IMPEDIMENTS TO VOLUNTARY LOW-IMPACT DEVELOPMENT IN THE DISTRICT OF COLUMBIA

NRDC
THE EARTH'S BEST DEFENSE

OUT OF THE GUTTER

Reducing Polluted Runoff in the District of Columbia

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This appendix identifies District of Columbia development regulations that pose potential impediments to the voluntary use of Low-Impact Development ("LID") practices—lot-level strategies described in the Introduction, that reduce development impacts through the use of multiple systems that retain, detain, filter, treat, use, and reduce runoff. In preparing the appendix, we have focused on District of Columbia Municipal Regulations and standards that govern private development, including:

1. Zoning, Title 11 of the Code of District of Columbia Municipal Regulations;
2. District of Columbia Construction Codes, Titles 12-12G of the Code of District of Columbia Municipal Regulations, and sections of the following model codes that have been adopted by the District of Columbia: BOCA National Building Code/1996, International Plumbing Code/1995, International Mechanical Code/1996, BOCA National Fire Prevention Code/1996, BOCA National Property Maintenance Code/1996, CABO One And Two Family Dwelling Code/1995, and NFPA National Electrical Code/1996;[a]
3. Environment, Title 20 of the Code of District of Columbia Municipal Regulations;
4. Water and Sanitation, Title 21 of the Code of District of Columbia Municipal Regulations;
5. Public Health and Medicine, Title 22 of the Code of District of Columbia Municipal Regulations;
6. Public Space and Safety, Title 24 of the Code of District of Columbia Municipal Regulations; and
7. District of Columbia Department of Consumer and Regulatory Affairs. *1987 Standards and Specifications for Soil Erosion and Sediment Control*. Adopted as prepared

[a] In subsequent citations, we will refer to the BOCA National Building Code/1996 as "NBC/1996," the International Plumbing Code/1995 as "IPC/1995," and the CABO One And Two Family Dwelling Code/1995 as "CABO Dwelling Code/1995."

by the U.S. Department of Agriculture, Soil Conservation Service. Washington, D.C.: Government of the District of Columbia.

Uncodified design standards for public infrastructure projects—for example, the D.C. Department of Public Works' *Standard Specifications for Highways and Structures* (1996)—were not included in this analysis. In addition, insurance standards, ANSI Standards governing ADA accessibility, and federal statutes and regulations were not evaluated.

In reviewing the District of Columbia development regulations, we focused on provisions that would inherently block the use of LID practices—for example, District of Columbia Construction Code provisions that mandate downspout connections to the public storm sewer system. We did *not* attempt to identify or suggest revisions to each and every regulatory requirement that might take precedence over a particular proposed LID practice in a specific site plan. The District of Columbia zoning ordinance, for example, requires accessory parking spaces for most development; so a developer who submits a site plan that includes an LID landscaping feature, but no parking, might be told that the area proposed for the LID feature should be changed into accessory parking spaces. This report does not attempt to address these types of conflicts or to create an override in favor of LID practices in such cases.

This appendix is not intended to serve as a legal opinion or, with respect to particular development projects, as a substitute for careful review and analysis of the District of Columbia's development regulations and consultation with the agencies that implement them. Instead, it is a policy document that seeks to assist lawmakers in identifying general regulatory obstacles to LID in the District of Columbia development codes. Where regulatory impediments were discovered, we usually propose language to introduce flexibility into the standard or regulation. These proposed changes, however, are not designed to create a comprehensive system of incentives or mandates for the use of LID. Such systems are briefly discussed in the final chapter of the report, but development of such a system for the District of Columbia is beyond the scope of the current project.

The appendix addresses issues in the order in which they appear on the LID Checklist.

I. DEVELOPMENT STANDARDS

A. Site Preparation

1. Site Disturbance and Clearing

► Does the Erosion and Sediment Control (ESC) ordinance require widespread clearing of construction sites?

► Does the ESC ordinance require removal of all trees and woody vegetation as part of site preparation?

The District of Columbia's Erosion and Sediment Control program does not mandate widespread clearing of construction sites or removal of all trees and woody vegetation as part of site preparation. Approval of a building permit in the District of Columbia is "conditioned upon submission by the permit applicant of an erosion and sedimentation plan which has been reviewed and approved by the [D.C. government]."[b] 21 D.C.M.R. § 502.1. In addition, 21 D.C.M.R. § 526.1 provides that "No person shall, unless exempt, engage in any earth movement or land change within the District of Columbia without instituting appropriate storm water management measures to control or manage runoff from such developments."

Although individual erosion and sedimentation plans will vary, the District of Columbia's "Erosion Control Principles: Building, Demolition, and Site Development Projects" include:

> *Retention of as much natural vegetation on the site as practicable is required. Removal of vegetation shall be limited to that which is necessary for construction or landscaping activities.*
>
> *The vegetated areas retained may act as a filter to trap sediment and keep it on site.*

21 D.C.M.R. §§ 542.3-542.4. The District of Columbia's guidelines for erosion and sediment control planning also include: "Limit grading to areas of workable sizes so as to limit the duration of exposure of disturbed and unprotected areas." 21 D.C.M.R. § 538.1(e). Pursuant to 21 D.C.M.R. § 538.2, "[a]ll appropriate conservation practices shall be applied on the first disturbed section of land before the next section is opened up." *See also* Erosion Control Principles: Design, 21 D.C.M.R. § 539.

2. Grading/Slope Requirements

> **► Do grading and slope requirements limit or impede the use of post-construction LID practices?**
>
> **► Do codes and regulations require conventional drainage practices, or is there flexibility for alternatives (e.g., do sites have to be graded toward the street or municipal drainage infrastructure, or can existing natural drainage patterns be used)?**

The District of Columbia does not impose grading and slope requirements that inherently preclude the use of post-construction LID practices or require runoff to be directed toward the street and/or public sewer system. For one- and two-family dwellings, "storm water is permitted to discharge onto flat areas *provided the storm water will flow away from the building, will not flow over sidewalks, parking areas or other*

[b] The D.C. Municipal Regulations currently identify the Department of Consumer and Regulatory Affairs as the agency responsible for reviewing and approving erosion and sedimentation plans. That responsibility, however, has been transferred to the Watershed Protection Division of the D.C. Department of Health's Environmental Health Administration.

walkways, and will not flow over property lines onto adjacent lots unless it runs into existing natural water courses." 12B D.C.M.R. § 1101.2 (emphasis added). The District of Columbia Department of Consumer and Regulatory Affairs ("DCRA") has also adopted a "Standard and Specifications for Land Grading" that includes design criteria intended "to provide for erosion control and vegetative establishment on those areas where the existing land surface is to be reshaped by grading according to plan."[c] These goals are generally consistent with LID. According to the Standard and Specifications, "[p]rovisions shall be made [in grading plans] to safely conduct surface runoff to storm drains, protected outlets or to stable water courses to insure that surface runoff will not damage slopes or other graded areas."[d] The requirement identifies a "Grassed Waterway"—basically, a grassy swale[e]—as one method of achieving this goal.

Only a few District of Columbia Construction Code provisions address grading and slope requirements. In addition to the Plumbing Code section cited above (12B D.C.M.R. § 1101.2), the District of Columbia Building Code provides:

> **Site grading:** *The ground immediately adjacent to the foundation shall be sloped away from the building at a slope of not less than one unit vertical in 12 units horizontal (1:12) for a minimum distance of 8 feet (2438 mm) measured perpendicular to the face of the wall or an approved alternate method of diverting water away from the foundation shall be used.*

NBC/1996 § 1813.7, adopted by the District of Columbia.[f] In most cases, it should be possible to incorporate LID features into a site design without violating these requirements.[g]

The District of Columbia has also established the Tree and Slope Protection Overlay District and the Chain Bridge Road/University Terrace Overlay District, which cover selected parts of the City. 11 D.C.M.R. §§ 1511-15, 1565-69. Within the overlay districts, impervious ground coverage and tree removal are limited.

[c] District of Columbia Department of Consumer and Regulatory Affairs. 1987 Standards and Specifications for Soil Erosion and Sediment Control at 41.01.

[d] *1987 Standards and Specifications for Soil Erosion and Sediment Control* at 41.01.

[e] *The 1987 Standards and Specifications for Soil Erosion and Sediment Control* (at 36.01) define a "Grassed Waterway" as:
A natural or man-made channel of parabolic or trapezoidal cross-section that is below adjacent ground level and is stabilized by suitable vegetation. The flow channel is normally wide and shallow and conveys the runoff down the slope.

[f] International Building Code/2000 (IBC/2000) § 1803.3 also provides that:
The ground immediately adjacent to the foundation shall be sloped away from the building at a slope of not less than one unit vertical in 20 units horizontal (5-percent slope) for a minimum distance of 10 feet (3048 mm) measured perpendicular to the face of the wall or an approved alternate method of diverting water away from the foundation shall be used.

[g] The District of Columbia Public Health and Medicine regulations also provide that
The owner of any premises or building in the District used for other than residential purposes shall cause the yard or area, or both, to be graded and paved so that all drainage flows freely from all parts of the building into the sewer traps that may have been provided for that purpose. If there are no sewer traps, the drainage shall flow away from any inhabited building on the premises.
22 D.C.M.R. § 110.9. As with NBC/1996 § 1813.7, it should be possible to design LID features consistent with this requirement.

11 D.C.M.R. §§ 1513-14, 1567-68. Although the rules of the overlay districts do not prohibit topographical changes, land owners in the districts may obtain special exceptions from the zoning districts' impervious ground coverage and tree removal requirements only if "Tree removal, grading, and topographical change [are] limited to the maximum extent consistent with construction of a building permitted by the standards of this chapter." 11 D.C.M.R. §§ 1515.1(a), 1569.1(a). These code sections should discourage grading plans that significantly change the natural slopes of parcels within the areas covered by the overlay districts.

B. Building Standards

1. Disconnection of Impervious Surfaces/Areas

► Are there District regulations that require runoff to be directed toward the street?
► Do sites have to be connected to the District's storm water sewer system?
► Are gutters and downspouts required to be connected to the storm water sewer system?
► Is there a prohibition on the discharge of rooftop runoff to yards/landscaped areas, rain barrels, or cisterns?

a) D.C. Plumbing Code, Section 1101.2

Section 1101.2 of the current D.C. Plumbing Code governs runoff from "[a]ll roofs, paved areas, yards, courts and courtyards." According to DCRA, for land uses other than one- and two-family dwellings, Section 1101.2 has been interpreted to require sewer connections for storm water discharge whenever storm or combined sewers are available. For such land uses, discharge to "an approved place of disposal" that is not a sewer is permitted only when no sewer connection is available. For one- and two-family dwellings, "storm water is permitted to discharge onto flat areas provided the storm water will flow away from the building, will not flow over sidewalks, parking areas or other walkways, and will not flow over property lines onto adjacent lots unless it runs into existing natural water courses."

The following proposed language for Section 1101.2 would: (1) allow storm water discharge to vegetated areas for all land uses, not just one- and two-family dwellings, so long as certain conditions are met; (2) allow storm water discharges to any other "approved place of disposal"; and (3) for projects not exempt from the D.C. Storm Water Regulations, 21 D.C.M.R. §§ 526-535, require submission of storm water management plans prior to receipt of a building permit.

> **12B D.C.M.R. § 1101.2** *Where required: Storm water drainage shall comply with Sections 1101.2.1 and 1101.2.2.*

1101.2.1 Unless a construction project is otherwise exempt from the D.C. Storm Water Management Regulations, a permit shall not be issued for a building or structure associated with grading operations or construction, or both, that disturb more than five thousand square feet (5,000 ft²) of land area, or that are part of an approved subdivision plan which contains provisions for storm water management, until the submitted plans reflect the pertinent storm water management features approved by the official charged with the administration and enforcement of the D.C. Storm Water Management Regulations, 21 D.C.M.R. §§ 526-535, and the requirements of D.C. Law 5-188, Water Pollution Control Act of 1984, as amended.

1101.2.2 Storm water may be discharged from roofs, paved areas, yards, courts, courtyards, downspouts, rain barrels, cisterns or rooftop storage facilities to vegetated areas, such as lawns, gardens, grassy swales, or biorention cells on the same single record lot, rather than to storm sewers or combined sewers, whenever storm water will flow away from the building and will not flow over property lines onto adjacent lots unless it runs into existing natural water courses. Other storm water discharges shall be made in conformance with the D.C. Storm Water Management Regulations, 21 D.C.M.R. §§ 526-535, and the requirements of D.C. Law 5-188, Water Pollution Control Act of 1984, as amended, either to an approved place of disposal or into a storm sewer or combined sewer.

The District of Columbia Building Code Advisory Committee has proposed similar language for the next update to the District of Columbia Construction Codes, planned for sometime later this year.[h] The Subcommittee's proposed amendment would require approval for storm water discharges to vegetated areas. NRDC encourages DCRA and the District of Columbia Department of Health ("DoH") to work together to develop more detailed guidelines and approval procedures, so that developers can easily determine in advance when non-sewer storm water disposal options will be allowed.

NRDC's understanding is that the specific terms of Section 1101.2 would govern downspout disconnection, even if other sections of the Construction Codes appear to establish a generic sewer connection requirement.[i] If not, those sections of the D.C. Construction Codes should also be amended.

[h] District of Columbia Building Code Advisory Committee, Code Change Proposal Form 2001-2002, Subcommittee Amendment No. IPC-10.

[i] *See* Sections 301.3 and 301.5 of the current D.C. Plumbing Code, 12B D.C.M.R. §§ 301.3 and 301.5; and Section 3102.1 of the CABO Dwelling Code/1995, which contains language that is almost identical to D.C. Plumbing Code, Section 301.3. The International Residential Code/2000, § P2602.1 is identical to Section 3102.1 of the CABO Dwelling Code/1995.

b) Definition of "Cistern"

To accommodate the proposed changes to Section 1101.2 of the D.C. Plumbing Code, NRDC recommends eliminating the reference to "a home or farm" in the existing Plumbing Code definition of "cistern" (IPC/1995 § 602)[j]:

> **CISTERN.** *A small covered tank for storing water ~~for a home or farm~~. Generally, this tank stores rainwater to be utilized for purposes other than in the potable water supply, and such tank is placed underground in most cases.*

Cisterns are used in Low-Impact Development to capture and re-use storm water for watering lawns, gardens, and trees. Re-use of storm water reduces the amount of wet weather flow in both the combined and separate storm sewer systems in D.C. Because cisterns can be integrated into the design of an LID system for any type of building, and because the term is used in the proposed Section 1101.2, the "home or farm" restriction should be eliminated from the definition.

c) Amendment of Statutory Provision on Drainage of Lots

We recommend the amendment of D.C. Code § 8-201, entitled "Lots to be drained into public sewers and connected with water mains." This section of the D.C. Code provides, among other things, for sewer connections for each "original lot or subdivisional lot . . . situated on any street in [the District of Columbia] where there is a public sewer and water main,"

> *in such manner that any and all of the drainage of such lot, whether water or liquid refuse of any kind shall flow into said sewer;*

The provision was initially passed before the advent of the modern storm water program; and it does not clearly differentiate between storm water versus sewage and other liquid waste. Sewer and water connection requirements are now addressed in greater detail in the D.C. Construction Codes. To the extent that D.C. Code § 8-201 imposes a stricter sewer connection standard for storm water than the D.C. Construction Codes (including the modifications to the Construction Codes proposed by NRDC in this report), it should be amended to eliminate any inconsistency or repealed. D.C. Code §§ 8-202 through 8-205 are linked to D.C. Code § 8-201 and may also need to be modified if D.C. Code § 8-201 is changed.

[j] The language of IPC/2000 § 202 is identical to IPC/1995 § 602.

2. Site Design

a) Driveways—Width

► Is the minimum driveway width specified in the District greater than 18 feet for residential properties?

The District of Columbia Zoning Ordinance provides that

> *A driveway which provides access to required parking spaces shall meet the following standards:*
>
> *(a) It shall have a maximum grade of not more than twelve percent (12%) with a vertical transition at the property line;*
>
> *(b) A driveway serving a one-family dwelling or flat or which otherwise serves only one parking space shall be not less than seven feet (7 ft.) in width;*
>
> *(c) A driveway serving any use other than a one-family dwelling or flat, or which serves more than one (1) parking space shall be as follows:*
>
> *(1) Not less than twenty-five feet (25 ft.) from a street intersection as measured from the intersection of the curb line extended;*
>
> *(2) Not less than twelve feet (12 ft.) in width if designed for on-way [sic] circulation or fourteen feet (14 ft.) if designed for two-way circulation; and*
>
> *(3) Not more than twenty-five feet (25 ft.) in width,*
>
> *(d) A driveway which provides access directly from a street to a row dwelling or a flat shall be a minimum of twenty-eight feet (28 ft.) from all adjacent driveways which provide access directly from a street to a row dwelling or a flat, as measured from the nearest edge of each such driveway opening.*

11 D.C.M.R. § 2117.8. Within the Downtown Streetscape Area ("DSA"), the *Downtown Streetscape Regulations*[k] also provide that a "[d]riveway shall be a minimum width of twelve feet (12′) and a maximum width of twenty-five feet (25′)." 24 D.C.M.R. § 1110.2(b).

All of the minimum driveway widths included in these regulations (7 feet for a one-family dwelling or flat or which otherwise serves only one parking space; 12 or 14 feet for all other uses and driveways that serve more than one parking space) are well below the 18-foot minimum recommended in the LID Checklist for residential units.

[k] *Downtown Streetscape Regulations*, Department of Public Works, Office of Intermodal Planning, August 2000.

b) Driveways—Shared Driveways

► Are shared driveways prohibited in residential developments?

The District of Columbia Zoning Ordinance requires that in general, "each required parking space shall be accessible at all times directly from improved streets or alleys or shall be accessible from improved streets and alleys via graded and unobstructed private driveways. . . ." 11 D.C.M.R. § 2117.4. Shared driveways are not specifically prohibited. In fact, shared driveway openings with a maximum width of 14 feet are mandated for adjacent row dwellings that have direct access only from the street:

> *In the case of two (2) or more row dwellings which are constructed concurrently on adjacent lots, and have direct access only from the street, each two (2) row dwellings shall provide access to the required off-street parking spaces through adjacent driveways that share one (1) driveway opening. The width of each driveway shall not exceed seven feet (7 ft.) on each lot;*

11 D.C.M.R. § 2117.9(a). In addition, the *Downtown Streetscape Regulations* expressly allow the use of shared driveways and parking and loading facilities within the DSA. 24 D.C.M.R. § 1110.4.

Although perhaps unnecessary, the following proposed provision, which is patterned on Section 1110.4 of the *Downtown Streetscape Regulations*, would clarify that shared driveways are allowed in other parts of the District of Columbia for accessory parking spaces:

> *11 D.C.M.R. § 2117.8(e). The use of shared driveways for more than one (1) property or building shall be permitted.*

c) Driveways—Surfacing

► Is the use of pervious materials prohibited for residential properties?
► Is the use of pervious materials prohibited for commercial, industrial, and institutional properties?
► Is the use of "two track" design prohibited for single family properties?

The District of Columbia Zoning Ordinance expressly requires the use of all-weather impervious surfacing materials for parking spaces and driveways.[1]

[1] The District of Columbia Zoning Ordinance defines "Impervious Surface" as:
an area that impedes the percolation of water into the subsoil and impedes plant growth. Impervious surfaces include the footprints of principal and accessory buildings, footprints of patios, driveways, other paved areas, tennis courts, and swimming pools, and any path or walkway that is covered by impervious material. (39 DCR 1904)
11 D.C.M.R. § 199.1.

11 D.C.M.R. § 2117.4 (private driveways); 11 D.C.M.R. § 2117.10 (open parking spaces, including access aisles, driveways, and ramp areas); 11 D.C.M.R. § 2204.1 (loading berths, service/delivery loading spaces including access aisles, driveways, and maneuvering areas); 11 D.C.M.R. § 2204.2 (private driveways providing access to loading berths and service/delivery loading spaces); 11 D.C.M.R. § 2303.1(a) (parking lots); 11 D.C.M.R. § 2304.5 (queuing lane for drive-through uses). The impervious surfacing requirement also appears to preclude the use of two-track driveway design.

The *Downtown Streetscape Regulations* provide that within the DSA, "Driveways and their aprons shall be poured concrete and flush with grade of sidewalk." 24 D.C.M.R. § 1110.2(a). In addition, Section 607.2 of the Public Space and Safety Code, 24 D.C.M.R. § 607.2, provides that for parking lots, "Driveways shall be constructed of concrete, and shall meet the specifications of the Department of Public Works."

The following proposed changes would: (1) allow the use of porous pavement for driveways; and (2) allow the use of two-track driveway design for one-family dwellings.

> *11 D.C.M.R. § 2117.4. Except as provided in § 2117.15, each required parking space shall be accessible at all times directly from improved streets or alleys or shall be accessible from improved streets and alleys via graded and unobstructed private driveways which ~~form an all-weather impervious surface~~ have been designed to support vehicular traffic. Improved streets or alleys providing access to required parking spaces shall have a minimum width of ten feet (10 ft.) and be paved in compliance with the standards of the District of Columbia Department of Public Works.*
>
> *11 D.C.M.R. § 2117.10. All open parking spaces, including access aisles, driveways, and ramp areas shall be paved and maintained with bituminous, concrete or brick materials, or a combination of these materials; or where allowed by the District of Columbia Department of Health's Storm Water Manual, porous pavement designed to support vehicular traffic and certified by a professional engineer licensed in the District of Columbia; or other materials approved by the District of Columbia Department of Public Works as structurally equivalent or better, ~~which form an all-weather impervious surface, and~~ which is at least four inches (4 in.) in thickness. For one-family dwellings, two-track driveway design shall be permitted.*
>
> *11 D.C.M.R. § 2204.1. All loading berths and service/delivery loading spaces including access aisles, driveways, and maneuvering areas shall be paved and maintained with bituminous, concrete or brick materials or a combination of these materials; or where allowed by the District of Columbia Department of Health's Storm Water Manual, porous pavement designed to support vehicular traffic and certified by a professional engineer licensed in the District of Columbia; or other materials~~ if*

> *approved by the District of Columbia Department of Public Works as structurally equivalent or better, ~~which form an all-weather impervious surface and~~ which is at least six inches (6 in.) in thickness.*
>
> *11 D.C.M.R. § 2204.2. All required loading berths and service/delivery loading spaces shall be directly accessible from an improved street or alley or shall be accessible from an improved street or alley via graded and unobstructed private driveways which ~~form an all-weather impervious surface~~ have been designed to support vehicular traffic.*
>
> *11 D.C.M.R. § 2303.1(a). All areas devoted to driveways, access lanes, and parking areas shall be paved and maintained with bituminous concrete or brick materials, or a combination of these materials; or where allowed by the District of Columbia Department of Health's Storm Water Manual, porous pavement designed to support vehicular traffic and certified by a professional engineer licensed in the District of Columbia; or other material approved by the District of Columbia Department of Public Works as structurally equivalent or better, ~~which form an all-weather impervious surface, and~~ which is a minimum of four inches (4 in.) in thickness.*
>
> *11 D.C.M.R. § 2304.5. The queuing lane shall be paved and maintained with materials which ~~form an all-weather impervious surface~~ have been designed to support vehicular traffic.*

These changes are intended to introduce flexibility into the District of Columbia's paving requirements. For some land uses, however, porous pavement is inappropriate. In areas where there is a risk of chemical, oil, or gasoline spills—for example, fuel dispensing facilities, areas where liquid materials are stored above ground, solid waste storage areas, warehouses, and high-traffic areas - impervious pavement may be preferable. The proposed language relies on the District of Columbia Department of Health's Storm Water Manual to establish standards for where pervious pavement would be permitted.

NRDC's understanding is that these amended provisions would not apply within the Downtown Streetscape Area, unless the *Downtown Streetscape Regulations* mandating particular driveway and sidewalk construction techniques are also changed. *See*, *e.g.*, 24 D.C.M.R. § 1105 (Standards for Sidewalk Treatment); 24 D.C.M.R. § 1110.2(a) ("Driveways and their aprons shall be poured concrete and flush with grade of sidewalk"). Although NRDC is not proposing specific changes to these sections of the *Downtown Streetscape Regulations* now, it encourages the District of Columbia to consider allowing pervious pavement within the DSA and to develop pervious pavement standards that are consistent with the other design goals of the *Downtown Streetscape Regulations*.[m]

[m] Because the DSA is a high-traffic area, additional analysis may be appropriate before significantly increasing the use of pervious pavement in that part of the city.

d) Prohibitions on Temporary Ponding of Storm Water on Yards and Landscaped Areas

► Do current grading or drainage requirements prohibit temporary ponding of storm water on yards or landscaped areas?

We have not identified any District of Columbia development code provisions that specifically prohibit the temporary ponding of storm water on yards and landscaped areas. Particular ponding designs could create a common law nuisance or health nuisance (22 D.C.M.R. § 100 *et seq.*). However, it should be possible to design LID systems that do not require ponding of stagnant water for periods of time that would raise nuisance or mosquito control concerns.

3. Building Codes

a) Temporary Rooftop Storage

► Do District codes and regulations restrict the temporary storage of storm water on rooftops?

IPC/1995, Section 1112, which was adopted and made part of the District of Columbia Plumbing Code, provides for "Controlled Flow Roof Drain Systems":[n]

> **1112.1 General.** *The roof of a structure shall be designed for the storage of water where the storm drainage system is engineered for controlled flow. The controlled flow roof drain system shall be an engineered system in accordance with this section and the design, submittal, approval, inspection and testing requirements of Section 105.4. The controlled flow system shall be designed based on the required rainfall rate in accordance with Section 1107.1.*
>
> **1112.2 Control devices.** *The control devices shall be installed so that the rate of discharge of water per minute shall not exceed the values for continuous flow as indicated in Section 1110.1.*
>
> **1112.3 Installation.** *Runoff control shall be by control devices. Control devices shall be protected by strainers.*
>
> **1112.4 Minimum number of roof drains.** *Not less than two roof drains shall be installed in roof areas 10,000 square feet (930 m^2) or less and not less than four roof drains shall be installed in roofs over 10,000 square feet (930 m^2) in area.*

[n] IPC/2000 § 1110 includes virtually identical provisions.

These provisions appear to allow the use of roofs for temporary storage of water as part of a controlled flow roof drain system. According to DCRA Staff, temporary storage systems for storm water would be acceptable from the perspective of the Building Code, so long as the roof structure is properly designed to support the increased weight (*see, e.g.*, IPC/1995 § 1101),[o] and so long as Secondary (Emergency) Roof Drains (IPC/1995 § 1108)[p] are incorporated into the design to prevent the depth of ponding from exceeding that for which the roof was designed.

b) Planter Boxes and Permeable Siding

► Do District codes and regulations restrict the temporary storage of storm water on the sides of buildings (planter boxes, type of material used as siding)?

We did not locate any specific prohibitions in the reviewed Codes on the use of planter boxes on private property.

The District of Columbia Building Code establishes technical criteria that must be satisfied by exterior wall coverings. NBC/1996, Chapter 14.[q] It will be necessary to consult a materials engineer to determine whether or not those technical standards would allow the use of siding materials that reduce runoff by slowing or temporarily absorbing water. Even if the analysis concludes that such siding materials are not expressly permitted by existing Code standards, the D.C. Building Code/1999 provides that alternative materials can be used if approved by DCRA:

> *Materials not prescribed herein shall be permitted provided that any such alternative has been approved. Exterior walls, constructed of alternative materials shall be shown to be durable, weather resistant, structurally adequate, fireresistant, flood resistant and ratproof as required herein.*

NBC/1996 § 1404.7 (adopted by 12A D.C.M.R. § 101.2.1); 12A D.C.M.R. § 104.1.

d) Green Roofs

► Do District codes and regulations restrict the use of roof gardens?
► Are there roof weight-bearing requirements that restrict the use of roof gardens?

"Landscaped roofs" and "roof gardens" are currently allowed under the District of Columbia Building Code.

[o] Similar provisions are included in IPC/2000 § 1101.

[p] Similar provisions are included in IPC/2000 § 1107.

[q] Similar provisions are included in IBC/2000, Chapter 14.

Landscaped roofs

Although "green roofs" and "eco-roofs" are not separately discussed in the NBC/1996, Section 1607.6.1 addresses the roof loads that should be used to design buildings with "landscaped roofs":

> **Landscaped Roofs.** *Where roofs are to be landscaped, the uniform design live load in the landscaped area shall be 20 psf (958 Pa). The weight of the landscaping materials shall be considered as dead load and shall be computed on the basis of saturation of the soil.*

See also the virtually identical provision in the IBC/2000, IBC/2000 § 1607.11.2.3, Landscaped roofs.

The term "landscaped roof" does not appear to be defined in NBC/1996. Nevertheless, green roofs and eco-roofs would arguably fall within the ordinarily accepted meaning of a 'roof that is landscaped'; and if DCRA interprets Section 1607.6.1 roof landscaping as encompassing those techniques, there may be no need to modify or expand the Building Code to allow them.[r]

Although perhaps unnecessary, another approach would be to propose a new definition of the term "Landscaped Roof" and to tie that definition to the Department of Health's storm water regulations. For example, IBC/2000 § 1602.1 could be supplemented to include the following new definition:

> **Landscaped Roof.** *A roof that is designed to be partially or completely covered by soil and vegetation. This definition shall include, without limitation, any rooftop storm water facility that has been certified as a [Landscaped Roof/Green Roof/Eco-Roof] by the District of Columbia Department of Health.*

Roof gardens

NBC/1996 § 1607.6, which is part of the District of Columbia Building Code, also includes standards for roofs "designed for roof gardens or assembly or educational occupancies":

> **Special-purpose roofs.** *Where occupied for incidental promenade purposes, roofs shall be designed for a minimum* live load *of 60 psf (2873 Pa) and 100 psf (4788 Pa) where designed for roof gardens or assembly or educational occupancies.*

[r] NRDC has not evaluated the technical standards in NBC/1996 §§ 1607.6 and 1607.6.1 to determine whether they are appropriate for green roofs, eco-roofs, or roof gardens that will not be open to pedestrians or for assembly purposes. It will be necessary to consult a structural engineer to make that evaluation. If the current design load requirements in the NBC/1996 are excessive for these types of LID features, additional changes to the District of Columbia Construction Codes Supplement may be necessary to facilitate the construction of green roofs within the District.

See also IBC/2000 § 1607.11.2.2, Special-purpose roofs.

The term "roof garden" does not appear to be defined in NBC/1996. However, since the NBC/1996's live load standard for roof gardens is higher than that for landscaped roofs, it may be worthwhile to explore the difference between those terms with DCRA. If a technical problem emerges during that discussion, it may be necessary to propose changes or clarifications to the Building Code. For example, if a Building Code Official would treat a lightweight eco-roof that is inaccessible to pedestrians as a "roof garden," and if the live load standard for roof gardens is excessive for that technique, it may be appropriate to change the standard by incorporating express definitions into the Building Code (*e.g.*, by including lightweight "eco-roofs" in the definition of "landscaped roof"), or cross-referencing standards to be established by the Department of Health.

Roofs used for other special purposes

If green roofs are not considered to be "landscaped roofs" or "roof gardens" for the purposes of NBC/1996 §§ 1607.6 and 1607.6.1, they should fall within the general provision in Section 1607.6.3 regarding "[r]oofs to be utilized for other special purposes." Section 1607.6.3 provides that such roofs "shall be designed for appropriate *loads*, or as otherwise approved" (emphasis in original). *See also* IBC/2000 § 1607.11.2.2, Special-purpose roofs.

C. Transportation Infrastructure

1. Roads Drainage, Medians, Surfacing Materials

► Do municipal regulations require curbs and gutters for all street classes?

► Do municipal regulations require curbs and gutters in parklands and parkways?

► Are there regulations that limit the maximum width of medians and their use for treating runoff?

► Are pervious surfaces prohibited? If yes, on what street classes?

The District Division of Transportation appears to have discretion to incorporate LID techniques into specific street and road projects. Our review of the District of Columbia's Code and Municipal Regulations did not reveal a requirement that curbs and gutters be constructed for all street classes; explicit requirements limiting use of medians for LID; or prohibitions on the use of pervious surfaces. According to District Division of Transportation staff, general road construction standards are not codified in the District of Columbia. Instead, curbs and gutters, medians, road geometry, and surfacing materials are addressed in the designs developed for specific street and road construction projects.

Use of LID techniques might be facilitiated by developing standard specifications for road designs that include LID features. The District of Columbia has developed

Standard Specifications for Highways and Structures that provide detailed descriptions of construction methods and materials.[s] We did not find D.C. Code or Municipal Regulation provisions that require road project designs to use only the materials and practices identified in the *Standard Specifications*; but as a practical matter, most designs probably rely on the *Standard Specifications*. Adding LID-friendly choices to the *Standard Specifications* would probably increase their use.

2. Tree/Vegetation Planter Boxes (also applies to sidewalks and all streetscapes discussed below)

► Do municipal regulations prevent the use of tree/vegetation boxes in certain streets?
► Are there municipal regulations requiring tree planter boxes to be raised above grade?

The District of Columbia Municipal Regulations define "public parking" as

> *that area of public space devoted to open space, greenery, parks, or parking that lies between the property line, which may or may not coincide with the building restriction line, and the edge of the actual or planned sidewalk that is nearer to the property line, as the property line and sidewalk are shown on the records of the District.*

24 D.C.M.R. § 102.8. Section 104.3 provides that "Nothing in this section shall be construed to prevent the person having control of the premises abutting on a public parking from sodding or beautifying it with flowers." 24 D.C.M.R. § 104.3. Grading, paving, construction of a wall or structure, or planting of hedges in a public parking, however, requires a permit. 24 D.C.M.R. §§ 102.3, 104.1. The permit requirement is a potential obstacle to LID (*e.g.*, it could limit grading by an abutting landowner that would convert a public parking into a grassy swale); but it also may prevent actions that are inconsistent with LID (*e.g.*, paving of a public parking). NRDC is not recommending a change to this provision. However, it encourages the Department of Health and DCRA to work together to develop standards for issuing permits consistent with LID principles.

The District of Columbia Municipal Regulations define "tree spaces" as the "unpaved area of public space that lies between the street curb and the sidewalk, which is commonly reserved by the District government for planting trees." 24 D.C.M.R. § 109.1. The District of Columbia Public Space and Safety regulations provide that:

> *The beautification of a tree space may be undertaken at the discretion of the owner or occupant of the property that abuts the tree space, and shall*

[s] The District of Columbia's *Standard Specifications for Highways and Structures* is available at http://www.ddot.dc.gov/information/standards/index.shtm (last visited May 13, 2002).

> *be under the immediate care and keeping of the owner or occupant of the property that abuts the tree space.*

24 D.C.M.R. § 109.6. The regulations, however, impose a number of restrictions on the size and placement of "beautification areas" in public tree spaces, including: (a) beautification shall not extend over the curb or the sidewalk (24 D.C.M.R. § 109.7(a)); (b) beautification shall not extend within 3 feet of a crosswalk or paved bus stop (24 D.C.M.R. § 109.7(b)); (c) beautification shall not extend within six feet of an entrance to an alley (24 D.C.M.R. § 109.7(c)); (d) beautification shall not extend within six feet of a street corner (24 D.C.M.R. § 109.7(d)); (e) beautification shall not extend within four feet of a parking meter or a fire hydrant (24 D.C.M.R. § 109.8); and (f) beautification areas shall be not more than four feet wide and nine feet long, and at least six feet shall separate each beautified area (24 D.C.M.R. § 109.8). In addition, planting material used to beautify a tree space "shall have a shallow root system and shall not be allowed to grow to a height in excess of eighteen inches (18 inches)" (24 D.C.M.R. § 109.11). Title 24 of the District of Columbia Municipal Regulations does not require that tree planter boxes be above-grade.

The District imposes additional restrictions within the Downtown Streetscape Area ("DSA"). *See Downtown Streetscape Regulations*. In the DSA, one row of trees is required on each side of the street (24 D.C.M.R. § 1106.2), and

> *The tree space shall be protected by the installation of plantings with ground cover to be maintained by the adjacent property owner. The types of ground cover and plantings in a tree space shall be specified by the applicant and are subject to [Downtown Streetscape Review] Committee approval . . .*

24 D.C.M.R. § 1106.8(e). The regulations establish different tree space dimensions for different streets within the DSA. In general, tree spaces on streets south of Massachusetts Avenue are four feet by ten feet, with a minimum depth of 3 feet. Streets north of Massachusetts Avenue are generally required to have a tree space adjacent to the curb that is "four feet (4′) wide and continuous and shall have a minimum depth of three feet (3′)." On Massachusetts Avenue, the tree space "shall be six feet (6′) wide and continuous." 24 D.C.M.R. § 1106.8(a)–(c). The regulations also require that drainage be provided from beneath the tree space "[w]here an enclosed tree space is required due to the below grade restrictions." 24 D.C.M.R. § 1106.8(h).

The size and placement limits on beautification areas within public tree spaces probably preclude the use of land-intensive LID practices in those areas. Conventional grassy swales, for example, would not fit within the Title 24 "beautification areas" or the Downtown Streetscape Area's tree spaces. Nevertheless, the specifications appear to provide latitude for the voluntary use of at least some LID practices in public tree spaces; and the Code language does not prevent applicants from voluntarily submitting Public Space plans that include other landscaping elements. Revisions to these sections of the D.C. Public Space Code could improve urban tree habitat, while expanding opportunities for voluntary LID. The regulations, for example, could be

altered to increase the maximum size of tree space "beautification areas." In addition, tree space dimensions within the DSA and throughout the District could be enlarged.

3. Sidewalks

- **Do municipal regulations require a minimum sidewalk width in the District?**
- **Are sidewalks always required on both sides of residential streets?**
- **Do sidewalks have to be sloped so they drain to the street?**
- **Are pervious surfaces prohibited?**
- **Can runoff be stored under sidewalks?**

Our review of the District of Columbia's Code and Municipal Regulations did not reveal comprehensive sidewalk design or construction requirements outside the Downtown Streetscape Area. According to District Division of Transportation staff, there is no regulation governing sidewalk placement, dimensions, and materials throughout the District of Columbia. Instead, these matters are typically addressed in the designs developed for specific street and road construction projects.

Although the District Division of Transportation appears to have considerable discretion to incorporate LID into sidewalk design, D.C. codes restrict the use of porous pavers in some parts of the City. In the Anacostia, Capitol Hill, Georgetown, LeDroit Park, and Logan Circle historic districts, the pavement material for new sidewalk installations and substantial repairs on streets zoned R or SP shall be brick and sand. 24 D.C.M.R. §§ 1200.1, 1200.3. For streets in those historic areas zoned for commercial purposes, the pavement material shall be brick on concrete. 24 D.C.M.R. § 1200.4.

According to District Division of Transportation staff and the *Downtown Streetscape Regulations*, pressed concrete or brick pavers placed on a sand-cement bed of Portland Cement Concrete Base are required within the DSA. 24 D.C.M.R. § 1105; *Downtown Streetscape Regulations*, Exhibit B, "Specifications for Pressed Concrete Block Paving on PCC Base."

These Title 24 requirements currently prohibit the use of porous pavers in significant parts of the District of Columbia. Although NRDC is not recommending specific changes to these provisions at this time, it encourages the District to consider allowing pervious sidewalk pavements and below-sidewalk storage solutions that satisfy the aesthetic requirements of the DSA and historic districts, as well as providing the durability needed for urban pedestrian volumes.

4. Parking

- **Does the District require standard parking spaces to be larger than 9 x 18 feet?**
- **Are parking lots prohibited from having a percentage of smaller dimension spaces for compact cars?**
- **Is the use of pervious materials for parking areas prohibited?**

► Is there a prohibition on green space/landscaping in parking lots or limits on landscaping that would preclude the use of LID techniques?
► Are there requirements to direct runoff to the street or existing drainage infrastructure?
► Are there restrictions limiting the use of shared parking arrangements in the District?

a) Accessory Parking Spaces

The minimum size of standard off-street accessory parking spaces in the District of Columbia is 9 feet in width and 19 feet in length, exclusive of access drives, aisles, ramps, columns, office or work areas. 11 D.C.M.R. § 2115.1. This requirement is slightly larger than the minimum recommended by the LID checklist. The following proposed language would decrease the existing minimum parking space size:

> *Except as otherwise provided in this section, a required automobile parking space shall be a minimum of nine feet (9 ft.) in width and* <u>*eighteen*</u> ~~*nineteen*~~ *feet (*<u>*18*</u> ~~*19*~~ *ft.) in length, exclusive of access drives, aisles, ramps, columns, office or work areas and shall be striped according to the requirements of §2117.*~~*2*~~<u>*3*</u>*. Parking shall also be in compliance with the requirements of the District of Columbia Architectural Barriers Act of 1980 (D.C. Law 3-76, effective July 1, 1980).*

The District of Columbia Zoning ordinance allows accessory parking areas or accessory garages containing 25 or more required spaces to designate up to 40% of the parking spaces for compact cars. 11 D.C.M.R. § 2115.2. Such spaces "shall be a minimum of eight feet (8 ft.) in width and sixteen feet (16 ft.) in length." 11 D.C.M.R. § 2115.3.

The D.C. zoning ordinance also requires a minimum of 285 square feet of parking lot area for each required parking space. 11 D.C.M.R. § 2115.10. Although the LID checklist that NRDC used in its review of the D.C. development codes did not include any standards for parking lot geometry and total parking lot area, it may be appropriate to develop such standards for LID-friendly parking lots to be applied in the future.

If more than ten accessory open parking spaces are provided on a lot, landscaping is required:

> *Landscaping with trees and shrubs shall be provided for all open parking spaces provided on a lot where there are more than ten (10) open parking spaces provided collectively as accessory to any building or structure. The landscaping shall cover a minimum of five percent (5%) of the total area devoted to parking, including aisles and driveways. The landscaping shall be maintained in a healthy growing condition.*

11 D.C.M.R. § 2117.11. However, as discussed above, the District of Columbia Zoning Ordinance appears to preclude the use of porous pavement for accessory parking spaces:

> *All open parking spaces, including access aisles, driveways, and ramp areas shall be paved and maintained with bituminous, concrete or brick materials, or a combination of these materials or other materials approved by the District of Columbia Department of Public Works as structurally equivalent or better, which form an all-weather impervious surface, and which is at least four inches (4 in.) in thickness.*

11 D.C.M.R. § 2117.10. The changes to 11 D.C.M.R. § 2117.10 proposed above to allow the use of porous pavement for driveways, would also allow the use of porous pavement for accessory parking spaces. As discussed above, if this change is adopted, the District of Columbia Department of Health will also need to develop guidelines to ensure that porous pavement is not used in areas where chemical, oil, or gasoline spills may occur.

b) Parking Lots

According to the DCRA Building and Land Administration zoning staff, the accessory parking space requirements of Chapter 21 of the D.C. Municipal Regulations also apply to parking spaces in Parking Lots not accessory to any other use. Parking Lots are also governed by landscaping and paving regulations similar to those applicable to accessory parking spaces. 11 D.C.M.R. §§ 2303.1(f), 2303.2(b) (landscaping); 11 D.C.M.R. § 2303.1(a) (paving). The changes to 11 D.C.M.R. § 2303.1(a) proposed above to allow the use of porous pavement for driveways, would also allow the use of porous pavement for parking spaces in Parking Lots. As discussed above, additional provisions or regulation may be needed to ensure that porous pavement is not used in areas where chemical, oil, or gasoline spills may occur.

c) Runoff from Accessory Parking Spaces, Parking Lots, and Structured Parking

See I.B.1, Disconnection of Impervious Surfaces/Areas, above.

d) Parking Spaces Shared by Time of Day

The District of Columbia zoning ordinance allows required parking spaces for certain uses to be shared by time of day within the Uptown Arts-Mixed Use (Arts) Overlay District. 11 D.C.M.R. § 1901.5. NRDC is not recommending specific language at this time to allow time-of-day sharing of parking outside the Arts Overlay District. However, it encourages the District of Columbia to consider expanding this practice to other parts of the city where it may be appropriate.

5. Rights-of-Way

> **► Are LID practices, including natural landscape surfaces, restricted in public transportation right-of-ways (ROWs)?**
> **► Are landowners and developers restricted from using ROWs to implement and maintain LID-type storm water management?**

See I.C.2, Tree/Vegetation Planter Boxes, above, regarding the use of public parking, tree spaces, and beautification areas.

II. PUBLIC HEALTH AND SAFETY

A. Source Water Protection and Other Groundwater Issues

► Are there source water protection requirements that limit the use of infiltration practice in certain areas of the District?
► Are there other groundwater recharge areas that require special protection?
► Are there groundwater protection requirements that limit the use of infiltration practices in certain areas of the District?

Groundwater and source water protection requirements may preclude the use of LID techniques in some circumstances. For example, as noted above in Section I.B.2.c., the use of pervious pavement may be inappropriate where there is a risk of chemical, oil, or gasoline spills. Limits on the use of infiltration practices may also be needed if site soils are contaminated, or if groundwater is close to the surface. A review of the environmental laws governing groundwater and source water protection is beyond the scope of this project. NRDC, however, encourages the District to evaluate the extent to which such regulations are overly restrictive, prohibiting the use of LID infiltration techniques in areas where it is not necessary to do so.

B. Standing Water

► Do any codes or regulations prohibit intentional ponding of storm water on yards and landscaped areas?

Particular ponding designs could create a common law nuisance or health nuisance (22 D.C.M.R. § 100 *et seq.*). No specific time or depth limits for ponding of water, however, are identified in the District of Columbia Code or Municipal Regulations.

It should be possible to design LID systems that do not raise nuisance, mosquito control, or other public health concerns. In general, on-site storm water should not be highly contaminated with waste or pollutants; and if LID is properly designed, ponding of storm water should be relatively brief.

C. Open Drainage

► Do any building, development, or public health and safety codes or regulations prohibit or otherwise limit the use of open drainage channels, swales, ditches, or other conveyances for storm water?

The District of Columbia Municipal Regulations provide that any development constructed in D.C. "shall establish measures for the management of storm water runoff"; and "open vegetated swales and natural depressions" are expressly identified as ways to satisfy this requirement. 21 D.C.M.R. § 530.1.

D. Noxious Weeds and Weed Control; Pest Control

► Are there weed control regulations that limit or impede the use of vegetated channels, bioretention areas, swales, tree planter boxes or other LID practices that incorporate vegetation on public property and ROWs?
► Are there weed control regulations that limit or impede the use of LID practices on private property?
► Are there pest control regulations that limit or impede the use of vegetated channels, bioretention areas, tree planter boxes or other LID practices that incorporate vegetation or standing water on public or private property?

As discussed above, the District of Columbia Public Space regulations require that the planting material used to beautify a tree space "shall have a shallow root system and shall not be allowed to grow to a height in excess of eighteen inches (18 inches)." 24 D.C.M.R. § 109.11. In addition, D.C. Code § 8-2103.5, Rodent harborage prohibited, provides that "It shall be unlawful for any person to cause or permit the accumulation of debris on public or private property or cause or permit weeds or grass to grow to a height of 8 inches or more on private property which they own"; and D.C. Code § 8-301 provides that[t]

> *[i]t shall be the duty of the owner, occupant, or agent in charge of any land in the City of Washington, or in the more densely populated suburbs of said City, to remove from such land any weeds thereon of 4 or more inches in height within 7 days (Sundays and legal holidays excepted) after notice from the Department of Human Services so to do . . .*

Strict interpretation of these regulations could preclude the use of certain LID practices, such as "no mow zones," "forest buffers," "butterfly gardens," or "wildflower meadow areas." In situations where the use of "uncultivated" or wild vegetation in excess of four inches in height is an appropriate or desirable storm water management practice, education efforts and a statement of official policy may be required to clarify that such vegetation will be allowed as part of an LID feature where appropriate and when not posing a public health hazard or nuisance.

[t] Neither Chapter 3 (Weeds and Plant Diseases) nor Chapter 21 (Rodent Control) of Title 8 includes a definition of "weed." For the purposes of Title 8, Chapter 4 (Pesticide Operations), however, "The term 'weed' means any plant which grows where it is not wanted." D.C. Code § 8-401(ii). In addition, the District of Columbia Municipal Regulations governing Solid Waste Control define "weeds" as "uncultivated or wild vegetation that is greater than four inches (4 in.) in height." 21 D.C.M.R. 799 (Definitions).