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Year 4 Massachusetts Small Municipal Separate Storm System Permit – Regulatory Review

Nitsch Engineering

Submitted to the Town of Oxford
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Nitsch #14845

Year 4 Massachusetts Small Municipal Separate Storm System Permit – Regulatory Review

For the Town of Oxford

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1 Regulatory Review

Consistent with the 2016 Small Municipal Separate Storm Sewer System (MS4) Permit sections 2.3.6B and 2.3.6C, Nitsch Engineering reviewed the Town of Oxford regulations associated with the impervious cover and low impact development (LID) techniques. This exercise assessed current street design and parking lot guidelines and other local requirements that affect the creation of impervious cover. It also assessed existing local regulations to determine the feasibility of making LID techniques allowable when appropriate site conditions exist. These techniques can include green roofs, green infrastructure and infiltration practices, and water harvesting devices such as rain barrels.

1.1 Methodology

Nitsch Engineering reviewed all current Oxford regulations and identified language, rules, and bylaws that were associated with key words such as green, stormwater, pavement, LID etc. The list of municipal documents that were reviewed are listed below:

- General Bylaws
- Zoning Bylaws
- Subdivision Rules and Regulations
- Stormwater Management and Land Disturbance Regulations
- Housing Opportunity Overlay Zone Design Guidelines Handbook

In addition to identifying areas of the regulations that were associated with this type of review through keywords, specific sections were also targeted. For example, Chapter XI – Motor Vehicle Access, Parking and Loading in the zoning bylaws was analyzed for the assessment of street design and parking lot guidelines. Once the key sections in each document were identified, further assessment of the regulations was guided by the Pioneer Valley Planning Commission (PVPC) Street Design Checklist. This Checklist was approved by MassDEP for the purpose of assisting in the completion of the requirements for sections 2.3.6.b and 2.3.6.c in the MS4 Permit. The Checklist provides a framework for the municipal regulations and asks guiding questions about the rules and regulations to identify specific language that might invoke recommended changes.

Nitsch Engineering and the Town of Oxford met on May 25th, 2022, to review the Town's on-going efforts to update their current regulations to be more encompassing of stormwater and green infrastructure. After this meeting, Nitsch was able to prioritize certain Checklist items that aligned with the Town's current efforts to update their Subdivision Rules and Regulations and goals for future updates. These items were identified in the Checklist requiring further review by the Town to provide feedback on the feasibility of implementing these changes. After the feedback was received, Nitsch Engineering provided recommendations for regulatory updates including an approximate timeline (refer to the Checklist in Appendix A).

1.2 Overview of Assessment of Street Design and Parking Lot Guidelines and Feasibility of Allowing LID

The Town's current motor vehicle access, parking, and loading guidelines found in chapter XI of the Zoning Bylaws are dated as early as 1991 with a recent addition of an on-street parking off-set dated in 2021. The design regulations found in section IV D. of the Subdivision Rules and Regulations were last updated in 2015. Both sets of regulations have standards outlined for street design and parking lots with minimal consideration for LID techniques and impervious cover regarding stormwater. However, their newly adopted 2021 Stormwater Management and Land Disturbance Regulations focus specifically on stormwater mitigation through requiring and encouraging the use of LID techniques through permits and administrative approvals for projects disturbing more than an acre of land.

1.3 Recommendations

Nitsch Engineering recommends that the Town update the Zoning Bylaws and Subdivision Rules and Regulations with measures to reduce impervious cover creation in the street design and parking lot guidelines and create direct references to the Stormwater Management and Land Disturbance Regulations. The Town is currently working on updating their Subdivision Rules and Regulations, which provides them with an opportunity to incorporate the recommendations in the near-term, with updates of the Zoning Bylaw thereafter. For the Subdivision Rules and Regulations, since the Town is currently working on updating them, the timeline imposed was within the next year. Other timelines were within the next 2-5 years before the 2016 MS4 permit cycle ends.

In addition to the recommendations indicated on the Checklist (Appendix A), Nitsch Engineering has compiled additional pavement reduction strategies for consideration by the Town:

- Provide figures and cross sections of design elements and LID options, so that the public, contractors, and engineers have a better understanding of what the Town expects. It is also a chance to provide the public with some education on what the different LID options may look like.
- Projects exempt from Land Disturbance Permits include redevelopment of roadways including widening roads less than a single lane, adding shoulders, correcting substandard intersections, improving existing drainage systems, and repaving projects. Redeveloping roadways provides an opportunity to improve a huge impervious surface area. The Town should require LPDs in redevelopments of roads and parking lots.
- The Town should consider reducing the thresholds for the Administrative Land Disturbance Approval, which is currently required of projects disturbing between 10,000 square feet and one acre of land.
    - The Town of Auburn's Minor Permit Threshold is between 1,000 - 2,999 sf of new impervious area where their Major Permit threshold is greater than 2,999 sf of new impervious area.
    - The Town of Wayland's Minor Permit Threshold is between 500 - 2,500 sf of new impervious area where their Major Permit threshold is greater than 2,500 sf of new impervious area.
- Consider requiring pervious pavement for less trafficked areas including alleys, sidewalks, and driveways.

    - Devens, MA requires pervious pavement for alleys, and cul de sacs shall contain a pervious center. They also require that for neighborhood roads, pervious pavement and landscaping shall be the primary means of infiltrating stormwater runoff generated by the neighborhood. See Devens' Street and Road Design Standards link in Appendix B.
    - See also the sustainablecitycode website linked in Appendix B for more rules and regulation examples on how to better embrace LID and reduce runoff.
- Consider changing the following language "All access driveways and off-street parking and loading areas shall be paved with asphalt, concrete or other similar hard surface material with all parking spaces designated with a four (4) inch white or yellow stripe painted the entire length of each space" to allow for permeable pavement.
- Create a setback specific to the side of the home that services the driveway and reduces minimum set back requirements. Also require that the driveway be designed and oriented as to create the most direct path from the home to the road without winding to reduce the impervious surface when feasible.

Appendix A –

Pioneer Valley Planning Commission Street Design Checklist

INTRODUCTION

STREET DESIGN AND PARKING LOT GUIDELINES AND INFRASTRUCTURE

ASSESSMENT OF FEASIBILITY OF ALLOWING GREEN

NPDES MS4 Community: Oxford

Pioneer Valley Planning Commission, February 2022

Introduction

The United States Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) General Permit for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts (MS4) (with modifications effective on January 6, 2021) requires the development of two local assessments within four (4) years of the effective date of the permit as follows:

2016 Massachusetts Small MS4 General Permit, Section 2.3.6.b: Assessment of Street Design and Parking Lot Guidelines

Within four (4) years of the effective date of this permit, the permittee shall develop a report assessing current street design and parking lot guidelines and other local requirements that affect the creation of impervious cover. This assessment shall be used to provide information to allow the permittee to determine if changes to design standards for streets and parking lots can be made to support low impact design options. If the assessment indicates that changes can be made, the assessment shall include recommendations and proposed schedules to incorporate policies and standards into relevant documents and procedures to minimize impervious cover attributable to parking areas and street designs. The permittee shall implement all recommendations, in accordance with the schedules, contained in the assessment. The local planning board and local transportation board should be involved in this assessment. This assessment shall be part of the SWMP. The permittee shall report in each annual report on the status of this assessment including any planned or completed changes to local regulations and guidelines.

2016 Massachusetts Small MS4 General Permit, Section 2.3.6.c: Assessment of Feasibility of Allowing Green Infrastructure

Within four (4) years from the effective date of the permit, the permittee shall develop a report assessing existing local regulations to determine the feasibility of making, at a minimum, the following practices allowable when appropriate site conditions exist: i. Green roofs; ii. Infiltration practices such as rain gardens, curb extensions, planter gardens, porous and pervious pavements, and other designs to manage stormwater using landscaping and structured or augmented soils; and iii. Water harvesting devices such as rain barrels and cisterns, and the use of stormwater for non-potable uses. The assessment should indicate if the practices are allowed in the MS4 jurisdiction and under what circumstances are they allowed. If the practices are not allowed, the permittee shall determine what hinders the use of these practices, what changes in local regulations may be made to make them allowable, and provide a schedule for implementation of recommendations. The permittee shall implement all recommendations, in accordance with the schedules, contained in the assessment. The permittee shall report in each annual report on its findings and progress towards making the practices allowable.

Compliance Recommendation: Pre-Application Meeting with Developers

Requiring project applicants to participate in a pre-application meeting with local officials can be one of the most important and cost-effective strategies to limiting impervious cover and ensuring best stormwater management approaches. For this pre-application meeting, an applicant can be asked to take some first steps in thinking about the site through a Low Impact Development lens that involves analysis of site resources, soils, and a sketch plan informed by those considerations. (See link below to PVPC checklist for developer use in preparing for this meeting). The pre-application meeting then enables a preliminary conversation about the site, stormwater management and erosion control considerations, and concept plan prior to investing in extensive professional design efforts. This pre-application meeting can be included as part of stormwater management permitting and site plan review in zoning if there are smaller projects (under 1 acre) that a municipality wishes to include.

https://thinkblueconnecticutriver.org/wp-content/uploads/2020/12/10.-LID-Checklist-for-Preapplication-Meeting-PVPC-Model.docx

Benefits of Impervious Cover Reduction and Use of Green Infrastructure

While the MS4 permit requirements are aimed at water quality improvements, impervious cover and encouraging green infrastructure stormwater management can also reduce localized flooding, improve groundwater recharge, enhance neighborhood aesthetics, and reduce summer heat. Please refer to the resources provided below for additional information.

A Word About Stormwater Management in Drinking Water Supply Protection Areas

For drinking water supply protection areas--particularly recharge areas for public water supplies, but also where there is reliance on private wells for supply--it is important to carefully consider the impervious surfaces from which stormwater flows will be managed. For example, flows from non-metal rooftops could be managed to infiltrate directly into soils. The likelihood of contamination in such flows is typically low and thus the likelihood of eventual harm to groundwater sources for drinking is also low. A parking or loading area, however, is very different. In such circumstances, best practice would be to ensure that the perimeter area is curbed so that flows go through a pretreatment device prior to infiltration. The pretreatment facility should also include an emergency shutoff valve that can be activated in case of a spill to keep contaminated flows contained within the parking area and from reaching the infiltration facility. Note that the current 2008 MassDEP Stormwater Handbook does not allow for the location of any stormwater bmps in Zone 1 areas, unless necessary to manage stormwater from essential drinking water facilities.

How to Use This Checklist

This checklist can be used as a method of documenting review of existing local code for requirements that affect the creation of impervious cover and feasibility of allowing green infrastructure and it contains some notes and recommendations for potential policy and language changes. This checklist could also serve as the submission to EPA once code review assessment has been completed with additions in the column headings, "changes recommended" and "proposed schedule to incorporate changes." Best practice for review of code and potential revisions occurs through conversations with relevant boards and departments, such as the Planning Board, Public Works, Conservation Commission, Board of Health, and Fire Department.

Relevant Local Documents / Code to Review

Assuming that local stormwater bylaw/ordinance and regulations have been updated to comply with new pre and post construction MS4 permit standards, including promoting a Low Impact Development approach and advancing green infrastructure stormwater management, other key places within municipal code for review are as follows:		
Subdivision Rules & Regulations	Wetland Protection Bylaws / Rules & Regulations	Local Building Codes
Zoning Bylaws	Board of Health Bylaws / Rules & Regulations	Local Plumbing Codes
General Bylaws		

Citations / Resources

Author	Title	Web Link
American Planning Association - Massachusetts Chapter and Homebuilders Association of Massachusetts	Sustainable Neighborhood Road Design: A Guidebook for Massachusetts Cities and Towns	https://www.apa-ma.org/wp-content/uploads/2018/12/NRB_Guidebook_2011.pdf
Casey Trees and Davey Tree Expert Co.	National Tree Benefit Calculator	http://www.treebenefits.com/calculator/
Center for Watershed Protection	The Code & Ordinance Work sheet: A Tool for Evaluating the Development Rules in Your Community	https://owl.cwp.org/mdocs-posts/better-site-design-code-and-ordinance-cow-worksheet-2017-update/
Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs	Smart Growth / Smart Energy Toolkit: Smart Parking Model Bylaw	https://www.mass.gov/files/documents/2017/11/03/Smart%20Parking.pdf
Massachusetts Association of Conservation Commissions	MACC Wetlands Buffer Zone Guide Book	https://www.readingma.gov/conservation-division/files/macc-wetlands-buffer-zone-guidebook
Metropolitan Area Planning Council	Massachusetts Low Impact Development Toolkit: Low Impact Development - Do Your Local Codes Allow It? A Checklist for Regulatory Review	https://www.mapc.org/resource-library/do-your-local-codes-allow-lid/
Metropolitan Area Planning Council	Low Impact Development Toolkit	https://www.mapc.org/resource-library/low-impact-development-toolkit/
Metropolitan Area Planning Council	Once is Not Enough: Guide to Water Reuse in Massachusetts	http://www.mapc.org/wp-content/uploads/2017/11/3-1-Once-is-Not-Enough-Guide-to-Water-Reuse-10-05.pdf
Minnesota Pollution Control Agency	Overview for Stormwater and Rainwater Harvest and Use/Reuse	https://stormwater.pca.state.mn.us/index.php/Overview_for_stormwater_and_rainwater_harvest_and_use/reuse
Pioneer Valley Planning Commission	Low Impact Development Checklist	https://thinkblueconnecticutriver.org/wp-content/uploads/2020/12/10.-LID-Checklist-for-Preapplication-Meeting-PVPC-Model.docx
Pioneer Valley Planning Commission	Green Infrastructure Fact Sheets	http://www.pvpc.org/content/green-infrastructure-toolkit
Pioneer Valley Planning Commission	Pioneer Valley Sustainability Toolkit	http://www.pvpc.org/plans/pioneer-valley-sustainability-toolkit
U.S. Environmental Protection Agency	Water Quality Scorecard: Incorporating Green Infrastructure Practices at the Municipal, Neighborhood, and Site Scales	https://www.epa.gov/sites/default/files/2014-04/documents/water-quality-scorecard.pdf
U.S. Environmental Protection Agency	Assessing Street and Parking Design Standards to Reduce Excess Impervious Cover in New Hampshire and Massachusetts	https://www3.epa.gov/region1/npdes/stormwater/assets/pdfs/ImperviousAssessment.pdf
U.S. Environmental Protection Agency	General Permits for Stormwater Discharges from Small Municipal Separate Storm Sewer Systems in Massachusetts Authorization to Discharge under the National Polluntant Discharge Elimination System (with modifications effective January 6, 2021)	https://www3.epa.gov/region1/npdes/stormwater/ma/2016fpd/final-2016-ma-sms4-gp-mod.pdf

U.S. Environmental Protection Agency	Overcoming Barriers to Green Infrastructure	https://www.epa.gov/green-infrastructure/overcoming-barriers-green-infrastructure
U.S. Environmental Protection Agency	Incorporating Low Impact Development into Municipal Stormwater Programs	https://www3.epa.gov/region1/npdes/stormwater/assets/pdfs/IncorporatingLID.pdf
U.S. Environmental Protection Agency	Encouraging Low Impact Development: Incentives Can Encourage Adoption of LID Practices in Your Community	https://www.epa.gov/sites/default/files/2015-09/documents/bbfs7encouraging.pdf
U.S. Environmental Protection Agency	Soak Up the Rain Outreach Tools	https://www.epa.gov/soakuptherain/soak-rain-outreach-tools
U.S. Forest Service	The Sustainable Urban Forest Guide: A Step-by-Step Approach	https://urbanforestrysouth.org/resources/library/ttresources/the-sustainable-urban-forest-guide-a-step-by-step-approach/at_download/file

Acronyms/Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
ADT	Average Daily Trips
BMP	Best Management Practice
EPA	Environmental Protection Agency
LID	Low Impact Development
LUHPPL	Land Uses with Higher Potential Pollutant Loading
MS4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
ROW	Right of Way

NPDES MS4 Community: Oxford

Within Subdivision Regulations, standards for the following are critical for consideration: right of ways; utilities; roadway widths and lengths; cul-de-sacs; curbs; sidewalks; and bus waiting areas.

Street Standards in Subdivision Regulations

Right of Ways

Y/N	Checklist Item	Location in code and any standards	Example Language/*Notes (shown in italics)*	Prioritized for Oxford	Town Comments	Change(s) recommended	Proposed schedule to incorporate changes
N	Is the minimum right of way width less than 45 feet for a residential street? (For 500 ADT, between 33 and 36 feet?)	Subdivision Rules and Regs D. Design Standards (4) provides for 50-60 ft minimum right of ways.	*See table from Sustainable Neighborhood Road Design Guidebook for MA provided in this workbook at Tab 5 - Reference Tables and Figures.* *Good design has not so much to do with the width of the right of way itself, but considerations of context and what makes for efficient and effective use of the right of way. What makes sense for the elements of a right of way on a busy suburban road will likely not make sense for a low volume rural road.*	Y	The Town will review DOTs roadway classifications and consider a potential rural local road and rural local low volume.	Update regulations to align with the Sustainable Neighborhood Road Design Guidebook for MA.	Within the next year during the current rewrite.
N	Are street cross sections provided to show how elements of a right of way might vary given different contexts?		*Such drawings can provide a clear understanding about objectives and efficient and effective use of the right of way area in different contexts, bringing together "complete streets" considerations of accommodating different modes of transportation with "green streets" objectives of reducing impervious surface and improving stormwater management.*	Y	The Town requested that Nitsch provide samples from other communities so that they can consider it in the future.	See Appendix B	Within the next year during the current rewrite.
Y	Do the regulations limit clearing and grubbing within the right-of-way to the minimum necessary?	Subdivision Rules and Regs D. Design Standards (18)	Developers are encouraged to limit clearing within the right-of-way to the minimum necessary to construct the roadway, drainage, sidewalk, and utilities, and to maintain site lines. Under this approach, it is not required to clear and grub the entire right-of-way.	N			
Y	Are street trees required for new streets?	Subdivision Rules and Regs D. Design Standards (17)	*In addition to requiring the planting of street trees, it is a good idea to specify that the tree belt can be designed for stormwater management. Tree belts may include bioretention areas or other vegetated stormwater systems. Bioretention areas should utilize noninvasive species (not on any Massachusetts invasive plant list) that can tolerate cycles of drought and inundation.*	N			

Utilities

Y/N	Checklist Item	Location in code and any standards	Example Language/*Notes (shown in italics)*	Prioritized for Oxford	Town Comments	Change(s) recommended	Proposed schedule to incorporate changes
Y	Does the code allow utilities to be placed under the paved section of the ROW?	Subdivision Rules and Regs E. Construction Requirements (3)	Utilities (electric, telephone, cable TV, fiber optic, and all other conduits) may be located under the roadway or immediately adjacent to the roadway so as to optimize use of the right of way area for swales and other stormwater management facilities, sidewalks, and street trees.	N			
N	Does the code allow utilities to be placed immediately adjacent to the paved section of the ROW?			N			
N			*Often there is concern that such placement of utilities under the road will result in traffic delays and additional costs to utility companies. In the Rhode Island LID Site Planning and Design Guidance for Communities, however, authors from the Horsley Witten Group note that the reality is, "The amount of pavement needed to be removed during such operations can be decreased through better diagnostic tests and trenchless technologies for utility construction and repair." If the idea of putting utilities under the road edge is too great a concern for Departments of Public Works, then the next best strategy is to place utilities directly abutting roadway pavement, within 1 to 2 feet.*	N			

Roadway Widths and Lengths

Y/N	Checklist Item	Location in code and any standards	Example Language/*Notes (shown in italics)*	Prioritized for Oxford	Town Comments	Change(s) recommended	Proposed schedule to incorporate changes
Y	Is paved roadway <u>width</u> between 18 and 22 feet in low density residential developments with no bicycle lanes present? Low density residential neighborhoods are those with less than 400 average daily trips according to AASHTO, 2001.	Subdivision Rules and Regs D. Design Standards (4)	*Refer to table from Sustainable Neighborhood Road Design Guidebook for MA provided in this workbook at Tab 5 - Reference Tables and Figures.*	N			
			Many existing standards are based on universal application of guidelines for highways or very large-scale subdivisions planned more than 50 years ago. Revised standards should involve the minimum required pavement width and derive from careful considerations with public works and emergency response officials of traffic volume, on-street parking (where required), and passage of emergency vehicles and school buses.	N			
N	At higher densities, are parking lanes allowed to also serve as traffic lanes (i.e., queuing streets)?			N			
Y	Are narrower pavement <u>widths</u> allowed on road sections were there are no houses, buildings, intersections, or on-street parking spaces?	Subdivision Rules and Regs D. Design Standards (4)	*Revise local street standards to consider design speed, street type, and traffic volume on arterial and residential roads to allow for more compact roadways and intersections.* *If not currently permitted, allow for curb extensions such as pinchpoints, gateways, and chicanes to narrow roadways and utilize street space for pervious pavement or bioretention.*	N			
Y	Are reductions in frontage distances allowable where appropriate (i.e. open space developments, around cul-de-sacs, and along outside sideline of curved streets) to increase number of homes per unit length and to minimize street length?	It requires any two reduced frontage lots to be separated by a normal conforming lot Zoning Bylaws Ch. X (4)	Reduce street length in residential neighborhoods to minimize overall impervious cover creation and land disturbance.	N			
N	Are developers encouraged to explore alternative street layouts to increase the number of homes per unit length and minimize the length of the roadway?		Exploration of alternative street layouts to increase the number of homes per unit length and minimize the length of the roadway is encouraged.	N			

N	Can permeable paving be used for residential roads, shoulders, and parking lanes?	Subdivision Rules and Regs E. Construction Requirements (2)d	Where appropriate, use of permeable paving is allowed for road shoulders/parking lanes in residential neighborhoods and for sidewalks as compatible with Americans with Disabilities Act and Massachusetts Architectural Advisory Board design standards. *This approach could involve combining a traditional asphalt surface for the travel lanes and an adjacent porous surface for the shoulder/parking lanes or bike lane area. Snow and ice management for the roadway must avoid sand so as to avoid clogging of the porous shoulder area.*	Y	The Town expressed concerns on implementing permeable pavement, including the following: 1) Maintenace concerns after the Town accepts the road 2) Constructability concerns 3) High ground water areas They would instead, like to encourage more on driveways as a way to mitigate impervious area.	Update construction requirements in the Subdivision Rules and Regulations to allow for the use of pervious materials such as porous asphalt or concrete and porous pavers where possible considering the expressed concerns of the Town.	Within the next year during the current rewrite.
N	Do alignments specify: Streets ought to be located in order to protect important natural features, avoiding low areas and steep slopes in particular?	Subdivision Rules and Regs D. Design Standards (2)	Streets shall be located and designed to minimize: 1. disturbance of the site's natural features and environmentally sensitive areas, including low areas and steep slopes, native vegetation, and trees with a trunk diameter measured at 4.5' DBH (Diameter at Breast Height), breast height of 8 inches or more; 2. cut and fill, thereby reducing disturbance of native soils; 3. unnecessary contouring of the site to preserve natural topography. *Another possible consideration here (though unrelated to MS4 permit)* : Street lay out along east-west or north-south axes is encouraged. This allows building siting to take advantages of passive solar heat gain and accommodate future solar electric installations on south-facing roofs.	Y	The Town will include in their new subdivision rules and regulations.	Incorporate this language into Subdivision Rules and Regulations.	Within the next year during the current rewrite.

Cul-de-Sacs

Y/N	Checklist Item	Location in code and any standards	Example Language/*Notes (shown in italics)*	Prioritized for Oxford	Town Comments	Change(s) recommended	Proposed schedule to incorporate changes
N	Are dead ends discouraged by the regulations? (e.g. by encouraging or requiring connected streets or one-way loop streets)?	Subdivision Rules and Regs D. Design Standards (6)	A connected road network is of great importance to functioning and efficient road network, reducing response time for public safety officials. Dead-end streets are discouraged. An applicant should make every effort to avoid the creation of dead-end streets and should connect proposed subdivisions to existing dead end streets wherever reasonable and practicable. An applicant may demonstrate that a dead end street is appropriate when they can demonstrate that a future connection to an existing street is not possible or practicable, or when the surrounding property will never need a street connection because of extremely sensitive or permanently protected natural resources.	Y	The Town is open to discouraging dead end streets but connected streets and one way loop streets must be reasonable and practicable.	Implement a regulation that does not allow the use of dead-end streets unless approved by special permit where connected streets and one way loop streets are not reasonable and practicable.	Within the next year during the current rewrite.
N	Are landscaped/bioretention islands allowed in the center of cul-de-sacs?	It does not explicitly say, Subdivision Rules and Regs D. Design Standards (6)	All dead-end streets with turnaround islands may be planted with trees and/or other vegetation or left with natural tree growth in lieu of paving the entire area of the island. The maintenance of the inner circle shall be the responsibility of developers, their successors and assigns, or a homeowners' association.	Y	The Town board has allowed landscaped/bioretention islands in the center of cul-de-sacs in the past. The Town is open to including details in their future rules and regulations.	Incorporate language that requires landscaped/bioretention islands in the center of cul-de-sacs.	Within the next year during the current rewrite.
N	If curbing for cul-de-sacs is required, is it allowed to be perforated or notched to enable the flow of stormwater into the island area?	It does not explicitly say, Subdivision Rules and Regs D. Design Standards (6)	Where soils are conducive to infiltration (Natural Resource Conservation Service hydrologic soils group A or B), the center island may serve as a stormwater bioretention area with notched or perforated curbing to allow for entry of storm flows. Invisible curbing, where granite curbing forms an at-grade edge with the asphalt, may also be permitted in this situation.	Y	The Town will incorporate into the design details of the subdivision rules and regulations.	Incorporate this language into Subdivision Rules and Regulations.	Within the next year during the current rewrite.
N	Is minimum required radius for a cul-de-sac set for LID purposes?	50' outside radius is referenced without any mention of center island.	*Sustainable Neighborhood Road Design recommends 50-foot outside radius with vegetated center island.* *Massachusetts Fire Code 527 CMR requires 20-foot drive lanes and minimum inside turning radius of 25 feet.*	Y	The Town will incorporate into the design details of the subdivision rules and regulations.	Incorporate this language into Subdivision Rules and Regulations.	Within the next year during the current rewrite.
N	Are alternative turnarounds such as hammerhead allowed on short streets in low density residential developments?		*Hammerheads use less pavement overall than cul-de-sacs. Example below is per Sustainable Neighborhood Road Design:* *A hammerhead turnaround having a thirty (30) foot minimum curb radii; forty-five (45) foot minimum center lane radii, a head adequate for three point turn maximum, and a (length to accommodate local firefighting vehicle).*	Y	The Town is open to considering this further.	Explicately **allow** for the use of alternative turnarounds and provide the design example of a Hammerhead in the Subdivision Rules and Regulations. See Sustainable Neighborhood Road Design in Appendix B.	Within the next year during the current rewrite.

Sidewalks

Y/N	Checklist Item	Location in code and any standards	Example Language/*Notes (shown in italics)*	Prioritized for Oxford	Town Comments	Change(s) recommended	Proposed schedule to incorporate changes
N	In lower density residential contexts, are sidewalks allowed on just one side of a street? (As opposed to always required on <u>both</u> sides of residential streets.)	Both Subdivision Rules and Regs D. Design Standards (15)	*For low density neighborhoods, consider allowing sidewalks on just one side of street.* *See table from Sustainable Neighborhood Road Design Guidebook for MA provided in this workbook at Tab 5 - Reference Tables and Figures.*	Y	The Town is open to considering this further.	Alternate pedestrian layouts should be allowed in certain overlay districts or zoning. See Appendix B for design guidence.	Within the next year during the current rewrite.
N	Is permeable paving allowed for sidewalks?	E. Construction Requirements (2)d	If the site permits infiltration, sidewalks may be constructed of permeable paving materials. If using permeable materials, the developer must work in consultation with the Department of Public Works and an engineer with experience in this field, and materials must be evaluated at regular intervals as they age. Pervious asphalt should be based on specifications such as those found in the University of New Hampshire Stormwater Center Design Specifications for Porous Asphalt Pavements and Infiltration Beds. Sidewalks or pedestrian areas may also be constructed to direct stormwater runoff to a swale or other BMP. Permeable pavements provide increased traction when wet because water does not pool, and the need for sal and plowing is reduced during winter due to low/no black ice development. Compared to traditional paving methods, long-term maintenance costs may be lower in cold climates since permeable pavements resist cracking and buckling in freeze-thaw conditions. Nevertheless, permeable paving requires regular maintenance including: annual inspection of paver blocks for deterioration; periodic replacement of void material (gravel, etc.) if part of the facility; and annual industrial vacuuming of pavements to unclog sand and debris that have accumulated on the surface over time.	Y	The Town is open to considering this further.	Update construction requirements in the Subdivision Rules and Regulations to allow for the use of pervious materials such as porous asphalt or concrete, porous pavers, or reinforced grass blocks where possible considering the expressed concerns of the Town.	Within the next year during the current rewrite.
N	Are alternative pedestrian network layouts allowed (rather than placement in ROW)?		For certain developments, it may be more sensible for pedestrian circulation to make use of common areas rather than street right of ways.	Y	The Town is open to considering this further, however they request that it be made site specific.	Alternate pedestrian layouts should be allowed in certain overlay districts or zoning. See Appendix B for design guidence.	Within the next year during the current rewrite.

N	Is sidewalk width standard set for LID purposes?		*LID standard = 4 feet or less*	Y	The Town has rejected this change as the 5' is preferred for accessibility and passing width.	No further action suggested.	
N	Where curb and gutter streets are required for stormwater drainage, are sidewalks allowed to be disconnected from the stormwater drainage system?		Grading of impervious sidewalk surfaces should be done so as to direct stormwater runoff to bioretention areas or other such facilities to eliminate or keep flow out of the municipal storm drain system.	Y	The Town plans to add a detail to include recommending tree lawns (space between sidewalk and curbing).	Incorporate this language into Subdivision Rules and Regulations.	Within the next year during the current rewrite.
Bus waiting areas							
Y/N	**Checklist Item**	**Location in code and any standards**	**Example Language/*Notes (shown in italics)***	**Prioritized for Oxford**	**Town Comments**	**Change(s) recommended**	**Proposed schedule to incorporate changes**
N	Do bus waiting areas require use of permeable paving unless infeasible?		*Permeable paving must be used for bus waiting areas in locations where soils are indicated to be in Natural Resource Conservation Service hydrologic soils group A or B.*	N			
Curbs							
Y/N	**Checklist Item**	**Location in code and any standards**	**Example Language/*Notes (shown in italics)***	**Prioritized for Oxford**	**Town Comments**	**Change(s) recommended**	**Proposed schedule to incorporate changes**
N	Do street standards allow for LID stormwater management approaches (i.e. swales or other such BMPs instead of curb and gutter)? Or are curbs and gutters REQUIRED improvements?	Not in the Subdivision Regulations but yes in the Stormwater Management and Land Disturbance Regs	*In low or medium density developments where topography, soils, and slope permit, allow conveyance and treatment of stormwater runoff in the street right-of-way via vegetated open channels that incorporate runoff reduction practices such as dry swales, bioretention, biofilters, or vegetated swales, rather than requiring the use of curb and gutter stormwater conveyances.*	N			
N	Where curbs are necessary/required, are curb cuts/perforated curbs that allow runoff into swales or other stormwater BMPs allowed?	Not in the Subdivision Regulations but yes in the Stormwater Management and Land Disturbance Regs	*Where curbing is needed, think about specifying granite curbing as a way to help keep roads narrow overall. (With asphalt curbing it is hard to plow to the curb since material can be easily damaged. The tendency is to account for this extra width needed in winter months.* *If pursuing LID design standards, curbs should either be eliminated or, when deemed necessary to protect the roadway edge, they should be interrupted or invisible. Interrupted curbs are curbs with gaps that allow stormwater to move from the street through to a stormwater management facility, such as planters, swales, rain gardens, or tree filter boxes. Invisible curbs are buried along the street edge so as to allow stormwater to flow over into a stormwater management facility. All LID curb options should be implemented in connection with stormwater management facilities. In shared streets, curbs should either be eliminated or be invisible.*	N			
Y	Does the town have criteria for design of roadside swales?	Some, see Stormwater Management and Land Disturbance regulations Section 7 F (13). They reference the Mass. Stormwater Handbook for design standards.	*Refer to the design standards presented in the Massachusetts Stormwater Management Handbook: Volume Two.* *Potential design considerations / limitations:* *- Depending on land use and soil type, each grassed swale can treat a relatively small drainage area of a few acres. Large areas should be divided and treated using multiple swales.* *- Swales are impractical both in areas with steep slopes and with very low slopes.* *- Soil compaction can reduce infiltration capacity.* *- Pre-treatment practices may be required in areas with higher potential pollutant loading.*	Y	Yes	Include some detailed schematics of a few LID measures.	Within the next year during the current rewrite.
N	Where curb and gutter systems are installed, are inlets / drains required to have a notice regarding discharge to receiving waters?		*Could require that developers install standard signage indicating that waters drain to _____ River, etc.*	Y	The Town is considering changing their catch basin grates to include this language.	At the minimum, require that all new inlets/drains include the notice regarding discharge to receiving waters and work on updating existing infrastructure.	Implement requirement within the next year during the current rewrite. Roll out a plan to update existing infrastructure over the next 5 years.
Ensuring Soil Permeability							
Y/N	**Checklist Item**	**Location in code and any standards**	**Example Language/*Notes (shown in italics)***	**Prioritized for Oxford**	**Town Comments**	**Change(s) recommended**	**Proposed schedule to incorporate changes**
			<u>Important note</u> : These suggested standards on ensuring soil permeability might serve better under standards required for a stormwater management permit/and or under the zoning bylaw/ordinance - site plan review for projects that do not trigger stormwater permit requirements. They are included here to underscore the importance of soils in performance of infiltration facilities, but also in ensuring that runoff curve numbers used in calculations remain as accurate as possible post construction.	N			
N	Is it clear that topsoil removal from the site should not diminish the infiltration characteristics of the site?		Applicants must describe how their project will minimize and limit topsoil removal from the site.	Y	The Town is planning to add into their application requirements.	Incorporate this language into Subdivision Rules and Regulations.	Within the next year during the current rewrite.
N	Is it clear that any new soils brought on site should not diminish the infiltration characteristics of the site?		Applicants must describe how they will ensure that any new fill or soils brought to the site will not diminish the infiltration characteristics of the site.	Y	The Town is planning to add into their application requirements.	Incorporate this language into Subdivision Rules and Regulations.	Within the next year during the current rewrite.
N	Is there any mention of avoiding compaction of soils by construction vehicles and restoring permeability of soils for infiltration if compacted?		Ensure that all work is planned and executed so as to avoid compaction of topsoil and subsoils, including such best practices as reducing the number of trips required over area of disturbance, laying down soil protective mats for trafficked areas, and avoiding work after rain or snowmelt that soaks soils. For construction equipment, best practices should include using vehicles with low axle loads, reduced tire pressures, and use of flotation tires, doubles, radial tires, and/or large-diameter tires. For areas where such practices are not possible and soils are to be compacted by heavy equipment, subsurface restoration must occur prior to final landscaping activities .	Y	The Town is open to considering this further.	Incorporate this language into Subdivision Rules and Regulations.	Within the next year during the current rewrite.
Green Infrastructure Feasibility							
Y/N	**Checklist Item**	**Location in code and any standards**	**Example Language/*Notes (shown in italics)***	**Prioritized for Oxford**	**Town Comments**	**Change(s) recommended**	**Proposed schedule to incorporate changes**
	Are the following practices allowable when appropriate site conditions exist:			N			
N	Green roofs	No mention	*Green roofs are particularly appropriate for structures with a wide roof area, and typically are installed on flat or low angle rooftops. Design and maintenance considerations are described in more detail in PVPC's Green Infrastructure Fact Sheet on "Green Roofs." See:*	Y	The Town will add in their permit application as optional; "consideration of LID measures as listed below....".	Include an explicit list of LID options in the Stormwater Management and Land Disturbance Regulations including applicability and zoning allowances.	Within the next 2 years

			http://www.pvpc.org/content/green-infrastructure-individual-fact-sheets	N			
Y	Infiltration practices such as rain gardens, curb extensions, planter gardens, porous and pervious pavements, and other designs to manage stormwater using landscaping and structured or augmented soils	See Stormwater Management and Land Disturbance Regulations.	*Rain gardens, also referred to as bioretention areas, use soil, plants and microbes to treat stormwater before it is infiltrated or discharged, and function effectively on small sites or on large sites divided into multiple small drainages. Common applications include parking lot islands, median strips, and traffic islands. Limitations, design considerations, and maintenance requirements are described in more detail in PVPC's Green Infrastructure Fact Sheets on "Bioretention Areas," Green Streets," and "Tree Box Filters." See:*	N			
			http://www.pvpc.org/content/green-infrastructure-individual-fact-sheets	N			
			Porous/pervious paving is appropriate for pedestrian-only areas and for low- to medium-volume, low-speed areas such as overflow parking areas, residential driveways, alleys, and parking stalls. If the underlying soils have a permeability of less than 0.3" per hour, use of an underdrain will be required. Permeable paving is not ideal for high traffic/high speed areas because it generally has lower load-bearing capacity than conventional pavement. Design and maintenance requirements are described in more detail in PVPC's Green Infrastructure Fact Sheet on "Porous Asphalt." See:	N			
			http://www.pvpc.org/content/green-infrastructure-individual-fact-sheets	N			
			Encourage both preservation of existing stands of trees and mature trees on site as well as plans that incorporate trees into stormwater management practices. This can be done through specific requirements and through a system of credits. Calculating stormwater benefits of certain species based on size can be done through the National Tree Benefit Calculator. See calculator at:	N			
			http://www.treebenefits.com/calculator/	N			
			Allow for bioretention areas or other vegetated stormwater facilities within treebelt areas and to count toward other required landscaping features, including site, parking or perimeter screening. This creates areas that function on several levels, including aesthetics and stormwater management.	N			
Y	Water harvesting devices such as rain barrels and cisterns, and the use of stormwater for non-potable uses	See Stormwater Management and Land Disturbance Regulations.	*Cisterns and rain barrels are used to store rooftop runoff for later use for landscaping and other non-potable uses such as car washing. Water stored in cisterns is even used in some cases for toilet flushing and/or irrigation of planters within buildings. Cisterns and rain barrels can be used in most commercial and residential properties where rooftop runoff is directed to a gutter and downspout. Design and maintenance requirements are described in more detail in PVPC's Green Infrastructure Fact Sheet on "Rain Water Harvesting." See:*	N			
			http://www.pvpc.org/content/green-infrastructure-individual-fact-sheets	N			
	If no, please describe impediments: _____			N			
N	If yes, are there developer incentives for utilizing green infrastructure practices?	There are requirements in the Stormwater Management and Land Disturbance Regulations, but no incentives.	*The use of green infrastructure practices can be encouraged by offering incentives such as stormwater utility fee discounts or credits, waived or reduced permit fees, recognition programs for successful green infrastructure sites, and/or exemptions from portions of the local stormwater permitting requirements. For additional ideas on types of incentives and implementation, please refer to the EPA's Encouraging Low Impact Development Fact Sheet:*	Y	The Town would be interested in reviewing possible exemptions of stormwater permitting requirements but are concerned about the extent at they can relax the permit. They currently provide a mechanism where any project or land disturbance is under one acre, it is exempt from a Land Disturbance Permit and their Administrative Land Disturbance Approval.	Since green infrastructure is required of projects that invoke either an Administrative Land Disturbance Approval or a Land Disturbance Permit, developer incentives could be implemented to encourage those projects who are not required to implement green infrastructure. This could include a stormwater fee or discount credit, rebates and installation financing, development incentives, or an awards and recognition program. This change should occur in the Stormwater Management and Land Disturbance Regulations.	Within the next 2 years
			https://www.epa.gov/sites/default/files/2015-09/documents/bbfs7encouraging.pdf	N			

Development Policies in Subdivision Regulations

Y/N	Checklist Item	Location in code and any standards	Example Language/*Notes (shown in italics)*	Prioritized for Oxford	Town Comments	Change(s) recommended	Proposed schedule to incorporate changes
Y	Does the preliminary plan processes promote an LID approach?	See Stormwater Management and Land Disturbance Regulations.	*At the outset, encourage developers to undertake a Low Impact Development (LID) approach in their projects by requiring an LID plan for preliminary subdivision applications. The City/Town could help by providing a developer with a standard site analysis checklist that will help during the early stages of the project to maximize design and functionality of LID strategies and stormwater management practices. As part of this analysis and reporting, the applicant could identify proposed LID strategies and stormwater BMPs. Use of PVPC checklist could be part of this early review. See:*	N			
			https://thinkblueconnecticutriver.org/wp-content/uploads/2020/12/10.-LID-Checklist-for-Preapplication-Meeting-PVPC-Model.docx	N			

			<u>Important note</u> : It is best to include this early review element as part of stormwater management permit requirements for larger projects and site plan review requirements for smaller projects, but good to reinforce that process in Subdivision Regulations.	N			
			Under Preliminary Plan/General: To the fullest extent reasonable and practicable, all subdivisions shall be designed and constructed to incorporate the most recent LID and stormwater management design standards, best practices, policies and design elements. *To include in Preliminary Plan Contents (some of these elements go beyond the PVPC LID checklist, but are worthwhile considerations for this stage of subdivision review):* *Location and limits of soil types consistent with the soils classification maps prepared by the Natural Resources Conservation Service.* *Areas where the depth of natural soil to bedrock is four (4) feet or less.* *The extent of any Interim Wellhead Protection Areas and Recharge Areas.* *Delineation of slopes of twenty-five percent (25%) or greater.* *Areas delineated as "BioMap Core Habitat" or "Supporting Natural Landscape" on the Massachusetts BioMap Project developed by the Massachusetts Natural Heritage & Endangered Species Program.*	N			
Y	Is the definitive plan process coordinated with the stormwater management and erosion and sediment control permit process requirements?	See Stormwater Management and Land Disturbance Regulations.	*Define a process that combines submissions for stormwater management permits with Definitive Plans to avoid duplication.* *Possibly state:* An Application for a Stormwater Management and Erosion and Sediment Control Permit, in accordance with Section ___ of the _____ , along with all required plans and supporting information and documentation, must be included as part of the submission for a Definitive Subdivision Plan. No work shall commence on the construction of a Definitive Subdivision Plan until a Stormwater Management and Erosion and Sediment Control Permit has been approved and issued.	Y	The Town is planning to add into their application requirements.	Incorporate language that ties and specifically references the Stormwater Management and Land Disturbance Regulations.	Within the next year during the current rewrite.
Y	Is there a section within the subdivision regulations that addresses drainage?	Subdivision Rules and Regs D. Design Standards (20b)	*Consider removing specific stormwater management language from subdivision regulations and referring out to standards in the stormwater management ordinance/bylaw and regulations is recommended. It is best not to describe requirements in subdivision regulations to avoid conflict and inconsistencies as standards are updated from time to time.*	Y	The Town is planning to add into their application requirements.	Incorporate language that ties and specifically references the Stormwater Management and Land Disturbance Regulations.	Within the next year during the current rewrite.
Y	Do the site development standards explicitly permit LID stormwater management approaches?	See Stormwater Management and Land Disturbance Regulations.	*Review any additional standards carefully to ensure they enable LID stormwater management approaches and do not present barriers to such development strategies.*	Y	The Town is planning to add into their application requirements.	Incorporate language that ties and specifically references the Stormwater Management and Land Disturbance Regulations.	Within the next year during the current rewrite.
				*Prioritized for Town of Oxford comments	*Comments provided by the Town of Oxford on June 10, 2022		

ZONING BYLAW/ORDINANCE

Pioneer Valley Planning Commission, February 2022

ASSESSMENT OF STREET DESIGN AND PARKING LOT GUIDELINES AND FEASIBILITY OF ALLOWING GREEN INFRASTRUCTURE

NPDES MS4 Community: Oxford

Within Zoning, the following elements are critical considerations: parking ratios; parking lots and driveways (stall sizes, travel lanes, landscaping, etc.); dimensions and density; and landscaping.

Parking Ratios

Y/N	Checklist Item	Location in code and any standards	Example Language/*Notes (shown in italics)*	Prioritized for Oxford	Town Comments	Change(s) recommended	Proposed schedule to incorporate changes
N	Are parking maximums used in any instances (to prevent too much parking)?		*Consider the following:* *1. Establishing both minimum and maximum parking ratios to provide adequate parking while reducing excess impervious coverage. Parking reductions could be allowed for factors such as: mixed land uses, access to alternative transportation, demographics, and utilization of Transportation Demand Management (TDM) Programs including subsidized mass transit and parking cash out programs. Flexibility is a key component to providing adequate but not excessive parking.* *2. Requiring a Special Permit for an increase in maximum parking allowance. Some onsite parking requirements could be met off-site particularly in redevelopment sites and compact mixed use centers.* *For useful language on parking, see the MA Smart Parking Model Bylaw at:* https://www.mass.gov/files/documents/2017/11/03/Smart%20Parking.pdf	Y	The Town has considered shared parking options.	Incoporate parking maximums instead of parking maximums in a future rewrite of the Zoning Bylaws.	Within the next 5 years
Y	Does zoning require more than 3 **off street parking spaces** per 1,000 sq. ft. of gross floor area for office uses?	Page 39 of Zoning Rules and Regs	*For recommended parking requirements per 1,000 sq ft of Gross Floor Space, see table provided in this workbook at Tab 5 - Reference Tables and Figures.*		The Town is open to giving consideration in a future rewrite of their rules and regulations.	Reduce parking space requirments in a future rewrite of the Zoning Bylaws.	Within the next 5 years
N	Does zoning require more than 4.5 off street parking spaces per 1,000 sq. ft. of gross floor area for shopping centers?			Y	The Town is open to giving consideration in a future rewrite of their rules and regulations.	Reduce parking space requirments in a future rewrite of the Zoning Bylaws.	Within the next 5 years
N	Does zoning **vary parking requirement by zone** to reflect places where more trips are on foot or by transit?	It's by use.		Y	The Town is open to giving consideration in a future rewrite of their rules and regulations.	Reduce parking space requirments in a future rewrite of the Zoning Bylaws.	Within the next 5 years
Y	Does zoning have reduced off-street parking requirements for its downtown zoning district?	pg 38		N			
N	Does zoning have lower parking requirements for properties near transit stops?			Y	The Town is open to giving consideration in a future rewrite of their rules and regulations.	Reduce parking space requirments in a future rewrite of the Zoning Bylaws.	Within the next 5 years
N	Does zoning allow reduced parking requirements for properties within walking distance to multiple services?			Y	The Town is open to giving consideration in a future rewrite of their rules and regulations.	Reduce parking space requirments in a future rewrite of the Zoning Bylaws.	Within the next 5 years
N	Does zoning have lower parking requirements for properties in the more densely developed residential districts?			Y	The Town is open to giving consideration in a future rewrite of their rules and regulations.	Reduce parking space requirments in a future rewrite of the Zoning Bylaws.	Within the next 5 years
N	Does zoning allow **alternative measures** such as custom parking demand calculations, transportation demand management or in-lieu payments to reduce required parking?			Y	The Town is open to giving consideration in a future rewrite of their rules and regulations.	Reduce parking space requirments in a future rewrite of the Zoning Bylaws.	Within the next 5 years
N	Does zoning have provisions allowing for **shared parking** to reduce parking requirements?		*Refer to the Smart Parking Model Bylaw for bylaw language around three strategies for shared parking: opportunities to share parking between competing and non-competing uses on the same site, locating parking off-site on other privately owned lots or public parking facilities, and/or for using a "fee-in-lieu" approach. See:*	Y	The Town is open to giving consideration in a future rewrite of their rules and regulations.	Reduce parking space requirments in a future rewrite of the Zoning Bylaws.	Within the next 5 years
N	Are shared parking provisions by right?		https://www.mass.gov/files/documents/2017/11/03/Smart%20Parking.pdf	N			
N	Does the municipality provide model shared parking arrangements for private use?		*See model for shared parking here:*	N			
N	Does zoning require more than 2 **off-street parking spaces per residential** unit?	It states "at least 2", pg 12	https://www.gardinermaine.com/sites/g/files/vyhlif611/f/news/appendix_d_sampleparkingagreement_0.pdf	N			
Y	Does zoning require 2 off-street parking spaces per residential unit?			N			
N	Does zoning require less than 2 off-street parking spaces per residential unit?			N			
Y	Does zoning require more than 1 off-street parking space for an accessory dwelling unit?			N			
Y	Does zoning have lower parking requirements for smaller residential units?	pg 38		N			

Parking Lots and Driveways

Y/N	Checklist Item	Location in code and any standards	Example Language/*Notes (shown in italics)*	Prioritized for Oxford	Town Comments	Change(s) recommended	Proposed schedule to incorporate changes
N	Is requirement for standard parking lot stall consistent with LID purposes?	pg 42	*LID Standard = 9 feet or less by 18 feet or less*	Y	The Town is open to giving consideration in a future rewrite of their rules and regulations.	Reduce parking dimensions and requirements.	Within the next 5 years
N	Is requirement for drive lane width consistent with LID purposes?	pg 42	*LID Standard = 9 feet wide for one lane / 18 feet wide for two lanes*	Y	The Town is open to giving consideration in a future rewrite of their rules and regulations.	Reduce parking dimensions and requirements.	Within the next 5 years
N	For larger parking lots, are there provisions requiring compact car spaces?	pg 41		Y	The Town is open to giving consideration in a future rewrite of their rules and regulations.	Reduce parking dimensions and requirements.	Within the next 5 years
N	If yes, are at least 30% of parking spaces required to have smaller dimensions for compact cars?	Stated that the maximum is not to exceed 30%, pg 41		Y	The Town is open to giving consideration in a future rewrite of their rules and regulations.	Reduce parking dimensions and requirements.	Within the next 5 years
Y	Is there a minimum percentage of a parking lot required to be landscaped?	3%		N			

N	Do **landscaping** requirements for parking areas <u>allow</u> for vegetated areas with bioretention functions?	It doesn't specify in zoning regs for parking bylaws chapter XI, pg 41	If landscaped islands are located in an area with existing soils classified in the NRCS hydrologic soil groups A/B, such that the existing soils are suitable for infiltration stormwater runoff, the internal landscape areas may/shall be installed at a lower grade than the parking lot pavement, and curbing shall allow drainage from the pavement to enter and percolate through the landscaped areas while simultaneously protecting the landscape materials.	Y	The Town is open to giving consideration in a future rewrite of their rules and regulations, but would like to explore requiring versus suggesting.	At the minimum, update Zoning Bylaw language to explicately mention and **allow** for vegetated areas with bioretention functions in the landscaped areas of parking areas. Nitsch would also encourage the Town to explore in which scenarios is it appropriate to require bioretention areas in parking lots.	Within the next 5 years
Y	Do landscaping requirements for parking areas <u>encourage</u> vegetated areas with bioretention functions?	In the Stormwater Management and Land Disturbance regs		N			
N	Is the use of **pervious surfacing materials** <u>allowed</u> for parking stalls, spillover parking areas, shoulders, etc.?		Pervious materials such as porous asphalt or concrete, porous pavers, and reinforced grass blocks may be allowed in lower volume stalls or overflow parking areas. Note that snow storage should not coincide with these areas as plow piles may include sand, which will clog pervious pavement and prevent infiltration.	Y	The Town expressed concerns on implementing permeable pavement, including the following: 1) Maintenace concerns after the Town accepts the road 2) Constructability concerns 3) High groundwater areas They would instead, like to encourage more on driveways as a way to mitigate impervious area and provide the permeable pavement as an option to developers rather than a requirement.	Update section 5 of Chapter XI in the Zoning Bylaws to **allow** for and encourage the use of pervious materials such as porous asphalt or concrete, porous pavers, and reinforced grass blocks where possible considering the expressed concerns of the Town.	Update within the next year to remain consistent with the Subdvision Rules and Regulations.
N	Is the use of pervious surfacing materials <u>encouraged</u> for parking stalls, spillover parking areas, shoulders, etc.?						
N	Are pervious materials for **single family driveways** (porous pavers, paving stones, pervious asphalt or concrete), and/or use of two-track design for residential driveways allowed?						
Y	Does zoning allow for **common or shared driveways**?	pg 37	*Example from Hadley – through special permit: The Planning Board may issue a special permit permitting a common driveway (a single curb cut and driveway providing vehicular egress/access to more than one lot) when, in its judgment, such action is in the public interest and not inconsistent with the intent of this Zoning Bylaw, provided:* *5.7.1. Said common driveway shall not service more than three residential lots. In the case of commercial/retail and industrial/manufacturing uses in Business and Industrial zoned Districts a common driveway may serve more than three lots, but the total shall be set by the Planning Board in the issuance of their special permit.* *5.7.2. Said common driveway shall provide the only vehicular egress/access to the lots being serviced by it, and this shall be so stated in the deeds to the subject lots.* *5.7.3. Said common driveway shall not be eligible for maintenance by the Town or for acceptance by Town Meeting as a street, and this also shall be so stated in the deeds to the subject lots.* *5.7.4. The grade, length and location of the common driveway shall be of suitable construction, in the opinion of the Planning Board, for the access and turnaround of the number and types of vehicles, including moving vans, ambulances, fire and police, which will be utilizing such driveway.* *5.7.5. For common driveways servicing commercial/retail and industrial/manufacturing uses in Business and Industrial zoned Districts, the design and construction standards of said common driveway shall be set by the Planning Board in the issuance of their special permit.* *5.7.6. Common driveways servicing residential properties shall comply with all of the following:* *5.7.6.1 Shall have a length of no more than 500 feet; and* *5.7.6.2. Shall have a width of at least 15 feet; and* *5.7.6.3. Shall have passing turnouts providing a total width of at least 20 feet along a distance of at least 25 feet, spaced with no more than 300 feet between turnouts, and with the first such passing turnout being located at the driveway connection to the street; and* *5.7.7. All common driveways must:* *5.7.7.1. Meet the prior approval of the Highway Division and the Fire Department; and* *5.7.7.2. Conform to all other driveway requirements of the Zoning Bylaw.* *5.7.8. Where applicable, easements and easement plans must be submitted with the special permit application*	N			
N	If yes, are they allowed by right?			N		Encourage common driveways as opposed to requiring a special permit for them.	Within the next 5 years

Dimensions and Density

Y/N	Checklist Item	Location in code and any standards	Example Language/*Notes (shown in italics)*	Prioritized for Oxford	Town Comments	Change(s) recommended	Proposed schedule to incorporate changes
Y	Are there any special districts or flexible design opportunities that enable clustering of buildings and greater protection of open space areas on a site?	Cluster Development, pg 53	*Open Space Residential Development (OSRD), Open Space Design (OSD), Conservation Development and Natural Resource Protection Zoning (NRPZ) are the current zoning models for what was previously called cluster or flexible development. These models reverse the typical subdivision planning process by utilizing LID site design strategies for conserving natural hydrologic functions and reducing impervious surfaces for preventing runoff, and integrating green infrastructure as a fundamental design element. Resulting development plans typically retain native vegetation and natural areas, and structure site layout to greatly reduce street infrastructure. It has been noted that the open space set aside should be based on resource values, not by formula such as X% of the development.*	N			
Y	Is this type of development allowed by right?		*Permit such development as a "by right" form of development, where no special permit is required.*	N			
Y	Are the submittal or review requirements for such developments greater than for conventional development?			N			
N	Are there any other regulations that allow for reductions in dimensional requirements to increase flexibility in building placement?		*Allow flexible site design criteria such as reduced setbacks and smaller lot sizes.*	N			
			Reductions in frontages would allow for reduced road length/paved area, perhaps where appropriate such as in open space residential developments, at the outside sideline of curbed streets, and around cul-de-sacs.	N			

N	Is the use of bioretention and other stormwater practices allowed in setback areas?		*Explicitly allow bioretention areas, rain gardens, filter strips, swales, and constructed wetlands within required setback areas for front, rear, and side yards based on site-specific conditions such as soils, depth to groundwater table and slope.*	Y	The Town does not explicately exclude them, bioretention areas tend to be incorprated in the landscape layout within setbacks.	Incorporate language that specifically states the **allowance** of bioretention areas, rain gardens, filter strips, swales, and constructed wetlands within required setback areas for front, rear, and side yards based on site-specific conditions such as soils, depth to groundwater table and slope. Seeing this allowance specifically written in the regulations may encourgae more people to consider implementing them.	Within the next 5 years
			In a mixed-use district, setbacks should include enough space for a substantial vegetated buffer adjacent to the residential use as screening that can also serve as stormwater green infrastructure.				
Landscaping							
Y/N	**Checklist Item**	**Location in code and any standards**	**Example Language/*Notes (shown in italics)***	**Prioritized for Oxford**	**Town Comments**	**Change(s) recommended**	**Proposed schedule to incorporate changes**
N	Is the use of bioretention and other stormwater practices allowed within landscaped areas for parking lots (versus requirement for curb and gutter management of stormwater)?	Not in the Zoning Bylaws but yes in the Stormwater Management and Land Disturbance Regs	Edging and curbing in parking lots can be notched or perforated to allow stormwater flows into infiltration and bioretention areas. For larger parking lots, parking rows may be separated with planting strips that function to manage stormwater. Shade tree requirements in planting strips should also take into consideration stormwater treatment. Note that shade in parking lots will also help to reduce the "heat island" effect.	N			
N	Does language on screening and buffers indicate that these areas could be used for stormwater management?	Not in the Zoning Bylaws but yes in the Stormwater Management and Land Disturbance Regs	Depending on site-specific conditions such as soils, depth to groundwater table and slope, buffer and landscaped areas may include bioretention areas and other green infrastructure stormwater management facilities.	N			
N	Is the use of bioretention and other stormwater practices explicitly allowed within landscaped areas?	Stormwater Management and Land Disturbance Regs, pg 16, implies where ever.					
			Consider also including design standards for landscaping and screening that encourage the use of green stormwater management infrastructure facilities. In the same way that architectural design standards serve a town, design standards for landscaping can support placemaking within neighborhoods and across a community.	N			
			<u>Important note</u> : Suggested standards on ensuring soil permeability below serve best under standards required for a stormwater management permit/and, but they may also be appropriate under zoning bylaw/ordinance - site plan review for projects that do not trigger stormwater permit requirements. They are included here to underscore the importance of soils in performance of infiltration facilities, but also in ensuring that curve runoff numbers used in calculations remain as accurate as possible post construction.	N			
N	Is it clear that topsoil removal from the site should not diminish the infiltration characteristics of the site?		Applicants must describe how their project will minimize and limit topsoil removal from the site.	Y	The Town is planning to add into their application requirements.	Incorporate this language into the Zoning Bylaws.	Update within the next year to remain consistent with the Subdvision Rules and Regulations.
N	Is it clear that any new soils brought on site should not diminish the infiltration characteristics of the site?			Y	The Town is planning to add into their application req	Incorporate this language into the Zoning Bylaws.	Update within the next year to remain consistent with the
N	Is there any mention of avoiding compaction of soils by construction vehicles and restoring permeability of soils for infiltration if compacted?		Ensure that all work is planned and executed so as to avoid compaction of topsoil and subsoils, including such best practices as reducing the number of trips required over area of disturbance, laying down soil protective mats for trafficked areas, and avoiding work after rain or snowmelt that soaks soils. For construction equipment, best practices should include using vehicles with low axle loads, reduced tire pressures, and use of flotation tires, doubles, radial tires, and/or large-diameter tires. For areas where such practices are not possible and soils are to be compacted by heavy equipment, subsurface restoration must occur prior to final landscaping activities.	Y	The Town is open to considering this further.	Incorporate this language into the Zoning Bylaws.	Update within the next year to remain consistent with the Subdvision Rules and Regulations.

Development Policies in Zoning Regulations							
Y/N	**Checklist Item**	**Location in code and any standards**	**Example Language/*Notes (shown in italics)***	**Prioritized for Oxford**	**Town Comments**	**Change(s) recommended**	**Proposed schedule to incorporate changes**
N	Are standards and requirements within the zoning code consistent with the Stormwater Management Bylaw/Ordinance and Regulations?	No direct mention of the Stormwater Management and Land Disturbance Bylaw, pg. 64	*A best practice for eliminating conflicting standards is to reference the local stormwater bylaw or regulation within needed sections of the zoning code for appropriate drainage standards, thereby keeping all drainage standards and specifications in one section of the local code. All zoning standards for drainage should be consistent with the purpose and standards identified in any local stormwater management bylaw, regulation or policy to provide a seamless process for promoting LID site planning. Conserving the natural hydrologic function of a site, reducing impervious surfaces and preventing runoff are key principles in ensuring post development peak flows do not exceed predevelopment peak flows. Green infrastructure facilities should be explicitly encouraged for treatment, attenuation, and infiltration of stormwater at decentralized locations around a site to capture stormwater at its source.*	Y	More applicable between stormwater and land disturbance regs.	Incorporate language into the Zoning Bylaws that references the Stormwater Management and Land Disturbance Regulations.	Within in next 2 years
N	Does the site plan approval process promote and enable an LID approach?	No mention of it/no tie to Stormwater Management Regs	*Critical to effective implementation of green infrastructure facilities is the site inventory and analysis process which should occur before any design work. Existing site conditions may offer opportunities to minimize impacts as well as the costs of stormwater management and can be identified through careful site analysis. Local zoning and permitting can promote a thoughtful process by defining the planning process and providing standards for green infrastructure, especially for smaller projects that do not trigger review for a stormwater management permit.*	Y	Same as above	Incorporate language into the Zoning Bylaws that references the Stormwater Management and Land Disturbance Regulations and its respective site plan approval process.	Within in next 2 years
N	What elements count toward meeting open space requirements? (indicate all that apply)	No mention	*Consider allowing applicants to count <u>green infrastructure</u> stormwater management facilities as open space, especially if their project goes above and beyond requirements for stormwater management.*	N			
	Bioretention areas						
	Constructed wetlands						
	Green roofs						
	Other: _____ _____						

*Prioritized for Town of Oxford comments

*Comments provided by the Town of Oxford on June 10, 2022

OTHER CONSIDERATIONS

ASSESSMENT OF STREET DESIGN AND PARKING LOT GUIDELINES AND FEASIBILITY OF ALLOWING GREEN INFRASTRUCTURE

NPDES MS4 Community: Oxford

Y/N	Checklist Item	Location in code and any standards	Example Language/*Notes (shown in italics)*	Prioritized for Oxford	Town Comments	Change(s) recommended	Proposed schedule to incorporate changes
Board of Health Bylaw and Regulations							
N	Do regulations exceed Title 5 requirements, requiring oversized septic systems or larger setback distances?	They follow Title V	*Regulations should not require additional setbacks or classify stormwater structures so as to increase minimum setback distances (e.g. some towns require dry wells and bioretention areas to meet the same setbacks as a septic system).*	N			
N	Do regulations allow the use of stormwater for non-potable uses?		*The type of and quantity of pollution in stormwater depends on the composition of the surfaces over which stormwater runoff flows and the activities within the drainage area that generate pollution. The water quality requirements of common beneficial uses of stormwater and the level of treatment needed for various types of harvested stormwater to meet these requirements are summarized in the Minnesota Stormwater Manual's Water Harvesting and Use System Matrix:*	N			
			https://stormwater.pca.state.mn.us/index.php?title=Water_harvesting_and_use_system_matrix				
Wetlands Bylaw and Regulations							
N	Do regulations increase the required buffer above beyond what is required by the Wetlands Protection Act and/or establish more protective standards for buffer zones?		*Increased wetland buffer zones improve sediment filtration and nutrient removal from stormwater, and decrease potential flooding by providing additional opportunities for stormwater infiltration. However, the Wetlands Protection Act does not include performance standards for the buffer zone, and not all resource areas are afforded a buffer zone under the definitions of the Wetlands Protection Act. Through local wetlands bylaws and/or regulations, municipalities can claim jurisdiction over the 100-foot Buffer Zone (or larger areas) as a Resource Area in and of itself; expand the definition of Buffer Zone to include buffer zones to resource areas not currently included in the Wetlands Protection Act; and/or extend the 200-foot Riverfront Area to intermittent streams, brooks, and ponds.* *Additional information regarding the science behind the importance of buffer zones and bylaw/ordinance considerations can be found in the MACC Wetland's Buffer Zone Guidebook (link provided below), which includes a standard Burden of Proof statement that can apply to Buffer Zones if such areas are defined as within the local Conservation Commission's area of jurisdiction:* *The applicant for a permit shall have the burden of proving by a preponderance of the credible evidence that the work proposed in the permit application will not have unacceptable significant or cumulative effect upon he resource area values (i.e., ecosystem services and functions) protected by this bylaw. Failure to provide adequate evidence to the Conservation Commission supporting this burden shall be sufficient cause for the Commission to deny a permit or grant a permit with conditions.*	N			
			https://www.readingma.gov/conservation-division/files/macc-wetlands-buffer-zone-guidebook				
Municipal Policies and Programs							
	Does the municipality have a plan for water efficiency that includes reuse?	Potentially, in their Comprehensive Wastewater Management Plan, Chapter 2B	*MAPC's Guide to Water Reuse in Massachusetts includes limitations, benefits, and design considerations for different types of water reuse systems. See:*	N			
			http://www.mapc.org/wp-content/uploads/2017/11/3-1-Once-is-Not-Enough-Guide-to-Water-Reuse-10-05.pdf	N			
Y	Does the municipality have a program to address stormwater runoff and/or LID?	Their SWMP		N			
Y	Does the municipality provide information brochures / manual for homeowners describing rainwater harvesting and stormwater management techniques?	https://www.oxfordma.us/stormwater-management/pages/residents	*PVPC's Green Infrastructure fact sheets include a guide to Rainwater Harvesting:* http://www.pvpc.org/sites/default/files/files/PVPC-Rain%20Water%20Harvesting.pdf	N			
N	Does the municipality have policies that promote complete streets or LID considerations within capital improvement plans or in ranking road construction projects?			Y	Oxford has adopted Complete Streets and there is a policy in place. PMI drives the rankings - once ranked then they consider additonal elements under Complete Streets and LID.	Continue to implement the Complete Streets Policy on applicable projects including consideration for LIDs.	Continual
N	Do municipal policies require new street trees as part of road reconstruction projects?	Just replacement and protection	*Trees are effective in capturing and promoting absorbtion of stormwater. For more information, see the US Forest Service Report, entitled The Sustainable Urban Forest Guide: A Step-by-Step Approach at:*	Y	The Town is open to incorporating this requirement in future roadway projects .	Incorporate into a revision of the Zoning Bylaws	Within the next 5 years
N	Do capital improvement plans include tree planting as part of project budgets?		https://urbanforestrysouth.org/resources/library/ttresources/the-sustainable-urban-forest-guide-a-step-by-step-approach/at_download/file	N			
N	Has there been any review of emergency services policies or building and fire regulations to ensure that they allow LID techniques?			Y	No	Conduct a review of emergency services policies or building and fire regulations to ensure that they allow LID techniques.	Within the next 2 years

Y/N	Checklist Item	Location in code and any standards	Example Language/*Notes (shown in italics)*	Prioritized for Oxford	Town Comments	Change(s) recommended	Proposed schedule to incorporate changes
Local Building / Plumbing Codes							
	Do local building codes allow the use of permeable paving, narrow driveways, green roofs or other LID techniques?	They follow the Mass Building Code		N			
	Do local building codes allow the use of harvested rainwater for interior non-potable uses?	They follow the Mass Building Code		N			
	Do local plumbing codes allow the use of harvested rainwater for interior non-potable uses such as toilet flushing?	They follow the Mass Building Code		N			
				*Prioritized for Town of Oxford comments	*Comments provided by the Town of Oxford on June 10, 2022		

ASSESSMENT OF STREET DESIGN AND PARKING LOT GUIDELINES AND FEASIBILITY OF ALLOWING GREEN INFRASTRUCTURE

Pioneer Valley Planning Commission, February 2022

Example of Parking Requirements per 1,000 sq ft of Gross Floor Space from *Assessing Street and Parking Design Standards to Reduce Excess Impervious Cover in New Hampshire and Massachusetts*

Land Use	Maximum	Minimum
Bank	3	2
Large Scale Retail	4	2
General Office Building	4	2
Medical Building	8	2
Nursing Home	3	2
Restaurants	10	6
Shopping Centers	4	3
Bed and Breakfast	1.2 spaces per guest room or suite	1 space per guest room or suite
Personal Services	3	2
Churches and Places of Worship	1 space per 3 seats in the service portion of the building	1 space per 5 seats in the service portion of the building
Museums and Libraries	2	1
Public and Private Educational Institutions	1 space per 3 seats in the classroom	1 space per 5 seats in the classroom

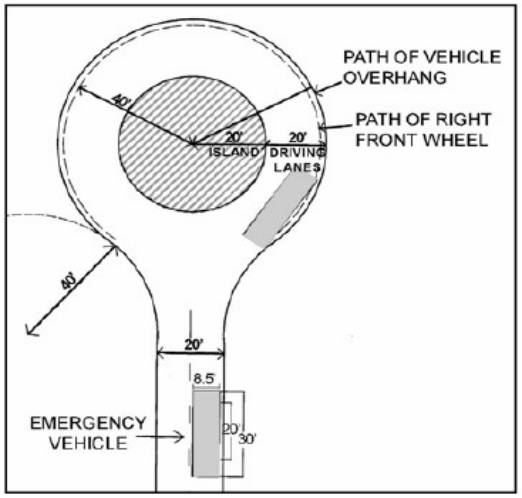
General Parameters for Residential Road Design from *Sustainable Neighborhood Road Design: A Guidebook for Massachusetts Cities and Towns*

Parameter	Single Use Residential Wide	Single Use Residential Medium	Single Use Residential Narrow	Single Use Residential Alley
Traveled Way				
Typical ADT	4,999 < 1,500	1,499 < 400	399 < 0	100 < 0
Design Speed	25 - 30 mph	20 mph	20 mph	15 mph
Operating Speed	20 - 25 mph	20 mph	15 - 20 mph	15 - 20 mph
Number of Through Lanes	2	2	2	1
Lane Width	10 - 12 feet	10 - 12 feet	10 feet	9 - 10 feet
Shoulder	2 feet	2 feet	2 feet	2 feet
Bike Lanes	Shared road or 6 feet wide	Shared road	Shared road	Shared road
Utility Easement Width	--	--	10 feet	10 feet
Range of ROW Width	40 - 50 feet	36 - 40 feet	33 - 36 feet	20 feet

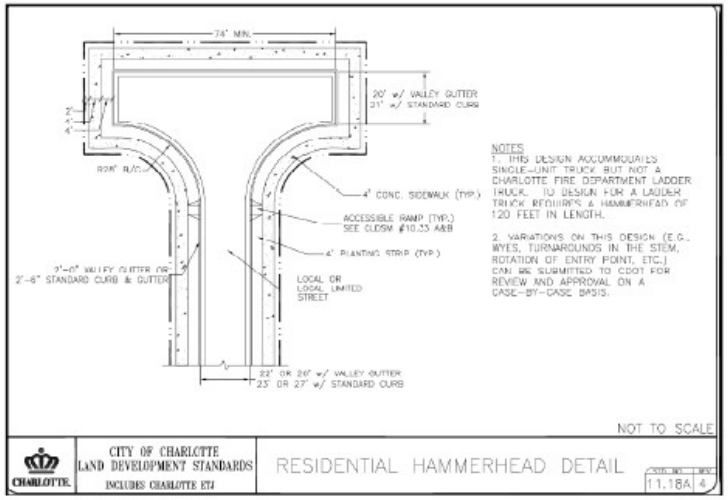
ASSESSMENT OF STREET DESIGN AND PARKING LOT GUIDELINES AND FEASIBILITY OF ALLOWING GREEN INFRASTRUCTURE	Pioneer Valley Planning Commission, February 2022

Parameter	Single Use Residential Wide	Single Use Residential Medium	Single Use Residential Narrow	Single Use Residential Alley
Roadside				
Desirable Roadside Width (pedestrian, swale, and planting strip)	5.5 - 12 feet	5.5 - 10 feet	5.5 feet	None
Grass Plot / Planting Strip	0 - 6 feet	0 - 6 feet	0 - 6 feet	None
Minimum Sidewalk Width	4 feet; one side OK	4 feet / shared road	Shared road	Shared road
Street Lighting	At intersections and pedestrian-scale lighting at residential driveways	At intersections and pedestrian-scale lighting at residential driveways	At intersections and pedestrian-scale lighting at residential driveways	At intersection with road
Intersections				
Traffic Control	Stop signs, 4-way yield	4-way yield	4-way yield	Yield exiting alley
Curb Radii	15 - 25 feet	15 - 25 feet	15 - 20 feet	15 feet

Example of Cul-de-Sac Designs and Dimensions, from *Sustainable Neighborhood Road Design: A Guidebook for Massachusetts Cities and Towns*



a. Cul-de-sac with vegetated island



b. Hammerhead turnaround design

Appendix B –

Design Guidance and Reference Materials

Reference Materials:

- Devens' Street and Road Design Standards
    - https://www.devensec.com/rules-regs/decregs207.html
- Sustainable City Code
    - https://sustainablecitycode.org/brief/pervious-cover-minimums-and-incentives-2/?msclkid=3d5132f0b12b11ecb1cf2f5f548ca2e4
- Massachusetts Cities and Towns Sustainable Neighborhood Road Design
    - https://www.town.billerica.ma.us/DocumentCenter/View/1080/Sustainable-Neighborhood-Road-Design
- Boston Complete Streets Design Guidelines
    - https://www.adaptationclearinghouse.org/resources/boston-complete-streets-design-guidelines.html#:~:text=The%20Boston%20Complete%20Streets%20guidelines%20contain%20design%20specifications,street%20system%20including%20sidewalks%2C%20roadways%2C%20intersections%2C%20and%20curbsides.
- MassDOT Separated Bike Lane Planning & Design Guide
    - https://coloradosprings.gov/sites/default/files/massdot-separated-bike-lane-design-guidlines_-full-report-small.pdf#:~:text=The%20Massachusetts%20Department%20of%20Transportation%E2%80%99s%20%28MassDOT%29%20Separated%20Bike,when%20separated%20bike%20lanes%20are%20appropriate%20and%20feasible.
- Alexandria, VA Complete Streets Design
    - https://www.alexandriava.gov/transportation-planning/complete-streets-design-guidelines
- Los Angeles Complete Streets
    - https://planning.lacity.org/odocument/c9596f05-0f3a-4ada-93aa-e70bbde68b0b/Complete_Street_Design_Guide.pdf