



Town of Nags Head
Residential Stormwater Ordinance Update
Low Impact Development Basics for Water Quality
Protection
Workshops May 22-23 2019

Kate Jones, Engineer Technician
kate.jones@townofnagshead.gov
252-449-4209

Why Regulate Stormwater?

Increased urbanization results in increased runoff to nearby water bodies, public infrastructure and possibly nearby private property.

- Water quality
- Water quantity

Image: Horlsey Whitten Group, Inc.



Why Low Impact Development? (LID)

Localities can use their zoning ordinances, policies, & land-use approval process to encourage environmental or better site design & planning techniques for new development & redevelopment that reduces impervious surfaces & preserves natural open space, thereby reducing stormwater. – Wetlands Watch



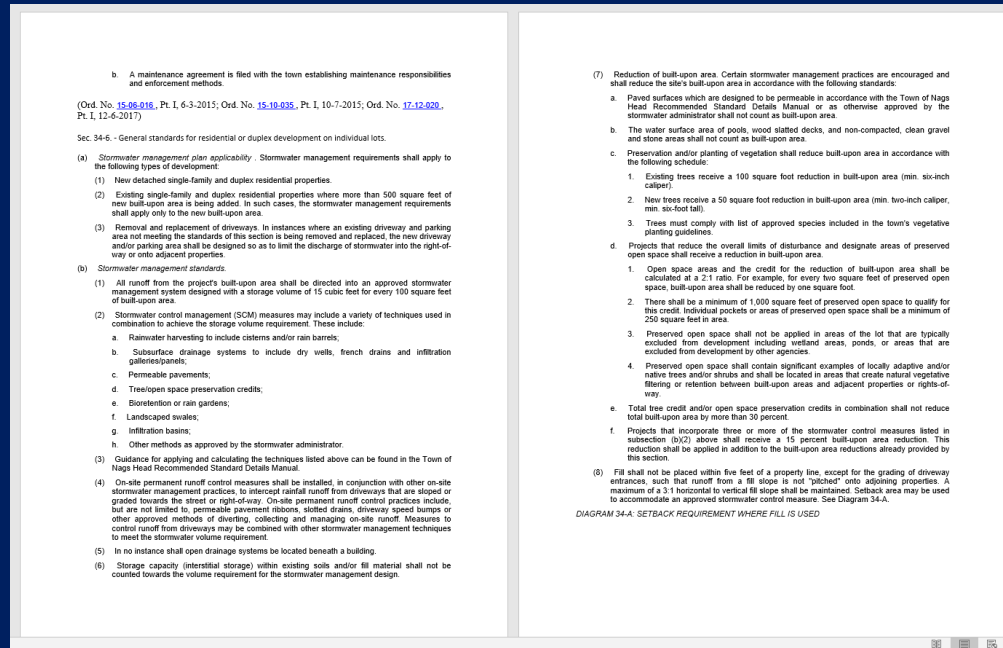
The Town of Nags Head regulates Stormwater through the following ordinance:

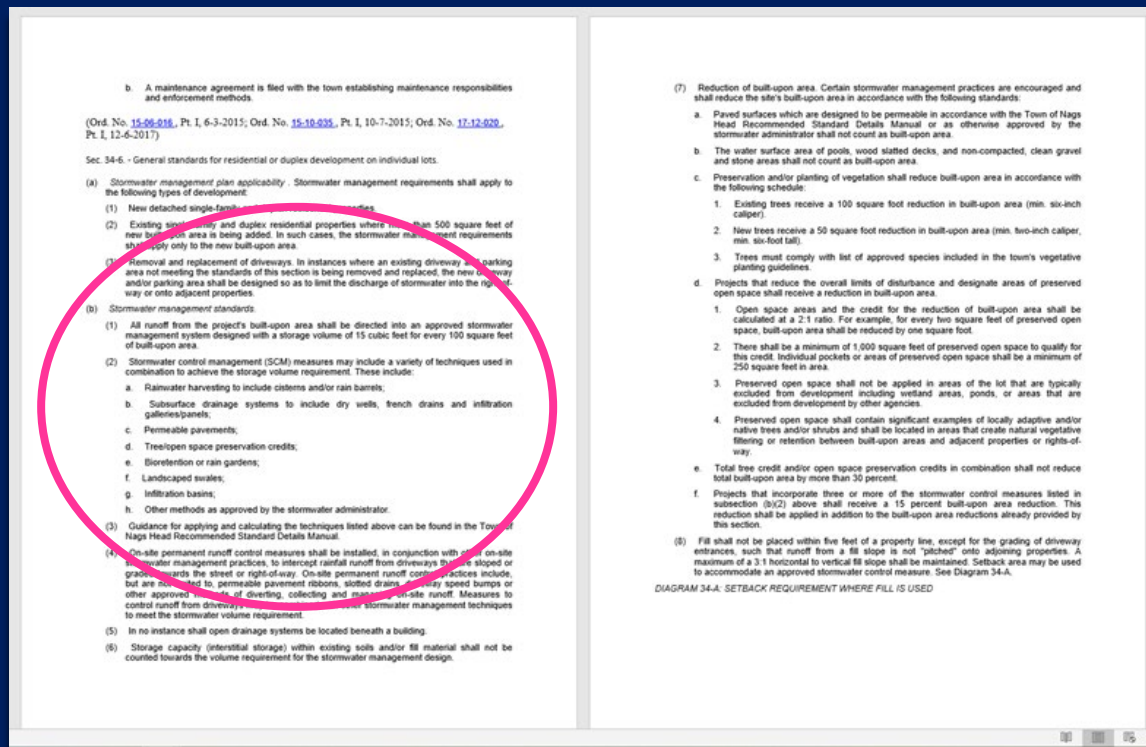
Chapter 34: Stormwater, Fill and Runoff Management

Section 34-5, Non-Residential

Section 34-6, One and Two Family Dwellings

Section 34-7, Subdivisions





Chapter 34-6

- All residential properties require a Stormwater management plan
- Redevelopment where > 500 square feet are added require a Stormwater management plan

- All runoff from the built upon area shall be directed in to an approved stormwater management system designed with a storage volume of 15 cubic feet for every 100 square feet of built upon area.



b. A maintenance agreement is filed with the town establishing maintenance responsibilities and enforcement methods.

(Ord. No. 15-00-018, Pt. I, 6-3-2015; Ord. No. 15-10-035, Pt. I, 10-7-2015; Ord. No. 17-12-029, Pt. I, 12-6-2017)

Sec. 34-6 - General standards for residential or duplex development on individual lots.

(a) Stormwater management plan applicability. Stormwater management requirements shall apply to the following types of development:

- (1) New detached single-family and duplex residential properties.
- (2) Existing single-family and duplex residential properties where more than 500 square feet of new built-upon area is being added. In such cases, the stormwater management requirements shall apply only to the new built-upon area.
- (3) Removal and replacement of driveways. In instances where an existing driveway and parking area not meeting the standards of this section is being removed and replaced, the new driveway and/or parking area shall be designed so as to limit the discharge of stormwater into the right-of-way or onto adjacent properties.

(b) Stormwater management standards.

- (1) All runoff from the project's built-upon area shall be directed into an approved stormwater management system designed with a storage volume of 15 cubic feet for every 100 square feet of built-upon area.
- (2) Stormwater control management (SCM) measures may include a variety of techniques used in combination to achieve the storage volume requirement. These include:
 - a. Rainwater harvesting to include cisterns and/or rain barrels;
 - b. Subsurface drainage systems to include dry wells, french drains and infiltration galleries/pans;
 - c. Permeable pavements;
 - d. Tree/open space preservation credits;
 - e. Bioretention or rain gardens;
 - f. Landscaped swales;
 - g. Infiltration basins;
 - h. Other methods as approved by the stormwater administrator.
- (3) Guidance for applying and calculating the techniques listed above can be found in the Town of Nags Head Recommended Standard Details Manual.
- (4) On-site permanent runoff control measures shall be installed, in conjunction with other on-site stormwater management practices, to intercept rainfall runoff from driveways that are sloped or graded towards the street or right-of-way. On-site permanent runoff control practices include, but are not limited to, permeable pavement ribbons, sloped drains, driveway speed bumps or other approved methods of diverting, collecting and managing on-site runoff. Measures to control runoff from driveways may be combined with other stormwater management techniques to meet the stormwater volume requirement.
- (5) In no instance shall open drainage systems be located beneath a building.
- (6) Storage capacity (interstitial storage) within existing soils and/or fill material shall not be counted towards the volume requirement for the stormwater management design.

(7) Reduction of built-upon area. Certain stormwater management practices are encouraged and shall reduce the site's built-upon area in accordance with the following standards:

- a. Paved surfaces which are designed to be permeable in accordance with the Town of Nags Head Recommended Standard Details Manual or as otherwise approved by the stormwater administrator shall not count as built-upon area.
- b. The water surface area of pools, wood slatted decks, and non-compacted, clean gravel and stone areas shall not count as built-upon area.
- c. Preservation and/or planting of vegetation shall reduce built-upon area in accordance with the following schedule:
 1. Existing trees receive a 100 square foot reduction in built-upon area (min. six-inch caliper).
 2. New trees receive a 50 square foot reduction in built-upon area (min. two-inch caliper, min. six-foot tall).
 3. Trees must comply with list of approved species included in the town's vegetative planting guidelines.
- d. Projects that reduce the overall limits of disturbance and designate areas of preserved open space shall receive a reduction in built-upon area:
 1. Open space areas and the credit for the reduction of built-upon area shall be calculated at a 2:1 ratio. For example, for every two square feet of preserved open space, built-upon area shall be reduced by one square foot.
 2. There shall be a minimum of 1,000 square feet of preserved open space to qualify for this credit. Individual pockets or areas of preserved open space shall be a minimum of 250 square feet in area.
 3. Preserved open space shall not be applied in areas of the lot that are totally excluded from development including wetland areas, ponds, or areas that are excluded from development by other agencies.
 4. Preserved open space shall contain significant examples of naturally adaptive and/or native trees, shrubs and shall be located in areas that incorporate natural vegetative filtering or retention systems and adjacent properties or rights-of-way.
- e. Total tree credit and/or open space preservation credits in combination shall not reduce total built-upon area by more than 30 percent.
- f. Projects that incorporate three or more of the stormwater control measures listed in subsection (b)(2) above shall receive a 15 percent built-upon area reduction. This reduction shall be applied in addition to the built-upon area reductions already provided by this section.
- (8) Fill shall not be placed within five feet of a property line, except for the grading of driveway entrances, such that runoff from a fill slope is not "pitched" onto adjoining properties. A maximum of a 3:1 horizontal to vertical fill slope shall be maintained. Setback area may be used to accommodate an approved stormwater control measure. See Diagram 34-A.

DIAGRAM 34-A: SETBACK REQUIREMENT WHERE FILL IS USED

Chapter 34-6 Reduction in built upon area credits

- Open Space credit
- Tree Credit
- Multiple SCM credit

SCMs - Stormwater Control Measures

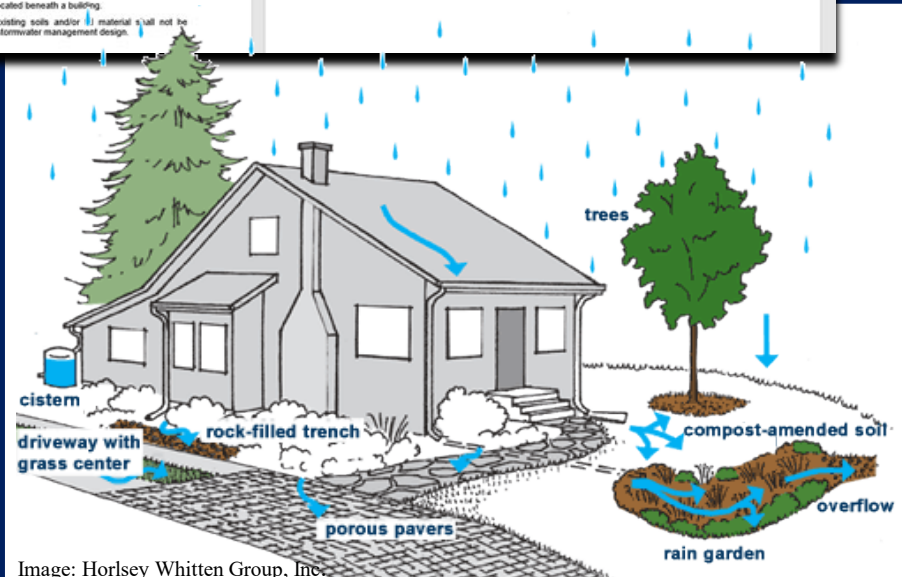


Image: Hurlsey Whitten Group, Inc.



Town of Nags Head Residential Stormwater Ordinance Update



The Town of Nags Head can assist homeowners, contractors etc. with the residential stormwater plan process!

- Worksheets A & B
- Available on line or at Town Hall offices

BUILT UPON AREA AND OPEN SPACE/TREE CREDIT CALCULATIONS - WORKSHEET A

BUILT UPON AREA CALCULATIONS:

STRUCTURE OR DWELLING FOOTPRINT	+		sq
COVERED DECK AND STAIRS	+		sq
DETACHED GARAGE	+		sq
DETACHED ACCESSORY STRUCTURE	+		sq
DETACHED EQUIPMENT STANDES	+		sq
UNCOVERED DRIVE WALKWAY, DECKED STAIRWAYS, CONSTRUCTED RELATIVE OPENING OVER OPEN SPACE	+		sq Excluded 0.00
SWIMMING POOL SURFACE AREA	+		sq Excluded 0.00
CONCRETE DECKED PATIOS, WALKWAYS	+		sq
PERMANABLE DECKED PATIOS, WALKWAYS	+		sq Excluded 0.00
CONCRETE DRIVEWAYS AND PARKING	+		sq
PERMANABLE DRIVEWAYS AND PARKING	+		sq Excluded 0.00
EXISTING BUILT UPON AREA	+		sq
BUILT UPON AREA SUBTOTAL	+		sq

OPEN SPACE AREA CALCULATIONS

MAXIMUM PERMISSIBLE OPEN SPACE/TREE CREDIT REDUCTION	+		sq
OPEN SPACE AREA TO BE PRESERVED	+		sq
IS TOTAL OPEN SPACE AREA GREATER THAN LUBD UP	+		Yes or No
ARE INDIVIDUAL POCKETS OF OPEN SPACE GREATER THAN 200 SF	+		Yes or No
OPEN SPACE AREA REDUCTION SUBTOTAL	+		sq

TREE PRESERVATION AREA CALCULATIONS

NUMBER OF EXISTING TREES TO BE PRESERVED 12" OR GREATER IN CALIPER	+		sq
EXISTING TREE BUILT UPON AREA REDUCTION (200 SF PER EX. TREE PRESERVED)	+		sq
NUMBER OF PROPOSED TREES 12" OR GREATER IN CALIPER, MIN. 8" TALL	+		sq
PROPOSED TREE BUILT UPON AREA REDUCTION (200 SF PER PRO. TREE PLANTED)	+		sq
TREE CREDIT AREA REDUCTION SUBTOTAL	+		sq
OPEN SPACE + TREE CREDIT AREA SUBTOTAL LESS THAN OR EQUAL TO MAXIMUM PERMISSIBLE OPEN SPACE/TREE CREDIT REDUCTION	+		Yes or No

STORMWATER CONTROL MEASURE CREDIT

ARE THREE OR MORE STORMWATER CONTROL MEASURES BEING PROPOSED	+		Yes or No
STORMWATER CONTROL MEASURE REDUCTION SUBTOTAL	+		sq
ADJUSTED BUILT UPON AREA TOTAL	+		sq

REQUIRED STORMWATER VOLUME CALCULATION

REQUIRED STORMWATER VOLUME (CU FT OF ADJUSTED BUILT UPON AREA)	+		CU FT
--	---	--	-------

RESIDENTIAL STORMWATER CONTROL MEASURE CALCULATION - WORKSHEET B

Step 4 - Stormwater Measure Calculations: Select the proposed measures, and size according to the volume of stormwater that needs to be managed. Detailed notes represent the necessary information to complete volume calculations. Other measures may be added if deemed appropriate and provided the calculations show the required volume has been met. The individual volumes shall be added to calculate the total on-site volume provided to determine whether the minimum volume requirement has been met. Alternative designated measures can be used in lieu of the measures above based on the technical specifications with absolute flow area are provided to the Town as part of this application.

Proposed Measure	Length (ft)	Width (ft)	Depth (ft)	Left Side Slope (ft/ft)	Right Side Slope (ft/ft)	Minimum Depth (ft)	Volume (cu ft)
Triangular Vag. Swale							1.0
Trapezoidal Vag. Swale							1.0
Infiltration Basin							1.0
French Drain							0.4
Dry Wall							0.4
Rain Garden							1.0
Pipe or Cylinder							1.0
Rain Barrel							1.0
Alternative SCM							1.0
Total Volume Provided (sum of values above)							
Total Volume Required (from built upon area calculations)							
Minimum Volume Requirement Met							

APPLICANT ACKNOWLEDGEMENT

Development Activities shall only begin after the Town of Nags Head has issued approval.

The applicant acknowledges that the proposed stormwater control measures are a condition of this approval and that any modifications to the plan number and dimensions of this approval shall require additional approval from the Town of Nags Head.

I (we) _____ hereby acknowledge the above statements and agree to assume full responsibility for the implementation and construction of the proposed stormwater management measures. Furthermore, I (we) also acknowledge the guidelines in the Recommended Standard Details for the evaluation of the stormwater control measures will be adhered to.

Signature: _____ Date: _____



SCM Options:

Above ground –

- Rain Garden
- Vegetated Swale
- Retention/Bio Retention
- Rain barrels/Gutter collection

Below ground –

- Infiltration trench/French drain
- Dry well

Permeable pavements

- Turfstone
- Pervious pavers
- Porous concrete
- Porous asphalt



Facts Sheets

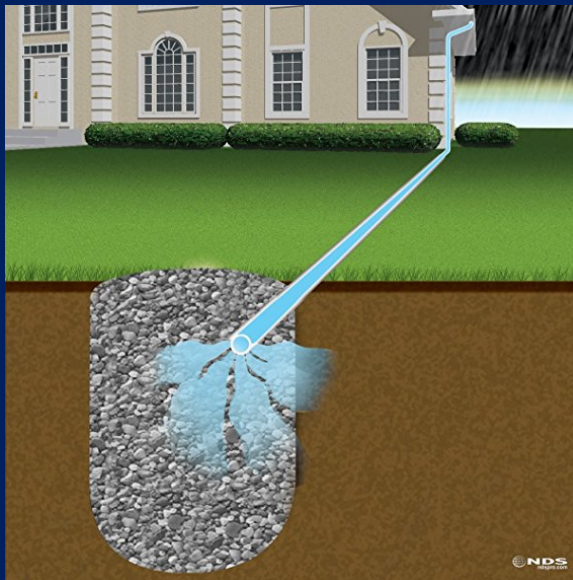
SCMs

Above ground measures

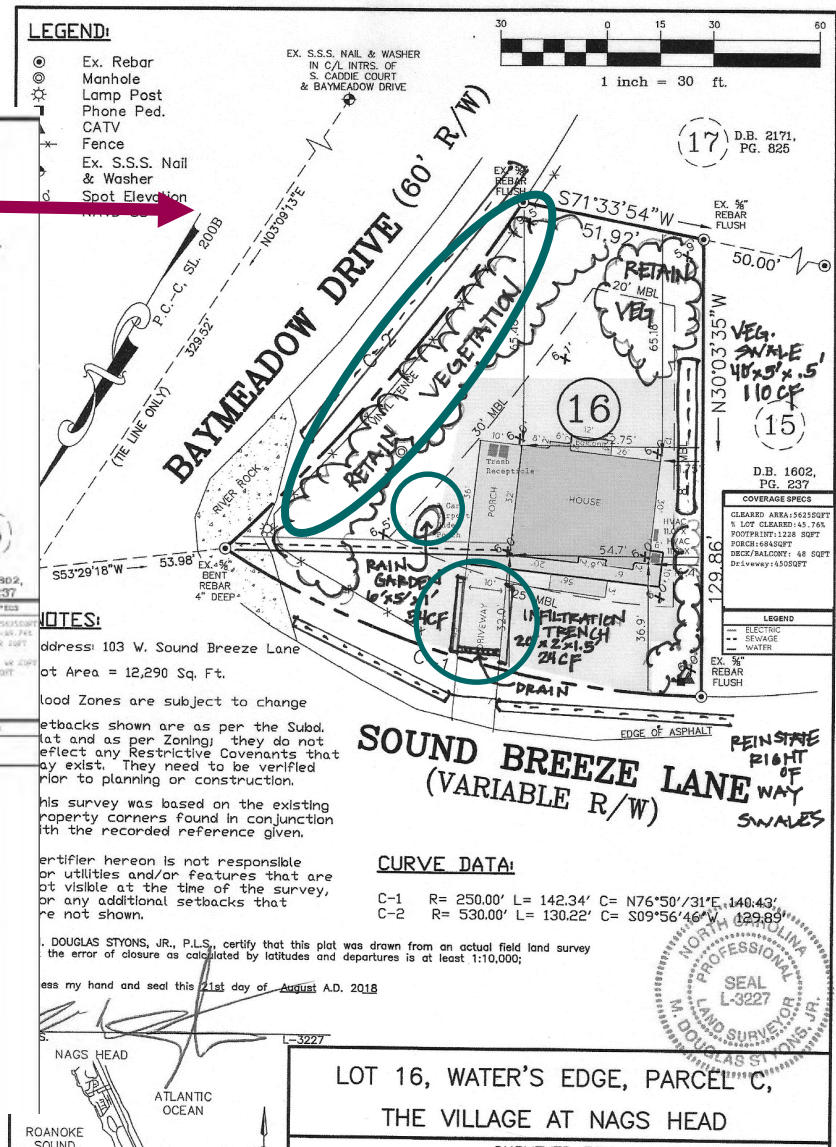
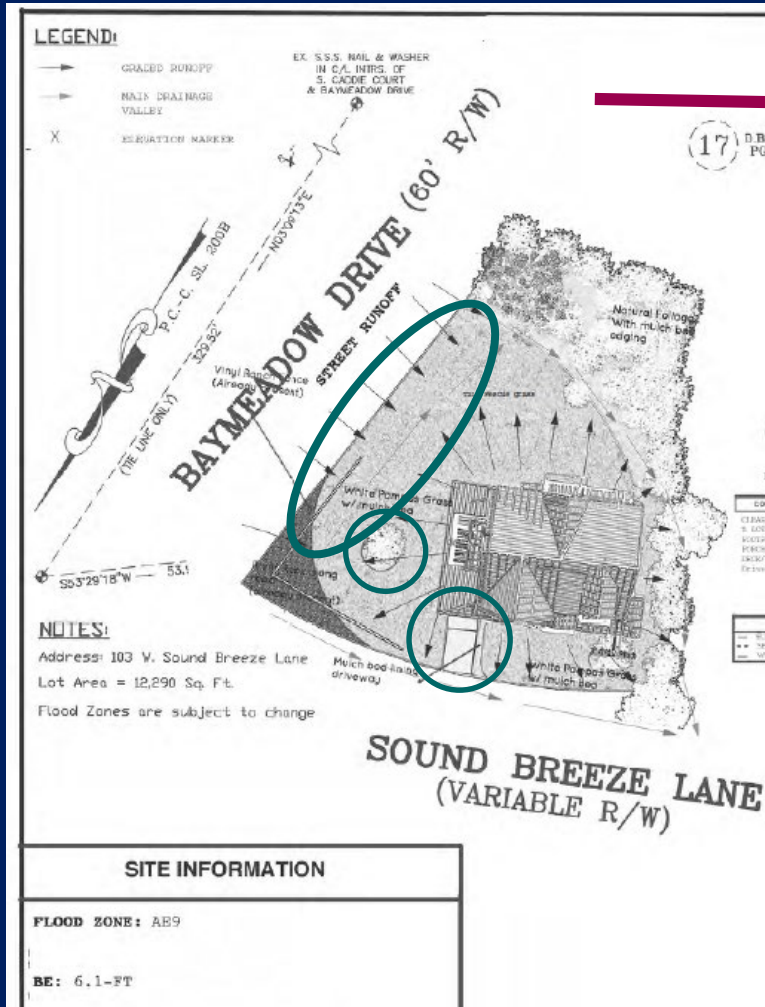


SCMs

Below Ground measures



Example 1 New Construction



Example 2

New Construction – Rain garden and Vegetated swale

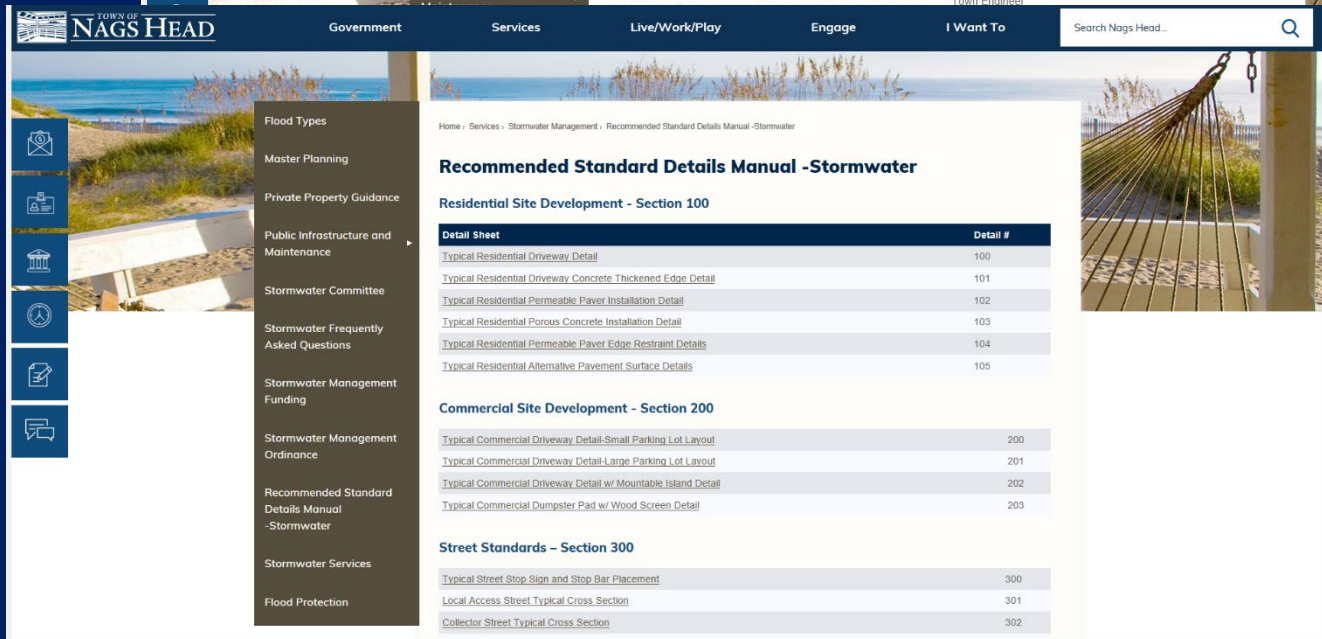
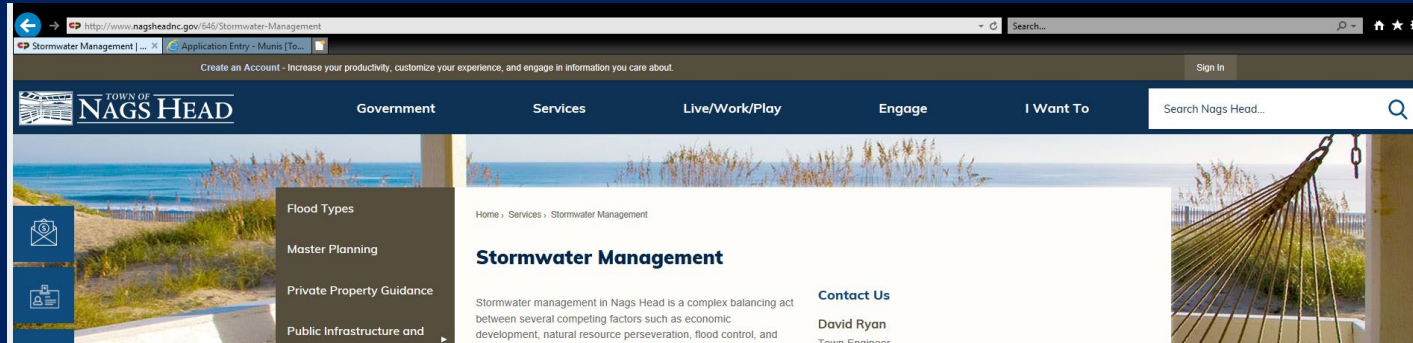


Example 3

New Construction – permeable pavements



More Information: nagsheadnc.gov



Town of Nags Head Residential Stormwater Ordinance Update

