelihood that employees would ride to work.⁴³ Furthermore, evidence from this same review suggests that implementing outdoor parking alone would increase mode share by 5.8%, indoor parking alone by 6.3% and indoor parking plus on-site showers by 7.1%.⁴³

INTENT

To provide publicly accessible and secure bicycle parking facilities that are integrated into community infrastructure in order to facilitate cycling and reduce barriers to ridership.

SPECIAL

Only two of the following parts are required to satisfy this feature.

Part 1: Bicycle Parking Infrastructure

VERIFICATION: Annotated Documents—Map

> Bicycle parking facilities are present throughout the community such that at least one of the following requirements is met:

- a. Buildings owned, operated or managed by the project owner provide short-term bicycle parking for at least 2.5% of peak visitors (minimum of two spaces) and long-term bicycle parking for at least 5% of regular building occupants (minimum of two spaces).¹³²
- b. All newly constructed parking lots and/or garages allocate a minimum of one bicycle parking space (available for public use) per 10 automobile parking spaces (up to a maximum of 200 spaces) that include racks, poles, hooks and locking devices for cyclists to secure bicycles.^{275,277}

AND/OR

Part 2: Building Bicycle Policy

VERIFICATION: Annotated Documents—Policy Document

> The following requirement is met for buildings owned, operated or managed by the project owner:

- a. Where no designated indoor bicycle parking space/area can be accommodated or existing spaces are fully occupied, policy is in place that allows occupants to bring personal bicycles inside the building and utilize elevators (or freight elevators) to transport bicycles between floors.^{275,278}

AND/OR

Part 3: Pro-cyclist Transit

VERIFICATION: Annotated Documents—Map or Policy Document

> At least one of the following is met:

- a. At least 50% of mass transit stations (rail, bus and/or ferry stations) have no-cost, public use and secure short-term bike parking facilities present within 30 m [100 ft] of the station's main entrance and/or boarding area.
- b. At least 75% of mass transit stations are within 400 m [0.25 mi] of a public use and secure long-term bicycle parking facility.
- c. A policy is developed or adopted so that mass transit users may bring bicycles on-board during select hours of operation.
- d. At least 25% of the aboveground transit fleet (e.g., buses, aboveground light rail, trollies) is fitted with on-board (interior or exterior) bicycle racks that cyclists may use during all hours of operation.





CYS ENHANCED CYCLIST ENVIRONMENTS | O

Cyclist-friendly communities provide a variety of comprehensive, cyclist-specific infrastructure and amenities that encourage ridership. Communities should also support the cyclist environment and strive to reduce risk of cyclist injury and conflict with other transportation network users. This requires an understanding of the cyclist network and the unique risks posed throughout transit network use areas including major and minor streets.²⁷⁹ The presence of cyclist infrastructure is shown to increase cycling behavior and is fundamental to accommodate and encourage cyclists of all abilities, levels of experience, confidence and ages.^{239,279} Designing inviting street environments for cyclists can help promote cycling as an active transportation alternative to more sedentary modes of transportation.

While the health benefits of cycling, such as lower risk of obesity, far outweigh the dangers, cyclists still represent 4% of global traffic deaths.^{204,267,280} In general, cyclists prefer streets with less traffic, lower traffic speeds and cyclist-specific amenities that separate cyclists from other roadway users.²³¹ Infrastructure that separates cyclists from motorized traffic and pedestrians decreases potential conflict among network users and is more inviting to cyclists.^{258,270} Furthermore, design strategies such as intersection treatments, lane markings, signage, medians and/or signal detection can increase visibility, identify a clear right-of-way, and facilitate awareness of potential conflict among roadway users, ultimately creating a more inviting environment for cyclists.^{234,239,250,258,259,262,263,270}

INTENT

To improve cyclist infrastructure and promote physical activity through evidence-based safety countermeasures.

Part 1: Cyclist Safety Countermeasures

VERIFICATION: Annotated Documents—Map and Professional Narrative

> A point-by-point narrative demonstrates that the transportation network includes design and/or policy strategies from each of the following categories:

- a. Separation of cyclists and other roadway users.
- b. Visibility of cyclists.
- c. Management of vehicular speed.



BSH COMMUNITY BICYCLE SHARE | O

Today, more than 800 bicycle share programs are available around the world with some of the largest programs found in Paris, France (20,000 bicycles) and Wuhan, China (70,000 bicycles).^{281,282} Bicycle share eliminates some of the barriers to cycling, such as the cost of cycle ownership and concerns of bicycle theft.²³⁹ Furthermore, there is no indication that bike share programs increase risk of collision or "close-calls" among cyclists and other roadway users.²⁸³ One of the major benefits of cycle share is displacement of sedentary transportation modes, such as automobiles, where some research indicates that about 60% of bike share trips replace sedentary modes of transportation.²⁸² Bicycle share programs are also associated with co-benefits including reduced traffic congestion, flexible mobility, improved connectivity to public transportation and air pollution mitigation.²⁸¹

Convenience and proximity to a docking station have emerged among the top usability factors for bicycle share.²⁸² Additionally, these factors play an important role in the planning process including the bicycle share coverage area, program density and station spacing.²³⁹ Ideally, stations are designated in areas with high land use mix, are colocated at public transportation stations when possible and are located along **dedicated bicycle lanes**.^{239,274,284}

INTENT

To provide a comprehensive bicycle share program and promote use of community bike share.



Part 1: Bicycle Share Program

VERIFICATION: Annotated Documents—Map

> At least 80% of the project boundary falls within the coverage area of a bicycle share program that meets at least one of the following requirements (building bike share programs may be included in these calculations):

- a. Minimum docking station density of 11 docking stations per 1 km² [.386 mi²].²³⁹
- b. Minimum of 2 bicycle docks for every shared bicycle in service.²⁸⁴
- c. Minimum area density of 1 docking station every 300 m [1,000 ft] along a dedicated bike lane.^{239,284}

Part 2: Membership Promotion

VERIFICATION: Annotated Documents—Policy Document

> The bicycle share program is promoted through two of the following strategies:

- a. Occupants of buildings owned, contracted or managed by the project owner receive a no-cost or discounted trial membership (e.g., day pass) or a similar trial incentive.
- b. Occupants of buildings owned, contracted or managed by the project owner receive a meaningful subsidy toward an annual membership.
- c. Mixed-media messaging and/or programming events offered at least once per quarter.



TRA MASS TRANSIT INFRASTRUCTURE | O

Mass transit includes multiple modes/types, such as subways, cable and street cars, buses, trolleys, light rails, ferries and water taxies, carpool services and commuter trains, among others.²¹¹ Within the European Union alone, 56.7 billion trips were reported in 2014, or about 152 trips per person.²⁸⁵ The same data showed that nearly 56% of those trips were taken on a bus or trolley compared to 14% by suburban rail.²⁸⁵ In the U.S., ridership reached 10.7 billion trips in 2013, rising 37% since 1995 (nearly double the population growth over the same time period).²⁸⁶

Evidence shows that individuals who use public transportation are more physically active, achieving about 19 more minutes of activity per day.²¹² Beyond the health benefits associated with increased physical activity, investment in mass transit infrastructure also offers economic benefits including reduced health-care expenditures.^{287,288}

As the global community continues to urbanize, modernize and grow in social and structural complexity, cities will increasingly need to provide a transportation network that effectively moves more people and **can adapt to changing transportation patterns and needs.** For example, bus rapid transit (BRT), which emphasizes reliability, comfort and speed.²⁸⁹⁻²⁹¹ Light rail transit (LRT), which emphasizes similar amenities as BRT, represents about 3% of all public transportation trips worldwide and is associated with reduced body mass index (BMI) and odds of becoming obese over time (81%).²⁹² Additionally, evidence suggests that individuals are willing to walk farther to these rapid transit access points, especially when those access routes have pedestrian-friendly amenities.^{289,291}

INTENT

To promote mass transit opportunities to facilitate active transportation and discourage more sedentary forms of transportation.

Part 1: Mass Transit Availability

VERIFICATION: Annotated Documents—Map

> The project is located on a site with existing or planned (with funding commitments) mass transit such that at least one of the following requirements is met:

- The project is located on a site with a minimum (current or anticipated) Transit Score® of 70.²⁹³
- At least 50% of all dwelling units and 50% of non-residential buildings are within a 400 m [0.25 mi] walk distance (measured from the main building entrance) from a **mass transit access point** that achieves at least 1 point toward minimum daily service trips outlined in Table 1 of the LT Credit: Access to Quality Transit in LEED for Neighborhood Development.¹³²
- At least 75% of all dwelling units and 75% of non-residential buildings are within an 800 m [0.5 mi] walk distance from a mass transit access point that achieves at least 1 point toward minimum daily service trips outlined in Table 1 of the LT Credit: Access to Quality Transit in LEED for Neighborhood Development.¹³²





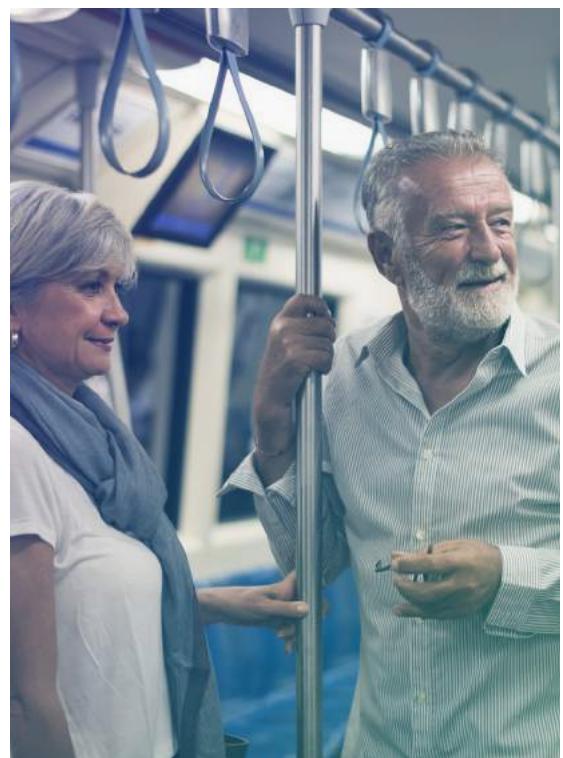
TRN

MASS TRANSIT SUPPORT | O

Supportive programming and policy initiatives can complement public and mass transit infrastructure and encourage public and mass transit use. For example, amenities that make transit more inviting to the community, such as infrastructure that protects riders from inclement weather, can encourage use in this rapidly growing sector.^{40,288,294} Beyond mass transit station amenities, supportive policies such as subsidies can also encourage use of mass transit for all sectors of society.²⁹⁵ Furthermore, working with media to communicate the benefits and further advocate for mass transit use are promising strategies toward increasing mass transit ridership.^{296,297}

INTENT

To encourage public transportation use through supportive programming initiatives and policies.



Part 1: Mass Transportation Campaign

VERIFICATION: Annotated Documents—Policy Document

> A **mixed-media campaign** is implemented that provides information on at least two of the following:

- a. Information on the physical activity benefits of using mass transit.
- b. Information on how community members can obtain mass transit passes or tickets, if available.
- c. Information on available transportation subsidies.

Part 2: Mass Transportation Amenities

VERIFICATION: Annotated Documents—Map

> All transit stations within the project boundary provide at least two of the following:

- a. Benches or other permanent seating furniture.²⁹⁸
- b. Shelters for weather protection.^{294,298,299}
- c. Natural or man-made shading devices intended to block direct sunlight and glare (not applicable to below-grade stations).
- d. Public art or landscape elements.
- e. Trash receptacles.²⁹⁸
- f. Security lighting that is in compliance with applicable features in the Light concept.²⁹⁸



WAY COMMUNITY WAYFINDING | O

Wayfinding is defined as an individual's ability to mentally represent his or her location within a physical space, and integrate this information into a decision-making process that leads to successful passage to their destination.³⁰⁰ Conditions of the built environment have an integral link to this process including the physical design and legibility of a space, the unique landscape and architectural focal points of each community and the small- and large-scale wayfinding signage systems that help users navigate. Wayfinding systems, such as maps and other signage (including digital signage), have become increasingly important as the built environment grows in complexity, size and density. Wayfinding systems aim to encourage walking, cycling and transit use by providing multimodal wayfinding information through the different perspectives of these user groups.²³⁹ These systems help users reach their destinations easily while contributing to accessibility, reduced stress and user empowerment.³⁰¹

Many cities have integrated wayfinding systems into their urban landscape successfully. For example, the Legible London initiative is already working across many boroughs of London with more than 1,300 signs already in place.³⁰² Other streetscape improvement projects, such as Walk! Philadelphia, incorporate directional signage (about 425 signs), diskmaps (about 258 signs) and transit portal signage (about 90 signs), throughout the city and utilize a database system for documenting necessary repairs and upkeep of wayfinding signage throughout the community.³⁰³

INTENT

To provide comprehensive wayfinding signage that fosters successful navigation throughout the project boundary to encourage physical activity.



Part 1: Wayfinding System

VERIFICATION: Annotated Documents—Professional Narrative

> A point-by-point narrative describes the following considerations:

- a. How existing or planned built environment elements contribute to community wayfinding (e.g., landmarks, architectural focal points and sight lines).
- b. How the project determines the type(s), quantity and placement of wayfinding signage that will be used within the project boundary.
- c. Which entities are responsible for inspecting and maintaining the integrity of wayfinding infrastructure.



Part 2: Active Maps

VERIFICATION: Annotated Documents—Map

> Wayfinding signage is present and includes the following:

- a. Forward-facing street map that includes street names.³⁰⁴
- b. Basic cardinal directions.³⁰⁴
- c. Designation of bicycle routes.
- d. Identification and location of, distance to and/or time to key community focal points such as those within an 800 m [0.5 mi] walk distance or bicycle ride.^{239,304}



PAS

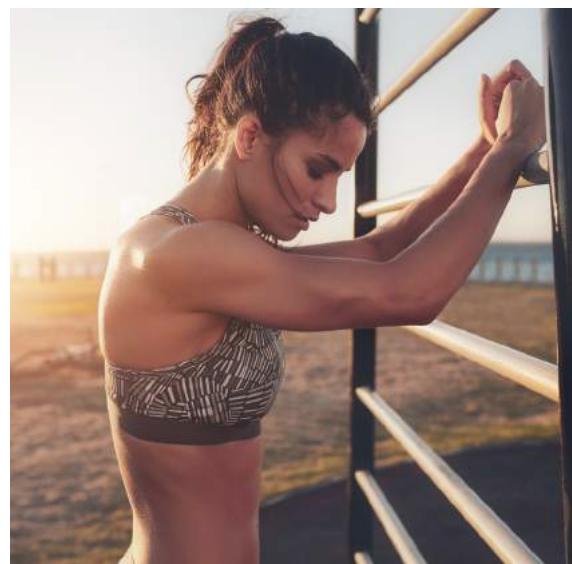
PHYSICAL ACTIVITY SPACES | O

Access to and availability of outdoor and indoor physical activity spaces can facilitate physical activity engagement and healthy weight status across diverse age groups.^{40,251,252,305-316} However, research shows that socioeconomic disparities and overarching neighborhood deprivation are negatively associated with availability, accessibility and quality of physical activity spaces.³¹⁷⁻³²¹ Green spaces and parks serve as key opportunities to promote physical activity and serve as a public use space for physical activity programming. In addition, some cities are installing “fitness zones”—easy-to-use, all-weather, outdoor fitness equipment—in public spaces (such as parks and plazas), which have emerged as a promising intervention to improve park use and energy expenditure.³²²⁻³²⁴

The availability of indoor activity spaces can also support physical activity engagement, particularly during inclement or extreme weather conditions. Furthermore, indoor recreational facilities for children can also be colocated with activity spaces for adults and/or older adults, which may promote activity engagement for multiple age groups.⁴⁰

INTENT

To provide diverse physical activity opportunities in indoor and outdoor spaces that are publicly accessible.





Part 1: Outdoor Fitness Spaces

VERIFICATION: Annotated Documents—Map

> At least two of the following are available for public use (at no-cost) within an 800 m [0.5 mi] walk distance of all residential buildings:

- a. Park or green space.
- b. Plaza.
- c. Athletic field and/or court.
- d. Trail network.
- e. **Blue space.**
- f. Play space geared toward children (e.g., playground).
- g. Fitness zone that includes all-weather fitness equipment.
- h. Colocated adult and child physical activity space (e.g., a playground with an adult fitness zone).

Part 2: Indoor Fitness Spaces

VERIFICATION: Annotated Documents—Map

> At least two of the following are available for public use within an 800 m [0.5 mi] walk distance of all residential buildings (residential buildings that meet this part within their property are considered to be in compliance):

- a. Fitness center, gym or studio.
- b. Recreation center.
- c. Play space geared toward children.
- d. Colocated adult and child physical activity space (e.g., a fitness center with an indoor play space for children).



PRG

ACTIVITY

PROGRAMMING | O

The WHO notes that physical activity is a “vital investment” for communities that has far-reaching impacts across the economic and social vitality of communities.³²⁵ Community programming and access to physical activity spaces has been shown to increase physical activity levels and physical fitness among participating adults and can even help improve social cohesion.^{313,326,327} Organized fitness programs can be offered in a variety of community settings including public parks, public plazas and community centers. Fitness and exercise programs should include a wide variety of age-appropriate and culturally relevant moderate-to-vigorous-intensity activities that target multiple domains of physical fitness and can easily be tailored to children, adults and the elderly.

Successful community programming can be observed in many cities, big and small, developed and developing. For example, New York City offers a diverse selection of fitness classes at no cost, including aerobics, Zumba, chair yoga and many others that are held in public parks throughout the five boroughs.³²⁸ Another example of community-wide programming, popularized in South American cities, is temporary street closures that allow for exclusive use by fitness groups, pedestrians and/or cyclists of diverse age groups and abilities.³²⁹⁻³³⁴ A systematic review on this topic found that street-closure programming ranges from 18 to 64 yearly events, lasting anywhere from 2 to 12 hours, and in some cases includes as few as 60 or as many as 1,000,000 participants.³³⁴ Research also demonstrates that many participants would have otherwise been sedentary had they not participated in activity programming on car-free streets.^{330,331} Notably, research indicates that efforts should be made to bring these exciting programs to a more diverse segment of the community, and emphasize how program leaders can better engage community stakeholders such as local city agencies, shop owners, community partners and other groups to improve the success and sustainability of these programs.^{333,335}



INTENT

To promote physical activity through diverse, age- and culturally appropriate activity programming in public use spaces throughout the community.

Part 1: Physical Activity Promotion

VERIFICATION: Annotated Documents—Policy Document and Map

> Fitness programming (at one or more locations) is offered and meets the following:

- a. Accessible within an 800 m [0.5 mi] walk distance of 75% of all dwelling units.
- b. Offered at no-cost or for a nominal fee.
- c. Offered at least once every three months.
- d. Directed by qualified staff or personnel.
- e. Includes diverse physical activity programming and/or instruction that is friendly for diverse age and ability types (e.g., yoga, aerobics, strength-training, aquatics, fitness education and other group fitness classes).



PET

PET SUPPORT | O

The U.S. Public Health Service highlights emerging evidence on the benefits of pet ownership suggesting that it has a host of positive health benefits, including improved mental and emotional well-being, such as lower rates of stress, anxiety and depression.³³⁶ In addition, pet owners are more likely to meet physical activity guidelines.³³⁶ Possibly as a result of this higher level of physical activity and exercise, pet owners have an improved cardiovascular risk profile and lower rates of obesity.^{336,337}

Part 1: Pet Friendly Spaces

VERIFICATION: Annotated Documents—Map

> At least one of the following is located within the project boundary or a 1.2 km [0.75 mi] walk distance of all dwelling units and includes water bowls (if potable water infrastructure is available), waste receptacles and pet-waste bags at no cost:

- a. Fenced dog park.
- b. Dog-run area.
- c. Public park and/or public space with daily off-leash hours and/or on-leash walking policies.
- d. Walking trail with daily off-leash hours and/or on-leash walking policies.



INTENT

To support pet ownership through pet-friendly, public use spaces to foster physical activity.



THERMAL COMFORT



THERMAL COMFORT BACKGROUND



Extreme hot and cold temperatures can result in extended periods of extreme weather, resulting in events such as summer heat waves and winter cold spells.³³⁸ Heat waves, defined as periods of hot weather that persist for multiple days, can lead to an increased risk of hyperthermia as well as all-cause morbidity and mortality.³³⁹ Cold spells, or periods of cold weather persisting for multiple days, can result in hypothermia as well as increased risk for all-cause mortality.³⁴⁰ Due to the substantial variations in local climates, both heat waves and cold spells are defined relative to local conditions. Vulnerable groups including children, the elderly, outdoor workers and individuals with preexisting health conditions are particularly vulnerable to both extremely hot and extremely cold temperatures.³⁴⁰⁻³⁴³ The largest increase in excess mortality in recent history attributed to a single heat wave occurred in Europe in August of 2003: a total of 70,000 excess deaths were documented.³⁴⁴ Studies project substantial increases of heat-related mortality under a changing climate rarely offset by decreases in cold-related deaths.³⁴⁵⁻³⁴⁷

As the urban landscape evolves, buildings, roads and infrastructure replace areas that were once open land and sources of vegetation. This development has led to the formation of urban heat islands, a phenomenon whereby dense urban areas experience higher temperatures and slower cooling than their rural surroundings.³⁴⁸ In densely populated urban areas, solar energy is absorbed by solid building materials and released back into the atmosphere, keeping temperatures elevated while the temperatures in surrounding, less densely populated areas drop at



night.³⁴⁹ Urban heat islands are a major problem in densely developed areas, as the effects cause increases in energy consumption, elevated emissions of air pollutants, decreased water quality and compromised human health.³⁴⁸⁻³⁵¹

In addition to the sun's health impacts related to increased ambient temperatures, the long-term effects of exposure to ultraviolet radiation from solar rays are a known cause of skin cancer.³⁵²⁻³⁵⁴ Globally, between two and three million non-melanoma skin cancers and 132,000 melanoma skin cancers occur each year, and are responsible for an estimated 10,000 deaths a year.^{355,356} Furthermore, while not a direct effect of an increase in temperature, sunburns are a physical manifestation of solar damage.³⁵⁷ Damage to the skin caused by ultraviolet radiation, a sunburn, causes swelling, pain, redness and blistering.³⁵⁷

The World Health Organization (WHO), the Centers for Disease Control and Prevention (CDC), and other institutions present interventions aimed at protecting both vulnerable populations and the community at large during periods of extreme high or low temperature. Policies that support early weather warning systems, access to designated areas for shelter and respite, mitigation of urban heat island effects through building and landscaping guidelines and strategies that decrease absorption of solar energy and increase evapotranspiration can work together to produce an appreciable reduction on the power grid and improve community health.^{343,350,358-360}



EXT EXTREME WEATHER WARNINGS | P

Periods of extended heat and extreme cold can have significant adverse impacts on physical and mental health.^{343,361-364} Heat waves can result in discomfort, respiratory difficulties, heat cramps and exhaustion as well as heat stroke and heat-related mortality.^{349,365} Cold spells can lead to increased systolic and diastolic blood pressure, greater risk of myocardial infarction and stroke and other types of cold-related morbidity and mortality.³⁶³ Vulnerable populations such as the elderly and homeless are particularly susceptible to heat- and cold-related distress.^{341,365} The effects of heat waves occur within one to two days, while the impacts of cold spells may occur over longer periods.^{363,366} Studies have demonstrated a reduction of heat- and cold-related adverse effects in communities where preventative measures have been implemented.^{340,367} Early warnings play a critical role in protecting communities, particularly the most vulnerable individuals, from adverse health impacts.³⁶⁸ A mechanism for issuing heat and cold warnings as well as a basic communication plan should exist in every community to address the adverse population impacts of extreme weather. Since both heat waves and cold spells are defined relative to local conditions, percentile thresholds are commonly used to issue replicable thresholds.³⁶⁸ Temperatures above the 95th or 99th percentiles have been associated with heat-wave-related mortality and temperatures under the 1st or 5th percentiles with cold-spell-related mortality.^{340,366,369,370} Heat waves and cold spells are often defined as temperatures below or above the identified thresholds indicators for at least two consecutive days.^{368,369,371}

INTENT

To protect against indoor and outdoor impacts of extreme temperatures by communicating extreme weather warnings and health-relevant advice in a timely manner to all people in the community potentially affected by extreme weather events.

Part 1: Heat Warnings

VERIFICATION: Annotated Documents—Policy Document

> Advance heat warnings are issued when local temperatures exceed either one of the following conditions:

- a. The 95th percentile for two or more consecutive days.^{368,372}
- b. Existing heat indices or other threshold values that meet a location-specific definition of a heat wave.³⁷²



Part 2: Cold Warnings

VERIFICATION: Annotated Documents—Policy Document

> Advance cold warnings are issued when local temperatures fall below either one of the following conditions:

- a. The 5th percentile for two or more consecutive days.³⁴⁰
- b. Existing threshold values that meet a location-specific definition of a cold spell.³⁷²

Part 3: Adverse Impacts Communication

VERIFICATION: Annotated Documents—Policy Document

> The following requirement is met:

- a. A public education and outreach plan is in place to communicate ways to protect against the indoor and outdoor impacts of extreme weather before, during and after heat waves and cold spells, with particular focus on communicating to the elderly, children, mobility-restricted individuals and low-income households.^{340,373,374}



HET

URBAN HEAT ADAPTATION: COMMUNITY SUPPORT | O

Although heat warnings are important regarding reducing urban heat and heat-related impacts, they are likely to have limited effectiveness if not accompanied by comprehensive strategies addressing adverse heat impacts.³⁷⁵ Urban adaptation to heat should encompass various measures that improve both the emergency response to heat waves and the long-term heat resilience of communities.³⁷³ These measures should ideally go beyond basic extreme weather response warnings and communication and integrate quantitative and qualitative data on exposure, sensitivity and adaptive capacity.³⁷⁶ Communities may also consider implementing protocols whereby residents check in on high-risk groups during emergency events to provide assistance and support if necessary. These practices are strongly encouraged to foster social cohesion in the community and to promote health and wellness during heat-wave episodes. For instance, one study estimated that heat warnings, in combination with other heat adaptation measures, reduced excess mortality in Philadelphia by 2.6 lives per day over a three-year period among individuals 65 years of age and older.³⁷⁷

INTENT

To promote community resiliency during extreme heat events, particularly as it relates to equipping vulnerable populations with tools to offset potential negative health impacts, via infrastructural and basic needs support.





Part 1: Cooling Shelters

VERIFICATION: Annotated Documents—Policy Document

> The following requirements are met when heat warnings are issued as described in the Feature EXT—Extreme Weather Warnings:

- a. Public announcements informing the public of all heat-relief services available in the community.^{373,378}
- b. Public and privately owned buildings with designated public use space, if present, are open during normal business hours and designated as public cooling shelters.^{373,379}
- c. Public and private homeless shelters, if present, provide connection services to find vacancies to accommodate all homeless persons.^{373,378}

Part 2: Utility Management for Hot Weather

VERIFICATION: Annotated Documents—Policy Document

> One of the following requirements is met when heat warnings are issued as described in the Feature EXT—Extreme Weather Warnings:

- a. Planned upcoming utility shutoffs are temporarily suspended.³⁶⁵
- b. Cooling assistance is provided for energy use in low-income households.³⁸⁰



HPE

URBAN HEAT ADAPTATION: PUBLIC EDUCATION | O

Although heat warnings are important for reducing urban heat and reducing heat-related impacts, they are likely to have limited effectiveness if not accompanied by comprehensive strategies addressing adverse heat impacts.³⁷⁵ Common community practices range from operating emergency “heat lines” and cooling centers to community education aimed at improving heat risk awareness, working closely with health service providers and encouraging residents to check in on each other in times of extreme weather.³⁸¹⁻³⁸³

Part 1: Emergency Phone Lines

VERIFICATION: Annotated Documents—Policy Document

- > Emergency heat lines are operated for community members to receive information on at least the following:
 - a. Symptoms of heat stress and other heat-related morbidities.³⁸⁴
 - b. Available heat-related services and resources in the community.³⁸⁴

Part 2: Community Education and Engagement

VERIFICATION: Annotated Documents—Policy Document

- > The following requirements are met:
 - a. Community education initiatives are planned in collaboration with local organizations throughout the year on symptoms of heat stress and necessary measures to help protect the health and well-being of vulnerable populations, including the elderly, children, mobility-restricted individuals, outdoor workers and low-income households.³⁷³
 - b. Specific community members are designated responsible for performing checks during heat waves on vulnerable populations, including the elderly, children, mobility-restricted individuals and low-income households.³⁸¹

INTENT

To promote community resiliency during extreme heat events, particularly as it relates to educating vulnerable populations about tools to offset potential negative health impacts.



CLD

URBAN COLD ADAPTATION: COMMUNITY SUPPORT | O

Urban adaptation to cold weather involves a comprehensive set of measures aimed at improving the community response. For instance, longer and more intense cold spells, as well as cold spells occurring earlier in the season, are more dangerous to humans.³⁶⁹ In addition, since a substantial portion of the cold-related health impacts are due to factors other than cold weather, such as influenza, the prevention of influenza, cardiovascular diseases and other common cold-season health issues can improve the public health resilience to cold temperatures.³⁸⁵ Any local adaptation measures should consider individual-level vulnerabilities, including homelessness, poverty, old or young age, disability and various health conditions.^{340,386} Various short- and long-term measures such as financial aid for energy use, operating warming shelters and improving housing conditions can be implemented to reduce cold-related health impacts.^{387,388}

Part 1: Warming Shelters

VERIFICATION: Annotated Documents—Policy Document

> The following requirements are met when cold warnings are issued as described in the Feature EXT—Extreme Weather Warnings:

- Public and private homeless shelters, if present, provide connection services to find vacancies to accommodate all homeless persons.³⁷⁸
- Public announcements informing the public of all available cold relief services and locations.³⁷⁸

INTENT

To promote community resiliency during extreme cold weather events, particularly as it relates to equipping vulnerable populations with tools designed to offset potential negative health impacts, via infrastructural and basic needs support.

Part 2: Utility Management for Cold Weather

VERIFICATION: Annotated Documents—Policy Document

> One of the following requirements is met when cold warnings are issued as described in the Feature EXT—Extreme Weather Warnings:

- Planned upcoming utility shutoffs are temporarily suspended.
- Financial aid is provided for energy use in low-income households.³⁴⁰



CPE

URBAN COLD ADAPTATION: PUBLIC EDUCATION | O

Urban adaptation to cold should involve a comprehensive set of measures aimed at providing a high level of awareness of possible disease during the winter season. For instance, longer and more intense cold spells as well as cold spells occurring earlier in the season are more dangerous to humans.³⁶⁹ Various short- and long-term measures such as risk communication and education should be implemented to reduce cold-related health impacts in parallel with issuing cold warnings.^{340,387}

INTENT

To promote community resiliency during extreme cold weather events, particularly as it relates to educating vulnerable populations about tools to offset potential negative health impacts.





Part 1: Public Health Preparedness

VERIFICATION: Annotated Documents—Policy Document

> Community education programs are initiated to educate the public on at least the following:

- a. Common diseases related to cold weather events such as influenza, the common cold, sinusitis, cardiovascular diseases and asthma.³⁴⁰
- b. Individual-level cold adaptation strategies such as wearing appropriate clothing, exercise and avoiding alcohol and drug use.³⁸⁷
- c. Related services and resources available in the community such as immunizations.³⁴⁰

Part 2: Community Outreach

VERIFICATION: Annotated Documents—Policy Document

> One of the following requirements is met:

- a. Educating homeowners, building managers and other **stakeholders** who can improve the energy efficiency of buildings (e.g., through retrofit programs) about the long-term financial and health benefits of various interventions.³⁸⁷
- b. Improving community cohesion by enabling a dialogue between citizens, policy makers and various professionals involved with cold adaptation, such as public health workers and emergency planners.^{387,389}



HIM

URBAN HEAT ISLAND MITIGATION | O

As communities expand, development replaces natural features of the landscape. By replacing open spaces and vegetation with buildings that inhibit wind and that use materials that retain heat, a new phenomenon known as the urban heat island has permeated the urban landscape.³⁹⁰⁻³⁹² The most prominent feature of an urban heat island is a sustained elevated temperature when compared to the immediately surrounding suburban or undeveloped areas.³⁴⁸ A cascade of negative effects associated with sustained elevated temperature, such as increased energy demand and increased air pollution, pose a dangerous threat to urban populations. A wide range of infrastructure-related and greening strategies can be adopted to mitigate urban heat islands. Most strategies are aimed at restoring the natural system of evapotranspiration, thereby releasing solar radiation back toward the sky.³⁵⁰ For example, green roofs not only reduce the temperature inside of buildings as a result of evapotranspiration and the shading but also have a cooling effect on the ambient air.³⁹³ Various cool roof technologies similarly lower local air temperatures and improve human comfort.³⁹⁴⁻³⁹⁶ Reducing surface temperatures of sidewalks, roadways and parking lots can also be effectively achieved through a mixture of greening, use of various high **albedo** and colored pavements and design strategies. Three overall strategies are traditionally used to reduce surface temperature of pavements: (1) increasing albedo, (2) reducing the proportion of the absorption to the thermal conduction and (3) raising thermal inertia.³⁹⁷ Specific approaches include resurfacing pavements with light-colored materials or utilizing reflective concrete or thermochromic pavements.³⁹⁸⁻⁴⁰⁰ Water-holding and heat- harvesting pavements are also efficient in mitigating the urban heat island.⁴⁰¹⁻⁴⁰⁴ See Appendix T1 for resources on heat reduction techniques and materials.

INTENT

To diminish the buildup of heat in cities by reducing the amount absorbed and retained by buildings and hardscape.



Part 1: Roof Tops

VERIFICATION: Annotated Documents—Map and Professional Narrative

> 75% of all non-occupiable or non-mechanical rooftops (excluding areas with photovoltaic installations) owned, operated or managed by the project owner meet one or more of the following:

- Uses a **green roof system** that includes at least a 2-inch covering of hardy groundcover.^{393,395,405}
- Low-sloped roofs (slope \leq 2:12) have a three-year aged **solar reflectance index (SRI)** of 64, or an initial SRI of 82.⁴⁰⁶
- Steep-sloped roofs (slope $>$ 2:12) have a three-year aged SRI of 32, or an initial SRI of 39.⁴⁰⁶

Part 2: Sidewalks and Roadways

VERIFICATION: Annotated Documents—Map and Professional Narrative

> For 50% or more of pedestrian-accessible street segments in the project and for 50% of roadways in the project, one or more of the following is met:

- Sidewalks provide shade with trees or with architectural devices or structures that have a three-year aged **solar reflectance (SR)** value of at least 0.28, or an initial SR of at least 0.33 at installation.⁴⁰⁶
- Roads use paving materials with a three-year aged solar reflectance (SR) value of at least 0.28, or initial SR of at least 0.33 at installation.⁴⁰⁶

Part 3: Parking Lots

VERIFICATION: Annotated Documents—Map and Professional Narrative

> 25% or more of all parking (measured by number of spaces) meets one of the following requirements:

- Constructed of **cool pavement** such as asphalt modified with high albedo materials or colored pavements.^{399,407,408}
- Grass covered with soil enclosed in a lattice structure providing lateral containment.⁴⁰⁸⁻⁴¹⁰
- Constructed of vegetated or non-vegetated permeable pavements.^{407,411}
- Covered by another floor of parking, a building, a roof, or other coverings.



VEG

URBAN VEGETATION AND GREEN SPACES | O

Urban vegetation can play an important role in moderating local climate throughout the year. The use of trees or vegetation facilitates evapotranspiration through the provision of shade, contributing to lower surface and air temperatures.³⁵⁰ A shaded surface can be up to 25 °C [45 °F] cooler than the peak temperature of the unshaded surface.⁴¹² Co-benefits of introducing urban vegetation and green spaces into a community include improved air quality, water quality (often via improved stormwater management) and savings in energy and pavement maintenance.⁴¹² Mimicking natural ecosystems can also be a good strategy for improving sustainability and reducing tree maintenance requirements (i.e., by relying on plants that are native to the climate).⁴¹³

INTENT

To promote heat mitigation strategies relying on tree and/or vegetation that reflect local climate conditions in both sparse and crowded areas.

Part 1: Tree Shading

VERIFICATION: Annotated Documents—Map and Professional Narrative

> One of the following requirements is met using trees and landscaping appropriate to the climate:

- 25% or more of paved surfaces area as measured across the entirety of the project boundary including roads, pedestrian-accessible street segments and parking lots are covered within 15 years of construction by tree canopy.⁴¹³
- 25% or more of road length as measured across the entirety of the project boundary with more than one lane in each direction separated by a line of trees.^{413,414}

Part 2: Vegetation Coverage

VERIFICATION: Annotated Documents—Map and Professional Narrative

> A combination of the following requirements is met for all playgrounds, sports fields, courtyards and public squares or plazas:

- 10% or more of the area is covered with horizontal or vertical vegetation.^{412,415}
- 10% or more of existing walls and other infrastructure are adapted to support vines or other types of green wall vegetation.^{416,417}



WAT URBAN WATER BODIES | O

Water bodies can have a positive effect on microclimates in urban areas by moderating extreme temperatures. Small water bodies such as fountains, pools and ponds can regulate temperature fluctuations and help improve thermal comfort during days of extreme heat.^{418,419} Studies suggest that temperatures around and downwind of water bodies can be 1–2°C [2–4°F] lower compared to surrounding areas.⁴¹⁹



INTENT

To temper local temperature fluctuations in urban areas, particularly in hot climates.

Part 1. Water Bodies

VERIFICATION: Annotated Documents—Map

> At least one of the following water bodies is within 1.2 km [0.75 mi] walk distance (or 15-minute mass transit trip) of 50% of community residents:

- A pond or other body of water.
- A water fountain or other water feature.
- A pool or alternative water body for swimming.⁴¹⁹



SUN PERSONAL SUN EXPOSURE | O

Moderate exposure to sunlight can be beneficial; however, excessive exposure to sun can pose serious hazards.

Ultraviolet (UV) radiation is a class 1 carcinogen, a “known human carcinogen” according to the International Agency for Research on Cancer (IARC).⁴²⁰ Exposure to UV radiation, while not 100% preventable, is manageable. The CDC recommends interventions and strategies tailored to activity and setting, such as occupational exposure, tourist activity exposure and everyday precautions.^{421,422}

INTENT

To promote a multipronged approach to ultraviolet radiation protective behaviors at the community level so that excessive exposure to the sun is limited.



Part 1: Occupational Exposure

VERIFICATION: Annotated Documents— Policy Document

> Employers managed or contracted by the project owner requiring five or more employees to work outdoors at one time implement the following:

- Work rest schedules based on heat index and level of activity.⁴²³
- Ultraviolet radiation protection plan.⁴²⁴
- Team health awareness plan.⁴²⁵

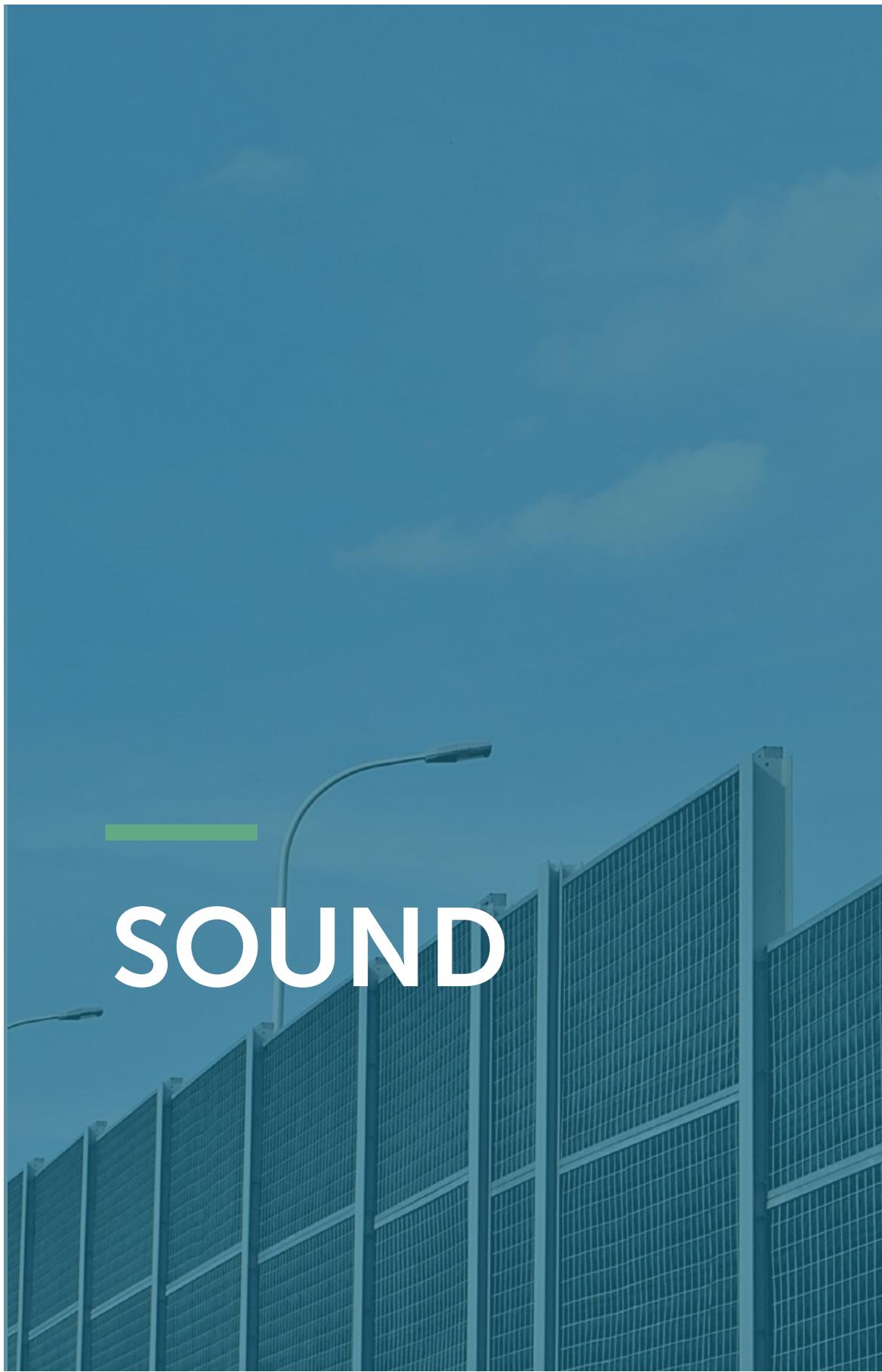


Part 2: Recreational Exposure

VERIFICATION: Annotated Documents— Policy Document

> Recreation areas that are owned, operated or managed by the project owner that charge admission for the expressed purpose of tourism or leisure activity where patrons are exposed to direct sunlight for an extended period meet one of the following requirements:

- Offer broad-spectrum UV protection at no cost, with a minimum sun protection factor (SPF) of 15 for times with least 50% of anticipated occupancy.⁴²¹
- Solar shades, umbrellas, tree canopies and other natural or artificially shaded areas that can provide coverage for at least 25% of anticipated occupancy.



SOUND BACKGROUND



Acoustic comfort is a state of satisfaction with the sound environment. It does not imply an absence of sound; rather, it requires that sound in a space is of the appropriate type and level for work, communication or leisure. It is a subjective measure; what one person may consider relaxing, another may deem distracting or annoying sound. Sound that is distracting, annoying or disruptive—most simply described as unwanted sound—is called noise.

In community settings, noise is discussed in the context of environmental noise. As defined by the World Health Organization (WHO), environmental noise includes noise from all sources in a community with the exception of occupational noise at an industrial workplace.⁴²⁶ Typical sources of environmental noise include traffic, such as road, rail and aircraft; industry, including construction; and neighbors, for instance, noise from residences or commercial establishments.

The significance of the health effects from environmental noise exposure varies. Impulsive or intermittent noise can disrupt speech or affect work productivity, and noise at a sufficiently high volume and duration can cause hearing loss. Noise exposure can activate the sympathetic nervous system and prolonged exposure can cause stress, which is correlated to myriad physiological and psychological health effects.⁴²⁷⁻⁴²⁹ Noise need not be excessively loud to be bad for health.⁴³⁰ Exposure to environmental noise, even at volumes lower than thresholds for hearing loss, is correlated to adverse health outcomes including annoyance,



sleep disturbance, cognitive impairment and cardiovascular disease.⁴²⁷

As populations continue to grow and global urbanization intensifies, the prevalence of noise and the number of individuals negatively impacted by noise increases. Data from six European countries identifies traffic noise as the third most important stressor related to environmental disease burden after particulate matter pollution and secondhand smoke.⁴³¹ The WHO estimates that in Western European countries alone, "at least 1 million healthy life years are lost every year from traffic-related noise."⁴²⁷

Exposure to community noise and the impacts of noise exposure, especially in the residential setting, are not experienced equally across a community. Older adults, children, people who have chronic medical conditions and shift workers are at increased risk for ill health effects from noise exposure due to their exceptional sleep schedules and sensitivity to disturbances.⁴³² Furthermore, people who live with poor-quality housing conditions (e.g., poor insulation) and in residential areas with noise pollution suffer disproportionate risk of poor health outcomes due to excessive

noise exposure.⁴³²

Strategies that aim to address environmental noise target at least one of three elements of sound propagation: the source, the transmission pathway or the receiver.

These strategies come in many forms, from administrative controls, such as land use and zoning policies, to design principles that separate noise sources from receivers or block receivers from experiencing noise. Programmatic approaches, including education programs, promote hearing health and policies, such as the distribution of hearing protection devices (HPDs) that assist individuals in protecting themselves from noise exposure that can cause hearing loss. While each of these known strategies can help reduce noise propagation and exposure, the creation and maintenance of healthy acoustical environments for communities requires a prioritization of acoustics in the project planning, design development and construction process. By prioritizing acoustics and its impacts on health, collaboration between decision-makers and stakeholders can lead to healthier communities.



SOU

SOUND PLANNING | P

Planning is a key strategy to achieving suitable environmental noise levels in communities. Noise is best addressed at its source, which means that proper acoustical planning has the potential to eliminate or reduce the risk for environmental noise production and exposure. Properly planning for acoustic priorities and incorporating design and policy best practices in the built and natural environment help to create communities with healthy and comfortable levels of environmental noise.

INTENT

To prioritize consideration of environmental noise in project planning and design development.

Part 1: Noise Narrative

VERIFICATION: Annotated Documents—Professional Narrative

- > A comprehensive narrative describes how the project prioritizes acoustics in the planning and design development process and details an action plan for noise mitigation and management, including a description of each of the following:
 - a. Major sources of sound, both desirable and undesirable, within or nearby the project prior to construction outset and anticipated throughout the life of the project.
 - b. Acoustic priorities for different land use zones within the project, including the identification of **noise-sensitive spaces**.
 - c. Sound mitigation design elements of the project.
 - d. Strategies for protecting the acoustic environment in areas of the project that presently have a healthy level of environmental noise (e.g., quiet spaces).⁴³³



SMP COMMUNITY SOUND MAPPING | O

Noise maps are assessment tools that depict modeled or measured exposure to environmental noise over a specified area and time period. As comprehensive illustrations of an area's soundscape, noise maps can guide planners and designers in site planning and land use decision-making, including the incorporation of sound mitigation strategies in the built and natural environment.⁴³³

INTENT

To illustrate the acoustic environment in an area in order to inform noise mitigation planning that protects residents from exposure to harmful noise levels.

Part 1: Noise Map

VERIFICATION: Annotated Documents—Map

> A strategic noise map, reviewed and revised (as necessary) every five years, includes the geographic area within the project boundary and identifies each of the following:

- a. Noise sources, including transportation infrastructure (roads, railways, airports, etc.), industrial activity sites and noise generated from other human activity.⁴³³
- b. Day, evening and nighttime environmental noise, presented as long-term averaged sound levels (e.g., L_{den} , L_{night} , L_{dn}), modeled prior to construction outset and updated throughout the project lifecycle.^{433,434}
- c. Environmental elements that affect sound propagation, including terrain, land cover, barriers, roads and buildings.⁴³⁴
- d. Loud and quiet (relatively) areas of the project and its surrounding areas.
- e. Estimate of the number of people exposed to environmental noise, with exposure specified by sound level bands.⁴³³



PLN

PLANNING FOR ACOUSTICS | O

Land use planning is a valuable tool utilized by urban planners to define and maximize the use of a parcel of land. In the context of acoustics, land use planning is implemented to maintain efficient use of land for transportation, entertainment and future development while minimizing disruptions to the acoustic comfort of those who live, work and play in a community. Exposure to noise can have negative impacts on physical and mental health.⁴²⁷ Children exposed to aircraft and rail traffic noise in their schools can experience detriments to cognitive development, including reading comprehension delays.^{435,436} Even at moderate exposure levels in their communities, children exposed to noise can experience elevated stress and negative effects on memory.^{437,438} Poor health effects from excessive noise exposure are not limited to children. Adults exposed to noise in their homes and communities are at higher risk for hypertension, myocardial infarction and stroke.^{35,439-444} Long-term exposure to aircraft noise has even been linked to increased risk for diabetes in older adults.⁴⁴⁵ Noise-sensitive spaces such as schools, homes and hospitals should especially be protected from common community noise sources including aircraft, road and rail traffic. When deciding how to incorporate a variety of land use cases in a community, projects should consider the acoustic priorities and goals of different space types.

INTENT

To reduce resident exposure to noise from traffic and industry through land use planning.



Part 1: Noise Compatible Development

VERIFICATION: Annotated Documents— Professional Narrative

> A narrative describes how noise-compatible development (siting facilities and properties so that their uses and sound priorities complement one another) within the following areas (as applicable) is utilized to maximize acoustic comfort:

- a. Industrial facilities.⁴⁴⁶
- b. Commercial facilities⁴⁴⁶
- c. Public service facilities.⁴⁴⁶
- d. Community service facilities.⁴⁴⁶
- e. Residential properties.⁴⁴⁶
- f. Multiuse properties.⁴⁴⁶
- g. Public and private right-of-ways.⁴⁴⁶
- h. Public spaces.⁴⁴⁶





ORD NOISE ORDINANCE | O

Ordinances or regulations that pointedly address environmental noise exist in cities around the world. Noise ordinances can include a variety of policies, including limits on nighttime sound levels and the establishment of curfews for major noise sources, such as industrial activity or neighborhood noise. Setting regulations on noise is an effective strategy for noise management, and can cost less than other mitigation approaches such as alterations to the built environment.⁴⁴⁷

INTENT

To reduce resident exposure to environmental noise through policies that prohibit excessive noise.

Part 1: Ordinance Adoption

VERIFICATION: Annotated Documents—Policy Document

- > A noise ordinance (e.g., existing municipal code, community bylaw, self-imposed policy) defines, at minimum, the following requirements:
 - a. Maximum allowable sound levels by **receiving land use**.⁴⁴⁸
 - b. Prohibited acts, including time period restrictions for allowable noise from sources such as traffic, industry, commercial establishments and residential dwellings.⁴⁴⁸
 - c. Exceptions and variances.⁴⁴⁸
 - d. Enforcement duties.⁴⁴⁸



NLV

NOISE LEVEL LIMIT | O

Most commerce and activity in a community takes place during daylight hours, with evening and nighttime hours primarily reserved for rest and sleep. Policies that limit the maximum allowable level of community noise throughout the day help to lower overall noise in a community, protecting the health and acoustic comfort of community members.



INTENT

To reduce exposure to environmental noise, especially in noise-sensitive spaces.

Part 1: Maximum Allowable Sound Level

VERIFICATION: Annotated Documents— Professional Narrative

> A plan for achieving the following environmental sound level goal, including a timeline, strategy for evaluation and summary of progress is maintained:

- a. Outside of residences: L_{dn} 65 dBA or less.⁴⁴⁹



HEA

HEARING HEALTH EDUCATION | O

Excessive noise exposure carries health risks, including a host of physiological and psychological health effects.⁴²⁷ In particular, noise-induced hearing loss (NIHL) due to excessive noise exposure is completely preventable.⁴⁵⁰ Despite its preventability, prevalence of hearing loss is increasing in the U.S., particularly among adolescents.⁴⁵¹ Globally, half of all hearing loss cases are avoidable through primary prevention methods including immunization, screening and reducing exposure to excessive noise.⁴⁵² Programs that educate the public on the health risks of noise exposure and provide them with the tools they need to protect themselves help individuals make informed decisions about their hearing health.



INTENT

To educate community members on the health and wellness impacts of excessive noise exposure and promote strategies to protect hearing health.



Part 1: Hearing Health Promotion

VERIFICATION: Annotated Documents—Policy Document

> Noise awareness education across the **lifespan** is facilitated through at least two of the following:

- Public dissemination of noise and hearing health information.
- School-based hearing health education programs.⁴²⁶
- Occupational-setting-based hearing health education programs for employers managed or contracted by the project owner.⁴⁵³
- Recreational-setting-based hearing health education programs.

Part 2: Hearing Protection Programming

VERIFICATION: Annotated Documents—Policy Document

> At least one of the following hearing protection programs is implemented:

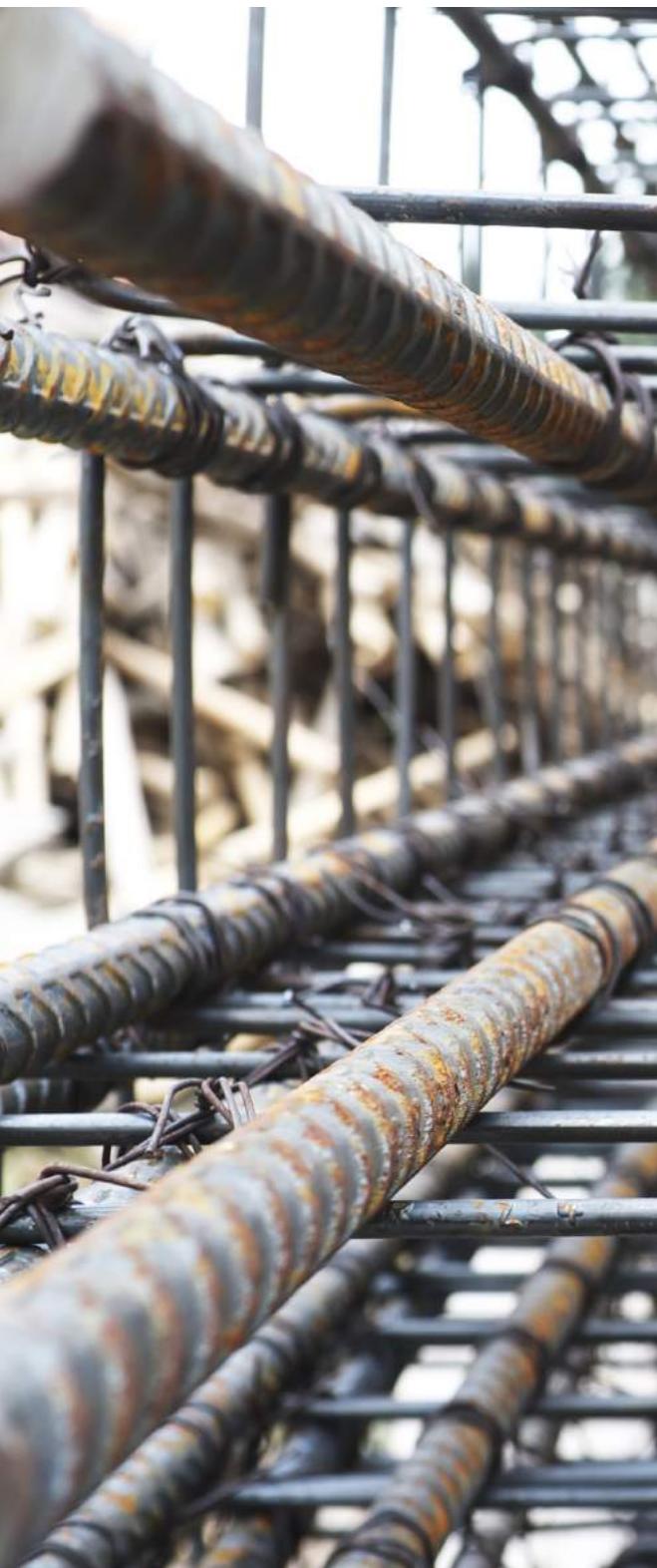
- No-cost hearing protection device (HPD) (such as earplugs) distribution programs in all indoor and outdoor venues owned, managed or contracted by the project owner where sounds levels exceed a four-hour time-weighted average sound level of 95 dBA.^{454,455}
- Hearing conservation programs** in all occupational settings where eight-hour time-weighted average sound level is 85 dB or higher.⁴⁵⁶



MATERIALS



MATERIALS BACKGROUND



The chemical industry is central to the global economy, responsible for converting raw materials such as oil, natural gas, air, water, metals and minerals into more than 70,000 different chemical substances and an endless variety of products and materials that make up buildings, developments and products.⁴⁵⁷ Despite the industry's positive impact on life expectancy, living conditions and health, the increase in volume and exposure to numerous chemicals over the past 150 years poses mounting health and environmental concerns.⁴⁵⁸

Global chemical production continues to rise today at an annual rate of about 3%; projected to surpass the global population growth rate.⁴⁵⁸ Unfortunately, current government and international regulations and policies demonstrate gaps and inconsistencies in the legal tools needed to mitigate risks.⁴⁵⁹ Currently, there are no globally applicable regulations dictating safe chemical use, and individual countries that do have national chemical safety regulations enforce their own standards. The lack of an international standard of classification has led to a piecemeal system of global regulations with no enforcing body or oversight.⁴⁵⁹ The Centers for Disease Control and Prevention (CDC), which provides one of the most authoritative listings of biomonitoring data for the United States, found 265 chemicals across the survey period 2012–2015 in the blood, serum and urine from a **representative sample** of about 2,500 Americans.⁴⁶⁰ Some of these chemicals, such as dichlorodiphenyltrichloroethane (DDT) and polychlorinated biphenyls (PCBs), have



been banned for more than 30 years.⁴⁶⁰ In Europe, the World Health Organization (WHO) found elevated levels of multiple chemical **carcinogens** such as cadmium, hexavalent chromium and benzene in blood and urine, as well as brominated flame retardants, including 2,2',4,4',5- pentabromodiphenyl ether (BDE-99), commonly used in polyurethane foams, upholstered furniture and carpet backing, and Hexabromocyclododecane (HBCD), typically used in polystyrene insulation foams in buildings, both of which are targeted by UNEP Stockholm Convention's **persistent organic pollutants (POPs)** list for elimination.⁴⁶¹⁻⁴⁶³ These results highlight the need for a global system of risk assessment and chemical management.

Despite the ubiquity of man-made chemicals in global circulation, the compositional nature, longevity and the health and environmental impact of a large number of them is largely unknown.⁴⁶⁴ Chemical hazards at the community

level can come from various sources. For example, older structures undergoing renovation or demolition can expose community residents to **toxic** chemicals such as **asbestos**, a known human carcinogen; PCBs, a probable human carcinogen; and **lead**, a **neurotoxicant**.^{465,466} Common outdoor structures, including park benches, railings, decks and picnic tables, can be sources of hazardous fungicides and biocides, while various hazardous **pesticides** and **herbicides** commonly used in landscaping pose a number of serious health risks.^{460,467-469} Fortunately, there is growing demand for, and supply of, green chemistry technologies and emerging tools that promote transparency and accountability in material and product manufacturing. Existing databases, tools and guidelines can provide direction in implementing policies for sampling, assessment and remediation, thus helping communities identify high-priority hazards and select better products that fulfill community priorities and needs.



HWM

HAZARDOUS WASTE MANAGEMENT | P

“Hazardous waste” is a label assigned to a specific class of refuse. This describes a class of waste potentially dangerous to living beings and/or the environment, particularly when handled, transported or disposed of in an unregulated or uncontrolled manner, thereby creating exposure risk via air, water and soil.⁴⁷⁰ Typically, waste goes through several steps to categorize and determine exemption or exclusion from hazardous waste regulation, which is typically defined at the national level, and/or through international waste treaties and agreements. Waste that is considered hazardous is then assigned a code reflecting necessary regulatory measures. Codes can reflect human health hazards, i.e., toxicity, or other properties including ignitability, corrosiveness and reactivity. Wastes with hazardous properties can range from products of manufacturing and industrial processes to batteries and fluorescent bulbs.⁴⁷⁰

Because of differences in the national definitions of hazardous wastes, national data collection, monitoring and enforcement, the amount of hazardous waste generated globally is unknown. Further, because the practice of hazardous waste disposal is highly regulated in some countries while not in others, this discrepancy has contributed to a dangerous practice of dumping of hazardous waste across international borders.⁴⁷¹ Proper, regulated disposal of hazardous waste is critically important to human health and the environment; effective management at the community scale can mitigate risk of environmental contamination and damage to human health.

INTENT

To support waste management and sanitation practices that take into account hazardous waste streams and reduce risk of environmental contamination and health hazards.



Part 1: Hazardous Waste Management

VERIFICATION: Annotated Documents—Professional Narrative

> A plan that includes information on deposit locations and hours of operation governs the management of the following hazardous wastes, as defined per regulations/guidelines in Table MA1:

- a. Batteries (e.g., nickel cadmium).
- b. Pesticides that are either recalled or collected in waste pesticide collection programs.
- c. Mercury-containing equipment.
- d. Mercury-containing lamps.



WST

WASTE STREAM MANAGEMENT | O

Global municipal solid waste generation is expected to increase to approximately 2.2 billion tons per year from 1.3 billion tons by 2025, an increase from 1.2 to 1.42 kg per person per day.⁴⁷²

Improperly managed waste can have tremendous health, environmental and economic costs downstream; unsanitary waste disposal methods can release hazardous chemicals into nearby groundwater and air and contribute to diseases.⁴⁷² Particularly in developing countries, uncollected solid waste can be responsible for flooding and air and water pollution.

Waste generation is closely linked with urbanization. As the rate of urbanization increases, particularly in larger, emerging markets, waste disposal and management will become a central and critical barrier to sustainable global development. No solution to waste management is without cost. Uncontrolled burning can result in serious toxic airborne releases, and while controlled waste incineration is necessary, it is also expensive, negatively impacts air since much of the waste stream is not combustible and requires steps such as by-product/ash disposal. Landfills are also tricky, requiring land availability, careful siting and management.

Solid waste management is the most critical service a municipality provides. A well-planned and properly maintained waste prevention and management practice is designed to address various material-related streams, to reduce environmental contamination and to protect health and well-being at the community level.

INTENT

To support comprehensive waste management and sanitation practices to mitigate environmental contamination and health hazards.

Part 1: Waste Reduction

VERIFICATION: Annotated Documents—Professional Narrative

> A waste stream management narrative and plan focusing on waste diversion is

developed and applied demonstrating the below hierarchy, or (if applicable) local plan cited:

- a. Waste or source reduction (including prevention, minimization and reuse).
- b. Recycling and materials recovery.
- c. Disposal (including incineration).



REM

SITE REMEDIATION AND REDEVELOPMENT | O

As communities grow and change, land use and development type undergo change as well. Such **change poses challenges**, for example sites that may have previously contained hazardous industries may contain residual chemicals lingering in the soil, air, surface or groundwater. Contaminated soil can leach toxic chemicals into nearby groundwater or surface waters, accumulate in sediments, volatilize and pose hazards to indoor air in buildings on the premises or be carried by wind-borne dust.⁴⁷³ When left unmanaged, contaminants from such sites can pose exposure hazards to those who live and work nearby through inhalation, ingestion or dermal contact.⁴⁷⁴

Un-remediated areas pose a significant public health risk if redevelopment or reuse occurs without proper mitigation of the remaining chemical hazards. Remediation removes hazards, and further redevelopment can work to accommodate environmentally responsible growth and save green land from sprawl development. Economically this can mean new sources of local revenue from previously unproductive land and revitalized neighborhoods.^{475,476}

Part 1: Cleanup and Redevelopment

VERIFICATION: Annotated Documents—Map and Remediation Report

- > Contaminated land within the project boundary is identified and remediated per standards/guidelines in Table MA1 or equivalent prior to development. Sustainable remediation programs considered equivalent must include the following criteria:
 - a. Provide risk-based approach to sustainable remediation (risk assessment/risk/benefit analysis).
 - b. Consider the three pillars of sustainability: society, environment and economy.
 - c. Apply a tiered approach to assessment and provide an appraisal of remediation options.
 - d. Consider safe working practices for workers during remediation.
 - e. Require record keeping of decision making and assessment processes.
 - f. Provide protocol for engaging stakeholders, including management of impacts on community.
 - g. Adopt a long-term vision that ensures lasting results.

INTENT

To support policies that mandate remediation and redevelopment of sites contaminated with hazardous waste or pollution from previous commercial use, alleviate environmental contamination and mitigate human exposure to toxic chemicals.



CRE CONSTRUCTION REMEDIATION | O

The process of demolition, renovation and construction brings with it many challenges including the handling of materials that might have at one time been deemed safe but are now considered **hazardous**. The global construction waste management market is forecast to grow at an annual rate of 9.67% through 2019, highlighting the importance of proper waste disposal. Improper handling and disposal of waste poses a very real threat to human health and the environment.^{477,478} Contamination of air, water and soil due to the process of demolition or renovation can have direct impact on community members. Although local and national laws in some countries mandate safe handling and disposal of construction waste, this is not necessarily the case globally. In developing countries, regulations that protect health are often viewed as cumbersome or as a hindrance.⁴⁵⁹ The establishment of remediation protocols and responsible disposal of materials is vital to population health at the community level.

INTENT

To support policies that mandate a protocol for demolition/renovation of structures, both interior and exterior, to mitigate airborne contamination and potential exposure hazards.

Part 1: Lead Abatement

VERIFICATION: Annotated Documents—Remediation Report

- > Renovation or demolition of buildings owned, operated or managed by the project owner and constructed prior to any applicable laws banning or restricting lead paint, lead evaluation and abatement is conducted in accordance with the following guidelines:
 - a. An on-site investigation of the space is conducted by a certified risk assessor or inspector technician to determine the presence of any lead-based hazards in paint, dust and soil using definitions established by standard(s) in Table MA1.
 - b. All spaces found to have lead-based hazards must adhere to work practice standards for conducting lead-based paint activities, as outlined in regulations/guidelines Table MA1.

Part 2: Asbestos Abatement

VERIFICATION: Annotated Documents—Remediation Report

> Renovation or demolition of buildings owned, operated or managed by the project owner constructed prior to any applicable laws banning or restricting asbestos, testing, evaluation and abatement is conducted in accordance with the following guidelines:

- a. An on-site investigation of the space is conducted by a certified risk assessor or inspector technician to determine the presence of asbestos hazards per standard(s) in Table MA1.
- b. All spaces determined to contain asbestos hazards must adhere to work practice standards for conducting asbestos abatement activities, as outlined in Table MA1.

Part 3: Polychlorinated Biphenyl Abatement

VERIFICATION: ANNOTATED DOCUMENTS—REMEDIATION REPORT

> Renovation or demolition of buildings owned, operated or managed by the project owner constructed or renovated between 1950 and the institution of any applicable laws banning or restricting PCBs carry out the following:

- a. Conduct evaluation and abatement of materials in accordance with regulations/guidelines in Table MA1.
- b. Conduct removal and safe disposal of PCB-containing fluorescent light ballasts in accordance with regulations/guidelines in Table MA1.

Part 4: Mercury Abatement

VERIFICATION: Annotated Documents—Remediation Report

> Renovation or demolition of buildings owned, operated or managed by the project owner identify and collect all mercury-containing equipment and devices for recycling in accordance with the following guidelines:

- a. Conduct evaluation and abatement of materials in accordance with regulations/guidelines in Table MA1.
- b. Conduct removal and safe disposal of all mercury-containing equipment and devices in accordance with regulations/guidelines in Table MA1.



ODS

OUTDOOR

STRUCTURES | O

Oftentimes the use of specialized chemicals is needed to preserve and protect structures. The use of preservatives and special treatments to protect against the weather and pest infestation has become an important part of maintaining the built environment. Chemicals used in outdoor products are often more hazardous than those indoors, a fact that is based less on the nature of the chemicals than concentration of chemicals and likelihood of exposure, or overexposure. It is estimated that up to 75% of the lumber produced from the mid-1970s to 2004 was pressure treated with **chromated copper arsenate (CCA)**, a treatment that can leach arsenic into the soil where children, plants and pets can be exposed.⁴⁷⁹ Lead in dust and soil can come from weathering and chipping of lead-based paint from infrastructure such as buildings, bridges etc., and further exposure hazards, particularly for children, include wear and tear or flaking of paint found on older playground equipment.⁴⁸⁰ A precautionary approach to the vetting and selection of materials used in outdoor structures is vital at a community level.

INTENT

To mandate safe guidelines for chemical use on outdoor structures and mitigate environmental contamination and community exposure to potentially hazardous chemicals.



Part 1: Treated Wood

VERIFICATION: Annotated Documents—Map Letters of Assurance—Architect

> Pressed wood and wood chip materials used in playgrounds and parks owned, managed or operated by the project owner meet the following conditions:

- a. Wood or wood mulch containing chromated copper arsenate (CCA) is not used.⁴⁸¹
- b. Wood containing chromated copper arsenate (CCA) is replaced with an alternative per regulations/guidelines in Table MA1.
- c. CCA wood structures that cannot be removed or replaced must be treated with oil-based semi-transparent stain to minimize leaching of arsenic per regulations/guidelines in Table MA1.

Part 2: Lead Paint

VERIFICATION: Annotated Documents—Remediation Report Letters of Assurance—Architect

> All playgrounds and child play areas owned, managed or operated by the project owner meet the following conditions:

- a. Paint and surface coatings used on new structures meet regulations/guidelines in Table MA1.
- b. Lead hazard assessment, abatement and interim strategies to control lead paint exposure are applied per regulations/guidelines in Table MA1.

Part 3: Lead in Soil and Dust

VERIFICATION: Annotated Documents—Remediation Report Letters of Assurance—Architect

> All playgrounds and child play areas owned, managed or operated by the project owner meet the following conditions per regulations/guidelines in Table MA1:

- a. Lead soil hazard assessment, remediation or well-managed programs of interim controls.
- b. Exterior lead dust hazard assessment and remediation.



PES LANDSCAPING AND PESTICIDE USE | O

There are many reasons to want to control pests in a community: they are vectors for disease, cause property damage and can destroy local flora. While it is important to take steps to control pests, it should not be done at the expense of human health. Approximately one billion pounds of pesticides are used in a typical year in the U.S. alone, with no known estimate of how this compares globally.⁴⁸² Pesticides and herbicides are of special concern because of the numerous exposure routes to humans in the community. It is estimated that 2.26 million tons of the active ingredients in pesticides are produced annually, with more than 25% of the production being done in developing countries where exposure laws may not be as comprehensive.⁴⁸³ Many pesticides and herbicides are applied by aerosolizing a liquid that can then be inhaled, or settle to the ground where it can permeate the soil and reach aquifers, or deposit directly into streams and rivers. Given the various exposure routes to pesticide chemicals and potential associated hazards, alternative methods to pest management, and careful evaluation, selection and use of low hazard pesticides is essential.

INTENT

To support policies that mandate the regulation and minimization of pesticide use to mitigate potential community exposure to chemicals known to pose high hazards.

Part 1: Pesticide and Herbicide Use

VERIFICATION: Annotated Documents—Operations Schedule

- > The following conditions are met for outdoor areas owned, managed or operated by the project owner per regulations/guidelines in Table MA1:
 - a. A plan for non-pesticide based pest management is applied.
 - b. Only pesticides with low hazard tier rankings are used.





HAZ HAZARD COMMUNICATION | O

Over 15 million chemical substances are currently in market use, and according to the World Health Organization “approximately 60,000 to 70,000 chemical substances in regular use and between 200 and 1,000 chemicals are produced in excess of one tonne annually.”⁴⁸⁴ As the global production and dependence on chemicals increases, particularly in emerging markets, the potential public health impacts of accidental toxic exposures must be taken into account. Providing public access to chemical handling information, use and storage can help hold facilities accountable and strengthens a community’s capacity to support the laws and regulations that protect them against chemical incidents and emergencies. In order to mitigate negative impacts of chemical incidents, a community has the right to know of potential chemical hazards it faces within and near its borders.



INTENT

To support transparency on the storage, use and handling of hazardous substances in order to support emergency preparedness and promote community knowledge and advocacy for chemical safety.

Part 1: Right to Know

VERIFICATION: Annotated Documents—Policy Document

> Project provides access to an electronic resource database with complete information on the storage, use and handling of hazardous substances reportable by local code:

- a. Within the project boundary.
- b. Outside the project boundary for chemicals considered toxic by inhalation, and whose "isolation and protective action distances," according to the U.S. Department of Transportation's Emergency Response Guidebook, or local equivalent, cross the project boundary with consideration of potential day and nighttime atmospheric conditions.

Part 2: Hazard Information

VERIFICATION: Annotated Documents—Policy Document

> Information on the storage, use and handling of hazardous substances reportable by local code within project boundaries provides the following details per regulations/guidelines in Table MA1:

- a. Facility Inventory Forms.
- b. Material Safety Data Sheet (MSDS) or Safety Data Sheet (SDS).
- c. Risk Management Plan for extremely hazardous substances or regulated toxic substances in quantities exceeding locally determined thresholds.
- d. Site plans indicating storage location.
- e. Notice of accidental spills and releases.
- f. Notices of violation.
- g. Notice of change for new storage of hazardous substances.
- h. Literacy level sensitive glossary of technical terms.



MIND BACKGROUND



Health is not defined by simply the absence of disease. Rather, it is indicative of an individual's overall physical, social and mental well-being. This holistic definition captures the ways in which social, physiological and mental processes collectively impact an individual's **comprehensive health status**. Mental health is an integral and essential component of overall health, a vital component of social well-being, and is critical to participation in a community. As such, it is necessary to understand the drivers of mental well-being in populations and leverage strategies that improve population mental health across all sectors of the community.

Mental, neurological and substance use disorders are a clear threat to global health. Collectively, they account for 13% of the global burden of disease, with depression alone ranking as the leading cause of disability worldwide.^{485,486} If left unmanaged, depression, as well as other mental health conditions, can place an individual at serious risk for suicidal ideation, attempted suicide and completed suicide. Suicide results in a tragic and preventable death, accounting for more than 800,000 deaths per year.⁴⁸⁷ Young adults and adolescents are particularly at mental health risk: mental health conditions are among the leading causes of disability in youth, and suicide is the second leading cause of death among adolescents and young adults (15–29 years old).^{485,487} Although treatments for these conditions exist, they are often unavailable or vastly underutilized. Even in high-income countries, 35% to 50% of people living with mental health conditions receive no care or treatment.⁴⁸⁶ This gap widens in low- and middle-income countries, where 76% to 85% of people living with mental health conditions do not receive necessary treatment.⁴⁸⁶



It is increasingly recognized that there exists a complex and inextricable relationship between the mind and body, and that this interplay can significantly impact health and well-being. Mental health plays an important and bi-directional role across some of the most common chronic diseases, including HIV, cardiovascular disease and diabetes.⁴⁸⁵ Furthermore, states of chronic stress are associated with increased risk of numerous adverse health consequences, such as depression, cardiovascular disease, diabetes and upper respiratory infection.⁴⁸⁶ Depression alone is associated with increased risk of disease, including diabetes, cancer, cardiovascular disease and asthma.⁴⁸⁶

The built environment serves as a powerful tool to help mitigate these adverse mental health outcomes. Improving access to green space creates opportunities for mental restoration, which can help relieve stress, anxiety and symptoms of depression.⁴⁸⁶ Similarly, streetscape greenery can contribute to positive outcomes, such as improved self-reported mental health status.⁴⁸⁶ Additionally, community-based strategies

that provide mental health services, treatment and prevention to all sectors of society can help address the profound gaps in availability and access to care.⁴⁸⁶ Combined, these design and operations strategies, along with other built environment interventions, have the potential to positively shape the mental health and well-being of individuals throughout a community.



AMH

ACCESS TO MENTAL HEALTH SERVICES | P

Mental, neurological and substance use disorders account for 13% of the global burden of disease and are among the leading causes of disability in youth.^{485,486} Unfortunately, 35% to 50% of people living with mental health conditions in high-income countries receive no treatment.⁴⁸⁶ This gap widens in low- and middle-income countries, where 76% to 85% of individuals do not receive the treatment they need.⁴⁸⁶ Many complex factors contribute to this gap: inadequate public health and human resources available, a lack of mental health promotion, the stigma associated with mental health conditions, along with many other factors.⁴⁸⁶ For example, data from the World Health Organization (WHO) suggests that there is less than one mental health professional per 200,000 people in low- and middle-income countries.⁴⁸⁶ Equitable access to care facilities and mental health services can help mitigate poor mental health outcomes by promoting care utilization, focusing on early diagnosis and improving receipt of adequate mental health care.⁴⁸⁸

INTENT

To improve the availability of and access to community-based mental health support and care.



Part 1: Mental Health Services

VERIFICATION: Annotated Documents—Map

> **Essential mental health services** are available and located within a 20-minute mass transit ride or 1.6 km [1 mi] **walk distance** of the project boundary, including at least two of the following:

- a. Inpatient hospital treatment.⁴⁸⁹
- b. Outpatient counseling services.⁴⁸⁹
- c. Intensive case-management.⁴⁸⁹
- d. Partial hospitalization programs.⁴⁸⁹
- e. Rehabilitation services (e.g., day centers, clubhouses).^{490,491}
- f. Therapeutic group homes or supervised residential services.⁴⁹¹
- g. Hospital diversion programs.⁴⁹¹
- h. Emergency crisis services (e.g., **mobile mental health crisis teams**).⁴⁹¹⁻⁴⁹³
- i. **Telemental health** programs (mass transit and distance requirements do not apply).⁴⁹⁴



Part 2: Community-Based Support Services

VERIFICATION: Annotated Documents—Map and Professional Narrative

> **Informal community mental health** care and support services are available and located within a 20-minute mass transit ride or 1.6 km [1 mi] walk distance, including at least two of the following:

- a. Early identification of mental health risks or conditions through screening initiatives.⁴⁹²
- b. Referrals to health services.⁴⁹²
- c. Assistance with activities of daily living.⁴⁹²
- d. Community reintegration support (e.g., housing placement, employment).⁴⁹²
- e. Consumer-run or peer programs.⁴⁹⁵
- f. Advocacy for individuals living with mental health conditions (e.g., anti-stigma campaigns).⁴⁹²
- g. Mental health promotion.⁴⁹²
- h. Practical support.⁴⁹²
- i. Crisis support.⁴⁹²





CRI

MENTAL HEALTH

CRISIS SUPPORT | O

A mental health crisis is as important to address as any other health crisis. It can occur without warning, and involves any situation in which a person is at risk of hurting him- or herself or others.⁴⁹⁶ Many factors can trigger a mental health crisis, including stress, physical illness, loss, trauma, violence and substance use.⁴⁹⁶ Among mental health crises, suicidal ideation is an acute health risk, and can result in an emergency situation if an individual decides to act upon their thoughts. Suicide accounts for more than 800,000 deaths per year, with a global mortality rate of 11.4 per 100,000 people.^{487,497} The links between suicide and depression, alcohol abuse or addiction and other mental health conditions are well established, yet suicide also occurs among individuals without preexisting mental health conditions who suffer intense moments of crisis.⁴⁹⁸ Vulnerable or marginalized populations are particularly at risk, such as adolescents and young adults; lesbian, gay, bisexual, transgender, and intersex (LGBTI) persons; refugees; or persons who have experienced abuse or trauma.^{498,499} Suicide can have a major impact on a family and the surrounding community, and proper intervention is needed on a community level to prevent suicide and its tragic consequences.

INTENT

To support and encourage help-seeking for individuals experiencing a mental health crisis through availability and access to services, and to encourage stakeholders to consider and implement reasonable design-interventions to support these individuals.

Part 1: Crisis Support Services

VERIFICATION: Annotated Documents—Professional Narrative

> At least one of the following mental health crisis services is available:

- a. Emergency crisis services (e.g., **mobile mental health crisis teams**).⁴⁹¹⁻⁴⁹³
- b. 24-hour crisis telephone line, chat or text services.



Part 2: Emergency Prevention

VERIFICATION: Annotated Documents—Professional Narrative

> A plan includes the following information:

- a. Consideration of the most common means of suicide within the project boundary based on local suicide attempt and completion data, to the extent such data exists and is available for the area within the project boundary.
- b. Restricting or managing means of suicide, as local laws allow.⁴⁹⁹

Part 3: Hotspot Management

VERIFICATION: Annotated Documents—Map and Professional Narrative

> A plan includes the following information:

- a. Identification of **suicide hotspots** within the project boundary, if any.^{499,500}
- b. Design interventions that limit access to identified hotspots (e.g., installation of physical interventions, such as bridge barriers, nets or fencing).⁵⁰⁰
- c. Design interventions at identified hotspots that encourage crisis help-seeking (e.g., implementation of signage indicating 24-hour crisis hotlines and language that encourages distressed individuals to seek help).^{499,500}



ABU

SUBSTANCE ABUSE AND ADDICTION SERVICES | O

Tobacco, alcohol and drug use contribute significantly to the global burden of premature death and disability.⁵⁰¹ In 2013, 246 million people between 15 and 64 years of age used illicit drugs, of which 1 in 10 suffered from a drug use disorder or dependency.⁵⁰² Half of these individuals included people who use injection drugs, a population at high risk of transmission of infectious diseases, such as HIV and hepatitis C.⁵⁰² Harmful use of alcohol is a leading global risk factor for premature death and disability, accounting for 3.3 million deaths per year (or 5.9% of all deaths) and 5.1% of the global burden of disease.⁵⁰³ Alcohol addiction is also a risk factor for neuropsychiatric disorders and non-communicable diseases, including cardiovascular diseases, cirrhosis of the liver and numerous cancers.⁵⁰⁴ Tobacco use is the largest preventable risk factor for non-communicable diseases.⁵⁰⁵ Smoking kills approximately six million people a year, of which more than five million are the result of direct tobacco use and 600,000 are the result of secondhand smoke.⁵⁰⁵ By 2020, it is predicted that tobacco will account for 10% of all deaths worldwide.⁵⁰¹

Despite the need for health intervention, substance use and addiction treatment is not available for many individuals. Community-based substance abuse and addiction treatment offers an integrated, comprehensive network of services that support and empower those undergoing treatment, including ease of patient treatment, reduced disruption of family and working life, flexibility and affordability.⁵⁰⁶

INTENT

To increase availability and access to community-based substance abuse and addiction programs that improve treatment outcomes through the provision of effective care.





Part 1: Treatment and Care

VERIFICATION: Annotated Documents—Map

> Substance abuse and addiction programs are located within a 20-minute mass transit ride or 1.6 km [1 mi] walk distance of the project boundary, including at least four of the following:

- a. Individual and group counseling.⁵⁰⁷
- b. Inpatient and/or residential treatment.^{507,508}
- c. Intensive outpatient treatment.⁵⁰⁷
- d. Case or care management.⁵⁰⁷
- e. Medication-assisted treatment.⁵⁰⁷
- f. Recovery support services (e.g., recovery homes, supportive housing).⁵⁰⁷⁻⁵¹⁰
- g. Peer support (e.g., mentoring or peer-led support groups).^{507,511}
- h. Screening initiatives supported by brief interventions.⁵¹²
- i. Telephone or online support programs (mass transit and distance requirements do not apply).
- j. Harm reduction interventions (e.g., needle exchange program).⁵⁰⁶



ARK

SUBSTANCE ABUSE AND ADDICTION SERVICES FOR AT-RISK POPULATIONS | O

At-risk populations experience a higher probability for substance abuse and addiction, and simultaneously also face greater barriers to treatment. Treatment for drug use is out of reach for many, with only one in six users accessing treatment. Women in particular face greater barriers to treatment: although one in three global drug users is a woman, women comprise only one in five users in treatment. Additionally, women who use drugs intravenously are more susceptible to HIV infection than men, thus contributing to a higher HIV prevalence among this vulnerable population.⁵⁰² Other at-risk populations include adolescents, who are at greater risk of drug abuse and addiction than the general population, as well as racial and ethnic minority groups, who tend to more frequently experience social, environmental and economic risk factors and poorer access to care.²⁸ A greater burden of substance use disorders extends to various at-risk populations, including children, women of childbearing age, pregnant and breastfeeding women, older adults, indigenous peoples, persons living with HIV/AIDS, homeless individuals, sex workers, sexual minorities and those with lower socioeconomic status.^{513,514} Substance abuse problems can have devastating impacts on individuals, families and communities. Addressing substance abuse in populations with unique risk factors is a critical path to community health and well-being.

INTENT

To support the provision of specialized substance abuse and addiction services in order to mitigate barriers to access for at-risk populations, as well as to promote early intervention and effective treatment.

Part 1: Specialized Programs

VERIFICATION: Annotated Documents—Map

> Specialized substance abuse and addiction services are located within a 20-minute mass transit ride or 1.6 km [1 mi] walk distance of the project boundary, including at least two of the following:

- a. Specialized programs and outreach tailored to the needs of identified at-risk populations.²⁸
- b. Community care and support for affected individuals and their families.⁵⁰³
- c. Gender-specific programs that address challenges commonly faced among women struggling with substance abuse and addiction (e.g., pregnancy/breastfeeding, accessibility due to childcare needs).⁵¹⁵
- d. Adolescent or youth-specific programs.²⁸



ALC

ALCOHOL ENVIRONMENT | O

Alcohol consumption is associated with numerous and widespread public health issues including injuries from motor vehicle crashes, fall-related injuries, violence and death.^{516,517} Beyond the individual physiological health risks associated with excessive alcohol consumption and misuse, the broader alcohol environment of a community poses a public health risk to children, youth and other vulnerable groups.

Alcohol outlet density is associated with higher rates of crime and violence, lower perceptions of safety, excessive alcohol consumption and other related harms.⁵¹⁸⁻⁵²⁰ The U.S. Centers for Disease Control (CDC) defines an alcohol outlet as a space where alcohol is legally sold for on- or off-premise consumption.⁵¹⁸ The CDC supports community limits on their density as an effective strategy to reduce public health risks.⁵¹⁸ In regard to exposure among special populations, research shows that children who are exposed to an alcohol outlet on their route to and/or from school are more than twice as likely to be offered alcohol or other drugs, and are nearly two times more likely to be exposed to the sale of drugs or to see others using drugs.⁵²¹ Evidence from the CDC also demonstrates that policies that prohibit sales to minors are effective at reducing underage purchasing.⁵²² Additional evidence supports limiting the hours or days in which alcohol can be sold as these policies effectively reduce excessive alcohol consumption and its related risks.^{523,524}

INTENT

To reduce public health risks associated with excessive alcohol consumption.

Part 1: Alcohol Environment Policy

VERIFICATION: Annotated Documents—Policy Document

> At least two of the following requirements are met:

- a. Policy is in place that limits the density of alcohol outlets (including those where alcohol is sold for on- or off-premise consumption) within the project boundary.⁵¹⁸
- b. Policy is in place that limits the days and/or hours in which alcohol can be sold (applicable to alcohol outlets where alcohol can be purchased for on- or off-premise consumption).^{523,524}
- c. Policy is in place that limits the sale of alcohol (of any kind) to minors (applicable to alcohol outlets where alcohol can be purchased for on- or off-premise consumption).⁵²²



RDR RESPONSIBLE DRIVING | O

Driving while intoxicated poses significant public health risks.²⁰⁴ Drivers whose blood alcohol concentration (BAC) reaches between 0.02 and 0.05 g/dl are at least three times more likely to be involved in a fatal accident.²⁰⁴ Between 2014 and 2015, fatal alcohol-related accidents in the U.S. increased by 3.2%, with the total fatalities rising to nearly 10,000 people.^{525,526} In the U.S. alone, the collective economic burden of alcohol-impaired driving is estimated to be more than \$44 billion annually.⁵²⁵ At the global scale, evidence from the WHO indicates that BACs above the legal limit were present in blood samples of about 20% of fatally injured drivers in high-income countries, and between 33 and 69% of samples from low- and middle-income countries.⁵¹⁶ The WHO recognizes drinking and driving legislation, in concert with enforcement, as a successful strategy to reduce alcohol-related crash risk and burden.²⁰⁴

Alternative strategies such as education programs, mass media campaigns and designated driver programs (e.g., offering designated drivers nonalcoholic beverages at no cost paired with informational signage about designated drivers incentives) have also proven effective in reducing the burden of alcohol-related vehicle injuries and deaths.^{527,528} Safe ride services have also emerged as a potential strategy, such as volunteer programs and partnerships with rideshare companies for safe rides home.^{529,530}

INTENT

To reduce public health risks posed by drinking and driving through responsible driver programs.

Part 1: Responsible Driving Programs

VERIFICATION: Annotated Documents—Policy Document

> A responsible driver program is implemented incorporating one or more of the following:

- a. Education and awareness.⁵³¹
- b. Mass media campaign.⁵²⁷
- c. Designated driver program.
- d. Safe ride services.





IPV

SUPPORT FOR VICTIMS OF INTERPERSONAL VIOLENCE | O

Annually, over half a million people die from interpersonal violence, with millions living as victims of nonfatal violence.⁵³² Intimate partner violence (IPV), a type of interpersonal violence, is a serious global health problem faced by one-third of women in their lifetime.⁵³² Interpersonal violence, as well as child mistreatment and abuse, can carry on for years without intervention or help.⁵³² In addition to physical harm, interpersonal violence is associated with serious mental health consequences, including depression, anxiety and posttraumatic stress disorder, as well as increased risk for adopting health-negative coping behaviors, such as smoking and/or drug and alcohol abuse.⁵³² Housing instability for women experiencing IPV is connected with elevated stress, decreased self-care and overall reduced health stability, and is the leading cause of homelessness and housing insecurity.⁵³³⁻⁵³⁵ The availability of emotional, social and legal support, including shelters, counseling, medical care, legal assistance and housing, offers a key role in helping those who are seeking refuge from an abusive environment.⁵³² Caring for and supporting victims is critical in breaking the cycles of violence facing this vulnerable population.

INTENT

To increase availability and access to services and support programs for victims of interpersonal violence.



Part 1. Community Services and Support Programs

VERIFICATION: Annotated Documents—Map and Professional Narrative

> Services and support programs are located within a 20-minute mass transit ride or 1.6 km [1 mi] walk distance of the project boundary and include at least two of the following:

- a. Safety planning assistance.⁵³⁶
- b. Temporary, safe accommodation (e.g., women's shelters, family shelters).^{533,536}
- c. Communication regarding or linkages to temporary, safe housing services.^{533,536}
- d. Priority preference on waiting lists for stable, affordable housing.⁵³³
- e. Communication regarding or linkages to stable, affordable housing service providers.⁵³³
- f. Legal assistance and referrals for obtaining protection orders.⁵³⁶
- g. Support applying for public assistance (e.g., housing subsidies).⁵³⁶
- h. Counseling and support groups for survivors and children.⁵³⁶
- i. Crisis counseling or hotlines (mass transit and distance requirements do not apply).⁵³⁶





SGR

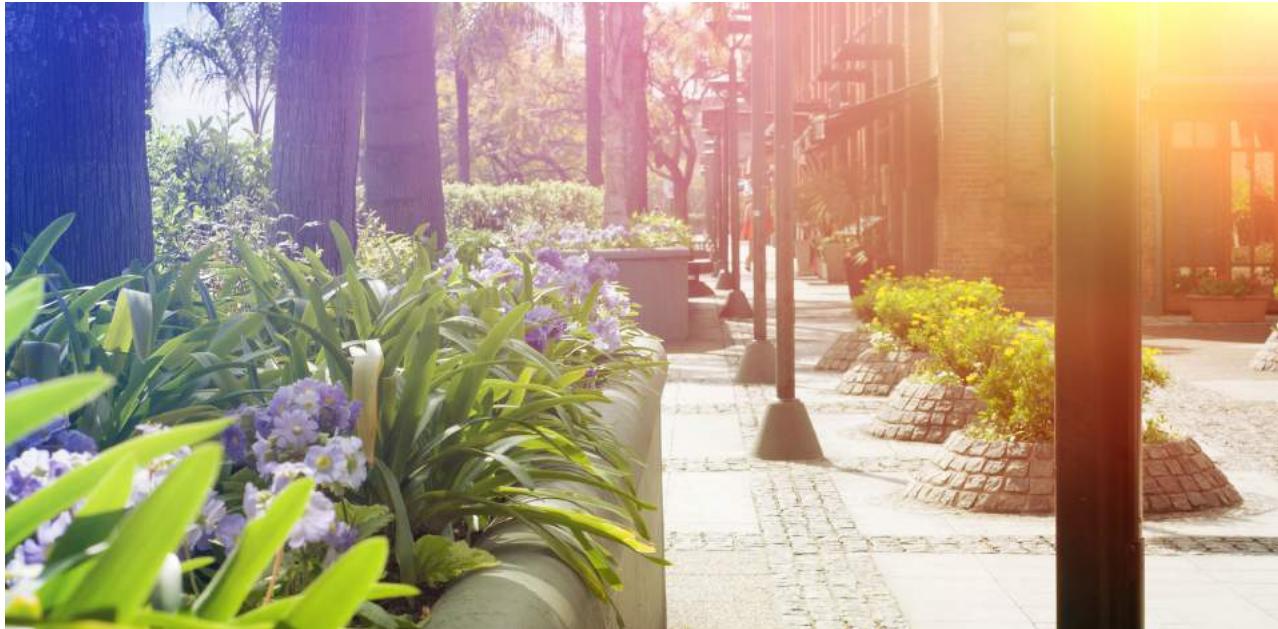
INTEGRATION OF STREETSCAPE GREENERY | O

Streetscape greenery is an integral part of the urban environment. It brings visually pleasing aesthetics and vitality to the predominantly gray urban landscape and contributes to the overall urban forest.⁵³⁷⁻⁵³⁹ Trees offer multiple functions beyond aesthetic value, providing a wide range of health, social, economic and environmental benefits.⁵⁴⁰ The level of greenery in the urban environment has an established relationship with mental health, levels of reported stress and perceptions of social cohesion within a neighborhood.⁵³⁷ Residents living in neighborhoods with more **streetscape greenery** perceive their own health as better, experience fewer acute health-related complaints and report better overall mental health status.⁵³⁷

Additionally, streetscape greenery can aid in the mitigation of urban oppressiveness, a form of environmental stress resulting from urban scenes in which high-rise buildings dominate the visual field, are uninterrupted by vegetation, block sky visibility and reduce the perceived openness of the outdoor environment.⁵⁴¹ The resulting negative psychological pressure can induce stress, anxiety and feelings of claustrophobia; however, the presence of trees between building façades and the sidewalk may alleviate these sensations.⁵⁴¹ Compared to built or hardened surfaces, trees and other natural elements have enhanced stress-reducing qualities, and, as such, are key contributors to the quality of the urban streetscape.⁵³⁷

INTENT

To support the integration of streetscape greenery in order to promote mental restoration and mental health and to improve perceptions of the urban environment.



Part 1: Placement of Streetscape Greenery

VERIFICATION: Annotated Documents—Map and Professional Narrative

> A narrative describes the planting and placement of streetscape greenery along roadways within the project boundary, including consideration of:

- Deliberate spacing of streetscape greenery.
- Environmental equity.⁵⁴²
- Areas with high population density and low preexisting tree cover.^{542,543}

Part 2: Installation and Maintenance of Streetscape Greenery

VERIFICATION: Annotated Documents—Operations Schedule

> Plans for the installation and maintenance of streetscape greenery along roadways within the project boundary include:

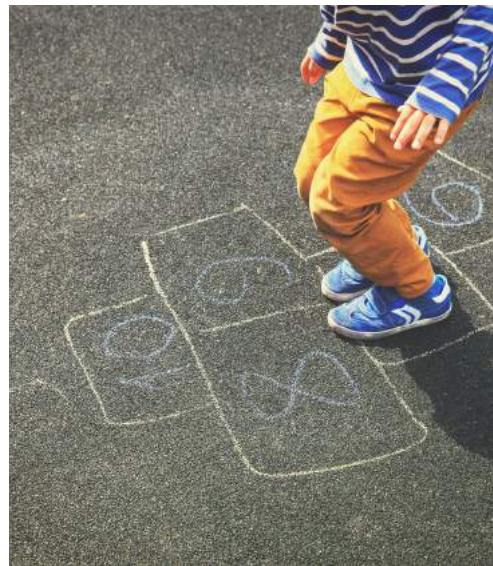
- Installation of street trees and other green landscaping on project roadways in accordance with local street tree planting codes and requirements (e.g., permits, planting season, planting locations, species selection).
- Maintenance of tree plantings.



CHI OUTDOOR CHILD PLAY SPACES | O

Opportunities to connect with the natural, green environment are associated with a range of health and developmental benefits for children.^{544,545}

Children who play in highly natural playgrounds have been found to experience fewer attention and concentration problems, as well as experience improvements in cognitive and physical functioning.⁵⁴⁶ Additionally, spaces that encourage more playful engagement styles, such as free play and exploration, are associated with numerous benefits including proper brain development, mental and emotional health and cognitive and social skill development.^{544,545} These spaces may also confer benefits to youth with attention deficit disorder (ADD) or attention-deficit/hyperactivity disorder (ADHD).^{547,548} Research in youth with ADD revealed that attentional capacities improved after children engaged in activities in **green spaces** rather than indoor spaces, and outdoor activities significantly reduced symptoms in youth with ADHD.^{547,548} Despite the mental and developmental benefits that natural play spaces afford children, children today have fewer opportunities for outdoor play.⁵⁴⁹



INTENT

To provide children with access to outdoor environments designed to promote enriching play opportunities.

Part 1: Access to Play Spaces

VERIFICATION: Annotated Documents—Map

> Outdoor child play spaces meet the following requirements:

- Located within the grounds of a public use green space.
- Signage at entrance of play space indicates hours of accessibility. If play space operates seasonally, signage at entrance will indicate months of accessibility.

Part 2: Design of Play Spaces

VERIFICATION: Annotated Documents—Professional Narrative

> A design plan and narrative describes how play spaces meet one of the following:

- Seven C's of Young Children's Outdoor Play Spaces (Appendix MI1).^{550,551}
- Head Start Body Start Play Space Assessment (Appendix MI1).⁵⁵²



GRE RESTORATIVE GREEN SPACES | 0

Urban green spaces are associated with a range of short- and long-term mental health benefits, positively affecting age groups across the life span, from children to older adults.⁵⁵³⁻⁵⁵⁵ The many associated benefits include lower levels of anxiety and depression as well as improved mental recovery from stress and fatigue.^{556,557} Conversely, the mental health cost associated with a lack of green spaces is alarming. Individuals who have less green space, who are dissatisfied with their access to green spaces and who perceive green and open spaces as far from home are at a greater risk for anxiety, depression and poor mental health.^{554,558,559} Socioeconomic inequalities in mental health are narrower in communities where residents report good access to green spaces or recreational areas.⁵⁶⁰

Environments that promote restoration are designed to provide relief from fatigue-inducing stressors, and to moderate the stress, irritability and overall negative effects that result from cognitive fatigue.^{561,562} Researchers hypothesize that green spaces impact mental health and well-being through cognitive restoration, and that physiological and emotional changes take place when individuals are exposed to natural settings.⁵⁶³ Through increased access, the potentially beneficial outcomes of restorative urban green can be distributed across a wide range of ages and socioeconomic groups within a community.⁵⁶⁴

INTENT

To support the provision of access to green spaces with restorative qualities designed to promote mental recovery and mental health.



Part 1: Access to Green Spaces

VERIFICATION: Annotated Documents—Map

> Green spaces within the project boundary meet the following requirements:

- a. At least 75% of dwelling units are within 300 m [1,000 ft] of public use green spaces that total a minimum size of 0.5 hectare [1.25 acre] or greater.⁵⁶⁵
- b. Entry points face a minimum of one public street.
- c. Signage at entrance indicates hours of accessibility. If space operates seasonally, signage at entrance indicates months of accessibility.

Part 2: Design of Green Spaces

VERIFICATION: Annotated Documents—Professional Narrative

> A narrative and design plan detail how green spaces contain the following:

- a. Minimum of 70% plantings, including tree canopies, verdant foliage or other visually stimulating plantings, such as bushes, flower beds and/or grass.^{566,567}

Part 3: Integration of Restorative Elements

VERIFICATION: Annotated Documents—Professional Narrative

> A narrative describes how green spaces are designed to provide the following:

- a. Respite from the surrounding urban environment.
- b. Elements that encourage involuntary attention.^{561,565}



BLU

RESTORATIVE BLUE SPACES | O

Although environments with water play an enormous cultural and economic role in human history, they are often omitted from the discourse on human health and the built environment.⁵⁶⁸ Nevertheless, research identifies a strong relationship between restorative experiences and blue space, with blue space integrated into an urban context showing potential for stress reduction, mood enhancement and attentional restoration.⁵⁶⁹ Both natural and built scenes containing water are associated with greater positive affect, are perceived to be more restorative and are associated with more positive subjective reactions compared to places without blue space.⁵⁶⁸

There are a number of reasons why blue space is associated with positive affect. For example, the visual properties of aquatic environments, such as lines and patterns of light that are interesting to the human eye, can be both attractive and restorative.⁵⁶⁸ Additionally, the sound of water (e.g., breaking waves) is considered calming and restorative.⁵⁶⁸ Aquatic environments often suggest a shared social, public space where people of diverse ages and backgrounds gather and congregate.^{570,571} Combined, these features can create a therapeutic landscape that brings together a mix of features designed to enhance health: individual restoration from everyday stress, positive socialization, social cohesion and the promotion of a strong sense of place.⁵⁷⁰

INTENT

To support the provision of access to blue spaces with restorative qualities designed to promote mental recovery and mental health.

Part 1: Access to Blue Spaces

VERIFICATION: Annotated Documents—Map

> Blue spaces meet the following requirements:

- a. At least one public use blue space is located within the project boundary or within 400 m [0.25 mi] walk distance of the project boundary.
- b. Land adjacent to blue spaces faces a minimum of one public street.
- c. Signage at entrance indicates hours of accessibility. If space operates seasonally, signage at entrance indicates months of accessibility.

Part 2: Integration of Restorative Elements

VERIFICATION: Annotated Documents—Professional Narrative

> A narrative describes how blue spaces are designed to provide the following:

- a. Respite from the surrounding urban environment.
- b. Elements that encourage involuntary attention.^{561,565}





BLT

RESTORATIVE BUILT SPACES | O

Cognitive restoration can be achieved across a wide variety of contexts, and as such, not all restorative places need to be green or blue.⁵⁶² In a study of workers living in an urban environment, average levels of cortisol and self-reported stress were significantly reduced by a brief visit to an art gallery during lunch.⁵⁷² Similarly, research indicates that certain built places, such as historic plazas or promenades, can be perceived as similarly restorative and preferred equally to an urban park.⁵⁷³ Additionally, houses of worship can provide a restorative atmosphere that eases attentional fatigue while also fostering contemplation and reflection.⁵⁷⁴ By integrating restorative elements that relieve individuals from fatigue-inducing environmental stressors, these built spaces have the potential to provide similar positive effects as green, blue or other naturally oriented environments.

INTENT

To support the provision of access to built spaces with restorative qualities that promote mental recovery and mental health.



Part 1: Restorative Places

VERIFICATION: Annotated Documents—Map

> At least two of the following public use spaces are located within the project boundary or within a 400 m [0.25 mi] walk distance of the project boundary:

- a. Museum or art gallery space.⁵⁷²
- b. House of worship.^{562,574}
- c. Meditation or prayer space.^{562,574}
- d. Historical site.⁵⁷³
- e. Promenade.⁵⁷³
- f. Plaza.⁵⁷³



Part 2: Access to Restorative Built Spaces

VERIFICATION: Annotated Documents—Professional Narrative

> Restorative built spaces located within the project boundary meet the following requirements:

- a. Entry points face a minimum of one public use street.
- b. Signage at entrance indicates hours of accessibility. If space operates seasonally, signage at entrance will indicate months of accessibility.

Part 3: Integration of Restorative Elements

VERIFICATION: Annotated Documents—Professional Narrative

> A narrative describes how built spaces are designed to provide the following:

- a. Respite from the surrounding urban environment.
- b. Elements that encourage involuntary attention.^{561,565}



SCE

PRESERVATION OF SCENIC VIEWS | O

Views that comprise natural areas, forests and cultural and historic resources can have a positive impact on health. Access to green, blue and natural spaces, including passive views, is linked to positive health outcomes and well-being, which includes reduced psychological distress.^{546,575,576}

Studies demonstrate that exposure to green or natural views is associated with various positive mental health outcomes, including stress reduction, memory recall and other aspects of cognitive performance.⁵⁷⁷⁻⁵⁷⁹ Visual access to scenic views and green spaces at a community scale can impact the interpretation of accessibility and thereby help improve associated positive health outcomes and mitigate health inequities. Access to green spaces and nature at a community level also facilitates attachment to place and promotes opportunities for social engagement and cohesion.⁵⁷⁹

INTENT

To preserve and maintain visual access to green and blue spaces and other scenic resources.



Part 1: Designation of Scenic Views

VERIFICATION: Annotated Documents—Professional Narrative

> A point-by-point narrative demonstrates the designation of scenic views within the project boundary and addresses the following:

- a. Designation of specific and general characteristics.⁵⁸⁰
- b. Site visits and identification of scenic resources.⁵⁸⁰
- c. Prioritization of specific views for preservation.⁵⁸⁰
- d. Preparation of a scenic resource map for public use⁵⁸⁰
- e. Maintenance of an up-to-date list of scenic resources.⁵⁸⁰

Part 2: Preservation and Management of Scenic Views

VERIFICATION: Annotated Documents—Professional Narrative

> A narrative for the preservation and management of scenic views and resources within the project boundary includes consideration of:

- a. How a proposed subdivision, land development or permit action near a designated scenic resource will work to avoid, minimize and/or mitigate negative scenic impacts.⁵⁸⁰
- b. Protection of natural scenic resources, such as local farmland, timberland, pastures or open space.⁵⁸¹
- c. Protection of private land that benefits the local community, such as maintaining a scenic view.⁵⁸²

— COMMUNITY



COMMUNITY BACKGROUND



Communities are characterized by groups of people living in a space, though that area is not limited to its built or natural physical features. The environments in which individuals are born, live and age include social networks, cultural norms, political systems and economic structures, among other elements. Collective and individual health outcomes are shaped by access to opportunities and ability to participate and thrive within these systems and circumstances. Global, national and local conditions that surround the individual—conditions that are shaped by money, power and the distribution of resources—are known as social determinants of health.⁵⁸³ Social determinants of health include constructs such as economics, education, health care, discrimination and racism.⁵⁸⁴

Spearheaded by leading international organizations such as the World Health Organization (WHO), a social determinants framework has unified and driven the global health agenda toward addressing health disparities, or the differences in health status among different population groups. **Health disparities** are often products of the unequal distribution of power and resources as a function of differences in race, ethnicity or socioeconomic status.

Data from the WHO underscores the present challenges in addressing health inequities on a global scale. In some developing regions, mortality rates



for children under the age of five are 20%—a dramatic rate compared to the 1.3% mortality rate among children in the WHO European region.⁵⁸⁵ This staggering health inequity contributes to a global 36-year gap in life expectancy.⁵⁸⁵

Inequities exist not only between countries but also within them. For example, in the United States, infant mortality among African Americans is between 1.5 and 3 times more likely compared to other races and ethnicities.⁵⁸⁵ An oft-repeated expression in public health is that your postal code matters more than your genetic code, underscoring the role your surrounding neighborhood plays in determining your health and life expectancy. In some neighborhoods in the U.S., health and resource disparities are so great at the local level that individuals living just a few miles away from one another experience up to a 25-year difference in life expectancy.⁵⁸⁶ The place where you live matters, and the systems and structures contained within these places

impact health in immense ways.

Improving community design is one way to combat these health inequities. Housing and living conditions, sanitation and waste management, educational opportunity, access to health care services and safe social spaces are examples of physical and social determinants of health that can be addressed through effective, community-level policy measures and design strategies. Solutions that utilize the social determinants framework and address the overarching context in which health and disease perpetuate must equally address the question of equity and distribution of resources. Strategies that address public health issues with this frame of thinking are positioned to make profound and widespread changes in population health.



VIS COMMUNITY VISIONING | P

By engaging key community stakeholders from the onset of the project, projects are able to facilitate a dialogue between decision-makers, planners and the public, thereby creating an opportunity for the development of a collective vision that benefits the widest range of constituents.⁵⁸⁷ In reaching for this collective vision, facilitators should also incorporate a focus on identifying a common set of measurements, reinforcing activities and continuous communication as part of a broader collective impact approach to help promote buy-in and stakeholder activation.^{588,589} This public input process is instrumental for the long-term maintenance of community support so that considerable benefits are accrued for the community, and also supports the continuation of sound community decisions as it develops and progresses toward its health goals.

INTENT

To collaboratively develop a shared vision, measurements and activities for community design and development.

Part 1: Participatory Development

VERIFICATION: Annotated Documents—Professional Narrative

> A point-by-point narrative describes how the project engages stakeholders in project design and development through each of the following:

- a. Identification of stakeholder groups, including people from outside the project boundaries who are impacted by the project as well as anticipated users of the space.⁵⁹⁰
- b. Consideration of barriers to stakeholder participation, including timing, location, format and cultural norms or values.⁵⁹⁰
- c. Culturally, literacy- and **numeracy**-level-appropriate communication strategies.⁵⁹⁰
- d. Discussion of project scope (including limitations) and goals with stakeholders, including discussion of HIA screening (if Feature HIA—Health Impact Assessment Screening is pursued).⁵⁹⁰
- e. Record of response to stakeholder feedback on the project plan.^{590,591}
- f. Monitoring and evaluation of project development with stakeholders.⁵⁹⁰



HIA

HEALTH IMPACT ASSESSMENT

SCREENING | O

The places in which people live, work, learn and play are critical determinants of their individual and population health. As defined by the World Health Organization, a **Health Impact Assessment (HIA)** is "a means of assessing the health impacts of policies, plans, and projects in diverse economic sectors using quantitative, qualitative, and participatory techniques."⁵⁹² The use of HIAs has grown steadily over the past 15 years and represents a method of understanding the drivers of health and disease in the context of a particular place, and illuminating the impact of policies, programs and projects on population health.⁵⁹² HIA practitioners recognize that health is influenced by factors beyond the health care system, including aspects of the physical environment as well as social determinants of health. HIAs are used as a best practice tool to consider the potential effects of a policy, program or project on the health of a community, as well as the distribution of those effects. Distinctly, HIAs provide recommendations to enhance the potential benefits and mitigate the potential harms of the options considered.⁵⁹³

INTENT

To identify the current and future stakeholders affected by the project and to assess the need and feasibility of an HIA as a prospective planning tool.

Part 1: Baseline Community Health Profile and Screening

VERIFICATION: Annotated Documents—Professional Narrative

- > A narrative identifies the people who will potentially be affected by the project and defines the potential health impacts of the project to that community through the following (see Appendix C1: Health Impact Assessment (HIA) Screening):
 - a. Community health profile consisting of the geographic boundaries, socio-demographic characteristics and health needs of the affected community (note: can be sourced from a community health needs assessment, local public health Department data or other reputable source).⁵⁹⁴⁻⁵⁹⁶
 - b. Description of a screening process that indicates the need and feasibility of conducting an HIA.^{594,597-599}



HII

HEALTH IMPACT ASSESSMENT IMPLEMENTATION | O

HIA^s are a valuable, data-driven tool available to stakeholders, community organizers, researchers and health leaders who aim to understand the context of health and disease in a particular place. By providing a comprehensive evidence-base, HIA^s are a tool for evaluating communities across multiple dimensions (e.g., environment, education, housing, transportation, community cohesion, economics, public realm and health) to support developing interventions aimed at reducing health inequities across racial, ethnic and/or social classes and improving overall population health.^{592,600,601}

INTENT

To evaluate potential human health impacts, provide recommendations to enhance health impacts through a participatory process and evaluate the effectiveness of HIA^s.

Part 1: HIA Implementation

VERIFICATION: Annotated Documents—Professional Narrative

> If the screening process (Feature HIA—Health Impact Assessment Screening) has established the need and feasibility of an HIA, a point-by-point narrative demonstrates completion of the following key HIA processes (for further guidance see Appendix C2: HIA Protocol):

- a. Scope, including at least one community stakeholder meeting.^{594,602}
- b. Assessment, including incorporating baseline findings from the community health profile completed (Feature HIA—Health Impact Assessment Screening).⁵⁹⁴
- c. Recommendations, including at least one community stakeholder meeting.^{594,603}
- d. Communication and dissemination of HIA findings.⁵⁹⁴
- e. Monitoring and evaluation.⁵⁹⁴

Part 2: HIA Monitoring and Evaluation

VERIFICATION: Annotated Documents—Professional Narrative

> A point-by-point narrative demonstrates plans for completing at least one of the following:

- a. An impact evaluation within one year of project certification that demonstrates how the HIA influenced the planning and decision-making of the project.⁵⁹⁴
- b. An outcome evaluation within one year of 50% occupancy that demonstrates if and how positive health benefits were maximized and adverse health risks minimized within the project boundary.⁵⁹⁴



Flexible and accessible community spaces can positively impact the social and public lives of community members. Design strategies that improve access to shared, public and democratic social spaces that encourage diverse use and welcome diverse users can help facilitate the social cohesion and trust needed to build social capital.⁶⁰⁴ Even after controlling for individual characteristics, social cohesion has been positively associated with self-rated health, as well as objective outcomes including stroke and stroke mortality.⁶⁰⁵⁻⁶⁰⁷ Developers, community stakeholders and designers should consider how social spaces can be used and integrated into the surrounding environment, who will benefit from these spaces and how the spaces can be designed, redesigned and operated to promote equitable use across all social sectors and cultures to promote a more civil society.⁶⁰⁸



INTENT

To provide public spaces, amenities and programming for community members to socialize, assemble and collaborate.

Part 1: Indoor Gathering Spaces

VERIFICATION: Annotated Documents—Map

> At least one of the following public use spaces where people can interact and congregate at no cost is within the project boundary:

- Community center.
- Senior center.
- Library.
- Museum.
- Atrium.

Part 2: Outdoor Gathering Spaces

VERIFICATION: Annotated Documents—Map

> At least two of the following public use spaces where people can interact and congregate at no cost are within the project boundary:

- Plaza or square.
- Park.
- Amphitheatre.
- Pedestrian street.**
- Community garden.

Part 3: Programming for Social Cohesion

VERIFICATION: Annotated Documents—Policy Document

> The project hosts or permits residents, employers, businesses and organizations to host no-cost entry events at least once per quarter such as, but not limited to, the following:

- Block party or neighborhood association event.
- Cultural festival.
- Celebration of a community milestone.
- Community-wide service day.
- Arts festival.
- Street fair.
- Food festival.
- Carnival or fair.



PUB

PUBLIC SPACES | O

Privately owned public spaces (POPS), also referred to as privately owned public open spaces (POPOS), are spaces within privately owned buildings or on privately owned properties that allow access for public use. These spaces often take the form of plazas, arcades, atriums, concourses or gallerias.⁶⁰⁹ Opening portions of private spaces for public use is a strategy for promoting spatial equity within a community, offering members from all sectors of the community the opportunity to access and enjoy space in the urban landscape.

INTENT

To promote the development of an urban form that is accessible to the general public.

Part 1: Privately Owned Public Use Space

VERIFICATION: Annotated Documents—Map and Policy Document

> 75% of privately owned commercial or residential buildings with a floor area of 10,000 m² [108,000 ft²] provide public access to an allotted space that meets the following requirements:

- a. Totals at least 186 m² [2,000 ft²].
- b. Accessible at all times, unless regularly closed for security purposes (e.g., during nighttime hours) or for special events.
- c. Entry points are accessible from a minimum of one public use street.⁶¹⁰
- d. Signage at entrance indicates hours of accessibility, the space's designation as public use and that patronage of the business or building is not necessary to use the space.
- e. Provides quality seating areas and sufficient lighting and is easily navigable.⁶¹⁰
- f. Adheres to a regular maintenance and cleaning schedule.



SAN SANITATION | O

Sanitation is a basic community necessity and a core component of health equity. Cleanliness is instrumental in preventing the spread of disease, enhancing community self-esteem and pride and maintaining the safety of communities across the lifespan.^{611,612} Additionally, inadequate management of waste is linked to lower community perceptions of neighborhood safety, quality and disorder, which have been linked to negative health outcomes.^{613,614} For example, among pregnant women, self-perceived poor neighborhood quality is associated with preterm birth.⁶¹³ Additionally, youth who perceive their neighborhood as disorderly have been found to be at increased risk for hypertension.⁶¹⁴ Neighborhood cleanliness, therefore, is not just critical for preventing the spread of communicable disease but also a subtle yet influential component in supporting the long-term health and well-being of community members.

INTENT

To protect the enjoyment of the built and natural environment through the maintenance of shared public spaces.

Part 1: Waste Receptacles

VERIFICATION: Annotated Documents—Map and Operations Schedule

- > Waste receptacles meet the following requirements:
 - a. Available on sidewalks in commercial and mixed-use zones to collect pedestrian litter.
 - b. Installed at least every 244 m [800 ft] along pedestrian-accessible paths.⁶¹⁵
 - c. Emptied regularly.

Part 2: Sidewalk and Street Cleaning

VERIFICATION: Annotated Documents—Operations Schedule and Policy Document

- > The following requirements are met:
 - a. Sidewalk cleaning is performed regularly.
 - b. Street cleaning, including cleaning of designated bike lanes, is performed regularly.
 - c. Street cleaning schedule is posted for public notice.

Part 3: Community Beautification

VERIFICATION: Annotated Documents—Policy Document

- > The following requirements are met:

- a. Residents and businesses are invited to participate in beautification initiatives that are held, at minimum, annually.



CHW

COMMUNITY HEALTH AND WELLNESS | O

Communication messages, campaigns and programs can be a strategic and effective way to influence motivations, opinions, attitudes and behaviors surrounding a specific health behavior at the population level.⁶¹⁶ Targeted communications and health promotion programs disseminated across multiple platforms (e.g., television, radio, public transportation or social media) have the power to reinforce or change community norms regarding health practices, behaviors or conditions. Such campaigns approach behavior change and communications from multiple modes and tactics, including telephone reminders for cancer screenings, brochures about screening availability and locations and literacy-level-appropriate pamphlets explaining the out-of-pocket costs of screening.⁶¹⁷ Ultimately, the goal of these campaigns is increased public awareness of and engagement in positive health behaviors.⁶¹⁶ Furthermore, community health interventions such as health screening programs can be used as an opportunity to link individuals who participate in screenings with appropriate providers for follow-up care.

INTENT

To increase health literacy and improve public health outcomes.

Part 1: Health Needs Assessment and Programming

VERIFICATION: Annotated Documents—Professional Narrative

- > A point-by-point narrative demonstrates plans for the following:
 - a. Completion or identification of a community health needs assessment that identifies the local burden of disease (including the top five causes of morbidity and mortality) in the project's municipality or county.
 - b. Creation and dissemination of multichannel health campaigns that include programming and education developed to address the environmental design and lifestyle factors that contribute to the top five causes of morbidity and mortality in the project.
 - c. Evaluation of the campaigns to assess outcomes and impact.

Part 2: Screening Programs**VERIFICATION: Annotated Documents—Policy Document and Map**

- > Annual screening programs are available at no cost to all residents and visitors regardless of insurance status for at least six of the following, with selection dependent on local burden of disease data (Part 1a of this Feature), within an 800 m [0.5 mi] walk distance or 20-minute mass transit ride of the project boundary:
 - a. Breast cancer.
 - b. Colorectal cancer.
 - c. Cervical cancer.
 - d. Skin cancer.
 - e. Cardiovascular disease risk factors, including blood pressure, cholesterol and body mass index (BMI).
 - f. Stroke risk factors, including blood pressure and cholesterol.
 - g. Type 2 diabetes.
 - h. Respiratory health.
 - i. Vision.
 - j. Hearing.
 - k. Mental health.
 - l. Sexual health.

Part 3: Resource Database**VERIFICATION: Annotated Documents—Policy Document**

- > An electronic database or resource list is available that contains culturally and literacy-level-appropriate information related to each of the following:
 - a. Vaccination.
 - b. Maternal and child health.
 - c. Adolescent health.
 - d. Sexual and reproductive health.
 - e. Parenting and caregiving.
 - f. Substance use, abuse and dependency.
 - g. Mental health, including suicide prevention hotlines.
 - h. Interpersonal violence.
 - i. Financial education or health.
 - j. Employment readiness.
 - k. Basic life skills education.
 - l. Any other health condition identified in the community health needs assessment (Part 1 of this Feature).



CHR

COMMUNITY HEALTH RESILIENCE | O

A community's ability to successfully respond to public health emergencies is founded in its resilience.⁶¹⁸⁻⁶²⁰ Resilient communities hold the physical, social, economic and psychological capacity to prepare for, withstand, adapt to and recover from various events, from local emergencies to large-scale disasters.⁶¹⁹⁻⁶²¹ This type of preparation requires action-oriented planning from multiple stakeholders that can effectively reach community members and response teams. Furthermore, preparedness requires that communities have evaluated prospective risks and developed comprehensive action plans unique to different types of situations and specific to their community and cultural context.^{620,621}

INTENT

To prepare communities to respond to and recover from threats to public health.

Part 1: Community Preparedness

VERIFICATION: Annotated Documents—Policy Document

> An emergency planning and preparedness policy addresses relevant threats to the project (e.g., natural disasters and health emergencies) and achieves the following:

- a. Identifies the unique health risks of the population within the project boundary (may include an assessment of the larger geographic area outside the project boundary, so long as the project boundary is included in that geographic unit).⁶¹⁹
- b. Builds partnerships to support preparedness (e.g., Red Cross and a local emergency response unit).⁶¹⁹
- c. Engages with community organizations to foster supportive resource networks (e.g., food banks and local health departments).⁶¹⁹
- d. Coordinates training and promotes community engagement in preparedness (e.g., emergency response training or drills at local schools and workplaces).⁶¹⁹

Part 2: Community Recovery

VERIFICATION: Annotated Documents—Policy Document

> A recovery policy addresses recovery, adaptation and/or regrowth and considers the following:

- a. Recovery needs and monitoring of various public health, medical, mental and behavioral health systems and resources.⁶¹⁹
- b. Coordination of recovery efforts among public health, medical, mental and behavioral health systems.⁶¹⁹
- c. Efforts to mitigate damages in future incidents.⁶¹⁹



PRI ACCESS TO PRIMARY HEALTH CARE | O

Determinants of physical and mental health include individual factors as well as the social, cultural, economic, political and environmental contexts in which people live.⁶²² Among these environmental determinants is geographic access to primary care, a vital and essential component of mental and physical health. Expanding and providing transportation support to healthcare facilities not only improves access to care but also supports consistent use of health services and encourages early intervention for health issues. Additionally, integration of mental health care into routine primary care has been shown to be an effective means of increasing care delivery and overall provision of essential mental health services.⁶²³⁻⁶²⁶ Overall, increasing equitable access to integrated primary mental health services can help reduce disparities in access to mental and physical health services and improve health outcomes by encouraging continuity of accessible, affordable and acceptable care.^{622,626}

INTENT

To support and promote accessibility to primary care and mental health services.

Part 1: Geographic Access

VERIFICATION: Annotated Documents—Map and Policy Document

> At least one of the following programs, policies or conditions is met to facilitate access to a general medicine health care facility:

- a. Facility is located within an 800 m [0.5 mi] walk distance or 20-minute mass transit ride of the project boundary.
- b. Facility transport services are provided through at least one of the following: non-emergency medical transportation services, mass transit discounts,⁸ shuttle services, parking or taxi vouchers or others means of facilitated access.^{595,627}



EDU EDUCATIONAL OPPORTUNITY | O

Access to education is a universal right and is inextricably tied to the health and vitality of individuals in communities around the world, as called for by the United Nations in Sustainable Development Goal #4: Ensure inclusive quality education for all and ensure lifelong learning.^{628,629} Early childhood education, for example, is associated with positive long-term health and social outcomes, such as decreased crime rates, decreased teen birth rates and improved emotional development.⁶³⁰ In some instances, individual-level factors such as race, religion, gender, sexual orientation, disability (physical or intellectual), past academic history, language ability or income, as well as external conditions such as geographical location or availability of facilities, prevent equitable educational attainment. Frequently, certain populations are awarded greater educational access compared to others, influenced by factors such as their gender, race, or the region in which they live.⁶³¹ It is imperative that communities actively work to eliminate these potential barriers or unwarranted biases to provide sufficient education opportunities to all members of the community.

INTENT

To facilitate equitable access to educational opportunities.

Part 1: Educational Access

VERIFICATION: Annotated Documents—Map

> The following educational support programs are provided, as appropriate based on local demographic need, within an 800 m [0.5 mi] walk distance or 20-minute mass transit ride of the project boundary:

- a. Center-based early childhood education (i.e., pre-kindergarten).
- b. Full-day kindergarten programs.
- c. Secondary school completion programs.
- d. **Out-of-school-time academic programs.**
- e. Post-secondary education opportunities.⁶³²
- f. Continuing education for formal (i.e., accredited) and informal lifelong learning.



HOU FUNDAMENTAL HOUSING QUALITY | O

Consistent housing quality and conditions are a fundamental component of population health, including an adequate standard of living that includes shelter, sanitation, electricity, water, access to transportation and communications, continued maintenance and improvement and protection against rent exploitation or housing discrimination.⁶³³ This minimum standard of healthy housing conditions is an important strategy designed for the prevention of a wide range of diseases and unintentional injuries, including respiratory or cardiovascular disease due to poor indoor air quality, communicable disease spread through unsanitary living conditions or increased vulnerability to temperature extremes.⁶³⁴

INTENT

To promote equitable access to housing for all potential residents.

Part 1: Accessible Dwellings

VERIFICATION: Annotated Documents—Policy Documents

- > All newly constructed multi-family residential buildings with at least five units (including mixed-use buildings with residences) owned, managed or operated by the project owner meet the following:
 - a. All entrances and public common use areas comply with U.S. Fair Housing Act Accessibility Requirements for Multifamily Housing or local equivalent.

Part 2: Universal Design

VERIFICATION: Annotated Documents—Policy

Documents

- > At least 90% of multi-family residential buildings with at least five units (including mixed-use buildings with residences) owned, managed or operated by the project owner design a minimum of 20% (and not fewer than one) of its units in accordance with the following:
 - a. LEED ND v4 Visitability and universal design Option 1.¹³²

Part 3: Fair Housing

VERIFICATION: Annotated Documents—Policy Documents

- > For all residences in the project, the following are prohibited on the basis of race, color, national origin, religion, sex, familial status, handicap, sexual orientation or any other characteristic deemed a protected class:
 - a. Refusal of renting or selling housing.⁶³⁵
 - b. Refusal of housing negotiation.⁶³⁵
 - c. Making housing unavailable.⁶³⁵
 - d. Denying a dwelling.⁶³⁵
 - e. Setting uniquely different terms, conditions or privileges related to the sale or rental of housing.⁶³⁵
 - f. Providing uniquely different housing services or facilities.⁶³⁵
 - g. Falsely denying that housing is available for inspection, sale or rent.⁶³⁵
 - h. Persuading owners to sell or rent.⁶³⁵
 - i. Denying access to a facility or service related to the sale or rental of housing.⁶³⁵





EQU HOUSING EQUITY AND AFFORDABILITY | O

As the trend toward urbanization continues to accelerate, housing has become an increasingly critical design strategy for prevention of disease as well as health hazards resulting from climate change and extreme weather patterns. Research indicates that housing quality is associated with morbidity from both chronic and infectious diseases, physical injuries and mental disorders; as such, promoting access to quality housing designed to limit exposure to harmful toxins and the intrusion of disease vectors, as well as to better enable access to safe drinking water, hot water for cleanliness and proper food storage is a key component of population health.^{636,637} Creating quality affordable housing may not only improve the health of specific individuals but also catalyze a movement toward healthier communities for all.

INTENT

To support housing options for all potential residents, regardless of income level.

Part 1: Unit Allocation

VERIFICATION: Annotated Documents— Policy Documents

> At least one of the following requirements is met for all for-rent dwelling units, including mixed-use buildings:

- a. 20% or more units are designated for tenants whose incomes are at or below 50% of local Area Median Income (AMI), adjusted for family size.⁶³⁸
- b. 40% or more units are designated for tenants whose incomes are at or below 60% of local AMI, adjusted for family size.⁶³⁸
- c. Adherence to locally applicable affordable housing regulations.

Part 2: Housing Cost Limits

Verification: Annotated Documents— Policy Documents

> The following requirement is met for all for-rent dwelling units:

- a. Monthly housing costs (including any utility allowances) paid by the tenant are in accordance with those set under the Low-Income Housing Tax Credit (LIHTC) program based on Section 42 of the Internal Revenue Code.⁶³⁸



DIG DIGITAL CONNECTIVITY | O

Digital connectivity is instrumental in helping communities reach their full potential, providing benefits across economic, civic, educational, environmental and social sectors.⁶³⁹ Providing fast, reliable wireless internet (Wi-Fi) in community spaces not only aids in bridging the divide between those who can and cannot afford Internet but also has the potential to help visitors with wayfinding and enhance the economic vitality of an area.⁶⁴⁰

INTENT

To support meaningful participation in society through support of digital infrastructure and facilitation of digital connectivity.

SPECIAL

This feature requires either one of the parts to be met.

Part 1: Digital Infrastructure

VERIFICATION: Annotated Documents—Policy Documents

> The following requirements are met:

- a. Adoption of a "dig once" principle: all new buildings must install Internet cables or fiber optics cables when laying underground lines (e.g., sewer or electricity).⁶⁴¹
- b. All new or retrofitted buildings are fitted with provider-neutral wiring that any Internet service carrier can connect to from an access point in or near the building.⁶⁴¹

OR

Part 2: Wi-Fi Network

VERIFICATION: Annotated Documents—Map

> The following requirements are met:

- a. Network of no-cost Wi-Fi hotspots or zones is available in public spaces.
- b. Network covers at least 75% of the public use area owned, operated or managed by the project owner.



ENG CIVIC ENGAGEMENT | O

Civic engagement involves participation and engagement of citizens in the improvement and support of the vitality of the community, often through channels of volunteering, local politics or community social justice efforts.⁶⁴² Through these avenues of civic participation, residents cultivate a greater sense of identity and ownership over their community, which can contribute to positive social and health outcomes, especially through the fostering of social capital.⁶⁴³ For example, volunteerism and other types of involvement can help community-dwelling older adults stay physically, socially and cognitively engaged in the community, with research showing older adult volunteers experiencing less depressive symptomatology, lower utilization of health services and greater life satisfaction.⁶⁴⁴ Similarly, voting among older adults is linked to improved feelings of autonomy and overall subjective well-being, and political activism is linked with improved social well-being and subjective vitality.^{645,646} Benefits from participation are not limited to civic acts; social participation in activities like associations and hobby clubs is also linked to self-rated good health.⁶⁴⁷ Ensuring that all citizens have the ability, agency and opportunity to participate in various types of civic and social acts allows for the cultivation of an engaged population that benefits both residents and the community as a whole.⁶⁴⁸

INTENT

To encourage the creation of opportunities for all community members to become actively involved in the community and its improvement efforts through engagement and volunteerism.



Part 1: Voting Opportunities

VERIFICATION: Annotated Documents—Policy Document and Map

> At least one of the following requirements is met:

- a. All dwelling units are within an 800 m [0.5 mi] walk distance of a voting station.
- b. Vans, shuttles or alternative enhanced transport to voting stations are provided on voting days.



Part 2: Community Engagement

VERIFICATION: Annotated Documents—Policy Documents

> At least two of the following requirements are met:

- a. Minimum of one in-person or digital town hall meeting with capabilities for digital participation is held per year.
- b. Residents have the right and are encouraged to create a resident and/or tenant association that is independent of project administration.
- c. Residents have the opportunity to engage in **participatory budgeting**.
- d. Residents have the opportunity to participate in citizen advisory boards.

Part 3: Volunteerism

VERIFICATION: Annotated Documents—Policy Documents

> At least one of the following requirements is met:

- a. Project maintains a list of volunteer opportunities in the project area and greater community, with a minimum of one opportunity per month open to all community members.
- b. Residents have the opportunity and are encouraged to create a **timebank** that is supported by the project administration.



PRE PRESERVATION AND REHABILITATION | O

Cultural, historical or architectural spaces or landmarks are instrumental in the maintenance of community vibrancy. Destruction of meaningful places can fracture the social ecosystem and lead to poor stress-related health outcomes as well as loss of capital within a community.⁶⁴⁹ Preservation of significant spaces provides the opportunity to elevate community history into the public landscape, adding depth of identity to the community while also socially and culturally connecting citizens to the community and cultivating a richer sense of civic pride.⁶⁵⁰ Rehabilitation of land holdings such as vacant lots can be beneficial as well, since these spaces can be transformed into spaces for healthy food production, physical activity and social interaction.⁶⁵¹

INTENT

To respect the value of place attachment, community identity and social cohesion through preservation and creation of meaningful public spaces.

Part 1: Preservation of Place

VERIFICATION: Annotated Documents— Policy Documents

> The following requirements are met:

- a. All buildings or landscapes protected by federal, state and local historic or heritage preservation programs are left intact.⁶⁵⁰
- b. Consultation with local historic association or governing body for long-term plans for buildings or landscapes protected by federal, state and local historical or heritage preservation programs, including understanding rehabilitation needs and community constituency.

Part 2: Vacant Lot Transformation

VERIFICATION: Annotated Documents— Professional Narrative

> All vacant lots owned or managed by the project owner have debris removed and undergo a lot transformation process that meets at least one of the following requirements:

- a. Visual enhancement through artwork at the lot perimeter.
- b. Planting of grass or vegetation with perimeter demarcation to facilitate stormwater runoff.
- c. Creation of pop-up gardens or temporary planting plots.



CEL CELEBRATION OF PLACE | O

Active celebration of a place's culture and a social, economic and political history reinforces local identity and character.⁶⁵² Programming and design strategies that recognize unique aspects of the community and foster a sense of place can also highlight local assets for community members and visitors.

INTENT

To honor local history, cultural practices, institutions and identity of the project area.

Part 1: Community Design and Identity

VERIFICATION: Annotated Documents— Professional Narrative

- > The following aspects are included in the project plan:
 - a. Incorporation of native flora into landscape design throughout the project area.
 - b. Installation of public art throughout the project area, including both temporary and permanent installations.
 - c. Adoption of vernacular design strategies that honor local architecture and material supply.
 - d. Designation of sites that celebrate local culture or history.
 - e. Education of residents and visitors about design and operation elements of the project.

Part 2: Community-Serving Retail and Institutions

VERIFICATION: Annotated Documents— Professional Narrative

- > A narrative describes how the project promotes local retail and institutional cultivation, including a consideration of the following:
 - a. Serving the target community demographics.
 - b. Supporting opportunities for locally owned retail.
 - c. Fostering health and wellness-oriented retail and institutional offerings.
 - d. Encouraging food retailers within the project area to purchase goods from local producers.
 - e. Encouraging active transportation to everyday services and retail needs.



ART

PUBLIC ART | O

Public art expresses community identity, enhances civic pride, serves as a community landmark and can stimulate communities economically.⁶⁵³ Integrating art into public settings increases accessibility and visibility of art for the public and enhances public appreciation of art by removing it from the traditional museum or gallery setting and bringing it directly into the community. Beyond these benefits, public art connects artists with the community and promotes diversity in civic planning and development, allowing communities to create a more personal, enriched space that feels authentic and unique to the neighborhood.⁶⁵⁴

INTENT

To foster public creativity and appreciation for art.

SPECIAL

This feature requires either one of the parts to be met.

Part 1: Percent for Art

VERIFICATION: Annotated Documents—Policy Document

> All new buildings larger than 2,323 m² [25,000 ft²] owned, operated or managed by the project owner meet at least one of the following requirements:

- a. At least 1% of the total cost of construction (maximum required \$200,000 USD) is spent on public art on the site or within the community.⁶⁵⁵
- b. At least 20% of the building frontage is dedicated to public art.

OR

Part 2: Public Art Program

VERIFICATION: Annotated Documents—Professional Narrative

> The project adopts a public arts program and provides a narrative demonstrating the following:

- a. Financial support from project for public art projects.
- b. Prioritization of the recruitment of local artists for the creation of temporary and permanent works.
- c. Consultation with an art professional in the selection of local artists.⁶⁵⁶



SAF COMMUNITY CONFIDENCE | O

Individual perceptions of community safety are important determinants of health, behavioral and economic outcomes.⁶²⁰ For example, fear or perceptions of crime (a distinct measure from actual crime rates) has been known to limit mobility of community residents and may prevent them from fully engaging with their community and peers.⁶⁵⁷ Crime Prevention Through Environmental Design (CPTED) is a multidisciplinary design approach that focuses on incorporating passive design strategies such as lighting, landscaping and activity planning into the planning and management of public spaces and buildings.⁶²⁰ A growing body of evidence shows that CPTED strategies have been effective in reducing crime rates and fear of crime in communities.^{658,659} While more conclusive evidence is needed to establish concrete outcomes associated with these interventions, much of the evidence base suggests that CPTED can be an effective and pragmatic public health tool.⁶⁵⁹

INTENT

To improve community safety, health and vitality by integrating CPTED principles into the project master plan and/or operations.

Part 1: Crime Prevention Through Environmental Design

VERIFICATION: Annotated Documents—Professional Narrative

> A point-by-point narrative outlines how at least three of the following requirements of the CPTED framework are incorporated in the design and/or operation of spaces owned, operated or managed by the project owner:

- a. Natural surveillance—spatial design and placement of physical elements to increase visibility within and around a space.⁶²⁰
- b. Natural access management—landscape and wayfinding elements that help define and guide community members throughout space.⁶²⁰
- c. Space delineation—physical and environmental attributes that help define space and express a positive sense of ownership.⁶²⁰
- d. Activity support—planning and placing community social activities in public spaces.⁶²⁰
- e. Physical maintenance—general upkeep plan for buildings and public spaces that includes activities such as landscaping and trash maintenance.⁶²⁰
- f. Order maintenance—prevention and remediation plan for vandalism and property damage.⁶²⁰
- g. Social capital—designated gathering areas, community programs or events that foster social trust and positive collective action regarding community safety.⁶²⁰



POC

POST-OCCUPANCY SURVEYS | O

Given the diversity of communities, it is difficult to prescribe a comprehensive set of features that are effective across all settings. Occupancy surveys can be useful in measuring the extent to which a project is effectively promoting and protecting the health and comfort needs of its users.

INTENT

To allow occupants the opportunity to provide feedback to project owners, and to help further develop the WELL Community Standard.



Part 1: User Survey Content

VERIFICATION: Annotated Documents—Policy Document

> A **representative sample** of at least 30% of occupants are surveyed annually (starting within one year of achieving 50% occupancy) on the following topics:

- a. Physical environmental quality, including air, water, light, acoustics and thermal comfort.
- b. Social environment, including social programming, quality of life and perceived safety.
- c. Community design, including access to services and amenities.

Part 2: Information Reporting

VERIFICATION: Annotated Documents—Policy Document

> Survey results are reported on an aggregated, anonymized basis to the following groups:

- a. Project owners and managers.
- b. Community residents (upon request).
- c. The IWBI, at least once per year.



— INNOVATION



INNOVATION BACKGROUND



The Innovation category recognizes and rewards projects that utilize innovative practices to integrate health and wellness into the design and operation of communities. Projects may earn an additional 10 points for innovative design, performance, operations, programming or advocacy initiatives that are not addressed in the WELL Community Standard. These initiatives may include collaboration between developers and other parties, the participation of a WELL Accredited Professional (WELL AP) on the project team or a commitment to environmental sustainability through certification in a leading neighborhood or community green rating system.

Projects are limited to a total of 10 points in the Innovation category.



GND GREEN RATING SYSTEMS | 10 PTS

The WELL Community Standard aligns with leading global green rating systems and recognizes projects with a commitment to both environmental sustainability and human health. Policies that reduce the environmental impact of buildings and large developments also contribute to the advancement of **human health at the community scale**. The environment itself can act as a mechanism to promote and reinforce health by providing fresh air, clean water, affordable and accessible food and green spaces for physical activity and social connection. Thus, balancing sustainability and health allows both people and the physical environment that surrounds them to thrive.

INTENT

To recognize projects that have achieved certification under a leading neighborhood or community green rating system.

Part 1: Sustainable Community Certification

VERIFICATION: Annotated Document—Certification Certificate

- > The project has achieved certification for one of the following sustainability programs:
 - a. LEED for Neighborhood Development.
 - b. Green Star—Communities.
 - c. BREEAM Communities.
 - d. Other programs approved by IWBI.



INP

PLANNING FOR HEALTH | 1 PT PER PROPOSAL, UP TO 10 PTS

Health outcomes are largely shaped by the infrastructure and environments that exist within neighborhoods and communities. Decisions that impact land use, urban design and local transportation also directly impact the local air and water quality, perceptions of safety, physical activity opportunities and other factors that influence human health. Addressing public health through the built environment thus requires interdisciplinary collaboration between developers and local parties, such as government agencies or public health organizations.^{660,661} Cities around the world are successfully integrating health into planning policies. Examples include integrating active design language into zoning codes or design guidelines, revising outdated zoning codes that prohibit the transformation of vacant lots or underutilized roadways and incentivizing grocers and other retailers to build in areas of underserved markets.^{40,608,662} These actions lead to lasting changes that support community health and engagement as well as promote equity by reducing environmental and health disparities.

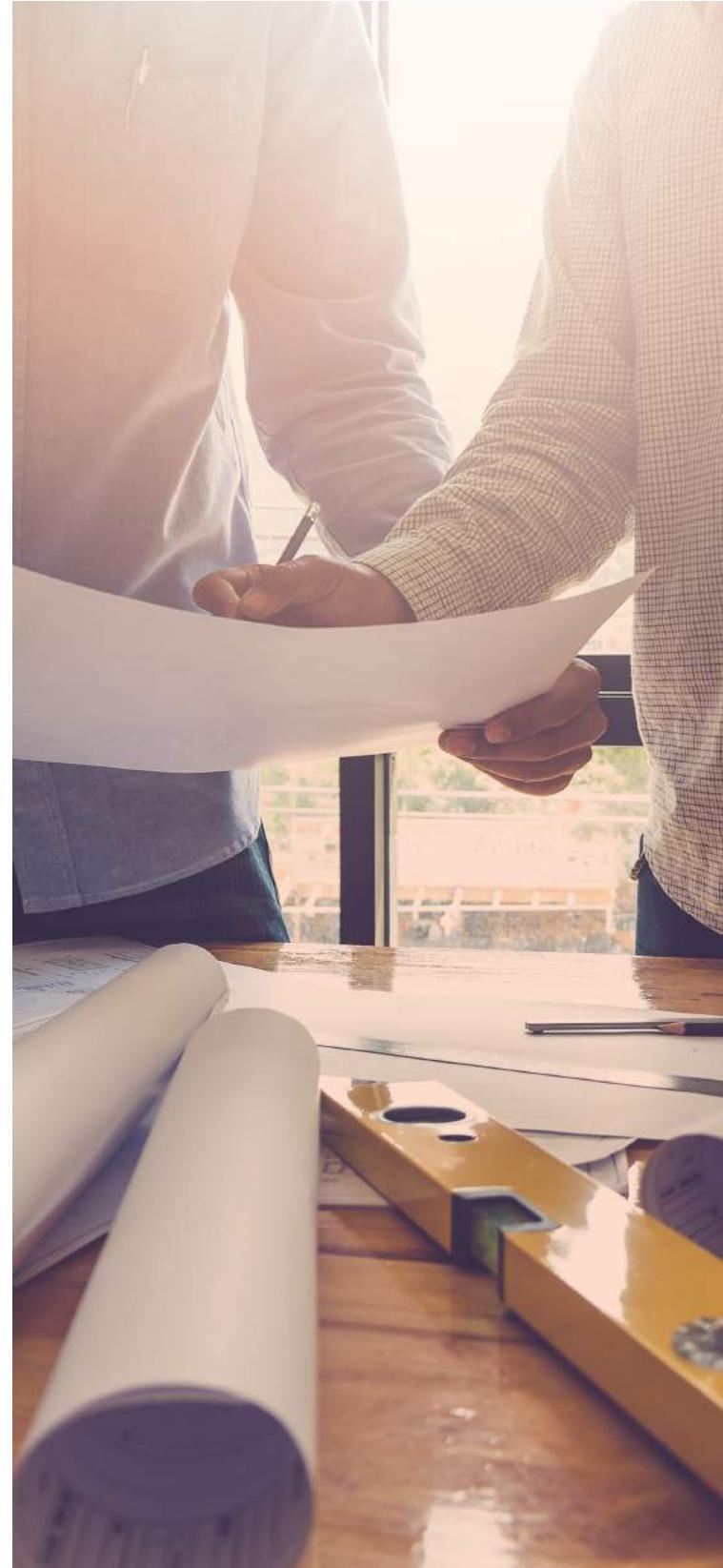
INTENT

To recognize projects that successfully change local planning codes, regulations or ordinances to drive the creation of healthy environments.

Part 1: Market Transformation**VERIFICATION: Annotated Documents—
Innovation Proposal**

> The project meets one of the following:

- a. The project demonstrates that the local code has been changed as a result of project advocacy to meet or exceed a WELL feature.
- b. The project demonstrates that an exemption to local code has been made to meet or exceed a WELL feature.





INV INNOVATE WELL | 1 PT PER PROPOSAL, UP TO 10 PTS

As the scientific understanding of health continues to evolve, so too does the ability to address the complex issue of promoting wellness through the built environment. The WELL Community Standard embraces the creative thinking that is needed to address the complex ways in which communities can contribute to the advancement of health and well-being.

INTENT

To recognize projects that address health and wellness in novel ways that are not addressed in the WELL Community Standard.



Part 1: Innovation Proposal

VERIFICATION: Annotated Documents—Innovation Proposal

- > The proposed feature meets the following requirements:
 - a. Relates to human health and wellness in a novel way that is not already covered in the WELL Community Standard.
 - b. Identifies the intent, proposed requirements for performance verification and the design approach or strategies used to meet the requirements.

Part 2: Innovation Support

VERIFICATION: Annotated Documents—Innovation Proposal

- > The proposed feature is supported by the following:
 - a. Existing scientific, medical and industry research that is consistent with applicable laws, regulations and leading practices in community design and management.



WLP

WELL ACCREDITED PROFESSIONAL | 1 PT



INTENT

To recognize projects that engage a WELL AP to support the WELL certification process.

The WELL Accredited Professional (WELL AP) credential denotes expertise in the WELL Building Standard and a commitment to advancing human health and wellness in buildings and communities. The presence of a WELL AP on a project team can benefit project planning and achievement efforts by streamlining the WELL application and certification process.

Part 1: WELL AP

VERIFICATION: Annotated Document—Credential Certificate

> At least one member of the project team:

- a. Has achieved the WELL Accredited Professional credential by the time of documentation submission.
- b. Maintains accreditation until project's initial certification is achieved.

APPENDICES

APPENDIX N1: BREASTFEEDING SUPPORT

A lactation or nursing room (that is not a bathroom) is at least 2.1 m x 2.1 m [7 ft x 7 ft] and provides the following, at a minimum:

- a. Work surface and chair.⁶⁶³
- b. Sink, faucet and paper towel dispenser.⁶⁶³
- c. User-operated lock for privacy.⁶⁶³
- d. Multiple electrical outlets.⁶⁶³

APPENDIX N2: PUBLIC SPACES OF ASSEMBLY

CATEGORY	BUILDING TYPE
Social	Community or recreation center
	Meeting hall
	Convention center
Entertainment	Sports arena or stadium
	Cultural arts facility (museum, performing arts)
	Entertainment venue
	Casino
	Zoo
	Airport
Services	Transportation terminal
	Education facility
Civic and community facilities	Government office that serves public on-site
	Public library
	Social services center
	Health care facility
	Place of worship

APPENDIX F1: USE CATEGORIES

CATEGORY	USE TYPE
Food retail	Grocery with produce section Supermarket
Community-serving retail	Convenience store Farmers' market Hardware store Pharmacy Other retail
Services	Bank Entertainment venue Gym, health club, exercise studio Hair salon Laundry, dry cleaner Restaurant, café, diner (excluding those with only drive-through service)
Civic and community facilities	Adult or senior care (licensed) Childcare (licensed) Community or recreation center Cultural arts facility (museum, performing arts) Education facility Government office that serves public on-site Medical clinic or office that treats patients Place of worship Police or fire station Post office Public library Public park Social services center

Source: LEED for Neighborhood Development.¹³²

The following restrictions apply:

1. A use may be counted as only one use type (e.g., a retail store may be counted only once even if it sells products in several categories).
2. No more than two uses in each use type may be counted (e.g., if five restaurants are within the required distance, only two may be counted).
3. The uses accessible to each counted dwelling unit must represent at least two categories.

APPENDIX F2: CYCLIST INFRASTRUCTURE

TABLE 1: BUFFER STRATEGIES	
STRATEGY	REQUIREMENTS
Delineator posts	<ul style="list-style-type: none"> • Maximum 12 m [40 ft] spacing.⁶⁶⁴ • Maintain a recommended buffer zone of 1 m [3.2 ft].²³⁹
Bollards	<ul style="list-style-type: none"> • Maximum 12 m [40 ft] spacing.⁶⁶⁴ • Maintain a recommended buffer zone of 1 m [3.2 ft].²³⁹
Concrete barrier	<ul style="list-style-type: none"> • Continuous spacing (can allow drainage gaps).⁶⁶⁴ • Maintain a recommended buffer zone of 1 m [3.2 ft].²³⁹
Raised median	<ul style="list-style-type: none"> • Minimum curb height of 15 cm [6 in].⁶⁶⁴ • Maintain a recommended buffer zone of 1 m [3.2 ft].²³⁹ • Continuous spacing (can allow drainage gaps).⁶⁶⁴
Raised lane	<ul style="list-style-type: none"> • Minimum 7.6 cm [3 in] rise.⁶⁶⁴ • Includes a recommended buffer zone of at least 1 m [3.2 ft].²³⁹
Planters	<ul style="list-style-type: none"> • Consistent spacing (can allow drainage gaps).⁶⁶⁴ • Maintain a recommended buffer zone of 1 m [3.2 ft].²³⁹
Parking stops	<ul style="list-style-type: none"> • Minimum barrier height 10 cm [4 in].⁶⁶⁴ • Minimum barrier length 1.8 m [6 ft].⁶⁶⁴ • Minimum barrier spacing 1.8 m [6 ft].⁶⁶⁴ • Maintain a recommended buffer zone of 1 m [3.2 ft].²³⁹
Parked cars	<ul style="list-style-type: none"> • Parked cars may be used to separate cyclists from traffic but should maintain a recommended buffer zone of 1 m [3.2 ft] between the cycle and parking lanes.²³⁹ • Parking spaces are compliant with applicable preconditions or achieved optimizations in the Air concept.

APPENDIX F3: PHYSICAL ACTIVITY RECOMMENDATIONS

The World Health Organization (WHO) recommends that adults (ages 18–64) and older adults (ages 65 and above) engage in at least 150 minutes/week of moderate-intensity physical activity, or 75 minutes/week of vigorous-intensity activity (or an equivalent combination), plus muscle-strengthening activities on two or more days/week.²¹⁶ Children (ages 6–17) are encouraged to engage in at least 60 minutes/day of age-appropriate moderate- to vigorous-intensity activities, muscle-strengthening activities on at least three days per week, and bone-strengthening activities (i.e., weight-bearing activities such as jumping, stair climbing and weight-lifting) on at least three days/week.²¹⁶ The U.S. Department of Health and Human Services (HHS) further recommends that older adults participate in neuromuscular training activities (i.e., balance and coordination activities) to mitigate fall risk and age-related functional declines.⁶⁶⁵

APPENDIX MA1: REGULATIONS, GUIDELINES AND EQUIVALENTS

Table MA1 further describes the regulations and guidelines referred to in the Materials chapter. When more than one document is listed in the Regulations/Guidelines column, either one is acceptable. Projects may submit additional programs for evaluation as Equivalency Proposals.

TABLE MA1: REGULATIONS, GUIDELINES AND EQUIVALENTS

FEATURE CODE	FEATURE NAME	PART NAME	REGULATIONS/GUIDELINES
REM	Site Remediation and Redevelopment	Cleanup and Redevelopment	<p>Req. a</p> <ul style="list-style-type: none"> ISO/PRF 18504—Soil quality—Guidance on sustainable remediation⁶⁶⁶ ASTM E2893—16 Standard Guide for Greener Cleanups^{667,668}
CRE	Construction Remediation	Lead Abatement	<p>Req. a</p> <ul style="list-style-type: none"> U.S. EPA 40 CFR Part 745.65 for residential dwellings or child-occupied facilities⁶⁶⁹
			<p>Req. b</p> <ul style="list-style-type: none"> U.S. EPA 40 CFR Part 745.227 work practice standards for conducting lead-based paint activities, as outlined for multi-family dwellings⁶⁶⁹
		Asbestos Abatement	<ul style="list-style-type: none"> National Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 61.145, Subpart M⁶⁷⁰
		Polychlorinated Biphenyl Abatement	<ul style="list-style-type: none"> U.S. EPA Steps to Safe PCB Abatement Activities⁶⁷¹
		Mercury Abatement	<ul style="list-style-type: none"> United States Solid Waste and Environmental Protection Emergency Response Agency. Resource Conservation and Recovery Act. Construction, Demolition, and Renovation.⁶⁷²
ODS	Outdoor Structures	Treated Wood	<p>Req. b</p> <ul style="list-style-type: none"> United States Department of Agriculture; Preservative-Treated Wood and Alternative Products in the Forest Service⁶⁷³
			<p>Req. c</p> <ul style="list-style-type: none"> Washington Toxics Coalition. Identifying Effective Sealants for CCA-Treated Wood.⁶⁷³
		Lead Paint	<p>Req. a</p> <ul style="list-style-type: none"> Consumer Product Safety Improvement Act 2008; Section 101 of Public Law 110-314, as modified by H.R. 2715 (Public Law 112-28, August 12, 2011) and in 16 CFR part 1303⁶⁷⁴
			<p>Req. b</p> <ul style="list-style-type: none"> Consumer Product Safety Commission; Staff Recommendations for Identifying and Controlling Lead Paint on Public Playground Equipment⁶⁸⁰
		Lead Soil and Exterior Dust	<ul style="list-style-type: none"> U.S. EPA 40 CFR Part 745.65 for residential dwellings or child-occupied facilities⁶⁶⁹
PES	Landscaping and Pesticide Use	Pesticide and Herbicide Use	<p>Req. a</p> <ul style="list-style-type: none"> San Francisco Environment Code; Chapter 3, Integrated Pest Management (IPM) program⁶⁷⁵
			<p>Req. b</p> <ul style="list-style-type: none"> San Francisco Hazard Review Process evaluation results through (1) Pesticide Research Institute's PestSmart tool⁶⁷⁶ or (2) Pesticide Product Evaluator tool⁶⁷⁷ If a pesticide has not yet been evaluated by the Pesticide Research Institute's tools above, use the Guide to the San Francisco's Reduced Risk Pesticide List Hazard Tier Review Process, which outlines the procedure for evaluating pesticides.⁶⁷⁸
HAZ	Hazard Communication	Hazardous Information	<ul style="list-style-type: none"> Right to Know Program, City of New York, Bureau of Police and Security Division of Emergency Response, 2016⁶⁷⁹
HWM	Hazardous Waste Stream Management	Hazardous Waste Management	<ul style="list-style-type: none"> U.S. EPA 40 CFR Part 273 Standards for Universal Waste Management⁶⁸⁰ <ul style="list-style-type: none"> Batteries as described in §273.2, Pesticides as described in §273.3, Mercury-containing equipment as described in §273.4, Lamps as described in §273.5.

APPENDIX MI1: OUTDOOR CHILD PLAY SPACES

Seven C's of Young Children's Outdoor Play Spaces

Character: The overall feel, physical character and design intent and how it will guide design decisions (e.g., modern, organic, modular, reuse).⁵⁵¹

Context: How the design has considered the play space itself, its surrounding landscape and how they interact with each other (e.g., sensitive to climate).⁵⁵¹

Connectivity: The play space has physical, visual and cognitive connectivity (e.g., diverse pathways within the space or between indoor and outdoor spaces).⁵⁵¹

Change: Differently sized subspaces provide areas for children to play alone or in groups and with changing materials (e.g., living plants or animals).⁵⁵¹

Chance: Open-endedness or flexibility to encourage children to create, manipulate, shape and explore the play space (e.g., messy zones, loose and movable materials, mystery). The space should be appropriately designed to the scale of children.⁵⁵¹

Clarity: Physical legibility and perceptual imageability (e.g., clear entry and exit spaces, soundscape and noise management).⁵⁵¹

Challenge: Provides several levels of physical and cognitive difficulty without being hazardous.⁵⁵¹

Strategies from Head Start Body Start Play Space Assessment

Key features: Play space comprises a variety of developmentally appropriate play areas and learning settings, including at least five of the following: multipurpose, open space; anchored play equipment (e.g., climbing structure, swings, slides); wheeled toys; manipulative equipment (e.g., balls, jump ropes); water play features (e.g., hose/sprinkler, wading pool); music and movement/acoustic play area (e.g., log drums, chimes); sand play area; balance beam/stepping stones; playhouse; flower or vegetable garden; loose parts for building; climbing tree; climbing/rolling mound; raised deck/stage.⁵⁵²

Movement opportunities: Play space promotes physical activity and movement, including at least five of the following actions in each relevant category: traveling actions (walking, skipping, hopping, climbing, jumping, crawling, sliding, marching, galloping, running, leaping); stabilizing actions (twisting, turning, squatting, swinging, swaying, pushing, pulling, stretching, bending, shaking, dodging, landing); manipulating actions (throwing, catching, bouncing, tossing, rolling, kicking, trapping, opening, closing, striking, object handling).⁵⁵²

Flexibility and play: Play space offers features that can be changed or played with in many different ways, including spontaneous, innovative, flexible and creative play; solitary, parallel or cooperative play; functional, construction and symbol play.⁵⁵²

Natural features: Play space incorporates a variety of natural elements, including at least three of the following categories: trees or shrubs, flowering plants (non-poisonous); vines; topographic variations (e.g., mounds, terraces, slopes); other safe ground surfaces.⁵⁵²

Welcoming atmosphere: Play space has friendly, clean, inviting atmosphere, and includes at least two of the following visual or auditory elements: banner, chime, wind sock, statue, gazing ball, flag, cultural artifact or decorative object.⁵⁵²

Sensory elements: Play space provides opportunities for a variety of sensory experiences, including all of the following: vestibular stimulation (e.g., rolling, rocking, swinging, sliding, merry-go-round, gliders); proprioceptive stimulation (e.g., climbing, crawling on/through, lifting, throwing); olfactory stimulation (e.g., fragrant herb plantings).⁵⁵²

Accessibility and inclusive play: Play space provides opportunities for children across ages and abilities to access and enjoy the environment and participate with peers.⁵⁵²

Risk and challenge: Play space promotes adventure (e.g., hiding places, safe jumping perches) and challenges children's physical, social and cognitive abilities (e.g., varying height apparatus, balancing activities).⁵⁵²

APPENDIX C1: HEALTH IMPACT ASSESSMENT (HIA) SCREENING

Baseline Community Health Profile and Screening Process to Inform Decision-Making

Baseline Community Health Profile

The baseline community health profile applies to populations directly affected by the project as well as populations indirectly affected by certain aspects of the project, i.e., populations located in neighboring areas adjacent to the project.

The narrative covers the following health profile components:

1. Geographic boundaries of the affected community.⁵⁹⁵ Include a map showing the boundaries for both the project and the defined community.

- If the project is developing a new area with no previous occupants, the narrative will likely focus on affected communities in populations outside the project area.
- If the project is developing an area with no residents but has other regular occupants such as those who enter the project area to work, attend school or visit, the narrative can include the most common neighborhoods of origin of those regular occupants.

2. Socio-demographic characteristics and health needs of the affected community. This section must include at least the following:

- Socio-demographics: age, gender, race/ethnicity, economic status (such as income or percent in poverty), educational attainment and primary language.^{594,595}
- Health status/needs at the smallest unit of analysis that covers the affected community and that are no larger than the county level (in the U.S.) or equivalent.⁵⁹⁶

3. Sources of data. The socio-demographic and health data will typically come from existing sources that are widely available to the public, such as the following:

- The U.S. Census Bureau provides population-based statistics and limited health-related statistics at levels as small as census tracts and zip code tabulation areas.⁶⁸¹
- Community-level health data are often available from health Departments (e.g., Florida Department of Health in Hillsborough County, New York City Department of Health and Mental Hygiene) on a range of topics.
- County Health Rankings & Roadmaps provide health data for each U.S. county.⁶⁸²
- In Europe, the country-level data is available in the Eurostat tool.⁶⁸³

4. Additional resources for guidance on data sources:

- Appendix E: HIA Data Sources and Related Resources, in *A Health Impact Assessment Toolkit*.⁶⁰³
- Attachment F: Available Data Sources for Conducting HIAs, in *Guidance and Tools for Conducting Rapid Health Impact Assessments*.⁵⁹⁴

Screening Process to Inform Decision-Making

The screening process assesses the need and feasibility of conducting an HIA for the project. Provide a summary describing or demonstrating the following:

1. **Need.** The proposed project(s) has potential health impacts. If the project has multiple components, identify which subset of components has the most potential health impacts based on existing evidence.⁵⁹⁴
2. **Sufficient time.** The project has five months or more for the completion of the HIA in order to inform planning or design decisions.⁵⁹⁴
3. **Usefulness/value.** The findings and recommendations from the HIA are likely to inform the decision-making process. For example, if the project has passed the planning stages with no flexibility to adopt changes, an HIA would not be useful.^{594,597,598}
 - There are some rare exceptions where post-decision HIAs may still be useful; for example, if a policy has been passed but not yet implemented, the HIA findings may be used to influence or modify the implementation process for a specific health issue or if similar proposals or plans are likely in the immediate future of the project.⁵⁹⁹
4. Additional resources:
 - Attachment B: HIEC Tool for Reviewing RHIA Proposals.⁵⁹⁴
 - HIA Screening Worksheet (page 37).⁶⁰³
 - Considerations for the selection of appropriate policies, plans or projects for analysis using Health Impact Assessment.⁵⁹⁹

APPENDIX C2: HEALTH IMPACT ASSESSMENT IMPLEMENTATION

Health Impact Assessment (HIA) Protocol

Scope

Determine the scope of the HIA, including the methods, resources needed and community stakeholders involved in conducting the HIA. Whenever possible, drawing on literature and methods from existing similar HIAs completed, while noting differences in the community and project components, will save time and resources needed.⁶⁸⁴ Partnering with a public health professional is highly recommended.

Scope must identify the following:

1. Potential health impacts.
2. Key community stakeholders.
3. Representatives of the impacted community, such as residents or community-based organizations serving the affected community.^{594,602} A plan to convene a minimum of two community stakeholder meetings: one during scoping stage and one during the recommendations stage.⁵⁹⁴
4. Data sources and methods to be used.
5. A designated point of contact on staff for any public inquiries related to the HIA.

Assessment

Must include document demonstrating:

1. A logic model visualizing the pathways by which the project/policy may impact health outcomes.⁵⁹⁴
2. Potential health impacts, with particular attention to the distribution and vulnerable populations.

Recommendations

Provide evidence-based recommendations to mitigate negative and maximize positive health impacts for each impact the HIA has identified that includes the following:^{594,603}

1. A community stakeholder meeting held to collaboratively develop recommendations.
2. Evidence-based recommendations based on existing literature.
3. Actionable and feasible recommendations on changes to the proposed project.

Plan for Communication and Dissemination of Findings

The project must provide a plan for no-cost and open access to the HIA report or findings (e.g., website or hard copies upon request).⁵⁹⁴

Plan for Monitoring and Evaluation

This monitoring and evaluation stage evaluates the impacts of the HIA on the project's decisions or the impacts of the HIA's findings/recommendations on the health outcomes of the affected community.⁵⁹⁴

1. The impact evaluation answers the following question:

- Did the project implement the recommendations of the HIA?⁵⁹⁴

2. The outcome evaluation answers the following question:

- Were the selected health impacts enhanced and health risks minimized in the affected community?⁵⁹⁴

For a sample tracking sheet, see RHIA Tracking: Impact and Outcome Indicators, Attachment J.⁵⁹⁴

GLOSSARY

A

ALBEDO: a measure of diffuse reflectivity of a surface, or the reflective power of a surface. It corresponds to the ratio of the radiation reflected from the surface, to the radiation incident upon the surface, reported from 0 to 1, where 0 corresponds to total absorption and 1 corresponds to total reflectance. The term "solar reflectance" is also used with reference to solar energy.

ALLEY: narrow passage behind or between buildings that are often reserved for pedestrian or service vehicle traffic. Alley ways may be dead-end paths or allow for through traffic but are not a typical route of vehicle travel.

ALL-WEATHER PATHWAY: a footpath or other pedestrian path, including streets with shared space and traffic calming, that can be used despite varying weather conditions.

ARTICULATION OF STREET FACING FACADES: street-frontage design elements that create the streetscape environment.

ASBESTOS: a naturally occurring fibrous silicate-based mineral that is commonly used in insulation because of its chemical and flame resistance, tensile strength and sound absorption properties.

B

BABY-FRIENDLY DESIGNATION: a designation awarded to hospitals and birthing centers as part of the Baby-Friendly Hospital Initiative, a global collaboration between the WHO and UNICEF. Its aim is to increase the number of babies who are exclusively breastfed worldwide.

BLUE SPACE: any environment, either natural or built, that contains visible amounts of standing or running water. These spaces typically contain a highly dominant and visible aquatic feature (e.g., shoreline, inland waterway, lake, reservoir), but can also include a water element that plays a secondary role in the space (e.g., fountain, stream).

C

CARCINOGEN: a chemical substance(s) or mixture with different levels of cancer-causing potential via DNA mutation and/or increased cell division.

CASH IN LIEU OF FREE PARKING: a program where employers or other providers of parking distribute incentive payments to individuals who do not utilize the parking facilities.

CENTER-BASED EARLY CHILDHOOD EDUCATION: childcare and early childhood education services based out of a central facility, such as a school.

CHROMATED COPPER ARSENATES (CCA): a wood preservative belonging to pesticides collectively known as chromated arsenicals, characterized by containing chromium, copper and/or arsenic that protect wood.

CIRCADIAN RHYTHM: an internal clock that keeps the body's hormones and bodily processes on a roughly 24-hour cycle, even in continuous darkness. There are several circadian rhythms in the human body, wherein tissues and organs all have their own rhythm, synchronized to a master clock in the brain.

COLOR RENDERING INDEX (CRI): comparison of the appearance of eight to fourteen colors under a light source in question, compared to a blackbody source of the same color temperature.

COMMUNITY SUPPORTED AGRICULTURE (CSA): a program in which individuals pledge support to a farm by purchasing shares of produce that are later delivered to a convenient drop-off location in the community.

CONCESSION STAND: a food stand, kiosk or bar (permanent or mobile) that services individuals at sporting events, amusement parks, theaters and other entertainment venues. Concessions stands are often contracted out to third parties or vendors.

CONSUMER-RUN OR PEER PROGRAMS: programs owned, administratively controlled and operated by individuals who have experienced or been previously diagnosed with a mental health condition (i.e., mental health consumers). Typically, at least 51% of governance is controlled by mental health consumers, and programs typically focus on providing mutual support, community building services (e.g., peer counseling, linkages to resources) and advocacy.

CONVENTIONAL BICYCLE LANE: a portion of a shared roadway that is designated to cyclists that flows in the same direction as vehicular traffic but is not buffered from traffic or parked vehicles. Conventional bicycle lanes are typically demarcated with pavement markings and signage to indicate that both cyclists and motorists should share the roadway.

COOL PAVEMENT: pavements that consist of using materials that reflect solar energy or enhance evaporation, allowing the pavement to stay cooler than traditional pavements. These materials can be used on sidewalks, parking lots and streets or any other areas (e.g., parks and playgrounds) that are typically covered by concrete or traditional paving materials.

COOL ROOF TECHNOLOGY: a cool roof is one that has been engineered in such a way that it reflects a significant amount of solar radiation

GLOSSARY CONT.

upward, toward the sky. This can be accomplished through the use of highly reflective paint, sheet covering or highly reflective tiles or shingles.

CORRELATED COLOR TEMPERATURE (CCT): color temperature at which a blackbody would be able to produce a spectral distribution similar to that produced by a given source.

D

dBA: a weighted decibel expression of the relative loudness of sound as perceived by the human ear. The weighting is utilized because the human ear is less sensitive to sound at low audio frequencies than it is at higher frequencies.

DEDICATED BICYCLE LANE: infrastructure exclusive to cyclists that includes separated (buffered) and protected (physically separated) bike lanes. These lanes are typically demarcated with pavement markings, buffers zones and/or infrastructure and signage.

DWELLING UNITS: space should be intended for long-term occupancy and provide facilities for cooking, sleeping and sanitation. Hotel rooms, for example, are not dwelling units.

E

E-CIGARETTE: handheld device that uses heat to vaporize for the purpose of inhaling a liquid which contains propylene glycol, glycerine and often nicotine.

ELECTRONIC BENEFIT TRANSFER (EBT): an electronic system in place in the United States that allows state welfare to be issued via payment cards that can then be used for food and cash benefits.

ENVIRONMENTAL EQUITY: equitable spatial distribution of greenery across a geographical area, with the goal of preventing locational inequities in the distribution of greenery.

ESSENTIAL MENTAL HEALTH SERVICES: essential services include early identification and treatment of mental disorders, management of stable psychiatric patients, counseling for common mental disorders, referral to more specialized levels of care if needed and mental health promotion and prevention activities.

EXCLUSIVE BREASTFEEDING: feeding an infant only breast milk and no other solids or liquids, including water. The WHO, UNICEF, and American Academy of Pediatrics recommend that infants should be exclusively breastfed for the first six months of life to achieve optimal growth, development and health.

F

FOOD INSECURITY: an economic and social condition of limited or uncertain access to adequate food.

G

GREEN ROOF SYSTEM: a green roof is a vegetative layer installed on a rooftop for the purposes of cooling and energy management. The design has at least a 2-inch covering of hardy groundcover and can include additional features such as a park, and trees.

GREEN SPACE: any environment, either natural or built, that contains vegetation (e.g., trees, grass, forests, parks, gardens).

H

HEALTH DISPARITIES: differences in the health status of different groups of people.

HEALTH IMPACT ASSESSMENT (HIA): the process that helps evaluate the potential health effects of a plan, project or policy before it is built or implemented. HIA brings potential positive and negative public health impacts and considerations to the decision-making process for plans, projects and policies that fall outside traditional public health arenas, such as transportation and land use. An HIA provides practical recommendations to increase positive health effects and minimize negative health effects.

HEARING CONSERVATION PROGRAMS: occupational-setting-based programs that aim to protect employee hearing health and to prevent noise-induced hearing loss. United States Department of Labor Occupational Safety and Health Administration requires that employers monitor noise exposure to identify employees exposed to 8-hour time-weighted averages at or above 85 dB. Components of the program include monitoring, audiometric testing, training, distribution of hearing protection devices and record-keeping.

HEAT LINES: emergency call numbers established during extreme heat events that provide educational information on identifying symptoms of heat stress or heat-related illness, as well as guidance on relevant, available community resources such as the location of publicly accessible cooling centers.

HERBICIDES: chemical substances used to control unwanted plants or weeds.

I

ILLUMINANCE: the amount of light at a particular point in space, per unit area. Measured in lux or foot-candles.

INFORMAL COMMUNITY MENTAL HEALTH CARE: services provided in the community that are not part of the formal mental health care system, including professionals in non-mental health sectors (e.g., teachers, police officers), services provided by non-governmental and family organizations and community members. These individuals and organizations require a basic understanding of mental health conditions as well as counseling and/or advocacy skills.

INTEGRATED PRIMARY MENTAL HEALTH SERVICES: mental health services that are integrated into the primary care level of the health delivery system, including first-line interventions and provision of basic mental health services by primary health clinicians who are skilled and able.

INTERACTIVE WATER FEATURES AND FOUNTAINS: a facility for playing that involves user contact with water. Also known as wet deck, splash pad, spray pad or spray park.

INTRINSICALLY PHOTOSENSITIVE RETINAL GANGLION CELLS

(iPRGCS): cells on the retina that relay environmental light levels to the suprachiasmatic nucleus in the brain through the retinohypothalamic tract. Most sensitive to 480 nm (blue) light.

INVOLUNTARY AND VOLUNTARY ATTENTION: Individuals have two main types of attention: (1) directed attention and (2) involuntary attention. Directed attention is a limited resource that becomes depleted as the mind exerts effort on specific, focused tasks. Involuntary attention is effortless and is typically achieved in natural environments. Involuntary attention helps restore directed attention, thereby supporting cognitive performance.

L_{den}: average sound level over a 24-hour period, with a penalty of 5 dB added for the evening hours or 19:00 to 22:00, and a penalty of 10 dB added for the nighttime hours of 22:00 to 07:00. It is very similar in nature (and in results) to the L_{dn}, but with the added penalty for the evening period.

L_{dn}: average equivalent sound level over a 24-hour period, with a penalty added for noise during the nighttime hours of 22:00 to 07:00. During the nighttime period 10 dB is added to reflect elevated human noise sensitivity during nighttime hours.

LEAD: a naturally occurring metal used in creation of some pipes, ceramics and paints.

LIFESPAN: the length of time in which a human lives.

LIGHT DUTY VEHICLE: car or truck with a gross weight of 3855 kg [8,500 lb] or less.

LIGHTING ZONES: a categorization of an area defined by the amount

of ambient lighting levels typical of that area, derived from the lighting zones described in the Joint IDA-IES Model Lighting Ordinance (MLO). This is distinct from traditional "zoning" delineations.

L_{night}: night-equivalent outdoor sound pressure level associated with a particular type of noise source during nighttime (at least eight hours), calculated over a period of a year.

LOCAL FOOD ENVIRONMENT: the number and types of food stores and food service establishments located in the neighborhood where occupants reside, typically defined by census tract.

LONG-TERM BICYCLE PARKING: enclosed bike racks on the exterior or interior of a building that provide added shelter and security for long-term and/or overnight use (e.g., bike locker, bike shelter, bike room, valet parking).

LUMENS: a measure of luminous flux, derived from the SI base unit candela, and therefore weighted to the eye's sensitivity to light. One watt of light at 555 nm equates to 683 lumens.

M

MASS TRANSIT: a system of large-scale public or private transportation in a given area, typically comprising buses, light rail, subways and elevated trains.

MASS TRANSIT TRIP: a measure of distance based on use of the mass transit network, described in minutes. Distance may be demonstrated using outputs from wayfinding software or using the timetables published by the transit agency and an assumed walking speed of 20 minutes per mile for connecting to the origin/destination. The route must operate at least four times per day to count for this metric.

MATERIAL SAFETY DATA SHEET (MSDS) OR SAFETY DATA SHEET

(SDS): a document on all hazardous chemicals a manufacturer makes, distributes or imports including information such as chemical properties; physical, health and environmental health hazards; protective measures; and safety precautions for handling, storing and transporting the chemical.

MIXED-MEDIA MESSAGING: a messaging or advertising technique that uses multiple mediums to communicate with an audience, such as print, radio, television and/or Internet.

MIXED-USE: a type of community development (typically associated with more urban settings) that includes several building types (e.g., residential, commercial, industrial).

MOBILE MENTAL HEALTH CRISIS TEAM: an interdisciplinary team of mental health professionals (e.g., nurses, social workers, psychiatrists, psychologists, mental health technicians, addiction specialists, peer counselors) that respond to persons in the community in need of acute mental health services, usually providing care at home. Teams typically

GLOSSARY CONT.

operate under voluntary agencies or municipal hospitals.

MOBILE LACTATION STATION: a freestanding lactation suite that provides the space, privacy and resources to support breastfeeding anywhere.

N

NEUROTOXICANT: a class of chemicals known to target and damage the nervous system and include endogenous and synthetic compounds, such as lead, mercury, solvents, PCBs or arsenic.

NOISE-SENSITIVE SPACES: areas where exposure to environmental noise is especially harmful to human health and well-being, e.g., schools, hospitals and residences.

NUMERACY: ability to reason with numbers and other mathematical concepts, to apply these in a range of contexts and to solve a variety of problems.

O

ORNAMENTAL STREET LIGHTING: a street luminaire that serves both optical and decorative functions, typical in some residential areas and particularly in historic districts.

OUT-OF-SCHOOL-TIME ACADEMIC PROGRAMS: education enrichment opportunities offered outside of normal school hours.

P

PARTICIPATORY BUDGETING: a democratic process in which community members are directly involved in the decision-making regarding spending of a public budget.

PEDESTRIAN PATH: infrastructure dedicated to pedestrian use such as sidewalks and other all-weather surfaces.

PEDESTRIAN STREET: area or street reserved solely for pedestrian use where automobile use is prohibited.

PERSISTENT ORGANIC POLLUTANTS (POPS): organic compounds that resist various forms of degradation, including biological and photolytic processes, among others.

PESTICIDE: chemicals used to mitigate or destroy a range of pests or organisms including insects and fungi.

PRIMARY CARE: first level of contact that individuals, families, and communities have with the health care system. Members of this care team include medical doctors, nurses and other clinicians who provide

the first line of general health services.

PRIVately-OWNED PUBLIC SPACES (POPS): spaces within privately owned buildings or on privately owned properties that allow public use; also referred to as privately owned public open spaces (POPOS).

PRODUCE SECTION: the section of a food retail establishment often containing a variety of fresh fruits and vegetables, including local, organic and seasonal selections.

PROTECTED BICYCLE LANE: exclusive cycle facilities that are physically separated from vehicular traffic and pedestrian facilities. Separation, or barriers, include design strategies such as raised buffers, parking lanes, bollards and other materials.

PUBLIC SPACES OF ASSEMBLY: primary spaces where occupants are present on an irregular basis and for a transient time, such as community and convention centers, arenas and stadiums, entertainment facilities and other service facilities.

PUBLIC USE: refers to interior or exterior rooms or spaces located within a building or outdoors that are made available to the general public on a daily basis whether for free or at no cost. Public use spaces may be provided outdoors or in a building that is privately or publicly owned. Public use areas exclude all "private use common areas."

PUBLICLY AVAILABLE FOOD HYGIENE OR SANITARY INSPECTION REPORT:

REPORT: inspection reports of food service establishments that are typically available online (on local food safety websites) and contain the following information: establishment location and type, latest inspection date, inspection findings or comments and violations observed.

Q

QUALITY ADJUSTED LIFE YEARS (QALY): a standard measure of disease burden used in epidemiology that quantifies the quality and years of life lost to any disease.

R

RECEIVING LAND USE: the use type of the land that is experiencing (receiving) sound.

REPRESENTATIVE SAMPLE: To ensure the population surveyed is representative of the community, surveys must include at least two of the following: employees, non-permanent residents (e.g., visitors, students) or residents. Surveys should demonstrate consideration and inclusion across diverse sociodemographic variables such as age, gender, race/ethnicity, economic status (such as income or percent in poverty), educational attainment and primary language.

RESIDENTIAL AREA: area that predominantly (more than 50% by land area excluding roads) comprises residential units such as single-family homes, duplexes, row houses, and multi-family buildings.

RIPARIAN BUFFER: an area surrounding streams and rivers that contains trees and other vegetation that reduces the impact from surrounding land on the water system.

S

SEPARATED BICYCLE LANE: a cycle lanes paired with a demarcated buffer zone that separates the cycle lane from adjacent motor vehicles (parked vehicles and/or traffic).

SHARED BICYCLE LANE: bicycle lanes that are not separated or protected from vehicular traffic. These lanes are marked with in-pavement markings such as sharrows that indicate a shared vehicular and cyclist environment, reinforce cyclist presence on a vehicular street, and may designated cyclist positioning within the shared lane.

SHORT-TERM BICYCLE PARKING: unenclosed bike racks typically placed at the building exterior.

SOLAR REFLECTANCE (SR): refers to the fraction of solar energy that is reflected by a surface. Reported from 0 to 1, where 0 refers to a surface that absorbs all solar energy and 1 refers to a surface that reflects all incident solar radiation.

SOLAR REFLECTANCE INDEX (SRI): a metric that describes the ability of a roof surface to reject solar heat. It takes into consideration both the solar reflectance of the surface as well as the thermal emittance of the surface (how efficiently the surface emits thermal radiance and cools itself). SRIs are defined between 0 and 100 wherein standard black (reflectance 0.80, emittance 0.90) is 0, standard white (reflectance 0.80, emittance 0.90) is 100. This means higher SRIs correspond to greater reflectivity, marking a cooler roof.

STAKEHOLDERS: people or organizations invested in the program, interested in the results of the evaluation and/or with an interest or investment in what will be done with the results of the evaluation. Representing their needs and interests throughout the process is fundamental to good program evaluation.

STREET: any dedicated right-of-way that allows one or more modes of travel.

STREET CONNECTIVITY: the capacity of the transportation network (such as streets, pedestrian and cycling routes) to connect users to their destinations. Well-connected networks are marked by features such as high-intersection density, few dead-end paths and short street segments.

STREET CONNECTIVITY INDEX: ratio of street segments to intersections, or the quantity of roadway links divided by the quantity of roadway nodes in each area. Values typically fall between 1 and 2, with higher values indicating more connectivity.

STREET SEGMENT: defined section of a longer street that is marked by an intersection or other cross path.

STREETSCAPE GREENERY: any type of vegetation that gives the street a green appearance.

SUICIDE HOTSPOT: a high-risk place that provides opportunity for suicide attempt or completion, such as jumping from height or placing oneself in front of a moving vehicle.

SUPERMARKET AND FULL-SERVICE GROCERY STORE: a food retail establishment selling all major categories of food (fruits, vegetables, grains, protein foods and dairy) that is typically larger in size and offers a greater variety of foods than a convenience store.

T

TELEMENTAL HEALTH: the use of technology to provide mental health services from a distance, often for individuals who may be geographically, culturally or linguistically isolated (e.g., those who do not speak the dominant language; individuals who are homebound). Also referred to by more specific terms that pertain to the service being offered, such as telepsychology, telepsychiatry and telebehavioral health.

TIMEBANK: a service exchange system where volunteer hours serve as currency. Participants receive time credits for services rendered and exchange those credits for services from other participants.

TOXIC/TOXICITY: extent to which a substance is harmful to a living organism.

U

UNBUNDLED PARKING: parking that is charged for separately than the associated activity; for example, parking meters at a shopping center or spaces at an apartment building that are rented separately from the dwelling units.

URBAN AGRICULTURE: The agricultural cultivation and production of crops or livestock that is integrated into urban systems in areas such as vacant lots, rooftops or community gardens, it is sometimes referred to as urban farming or urban gardening.

V

VEILING LUMINANCE RATIO: the maximum veiling luminance at the driver's eye divided by the average pavement luminance. Luminance is the density of light leaving a surface in a specific direction, measured in candela/square meter (cd/m²). In the context of roadway lighting, luminance is the amount of light reflected from the pavement in the direction of the driver's eye. Veiling luminance refers to the effect on the visual field caused by stray light within the eye, resulting in impaired visual performance.

W

WALK DISTANCE: the distance that a pedestrian must travel between origins and destinations without obstruction, in a safe and comfortable environment on a continuous network of sidewalks, all weather-surface footpaths, crosswalks or equivalent pedestrian facilities. The walk distance must be drawn from an entrance that is accessible to all building users.

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