



## **TOOL 3: LAND-USE AND DEVELOPMENT REGULATORY GUIDE**

*Greater Baltimore Wilderness Regional Resilience Green  
Infrastructure Network Local Implementation Toolkit*



**American Planning Association**

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## The Greater Baltimore Wilderness Coalition Coastal Resilience Project

The [Greater Baltimore Wilderness Coalition](#) is a voluntary alliance of public agencies, non-governmental organizations, professional associations, and conservation coalitions. The region it spans includes the area from the Chesapeake Bay on the east to the Piedmont in the west, and from Pennsylvania in the north to the suburbs of Washington, D.C., in the south. It includes the counties of Anne Arundel, Baltimore, Carroll, Harford, Howard, Montgomery, and Prince George's and the cities of Annapolis, Baltimore, Bowie, and others.

The goal of the resilience project is to develop a regional vision for climate resilience which will identify key green infrastructure investments across the Patapsco, Patuxent, and Gunpowder River watersheds. [The Conservation Fund](#) is leading the project team, with assistance from the [American Planning Association](#) (APA). Other team members include the [U.S. Geological Survey, Center for Chesapeake Communities](#), and [Chesapeake Conservancy](#).

### About This Toolkit

This five-part toolkit is a companion to the Greater Baltimore Wilderness Region [Green Infrastructure Identification and Ranking](#) portal. The first tool presents a series of checklists to help planners and local officials evaluate the consistency of local plans and plan implementation methods with the opportunities for green infrastructure protection or enhancement highlighted in the portal. The second, third, and fourth tools provide guidance to help them begin the process of articulating policies and laying groundwork for action through locally adopted plans, land-use and development regulations, and public investments, respectively. The fifth, and final, tool briefly describes how three key private stakeholder groups can contribute to the implementation of the Greater Baltimore Wilderness Coalition's Regional Resilience Green Infrastructure Network.

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## GREEN INFRASTRUCTURE IDENTIFICATION AND RANKING PORTAL

The Greater Baltimore Wilderness Region [Green Infrastructure Identification and Ranking](#) portal contains multiple data layers that collectively represent a Regional Resilience Green Infrastructure Network. This network is rooted in five green infrastructure strategies to maintain and increase regional resilience to coastal storms and other climate change impacts:

- **Protect Natural Resources:** Preserve, restore, or enhance valuable and vulnerable land and water resources providing hazard mitigation and other co-benefits, including floodplains, wetlands, forest, stream systems, steep slopes, hydric and highly erodible soils, and important habitat areas.
- **Enhance and Restore Tree Canopy:** Maintain, enhance, and restore tree canopy in urban and suburban communities to reduce stormwater runoff, ameliorate the urban heat island effect, and improve air quality.
- **Implement Multi-Benefit Green Stormwater Infrastructure:** Retrofit developed areas to reduce impervious surface and incorporate best management practices such as bioretention areas, green streets, and green roofs in order to reduce vulnerability to flooding and associated pollution.
- **Protect Critical Infrastructure:** Use green infrastructure to buffer critical infrastructure from extreme weather impacts, including key transportation corridors, power production and transmission facilities, hospitals, and emergency management centers, water supply reservoirs, and wastewater treatment facilities.
- **Defend the Coast:** Preserve, restore, or enhance natural habitat and introduce nature-based practices (e.g., living shorelines) to buffer coastal areas from impacts of coastal flooding, storm surge, and sea-level rise.

This network is a potentially important tool for enhancing resilience to coastal storms and climate change throughout the Baltimore region. However, the realization of its vision depends largely on the policies and actions of the individual counties and municipalities that govern the region.

Land-use and development regulations are one of the primary tools that local jurisdictions use to help implement the policy recommendations contained in their plans (see Tool 2). There are a wide variety of local regulations that affect not only the location, type, and form of new development, but also how land-use and development affects the provision or protection of green infrastructure at multiple scales. These include zoning and subdivision ordinances, as well as stormwater management, sediment and erosion control, tree preservation, floodplain protection, and environmentally sensitive area protection ordinances. In some cases, all of these different types of development regulations are colocated in a unified development code, but more commonly, localities often adopt and enforce many of these regulations separately. And in larger jurisdictions, multiple agencies are often involved in the review of development applications.

### Defining Green Infrastructure and Climate Resilience

Green infrastructure is our natural life support system—an interconnected network of forests, wetlands, waterways, floodplains, and other natural areas; parks, greenways, and other conservation lands; forests, ranches, and farms; and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources, and contribute to people's health and quality of life. At broad scales, it includes large blocks of forest, wetlands, stream networks, and other natural systems. Meanwhile, at local scales, smaller patches may be included, and at the site scale, green infrastructure may focus on natural or semi-natural solutions to reduce stormwater runoff or heat.

For purposes of this project, we use the term *climate resilience* to refer to the ability to resist or mitigate the negative impacts of the changing climate in Maryland's coastal zone, including watersheds that empty into the Chesapeake Bay. The negative effects primarily examined include rising sea levels, increased precipitation and corresponding increased stream flows and greater stormwater runoff, and coastal storm damage from wave erosion and storm surge. In looking to what services could be provided by green infrastructure—that is, natural features such as forests and wetlands as well bioengineered approaches, such as bioswales, raingardens, and green streets—the project team focused on how green infrastructure could buffer or mitigate physical damage to communities, built infrastructure such as roads and hospitals, and ecosystem features themselves. These mitigating services are examples of *climate resilience*. The term *resilience* is also used to refer to social and economic factors that can determine how well specific populations or neighborhoods can weather and recover from significant climate-caused impacts. While some social and economic factors were included in our green infrastructure analysis, these aspects were not the primary focus of the project.

## INVENTORYING EXISTING REGULATIONS

It is not uncommon for local government to have adopted dozens of discrete ordinances that affect the use of green infrastructure to enhance community resilience. Some of these regulations relate directly to the provision or protection of green infrastructure, while others have an indirect effect on the type and extent of green infrastructure in specific locations. In larger localities, these regulations may be administered by staff from multiple departments, with or without formal mechanisms for coordination and review. Consequently, it makes sense for localities to inventory these regulations to identify potential gaps, redundancies, or conflicts.

Here are some of the most common local green infrastructure-related regulations in Greater Baltimore:

- **Zoning Ordinances:** Counties and municipalities use zoning ordinances to divide their jurisdictions into zoning districts with different permissible land uses and to impose district- or use-specific development standards that affect the form or intensity of development and activities on a site. Zoning ordinances can affect the protection of green infrastructure directly by prohibiting new development in specific locations and indirectly by limiting the amount of impervious coverage for new development. These regulations can also encourage or require the provision of new green infrastructure through landscaping requirements and incentives or requirements for incorporating low-impact development (LID) strategies into new development projects.
- **Subdivision Ordinances:** Counties and municipalities use subdivision ordinances to control the division of parcels into multiple developable lots and to specify necessary improvements for each subdivision. Subdivision ordinances can affect the preservation or provision of green infrastructure by requiring a certain amount of open space or the protection of environmentally sensitive features as land is developed. Some of these regulations also encourage cluster development (or conservation subdivisions), which incentivizes open space and sensitive feature protection by allowing developers to use groupings of smaller lots in strategic locations.
- **Stormwater Management Ordinances:** Counties and municipalities use stormwater management ordinances to minimize the impacts of stormwater runoff due to site development on local storm-sewer systems, streams, and wetlands. Under Maryland's Stormwater Management Act all localities must use environmental site design (ESD) to the "maximum extent practicable" in stormwater management. ESD consists of site planning and stormwater management practices that mimic natural hydrology or otherwise attempt to minimize the rate and volume of stormwater flows into storm-sewer systems or neighboring parcels.
- **Erosion and Sediment Control Ordinances:** Counties and municipalities use erosion and sediment control ordinances to protect water quality by minimizing land erosion and sediment in runoff due to grading land or removing vegetation for new site development. Under Maryland's Stormwater Management Act all localities must adopt erosion and sediment control ordinances that require an integrated review of erosion and sediment control and stormwater management plans to ensure that new site development uses ESD to the "maximum extent practicable."
- **Forest and Tree Protection Ordinances:** Counties and municipalities use forest and tree protection ordinances to limit and mitigate tree removal along public rights-of-way and on individual lots. Under Maryland's Forest Conservation Act all localities must adopt forest conservation ordinances that require development projects on parcels of 40,000 square feet or greater to prepare forest conservation plans consistent with state preservation and afforestation/reforestation priorities. Some localities in Greater Baltimore have adopted additional provisions that protect existing trees along public rights-of-way and on smaller lots.
- **Floodplain Management Ordinances:** Counties and municipalities use floodplain management ordinances to minimize property damage and injuries from riverine flooding. Local floodplain ordinances are a necessary precondition for participation in the federal flood insurance program. However, these ordinances do not need to prohibit structural development in floodplains in order to remain eligible, only to require flood protection measures to minimize the likelihood of flood damage. Consequently, some floodplain ordinances in Greater Baltimore generally prohibit the construction of new habitable structures in the 100-year floodplain, while others permit new development with structural or nonstructural flood protection measures.
- **Environmentally Sensitive Areas Ordinances:** Counties and municipalities use environmentally sensitive areas ordinances to minimize property damage due to floods and to protect ecosystem services. Beyond the floodplain protections discussed above, most localities in Greater Baltimore have ordinances that require vegetated buffers along riparian corridors and prohibit new development within these riparian buffers and on adjacent steep slopes, and all of the jurisdictions within the Chesapeake Bay Critical Area have expanded buffers that incorporate tidal wetlands and various other environmentally sensitive features.

Some or all of the ordinances above may be grouped together (with other related ordinances) into a unified land-use or development code. And any of these regulations may be stand-alone ordinances or separate titles, articles, or chapters within a local code of ordinances. With either approach there is a risk that separate sets of regulations may contain conflicting provisions or otherwise be working at cross-purposes.

At a minimum, a local inventory of green infrastructure-related regulations should include the following:

- **Title and Placement:** Note the official name of each set of regulations and its location within the local code of ordinances (e.g., title, article, chapter, or section number) or status as an uncodified ordinance.
- **Applicability:** Note the types of land uses or development projects that each set of regulations addresses.
- **Administrative Authority:** Note the department, agency, or official charged with administering each set of regulations.
- **Dates of Adoption and Last Review:** Note the dates of initial adoption and most recent amendment for each set of regulations.
- **Summary of Substantive Provisions:** Summarize the relevant permissions, requirements, prohibitions, and limits established by each set of regulations.
- **Summary of Procedural Provisions:** Summarize the review and decision-making processes for each set of regulations.

Through the process of compiling such an inventory, you may notice land-use or development situations where two or more sets of regulations apply. In some cases, these regulations may be redundant; in other cases, provisions may be contradictory. Similarly, you may notice land-use or development situations that seem to be unintentionally included or exempted from one or more sets of regulations. While some of these issues may be easily resolved by minor code revisions, others will require a more holistic regulatory approach.

## DEVELOPING A HOLISTIC REGULATORY APPROACH

A holistic regulatory approach considers the cumulative effects of different sets of land-use and development regulations and ensures that all regulations are consistent with local plans, with each other, and with local public investments. This consistency increases the likelihood of the jurisdiction making efficient progress toward its local policy goals (see Tool 2). When your inventory reveals genuine regulatory gaps, new regulations may be needed. However, the primary goals of taking a holistic approach are efficiency and efficacy, and not expansion.



(Credit: American Planning Association)

## Consistency with Local Plans

The State of Maryland requires that zoning regulations and associated decisions controlling the timing, location, and nature of development be consistent with and work to further the comprehensive plan (Annotated Code of Maryland, Land Use, §1-303). While there is no parallel state requirement for functional or subarea plans that have not been adopted by reference into the comprehensive plan, few would argue against the importance of evaluating the consistency of all regulations with every relevant local plan. For each set of regulations, ensure that the intent or purpose statement has clear support in one or more locally adopted plans. Evaluate all rezoning proposals against the land-use designations and policy recommendations of the local comprehensive plan and any relevant subarea plan.

## Consistency Among Regulations

In addition to being consistent with local plans, sets of regulations should be consistent with one another in order to achieve mutually reinforcing outcomes. There are a number of common land-use and development scenarios across Greater Baltimore that each merit careful consideration:

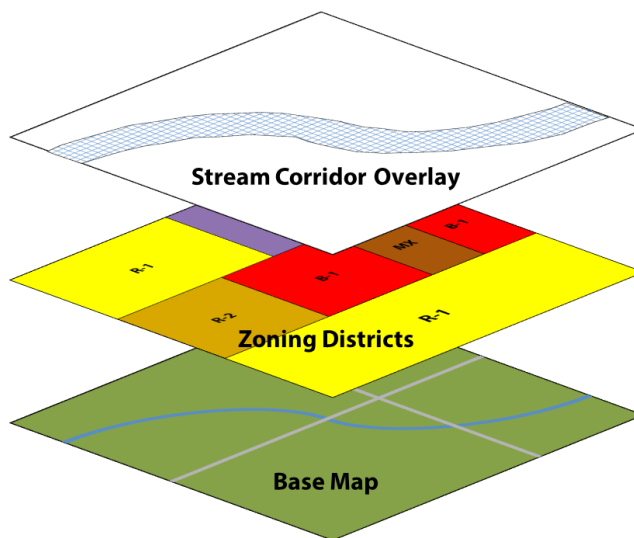
- **Suburban Greenfield Development:** New development on previously undeveloped land (or land currently in agricultural use) typically increases the net amount of impervious surfaces within a watershed. Consequently, suburban greenfield development proposals frequently trigger all of the major green infrastructure-related regulations referenced above.
- **Suburban Infill/Redevelopment:** New development on previously developed land or remnant parcels in areas characterized by relatively low densities and a separation of land uses presents opportunities to satisfy demand that may otherwise be met by greenfield development and to add new green infrastructure. Meeting both of these policy goals, however, may require flexible site and building development standards that facilitate tree planting and GSI without sacrificing development density. For example, this may mean allowing developers to build taller, smaller footprint structures, or to cluster development on a portion of the development site.
- **Urban Infill/Redevelopment:** New development on previously developed land or remnant parcels in areas characterized by relatively high densities and a mix of land uses also presents opportunities to satisfy demand that may otherwise be met by greenfield development and to add new green infrastructure. However, meeting both of these policy goals typically requires flexible site and building development standards. For example, excessive minimum parking requirements can make it infeasible to plant trees, and lot-based impervious coverage limits may preclude the installation of shared GSI.
- **Change of Use:** Changes of use for previously developed parcels (without any proposed building expansion or new construction) present opportunities to reuse existing structures and add new green infrastructure. Because a change of use often requires full compliance with all site development standards, some nonconforming sites may need to add both landscaping and parking spaces to secure approval for a change of use. Consequently, flexible site development standards can also be important in contexts where most existing uses are not in conformance with standards for new development.

## Consistency with Public Investments

Beyond consistency with local plans and consistency among regulations, it is also important to evaluate how land-use and development regulations may affect different types of public investments. For example, subdivision regulations that permit (or encourage) private streets or open spaces may limit public investment opportunities in GSI. Conversely, site development standards that encourage or require tree canopy enhancement or GSI can help magnify the benefits of public tree-planting projects and reduce the need for conventional stormwater infrastructure capacity expansion projects. For each set of regulations, discuss the potential public investment implications with staff who manage capital improvement projects. Evaluate all rezoning proposals against the current capital improvements program.

## ENHANCING CONSISTENCY WITH THE REGIONAL NETWORK

The “Land-Use Regulations” section of the Planning System Audit (Tool 1) identifies five regulatory topics that have strong connections to the Greater Baltimore Wilderness Coalition’s Green Infrastructure Strategies to Increase Regional Resilience. Each of these topics corresponds to a distinct regulatory approach, and there are a number of techniques associated with each approach that localities can use to enhance consistency with the Regional Resilience Green Infrastructure Network.



Zoning overlays modify, but do not replace, base zoning designations. (Credit: American Planning Association)

## Natural Resource Conservation Zoning Districts or Overlays

Natural resource conservation zoning districts or overlays protect lands that are of high ecological (e.g., forests, wetlands, floodplains, steep slopes, wildlife habitat) value by limiting development to uses compatible with natural resource conservation goals. A district is a base zoning designation with its own use permissions and development standards, and localities typically use lot boundaries or street center lines as district boundaries. Meanwhile, an overlay is a supplemental zoning designation that modifies some of the base zoning provisions. Localities often use the existence of site-specific conditions to trigger the applicability of an overlay, and it is not unusual for overlay boundaries to bisect lots.

This regulatory approach supports the following resilience strategies:

- **Natural Resource Protection:** The primary intent of a natural resource conservation zoning district or overlay is to protect existing natural resources from new development. However, the specific provisions of a district or overlay and the mapping of that district or overlay ultimately determine the efficacy of this approach for natural resource protection.
- **Coastal Defense:** Preserving existing coastal habitat can enhance resilience to coastal storms, flooding, and sea-level rise, and coastal habitat protection clearly falls within the intent of a natural resource conservation zoning district or overlay.

Here are some recommendations for localities considering adopting or amending natural resource conservation zoning districts or overlays:

- **Use Permissions:** Require discretionary use permits for all new development in base districts, or prohibit all new development in overlay areas. Generally speaking, allowing new development as-of-right in natural resource areas is antithetical to the stated goals of the district or overlay.
- **Mapped Extent:** Map base districts to parcels located within locally designated green infrastructure hubs or corridors, state-designated areas of ecological significance, and locally designated environmentally sensitive areas. Map overlays to portions of parcels that correspond to the areas listed above.

## Low-Impact Development Standards

LID standards require new development to mitigate stormwater impacts through techniques, including rain gardens, bioswales, green roofs, and permeable pavement, which help capture and treat stormwater at its source and mimic predevelopment hydrology. In practice, localities may apply these standards through provisions related to land subdivision or site development, through zoning district or use-specific development standards, or through standards that apply to certain types of development (e.g., projects seeking bonus density).

This regulatory approach supports the following resilience strategy:

- **Multi-Benefit Green Stormwater Infrastructure:** The primary intents of LID standards are to reduce vulnerability to flooding and minimize water pollution through the addition of site-scale green infrastructure. However, the specific provisions of these standards ultimately determine the efficacy of this approach for multi-benefit GSI.

Here are some recommendations for localities considering adopting or amending LID standards:

- **Requirements:** Require all new development projects on sites that involve steep slopes or highly erodible soils or include portions of 500-year floodplains to incorporate LID techniques. Permit applicants to select different techniques based on the development context (i.e., greenfield, suburban infill/redevelopment, or urban infill/redevelopment).
- **Incentives:** Offer bonus density or height, reduced parking off-street parking requirements, flexible setbacks, or expedited review for projects located in watersheds with more than 5 percent impervious coverage or excessive nutrient loading that incorporate LID techniques. Encourage shared LID techniques in strategic locations to maximize flexibility in site design or to facilitate pedestrian-oriented design.

## Urban Forestry Standards

Urban forestry standards specify tree-planting, protection, mitigation, and maintenance requirements for a wide range of land-use contexts, including developed sites and public rights-of-way. These standards often prohibit removing trees over a certain size without a special permit (typically requiring mitigation) and may require a minimum density of tree plantings or canopy coverage for all new site development. In practice, localities may apply these standards through a separate set of tree protection or urban forestry regulations, provisions related to land subdivision or site development, or zoning district development standards.

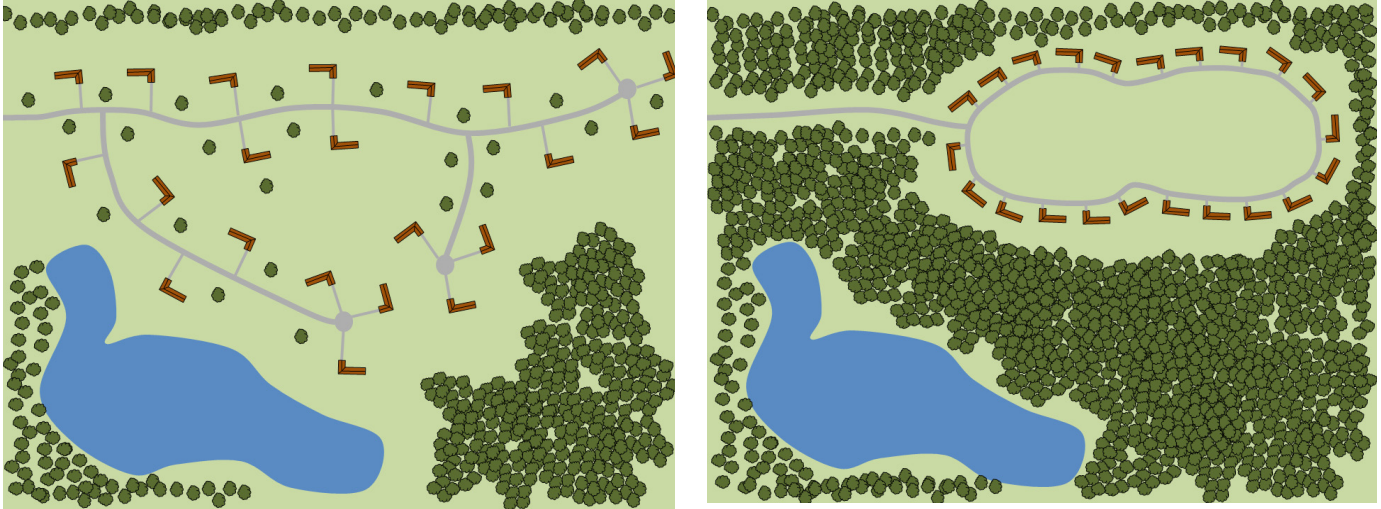
This regulatory approach supports the following resilience strategies:

- **Tree Canopy Enhancement and Restoration:** The primary intent of urban forestry standards are to maintain, enhance, or restore tree coverage in urban and suburban contexts. However, the specific provisions of these standards ultimately determine the efficacy of this approach for tree canopy enhancement and restoration.
- **Multi-Benefit Green Stormwater Infrastructure:** Trees in urban and suburban areas capture and filter stormwater runoff, minimizing the rate and volume of stormwater flows into storm-sewer systems or neighboring parcels. However, the amount and types of trees required by urban forestry standards ultimately determine the efficacy of this approach for multi-benefit GSI.
- **Critical Infrastructure Protection:** Trees located in close proximity to critical infrastructure sites and corridors can help protect these sites and corridors from extreme weather by providing shade, acting as a wind break, and capturing stormwater runoff. However, the amount, types, and locations of trees required by urban forestry standards ultimately determine the efficacy of this approach for critical infrastructure protection.
- **Coastal Defense:** Trees located in coastal high-hazard areas can help protect these areas from coastal storms and flooding by acting as a wind break and capturing stormwater runoff. However, the amount, types, and locations of trees required by urban forestry standards ultimately determine the efficacy of this approach for coastal defense.

Here are some recommendations for localities considering adopting or amending urban forestry standards

- **Requirements:** Require all development projects subject to subdivision or site plan review to preserve or plant trees in order to provide a minimum percent of tree canopy, and require permits and mitigation for removal of any tree over a certain size or any historic, landmark, or specimen tree.





Conventional (left) versus conservation (right) subdivision design. (Credit: American Planning Association)

- **Prohibitions:** Prohibit tree removal in state-designated areas of ecological significance, locally designated ecologically sensitive areas, close proximity to critical infrastructure, and coastal high-hazard areas.
- **Incentives:** Offer reduced impact fees, expedited permitting, or other development incentives for tree planting in excess of minimum requirements in areas designated as green infrastructure hubs or corridors, state-designated areas of ecological significance, locally designated environmentally sensitive areas, watersheds that exceed nutrient loading limits, close proximity to critical infrastructure, or coastal high-hazard areas.

## Conservation Subdivision Design Standards

Conservation subdivision design standards allow site developers to design and lay out new streets and lots in a way that protects environmentally sensitive features (e.g., forests, wetlands, floodplains, steep slopes, wildlife habitat) and maximizes the amount of site area retained as permanent open space in exchange for smaller individual lot sizes and sometimes a greater number of total lots than would otherwise be permitted under conventional subdivision design standards.

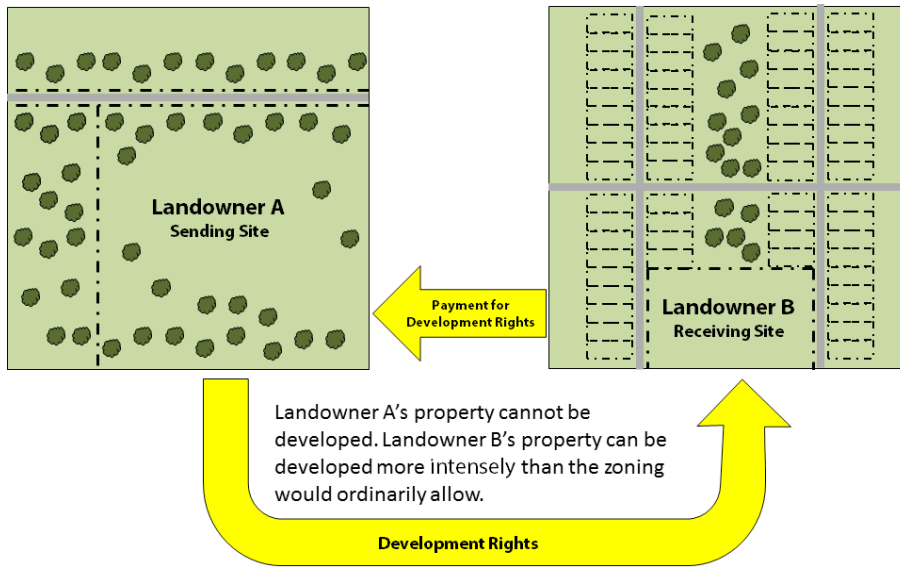
This regulatory approach supports the following resilience strategies:

- **Natural Resource Protection:** The primary intents of conservation subdivision design standards are to protect environmentally sensitive features from new development and to retain a high percentage of open space with new site development. However, the specific provisions of these standards ultimately determine the efficacy of this approach for natural resource protection.
- **Tree Canopy Enhancement and Restoration:** Conservation subdivision standards can specify that trees or tree stands over a certain size meet the definition of an environmentally sensitive feature. However, the specific provisions of these standards ultimately determine the efficacy of this approach for tree canopy enhancement and restoration.
- **Coastal Defense:** Conservation subdivision standards can specify that coastal habitat meets the definition of an environmentally sensitive feature. However, the specific provisions of these standards ultimately determine the efficacy of this approach for coastal defense.

Here are some recommendations for localities considering adopting or amending conservation subdivision design standards:

- **Requirements:** Require conservation subdivision design for all new subdivisions in greenfield areas. These standards should explicitly require a minimum percent of the site area to be preserved as open space and prohibit disturbance of environmentally sensitive features, including trees over a certain size and coastal habitat.
- **Incentives:** Offer increased residential density for suburban infill/redevelopment projects that adhere to conservation design principles.

Transfer of development rights. (Credit: American Planning Association)



## Transfer of Development Rights

Transfer of development rights (TDR) provisions allow property owners in areas designated for conservation (i.e., sending areas) to sell unused development rights to developers for use in areas designated for infill or redevelopment (i.e., receiving areas).

This regulatory approach supports the following resilience strategies:

- **Natural Resource Protection:** A common intent of TDR is to preserve natural resources from new development. However, the specific TDR provisions and market for development rights transfers ultimately determine the efficacy of this approach for natural resource protection.

Here are some recommendations for localities considering adopting or amending conservation subdivision design standards:

- **Requirements:** Require all site development projects in designated conservation zoning districts to purchase development rights within the same zoning district from a parcel of at least equal size and of similar quality, character, and development potential as a condition for discretionary development approval.
- **Incentives:** Offer bonus density for infill/redevelopment projects that purchase development rights from designated sending areas.

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