Built

Buildings

Intent

Buildings located along the riverfront establish the edge of the public realm, becoming a "face" to the individual districts in which they are located. Viewed from the waterscape and other vantage points, they become landmarks that orient visitors and inhabitants. Added together, buildings compose a district with distinctive forms and landmarks.

This section is intended to give guidance when designing buildings and creating master plans for new districts, to create a built edge to the riverfront that complements the natural setting and that in turn, activates and distinguishes the district.

DEFINITIONS

Massing

The volume and shape of a building

Key Concepts

All building and site development should incorporate elements of green-building design. Developers and owners are encouraged to utilize the Leadership in Energy and Environmental Design (LEED) standards as established by the U.S. Green Building Council (USGBC).

Guidelines

Contextual Scale and Massing

1.1 In new districts, a master plan should outline the minimum and maximum requirements for building height and **massing**.

1.2 In dense urban areas, such as the City of Pittsburgh, construct buildings to a minimum of four stories and 60 feet high in districts adjacent to a river, with six to eight stories preferred.

1.3 Design building **massing** with consideration of maintaining views of rivers, key landmarks and architecture, and the vistas and spaces around them. Maximize light and air to open spaces and minimize shadows on adjacent properties and open spaces.

1.4 For individual building projects, identify the height patterns that are present in the district in which they are located. Relate the height of the new development to the height of the surrounding district, and reduce negative impacts on adjacent properties, such as blocking views, casting open spaces into shadow for a significant period of the day, etc. **Schematic illustrations** of the massing of the surrounding district will be required in order to review

the proposal's compatibility with the established district and the overall design goals for the riverfront.

1.5 Due to the Pittsburgh area's varied topography and changing landscape, roofs of buildings in and adjacent to the riverfront are visible from multiple vantage points. Building tops become important landmarks within individual districts, such as the Golden Triangle. Pay careful attention to the design of building tops and roofs, giving a vertical emphasis to those building tops that are viewable from surrounding areas.

Setbacks and Build-to Lines

2.1 In general, build to the property line or an established build-to line of an existing district for all properties located along both perpendicular and parallel connections, with the intention to develop a consistent and continuous urban fabric within districts.

2.2 "Hold the corner" of buildings at intersections, except where open spaces are strategically located.

2.3 In new districts, an individual district master plan should outline the minimum and maximum requirements for building setbacks and build-to lines.

2.4 For individual building projects, identify the setback and build-to patterns that are present in the district in which they are located. The location of structures should work within the established pattern of the district unless this pattern has otherwise been deemed undesirable. **Schematic illustrations** of the massing of the surrounding district will be required in order to review the proposal's compatibility with an established district and overall design goals for the riverfront.

2.5 Development is encouraged to provide outdoor terraces and porches within setbacks as a means for providing semiprivate spaces for building occupants and encouraging use of the riverfront.

Ground-Floor Design

Buildings located in riverfront districts will accommodate a variety of different uses, ranging from public to private.

3.1 Activate the ground floor with different uses and make them adaptable over time.

3.2 Maximize glazing at least 60 percent.

3.3 While publicly oriented uses are generally encouraged along all district edges, there are also many opportunities to create residential communities adjacent to the park.

3.4 Where appropriate, promote **mixed-use districts** by providing a minimum first-floor height of 18 feet to accommodate a wide range of ground-floor uses.

3.5 Where buildings are located adjacent to riverfront roads, locate primary entrances and addresses on the riverfront road.

Schematic illustrations

Help to determine a concept and to present it in a form that achieves understanding and acceptance. Although the design is not entirely represented, the schematic drawings can demonstrate basic spaces, scale, and relationship of components.

Mixed-use districts

Blend a combination of residential, commercial, cultural, institutional, or industrial uses, where those functions are physically and functionally integrated, and that provide pedestrian connections.

Roof terraces and balconies

Outside spaces of a building used for the enjoyment of the occupants that offer views of the surrounding area.

Green roofs

Partially or completely covered with vegetation and a growing medium, planted over a waterproofing membrane. They may also include additional layers, such as a root barrier, and drainage and irrigation systems.

FURTHER INFORMATION

More detailed information and building design guidelines can be found within the ***Three Rivers Park Design Guidelines***.

riverlifepgh.org/resources

3.6 Locate service entrances away from the riverfront and primary connections to the park.

3.7 Where residential uses are located on the ground floor of a building, use terraces and elevation changes to provide semiprivate entrances and outdoor spaces for residents, without impinging on the public nature of the park.

3.8 Where privacy is required, create screening through changes in floor height, landscaped setbacks, or other devices, rather than dark or reflective glazing.

Building Materials

4.1 Compose buildings of materials with a "Pittsburgh palette" to enhance the quality of the riverfront. These materials can include stone, metal, brick, terra cotta, aluminum, glass, and steel, and can be locally sourced in order to meet green building targets. Other materials may be used for trim and detail, but are not encouraged as a primary building material.

4.2 Avoid the use of stucco, EIFS systems, wood and simulated wood products, one-way or mirror glass and spandrel glazing as primary building materials, except when used sparingly or as accent features.

4.3 Encourage the creative uses of materials in order to reflect the overall character of the park and the district.

4.4 Use transparent glazing with minimal tinting in order to provide views from and into buildings. Make ground-floor glazing 100 percent transparent, allowing clear views into and out of buildings.

4.5 Use green building products, as defined by the standards of the USGBC and similar rating systems, whenever possible.

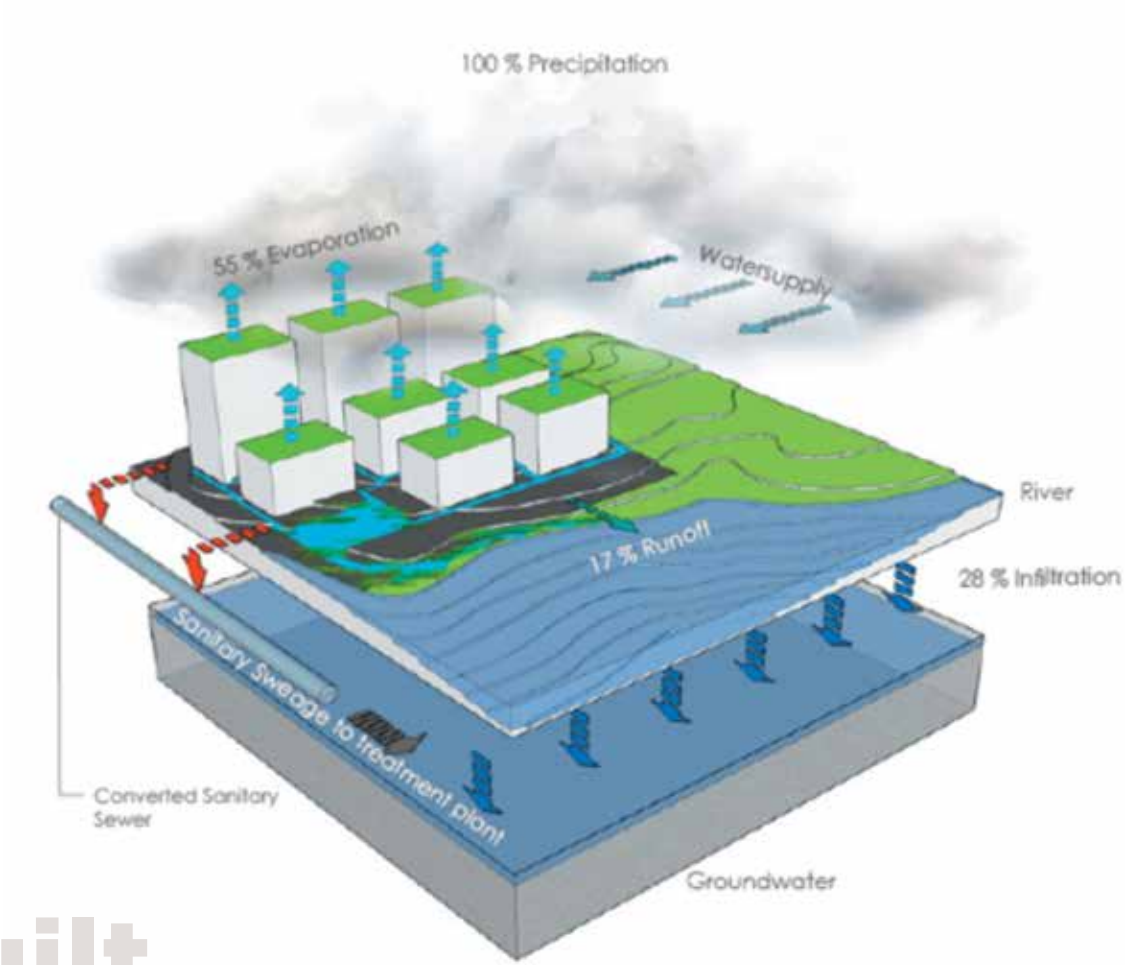
Rooftop Design

5.1 Incorporate **roof terraces and balconies** overlooking the riverfront, for both public and private uses, in buildings located along the riverfront. Where appropriate, provide publicly oriented uses, such as restaurants and cafés, in these locations.

5.2 Create **rooftop gardens** to extend the landscape quality across new and unexpected places in the urban fabric.

5.3 Whenever possible, construct **green roofs** to reduce stormwater run-off, reduce heat island effects and add to the landscape quality of the riverfront.

5.4 Incorporate rooftop mechanical equipment into the building design, and shield it from view.



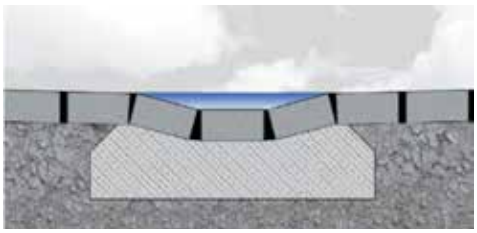
Built

Stormwater

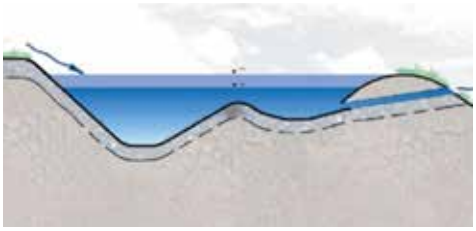
Intent

Simply put, stormwater management is the act of managing the quantity and quality of stormwater. When designed as part of landscapes, roadways, utilities, and rooftops, stormwater management systems can connect the urban environment to the natural environment. Proper stormwater management can aid in preventing myriad problems such as flooding, pollution and groundwater depletion, but in many urban regions only two out of every ten drops of water reach the soil and recharge the aquifer. Before stormwater reaches the ground, it is nearly unpolluted. After landing, it flows and takes in materials, in both dissolved and undissolved forms, from the surfaces on its flow path to the river or groundwater. To reduce these problems, stormwater should be allowed to be retained, cleansed and infiltrated before excess amounts overflow into streams and rivers. The following guidelines are intended to diminish the negative impacts of stormwater on the environment, while restoring the water quality and health of river ecosystems.

Key Concepts

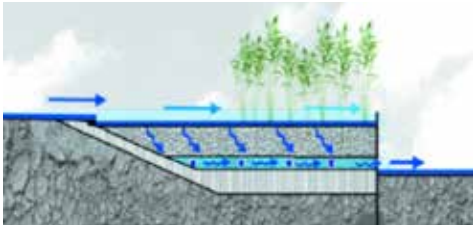


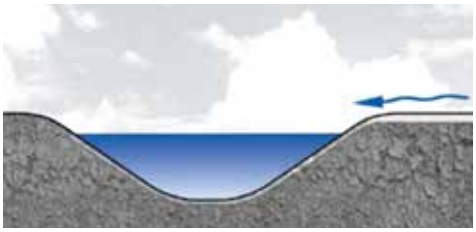
Open Canal: These are used for surface stormwater drainage for roads and parking lots. They can be located on the side, in the center or halfway between surfaces. Advantages include the visibility of the stormwater system, easy maintenance and aesthetic design options for the streetscape. Open canals need to be as shallow as possible to allow for convenient crossing by pedestrians or cyclists.



Sedimentation Basin: These are used to improve stormwater quality and reduce sediment loads. They remove (by settling) coarse to medium-sized sediment from water. Sedimentation basins can take various forms, as permanent systems or as temporary measures to control sediment discharge.

Bioretention Swale: These are **retention** or **detention** basins with a vegetated (i.e., landscaped) surface. Runoff is cleansed as it percolates downward. Different construction elements can be used to direct the inflow of stormwater for cleansing and drainage to reduce the outlet and for emergency overflow.





Vegetated Swale: These are used to remove soil particles and move stormwater through buffer strips and bioretention systems. Swales utilize land flow and mild slopes to convey water slowly downstream. They protect waterways from damage by erosive flows from frequent storm events.

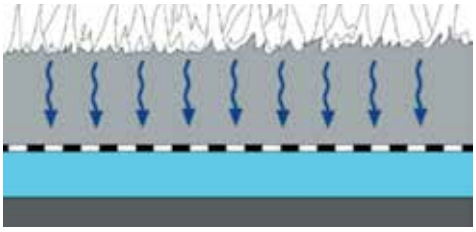
DEFINITIONS

Retention

Water is retained permanently (in a cistern, basin, or wetland) either for later use or until it is dissipated through plant absorption, evaporation, or percolation into the ground.

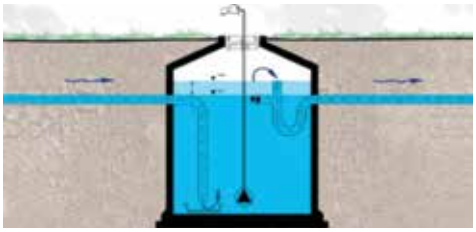
Detention

The temporary storing of rainwater in an on-site facility to release it intermittently later. The flow of water can also be slowed down through a variety of methods, such as draining it through vegetation, increasing the roughness and area, or decreasing the gradient of the runoff surface, etc.

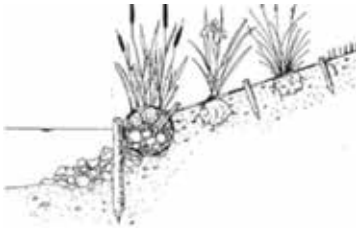


Green Roof: These can be planted partially or completely with vegetation and soil over a waterproofing membrane. Green roofs reduce **stormwater runoff**, keep temperatures down and reduce heat loss and energy consumption in winter.

Underground Substrate Filter: These are box structures, built underground, containing compression-free material that helps to treat organic pollution.



Cistern: These function mainly as rainwater storage and secondly for stormwater detention. The basic storage volume depends on the demand of rainwater use for toilet flushing, irrigation, climatization, or water features.



Bioengineering: Bioengineering seeks to harness the inherent qualities and capabilities of organic matter to replicate natural systems as closely as possible, not only in the use of materials, but also in the methods of construction.

Guidelines

1.1 Stormwater collected from street surfaces and parking lots must be treated prior to its release in order to remove contaminants (heavy metals, fuel, dust, toxic elements, etc.) collected during rainfall. This can be accomplished with integrated stormwater and green infrastructure techniques.

1.2 The flow from combined sewers can be reduced over time if people apply strategies to reduce runoff along the waterfront, and carry that approach upstream throughout the watershed.

1.3 Rainfall runoff from project sites should be captured and held by **vegetative and soil-based systems**, especially for small, frequent rainfalls.

Stormwater runoff

Water from rain or melting snow that "runs off" across the land instead of seeping into the ground.

Vegetative and soil-based systems

Vegetative areas that have soils engineered in order to retain larger volumes of water for containment. These are sometimes referred to as mini reservoirs, which contain 4- to 8-feet deep swales and use soils to trap pollutants as water is filtered through the system. They use materials, such as lava rock, that have a high porosity to store water. These swales or Bio-Swales can be used in parking lots and other areas with low permeability as a green infrastructure alternative.

Infiltration

The process by which water seeps into the ground, recharging groundwater and aquifers. An added benefit is purification, because water is progressively cleansed as it percolates through layers of sand and soils.

Purification

The process of purifying water pollutants requires a different set of treatments, screening, sedimentation, adhesion, and filtration, biological uptake, and chemical treatment.

Conveyance

This refers to the measure by which runoff water is transported and directed from the point of initial rainfall to final discharge. This is necessary to ensure that water is brought along the right channels to ensure minimum contamination and maximize effective runoff.

1.4 Water should never be conveyed to the river in a pipe or concrete system without the opportunity for capture and treatment, ideally through the use of soil and sunlight.

1.5 When there is a need to convey water, it should happen in open soil and in vegetation systems that slow, absorb, **infiltrate** and clean the water. Water should not be "piped" through the project unless it is buried too deep to reach.

1.6 Open water may not be possible everywhere, but systems that allow water to seep into soils or planting areas can be used even in very structured areas.

1.7 Every opportunity, no matter how small, should be taken to manage stormwater visibly. If possible, people should be able to see and remember the rainfall runoff in a positive way. Even water that comes off roofs can be seen and heard for a moment. Many small things add up to a bigger change.

1.8 Changes away from solid materials and surfaces—green roofs and walls, porous pavements, the removal of pavement—should be encouraged.

1.9 Projects should look beyond their footprint to take the water from uphill—roads, other buildings and paved areas—and reconnect it to the soil and vegetation.

1.10 The path of the combined sewer system should be identified to remind people of where streams are buried and where they reach the river.

FURTHER INFORMATION

For more information on stormwater management, please refer to ***Stormwater Is the Communicator***.

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Character

Landscape

Intent

Landscape encompasses the natural and built forms that help to define riverfronts. From riparian zones to landscaped trails and streets to gardens and parks, the landscape element has a critical role in stabilizing riverbanks, providing habitat, and creating enhanced open space. Landscape also forms special places by linking the rivers to the network of streets and buildings, often providing the defining characteristics of a place. Landscape provides the contrast between the strong forms of the built environment and the natural forms of its setting that are most memorable and inspiring. The following guidelines are intended for developments seeking to manage the delicate balance between the built and natural environment.

Key Concepts

- Riverbanks are a crucial interface for river hydrology, riparian support systems and waterfront activities. A range of riverbank conditions are represented in Southwestern Pennsylvania, from hard-edged conditions (seawalls, slag piles, bridge abutments, riprap) to soft edges (shallow banks with floodplain vegetation, steep banks with planted vegetation, mown and trampled earth banks with invasive vegetation).
- Hard river edges can be a significant concern because they disrupt the natural fluctuations of water that support a riparian plant environment. Commercial barge and recreational boat traffic contribute wave action against the shoreline, making it more difficult for young vegetation to establish at the immediate river edge.
- Invasive vegetation is a relatively recent problem for rivers. Japanese knotweed, Tree of Heaven, and other opportunistic plant species are multiplying on the river edges at a significantly greater rate than **native species**. This is resulting in decreased species richness, decreased biodiversity and less resilient ecosystems.
- Plant native or non-invasive species throughout the river corridors. Native species are preferred for the river-edge landscapes because of their adaptation to the local environment, response to flood conditions, and biodiversity enhancement.

DEFINITIONS

Native species

Its presence in a region or ecosystem is the result of only natural processes, with no human intervention

- With people living, working and playing closer to the rivers, there is a natural tendency toward removal of trees and vegetation in order to give better views of the river. The unintended consequences of this removal are the degrading of the riverfront ecology, a decrease in the effectiveness of stormwater management, and bank instability.

Guidelines

Landscape Goals

1.1 The landscape should be shaped by the topography that historically defined the natural and urban form.

1.2 The landscape should contribute to a **biologically diverse** network of open-space corridors to support and enhance the wildlife habitat and plant communities of Western Pennsylvania.

1.3 The landscape should consist of a primarily native species palette.

1.4 The landscape should build on the identity and visibility of the region's rivers and establish a coherent, recognizable system of places along the rivers throughout the region.

1.5 The landscape should provide a special and comfortable sense of place at the river's edge, providing character and identity to the adjoining districts and neighborhoods.

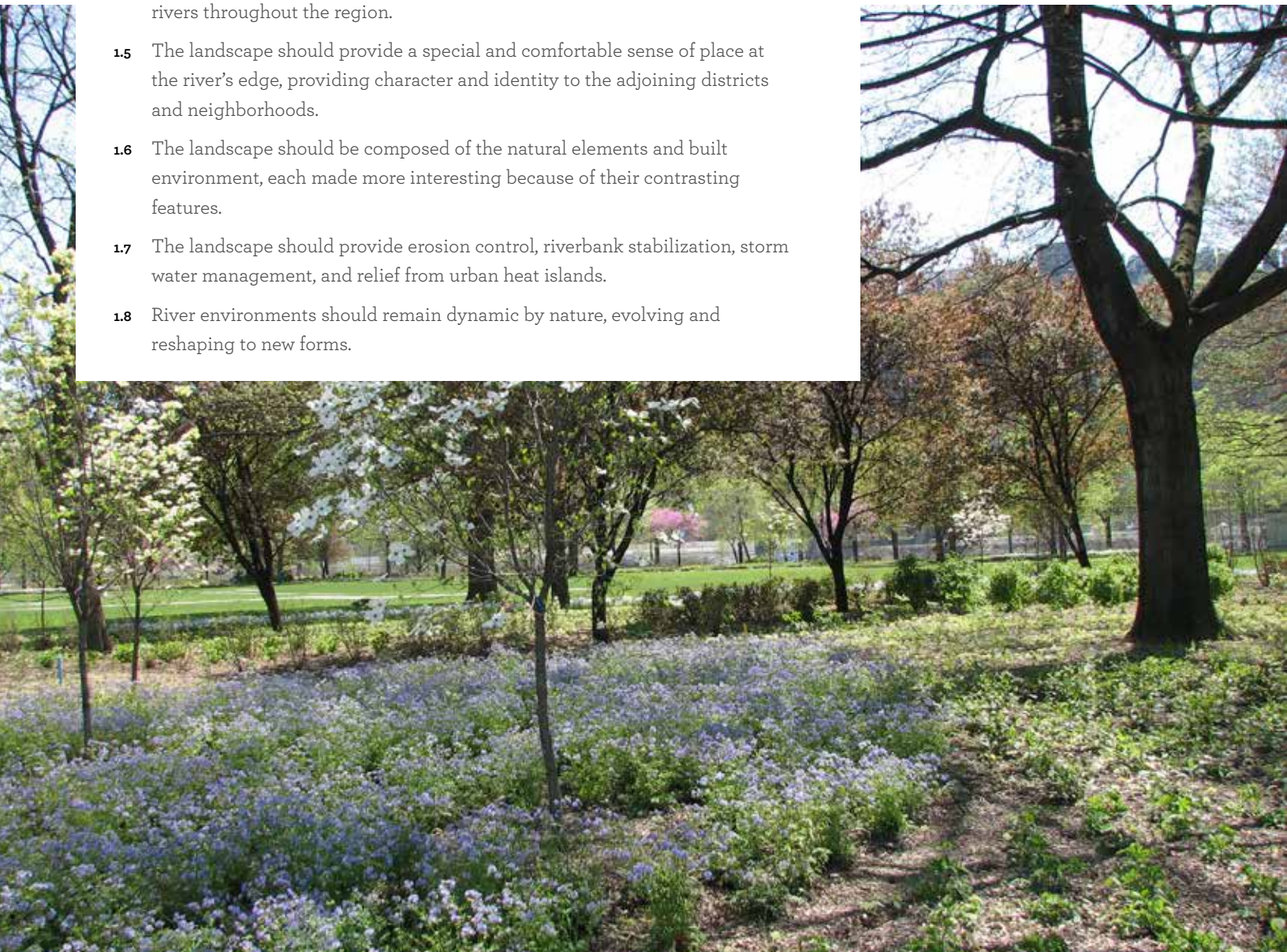
1.6 The landscape should be composed of the natural elements and built environment, each made more interesting because of their contrasting features.

1.7 The landscape should provide erosion control, riverbank stabilization, storm water management, and relief from urban heat islands.

1.8 River environments should remain dynamic by nature, evolving and reshaping to new forms.

Biological diversity

The diversity, or variety, of plants and animals and other living things in a particular area or region.



Project Guidelines

2.1 Hire a landscape architect to help in determining how the river edge should be landscaped and designed.

2.2 Train landscapers to work with living systems. It is important that training rely on accurate field observation and data collecting. Training should also be comprehensive, incorporating horticulture and ecology.

2.3 On riverfronts, plantings should be directly related to the slope of the land; a slope of 2:1 needs to be 100 percent planted, a slope of 3:1 can handle a mix of plantings and open areas and a 4:1 slope is desired for establishment of native species plantings.

2.4 Replace paved surfaces and lawns with plants and porous materials—plants can play a significant role in decreasing **stormwater runoff** and improving water quality. Replacing lawns with native meadow, shrub, and tree plantings will decrease the amount of both runoff and pesticides. Plants along a riverbank not only reduce the velocity of surface runoff but also purify the groundwater before it reaches the river by absorbing nutrients.

2.5 If possible, address the condition of land adjacent to the riverfront, such as industrial sites, combined sewers overflows (CSOs), or impervious paving before committing to a full-scale planting effort along the banks.

2.6 Address structural conditions, such as collapsing banks, before planting. Where possible, use **green reinforced surface treatments**, rather than non-living materials.

2.7 Use lightweight, root-breathable bioengineered walls planted with seed, live stakes, and **turf reinforcement mats** to increase erosion resistance and encourage sediment deposition on banks

2.8 Accept the possibility of occasional damage by ice and flooding. Incorporate break-away and tie-in points to manage potential losses.

2.9 Maintain **canopy trees** along the entire riverbank to the fullest extent possible. Develop a diverse hierarchy of landscape cover types—forests are the preferred restoration target because they have the most biomass and therefore the greatest capacity to restore the environment.

2.10 Implement or strengthen landscape requirements in local zoning ordinances.

2.11 Ensure that river-edge management is adequately budgeted. Maintenance budgets need to incorporate all new and existing projects. Riverfront projects are susceptible to damage from flooding and commercial activities, as well as more typical wear and tear from public use.

Stormwater runoff

Water from rain or melting snow that "runs off" across the land instead of seeping into the ground.

Green reinforced surface treatments

Planted treatments placed along hard surfaces. They may not have the complexity of a soil-based system to retain large volumes of water but, if extended over long distances adjacent to roadways and trails, will provide an accumulated stormwater capture and filtration benefit.

Turf reinforcement mats

Non-biodegradable materials that provide erosion protection and accelerate vegetative growth. Their open-weave construction allows for maximum root and stem entanglement, thereby increasing the vegetation's ability to withstand higher flow velocities and shear stresses.

Canopy trees

Trees that are specifically grown for their canopy. A common term for canopy trees is shade trees. A canopy is the outer layer of the tree's leaves, and shade trees have a dense canopy that blocks out the light.

Invasive Species Management

- Avoid use of invasive species in landscapes. Although many states list ornamental species as invasive plants, local nurseries might still sell them to the public.
- Minimize disturbance and revegetate disturbed areas. First and foremost, protect intact native plant communities.
- Plant canopy trees. By planting disturbed areas with native species quickly after a disturbance occurs, invasives can be kept in check more easily.
- Monitor the property regularly for invasive species, and when they do appear, remove them quickly before they have a chance to become established.
- Fertilize minimally—or not at all. Overfertilization increases weed numbers and increases nutrient loads in runoff.

Disturbance

A temporary change in average environmental conditions that causes a pronounced change in an ecosystem.

FURTHER INFORMATION

For more useful information about the creation and management of river landscapes, please read through the ***Landscape Management Guidelines***.

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Types of Landscape

Forest (>50 percent canopy cover)

Continuous canopy with layers—plant wherever possible; provides shade, recreation, riparian habitat, stormwater and erosion control, flood mitigation and water quality treatment

Woodland (<50 percent canopy cover)

Open canopy with tall grasses—plant wherever views are desired through trees; provides most benefits of forest and may be more acceptable in developed areas

Shrub Land

Mixed species of varying heights—plant to protect steep slopes and as natural fences for pedestrian/bicycle traffic control

Meadow

Warm season grasses and wildflowers—plant as a means of managing large open areas; provides riparian buffers and habitat for small mammals, insects and birds

Lawn

Plant on relatively flat slopes and active recreation zones only; separate lawns from river edges with riparian buffer

Character

Public Art

Intent

DEFINITIONS AND USEFUL TERMS

Expert review panel

Generally composed of no fewer than three and no more than five professionals selected on the basis of their expertise relative to the specific goals and objectives of the project

Public art has the power to connect people to the riverfront. Great public art enhances, energizes and defines its surroundings, generating civic pride and cultural identity. For public art to make a meaningful contribution, there must be a commitment to uncompromising standards of quality. The artwork must embody the vital identity and values of the riverfront, elevate the experience of the visitor, and bolster a distinctive sense of place.

Using a variety of media and textures, artists can create landmarks and visual experiences, distinguishing the viewpoints and drawing people to them. Public artwork should provide cohesiveness to the trails and pathways and expand opportunities for pedestrians to recognize, appreciate and celebrate the importance of the river. This section will provide guidance in developing strategies for artist selection, appropriate implementation of artwork into riverfront parks, and maintenance of public artwork.

The Pittsburgh Urban Redevelopment Authority published a document in 2010 that provides information about providing public art in developments. This resource should be consulted when adding public art to a riverfront project.

Key Concepts

Temporary Art

Programming temporary art provides a unique platform for the public to experience contemporary art. It allows for the realization of a diversity of experimental projects by both established and emerging artists that serve to advance the understanding and appreciation of the river. Temporary art invites a range of media, including digital, mechanical, musical, literary and performance art. Participatory community events such as, a floating parade and the Riverlife Festival are among the limitless possibilities.

Maintenance Considerations

Long-term survival of outdoor artworks along the river is affected not only by proximity to the water, but by climate, use of the site, adjacent buildings, trees, roads and sidewalks. It is important to determine who will use the area—pedestrians and pets, cyclists, skateboarders, etc.—and how it will be used.

The survival of outdoor artwork depends on the nature of its construction, the environment it is exposed to and the maintenance it receives. To anticipate and limit future maintenance needs, consult with professional curators whose technical understanding of materials and fabrication processes are invaluable during the artwork review process.

Guidelines

Project Management

Professional project management is critical to the successful implementation of public art projects. A project manager should:

1.1 Coordinate the interests and needs of a multitude of participants, including peer professionals, community members, and other stakeholders to ensure that the full potential of the public art project can be realized.

1.2 Facilitate the artist and artwork selection and approval processes, including the approvals of local regulatory and review bodies.

1.3 Manage the design, fabrication, and installation of public artwork.

1.4 Anticipate, plan for and implement the complex layers of competing schedules, information requirements, budgets and programmatic needs.

1.5 Negotiate agreements and develop consensus around highly complex issues and situations.

1.6 Oversee gifts of artwork and memorials for placement in parks.

1.7 Provide guidance on the incorporation of public art into development projects.

Expert Review

Expert review of public art projects should benefit the implementation of public art projects in the following ways:

2.1 Advocate for the inclusion of public art in all infrastructure projects.

2.2 Recommend a pool of potential artist selection panel members.

2.3 Act as a liaison to the individual artist selection panels.

2.4 Review and take action on the artist selection panel recommendations.

2.5 Review design milestones for any given project.

Open competition

Initiated by circulating an announcement with information about the project budget, site and other parameters for the desired artwork, and calling for artists to submit proposals. Any artist may apply.

Invitational competition

Frequently used as an alternative to an open competition.

Nomination process

Nominations of appropriate and qualified artists are solicited from a select number of expert and well-informed arts and design professionals.

Request for qualifications

Asks artists to send in qualifications to be reviewed by the selection panel but does not ask for a specific proposal to be submitted. The selection of an artist on the basis of a request for qualifications takes place when a project is in its earliest stage of design.

Request for Proposals

Asks artists to submit qualifications as well as a proposal for a specific site. The selection of artwork on the basis of a site-specific proposal is appropriate for existing sites, or when the design of a construction project has evolved to a point where there is adequate information to develop a responsible proposal. Various artists may respond to the stated project goals and specific conditions of the site. The selection panel weighs the artistic merits of several concepts, thoroughly exploring the questions of feasibility and budget.

FURTHER INFORMATION

More detailed information and building design guidelines can be found within the ***Three Rivers Park Public Art Strategy,*** and ***Add Value Add Art*** by the Urban Redevelopment Authority and the Office of Public Art.

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Maintenance Considerations

The maintenance needs of the artwork should be kept reasonable and should be adequately managed following these guidelines:

3.1 Prepare for ongoing maintenance requirements and cost.

3.2 If possible, make sure that there is provision for maintenance funds or a maintenance agreement by the donor.

3.3 Establish artwork installation and removal specifications.

3.4 Get written permission from the artist or artist's estate for a qualified conservator to conserve the artwork when necessary.

Character

Lighting

Intent

Lighting has the power to ensure that the public realm remains safe, comfortable and engaging after dark. Night lighting can help transform a foreboding space or a dark building into effective markers, ensuring that people feel comfortable moving through the park. Effective lighting will clearly identify a destination as well as exit and entry points from the river. This section is intended to provide guidance and concepts to create a successful lighting strategy for a district or for an individual project application.

Key Concepts

- Brightness and Contrast: Too much light is frequently projected onto buildings, destroying any appreciation of the architecture by washing out the details. Lower light levels can often be more revealing and sympathetic.
- Environmental Effects: There are a number of environmental factors that can be positively impacted by exterior lighting with regard to **direct energy use**, visual impact, **light spill and light pollution**, and effects on flora and fauna.
- Visual Impact: The appearance of lighting equipment during the daytime can be an unsightly obstacle and can have a significant impact on local views. Lighting equipment mounted on building facades without due consideration of the architecture can be unsightly.
- Reducing Crime and Fear of Crime: Carefully applied exterior lighting can have a positive actual and perceived effect on safety. Expenditure on good lighting in a public realm is a more effective means of increasing safety than an equal expenditure on electronic surveillance equipment.

Guidelines

Lighting Bridges

1.1 A detailed lighting design for a bridge should illuminate and enhance the essential character of the structure. To do this, all light sources must be concealed from view as much as is possible.

1.2 Avoid glare for pedestrians on the bridge and for those viewing the structure from a distance.

1.3 Dark painted bridges can be difficult to illuminate with projected light. In these instances, consider delineating the essential structural elements with lines of light.

Lighting Structures

2.1 Lighting should be considered at a very early stage in the project planning to ensure that exterior lighting schemes are designed as part and parcel of the new development, rather than as an afterthought.

2.2 Light only buildings and structures of sufficient merit or where lighting enhances the ambience of the immediate surroundings. Take into account the existing lighting of adjacent buildings and be considerate of the total lighting effect on an area. Do not illuminate buildings or structures where residential spaces will be compromised by intrusive lighting.

2.3 Ensure that exterior lighting installations avoid visual clutter without glare, are discreet, and do not compromise the architectural integrity of the structure.

DEFINITIONS AND USEFUL TERMS

Direct Energy Use

The use of optically efficient lighting that directs light onto the required area with minimal light spill is a part of good lighting practice.

Embodied energy of the installation

A life cycle assessment examines the total environmental impact of a material or product through every step of its life—from obtaining raw materials (for example, through mining or logging) all the way through manufacture, transport to a store, use in the home, and disposal or recycling.

Light spill and light pollution

The use of exterior artificial lighting can cause light pollution. Light pollution principally occurs as sky glow, light trespass, and glare. Direct upward light from exterior lighting installations causes sky glow. Glare is caused by the uncomfortable brightness of a light source viewed against a darker background. Light trespass is defined as light spilling beyond the boundary of a property or area to be illuminated.

2.4 Existing structures and buildings will require particular care in product selection to make sure that the illumination and fixtures are respectful of the building's architectural character while lit and during daylight.

Lighting Landscapes

3.1 Not all elements of the landscape need to be directly illuminated.

3.2 The lighting design should seek to strike a balance between light and shadow, creating a balanced overall composition and avoiding too much lighting (glare) and too little lighting (for safety considerations).

3.3 Lighting has the opportunity to enhance views and vistas and to reveal different perspectives for those experiencing the park as pedestrians, by car, or from the water.

Lighting Fountains and Water Features

4.1 Lighting design for water features and fountains is a specialized task, often undertaken by manufacturers or suppliers, who have practical experience creating lighting effects that are most compatible with different types of water displays.

4.2 All equipment must be watertight and fully submersible.

4.3 The location of the light fixtures in relation to water jets and cascades is critical. Light from underwater fixtures will be refracted or reflected depending on the angle of incidence of the light beam. Bubbles and particles in the water may also affect the light.

Lighting Art Installations

5.1 Art installations provide an opportunity to integrate lighting in a stand-alone project, on both large and small scales.

5.2 The lighting scheme for artwork should be approved by the artist and project managers to ensure that the lighting is appropriate and sensitive within the context of the park.

5.3 Operational costs should be considered as part of the artwork project scope.

Design

6.1 Provide adequate light, with even distribution and a suitable **color**, in order to enhance the form and character of the outdoor environment.

6.2 Utilize indirect lighting wherever possible.

6.3 Reveal hazards such as stairs and changes in level. Illuminate dark and potentially dangerous areas.

6.4 Accommodate opportunities for entertainment and leisure after dark. Often a small amount of light can fulfill these needs.

6.5 Effect lighting on a large scale, highlighting individual buildings and features. The best results may be achieved when individual schemes within a district are coordinated together by the same team of professionals.

Scale

Relates to perceived size of structures, buildings, and spaces relative to other forms and to people when viewed at night. The more diffuse and general the lighting is, the easier it will be to assess the relative scale of objects and structures.

Rhythm

The spacing of individual illuminated elements, lighting columns, and pools of light are perceived as rhythms. Wider spacings between fixtures and lit surfaces will elicit a subdued response from the viewer. An awareness of the rhythms created by artificial lighting should be considered during design development.

Emphasis

Selective lighting can enhance attractive features and conceal unattractive ones.

Color

The color appearance of a light source or illuminated surface will be seen as either "warm" or "cool." Lamps with a low correlated color temperature are "warm" and those with a high correlated color temperature are "cool."

Sustainability

7.1 All fixtures should utilize energy-efficient technologies.

7.2 The environmental impact of exterior lighting needs to be considered at the very beginning of the design process to balance energy conservation with proper lighting for the highest possible efficiency.

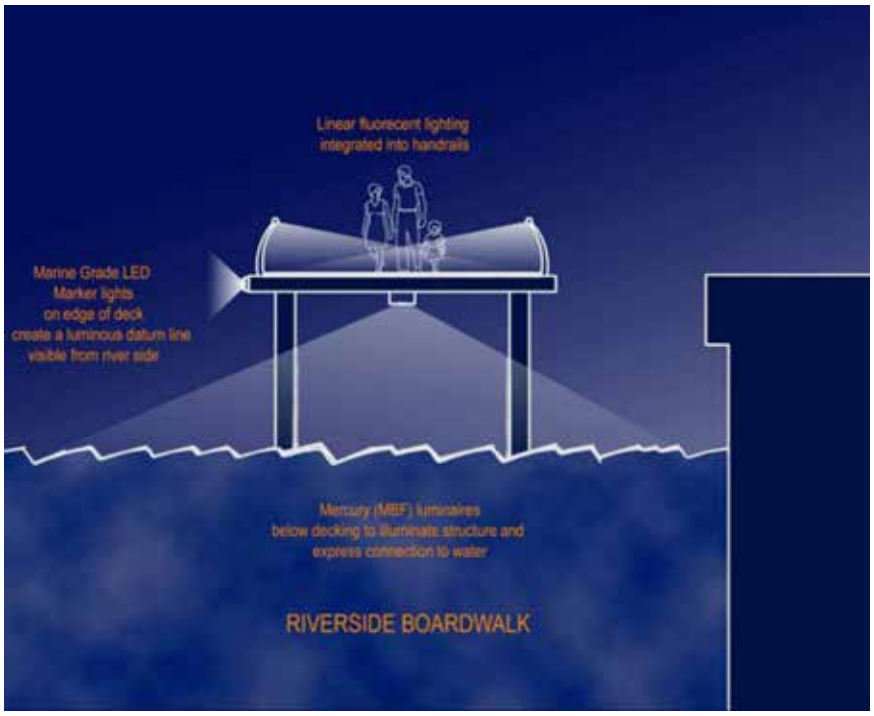
7.3 Lighting efficiency maximizes sustainability and minimizes long-term costs, particularly for a large-scale project.

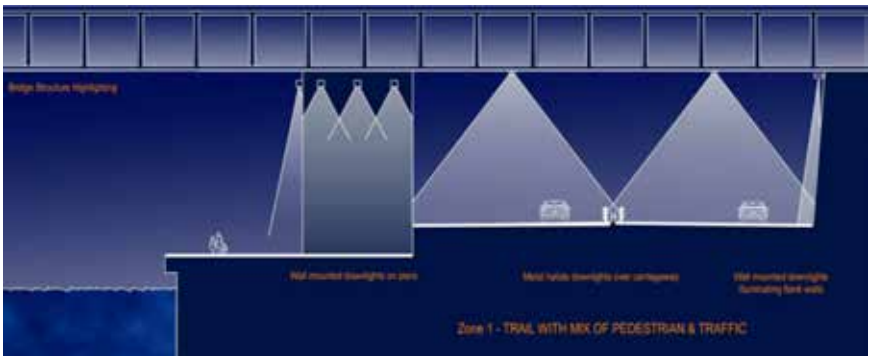
Build Quality

8.1 All exterior light fixtures need to be robust, particularly in the "marine" environment.

8.2 Working samples of proposed lighting types should always be tested and approved before equipment is finally chosen. Ideally, an on-site lighting trial should take place before any final decisions are made.

8.3 The number of light sources and types of fixtures available to lighting designers are constantly changing. Care should be taken to ensure that the most current and most efficient options on the market are considered.





Light Spill and Light Pollution

9.1 Ensure that all exterior lights are designed and installed so that light is emitted in a downward direction, rather than horizontally or upward.

9.2 Ensure that the correct amount of light is provided in order to avoid light pollution.

9.3 Make sure that exterior lighting is timed to shut off consistently when it is no longer needed.

Installation, Operation and Maintenance

10.1 The cost of most urban exterior lighting projects represents a low level of capital expenditure that results in a large return in terms of added value to property development, improved public realm spaces, and increased safety.

10.2 Factor in capital costs to include design fees, installation, fixtures, control equipment, meters and housing.

10.3 Factor in operating costs to include electricity, replacement lamps, routine maintenance and inspection, and installation and removal of temporary and seasonal lighting displays.

FURTHER INFORMATION

More detailed information and building design guidelines can be found within the ***Three Rivers Park Lighting Strategy***.

riverlifepgh.org/resources

Five Factors to Consider When Selecting Light Sources:

Efficacy: The output of the lamp in relation to its energy usage, measured in lumens per watt. This is often the principal consideration for reasons of economy.

Lamp Life: The average life of a lamp in a large installation. The figures quoted by lamp manufacturers are to ”50 percent failure.” Lamp life has a significant impact on maintenance costs.

Color Appearance: An assessment of what the color of the light source appears to be. This is important in considering the overall effect of the lighting.

Color Rendering: The ability of the light source to render colors accurately. Although less important in exterior lighting, poor color rendering can have a deadening effect on an area. Good color rendering light sources have Ra >80 or below to Group 1A, 1B or 2A.

Lamp Shape and Coating: The shape of a light source will dictate much of the light design. A phosphor coating will change the quality of the light.