AGENDA

TOWN OF NAGS HEAD BOARD OF COMMISSIONERS
NAGS HEAD MUNICIPAL COMPLEX - BOARD ROOM
WEDNESDAY, JUNE 3, 2020; 9:00 A.M.

In order to view and listen to the Board meeting remotely, please register here:
https://nagsheadnc.zoom.us/webinar/register/WN_fwSm-NDdTH6NMcr5oibp2Q

Please email your comments for the Public Comment portion or for the Public Hearings here:
publiccomment060320@nagsheadnc.gov

(Emailed comments will also be accepted during the Board meeting until the end of the Public Comment portion of the meeting AND up to 24 hours after each Public Hearing is concluded

for comments related to any of the Public Hearings)
Comments should include your name and address and
Should be limited to five minutes when read aloud.

If you would like to participate in any of the Public Hearings, please contact Carolyn F Morris at carolyn.morris@nagsheadnc.gov or at 252-449-2009 until 9 am on June 3, 2020

A. CALL TO ORDER / MOMENT OF SILENCE/PLEDGE OF ALLEGIANCE

B. ADOPTION OF AGENDA

C. PUBLIC COMMENT

D. CONSENT AGENDA

1. Consideration Of Tax Adjustment Report

   Documents:

   6 D1 TAX ADJUST REPORT SUMMARY.PDF
   6 D1 TOWN-WIDE TAX ADJ REPORT.PDF
   6 D1 MSD TAX ADJ REPORT.PDF

2. Consideration Of Resolution Authorizing
   water payment plans resulting from State Executive Order #124

   Documents:

   6 D3 AUTH WATER PAYMENT PLANS SUMMARY.PDF
   6 D3 AUTH WATER PAYMENT PLANS RES.PDF

3. Update Of Low Impact Development Manual And Stormwater Reference Manual

Documents:

6 D4 LOW IMPACT DEV AND STORMWATER UPDATE SUMMARY1.PDF
6 D4 LOW IMPACT DEV AND STORMWATER MANUAL.PDF

4. Request For Public Hearing To Consider Text Amendments
   to the Unified Development Ordinance submitted by a property owner to expand the principal sale items from outdoor stands to include reservations and tickets for events/activities

   Documents:

   6 D5 RPH OUTDOOR STANDS SUMMARY.PDF

E. PUBLIC HEARINGS

1. Public Hearing To Consider Citizen Comment On The Town Manager's Proposed Operating Budget
   for July 1, 2020 – June 30, 2021, proposed CIP requests for FY 20/21 through FY 24/25, and updated Consolidated Fee Schedule

   Documents:

   6 E1 PH BUDGET PUBLIC HEARING SUMMARY.PDF
   6 E1 PH BUDGET PUBLIC HEARING PN.PDF

2. Public Hearing To Consider A Text Amendment To The UDO
   submitted by Kim Cowen and Megan Dixon to allow "Tutoring Facility/Learning Center" as a permitted use within the C-2, General Commercial Zoning District

   Documents:

   6 E2 PH LEARNING CENTER SUMMARY.PDF
   6 E2 PH LEARNING CENTER PN.PDF
   6 E2 PH LEARNING CENTER MEMO APP ORD.PDF

3. Public Hearing To Consider A Text Amendment To The UDO
   pertaining to temporary uses or temporary alteration of uses related to declared emergencies

   Documents:

   6 E3 PH UDO TEMP USE PERMIT SUMMARY.PDF
   6 E3 PH TEMP USE PERMIT DURING EMER PN.PDF
   6 E3 PH UDO TEMP USE PERMIT MEMO ORD.PDF

F. REPORTS AND RECOMMENDATIONS FROM THE PLANNING BOARD AND THE PLANNING AND DEVELOPMENT DIRECTOR

G. OLD BUSINESS TABLED FROM PREVIOUS MEETINGS

1. From May 6th Board Meeting
   - Consideration of numerous text amendments to the Unified Development Ordinance as it pertains to updated Flood Maps; Consideration of update to the Flood Damage Prevention Ordinance (Public Hearing held May 6, 2020)

   Documents:

6 G1 FLOOD ORDINANCE SUMMARY.PDF
6 G1 FLOOD ORDINANCE WITH ATTACH.PDF

2. From May 6th Board Meeting
   – Discussion of scope of work from Moffat & Nichol - Beach Nourishment Project Coastal Engineering and Design

   Documents:

   6 G2 BN COASTAL ENG AND DESIGN SUMMARY.PDF
   6 G2 BN COASTAL ENGINEERING SVCS PROPOSAL.PDF
   6 G2 BN MONITORING SURVEY PROPOSAL.PDF

3. Major Site Plan For Gone Coastal Shopping Center
   From May 6th Board meeting - Consideration of a Major Site Plan for Gone Coastal Shopping Center, 7531 S Virginia Dare Trail, submitted by Jim and Stephanie Selckmann

   The Applicant has requested a Continuance to the July 1, 2020 BOC meeting

4. Preliminary Plat For A Major Subdivision, Known As Coastal Villas
   From May 6th Board meeting - Continued consideration of a Preliminary Plat for a Major Subdivision, known as Coastal Villas, for an approximately 9.86 acre property, zoned R-2, Medium Density Residential, owned by Nags Head Construction (Applicant), located on the west side of US 158, approximately 300 feet south of the intersection of W. Soundside Road and US 158 (Parcel # 006749004; PIN # 989108886987); the revised Preliminary Plat proposes to create 17 lots, along with an associated street and other required improvements

   The Applicant has requested a Continuance to the July 1, 2020 BOC meeting

H. NEW BUSINESS

1. Committee Reports

   Documents:

   6 H1 COMMITTEE REPORTS SUMMARY.PDF

I. ITEMS REFERRED TO AND PRESENTATIONS FROM TOWN ATTORNEY

J. ITEMS REFERRED TO AND PRESENTATIONS FROM TOWN MANAGER

1. From May 20, 2020 Board Meeting - Recycling

K. BOARD OF COMMISSIONERS AGENDA

L. MAYOR'S AGENDA

1. Future Town Envision

   Documents:

   6 L1 MAYOR ENVISION THE TOWN SUMMARY.PDF

2. Request For Closed Session
   to discuss personnel matter in accordance with GS 143-318.11(a)(6)

   Documents:

6 L2 MAYOR RCS PERSONNEL SUMMARY.PDF

M. OTHER BUSINESS

N. ADJOURNMENT

O. FULL AGENDA In .PDF Format With Bookmarks

5401 S. Croatan Hwy, Nags Head, NC 27959
252-441-5508

Agenda Item Summary Sheet

Item No: **D-1**
Meeting Date: **June 3, 2020**

Item Title: Consideration of Tax Adjustment Reports

Item Summary:

Attached please find the list of adjustments to the 2019 Tax Levy (per information received from Dare County) for Property and for MSD valuations.

These reports are submitted for your approval at the June 3rd Board of Commissioners meeting.

Number of Attachments: 2

Specific Action Requested:

Tax reports provided for Board review and approval.

Submitted By: Linda Bittner, Tax Collector Date: May 28, 2020

Finance Officer Comment:

No unbudgeted fiscal impact.

Signature: Amy Miller Date: May 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: May 28, 2020

Town Manager Comment and/or Recommendation:

I concur with staff.

Signature: Cliff Ogburn Date: May 28, 2020

Town of Nags Head, North Carolina
ANALYSIS OF CURRENT 2019 TAX LEVY
As of May 28, 2020 for the June 3, 2020 BOC Mtg

	Town-Wide Tax			Total Levy	
	Property Valuation	Rate	Total Levy	Property Excluding Registered Motor Vehicles	Registered Motor Vehicles
Original levy:					
Property taxed at current year's rate	2,383,436,490	0.00317	7,555,496.64	7,555,496.64	
Registered Motor Vehicles at current year's rate	28,295,614.00	0.00317	88,974.44		88,974.44
Registered Motor Vehicles at 2018 year's rate	9,502,329.00	0.00307	29,172.15		29,172.15
Registered Motor Vehicles at 2017 year's rate	69,970.00	0.00297	207.81		207.81
Registered Motor Vehicles at 2015 year's rate	(2,011.00)	0.00267	(5.37)		(5.37)
Penalties			5,460.81	5,460.81	
Total	**2,421,302,392**		**7,679,306.48**	**7,560,957.45**	**118,349.03**
Discoveries & Adjustments:					
Current year discoveries & adjustments tax	1,686,283.00		4,309.89	4,309.89	
Town wide beach nourishment tax			455.29	455.29	
Corporate Utilities discoveries & tax	22,078,064.00		64,026.38	64,026.38	
Corporate Utilities beach nourishment tax			5,961.09	5,961.09	
Penalty Discoveries			2,075.47	2,075.47	
Total	**23,764,347**		**76,828.12**	**76,828.12**	
Releases & Adjustments:					
Current year releases & adjustments	(309,694.00)		(898.12)	(898.12)	
Town wide beach nourishment			(83.60)	(83.60)	
Penalty Releases			(574.94)	(574.94)	
Total	**(309,694)**		**(1,556.66)**	**(1,556.66)**	
Write-offs or Adjustments:			0.00	0.00	
Total Property Valuation	**2,444,757,045**				
Net levy		**7,754,577.94**		**7,636,228.91**	**118,349.03**
Uncollected Taxes		(15,017.95)		(15,017.95)	0.00
Uncollected Town Wide Beach Nourishment		(1,385.87)		(1,385.87)	0.00
TOTAL UNCOLLECTED TAXES AS OF 05/28/20:		**(16,403.82)**		**(16,403.82)**	**0.00**
CURRENT YEAR TAXES COLLECTED:		**7,738,174.12**		**7,619,825.09**	**118,349.03**
CURRENT LEVY COLLECTION PERCENTAGE:		**99.788%**		**99.785%**	**100.000%**

Town of Nags Head, North Carolina
ANALYSIS OF CURRENT 2019 MSD TAX LEVY
As of May 28, 2020 for the June 3, 2020 BOC Mtg

	BEACH NOURISHMENT DISTRICT				
	MSD Valuation	Rate	Total Levy	MSD Excluding Registered Motor Vehicles	Registered Motor Vehicles
Original MSD Levy:					
MSD Beach Nourishment at current year's rate	809,869,299	0.00175	1,417,272.90	1,417,272.90	
Registered Motor Vehicles at current year's rate	1,614,681.00	0.00175	2,811.91		2,811.91
Registered Motor Vehicles at 2018 year's rate	767,675.00	0.00175	1,343.43		1,343.43
Registered Motor Vehicles at 2017 year's rate	66,748.00	0.00175	116.81		116.81
Penalties			0.00	0.00	
Total	**812,318,403**		**1,421,545.05**	**1,417,272.90**	**4,272.15**
Discoveries & Adjustments:					
Current year discoveries & adjustments	0.00		0.00	0.00	
Town wide beach nourishment			0.00	0.00	
Penalty Discoveries			0.00	0.00	
Total			**0.00**	**0.00**	
Releases & Adjustments:					
Current year releases & adjustments	0.00		0.00	0.00	
Town wide beach nourishment			0.00	0.00	
Penalty Releases			0.00	0.00	
Total			**0.00**	**0.00**	
Write-offs or Adjustments:			0.00	0.00	
Total MSD Valuation	**812,318,403**				
Net levy		**1,421,545.05**		**1,417,272.90**	**4,272.15**
TOTAL UNCOLLECTED MSD AS OF 05/28/20:		**(613.72)**		**(613.72)**	**0.00**
CURRENT YEAR MSD COLLECTED:		**1,420,931.33**		**1,416,659.18**	**4,272.15**
CURRENT MSD COLLECTION PERCENTAGE:		**99.957%**		**99.957%**	**100.000%**

Agenda Item Summary Sheet

Item No: **D-3**
Meeting Date: **June 3, 2020**

Item Title: Consideration of resolution authorizing water payment plans – in accordance with State Executive Order #124

Item Summary:

Governor Cooper's Executive Order #124 authorized local government to assist water customers during the COVID-19 pandemic re: past due accounts and reconnection fees. Reconnection fees may be waived and water service will not be disconnected due to non-payment until June 2, 2020.

In accordance with the Governor's Executive Order #124, the attached resolution is provided for your consideration on June 3rd.

Number of Attachments: 1

Specific Action Requested:

Resolution provided for Board consideration of adoption.

Submitted By: Amy Miller, Finance Director Date: May 27, 2020

Finance Officer Comment:

Authorization is for a six-month repayment plan of six equal monthly installments for water balances that became delinquent between March 31, 2020 and June 1, 2020 – the resolution requires the balance to be paid in full by December 2, 2020.

Signature: Amy Miller Date: May 27, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: May 27, 2020

Town Manager Comment and/or Recommendation:

I concur.

Signature: Cliff Ogburn Date: May 27, 2020

Resolution Authorizing Water Payment Plans From COVID-19

WHEREAS, on March 10, 2020, Roy Cooper, Governor of North Carolina, issued Executive Order No. 116 which declared a State of Emergency to establish the State's response and protective actions to address the Coronavirus Disease 2019 (COVID-19) public health emergency and to provide for the health, safety, and welfare of residents and visitors located in North Carolina; AND

WHEREAS, on March 13, 2020, the President of the United States declared that the COVID-19 pandemic in the United States constitutes a national emergency, retroactive to March 1, 2020; AND

WHEREAS, on March 19, 2020, the North Carolina Utilities Commission issued an Order Suspending Utility Disconnections for Non-Payment, Allowing Reconnection, and Waiving Certain Fees; AND

WHEREAS, on March 31, 2020, Executive Order No. 124 issued by Governor Roy Cooper, prohibits shut-offs, late fees, and reconnection fees of utilities; AND

WHEREAS, on April 15, 2020 in accordance with the Governor's Executive Order No. 124, the Town of Nags Head authorized fees related to water past due accounts and reconnection fees be waived and water service will not be disconnected due to non-payment until June 2, 2020; AND

WHEREAS, if a delinquency occurred between March 31, 2020 and June 1, 2020, the Town of Nags Head authorizes a 6-month repayment plan of 6 equal monthly installments for past due water account balances caused during the COVID-19 pandemic only; AND

WHEREAS, any water service balance that became delinquent between March 31, 2020 and June 1, 2020 must be paid in full by December 2, 2020; AND

WHEREAS, if the water service balance isn't paid according to the payment plan terms, the whole amount under the payment plan becomes due, the payment plan becomes void, and the Town of Nags Head has the right to disconnect the service and apply a late fee penalty; AND

WHEREAS, all water service account balances that become delinquent after June 1, 2020 must be paid within noted due dates or the Town of Nags Head has the right to disconnect the service and apply a late fee penalty; AND

WHEREAS, all payments received by the Town of Nags Head will be applied to the oldest outstanding balance first in accordance with existing policies.

NOW THEREFORE BE IT RESOLVED that the Nags Head Board of Commissioners hereby authorizes a 6-month repayment plan of 6 equal monthly installments for water balances that became delinquent between March 31, 2020 and June 1, 2020 and must be paid in full by December 2, 2020.

This the 3rd day of June 2020.

_____
Benjamin Cahoon, Mayor
Town of Nags Head

ATTEST:

_____
Carolyn F Morris, Town Clerk

Agenda Item Summary Sheet

Item No: **D-4**
Meeting Date: **June 3, 2020**

Item Title: Update to the Low Impact Development Manual and stormwater reference manual

Item Summary:
The intent of the changes to the Town's Low Impact Development (LID) Manual is to create consistency with the revised residential stormwater regulations that are now incorporated into Article 11 Environmental Regulations Part I, Stormwater, Fill, and Runoff Management and regulations consistent with the NCDEQ Stormwater Design Manual. The format has been revised to become more user friendly.

Changes primarily consist of the following:

- Chapter 2-Change in terminology from Best Management Practice to Stormwater Control Measure (to be consistent with NCDEQ Stormwater Design Manual).
- LID Compliance in Nags Head- Changes reflect recent ordinance changes which are discussed in Chapter 3, available stormwater credits and SW Plan overview which have been modified from 2014.
- Living Shorelines have been added as an LID measure at the request of the NC Coastal Federation.
- SCM Fact Sheets from the Town of Nags Head Recommended Standard Details have been incorporated into Chapter 5 of the manual.
- Backyard wetlands and planter boxes have been omitted due to their lack of use in Nags Head and cost for maintenance and upkeep.
- Chapter 6 Non-residential Stormwater Management- Stormwater calculations from the NCDEQ Stormwater Design manual have been incorporated into this chapter.
- The reference information from the first edition has been condensed and inserted into Chapter 1 of the Second Edition.
- USDA Soils maps have been deleted along with the DWQ stormwater table.

Number of Attachments: 1

Specific Action Requested:

Request Board adoption of attached Low Impact Development Manual and stormwater reference manual.

Submitted By: David Ryan, Town Engineer Date: May 27, 2020

Finance Officer Comment:

No unbudgeted costs associated with this agenda item.

Signature: Amy Miller Date: May 27, 2020

Town Attorney Comment:
N/A

Signature: John Leidy Date: May 27, 2020

Town Manager Comment and/or Recommendation:
I concur with staff.

Signature: Cliff Ogburn Date: May 27, 2020

LID

Low Impact Development Manual

and stormwater reference manual

TOWN OF NAGS HEAD

P.O. Box 99
Nags Head, NC 27959
www.nagsheadnc.gov

North Carolina Coastal Federation
Working Together for a Healthy Coast

637 Harbor Rd.
Wanchese, NC 27981
www.nccoast.org

Second Edition- April 2020

Acknowledgements

In 2013, the Town of Nags Head began work with the N.C. Coastal Federation to develop a Low Impact Development manual as a reference document for local citizens and developers as part of Town efforts to improve stormwater management and as a technical resource for application of Town Stormwater regulations. This project is based on the LID manual for the coastal towns of Columbia, Cedar Point and Cape Carteret. The Town of Columbia worked in direct partnership with the N.C. Coastal Federation to complete an LID manual. The Town of Cedar Point worked in partnership with the Town of Cape Carteret, the N.C. Coastal Federation, engineering consultants WithersRavenel, N.C. Division of Water Quality and the LID Technical Review Team to complete the Cedar Point/Cape Carteret manual. We would like to thank these three communities and their partners for sharing their work and providing a model for us to follow.

In 2019, the Town of Nags Head initiated an update of the Low Impact Development Manual with assistance from the N.C. Coastal Federation to reflect modifications to the Town's residential stormwater management ordinance.

We would like to specifically thank the following individuals involved in the development and review of the Town of Nags Head Stormwater Management Regulations. We would also like to thank those individuals and organizations who provided photographs and technical information for the manual.

Bob Edwards, Mayor- Town of Nags Head
Marvin Demers, Commissioner, Town of Nags Head
Richard Murphy, Planning Board, Town of Nags Head
Pogie Worsley, Planning Board, Town of Nags Head
Kelly Wyatt, CZO, Town of Nags Head
Dabni Shelton, CZO, Town of Nags Head
Kim Allen, Town of Nags Head
Andy Deel, P.E. , Deel Engineering, PLLC
David Ryan, P.E., Town of Nags Head
Elizabeth Teague, AICP, CTP, Town of Nags Head
Andy Garman, Town of Nags Head
Kate Jones, Town of Nags Head
Ladd Bayliss, N.C. Coastal Federation
Mark Stripp, UNC Chapel Hill
Katrina Phillips, UNC Chapel Hill
Michael Flynn, CFM, N.C. Coastal Federation
Stephen Cummings, N.C. Coastal Federation
Ben Cahoon, Mayor, Town of Nags Head
Susie Walters, Mayor Pro-Tem, Town of Nags Head
Renee Cahoon, Commissioner, Town of Nags Head
Webb Fuller, Commissioner, Town of Nags Head
Mike Siers, Commissioner, Town of Nags Head

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Chapter 1

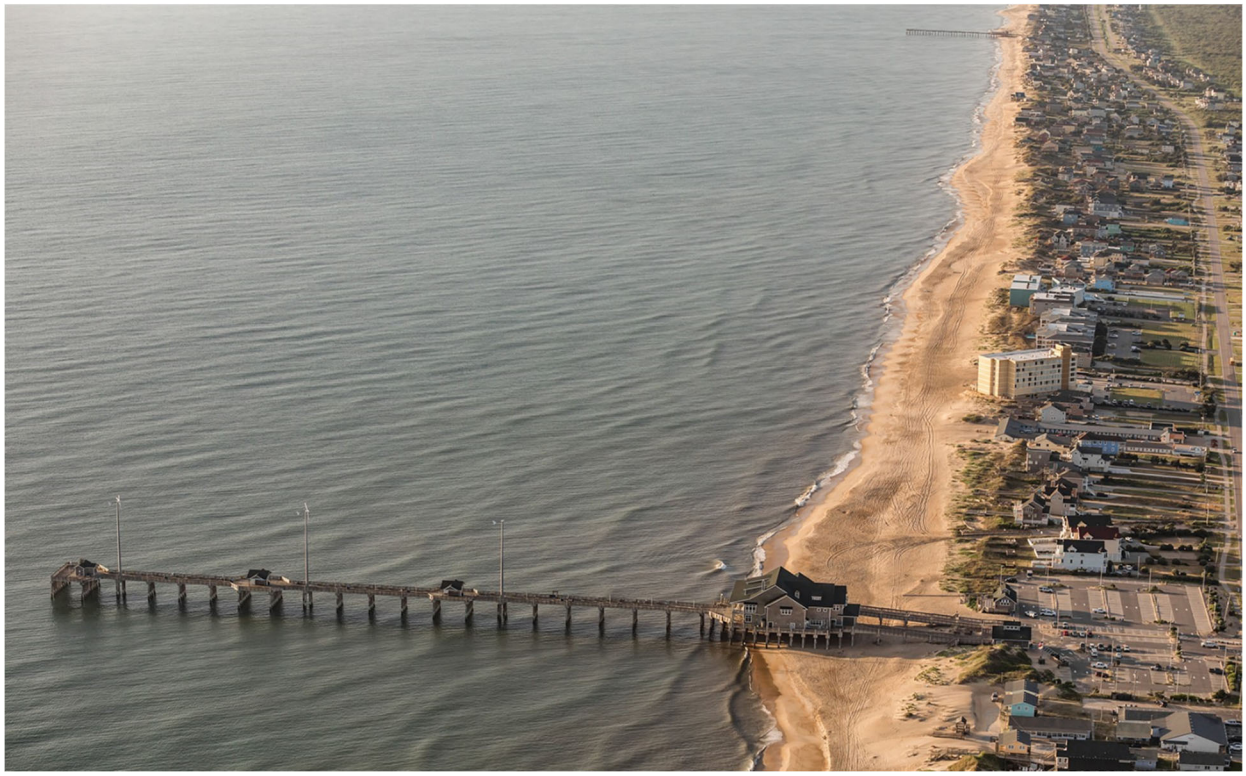
Introduction

The Town of Nags Head is a unique resort community that takes pride in its clean water, low density of development and vast open spaces. Residents and visitors alike rely on the Town's abundant water resources to live, work and play. Nags Head's economic prosperity is dependent on the availability and health of its water resources.

Due to the various ways we use our water, it is essential for us to protect our water resources. To achieve this goal, actively managing stormwater runoff is essential. An effective approach to managing stormwater runoff is through Low Impact Development (LID).

Town of Nags Head Facts

- Nags Head has 11 miles of oceanfront coastline and an equivalent amount of estuarine shoreline.
- Approximately 90% of the properties are developed.
- Approximately 50% of the developed properties were developed prior to 1980.
- About 55 miles of drainage infrastructure within the Town boundaries.
- Approximately 85% of the developed properties are served by on-site wastewater.



A view of the Nags Head oceanfront shoreline near Jennette's Pier (Photo credit: Great Lakes Dredge and Dock Company, LLC)

Background

The Town of Nags Head is located on Bodie Island, east of Roanoke Island in Dare County, North Carolina. The 6.7 square mile township is bounded by the Roanoke Island to the west, Atlantic Ocean to the east, Town of Kill Devil Hills to the north, and Cape Hatteras Seashore to the south. Incorporated in 1961, the Town of Nags Head has developed into a popular vacation destination. Over the last 40 years development within Nags Head has accelerated creating an increased burden on the Town's resources. As development occurs, the additional impervious surfaces create more stormwater runoff and less availability for infiltration into the surrounding sandy soils. The increase in stormwater runoff can contribute to roadway and property flooding as well as the degradation of the water quality of the surrounding waterbodies.

The existing stormwater drainage system for the Town relies heavily on (5) ocean outfalls maintained by the North Carolina Department of Transportation (NCDOT). The outfalls were originally constructed to provide drainage for ocean overwash events when the storm surge from the ocean overtops the dunes. As development has occurred, additional stormwater drainage systems were connected to the outfall. In most instances the outfall pipes were not designed to convey flows from the drainage systems that are currently connected to the outfalls.

The existing outfall system operation primarily serves as a mechanism to provide flood relief for roadways. However, providing flood relief by draining runoff towards surrounding waterbodies can degrade the water quality of the receiving waters as pollutants from impervious surfaces are conveyed through the stormwater outfalls.

Preserving water quality is critical to the Town of Nags Head as we strive to be good stewards of the environment in our mission "to provide for the health, safety and welfare of the citizens, property owners and visitors to the Town." In order to protect this vital resource, stormwater management strategies can be employed to reduce the volume of untreated stormwater discharging to receiving waters. Low Impact Development is a specific management strategy that can be applied to mitigate both flood related impacts and water quality treatment.

Figure 1.1 Town of Nags Head Map

Purpose

This manual is intended to provide a broad application of Low Impact Development techniques to new, existing and redevelopment sites. The level and types of applications will vary from site to site. It is intended to provide property owners, builders, developers and the general public with guidance on integrating LID at various scales. Stakeholders can use this manual as technical guidance to design, construct and maintain specific LID measures.

This manual can also be used as a reference for those who seek compliance with the provisions of the Town of Nags Head Unified Development Ordinance, Chapter 11, Environmental Regulations, Part 1 Stormwater, Fill and Runoff Management. To proactively manage stormwater and protect water quality, it will take the support of all stakeholders involved to successfully, communicate, coordinate and educate to implementing LID into the community.

Application of Manual

This document provides technical guidance on the application of LID practices as an acceptable approach to meet state and local stormwater management objectives. The information contained within the manual is intended as a starting point to provide guidance in the application of LID practices.

For new development and redevelopment projects requiring permits, this manual should be used in conjunction with applicable current local, state and federal laws, rules, codes, ordinances and standards.

Existing property owners and community members play a vital role in protecting the health and welfare of coastal water quality. This manual provides simple solutions that can be implemented on a lot by lot basis. Town staff can advise and assist property owners on smaller scale residential projects.

A view of the Nags Head oceanfront (Photo courtesy of Town of Nags Head)

Chapter 2

Stormwater Management

Clean water resources are essential to the economic vitality of Nags Head. Proper stormwater management is an essential component of water quality protection. Low impact development is the cornerstone of stormwater management and a mechanism to protecting our water resources.

Hydrologic Cycle

A key component to protecting water resources is to keep the water cycle in balance. The movement of rainfall from the atmosphere to the land and then back to the atmosphere is a naturally continuous process to humans and virtually all other forms of life. The balanced water cycle of precipitation, evapotranspiration, infiltration and groundwater recharge sustains Nags Heads vast but fragile water resources.

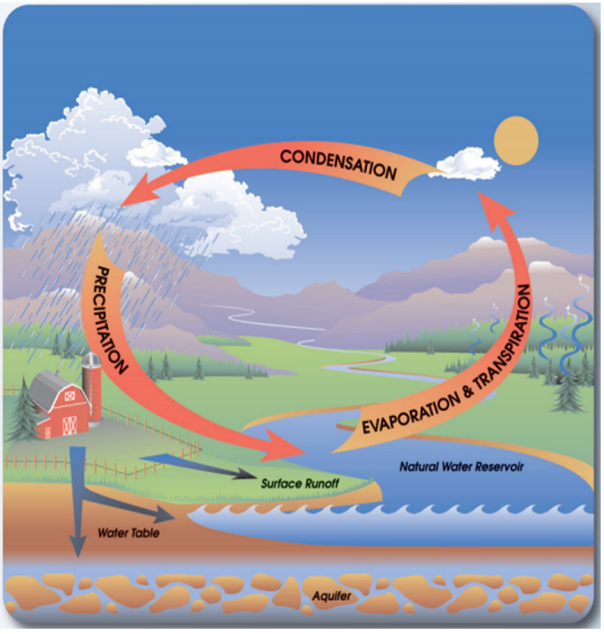


Figure 2.1 Water Cycle Graphics courtesy of the NC Wildlife Resources Commission

In the Town of Nags Head, most of the annual rainfall infiltrates, (soaks into), the underlying sandy soils. Infiltration is the result of precipitation percolating downward through the soil until it reaches the water table. The water table moves laterally and downgradient, through the influence of gravity, ultimately intersecting with channels, wetlands and surface waters.

Over half of the annual rainfall returns to the atmosphere through evapotranspiration. Surface vegetation, especially trees, transpire water to the atmosphere. Evapotranspiration rates for vegetation vary by season, with peak evapotranspiration rates occurring during the spring and summer growing season.

Land development and construction activities change the land surface and impacts the water cycle. Altering one component of the water cycle results in changes in other elements of the cycle. Impervious surfaces, such as roads, buildings and parking lots, prevent rainfall from infiltrating into the soil and significantly increases the amount of rainfall that runs off. Research shows that soil compaction resulting from land development activities produces a greater amount of runoff than pre-development conditions. When natural vegetation is removed, the amount of evapotranspiration decreases. As impervious areas increase, runoff increases and can result in the decrease of groundwater recharge.

Impacts of Development

Stormwater runoff is precipitation which sheds off improved or unimproved surfaces that is released into channels, wetlands, estuaries and surface waters. Problems related to stormwater runoff are most evident in developed areas. A change in the

water cycle can have a dramatic effect on our water resources. The impact is based on both the quantity and quality of stormwater runoff reaching our sounds and oceans.

When rain reaches the ground, it typically infiltrates into the soil until the point where the soil can become completely saturated. The infiltration process naturally filters the water before it settles into aquifers or makes its way as groundwater flow to estuaries, the sound, or the ocean. The sandy soils of the Outer Banks generally absorb rainfall efficiently into the ground. However, some periods of rainfall may exceed the ground's ability to collect and filter the water. Precipitation onto saturated ground can result in surfacing groundwater and localized flooding.

Development activities that result in the removal of trees and other vegetation can effectively reduce natural and passive stormwater measures such as evapotranspiration, (plant uptake). This can result in less absorption of precipitation into the ground, or used by plants, thereby increasing the potential for stormwater to concentrate and collect pollutants with discharges to the bodies of water that we depend on for food, income, and recreation.

Residential and commercial development can alter natural drainage patterns and increase impervious surfaces such as parking lots, driveways, or rooftops that do not absorb water. As precipitation falls and flows from an impervious surface, the runoff collects chemicals, oil, antifreeze and refuse from parking lots, or fertilizers, pesticides, and sediment from lawns and gardens. Runoff can also pick up loose soil or scour the ground, producing erosion. Sediment and silt carried by stormwater can impede drainage flow resulting in reduced system effectiveness.

Impervious surfaces are warmed by the sun. Runoff from warmed surfaces increase the

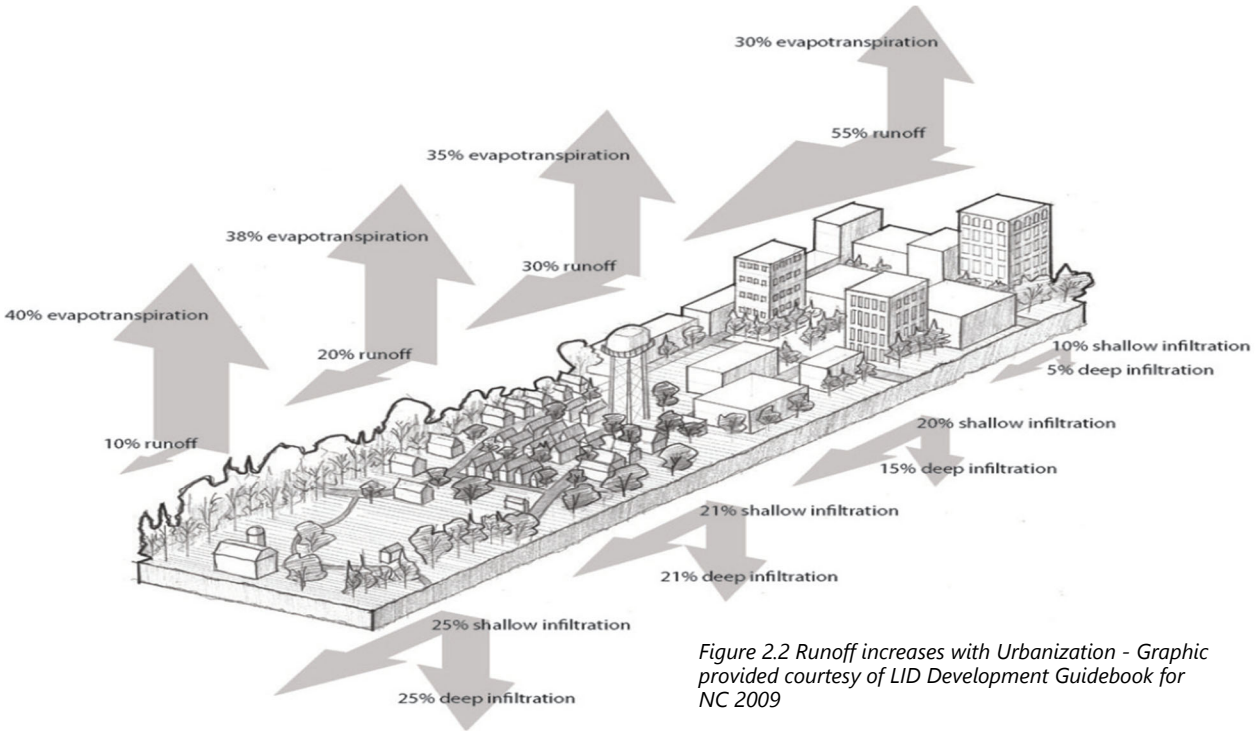


Figure 2.2 Runoff increases with Urbanization - Graphic provided courtesy of LID Development Guidebook for NC 2009

temperature of water entering our estuaries, sounds and ocean. Erosive flows and increased water temperature will negatively impact the diversity of aquatic habitat.

Stormwater runoff can negatively impact water resources in many ways leading to diminished economic and recreational opportunities.

Low Impact Development

The term low impact development (LID) refers to systems and practices that are implemented in such a manner that the post-development hydrologic response mimics the predevelopment response (quantity, character and constituents). From a stormwater management perspective, LID is the application of techniques to emulate the natural water cycle. The basic principle is modeled after nature and manage rainfall runoff close to its source.

Low impact development techniques are based on the premise that stormwater is a resource and not to be quickly transported and disposed of. Instead conveyance/ management/ treatment in large costly end-of-pipe facilities, LID addresses stormwater through small, cost-effective and integrated landscape features that can be implemented at various scales.

With the change in land surface from construction and land development activities, not only does the peak runoff rate increase, but the total volume of runoff can dramatically increase. LID focuses on both peak rates and total volumes of runoff.

LID application techniques are designed to attenuate peak rates of runoff for larger storms and prevent runoff volume increases for more frequent smaller storms. Thus, natural flow patterns are kept in balance, minimizing the adverse impacts associated with stormwater runoff.

This manual focuses on Low Impact Development (LID) approaches to managing stormwater. LID uses techniques to capture and store stormwater as close to the source as possible to promote infiltration and treatment, thereby reducing runoff and the amount of pollution that runoff can convey. LID practices include site planning that provides small, decentralized management practices and approaches that are versatile and site specific.

LID Practices

Strive to replicate all components of the hydrologic cycle by:

- Minimizing total runoff volume
- Controlling peak runoff rate
- Maximizing infiltration and groundwater recharge
- Maximizing evapotranspiration
- Protecting water quality

For new development, an LID approach identifies natural features and strategically places buildings, driveways and parking areas advantageously to allow for a stormwater management system that works with existing natural features and drainages.

In redevelopment, LID includes forming an inventory of built and natural areas that can incorporate strategies and technologies to handle existing conditions and maximize infiltration in existing open space.

LID Principles

1. Focus on Prevention
   - Protect wetlands, floodplains and coastal habitats
   - Maintain slopes and flow paths
   - Minimize grading and tree clearing

2. Work with the Landscape
   - Identify environmentally sensitive areas
   - Outline a plan to protect those areas
   - Use hydrologic features of the site

3. Keep it Simple
   - Use low-cost approaches to decentralize run-off
   - Micromanage stormwater close to where it falls
   - Direct runoff from impervious surfaces to landscaped areas and other small scaled techniques for infiltration

4. Practice multi-tasking
   - Use landscaping for a variety of purposes. Landscapes can capture and treat pollutants and provide curb appeal
   - Distribute management practices on a site so that they work together to reduce runoff and associated impacts

5. Maintain and Sustain
   - Maintain LID features so that they remain effective and provide long-term success

Vegetated swale – Photo provided by the Town of Nags Head

Rainwater Harvesting – Photo provided by Town of Nags Head

Rain Garden – Photo provided by Town of Nags Head

Stormwater Control Measures (SCM)

Stormwater Control Measures (SCMs) are structural measures that are used to capture, control and treat stormwater runoff. Stormwater Control Measures and Best Management Practices (BMPs) are essentially interchangeable terms that describe techniques to manage stormwater.

An individual SCM or combination of SCMs can effectively treat and reduce pollutants contained within stormwater runoff. SCMs provide an effective and practicable means to meet water quality standards or goals by reducing the volume of stormwater runoff and concentration of pollutants contained therein when implemented as designed and appropriately maintained.

SCMs are physical structures that are designed to remove pollutants from stormwater runoff while simultaneously improving water quality, reducing flooding, erosion, and promoting groundwater recharge. An SCM can be designated either primary or secondary based on its level of Total Suspended Solid (TSS) removal. Primary or secondary SCMs can cooperate with each other to achieve more effective on-site stormwater management.

There is no single SCM that is suitable for every site, and one SCM might not provide the necessary measures to fully manage stormwater runoff in compliance with goals and regulations. Plus, unique land features or differences in development impact the effect of certain SCMs for proper stormwater management. There are different SCMs that are better suited for different aspects of stormwater management. The use of multiple SCMs and integration with the natural surroundings is highly recommended to meet stormwater management goals.

Grassed Swale – Photo provided by Town of Nags Head

Concrete Grid Pavers – Photo provided by Town of Nags Head

Infiltration Basin – Photo provided by Town of Nags Head

Chapter 3

LID for Stormwater Compliance in Nags Head

New modifications have been added to the Stormwater Management Ordinance as of Jan. 1, 2019 that require all new development and/or redevelopment over 500 square feet within the jurisdiction of the town to develop stormwater management plans.

No development activity shall occur except in compliance with the provisions, conditions, and limitations of a land disturbance permit as issued by a zoning administrator. Exemptions include developments with a land disturbance associated with investigation services, (i.e. lot or boundary survey), the evaluation of a property for septic suitability, or repair of existing septic systems. Other permits may be required in accordance with federal, state, or local laws.

Built upon area (BUA) credits may be given for the preservation of significant trees in the area, the addition of trees post-development, as well as the preservation of significant open space. These areas, once identified, will have to remain largely undisturbed during site development.

While LID techniques are applicable for commercial projects, this section of the manual will be focused on individual residential lot development and lays out a step by step approach for developing a stormwater management plan. Adhering to stormwater management requirements and application of LID techniques will effectively reduce pollution from stormwater runoff and improve water quality along the coast.

This section of the manual provides an overview of the Town's application requirements for compliance with the Town's Environmental

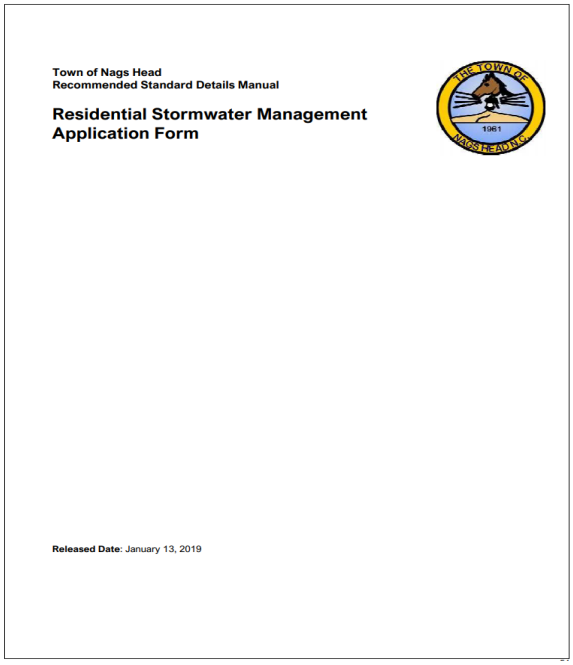
SW Plan Overview

- **Specific regulatory requirements** can be referenced from the **Town of Nags Head Unified Development Ordinance, Article 11-Environmental Regulations.** https://library.municode.com/nc/nags_head/codes/code_of_ordinances
- **Applies to new construction, redevelopment or property improvements** that **add 500 s.f.** or more of built-upon area.
- **Requires** the preparation of a stormwater management plan.
- **Stormwater management plans** can be prepared by the contractor or applicant, with proposed stormwater control measures notated on a prepared site development plan.
- **Staff is available to assist with site planning** of stormwater control measures (SCM), dimensions and associative stormwater volume compliance.
- **Fact sheets** are available for the individual SCM's. Technical information is provided to cover SCM siting, design, installation and operation and maintenance.
- **Staff will conduct a post-construction review** of the stormwater control measures to determine compliance.
- **Formal** operation and maintenance agreements are not required.
- **Separate requirements are required for residential applications requesting lot coverage bonus as per UDO Article 8-8.6.6.2

Regulations - Stormwater, Fill and Runoff Management - General standards for residential or duplex development on individual lot.

Stormwater Credits

Homeowners and/or contractors may contact Town staff for assistance with identifying significant trees to retain and open space portions to preserve, before site clearing begins. These areas will need to remain largely undisturbed during site development. Users of this manual should note that built-upon area (BUA) differs from lot coverage in that BUA means an impervious or partially impervious surface that does not allow water to infiltrate through. Lot coverage is the percentage of a parcel of land that is covered by surface improvements. Staff members will meet you on site and assist with this process. Credits are broken down into the for categories: Tree preservation, Tree planting, Open space preservation & multiple SCM credits.


Town of Nags Head
Recommended Standard Details Manual

Residential Stormwater Management Application Form

Released Date: January 13, 2019

Town of Nags Head Residential SW Management Application Form

Available Credits

1. Tree Preservation Credit- **100 SF reduction in built-upon area** for each tree **preserved** over 6" caliper.
2. Tree Planting Credit- **50 SF reduction in built-upon area** for each tree **planted** that is 2" caliper or greater.
3. Open Space Credit**- 30% reduction in built upon-area for each square foot of open space preserved**. **A minimum of 1,000 SF shall be preserved to qualify** for this credit. Preserved open space shall be applied to areas that are excluded from development including wetland areas, ponds, or areas that are excluded from other agencies.
4. Multiple SCM credit – incorporating **at least (3) different SCMs** on site results in **a 15% reduction in built-upon area**.

Important Notes

1. **Choose** the SCM that works best for your site. Some SCM's function better than others depending on landscape, topography & depth to soil wetness condition.
2. **Contact** the Town before you start land disturbing activities.
3. **SW Permit is required** for development, redevelopment or additions is 500 SF or more of built-upon area.
4. SW Permit application https://www.nagsheadnc.gov/DocumentCenter/View/2035/Residential-Stormwater-Management-Application

Chapter 4

Non-Structural Practices

Site Fingerprinting

A core concept of LID is managing stormwater runoff at the source by integrating site design and planning to preserve natural systems, protect open spaces, retain existing vegetation and maintain hydrologic functions. Site Fingerprinting is a practice that uses site design as a stormwater management tool by reducing land disturbance, preserving soil structure, and utilizing suitable natural areas (rather than expensive structural practices for runoff management). Rather than grading land to fit a desired development type, the type of development is dictated by the existing conditions of the site, resulting in a developed site which uses the land to maintain and protect the natural balance of the surrounding ecosystem.

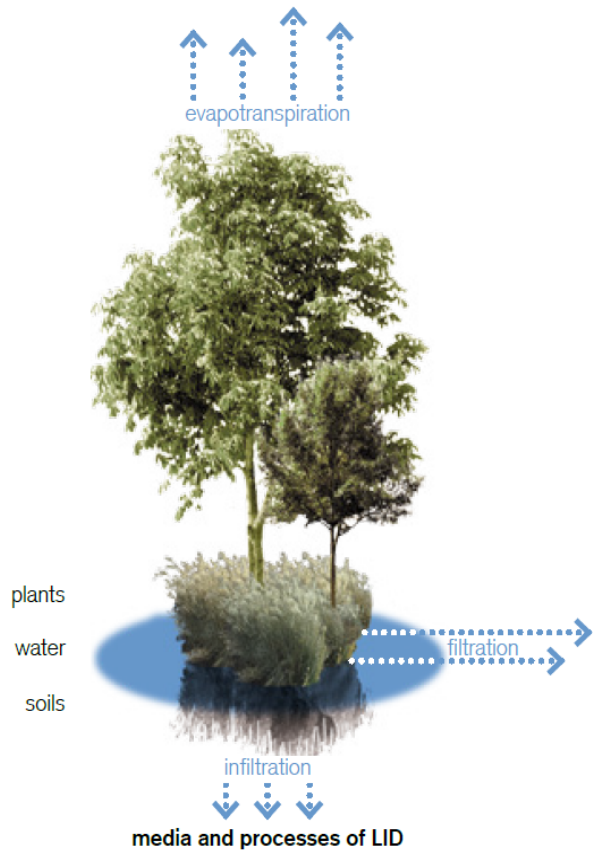
Site fingerprinting utilizes nonstructural Best Management Practices (BMP's) which take broader planning and design approaches that are less structural in nature. Examples of non-structural BMP's are:

Non-Structural BMP's

- **Cluster** development
- **Minimize** soil compaction
- **Minimize** disturbed areas
- Protect natural drainage pathways
- **Protect** riparian buffers
- **Protect** environmentally sensitive areas
- **Reduce** Impervious surfaces
- **Disconnect** stormwater connections

By fitting the development to the land, it is often easier to preserve existing vegetation, giving a more established look to new developments. Incorporating Site Fingerprinting into the site development planning process includes many benefits which include:

- Reduced land clearing costs,
- Reduced costs for total infrastructure,
- Reduced costs for stormwater management,
- Reduced runoff volumes discharged into our waterways, and
- Enhanced community and individual lot aesthetics.



Graphic courtesy of UACDC Low Impact Design a design manual for urban areas

Re-Routing Downspouts

A downspout or roof drainpipe is a vertical pipe that conveys rainfall runoff from roof gutter collection system. Typically, downspouts are directed to driveways or to a storm sewer system which conveys flow to either the Atlantic Ocean or the Roanoke Sound. By disconnecting your downspout and redirecting runoff to a landscaped area or lawn, you can create opportunities for infiltration reducing impacts to our vital water resources. Alternatively, roof runoff can also be directing into a rain barrel or a cistern. It is a simple and effective way to reduce stormwater runoff.

Additional benefits of downspout re-routing include:

- Reduced runoff volume and water quality impacts on downstream resource areas,
- Directs water to landscaped areas saving on the cost of irrigation,
- Can be combined with other SCM's to create an effective stormwater management plan, and
- It's cost effective.

Helpful Hints

Receiving Area length should be a minimum of half of the roof length that is directed to it.

Receiving Area width should be at least half of the overall length.

Avoid diverting runoff onto neighboring properties or onto your septic system or drainfield area**.**

Use pop-up emitters to disperse runoff onto landscaped areas.

Helpful Hints (continued)

Link downspouts to rain barrels or cisterns for rainwater harvesting.

Direct downspouts to areas where water can infiltrate into the ground such as lawns, and landscaped areas.

Receiving Area should be lower than the elevation around building foundation and graded at least 5 ft. from the dwelling.

Avoid adding downspout connections across a walkway, patio or driveway to avoid creating a tripping hazard**.**

Homeowners show how to add a diverter to redirect drainage from downspouts away from sidewalks and driveways towards lawns, natural areas, or rain gardens - photo courtesy of N.C. Coastal Federation

Living Shorelines

A Living Shoreline is a natural solution for shoreline erosion and protection. It also provides retrofits for common practices, such as bulkheads, which are temporary measures to combat shoreline erosion. A living shoreline system implements native marsh plants and sometimes oyster or rock sills to create a more natural and productive shore. It also provides a stabilization method for erosion with the changing tides and storms while simultaneously enhancing and preserving natural ecosystems. There are stormwater control measures that can benefit from living shorelines like backyard wetlands. A living shoreline is a secondary technique for a SCM. The protection of shorelines from erosion allows the native marsh vegetation and soils to reduce pollutant loads, help improve water quality though plant uptake and infiltration, and water filtration where oyster sills are in place.

Living Shoreline at the North Carolina Coastal Federation's office in Wanchese, NC, Photo courtesy of N.C. Coastal Federation

Several different techniques can be employed for the construction of a living shoreline This includes

- Hybrid techniques: Combination of structural and non-structural practices. (Example: Rock sills and edging, oyster sills)
- Non-structural techniques: implements native features of the land and vegetation. (Example: Planting native vegetation to marshlands, edging)

Helpful Hints

Wave Energy is a primary factor in determining living shoreline placement and type of technique, (i.e. hybrid or non-structural) to be employed.

Excessive wave energy may impede growth and development of newly planted vegetation.

Consider the type of technique to be employed how (i.e. hybrid or non-structural) and how it will be adapted to the existing landscape.

Use native vegetation when possible, to maintain natural habitat and features.

There are many benefits to utilizing living shorelines that include:

- Reduced erosion and wave energy
- Maintained natural marsh
- Protected coastal habitat
- Filtered and improved water quality
- Buffered shore for changing water levels

If considering a living shoreline please contact the N.C. Division of Coastal Management representative for permit guidance. The N.C. Coastal Federation or a licensed design professional can be an additional resource for design assistance.

Chapter 5

SCM Fact Sheets

A fact sheet has been prepared by the individual SCM providing an overview of mechanism description, benefits, siting considerations, design consideration, sizing calculations, installation and operation and maintenance recommendations. The fact sheets can be removed separately and serve as a stand-alone document for quick reference.

SCM Structural Practices

Detail 500 -French Drain

Detail 501 -Dry Well

Detail 502 -Infiltration Trench

Detail 503 -Infiltration Basin

Detail 504 -Permeable Paver

Detail 505 -Rain Barrel

Detail 506 -Rain Garden

Detail 507 -Vegetated Swale

Detail 508 -Recommended Plant List(s)

Vegetated Swale: photo provided by Town of Nags Head

Rain Garden: photo provided by Modelremodel.com

Pervious Pavers: photo provided by Town of Nags Head

Trench Drain: photo provided by Town of Nags Head

FRENCH DRAIN
DESIGN & INSTALLATION

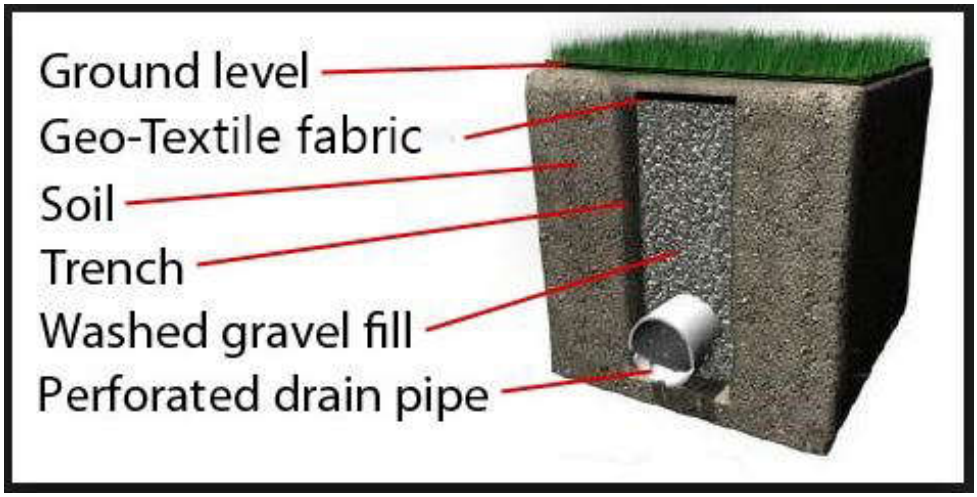


Illustration: englishrooferinnormandy.com

SITING

Drainage Area
Small to medium drainage area, 500 -1000 SF.

Space
Underground trench that can be utilized in limited space.

Topography
French drain is impractical in areas of steep slopes.

Soils
Permeable soils are best suited for French drains.

Setbacks
Min. 5' from building foundation, 10' from septic systems, Min. 25' from wetlands.

DESIGN INFORMATION

DESCRIPTION
A French drain is a trench covered in washed stone or other approved media that diverts surface runoff and groundwater away from a certain area. French drains are commonly used to capture and collect runoff and convey to another Storm water control measure (SCM).

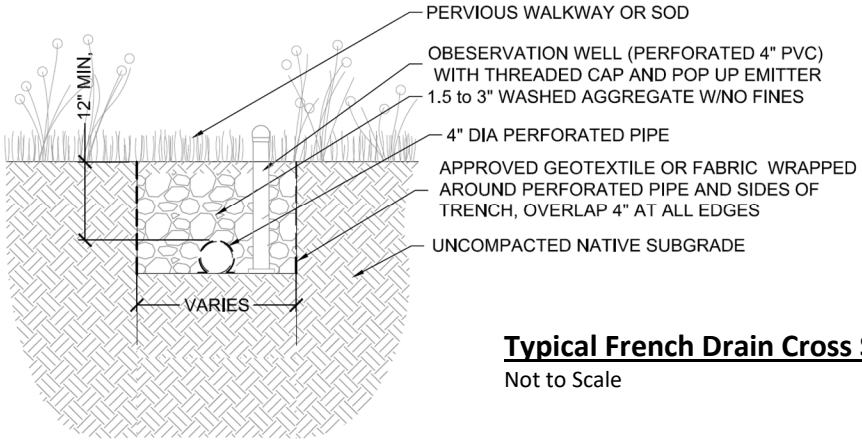
BENEFITS
1. Enhances groundwater recharge.
2. Can be used in limited space.
3. Provides for an underground solution, with usable space above.

DESIGN CONSIDERATIONS
1. Variety of lengths depending on storage volume needed.
2. Choose your location based upon whether the application will receive runoff by sheet flow or conveyance.
3. Minimum 1% longitudinal slope for conveyance to another SCM.
4. Minimum 10" width, maximum 36" in depth.
5. Fabric shall encase the gravel and be of a polypropylene mesh fabric or non-woven geotextile.
6. Aggregate shall be washed 1-1/2" -3" in size without any fines.
7. Pre-fabricated French drain substitutes will be considered when product technical specifications are provided.

SIZING CALCULATIONS
1. Calculate Tributary area in Square Feet.
2. Divide tributary area by 100, then multiply by 15 to get water quality volume requirement in cubic feet.
3. Calculate the storage volume of your proposed infiltration trench L x W x H x .4; see worksheet B.
4. The total storage volume shall exceed the minimum required water quality volume.
5. If you are taking advantage of open space credits and storm water control measure credits, see worksheet A & B for confirmation of volume requirement.

Vertical Separation

Min. 12" separation from bottom of trench to seasonal high-water table.



Typical French Drain Cross Section
Not to Scale

OPERATION& MAINTENANCE

(TO BE CONDUCTED POST-CONSTRUCTION & ANNUALLY**)**

Clogging

Over time, French drains can be compromised by tree roots, stray soil, gravel and other debris. Regardless of whether your French drain has become clogged, it's a good idea to clean it out on an annual basis.

Cleaning

Using your garden hose, send water down the drain. If the water backs up instead of running through, you may have a clog. Unclog the drain with a pressure washer. Use a sewer snake to clean out stubborn clogs

Remedial Measures

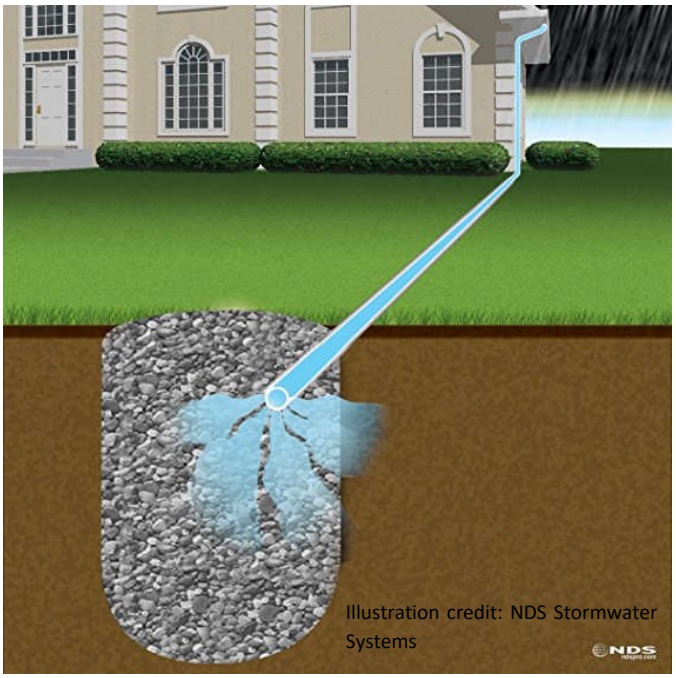
If French Drain has not drained within 48 hours after storm, drain via pumping. Excavate around well perimeter to expose clean soil (~2 inches). Replace and reline filter fabric. Clean or replace aggregate and any perforated piping.

INSTALLATION

MATERIALS

- After calculating necessary sizing calculations, excavate a ditch that will allow at least 12" from top of the pipe to top of grade.
- If you're installing a French drain around your foundation or pilings, take care to position the pipe below slab or finished floor level.
- Install non-woven geotextile or polypropylene mesh fabric by lining inside ditch bottom and walls.
- Install perforated pipe sloping 1" for each 10' of length (1% slope) for SCM connection. Stand-alone SCM can be level.
- Backfill trench with clean, 1 – 1 ½ " to 3" washed aggregate with no fines.
- Recommend one bypass device such as a pop-up emitter, which will direct overflow away from your house, every 50-linear ft.
- A minimum of 1 observation well should be provided per SCM. An observation port shall consist of a 4" diameter pipe to permit observation of internal water levels.

DRY WELL
DESIGN & INSTALLATION



SITING

Drainage Area
Small to Medium drainage areas; 500-1000 SF.

Space
Not used where it may create a risk for ground floor flooding, conflict with sewage disposal systems or under pavement areas.

Topography
Installation on slopes greater than 20% should be avoided.

Soils
Permeable soils are best suited for dry well. HSG shall be Type A or B.

Setbacks
Depths 2' or less- min. 5' from building foundations, Depth 2' or greater 10' min. from building foundation.

Min 10' from septic systems Min. 25' from "404" wetlands.

DESIGN INFORMATION

DESCRIPTION
A dry well is a subsurface storage facility that receives and temporarily stores stormwater runoff. Discharge of stored runoff from a dry well occurs through infiltration into the surrounding soils. A dry well may be either a structural chamber and/or an excavated pit filled with aggregate. Drywells are typically used to infiltrate stormwater runoff from roofs via a roof gutter collection system.

BENEFITS
1. Reduces runoff volume and attenuates peak flows
2. Enhances groundwater recharge.
3. Minimal visual impacts.

DESIGN CONSIDERATIONS
4. The depth shall be less than the widest surface dimension.
5. Aggregate shall be washed 1-1/2" -3" in size without any fines.
6. The drywell shall be equipped with a system bypass.
7. A 40% void ratio in the aggregate bed shall be utilized.
8. Minimum 24 in. depth, Maximum 48 in. depth.

SIZING CALCULATIONS
1. Calculate Tributary area in square feet.
2. Divide tributary area by 100, then multiply by 15 to get water quality volume requirement in cubic feet.
3. Calculate the storage volume of your proposed dry well L x W x H x .4; see worksheet B for detailed calculations.
4. The total storage volume shall exceed the minimum required water quality

Vertical Separation

Min. 12" separation from bottom of well to seasonal high-water table.

volume.

5. If you are taking advantage of open space credits and stormwater control measure credits, see worksheet A & B for confirmation of volume requirement.

OPERATION & MAINTENANCE

(TO BE CONDUCTED POST-CONSTRUCTION & ANNUALLY)

Observation Well

Check Observation wells within 48 hrs. of the end of wet weather. Water should have percolated from the well within this time frame.

Pre-Treatment Devices

Inspect pretreatment devices, (i.e. downspout filters) for operability and sediment buildup.

Bypass Devices

Inspect bypass devices to ensure functionality.

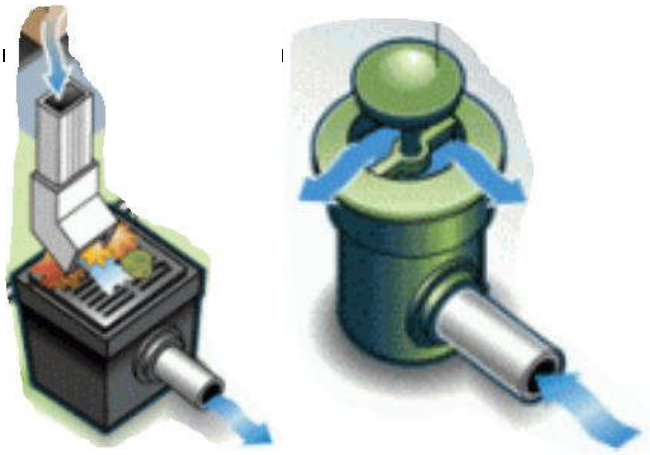
Remedial Measures

If dry well has not drained within 48 hours after storm, drain dry well via pumping. Excavate around well perimeter to expose clean soil (~2 inches). Replace and reline filter fabric. Clean or replace aggregate and any perforated piping.

INSTALLATION

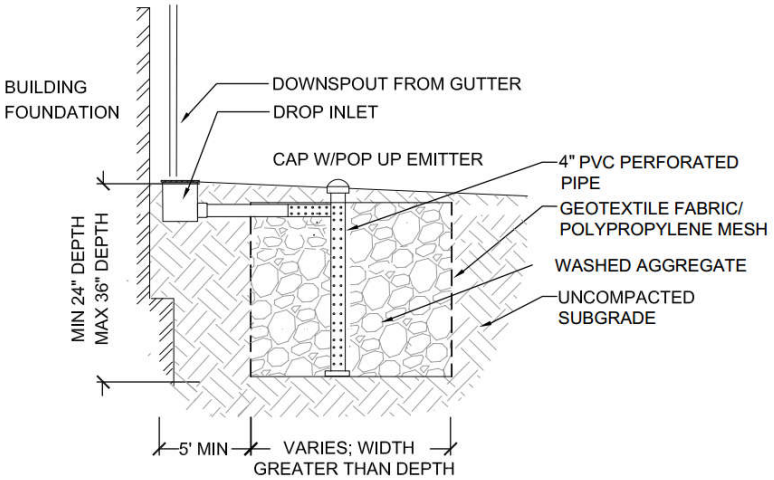
MATERIALS

- Washed locally available aggregate with a diameter range of 1-1/2" to 3" in size.
- Line the well side walls with non-woven geo textile or polypropylene fabric to minimize sedimentation from lateral soil movement.
- Conveyance- It is recommended that surface runoff be directed via a roof gutter collection system piping.
- Pre-screening- To prolong the operating life of the system, an inline pretreatment mechanism, (i.e. filter downspout filter) shall be installed on the inlet end of the dry well.
- Pre-manufactured products such as round plastic containers with perforations to allow water to exfiltrate is an acceptable alternative.
- A positive outlet shall be required to permit bypass flows more than the water quality volume. Recommended minimum 1 per 50 linear feet.
- An operation and maintenance port to allow inspection and maintenance and the observation of water level is a requirement.



Bypass device: Typical Pop up Emitter (right)

Pre-treatment device: Typical Drop Inlet (left)



Typical Dry Well Cross Section

Not to Scale

INFILTRATION TRENCH

DESIGN & INSTALLATION

SITING

Drainage Area

Small to medium drainage areas; 500 – 1000 SF.

Space

Can fit in underutilized or marginalized areas of a site.

Topography

Infiltration trench bottom should be level, but the slope of the surface may vary.

Soils

Permeable soils are best suited for French drains.

Setbacks

From septic systems, 5' less than 2' depth, 10' greater than 2' depth. Min 5' from Building Foundations, Min. 25' from "404" wetlands.

DESIGN INFORMATION

DESCRIPTION

Infiltration trenches are excavated trenches filled with granular material. The voids between the aggregate materials provide the volume for temporary storage of runoff that gradually infiltrates into the surrounding soil. Dry Wells are very similar to Infiltration Trenches but are configured as a stone-filled pit rather than a trench (see DRYWELL fact sheet).

ENHANCES GROUNDWATER RECHARGE.

1. Can filter out sediment and other pollutants.
2. Underground solution for small or remedial spaces.

DESIGN CONSIDERATIONS

1. Long linear applications help prevent groundwater mounding by reducing the rate of potential infiltration and make infiltration trenches ideal for application beneath curbs, gutters, sidewalks and parking area perimeters.
2. The surface of the trench may be covered in grass having a surface inlet, or with porous material such as stone or gravel.
3. 36" maximum depth.

SIZING CALCULATIONS

1. Calculate Tributary area in Square Feet.
2. Divide tributary area by 100, then multiply by 15 to get volume requirement in cubic ft.
3. Calculate the volume of your proposed infiltration trench L x W x H x .4; see worksheet
   B for volume calculations.
4. The total storage volume shall exceed the minimum required water quality volume.
5. If you are taking advantage of open space credits and storm water control measure credits, see worksheet A for confirmation of volume requirement.

Photo credit: Sustainable drainage systems

Photo credit: Atalier Cap Paysage Urbanisme

OPERATION & MAINTENANCE

(TO BE CONDUCTED POST-CONSTRUCTION & ANNUALLY)

Clogging

Remove debris and inspect for sediment buildup and structural damage. Ensure the trench is dewatering between storms and not bypassing facility.

Cleaning

Remove sediment adjacent to or near trench. Repair any erosion in aggregate or grassed areas.

Remedial Measures

If trench has not drained within 48 hours after storm, drain via pumping. Excavate around well perimeter to expose clean soil (~2 inches). Replace and reline filter fabric. Clean or replace aggregate and any perforated piping.

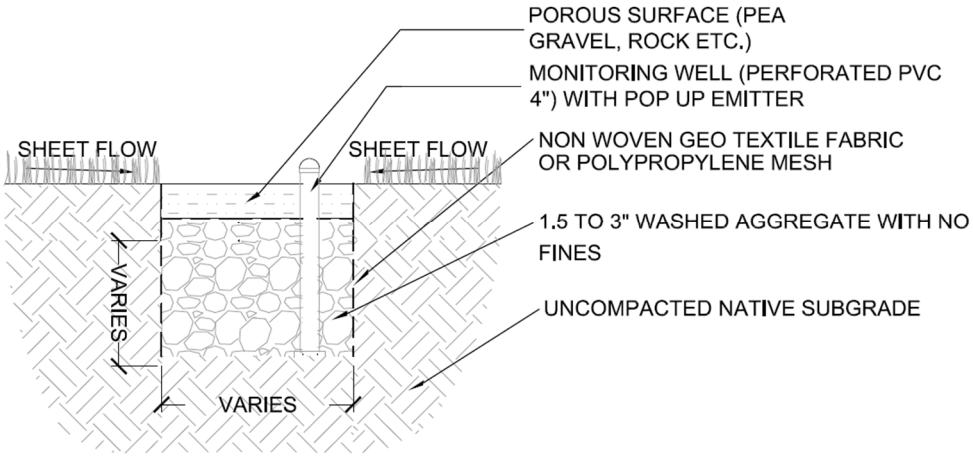
Vertical Separation

-Min. 12” separation from bottom of trench to seasonal high-water table.

INSTALLATION

MATERIALS

1. Stake out the project and mark utilities. Confirm the flow of water into the Infiltration Trench, checking the areas that will contribute runoff to the practice. The best method is direct observation during a rain event, combined with an accurate survey with spot elevations.
2. Excavate the trench at least 18 inches wide. Use only light weight (i.e., walk-behind) machinery and hand tools, or work from the side of the trench. Do NOT compact subgrade.
3. Line the side of the Trench with non-woven geotextile or polypropylene mesh.
4. Install observation well with the footplate at the bottom of the trench. A Min. of 1 observation well should be provided.
5. Install washed aggregate or other approved substrate within 2-4 inches of ground surface.
6. Add Porous surface; Install a 2-4-inch layer of pea gravel. It is also acceptable to top the
   stone layer with soil and sod as an alternative. Do not compact the top layer.
7. Use a bypass device such as a pop-up emitter, which directs any overflow away from home. Recommend 1 pop up emitter per every 50 linear feet.



Typical Infiltration Trench Cross Section

Not to Scale

INFILTRATION BASIN

DESIGN & INSTALLATION

Photo credit: Prime Environmental

SITING

Drainage Area

Varies; Up to 2 acres.

Space

Infiltration trenches can take up significant space and must have a level bottom surface.

Topography

Infiltration Basins are impractical in areas of steep slopes.

Soils

Permeable soils are best suited.

DESIGN INFORMATION

DESCRIPTION

An infiltration basin is a sodded or vegetated, open impoundment where incoming runoff is stored until it gradually infiltrates into the soil.

BENEFITS

1. Enhances groundwater recharge
2. Cost effective
3. Infiltration basins may also act as “bioretention areas” of shallow landscaped depressions, in which vegetation and filtration can further reduce runoff and remove pollution.

DESIGN CONSIDERATIONS

1. Variety of lengths depending on storage volume needed.
2. Minimum 5-6’ bottom width.
3. Maximum 1% bottom cross slope.
4. Maximum 3:1 side slopes; preferably 4:1 or 5:1.
5. Vegetated alternative – minimum 60% plant density.

SIZING CALCULATIONS

1. Calculate Tributary area in square feet.
2. Divide tributary area by 100, then multiply by 15 to get water quality volume requirement (cubic feet).
3. Calculate the storage volume of your proposed infiltration basin L x W x H x LSide x RSide = total storage volume (cf). See worksheet B for exact volume calcs.
4. The total storage volume shall exceed the minimum required water quality volume.
5. If you are taking advantage of open space credits and storm water control measure credits, see worksheet A & B for confirmation of volume requirement.

INSTALLATION

MATERIALS

1. Protect infiltration basin area from compaction during construction. If possible, install Infiltration basin during later phases of site construction to prevent sedimentation and/or damage from construction activity.
2. Install and maintain proper Erosion and Sediment Control Measures during construction.
3. If necessary, excavate Infiltration basin bottom to an uncompacted subgrade free from rocks and debris. Do NOT compact subgrade.
4. Seed and stabilize topsoil.
5. Vegetate if implementing a bio filtration swale as per the recommended plant specifications below. Make sure to maintain and water the vegetation as needed.
6. Rip Rap or Landscape stone is recommended for high velocity outflows.

Setbacks

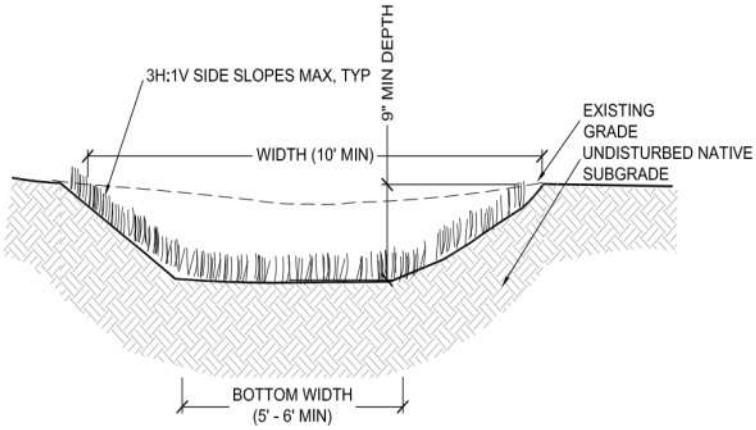
Min 10' from septic systems Min 10' from Building Foundations. Min. 25' from "404" wetlands

Vertical Separation

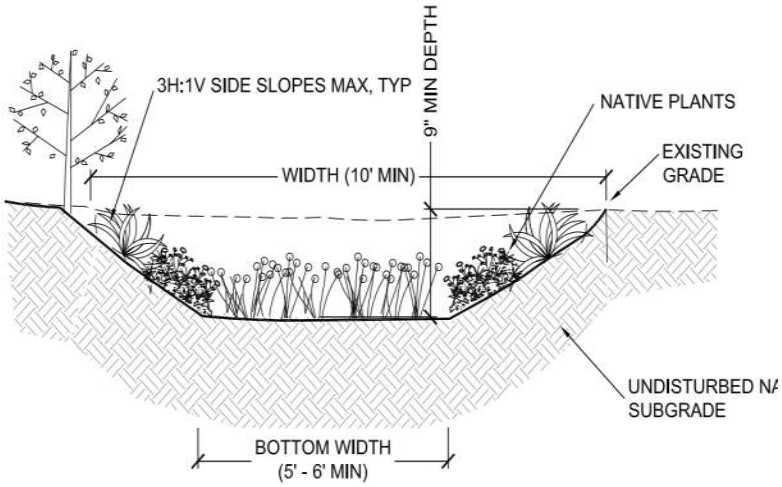
Min. 12" separation to seasonal high-water table from the bottom of the basin.

PLANTING

- Recommended planting guidelines: Basin lower slopes or bottom = 3 plugs per 1 square foot (min. 1-inch diameter by 6-inch tall) (plants that like standing water)
- Basin sides = Grasses – planted 2' – 3' o.c.
  Shrubs – planted 6'-8' o.c
- Basin top= Trees – if desired, near top of swale, planted 10' o.c.



TYPICAL GRASSED INFILTRATION BASIN
NOT TO SCALE



TYPICAL BIO INFILTRATION BASIN
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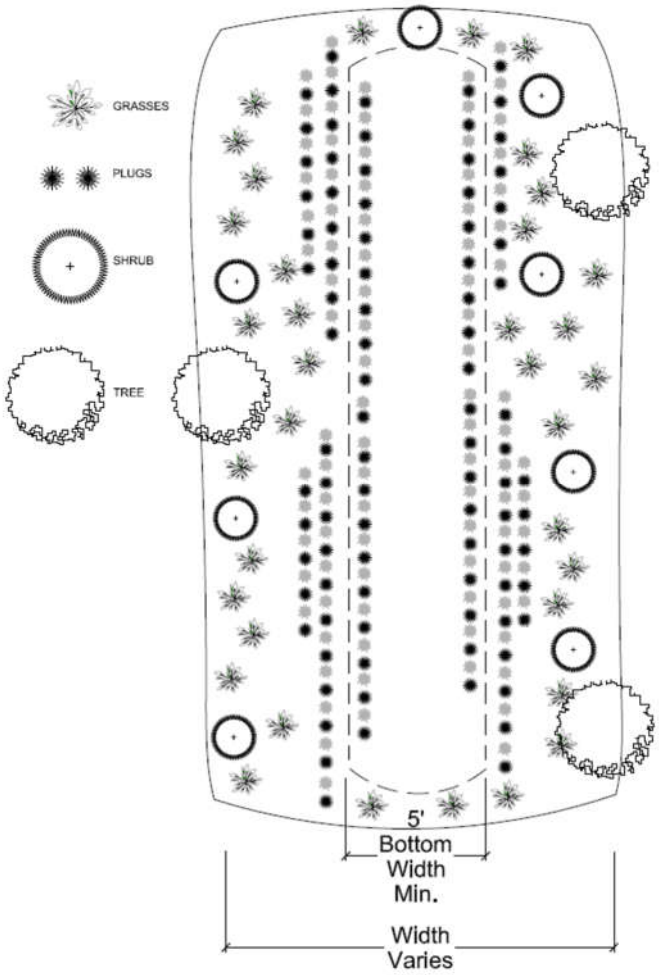


Typical Bio Infiltration Basin Planting Plan
Not to Scale

OPERATION & MAINTENANCE

(TO BE CONDUCTED POST-CONSTRUCTION & ANNUALLY)

Clogging

Litter and debris removal (monthly). Grass cutting for spillways and access routes (minimum of monthly during growing season). Mowing and /or cutting around the basin margins. (monthly during growing season)

Cleaning

Removal of sediment from inlets and outlet (annually) or after significant rainfall events (1.5 “or more).

Remedial Measures

Backfill/rehabilitate areas where any channeling was created during flash floods. Generally, ongoing maintenance is essential to maintain the effectiveness of infiltration basins. Since these basins are long-lived, once in operation only minimal maintenance costs arise.

Photo Credit: Konrad Lew

PERMEABLE PAVER

DESIGN & INSTALLATION

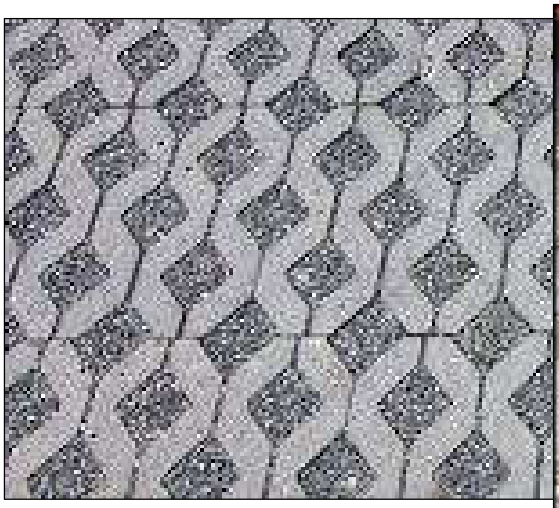


Photo credit: Rockstarstoneworks

Photo credit: Ecostone

SITING

Drainage Area
Small and large drainage areas.

Space
Can be used on driveways, walkways and patios.

Topography
Easiest to install in flat or slightly sloped areas. Maximum cross slope 2%.

Soils
Well drained soils are necessary.

Setbacks
Min 2' from property lines Min 5' from septic systems and Min. 25' from "404" wetlands

Vertical Separation
-Min 12" separation to seasonal high-water table.

DESIGN INFORMATION

DESCRIPTION
Permeable pavers typically have solid concrete surfaces and are meant to be laid with wide spaces between them on a bed of gravel or aggregate. Storm water collects in the joints and is absorbed into an underground base of gravel, which filters pollutants and prevents runoff.

BENEFITS
- Can be used on driveways and patios.
- Maintenance is minimal.
- Enhance the beauty of your yard and the neighborhood.

DESIGN CONSIDERATIONS
For most residential settings, permeable pavers will be applied on driveways and walkways.

1. Check the soils; make sure the soils properly infiltrate and are uncompacted.
2. Min. 3 1/8" thickness for vehicular applications
3. Min. 2 3/8" thickness for pedestrian.
4. A bedding or leveling course above the aggregate base layer should be considered.
5. Permeable pavers shall not count as built upon area.
6. If permeable pavers manage runoff from other built upon areas an additional depth of aggregate base layer will be required.
7. Paver installations will not be counted towards multiple SCM credit with slopes over 2% unless a tiered base layer is provided.

SIZING CALCULATIONS.
1. If you are taking advantage of open space credits, tree credits and storm water control measure credits, see worksheet A for confirmation of volume required.

OPERATION & MAINTENANCE

(TO BE CONDUCTED POST-CONSTRUCTION & ANNUALLY)

An effective maintenance plan shall ensure system efficiency of permeable pavement installations.

Cleaning

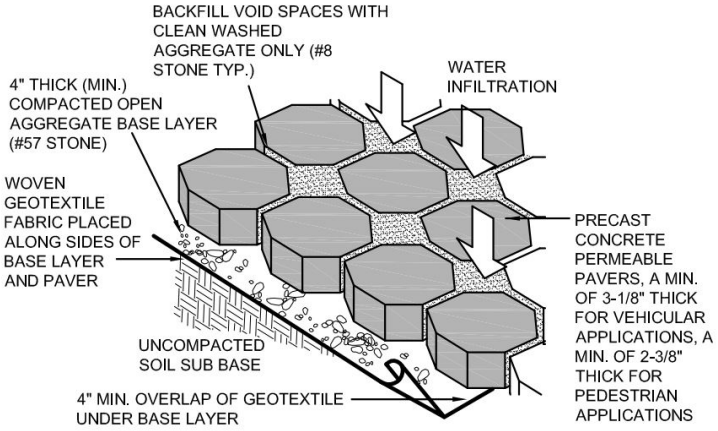
The surface should be kept clean of weeds, leaves, mulch, topsoil and excess sand. Bristle brooms, leaf blowers, rotary brushes, power washers or walk behind vacuums shall be utilize for preventative maintenance and extend the paver's functional life.

Materials

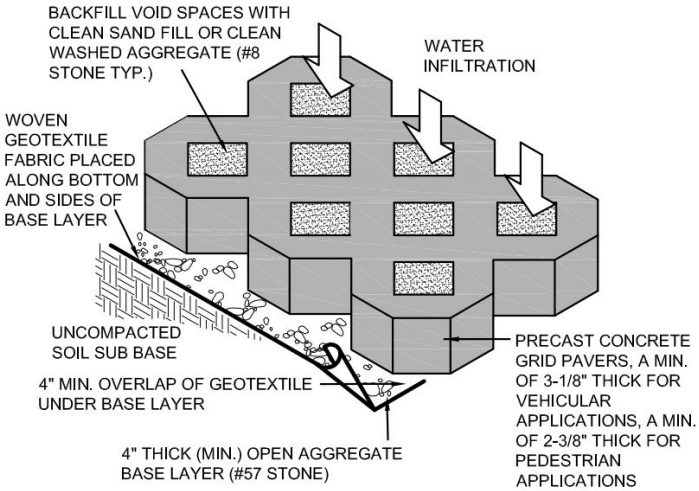
Additional aggregate fill material may also need to be added after cleaning.

Inspections

Inspection of the site should occur monthly for the first few months after construction. Then inspections can occur on a semi-annual basis, preferably after rain events when clogging will be obvious. Consult a professional for remedial measures when surface ponding is observed.



PRECAST CONCRETE PERMEABLE PAVER



PRECAST CONCRETE GRID PAVER

INSTALLATION

MATERIALS

- Permeable pavers, other than Turfstone, shall be considered and shall be approved on a case by case base basis with the submission of specific product technical specifications. Pavement section substitutions shall follow manufacturer recommended specifications OR as designed by a NC licensed Professional Engineer.
- Erosion and sediment control around the perimeter of the pavers is critical. Mulch, topsoil and sand shall be managed post-installation.
- Excavate to a depth as needed to accommodate, base layer depth, bedding course depth and surface course layer so install is flush and level with other finished surfaces.
- Lay woven geotextile fabric; place along sides of base layer and pavers, provide 4" overlap under base layer.
- Install a 4" thick open aggregate base layer over the leveled and uncompacted subgrade.
- The Town Engineer shall be contacted for review and approval upon installation of the base layer in advance of the paver install.
- A bedding layer of 1-1/2" to 2" with No. 8 stone, or approved equal, may be utilized to provide a level base surface for paver installation. A non-woven geotextile fabric is recommended to be installed between the bedding later and open graded aggregate base layer.
- Install a paver edge restraint to keep the pavers from shifting. (See Typ residential permeable paver edge restraint Detail 104).
- A final inspection shall be conducted by the Town Engineer or authorized representative.

RAIN BARREL
DESIGN & INSTALLATION

Photo credit: Reddit.com

DESIGN INFORMATION

DESCRIPTION

Rain barrels are containers used to collect a portion of the rainwater that flows from your rooftop and stores it for uses such as watering your lawn and garden.

BENEFITS

1. Provides a free water source for gardens, lawns, and car washing.
2. Collected water can be used any time, even during periods of water restrictions.
3. Since rainwater is soft, oxygenated, devoid of chlorine and other chemicals it can help improve the health of your garden, lawn, and trees.
4. Cost effective.

DESIGN CONSIDERATIONS

Typical components of a rain barrel include a hose connection at the outlet, a screen trap to filter out downspout debris at the inlet, and an overflow outlet. A range of materials, designs, and colors are available. Locate each rain barrel on a stable, flat surface near the downspout that will be connected to the rain barrel. The barrel should be elevated on cinder blocks or a platform, so that gravity can deliver flow to the area to be watered and to make hose attachment easier.

SIZING CALCULATIONS.

1. Calculate the area of roof draining to the barrels in SF. Divide this area by 100, and multiply by 15 = water quality volume (cubic feet).
2. Calculate the storage volume of the rain barrel (s) gallons (capacity) X .134 cubic feet per gallon; refer to worksheet B for exact calculations.
3. The total storage volume shall exceed the required water quality volume.

SITING

Drainage Area

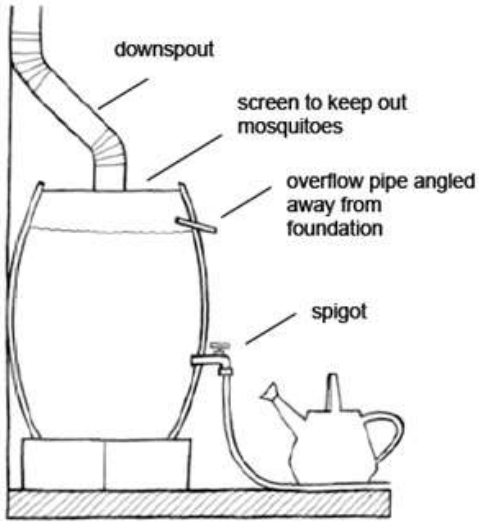
Rain barrels are a good option for homes and buildings with downspouts and where occupant(s) plans to use the captured water.

Space

You can install multiple rain barrels, in series, to a single downspout. You can also connect a single rain barrel to several leaders draining different portions of your roof. **Min. Volume requirement is 100 Gal. storage for multiple SCM credit.**

Topography

Rain Barrels need to be installed on level surface.



Typical Rain Barrel Cross Section
Not to Scale
Diagram credit: clearwater.org

Photo credit: Reddit.com

INSTALLATION

MATERIALS

- Gutters are necessary to direct water to your Rain Barrel.
- Only year-round residents or homes with year-round maintenance are acceptable for rain barrels.
- Install downspouts at areas where you want your rain barrel to be.
- Make sure you intend to use the water collected in a Rain Barrel for a purpose in your yard such as watering a landscaped area or vegetable garden.
- Mosquito Prevention can be achieved with a fine mesh screen fitted on the lid of the rain barrel. This will prevent mosquitoes from gaining access and laying eggs.

OPERATION & MAINTENANCE

TO BE COSTRUCTED POST CONSTRUCTION & ANNUALLY

Drain

Drain Rain Barrels after each significant rainfall from April to November. At a minimum, empty the rain barrel every two weeks.

Cleaning

Clean the rain barrel periodically and inspect it for clogs and leaks. Remove leaves and other debris from the filter screen and ensure that it is not damaged and is securely fastened. IT is recommended to disinfect the rain barrel with bleach once a year. Unless designed for freezing temperatures, the rain barrel should be disconnected and drained for winter.

Remedial Measures

If the Rain Barrel becomes cracked, or any of the materials become worn, replace as necessary to prevent leakages.

RAIN GARDEN
DESIGN & INSTALLATION

Photo credit: thisoldhouse.com

SITING

Drainage Area
Small to Medium Areas 500 -1000 SF; Sized to drain within 24 hours.

Space
Graded low points, but soils must infiltrate.

Topography
Rain gardens are easiest to install in flat or slightly sloped areas.

Soils
Well drained soils are necessary. Avoid placing the rain garden in a low spot in the yard that always seems wet. A rain garden is not a water garden or a wetland.

Setbacks
Min 10' from building foundation
Min 5' from septic systems and
Min. 25' from "404" wetlands

DESIGN INFORMATION

DESCRIPTION
A rain garden is a depression (about 6 to 18" inches deep) that collects storm water runoff from a roof, driveway or yard and allows it to infiltrate into the ground. Rain gardens are typically planted with shrubs and perennials (natives are ideal), and can be colorful, landscaped areas in your yard.

BENEFITS
1. Rain gardens also often provide habitat that can attract beneficial wildlife such as butterflies and hummingbirds.
2. Increase groundwater recharge.
3. Easy to install and maintain.
4. Enhance the beauty of your yard and the neighborhood.

DESIGN CONSIDERATIONS
For most residential settings, you will be capturing runoff from your house roof and directing it to your rain garden. This can be accomplished by piping the downspout directly into your garden, or by letting it run over grass before entering the garden.

1. Pick a Site – make sure you take into considerations all setbacks and utilities.
2. Check the soils; make sure the soils properly infiltrate.
3. Maximum width of 10' (100 SF) applies to most Rain Garden sizing.
4. Plant material should fill 60 % of the rain garden.

SIZING CALCULATIONS
1. Calculate Tributary area in Square Feet.

Vertical Separation

-Min 12" separation to seasonal high-water table.

2. Divide the Tributary area by 100, then multiply by 15 to get water quality volume requirement in cubic feet.
3. Calculate the storage volume of your Rain Garden L x W x D x Lsideslope x Rside slope; see worksheet B for more detail.
4. 4If you are taking advantage of open space/tree credits and storm water control measure credits, see worksheet A for confirmation of volume required.

OPERATION & MAINTENANCE

(TO BE CONDUCTED POST-CONSTRUCTION & ANNUALLY)

With the use of native vegetation and an appropriately planned design, long term maintenance in a rain garden is low relative to conventional landscaping.

Watering

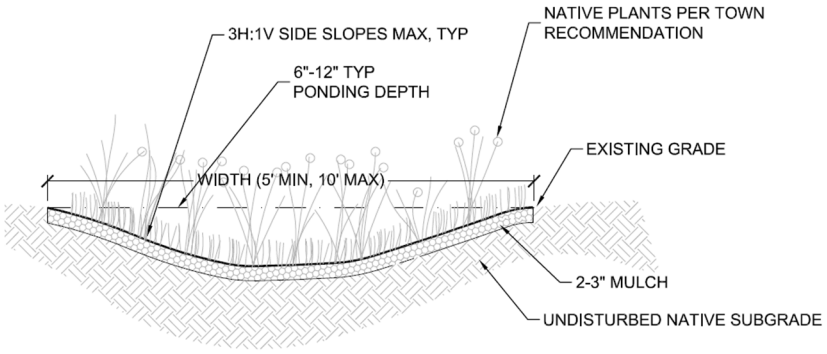
During the establishment period of the first year, watering may be required on a more frequent basis. Once established, watering should not be necessary at all except in cases of extreme drought.

Weeding

Weeding will be required during the first three years of establishment and will be less frequent after the three-year period.

Remedial Measures

Annual maintenance is not necessarily different than traditional landscaping and includes removal of dead vegetation each spring, addition of mulch, periodic inspection of soil erosion, plant health and removal of litter as needed.



Typical Rain Garden Cross Section.

Not to Scale.

INSTALLATION

MATERIALS

- After calculating the appropriate size, stake out the garden with string and measuring tape.
- Excavate the garden to design depth + thickness of mulch layer, with appropriate side slopes.
- Plant and Mulch. Consider the plants water requirements as the middle of the rain garden may be slightly wetter than the outer edges.
- Consider placing landscape rock on the side slopes to reinforce the rain garden during storms.
- Very heavy rainfall can cause the garden to overflow, so plan for that in the design. Excess water can go into another SCM, like another rain garden, a vegetated swale or other approved storm water control measure.

VEGETATED SWALE
DESIGN & INSTALLATION

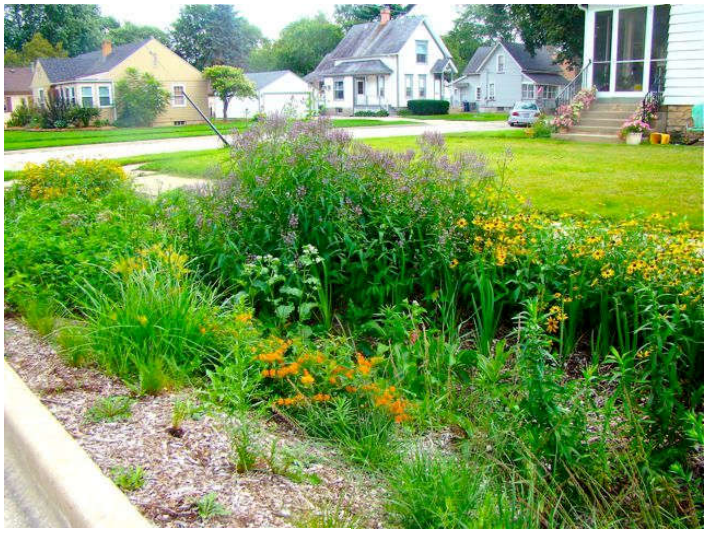


Photo credit: Blue Vervain

DESIGN INFORMATION

Siting

Drainage Area
Small to medium drainage area; 500 to 1000 SF.

Space
Swales should not be constructed on or near septic storage or drainage area.

Topography
Max 3:1 side slopes.

Soils
Permeable soils are best suited for Vegetated Swales.

Setbacks
Min. 5' from building foundations
Min 10' from septic systems
Min. 25' from "404" wetlands

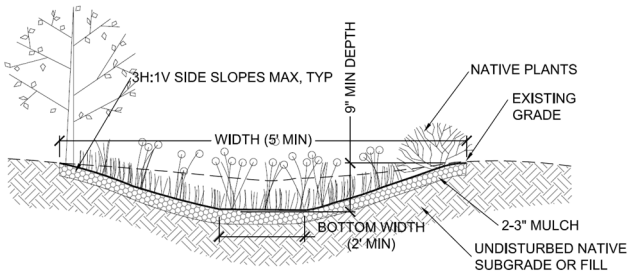
Vertical Separation
Min. 12" separation from bottom of swale to seasonal high-water table.

DESCRIPTION
A Vegetated Swale is a broad, shallow, trapezoidal or triangular channel, densely planted with a variety of trees, shrubs, and grasses. It is designed to attenuate and infiltrate runoff volume from adjacent impervious surfaces, allowing some pollutants to settle out in the process.

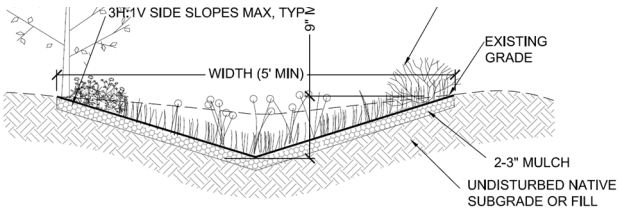
BENEFITS
1. Aesthetically pleasing; integrated into Landscape
2. Potential pollutant removal
3. More water uptake through plant roots and evapotranspiration than grassed swales

DESIGN CONSIDERATIONS
1. Variety of lengths depending on storage volume needed.
2. Runoff can be directed into Vegetated Swales either as concentrated flows or as lateral sheet flow drainage.
3. Minimum 60% planting density.
4. Planting dense, low-growing native vegetation that is water-resistant, drought and salt tolerant is ideal. See town recommended plant list.

SIZING CALCULATIONS
1. Calculate Tributary area in square feet.
2. Divide tributary area by 100, then multiply by 15 to get water quality volume requirement in cubic feet.
3. Calculate the storage volume of your proposed vegetated swale; **see worksheet B for more detail.**
4. Trapezoidal = L x W x D x Lsideslope x Rsideslope = storage Volume (cubic feet)
5. Triangular = L x D x Lsideslope x Rsideslope = storage Volume (cubic feet)
6. The total storage volume shall exceed the minimum required water quality volume.
7. If you are taking advantage of open space/tree credits and storm water control measure credits, see worksheet A for confirmation of volume requirement.



Typical Trapezoidal Vegetated Swale Cross Section
Not to Scale



Typical Triangular Vegetated Swale Cross Section
Not to Scale

INSTALLATION

MATERIALS

- Scarify the soil before construction to alleviate any compaction
  that may have occurred during construction.
- Rough grade the vegetated swale. Use light equipment to avoid excessive compaction and/or land disturbance.
- Fine grade the vegetated swale.
- Plantings should be **dense to reduce flow velocities, prevent erosion, and control weeds.**
- Swale bottom = 3 plugs per 1 square foot (min. 1-inch diameter by
  6-inch tall) (plants that like standing water)
  Swale sides = Grasses – planted 2' o.c.
  Shrubs – planted 6'-8' o.c
  Trees – if desired, near top of swale, planted 10' o.c.
- Plant the swale at a time of the year when successful establishment without irrigation is most likely. (Nov-March.) However temporary irrigation may be needed in periods of drought. Vegetation should be established as soon as possible to prevent erosion.

Operation& Maintenance

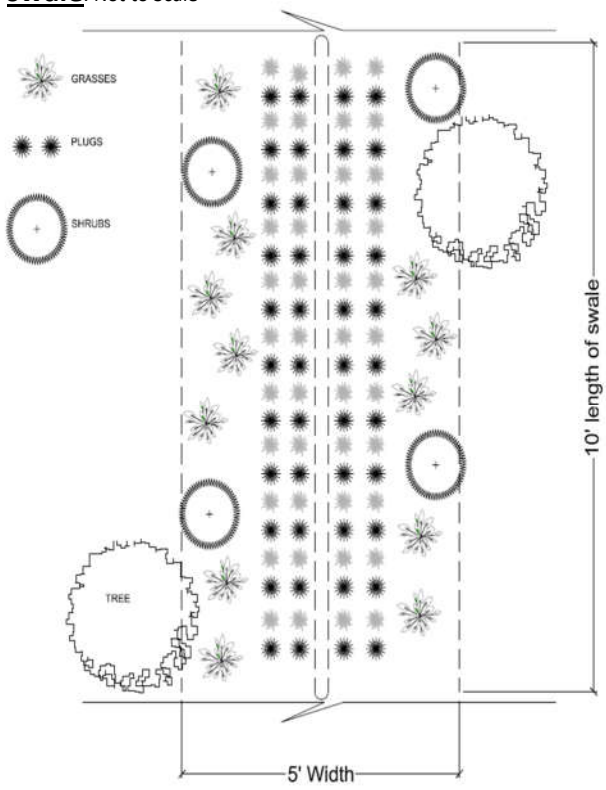
(TO BE CONDUCTED POST-CONSTRUCTION & ANNUALLY)

Annual maintenance is not necessarily different than traditional landscaping and includes removal of dead vegetation each spring, addition of mulch, periodic inspection of soil erosion, plant health and removal of litter as needed.

Watering – During the first year, water during the growing season during periods of drought. Drip Irrigation is recommended.

Weeding – Required as needed during the growing season for first year.

Typical planting plan for a 10'length of swale. Not to Scale



RECOMMENDED PLANT LIST

Photo credit: Rain Garden Alliance

PLANT INFORMATION

DESCRIPTION

Plants used in stormwater control measures should be carefully considered depending on several factors: water requirements or tolerance, sun exposure, tolerance for drought, sandy soil adaptability, and salt tolerance.

BENEFITS

1. Additional water uptake through evapotranspiration.
2. Filtering of environmental contaminants.
3. Aesthetically pleasing additional to the landscape.
4. Once established, minimal maintenance required.

DESIGN CONSIDERATIONS

1. Choose plants depending on the estimated amount of water they will receive. (e.g. will they be in standing water)
2. The use of native plants is suggested to reduce maintenance as they are better adapted to soils and environmental conditions.
3. Choose a variety of plants instead of just one or two species.

SIZING CALCULATIONS

1. Refer to the Fact Sheet for your desired storm water control measure for suggested plant density.
2. As a rule of thumb, most wetland (plants that are ok with standing water) are best planted in plugs. These are economical are come in flats.
3. 1 Gallon size is standard for most perennials; 1 or 3 Gal shrubs;
4. If you plant trees greater than or equal to 2” caliper, you can receive a reduction in built upon area. (Caliper is always measured six inches above ground or soil level for trees less than 4.5” caliper)

If you have additional plants you would like to use, Please contact the Town for approval before installation.

TREES (Zone 3)

Serviceberry *Amelanchier spp.*
Red Maple *Acer rubrum*
Bald Cypress *Taxiodium distichum* (standing water tolerant)
E Red Cedar *Juniperus virginiana* (sheltered, semi shaded location)

SHRUBS/PERENNIALS (Zone 3)

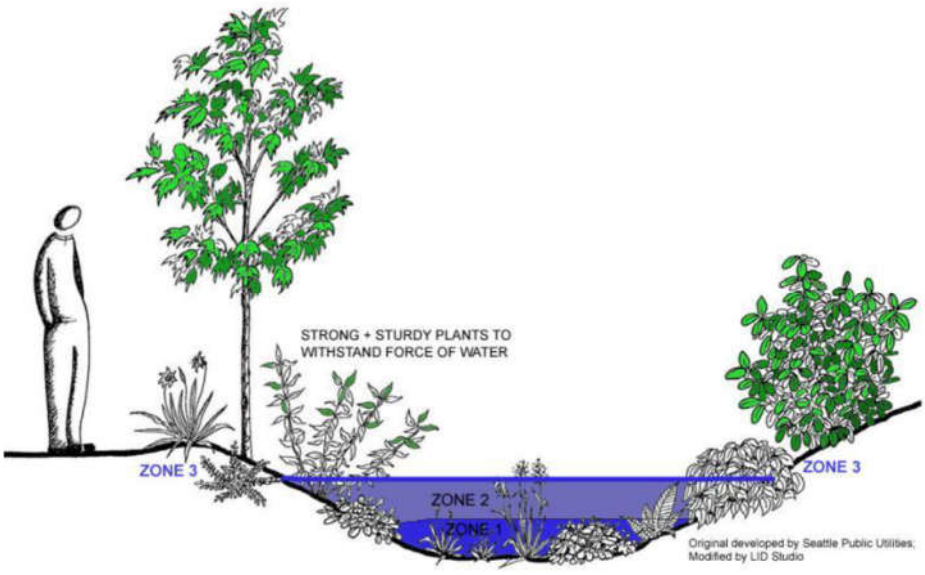
American beautyberry Callicarpa americana
Coastal sweetpepperbush Clethra alnifolia
Virginia sweetspire Itea virginica
Inkberry Ilex glabra
Slender wood oats Chasmanthium laxum
Switchgrass Panicum virgatum
Adam's-needle Yucca Yucca filamentosa
Muhly grass Muhlenbergia

PERENNIALS (Zone 2)

Lance leaved coreopsis *Coreopsis lanceola*
Swamp milkweed *Asclepias incarnata*
Wild blue indigo *Baptisia australis*
Lanceleaf tickseed *Coreopsis lanceolata*
Cinnamon fern *Osmunda cinnamomea* (semi shaded)
Swamp Sunflower *Helianthus angustifolius*

WETLAND PLANTS (standing water tolerant) (Zone 1)

Blue flag Iris *Iris versicolor*
Mallow *Kosteletzkya virginica*
American sweet flag *Acorus americanus*
Pickerel weed *Pontederia cordata*



Source: Anne Guillette, Low Impact Design Studio

BEACH FRONT RECOMMENDED PLANT LIST

Photo credit: Rain Garden Alliance

PLANT INFORMATION

DESCRIPTION

Plants used in stormwater control measures should be carefully considered depending on several factors: water requirements or tolerance, sun exposure, tolerance for drought, sandy soil adaptability, and salt tolerance.

BENEFITS

1. Additional water uptake through evapotranspiration.
2. Filtering of environmental contaminants.
3. Aesthetically pleasing additional to the landscape.
4. Once established, minimal maintenance required.

DESIGN CONSIDERATIONS

1. Choose plants depending on the estimated amount of water they will receive. (e.g. will they be in standing water)
2. The use of native plants is suggested to reduce maintenance as they are better adapted to soils and environmental conditions.
3. Choose a variety of plants instead of just one or two species.

SIZING CALCULATIONS

1. Refer to the Fact Sheet for your desired storm water control measure for suggested plant density.
2. As a rule of thumb, most wetland (plants that are ok with standing water) are best planted in plugs. These are economical are come in flats.
3. 1 Gallon size is standard for most perennials; 1 or 3 Gal shrubs;
4. If you plant trees greater than or equal to 2” caliper, you can receive a reduction in built upon area. (Caliper is always measured six inches above ground or soil level for trees less than 4.5” caliper)

If you have additional plants you would like to use, Please contact the Town for approval before installation.

TREES (Zone 3)

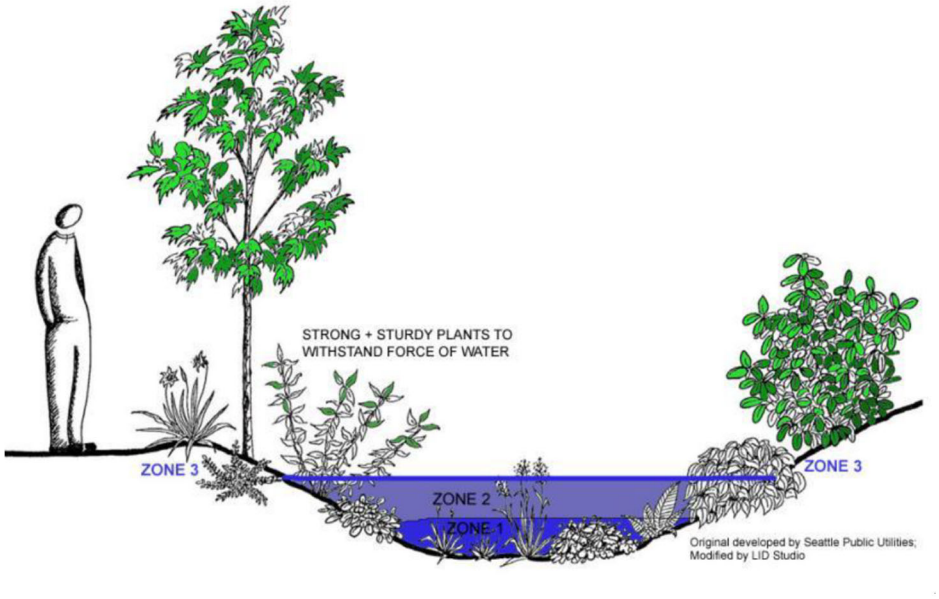
Japanese Black pine
Eastern Red Cedar (must be sheltered from NE wind)

GRASSES (Zone 2)

Slender wood oats (*Chasmanthium laxum)*
Switchgrass (*Panicum virgatum)*
Curlyleaf Yucca (*Yucca filamentosa)*
Muhly grass (*Muhlenbergia)*
Little bluestem (*Schizachyrium scoparium)*
Blanket Flower (Gaillardia pulchella)
Seaside goldenrod (Solidago sempervirens)

PLUGS (ZONE 1/2)

American beachgrass (cool weather planting)
Sea oats (warm weather planting)
Panicgrass (Panicum amarum) (warm weather planting)



Source: Anne Guillette, Low Impact Design Studio

Chapter 6

Non-residential Stormwater Management

Stormwater Management for Commercial, Mixed Use, and all Non-Single Family or Non-Duplex Residential development, including Multi-Family development is regulated by Article 11.4, Environmental Regulations of the Town of Nags Head Unified Development Ordinance. This section shall serve as a supplement to these set of regulations to provide technical guidance and specifically to describe design methods to calculate the level of control to meet the regulations set forth in Article 11.4.

Non-residential stormwater management differs from single-family residential individual lot development in that stormwater management plans and supporting technical documents shall be prepared by a qualified and registered design professional knowledgeable within the field of work for the performance of the design, construction, operation and function of the stormwater facilities. Development and redevelopment of property with commercial uses, mixed land uses or residential uses other than single-family or duplex residential uses require the submission of a stormwater management plan with the exception of the following:

- Is consistent with the zoning regulations of the UDO related to redevelopment & nonconformities;
- Does not result in the net gain of built upon area;
- Does not include the importation of any fill material;
- A stormwater retrofit for an existing property for flood mitigation limiting the import of fill to 12 inches or less.

All other development or redevelopment that results in a net gain in built-upon area requires the submission of a stormwater plan demonstrating that the stormwater runoff generated from the project's built-upon area shall be directed into an approved stormwater management system designed to accommodate the volume of runoff generated by a 4.3-inch design storm event.

The manual is intended to provide guidance in the selection of appropriate structural control measures (SCM's), design criteria to meet applicable stormwater regulations. However, this manual does not cover every situation or potential solutions. The design professional is responsible for exercising professional judgement when selecting, siting and designing SCM's to meet applicable local and state regulations. Additional guidance can be found at North Carolina Department of Environmental Quality Stormwater Design Manual, (NCDEQ 2017).

Designers should review state stormwater requirements for applicability. If greater than 10,000 sf of built upon area or greater than 1.0 ac. of land disturbance activities are proposed, state regulatory requirements may apply. For those cases where the developer is required to submit stormwater management applications to meet both local and state requirements, copies of the NCDEQ state approved plans in conjunction with fully executed operation and maintenance agreements shall be provided to the Town.

In general, if any part of this manual differs from any other ordinance, rule, regulation or provision of law, whichever provision that imposes the higher protective standard shall control.

Stormwater Management Calculations

Stormwater programs in North Carolina require high density development projects to treat to a design storm depth in a SCM. To size the SCM, the designer shall calculate the volume of runoff that will drain to it. Stormwater rules do not reference any specific calculation methods. This chapter provides technical guidance for stormwater calculation methods that are typically used at both the state and local levels.

Rational Method for Peak Flow

$$Q_p = C*I*A$$

Q_P= Peak Flow for design storm (cfs)

C = Composite runoff coefficient

I = Rainfall intensity for design storm (in/hr)

A = Drainage Area (ac.)

The peak flow is often calculated using the Rational Method. The composite runoff coefficient, C, reflects the runoff potential for the area. The range of runoff coefficients typically varies between 0.35 to 0.95, with the higher values representing the greater runoff potential. The composite runoff coefficient is the weighted average of all the land uses in the drainage area. Table 1 presents values of runoff coefficients for various surfaces.

Table 1: Rational Runoff Coefficients by Land Use (ASCE 1975,Viessman, et.al.1996, Malcom 1999)

Surface Description	Runoff Coefficient (C)
Unimproved Areas	0.35
Asphalt	0.95
Concrete	0.95
Brick	0.85
Roofs, inclined	1.00
Roofs, flat	0.90
Lawns, sandy soil, flat (<2%)	0.10
Lawns, sandy soil, avg. (2-7%)	0.15
Lawns, sandy soil, steep (>7%)	0.20
Lawns, heavy soil, flat (<2%)	0.15
Lawns, heavy soil, avg. (2-7%)	0.20
Lawns, heavy soil, steep (>7%)	0.30
Wooded Areas	0.15
Pervious Pavement	0.67
SCM Surface Area	1.0

The rainfall intensity for stormwater management plans prepared to meet the Town of Nags Head requirements is 2.15 in/hr. The storm duration is 2 hrs. It should be noted that the Rational Method is the most applicable to drainage areas that are 20 acres or less.

Steps for using the Rational Method for Peak Flow:

Step 1: Delineate the tributary drainage area (**A**) that will be directed to the SCM, calculated in (ac.).

Step 2: Define the individual land use surface areas located within the boundaries of the tributary drainage area noted in **Step 1**.

Individual land use surface type descriptions are located in **Table 1.**

Step 3: Multiply the individual land use surface areas from **Step 2** by the associative land use runoff coefficient (unitless) shown in **Table 1.**

Step 4: Add the calculated values from **Step 3** and divide by the tributary drainage area (**A**) from **Step 1** to obtain the composite runoff coefficient (**C**).

Step 5: To obtain **Q** (cfs), multiply **C** (from **Step 4**), by **I** (2.15 in/hr), by A (from **Step 1**).

Step 6: To obtain the minimum required storage volume **Rv,** multiply **Q** (cfs) by the duration of the storm event. The Nags Head storm duration is 2 hrs or 7200 seconds.

Simple Method for Runoff Volume (Schueler 1987)

$$R_v = 0.05 + 0.9*I_A$$

Rv= Runoff coefficient (unitless)
I_A = Impervious fraction (unitless)

$$D_v = 3630*R_d*R_v*A$$

D_v = Design Volume (cu ft)
Rd = Design storm depth (in.)
A = Drainage area (ac)

An alternate and more simplified method for computing stormwater runoff is the Simple Method (Schueler 1987). The required information is as follows: (1) tributary area A (sf) that drains to a SCM, (2) the percentage of drainage area that is impervious (%), (3) the desired depth of rainfall targeted for capture. The Simple Method calculation process is as follows:

Step 1: Calculate the proposed imperviousness **I_A** of the proposed site development plan, (as a percentage or fraction)

Step 2: Multiply the impervious fraction **I_A** by 0.9 and add to 0.05 to calculate the runoff coefficient **R_V** (unitless).

Step 3: The design storm depth **R_d** for Nags Head is 4.3 in..

Step 4: Multiply the tributary drainage area **A** by the runoff coefficient **R_V** calculated in **Step 2** by the design storm depth 4.3 in. in **Step 3** by 3630 to obtain the design volume **D_V** (cu ft).

Step 5: The SCM volume shall be based on **D_V** or the minimum volume of runoff to be controlled.

Discrete NRCS Curve Number for Runoff Depth

$$S = 1000/CN - 10$$

S= Maximum retention after rainfall begins (in)

CN = Curve number (unitless)

$$Q = \frac{(P-0.2S)^2}{(P+0.8S)}$$

Q = Runoff depth (in)

P = Rainfall depth (in.)

The steps for using the Discrete NRCS Curve Number are as follows:

Step 1: Divide the tributary drainage area into land uses and assign the appropriate curve number **CN**, to each one (see Table 4). The **CN** characterizes the amount of runoff generated by a drainage area based on its USGS Hydrologic Soil Group (HSG) and ground cover.

Step 2: Refer to **Table 3** to obtain the CN curve number by HSG and associative land use cover.

Step 3: Multiply the individual land use areas from **Step 1** by the assigned land use **CN** by HSG described in **Step 2**.

Step 4: Add the calculated values from **Step 3** and divide by the total tributary drainage area **A** from **Step 1** to obtain the composite curve number **CN**.

Step 5: Calculate the maximum retention after rainfall begins **S** (in) by dividing curve number **CN**-10 into 1000

Step 6: The rainfall depth **P** for Nags Head is 4.3 in.

Step 7: Compute the runoff depth **Q** by inputting the results of **Step 5 S** maximum retention after rainfall begins and **Step 6 P** into the Runoff Depth equation.

Step 8: Find the runoff volume by multiplying **Q** runoff depth from Step 7 times the tributary area **A** (sf) and dividing by 12.

Table 2: Hydrologic Soil Groups

Soil Group	Description
A	Low runoff potential and high infiltration rates even when thoroughly wetted. Consist chiefly of deep, well to excessively drained sand or gravel and have a high rate of water transmission (greater than 0.30 in.hr). The textures of the sand are typically sand, loamy sand or sandy loam.
B	Moderate infiltration rates when thoroughly wetted and consist chiefly of moderately deep, well drained soils with moderately fine to moderately coarse texture. These soils have a moderate rate of water transmission (0.15-0.30 in/hr). The textures of these soils are typically silt loam or loam.
C	Low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward of water and soils with moderately fine to fine texture. These soils have a low rate of water transmission (0.05-0.10 in/hr). The soil texture is typically sandy clay loam.
D	High runoff potential and low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a clay layer at or near the surface and shallow soils over nearly impervious material. These soils have a very low rate of water transmission (0.0-0.05 in/hr). The textures of these soils are typically clay loam, silty clay loam, sandy clay, silty clay, or clay.

Additional information related to Hydrologic Soil Group can be referenced from the Soil Survey of Dare County, North Carolina, USDA SCS, March 1992

Table 3: Urban areas runoff curve numbers for SCS method by HSG

Cover Description	Curve Number by HSG			
	A	B	C	D
Fully developed urban areas				
Open space (lawns, parks, golf courses, etc.)				
Poor condition (<50% grass cover)	68	79	86	89
Fair condition (50%-75% grass cover)	49	69	79	84
Good condition (>75% grass cover)	39	61	74	80
Impervious Areas:				
Paved parking lots, roofs, driveways, etc.	98	98	98	98
Streets and roadways:				
Paved; curbs and storm sewers	98	98	98	98
Paved; open ditches	83	89	98	98
Gravel	76	85	89	91
Dirt	72	82	85	88
Developing urban areas				
Newly graded areas	77	86	91	94
Pasture (<50% ground cover or heavily grazed)	68	79	86	89

Pasture (50%-75% ground cover, moderately grazed)	49	69	79	84
Pasture (>75% ground cover, lightly grazed)	39	61	74	80
Meadow- continuous grass, protected from grazing, mowed for hay	30	58	71	78
Brush (,50% ground cover)	48	67	77	83
Brush (50% to 75% ground cover)	35	56	70	77
Brush (>75% ground cover)	30	48	65	73
Woods (forest litter, small trees and heavy grazing or regular burning)	45	66	77	83
Woods (some forest litter covering soil w/ moderate grazing but not burned, some	36	60	73	79
Woods (litter and brush cover the soil, no grazing)	30	55	70	77

Methodologies for Peak Runoff Rates

Many methodologies have been developed to estimate peak runoff rates and total runoff volume from land surfaces under many conditions. This Chapter describes methods that are most widely used in the State of North Carolina. This is not a complete list of procedures nor is it intended to discourage using alternative methods as they become available.

Additional Design Considerations

There are numerous factors that the designer should consider when undertaking a stormwater management plan in the coastal environment. These design factors should include, but are not limited to: pre-development conditions, topography, seasonal high water table and soil wetness conditions, site layout, impervious coverage, vegetative surface cover, environmental setbacks, grading, stormwater overflow, etc. Most of these items area covered within Article 11-Envirnmental Regulations -Part I Stormwater, Fill and Runoff Management. Several technical factors should be considered as part of the stormwater management planning process are not specifically noted in this Article of the Unified Development Ordinance. Additional guidance is provided below.

Storage capacity (interstitial storage) within existing soils and/or fill material shall not be counted towards the volume requirement for the stormwater management design. This is consistent with the standards for residential stormwater management plan development and with the NCDEQ Stormwater Design Manual. Interstitial storage calculations shall only be used to demonstrate excess storage above and beyond the local stormwater volume control requirement.

Site development proposals that include "piping in" of existing open drainage channels shall include design calculations that consider upstream tributary drainage areas for appropriate sizing of storm drainage infrastructure. All drainage facilities shall be encompassed within drainage easements to permit for maintenance activities.

Off-site flows into Town rights-of-ways or existing Town maintained drainageways shall provide supporting calculations demonstrating that post-development project outflows do not exceed pre-development project outflows OR a downstream analysis of existing facilities demonstrating that it can accommodate the proposed additional flows.

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Glossary

Annual plant - A plant that completes its entire life cycle in a single growing season.

Aquifer- A stratum of rock or soil that contains groundwater.

Base flow — Water flow in a stream or man-made channel between rainfall events. The source of the water flow is supplied by groundwater.

Best Management Practice (BMP) – Methods, measures or a practice or a combination of practices to prevent or reduce water pollution. Examples include treatment techniques, operating procedures, erosion control practices, fertilizer and animal waste management and runoff control.

Bioretention area — A water quality practice that utilizes landscaping and soils to treat stormwater by collecting it in shallow depressions and then filtering it through a planting soil media. (Also see rain garden.)

Buffer - An area of trees, shrubs and plants next to a waterbody that provides a permanent barrier against runoff from development, construction and other land uses. Buffers are designed to filter and protect the receiving waterbody from sediment and pollutants contained in storm water runoff. Buffers also function as habitat for migratory birds and aquatic and terrestrial wildlife.

Built Upon Area - means that portion of a development project that is covered by impervious materials or partially impervious surfaces and used to calculate stormwater runoff potential, including buildings; pavement and compacted gravel areas such as roads or parking lots, and paths and recreation facilities such as athletic courts and concrete pool decks. Built-upon area does not include the surface area of pools, wooden slatted decks, or un-compacted, washed gravel, or pervious or partially pervious paving material to the extent that the paving material absorbs water or allows water to infiltrate through the paving material. Built-upon area is distinct from "lot coverage" as defined herein.

Channel- means a natural or artificial watercourse with a definite bed and banks that conducts continuously or periodically flowing water.

Check dam - A small barrier built across the direction of water flow in a channel to retain excess water during heavy rains and to slow the speed of runoff traveling through the channel.

Deciduous plant - A plant that sheds or loses its foliage at the end of each growing season.

Detain (detention)- The temporary storage of stormwater prior to controlled release as runoff. (Contrast with retention.)

Disconnected impervious surfaces - Integration of treatment and management measures into developed areas to remove the links between hardscaped areas such as driveways, walkways, parking areas with the strategic placement of distributed lot-level controls that can be customized to more closely mimic a watershed's hydrology.

Ecosystem — An interactive system that includes the organisms of a natural community together with their abiotic, physical, chemical and geochemical environment.

Easement - A right, such as a right-of-way, afforded a person to make limited use of another's real property.

Estuary — Brackish-water area influenced by the tides where the mouth of the river meets the sea. Estuaries are breeding grounds for many species of fish and shellfish.

Evergreen plant - A plant that remains green and retains its foliage throughout the year.

Fecal coliform bacteria — Bacteria that are present in the intestines or feces of warm-blooded animals. The potential for contracting diseases from pathogens can be determined by testing for an "indicator" organism such as coliform bacteria. Testing of surface waters for coliform bacteria are often used as a measure of safe water quality levels.

Floodplain — Land areas adjacent to water courses, rivers or water bodies subject to recurring inundation.

Forebay — Stormwater design feature that uses a small basin to settle out incoming sediment delivered in runoff to a stormwater BMP.

Geographic information systems (GIS) — A computer system for capturing, storing, checking, integrating, manipulating, analyzing and displaying data related to positions on the Earth's surface. Typically, GIS is used for handling maps of one kind or another. These might be represented as several different layers where each layer holds data about a particular kind of feature (i.e. roads, waterbodies, etc.). Each feature is linked to a position on the graphical image of a map.

Groundwater - Water below the earth's surface, typically in aquifers, that supplies drinking wells and springs. Runoff can seep into the soil and recharge groundwater supplies.

Habitat - The specific area or environment where a plant or animal lives. A habitat must provide all of the basic requirements for life (food, water, shelter) and should be free of harmful contaminants and pollution.

Hydrologic Soil Group (HSG) - means a Natural Resource Conservation Service (NRCS) classification system in which soils are categorized into four groups of infiltration potential. The groups range from A soils, with high permeability and little runoff production, to D soils, which have low permeability and produce much more runoff.

Hydrology — Movement and distribution of groundwater and surface water in a system.

Impervious surface - Any hardened surface improvement that water cannot penetrate into (i.e. parking lots, streets, sidewalks, rooftops).

Infiltration – The process by which water drains or seeps into the soil matrix from the ground surface.

Infiltration Device - Any structure or measure designed to infiltrate retained water to the subsurface. These facilities may be above grade or below grade.

Land Use - The way land is used or developed, such as the types of buildings and activities permitted. Particular land uses are often associated with different types of pollution, such as erosion and sedimentation from construction activities.

Lot Coverage - means that portion of the lot area, expressed as a percentage, that is covered or occupied by impervious surfaces or structures. For the purposes of determining lot coverage, the following features shall be considered impervious: any principal or accessory use or structure located above the ground including decks; parking areas; vehicular use areas; roadways; access ways; and sidewalks or walkways that prevent the infiltration of rainwater. Lot coverage is utilized to determine zoning compliance and is distinct from the amount of built upon area used in stormwater management calculations.

Low impact development (LID) - Low impact development is an innovative stormwater management approach with a basic principle that is modeled after nature: manage rainfall at the source using uniformly distributed decentralized micro-scale controls. LID's goal is to mimic a site's predevelopment hydrology by using design techniques that infiltrate, filter, store, evaporate, transpire and detain runoff close to its source.

Mimic – Significantly equivalent in nature.

Mitigation - Actions taken to avoid, reduce, or compensate for the effects of human-induced environmental damage.

Native plant — A plant that naturally occurred in an area before disturbance by humans. Native plants are adapted to the weather, temperature and soil conditions of this region. Native plants require less (if any) fertilizers, pesticides or irrigation and tend to be disease and drought-tolerant.

Nonpoint source pollution (NPS) – Pollution that enters water bodies from a variety of sources. NPS pollution is caused by runoff from rainfall or snowmelt that moves over and through the ground, washing natural and human-made pollutants into surface waters and underground sources of drinking water Typical NPS pollutants are pet waste, lawn fertilizer, pesticides, car washing detergents, litter and sediment.

Nutrient — Substances such as nitrogen and phosphorous that are required by plants and animals for growth. In some circumstances, excessive nutrient additions to surface waters may result in excessive algal or plant growth and, subsequently, the accumulation and decay of increased organic matter.

Open Space - A vegetated, unoccupied, space open to the sky, without vertical structures or surfaces covered with pavements or other relatively impervious materials.

Outfall — Is a discharge point of stormwater system that exits the system and flows into a body of water. Outfalls include discharges from pipes, ditches, swales and other points of concentrated flows.

Pathogen - A disease-causing organism (viruses, bacteria, or fungi can be pathogenic organisms)

Perennial plant - A plant that grows and persists for more than one year. Perennial plants persist as vegetation from year to year or re-sprout from their rootstock annually.

Permeable - Soil or other material that allows the infiltration or passage of water or other liquids. This term is typically interchangeable with the term pervious.

Pervious paving – Is a stormwater control system that captures stormwater through voids in the pavement surface and filters water through an underlying aggregate reservoir. The reservoir can either infiltrate into the underlying soil subgrade or be designed to detain and release water to a stormwater conveyance system. Water-pervious materials such as a washed aggregate, concrete grid pavers, pervious concrete or pervious paving blocks for driveways, parking areas, walkways, and patios that minimize runoff from those areas, as well as increase infiltration.

Point source pollution - Pollution that can be traced to a single point, or output, such as a pipe.

Pollution - Any substance that exists in the environment that is undesirable or harmful for that environment.

Rain garden — A rain garden is a shallow depression planted with native plants, flowers or grass that captures and infiltrates rain before it becomes polluted runoff.

Receiving waters — Creeks, streams, rivers, lakes, estuaries and other bodies of water into which stormwater is discharged to.

Recharge – The downward movement of water through the soil matrix to below the limits of active evapotranspiration effects.

Retain (retention) – To facilitate full infiltration and/or evapotranspiration of stormwater, not allowing runoff.

River basin - Area encompassing all the land drained by streams and creeks flowing downhill into a major river. All water that falls within the basin flows into these streams and rivers.

Runoff -Water flowing across the land that does not infiltrate the soil, but drains into surface or groundwater, or when rainfall exceeds the infiltration capacity of the land.

Runoff volume - The volume of water that runs off the land development project from a prescribed storm event.

Sedimentation - Particles of soil, sand, silt, clay, or organic matter that are deposited onto the bottom of any surface water or are left behind when water leaves. Sedimentation often originates from land disturbance activities associated with construction sites or where bare land surfaces exist.

Storm drainage system – A network of structures, channels and underground pipes built to collect and transport runoff to streams, ponds, lakes, rivers and other water bodies. Storm drainage systems are completely separate from those that carry domestic and commercial wastewater (sanitary sewer system).

Stormwater Control Measures (SCMs) - "Stormwater Control Measure" or "SCM," also known as "Best Management Practice" or "BMP," means a permanent structural device that is designed, constructed, and maintained to remove pollutants from stormwater runoff by promoting settling or filtration; or to mimic the natural hydrologic cycle by promoting infiltration, evapotranspiration, post-filtration discharge, reuse of stormwater, or a combination thereof

Stormwater Management - The use of structural or nonstructural practices to

manage one or more components of hydrologic response (quantity, constituents, and character) from stormwater inputs**.**

Surface water — The water that rests on top of the earth in streams, lakes, rivers, oceans and reservoirs and is open to the atmosphere (i.e. rivers, lakes, creeks, streams, etc.).

Swales - Minor channels usually lined with grass used to transport runoff from less developed areas.

TMDL — Total maximum daily load is the calculation of the maximum amount of pollutants that a waterbody can receive and still meet water quality standards.

Tributary - A stream that flows into a larger stream or other body of water.

Water Cycle - The cycle in which water evaporates from surface waters, condenses into clouds, and falls again to the earth as rain or other forms of precipitation**.**

Water Quality — The biological, chemical and physical conditions of a waterbody; a measure of the ability of a waterbody to support designated uses.

Water Table – The depth at which the ground is saturated with water**.**

Watershed - Ecosystem consisting of three major components—stream channel, floodplain, and upland areas—that function together and drain to water bodies, including lakes, rivers, estuaries, wetlands, streams, and the surrounding landscape (groundwater recharge areas are also considered).

Wetland - Land whose soil is saturated with moisture either permanently or seasonally. They are generally distinguished from other water bodies or landforms based on saturated soil conditions for a period of time long enough season each year to support aquatic plants.

Web Resources

Rainwater Harvesting

NC Department of Environmental Quality *Stormwater Design Manual, Part C-7 Rainwater Harvesting* *https://deq.nc.gov/about/divisions/energy-mineral-land-resources/energy-mineral-land-permit-guidance/stormwater-bmp-manual*

North Carolina Coastal Federation, Smart Yards- Simple DIY Solutions: Rain Barrels, 2017 *https://www.nccoast.org/wp-content/uploads/2017/09/SmartYards_07-17.pdf*

Town of Nags Head Recommended Standard Details Manual- Rain Barrel- Detail 505 https://www.nagsheadnc.gov/938/Recommended-Standard-Details-Manual--Sto

Re-routing Downspouts

North Carolina Coastal Federation, Smart Yards- Simple DIY Solutions: Re-routing Downspouts, 2017 *https://www.nccoast.org/wp-content/uploads/2017/09/SmartYards_07-17.pdf*

NC Department of Environmental Quality *Stormwater Design Manual, Part C-10 Disconnect Impervious Surfaces* *https://deq.nc.gov/about/divisions/energy-mineral-land-resources/energy-mineral-land-permit-guidance/stormwater-bmp-manual*

North Carolina Cooperative Extension, Disconnect for Rainwater Dispersal, 2012 *https://wrri.ncsu.edu/docs/partnerships/bcwa/2.DISCONNECT.pdf*

Vegetated Swales

Town of Nags Head Recommended Standard Details Manual- Rain Garden- Detail 507 https://www.nagsheadnc.gov/938/Recommended-Standard-Details-Manual--Sto

NC Department of Environmental Quality *Stormwater Design Manual, Part C-1 Infiltration Systems* *https://deq.nc.gov/about/divisions/energy-mineral-land-resources/energy-mineral-land-permit-guidance/stormwater-bmp-manual*

North Carolina Cooperative Extension*, Low Impact Development, A Guidebook for North Carolina, Swales* *http://www.onsiteconsortium.org/npsdeal/NC_LID_Guidebook.pdf*

North Carolina State University, NC State Extension*, Swale Terminology for Urban Stormwater Treatment, 2020,* *https://content.ces.ncsu.edu/swale-terminology-for-urban-stormwater-treatment*

Rain Gardens

Town of Nags Head Recommended Standard Details Manual- Rain Garden- Detail 506
https://www.nagsheadnc.gov/938/Recommended-Standard-Details-Manual--Sto

Town of Nags Head Recommended Standard Details Manual- Rain Recommended Plan List- Detail 508
https://www.nagsheadnc.gov/938/Recommended-Standard-Details-Manual--Sto

North Carolina Cooperative Extension, Backyard Rain Garden,2014 https://forsyth.ces.ncsu.edu/wp-content/uploads/2016/03/RGmanual2015.pdf?fwd=no

North Carolina State Stormwater Engineering Group, *https://stormwater.bae.ncsu.edu/ search rain gardens.*

North Carolina Coastal Federation, Smart Yards- Simple DIY Solutions: Rain Gardens, 2017
https://www.nccoast.org/wp-content/uploads/2017/09/SmartYards_07-17.pdf

Contact your local nursery or Dare County Cooperative Extension for more assistance

Infiltration Trenches

Town of Nags Head Recommended Standard Details Manual- Infiltration Trench- Detail 502
https://www.nagsheadnc.gov/938/Recommended-Standard-Details-Manual--Sto

NC Department of Environmental Quality *Stormwater Design Manual, Part C-1 Infiltration Systems*
https://deq.nc.gov/about/divisions/energy-mineral-land-resources/energy-mineral-land-permit-guidance/stormwater-bmp-manual

North Carolina Cooperative Extension, Low Impact Development, A Guidebook for North Carolina, Infiltration Trench http://www.onsiteconsortium.org/npsdeal/NC_LID_Guidebook.pdf

Susdrain, *Component Infiltration trenches: https://www.susdrain.org/delivering-suds/using-suds/suds-components/infiltration/infiltration_trench.html*

Living Shorelines

North Carolina Coastal Federation, Smart Yards- Simple DIY Solutions: Living Shorelines, 2017
https://www.nccoast.org/wp-content/uploads/2017/09/SmartYards_07-17.pdf

North Carolina Coastal Federation, *Living Shorelines, https://www.nccoast.org/protect-the-coast/estuarine-shorelines/*

Living Shorelines Academy, *https://www.livingshorelinesacademy.org/index.php*

Virginia Institute of Marine Science (VIMS)-Living Shoreline Summit Presentations, 2006
https://www.vims.edu/cbnerr/coastal_training/recent_workshops/ls_summit.php

National Oceanic and Atmospheric Administration (NOAA) Living Shorelines Workgroup,2015, *https://www.habitatblueprint.noaa.gov/wp-content/uploads/2018/01/NOAA-Guidance-for-Considering-the-Use-of-Living-Shorelines_2015.pdf*

References

Currituck County *Stormwater Manual,* December 2017

Town of Nags Head *Stormwater Management Plan Volume II: Technical Report,* 2006

Southeast Michigan Council of Governments*, Low Impact Development Manual for Michigan, A Design Guide for Implementors and Reviewers,* 2008

North Carolina Cooperative Extension*, Low Impact Development A Guidebook for North Carolina,* 2009

North Carolina Department of Environmental Quality *Stormwater Design Manual,* 2017.

North Carolina State University*, Low Impact Development Fast Track Certification,* February 2011

Town of Nags Head *Recommended Standards Detail Manual,* 2019

Town of Cedar Point/Town of Cape Carteret *Low Impact Development (LID) Manual,* 2010

Georgia Department of Natural Resources, *Green Growth Guidelines*, 1st Edition, 2011

Urban Land Institute, *Environment and Development, Myth and Fact*, 2012

North Carolina Coastal Federation*, Low Impact Development:* *https://www.nccoast.org/protect-the-coast/restore/low-impact-development/*

Additional Resources

NC Water Resources Research Institute: *https://wrri.ncsu.edu*

NC Cooperative Extension: *https://www.darenc.com/departments/planning/soil-and-water/rain-garden-information*

Low Impact Development Center: *http://www.lowimpactdevelopment.org/resources*

North Carolina State University Stormwater Engineering Group*:* *https://stormwater.bae.ncsu.edu/*

Agenda Item Summary Sheet

Item No: **D-5**
Meeting Date: **June 3, 2020**

Item Title: Request for Public Hearing to consider text amendments to the Unified Development Ordinance submitted by a property owner to expand the principal sale items from outdoor stands to include reservations and tickets for events/activities

Item Summary:
The proposed text amendment (the applicant for the amendment is Kate Creef, Assistant General Manager, on behalf of Outlets Nags Head) is seeking to amend Section 7.76.1 to expand the principal sale items allowed to be sold from outdoor stands to include "reservations or ticket sales," and to amend Section 7.76.2. to increase the number of outdoor stands allowed per site from one (1) to two (2). A public hearing on the request was held at the Board of Commissioners meeting on May 6, 2020. The Board of Commissioners voted to table consideration of the proposed amendments and refer the matter back to the Planning Board for further review, with consideration of issues pertaining to location, visual impact, signage, and parking. The Planning Board has recommended further changes to the proposed amendment, which are considered substantive and therefore require an additional public hearing to be held.

Planning Board/Staff Recommendation
Initially, Staff recommended to the Planning Board that the amendment be adopted with modifications to the standards to require that the sale and advertisement of items be confined to stands and to allow a maximum of two (2) stands, with no more than one (1) stand selling fresh produce, hot dogs, coffee, ice cream or Italian ice, and/or fudge. Additionally, maximum stand area and time limits were also suggested, as well as amendment of the definition of Outdoor Stand for consistency. Based on discussion by the Board of Commissioners, Staff further recommended to the Planning Board that consideration be given to limiting the option for two stands to sites greater than a certain size, limiting signage to a total of fifteen (15) square feet for all outdoor stands, and clarifying where stands may be located on a site, in terms of being located within parking areas or needing to be located no closer to a property line than the distance from a principal building on a site or within a certain maximum distance from a principal building.

Upon reconsideration at their meeting on May 19, the Planning Board voted 6-0 to recommend that two stands only be allowed on sites with an area of ten (10) acres or greater, that signage for all stands be limited to a total of fifteen (15) square feet, and that stands used for reservations or ticket sales shall be located within shopping centers or group developments, such as within common areas or walkways, and shall not be located within any parking area.

Number of Attachments: 0

Specific Action Requested:
Schedule public hearing.

Submitted By: Planning and Development Date: May 27, 2020

Finance Officer Comment:
N/A

Signature: Amy Miller Date: May 27, 2020

Town Attorney Comment:
N/A

Signature: John Leidy Date: May 27, 2020

Town Manager Comment and/or Recommendation:
N/A

Signature: Cliff Ogburn Date: May 27, 2020

Agenda Item Summary Sheet

Item No: **E-1**
Meeting Date: **June 3, 2020**

Item Title: Public Hearing to consider citizen comment on the Town Manager's proposed operating budget for July 1, 2020 – June 30, 2021, proposed CIP requests for FY 20/21 through FY 24/25, and updated Consolidated Fee Schedule

Item Summary:

At the May 6th Board of Commissioners meeting, Town Manager Ogburn presented highlights of his recommended FY 20/21 Budget. At that time the proposed budget was distributed to Board members. A Public Hearing was subsequently scheduled for the June 3rd Board meeting.

Attached please find the Public Notice of Public Hearing which includes cost figures for the FY 20/21 Operating Budget.

Number of Attachments: 1

Specific Action Requested:

Public Hearing to be conducted on the FY 20/21 proposed budget.

Submitted By: Administration Date: May 28, 2020

Finance Officer Comment:

I will be available to answer any questions.

Signature: Amy Miller Date: May 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: May 28, 2020

Town Manager Comment and/or Recommendation:

The Finance Officer and I will be available to answer any questions during the June 3rd Public Hearing on the proposed FY 20/21 Budget.

Signature: Cliff Ogburn Date: May 28, 2020

Ben Cahoon
Mayor

Michael Siers
Mayor Pro Tem

Cliff Ogburn
Town Manager

Town of Nags Head
Post Office Box 99
Nags Head, North Carolina 27959
Telephone (252) 441-5508
FAX (252) 441-0776
www.nagsheadnc.gov

M. Renée Cahoon
Commissioner

J. Webb Fuller
Commissioner

Kevin Brinkley
Commissioner

TOWN OF NAGS HEAD - PUBLIC HEARING NOTICE
PROPOSED OPERATING BUDGET FOR FY 2020– 2021
AND UPDATED CONSOLIDATED FEE SCHEDULE

Notice is hereby given that the Town Manager's proposed operating budget for fiscal year July 1, 2020 - June 30, 2021, has been presented to the Governing Body. The Town of Nags Head Board of Commissioners will conduct a PUBLIC HEARING on the proposed budget in the Board Room of the Nags Head Municipal Complex located at 5401 S. Croatan Highway on **Wednesday, June 3, 2020** at 9:00 a.m.

Public Hearing is to consider citizen comment on the Town Manager's proposed operating budget for July 1, 2020 – June 30, 2021 and updated Consolidated Fee Schedule.

A copy of the proposed budget and CIP requests are available for public inspection in the Town Clerk's Office, Monday through Friday from 8:30 a.m. until 5:00 p.m. Copies of the proposed budget may be purchased at $10.00 each. Proposed budget, CIP requests, and Consolidated Fee Schedule may also be viewed on the Town's web site at www.nagsheadnc.gov.

All interested persons are invited/urged to make written or oral comments. A summary of the proposed budget follows:

REVENUES		
TAXES (Ad Valorem)	$	9,161,401
OTHER TAXES & LICENSES		5,330,391
INTERGOVERNMENTAL REVENUE		2,127,475
PERMITS & FEES		312,175
INVESTMENT EARNINGS		140,000
OTHER/MISCELLANEOUS REVENUE		281,750
OTHER FINANCE SOURCES		3,988,364
APPROPRIATION/FUND BALANCE		-
WATER FUND REVENUE		3,323,211
TOTAL REVENUES	**$**	**24,664,767**
EXPENDITURES		
GOVERNING BODY	$	129,605
BOND DEBT		2,521,353
TOWN MANAGER/CLERK		947,280
LEGAL		94,480
ADMINISTRATIVE SERVICES		987,470
IT		356,873
PLANNING AND DEVELOPMENT		1,270,709
PUBLIC WORKS		4,274,257
STORMWATER		496,258
PUBLIC SAFETY – Police		2,652,007
PUBLIC SAFETY - Fire/Ocean Rescue		3,695,922
CONTINGENCY		125,000
INTERFUND TRANSFERS		3,790,342
WATER FUND		3,323,211
TOTAL EXPENDITURES	**$**	**24,664,767**

This the 22nd day of May 2020.
Carolyn F. Morris, Town Clerk

Agenda Item Summary Sheet

Item No: **E-2**
Meeting Date: **June 3, 2020**

Item Title: Public Hearing to consider a text amendment to the Unified Development Ordinance to allow "Tutoring Facility/Learning Center" as a permitted use within the C-2, General Commercial Zoning District

Item Summary:
Kim Cowen and Megan Dixon have submitted a text amendment request to the Unified Development Ordinance which, if adopted, would permit "Tutoring Facility/Learning Center" as a permitted use within the C-2, General Commercial Zoning District. The applicants would like to offer tutoring, both part- and full-time, to registered homeschooled children, ages 6 and up.

Staff Recommendation/Planning Board Recommendation
Planning staff finds that the proposal is consistent with the 2017 Comprehensive Land Use Plan and the desire to encourage land uses that serve the needs of both year-round and seasonal residents in support of the town's overall vision for the community. Staff would recommend that the use be listed under the *Service* category in the Table of Uses and Activities and be defined as follows:

Tutoring Facility/Learning Center means a private, for profit or non-profit, use for the instruction of students in subjects and materials commonly taught in primary and secondary schools, for test preparation, or the teaching of music and visual arts.

Staff recommends adoption of the proposed amendment as presented. At their April 21, 2020 meeting the Planning Board voted unanimously to recommend adoption of the text amendment as presented.

Number of Attachments: 2

Specific Action Requested:
Conduct the Public Hearing.

Submitted By: Planning and Development Date: May 26, 2020

Finance Officer Comment:

Signature: Amy Miller Date: May 26, 2020

Town Attorney Comment:

Signature: John Leidy Date: May 26, 2020

Town Manager Comment and/or Recommendation:

Signature: Cliff Ogburn Date: May 26, 2020

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NOTICE OF PUBLIC HEARINGS
TOWN OF NAGS HEAD BOARD OF COMMISSIONERS

NOTICE IS HEREBY GIVEN that the Nags Head Board of Commissioners will conduct public hearings on **Wednesday, June 3, 2020** beginning at 9:00 am in the Board Room of the Municipal Complex, 5401 S. Croatan Highway, Nags Head, NC to consider and take action upon the following requests:

1) Public Hearing to consider citizen comment on the Town Manager's proposed operating budget for July 1, 2020 – June 30, 2021, proposed CIP requests for FY 20/21 through FY 24/25, and updated Consolidated Fee Schedule

Anyone wishing to be heard concerning the proposed budget may appear in person at the date/time specified or may speak via the Zoom platform/app.

2) Public Hearing to consider a text amendment to the UDO submitted by Kim Cowen and Megan Dixon to allow "Tutoring Facility/Learning Center" as a permitted use within the C-2, General Commercial Zoning District Public Hearing to consider a text amendment to the Unified Development Ordinance submitted by a property owner to expand the principal sale items from outdoor stands to include reservations and tickets for events/activities

Anyone wishing to be heard concerning the text amendment to the UDO may speak via the Zoom platform/app.

3) Public Hearing to consider a text amendment to the UDO pertaining to temporary uses or temporary alteration of uses related to declared emergencies

Anyone wishing to be heard concerning the text amendment to the UDO may speak via the Zoom platform/app.

A copy of the application requests are available for public inspection at the Office of the Town Clerk, Town Municipal Complex, 5401 S. Croatan Hwy, Nags Head, NC 27959, telephone (252) 441-5508 during normal business hours.

As a result of these hearings substantial changes may be made in the proposals as advertised to reflect objections, debate and discussion at the hearings.

This the 18th day of May 2020.

Carolyn F. Morris
Town Clerk

MEMORANDUM
Town of Nags Head
Planning & Development Department

To: Board of Commissioners

From: Kelly Wyatt, Deputy Planning Director
Michael Zehner, Director of Planning and Development

Date: May 22, 2020

Subject: Public Hearing to consider a text amendment to the UDO submitted by Kim Cowen and Megan Dixon to allow "Tutoring Facility/Learning Center" as a permitted use within the C-2, General Commercial Zoning District. *(Attachment E-2)*

OVERVIEW & BACKGROUND

Megan Dixon and Kim Cowen have submitted the attached text amendment request to the Unified Development Ordinance, which, if adopted would permit "Tutoring Facility/Learning Center" as a permitted use within the C-2, General Commercial Zoning District.

The applicants have provided a detailed explanation of the nature and reason for their request. They would like to offer tutoring, both part- and full-time, to registered homeschooled children, ages 6 and up. Ms. Cowen has spoken with both me and the Senior Building Inspector, Steve Szymanski, about the proposed business use. In looking at the current UDO, similar uses include Child Care Facility and School, however, by definition, the proposed use would not meet either of these use classifications. Therefore, it was recommended to Ms. Cowen that a text amendment request to consider establishing this new use would be necessary.

POLICY CONSIDERATIONS

Planning Staff finds the proposed use is consistent with the 2017 Comprehensive Land Use Plan and the desire to encourage land uses that serve the needs of both year-round and seasonal residents in support of the town's overall vision for the community.

PLANNING BOARD RECOMMENDATION

At their April 21, 2020 meeting the Planning Board voted unanimously to recommend adoption of the text amendment as recommended by Staff.

STAFF RECOMMENDATION:

Staff recommends adoption of the proposed amendment as presented, with the use listed under the *Service* category in the Table of Uses and Activities and be defined as follows:

> ***Tutoring Facility/Learning Center*** means a private, for profit or non-profit, use for the instruction of students in subjects and materials commonly taught in primary and secondary schools, for test-preparation, or the teaching of music and visual arts.

(DRAFT)
AN ORDINANCE AMENDING THE CODE OF ORDINANCES OF THE TOWN OF NAGS HEAD, NORTH CAROLINA PERTAINING TO PROPOSED NEW USE "TUTORING FACILITY/LEARNING CENTER"

ARTICLE I. Purpose(s) and Authority.

WHEREAS, pursuant to N.C.G.S. § 160A-381, the Town of Nags Head (the "Town") may enact and amend ordinances regulating the zoning and development of land within its jurisdiction and specifically the location and use of buildings, structures and land; pursuant to this authority and the additional authority granted by N.C.G.S. Chap. 160A, Art. 19 et. seq, the Town has adopted comprehensive zoning regulations and has codified the same within the Unified Development Ordinance, Part II of the Town Code, adopted pursuant to N.C.G.S. § 160A-363, which allows the Town to combine certain land development ordinances into a unified ordinance; and

WHEREAS, a text amendment application has been submitted requesting consideration be given to permitting "tutoring facility/learning center" within the C-2, General Commercial Zoning District' and

WHEREAS, the Town of Nags Head 2017 Comprehensive Plan includes policies supporting land uses that serve the needs of both year-round and seasonal residents in support of the town's overall vision for the community and to support and foster small, local businesses that preserve and uphold the vision and legacy of the town.

ARTICLE II. Construction.

For purposes of this ordinance amendment, underlined words (underline) shall be considered as additions to existing Town Code language and strikethrough words (~~strikethrough~~) shall be considered deletions to existing language. Any portions of the adopted Town Code which are not repeated herein but are instead replaced by an ellipsis ("...") shall remain as they currently exist within the Town Code.

ARTICLE III. Amendment of the Unified Development Ordinance.

PART I. That **Section 6.6 Table of Uses and Activities** be amended as follows:

		Residential Districts			**Commercial Districts**				
Use Category/Class	**Use Type**	**R-1**	**R-2**	**R-3**	**CR**	**C-1***	**C-2**	**C-3**	**C-4**
Service	Tutoring Facility/Learning Center						P		

PART II. That **Section 10.16 Required Parking by Use** be amended as follows:

Use Category/Class	Use Type	Required Parking
Service	Tutoring Facilities/Learning Center	One parking space for each 300 square feet of gross floor area.

PART III. That Appendix A Definitions, be amended as follows:

Section A.4 – Definitions

Tutoring Facility/Learning Center means a private, for profit or non-profit, use for the instruction of students in subjects and materials commonly taught in primary and secondary schools, for test-preparation, or the teaching of music and visual arts.

PART IV. All ordinances or parts of ordinances in conflict with this ordinance are hereby repealed. This ordinance shall be in full force and effect from and after the ___ day of ____ 2020.

_____

Benjamin Cahoon, Mayor

ATTEST:

_____

Town Clerk

APPROVED AS TO FORM:

_____

Town Attorney

Date adopted: _____

Motion to adopt by Commissioner _____

Motion seconded by Commissioner_____

Vote: _____ AYES _____ NAYS

App # 202010230

ZONING AMENDMENT APPLICATION
TOWN OF NAGS HEAD, NORTH CAROLINA

Applicant Outer Banks Montessori Collective

Mailing address 202 Shallow Street KDH 27948

Explanation of request

☐ Zoning Ordinance - Section(s) _____
Attach amendment in ordinance form.

☐ Zoning Map
Attach copy of current Zoning Map with affected property outlined in red.
Attach names and mailing addresses of the property owners of all parcels of land abutting the parcel in question.

Nature of request

A text amendment to create a new use category for a learning center in C-2 Zone in Nags Head

Reason for request

We are an academic service business - we provide tutoring, part & full time, to homeschool families. Each child we serve (ages 6+) is a registered homeschool child. Families can choose from a range of services - from 1 hour sessions up to 6 hours/day, 5 days a week & everything in between (3x/week, 1 week in 3/week off, 9-1, etc) We use the Montessori methodology as the bases of our services. Montessori includes the use of didactic, hands on learning materials that homeschool families might not have at home. We will have anywhere from 1-25 students in our space at one time.

We are not a school, we don't fit into any of the existing use categories (school, childcare, etc), And so we propose a new use that would accomodate us as a learning center / academic services, specifically to serve local homeschool families.

Applicant (Megan Dixon) & (Kim Cowen)

2/18/20
Date

757-613-1873

Agenda Item Summary Sheet

Item No: **E-3**
Meeting Date: **June 3, 2020**

Item Title: Public Hearing to consider a text amendment to the UDO pertaining to temporary uses or temporary alteration of uses related to declared emergencies

Item Summary:
In response to communication from the Outer Banks Restaurant Association, as well as discussion with other businesses, Planning Staff has prepared the proposed text amendment intending to enact provisions within the Unified Development Ordinance allowing for temporary uses or the temporary modification of uses to address conditions during declared states of emergency or resulting from such emergencies. The proposed text amendment has been updated to reflect feedback received from the Board of Commissioners.

Planning Board/Staff Recommendation
Planning Staff recommends approval of the text amendments as provided in the attached ordinance. As requested, Staff has made modifications to the proposed amendments with respect to allowed parking reductions and to improve the clarity of provisions addressing the expiration of temporary use permits; these changes are discussed in detail within Staff's memorandum.

The Planning Board reviewed the proposed text amendment at their meeting on May 19, and voted 6-0 (with one abstention) to recommend adoption as proposed.

Number of Attachments: 4

Specific Action Requested:

Hold public hearing and consider action on UDO text amendment

Submitted By: Planning and Development Date: May 27, 2020

Finance Officer Comment:

Signature: Amy Miller Date: May 28, 2020

Town Attorney Comment:

Signature: John Leidy Date: May 28, 2020

Town Manager Comment and/or Recommendation:

Signature: Cliff Ogburn Date: May 28, 2020

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NOTICE OF PUBLIC HEARINGS
TOWN OF NAGS HEAD BOARD OF COMMISSIONERS

NOTICE IS HEREBY GIVEN that the Nags Head Board of Commissioners will conduct public hearings on **Wednesday, June 3, 2020** beginning at 9:00 am in the Board Room of the Municipal Complex, 5401 S. Croatan Highway, Nags Head, NC to consider and take action upon the following requests:

1) Public Hearing to consider citizen comment on the Town Manager's proposed operating budget for July 1, 2020 – June 30, 2021, proposed CIP requests for FY 20/21 through FY 24/25, and updated Consolidated Fee Schedule

Anyone wishing to be heard concerning the proposed budget may appear in person at the date/time specified or may speak via the Zoom platform/app.

2) Public Hearing to consider a text amendment to the UDO submitted by Kim Cowen and Megan Dixon to allow "Tutoring Facility/Learning Center" as a permitted use within the C-2, General Commercial Zoning District Public Hearing to consider a text amendment to the Unified Development Ordinance submitted by a property owner to expand the principal sale items from outdoor stands to include reservations and tickets for events/activities

Anyone wishing to be heard concerning the text amendment to the UDO may speak via the Zoom platform/app.

3) Public Hearing to consider a text amendment to the UDO pertaining to temporary uses or temporary alteration of uses related to declared emergencies

Anyone wishing to be heard concerning the text amendment to the UDO may speak via the Zoom platform/app.

A copy of the application requests are available for public inspection at the Office of the Town Clerk, Town Municipal Complex, 5401 S. Croatan Hwy, Nags Head, NC 27959, telephone (252) 441-5508 during normal business hours.

As a result of these hearings substantial changes may be made in the proposals as advertised to reflect objections, debate and discussion at the hearings.

This the 18th day of May 2020.

Carolyn F. Morris
Town Clerk

MEMORANDUM
Town of Nags Head
Planning & Development Department

To: Board of Commissioners

From: Michael Zehner, Director of Planning & Development

Kelly Wyatt, Deputy Director of Planning & Development

Date: May 27, 2020

Subject: Public Hearing to consider a text amendment to the UDO pertaining to temporary uses or temporary alteration of uses related to declared emergencies (Attachment E-3)

OVERVIEW AND BACKGROUND

The proposed text amendment is intended to enact provisions within the Unified Development Ordinance allowing for temporary uses or the temporary modification of uses to address conditions during declared states of emergency or resulting from such emergencies. As the Board may be aware, Dan Lewis, President of the Outer Banks Restaurant Association, had emailed the mayors of the towns of Nags Head, Duck, Kill Devil Hills, Kitty Hawk, Manteo, and Southern Shores (attached) requesting the towns' consideration of regulatory changes that would allow for flexibility in restaurant operations in response to the COVID-19 Pandemic. This proposed text amendment is in response to that request, but has also been informed by further discussions between Staff and Mr. Lewis, Mark Ballog (owner of Lucky 12), and John Harris (owner of Kitty Hawk Kites); additionally, while in response to this immediate emergency, Staff believes that this provision will have application during other emergencies.

In short, this text amendment would allow for the issuance of a Temporary Use Permit only during an emergency declared by the Mayor (pursuant to Town and State laws) or due to impacts associated with a declared emergency. In these instances, Temporary Use Permits would be authorized to be issued jointly by the Town Manager and UDO Administrator for temporary uses or the temporary modification of uses; the drafted provisions allow for broad latitude in their application, however, there are limitations on eligible uses and modifications, and ultimately, a Permit could be rejected for any activity or accommodation, in the opinion of the Town Manager and UDO Administrator, that would be contrary to the purposes of the emergency declaration and/or the interests of the public health, safety, and welfare.

Obviously, the Town of Nags Head and the other Outer Banks' municipalities are not unique in the need to address this issue. Please find attached a blog post from the American Planning Association titled *7 Ways to Respond to Regulation Rollbacks*, intended to present perspectives and options for municipalities to address the Pandemic, while complying with applicable regulations and statutes.

The Planning Board reviewed the proposed text amendment at their meeting on May 19, 2020 and forwarded their recommendation in support to the Board of

Commissioners. The Board of Commissioners discussed the proposed text amendment at their meeting on May 20, 2020, in consideration of scheduling a public hearing. The Board voted to schedule a public hearing for June 3, and requested that Staff incorporate changes into the proposed text amendment that would allow for parking to be reduced by up to 25%, and make changes to proposed Section 4.11.5.3. to improve clarity consistent with intent.

POLICY CONSIDERATIONS

The most direct policy in the Comprehensive Plan pertaining to the proposed text amendment and the basis for the amendment is policy NR-11, as follows:

> *NR-11 Ensure that the town is a disaster resilient community that can survive, recover from, and thrive after a natural or man-made disaster event.*

In Staff's opinion, the proposed amendment is consistent with the intent of this policy, despite a lack of expectation for the current circumstances.

PLANNING BOARD RECOMMENDATION

The Planning Board reviewed the proposed text amendment at their meeting on May 19, and voted 6-0 (with one abstention) to recommend adoption as proposed.

One member of the Board did request, without objection from other members, that Staff verify that appropriate allowances were in place for businesses to display menu signs, and if not, request consideration of this aspect by the Board of Commissioners. The proposed text amendments allow for provisions of the Sign Ordinance to be waived, but limit additional temporary signs to no more than one. Additionally, the Sign Ordinance does not require a permit for signs less than 3 square feet in area. Staff believes these two provisions appropriately accommodate menu signage.

STAFF RECOMMENDATION

Staff recommends approval of the text amendments as provided in the attached ordinance. As requested, Staff has made the following modifications of the text amendments:

- Generally, the allowed maximum parking reduction within Section 4.11.5.2. has been increased from 20% to 25%; however, Staff recommends that it be an allowed reduction of existing parking versus required parking. Given parking requirements for some use categories, particularly shopping centers, administration and compliance could prove difficult. The attached ordinance includes the following amended provision:
    - The reduction of ~~required~~ **existing** parking by greater than ~~twenty (20%)~~ **twenty-five percent (25%)**;

- Section 4.11.5.3. of the attached ordinance has been amended as shown to improve clarity consistent with intent:

    - 4.11.5.3. Duration and Extension. Temporary Use Permits shall be issued with an expiration date, not to exceed ninety (90) days from the date of issuance. Generally, at the discretion of the Town Manager and UDO Administrator, such temporary use permits shall expire upon the termination of the declaration of emergency, the end of the circumstances under **or impacts associated with** the declaration causing the need for the accommodations, or upon the timeframe set by the Mayor, whichever is ~~sooner~~ **later**. Upon expiration, all temporary accommodations shall cease or otherwise be considered violations of the UDO, as applicable. Subject to the same limitations and discretion, the expiration date of a Temporary Use Permit may be extended, with such requests submitted no later than ten (10) business days prior to the pending expiration date.

With regard to the Board of Commissioners' review and action, Staff recommends consideration of the following UDO provisions:

3.5.3. Action by the Planning Board.

3.5.3.1. Every proposed amendment, UDO text amendment or zoning map amendment, shall be referred to the Planning Board for its recommendation and report. The Board of Commissioners is not bound by the recommendations, if any, of the Planning Board.

3.5.3.2. Prior to the consideration by the Board of Commissioners of a proposed UDO text amendment or zoning map amendment, the Planning Board shall advise and comment on whether the proposed amendment is consistent with the Comprehensive Plan. The Planning Board shall provide a written recommendation, certified by the UDO Administrator, to the Board of Commissioners that addresses plan consistency and other matters as deemed appropriate by the Planning Board, but a comment by the Planning Board that a proposed amendment is inconsistent with the Comprehensive Plan shall not preclude consideration or approval of the proposed amendment by the Board of Commissioners.

3.5.3.3. Members of the Planning Board shall not vote on recommendations regarding any UDO text amendment or zoning map amendment where the outcome of the matter being considered is reasonably likely to have a direct, substantial, and readily identifiable financial impact on the member.

3.5.4. Action by the Board of Commissioners.
Action upon an UDO text amendment or zoning map amendment, including the scheduling of a public hearing, will be at the discretion of the Board of Commissioners.

3.5.4.1. Before an item is placed on the consent agenda to schedule a public hearing, the Planning Board's recommendation on each proposed amendment must be received by the Board of Commissioners. If no recommendation is received from the Planning Board within 30 days from the date when submitted to the Planning Board, the petitioner may take the proposal to the Board of Commissioners without a recommendation from the Planning Board. However, the Planning Board may request the Board of Commissioners to delay final action on the amendment until such time as the Planning Board can present its recommendations. No such limitations shall apply to applications or requests submitted by Town staff or any Town Board.

3.5.4.2. After receiving a recommendation from the Planning Board on a proposed amendment, the Board of Commissioners may proceed to vote on the proposed ordinance, refer it to a committee for further study, or take any other action consistent with its usual rules of procedure.

3.5.4.3. The Board of Commissioners is not required to take final action on a proposed amendment within any specific period of time. Final action on an UDO text amendment or zoning map amendment submitted by third parties will be taken within a reasonable time. Final action taken within 90 days of the public hearing before the Board of Commissioners shall be presumptively reasonable.

3.5.4.4. No member of the Board of Commissioners shall vote on any zoning map amendment or UDO text amendment where the outcome of the matter being considered is reasonably likely to have a direct, substantial and readily identifiable financial impact.

3.5.4.5. Prior to adopting or rejecting any UDO text and/or map amendment, the Board of Commissioners shall adopt one of the following statements which shall not be subject to judicial review.

3.5.4.5.1. A statement approving the amendment and describing its consistency with the adopted Comprehensive Plan and explaining why the action taken is reasonable and in the public interest.

3.5.4.5.2. A statement rejecting the amendment and describing its inconsistency with the adopted Comprehensive Plan and explaining why the action taken is reasonable and in the public interest.

3.5.4.5.3. A statement approving the amendment and containing at least all of the following:

3.5.4.5.3.1. A declaration that the approval is also deemed an amendment to the Comprehensive Plan. The Board of Commissioners shall not require any additional request or application for amendment to the Comprehensive Plan.

3.5.4.5.3.2. An explanation of the change in conditions the Board of Commissioners took into account in amending the UDO to meet the development needs of the community.

3.5.4.5.3.3. Why the action was reasonable and in the public interest.

3.5.4.6. In deciding whether to adopt a proposed amendment to this UDO, the central issue before the Board of Commissioners is whether the proposed amendment advances the public health, safety, or welfare. When considering proposed map amendments:

3.5.4.6.1. The Board of Commissioners shall consider the entire range of permitted uses in the requested classification.

Attachments:

1. Proposed Text Amendment Ordinance;
2. Email from Dan Lewis, President, Outer Banks Restaurant Association; and
3. American Planning Association blog post *7 Ways to Respond to Regulation Rollbacks*

(DRAFT)
AN ORDINANCE AMENDING THE CODE OF ORDINANCES OF THE TOWN OF NAGS HEAD, NORTH CAROLINA PERTAINING TO TEMPORARY USE PERMITS DURING DECLARED EMERGENCIES

ARTICLE I. Purpose(s) and Authority.

WHEREAS, pursuant to N.C.G.S. § 160A-381, the Town of Nags Head (the "Town") may enact and amend ordinances regulating the zoning and development of land within its jurisdiction and specifically the location and use of buildings, structures and land; pursuant to this authority and the additional authority granted by N.C.G.S. Chap. 160A, Art. 19 et. seq, the Town has adopted comprehensive zoning regulations and has codified the same within the Unified Development Ordinance, Part II of the Town Code, adopted pursuant to N.C.G.S. § 160A-363, which allows the Town to combine certain land development ordinances into a unified ordinance; and

WHEREAS, pursuant to applicable provisions of Chapter 14, Emergency Management, of the Nags Head Town Code, and N.C.G.S. § 166A, the Town, through the Mayor, has the authority to declare the existence of state of emergency; and

WHEREAS, the Board of Commissioners find that it is necessary to enact provisions allowing for temporary uses or the temporary modification of uses to address conditions during declared states of emergency or resulting from such emergencies; and

WHEREAS, the Town of Nags Head 2017 Comprehensive Plan includes policies that seek to ensure that the Town is a disaster resilient community that can survive, recover from, and thrive after a disaster event; and

WHEREAS, the Board of Commissioners finds that these text amendments are consistent with the goals, objectives and policies of the Town's adopted Comprehensive Plan, and that this action is reasonable and in the public interest, and is in the interest of and not contrary to the public's health, safety, morals and general welfare for the Town to amend the Town's Unified Development Ordinance as stated below.

ARTICLE II. Construction.

For purposes of this ordinance amendment, underlined words (<u>underline</u>) shall be considered as additions to existing Town Code language and strikethrough words (~~strikethrough~~) shall be considered deletions to existing language. Any portions of the adopted Town Code which are not repeated herein, but are instead replaced by an ellipsis ("...") shall remain as they currently exist within the Town Code.

ARTICLE III. Amendment of the Unified Development Ordinance.

NOW, THEREFORE, BE IT ORDAINED by the Board of Commissioners of the Town of Nags Head, North Carolina, that the Unified Development Ordinance of the Town Code shall be amended as follows:

PART I. That **Section A.4, Definitions, of Appendix A, Definitions, of the UDO**, be amended by adding the following term and definition in the appropriate alphabetical order:

Temporary use permit means a permit issued by the Town Manager and UDO Administrator that allows for reasonable accommodations in zoning regulations for the temporary use or temporary modification of use of property.

PART II. That the definition of **Site Plan, and specifically Site Plan, Minor, as contained in Section A.4, Definitions, of Appendix A, Definitions, of the UDO,** be amended as follows:

Site plan means a plan provided that reflects existing and proposed conditions on a site that is intended for construction. This may include but is not limited to topography, structures or additions, grading, drainage, erosion control measures, trees to be saved or planted to comply with the applicable standards of this UDO as well as other requirements of the Town Code of Ordinances.

(1) ***Site plan, major*** means all site plans not meeting the requirements for a minor site plan.

(2) ***Site plan, minor*** includes the following: increases in lot coverage or building floor area not greater than 1,000 square feet, changes to stormwater management measures, landscape buffering, vegetation preservation area, signage, or site lighting for existing development, and/or any temporary changes to sites as part of activities eligible for and subject to the issuance of a Temporary Use Permit.

PART III. That **Section 3.8.6., Binding Effect, as contained in Article 3., Legislative/Quasi-Judicial Procedures, Part III., Quasi-Judicial Procedures, Section 3.8, Conditional Use Permits, of the UDO,** be amended as follows:

3.8.6. Binding Effect.
Any conditional use permit shall be binding to the property included in the permit unless subsequently changed or amended by the Board of Commissioners. Uses subject to a conditional use permit and the conditions thereof may be temporarily modified pursuant to Section 4.11.5. and Section 6.4.6. in a manner that would not be in compliance with the issued conditional use permit; such temporary modification shall not constitute a modification or change of the conditional use permit pursuant to Section 3.8.8., Change in Conditional Use Permit.

PART IV. That **Section 4.4., Applications Reviewed by Staff, as contained in Article 4., Development Review Process, Part II., Development Review Process, of the UDO,** be amended as follows:

SECTION 4.4 APPLICATIONS REVIEWED BY STAFF

Administrative approval includes the following types of development:

- Minor Site Plans (increases in lot coverage or building floor area not greater than 1,000 square feet, changes to stormwater management measures, landscape buffering, vegetation preservation area, signage, or site lighting for existing development, and/or any temporary changes to sites as part of activities eligible for and subject to the issuance of a Temporary Use Permit).

- Change of use applications not involving establishment of a new conditional use.

- Administrative Adjustments (see Section 4.14).

- Temporary Use Permits (see Section 4.11.5).

- Minor Subdivisions.

- Major Subdivision Final Plats.

The UDO Administrator has the authority to determine when projects meeting the above requirements shall require Major Site Plan review due to other project activities or unique circumstances; the UDO Administrator shall make such a determination in writing.

PART V. That **Section 4.9., Purpose and Intent, as contained in Article 4., Development Review Process, Part III., Development Permitting Requirements, of the UDO,** be amended by adding a thirteenth bullet to the bulleted list, as follows:

- Temporary uses or temporary modification of uses.

PART VI. That **Section 4.11., Permit Types, as contained in Article 4., Development Review Process, Part III., Development Permitting Requirements, of the UDO,** be amended by adding Section 4.11.5., as follows:

4.11.5. Temporary Use Permit.
In the event of an emergency declared by the Mayor pursuant to Chapter 14, Emergency Management , of the Nags Head Town Code and/or NCGS 166A-19.22, or owing to impacts associated with a declared emergency, the Mayor may authorize the Town Manager and UDO Administrator, jointly, or their designees, to allow for reasonable temporary accommodations in zoning regulations consistent with and furthering the purposes of the emergency declaration and in the interests of public health, safety, and welfare. Such

accommodations shall be in the form of the issuance of a Temporary Use Permit.

4.11.5.1. Applicability. Temporary accommodations eligible for the issuance of a Temporary Use Permit include:

- The allowance of uses on a temporary basis, pursuant to Section 6.4., and specifically Section 6.4.6.1.;
- The modification of uses on a temporary basis, pursuant to Section 6.4., and specifically Section 6.4.6.2.; and/or
- The waiving or varying of any applicable provision contained in Article 8, Article 9, or Article 10 of the UDO, except as limited by Section 4.11.5.2.

4.11.5.2. Prohibited Activities. The following activities or accommodations are ineligible for the issuance of a Temporary Use Permit:

- The increase of floor area and/or the construction or installation of permanent structures or buildings;
- The reduction of existing parking by greater than twenty-five percent (25%);
- The elimination of required landscaping or trees;
- The installation of more than one (1) additional temporary sign, limited in size and location pursuant to Part III., Sign Regulations, of Article 10, or signage beyond that which is necessary to provide for traffic control or public notices;
- The elimination, modification, or installation of driveways, except as necessary in the opinion of the Town Manager and UDO Administrator to accommodate the safe and efficient circulation of vehicles;
- The commencement of any water-dependent uses or activities;
- Any activity or accommodation, in the opinion of the Town Manager and UDO Administrator, that would be contrary to the purposes of the emergency declaration and/or the interests of the public health, safety, and welfare; and/or
- Any activity or accommodation that would not comply with applicable local, State, or Federal laws and regulations.

4.11.5.3. Duration and Extension. Temporary Use Permits shall be issued with an expiration date, not to exceed ninety (90) days from the date of issuance. Generally, at the discretion of the Town Manager and UDO Administrator, such temporary use permits shall expire upon the termination of the declaration of emergency, the end of the circumstances under or impacts associated with the declaration causing the need for the accommodations, or upon the timeframe set by the Mayor, whichever is later. Upon expiration, all temporary accommodations shall cease or otherwise be considered violations of the UDO, as applicable. Subject to

the same limitations and discretion, the expiration date of a Temporary Use Permit may be extended, with such requests submitted no later than ten (10) business days prior to the pending expiration date.

PART VII. That **Section 5.1., Intent, as contained in Article 5., Nonconformities, of the UDO,** be amended by adding Section 5.1.5., as follows:

5.1.5. Temporary uses or uses modified on a temporary basis subject to a Temporary Use Permit as authorized and limited by Section 4.11.5. shall have no effect on nonconforming status as established by the sections of this Article.

PART VIII. That **Section 6.4., Permitted Types, as contained in Article 6., Zoning Districts, of the UDO,** be amended as follows:

SECTION 6.4 PERMITTED TYPES.

Zoning districts have uses specified as permitted by right, conditional uses, and uses permitted with supplemental regulations. Detailed use tables are provided in Section 6.6, Table of Uses and Activities, showing the uses allowed in each district. Additionally, as authorized under Section 4.11.5., and Section 6.4.6. herein, uses may be temporarily permitted or modified on a temporary basis subject to a Temporary Use Permit. The following describes the processes of each of the categories that the uses are subject to:

PART IX. That **Section 6.4., Permitted Types, as contained in Article 6., Zoning Districts, of the UDO,** be amended by adding Section 6.4.6., as follows:

6.4.6. Uses or Modification of Uses with Temporary Use Permit.
As authorized under and limited by Section 4.11.5., uses may be temporarily permitted or modified on a temporary basis, subject to a Temporary Use Permit, as follows:

6.4.6.1. Temporary Use. Any use identified in Section 6.6, Table of Uses and Activities, may be temporarily permitted pursuant to Section 4.11.5. in any zoning district, except that uses not identified as Residential or Residential - Group in Section 6.6. may not be permitted in the Residential Districts or Special Districts identified in Table 6-1, Zoning Districts Established, unless otherwise permitted or allowed with a conditional use permit within such districts.

6.4.6.2. Temporary Modification of Use. Any use identified in Section 6.6., Table of Uses and Activities, as requiring a conditional use permit or being subject to supplemental regulations outlined in Article 7, Supplemental Regulations, may be temporarily modified pursuant to Section 4.11.5. in manner that would not be in compliance with any issued conditional use permit and/or supplemental standards, as applicable.

PART X. That **Part I., Introduction, as contained in Article 7., Supplemental Regulations, of the UDO,** be amended as follows:

PART I. INTRODUCTION

The following supplemental regulations shall pertain to the uses listed in the Table of Uses and Activities located in Article 6, Zoning Districts which are identified as a permitted use with supplemental regulations (PS) or a conditional use with supplemental regulations (CS).

For any use which requires the issuance of a conditional use permit, the supplemental use regulations listed herein may be in addition to any other conditions placed on the use by the Board of Commissioners in accordance with the standards in Section 3.8, Conditional Use Permits. The conditions may impose greater restrictions on a particular use than those which are listed herein.

Notwithstanding the foregoing, any use identified in Section 6.6., Table of Uses and Activities, as being subject to supplemental regulations listed herein, may be temporarily modified pursuant to and limited by Sections 4.11.5 and 6.4.6. in a manner that would not be in compliance these supplemental standards, as applicable.

All uses include in these supplemental regulations must also comply with all other requirements of this UDO. Where the requirements of these supplemental regulations may conflict with other provisions of the UDO, the requirements contained within the supplemental regulations shall prevail.

PART XI. That the **Table of Contents to Article 4 and Article 6 be updated to reflect Parts VI and IX of the Ordinance, respectively**.

ARTICLE IV. Severability.

All Town ordinances or parts of ordinances in conflict with this ordinance amendment are hereby repealed. Should a court of competent jurisdiction declare this ordinance amendment or any part thereof to be invalid, such decision shall not affect the remaining provisions of this ordinance amendment nor the Unified Development Ordinance or Town Code of the Town of Nags Head, North Carolina which shall remain in full force and effect.

ARTICLE V. Effective Date.

This ordinance amendment shall be in full force and effect upon the date of adoption by the Board of Commissioners.

_____
Benjamin Cahoon, Mayor
Town of Nags Head

ATTEST: _____
Carolyn F. Morris, Town Clerk

APPROVED AS TO FORM:
Town Attorney
Date adopted: _____
Motion to adopt by Commissioner _____
Motion seconded by Commissioner _____
Vote: ____ AYES ____ NAYS

Michael Zehner

From: Michael Zehner
Sent: Friday, May 15, 2020 1:17 PM
To: Michael Zehner
Subject: RE: Control Group

From: dlewis coastalprovisionsmarket.com <dlewis@coastalprovisionsmarket.com>
Date: May 3, 2020 at 12:25:13 PM EDT
To: Don Kingston <don.kingston@townofduck.com>, Tom Bennett <tbennett@southernshores-nc.gov>, Ben Cahoon <ben.cahoon@nagsheadnc.gov>, Benjamin Sproul <ben.sproul@kdhnc.com>, Gary Perry <gperry@kittyhawktown.net>, Bobby Owens <owens@townofmanteo.com>
Cc: Sheila Davies <sheila.davies@darenc.com>, "dcboc@darenc.com" <dcboc@darenc.com>
Subject: COVID Recovery Ordinance Compatibility

First, I would like to thank you all for you efforts on the Control Board in seeing our community through this current crisis. I'm sure it has been difficult balancing a variety of concerns and not being able to please everyone with these tough decisions.

I am reaching out to you all as head of the Outer Banks Restaurant Association (OBRA), a member of the NC Restaurant & Lodging Association's (NCRLA) Government Affairs Committee, and a member of the recently formed NCRLA COVID-19 Recovery Task Force. NCRLA has been in daily contact with Governor Cooper's office since the crisis began, and is now working with them on a reopening timeline and procedures, including the NC Restaurant Promise and COVID-19 training programs for restaurant personnel in conjunction with DHHS and NCSU Extension. Based on the task force's recent recommendation to the governor's office, we are expecting NC phase two to occur in late May, and will include among other things, restaurants opening at 50% capacity seating inside and on patios, and/or maintaining separation of tabes/chairs to comply with social distancing expectations. This would be expected to last at least 4-6 weeks in a best case scenario. Regardless of the timeline, our industry expects that outdoor dining, takeout and curbside delivery options will continue to play a much larger role in our business model for a much longer time. And the fact of the matter is, without other support or stimulus options, many restaurants here and across the country with not make it through this crisis.

With that said, I ask that all our municipalities take a look at two areas in their zoning that may work against efforts to service our guests in options other than inside dining. First is the itinerant/mobile vending ordinances that prohibit the use of carts, kiosks, and food trucks in most towns. I fully understand and agree with the intent of these ordinances: to not allow just anyone set up shop anywhere. But, especially now, with the tremendous need to serve guests for takeout, I would ask that all towns create an exception for restaurants to be able to use their own carts/kiosks/trucks on their own operational premises.

The second area of concern is the outdoor dining ordinances, many of which set a limited amount of square footage based on things such as lot coverage, parking, etc...., but don't necessarily take into account the number of people. In our new era, I would ask that all towns consider modifications to those limits in order to allow restaurants to space their tables in compliance with social distancing standards while still maintaining a viable number of seats with those spacing expectations.

I understand that most of these asks require either a text amendment, a zoning variance, and/or a conditional use application, along with a fee and a timeline that may take 2-3 months for any movement. But during these extremely trying times, I would ask if there is any way to expedite the

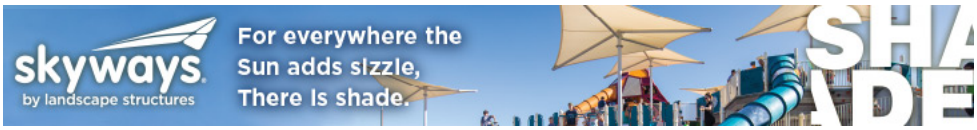
process, and the possibility of waving any fees that might be incurred. I would also be happy to have an OBRA member point person from each town work with all of you individually on these matters.

As many are having upcoming town council meetings shortly, I ask that the above be read in public comments, or added to the agenda, with exception of Town of Duck, as I have my own specific business interest there and will draft a separate version for their meeting on May 6.

Thank you again for your service to our community, and your consideration.

Dan Lewis

Daniel Lewis, CS, CSW
Chef/Owner, Coastal Provisions Restaurants
President, Outer Banks Restaurant Association
252-489-3171



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7 Ways to Respond to Regulation Rollbacks

Recently, a friend and colleague called me up and asked my advice. My ears perked up when he said that maybe I could help him before he lost his job. He was getting serious pressure from his elected officials to circumvent or roll back land use regulations to help local businesses impacted by the pandemic-induced economic downturn.

My colleague said that a quarter to a third of local businesses were projected to fold, and the local government was losing millions of dollars in revenue every month. Understandably, these were issues of the highest concern to local leaders.

> In his efforts to uphold the community's land-use requirements and the importance of public involvement, my colleague was at risk of being viewed as an obstacle to mitigating them.

How then can we offer strategies to be part of the solution, without exceeding our statutory and regulatory authority and while ensuring we do so in a manner consistent with our ethical principles?

Here are seven suggestions to consider:

1. PRIORITIZE MEASURES THAT ARE EASY FOR CUSTOMERS TO ACT ON

Planners can work with elected officials and community leaders in an expeditious manner to modify requirements, while still following procedural rules.

Simpler measures such as expanding the uses allowed in home occupations to enable businesses to work out of the home until social distancing requirements can be relaxed are often easier for businesses to act on and translate into meaningful economic activity that can help them stay afloat. Then, if these strategies yield positive benefits with limited side effects, communities can continue them after the crisis is over.

Planners should consider resisting efforts to waive design and development standards for projects that won't be completed for another 12 to 24 months. Such waivers may have limited value in helping businesses weather the short-term economic crisis. If inconsistent with community goals, such waivers could compromise the quality and functionality of the built environment for years to come.

2. IMPLEMENT IMPACTFUL ADMINISTRATIVE SOLUTIONS

Instead of changing their rules, some communities are taking action administratively wherever they can. For example, the City of Wilson, North Carolina, has stepped up its customer service (https://www.wilsonnc.org/home/showdocument?id=2761) with measures such as encouraging clients to schedule one-on-one phone calls with staff, opening a drive-through permitting window, and repurposing on-street parking spaces to facilitate pick-up of restaurant take-out orders.

In addition, planners should consider using appropriate administrative authority to prioritize projects and code revisions needed to protect the health, safety, and welfare of community members.

For example, we might prioritize the review of site plans needed to authorize drive-through testing sites and emergency housing. It may be prudent to work with the city or county manager's office to vet these in an expedited manner with governing boards and key stakeholders to confirm support.

Then, once the new administrative procedures are in place, planners should publicize them broadly to inform community stakeholders of the temporary change in operations. A good example of this is provided by the City of Portland's Planning and Sustainability Department (https://www.portlandoregon.gov/bds/article/756804).

3. FIND WAYS TO IMPLEMENT ONLINE PERMITTING

A potentially more complicated project is moving to online permitting. Yet, even if you have not had the time or money to implement such a system in the past (and have even less time or money in the present), there may be simple ways to begin shifting planning functions online.

For example, the City of Wilson, North Carolina, has made online forms "fillable" electronically so that customers don't have to print them out and instead can submit them digitally. In addition, software licenses for other functions such as online plan intake and electronic plan review can cost less than $1,000 a year and be installed relatively easily, while improving customer convenience and keeping development projects moving forward while social distancing measures are in place.

While lower in cost, such solutions often require good internal project management as well as strong collaboration with the Information Technology Department and may necessitate more trouble-shooting over time to configure and integrate future modules.

The City of Asheville has done a nice job building its own online permitting system (https://develop.plans.ashevillenc.gov/) one component at a time and creating a simple interface that guides users through the steps they need to take to make an electronic submittal. The city now handles about 90 percent of its plan reviews electronically.

> A full-service software vendor can provide an integrated solution for online permitting, including online plan intake and fee payment, internal workflow management, activity tracking by property, and ready integration with GIS.

While more comprehensive, such solutions can cost tens or hundreds of thousands of dollars and take six to 18 months, depending on whether or not your module is part of a larger organization-wide financial management system.

Even so, now may be the time when your organization is willing to make this investment. With the possibility of future waves of infection and more social distancing until a vaccine is developed, it may be worth the effort.

4. ADJUST PLANS TO RESPOND TO CHANGING NEEDS, BUT RESIST MEASURES THAT WILL UNDERMINE STILL-DESIRABLE LONG-TERM COMMUNITY GOALS

Flexibility is important to respond to changing community needs. Sometimes this can spark a long-needed reevaluation of long-term goals and strategies. However, rushed actions that undermine a still-desirable community vision can set back civic progress in significant ways.

5. MAKE SURE TO EVALUATE PROPOSED MEASURES FROM A DIVERSITY OF STAKEHOLDER PERSPECTIVES

Chances are, if a measure was unpopular before the pandemic, it will still be unpopular afterwards.

Efforts to overturn hard-earned community solutions may bring political consequences once the crisis is over, especially if they leave unpopular and lasting changes to the built environment. If pressure continues for such measures, we might work to implement a multi-channel public involvement strategy to give stakeholders as much opportunity as possible to provide input within the constraints of social distancing.

6. REMIND OTHERS THAT THE RULE OF LAW IS A FUNDAMENTAL ASPECT OF OUR DEMOCRACY

If the governing board is willing to tap emergency powers that it may possess to circumvent current development standards, then it is free to do so. Otherwise, we as planners need to stay within the limits of our authority, carry out our responsibilities, and work to maintain the integrity of local laws, despite the pressure we might experience to circumvent them.

7. ADVANCE EXPERIMENTAL MEASURES THAT COULD HELP DURING THE PANDEMIC AND BEYOND

The disruption to traditional operating procedures caused by the pandemic can also create a window of opportunity to advance new measures you have always wanted to try that are consistent with good planning principles. The best initiatives to advance may be those that help with short-term pandemic-related issues *and* bring lasting community benefits.

> Have you always wanted to expand administrative review of proposed development projects, especially for less-controversial decisions, to improve the efficiency of the development review process and free up public resources to handle other community planning needs?

Now might be the time for a pilot project, both to streamline review processes during the pandemic and to test this as a long-term procedural change.

Have you always wanted to allow a demonstration project for package delivery by aerial or terrestrial drones? Now might be a good time to try it, with social distancing measures heightening demand for home delivery, and fewer people on the roads.

Have you always wanted to create more safe places for pedestrians and bicyclists in your community? Now may be your chance. Seattle, for example, has just announced that it is making at least 20 miles of streets in its Stay Healthy Streets pilot initiative permanently car-free (https://sdotblog.seattle.gov/2020/05/07/2020-bike-investments-to-accelerate-including-20-miles-of-stay-healthy-streets-to-become-permanent-in-seattle/).

Pressure to roll back development standards in times of crisis can trap planners between professional ethics and political efficacy. With luck, these suggestions can help you focus the discussion on solutions that address the challenge at hand without creating lasting harmful impacts on the community or ethical dilemmas for public servants. And maybe the pandemic will even create an opportunity for you to try some thoughtful experiments that bring lasting improvements.

Top image: *Getty Images photo.*

ABOUT THE AUTHOR

Ben Hitchings, FAICP, CZO, is principal of Green Heron Planning based in Durham, North Carolina, and is a member of the APA Board of Directors.

MAY 12, 2020

By Benjamin Hitchings, FAICP

Tags: COVID-19, (/blog/?tags=1982) Health, (/blog/?tags=108) Plans, (/blog/?tags=1226) Zoning and Ordinances (/blog/?tags=101)

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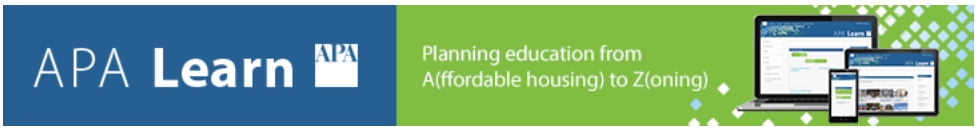

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ways-to-respond-to-regulation-rollbacks%2f&go=https%3a%2f%2flearn.planning.org%2fcatalog%2f)

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Agenda Item Summary Sheet

Item No: **G-1**
Meeting Date: **June 3, 2020**

Item Title: Consideration of numerous text amendments to the Unified Development Ordinance as it pertains to updated Flood Maps; Consideration of update to the Flood Damage Prevention Ordinance

Item Summary:
The proposed text amendments serve to adopt the updated Flood Insurance Rate Maps and Flood Insurance Study by amendment of the Flood Damage Prevention Ordinance; additionally, amendments are included to Article 4, Development Review Process, Section 8.6.4., Building Height, Section 11.5.3. Standard for Depth or Elevation of Fill, and Appendix A. Definitions. The Board continued consideration of these amendments from the meeting on May 6, 2020.

Planning Board/Staff Recommendation
Staff recommended to the Planning Board that the text amendments be adopted as proposed, with changes requested by the State's NFIP Office. The Planning Board recommended unanimous approval at their meeting on April 1, 2020, with the incorporation of those requested changes. The attached draft of the Ordinance includes these changes.

Number of Attachments: 7

Specific Action Requested:
Adoption of text amendment.

Submitted By: Planning and Development Date: May 27, 2020

Finance Officer Comment:

Signature: Amy Miller Date: May 27, 2020

Town Attorney Comment:

Signature: John Leidy Date: May 27, 2020

Town Manager Comment and/or Recommendation:

Signature: Cliff Ogburn Date: May 27, 2020

MEMORANDUM
Town of Nags Head
Planning & Development Department

To: Board of Commissioners

From: Michael Zehner, Director of Planning & Development

Holly White, Principal Planner

Date: May 27, 2020

Subject: Consideration of numerous text amendments to the Unified Development Ordinance as it pertains to updated Flood Maps; Consideration of update to the Flood Damage Prevention Ordinance (Attachment G-1)

Staff wishes to reiterate its previous recommendation, presented to the Board at the meeting on May 6, 2020, that the text amendments to the Unified Development Ordinance to affect the updated Flood Maps be adopted as proposed; the text amendment ordinance, as previously provided to the Board, is attached for review and consideration. Staff also wishes to reiterate the information supporting the amendments, as previously relayed to the Board in the memo dated April 27, 2020 and the presentation made to the Board at the May 6 meeting. Additionally, as previously noted, the Planning Board (at their meeting on April 1, 2020) recommended unanimous approval of the text amendments as proposed, with incorporation of changes recommended by Staff as requested by the State's NFIP Office (incorporated within the attached).

Following the May 6, 2020 Board meeting, Staff received a few inquiries from property owners regarding the effect of current flood regulations compared to proposed regulations. Additionally, Staff received the attached email from Sue Rice (including Staff's response) with more general comments and questions regarding the proposed Flood Maps and Ordinance being considered. Staff will be happy to expand on or clarify the responses to Mrs. Rice comments and questions.

Based upon the discussion on May 6, 2020, Staff understands that the two aspects of the proposed Ordinance subject to further consideration by the Board are the 10' Local Elevation Standard for areas west of NC12 and NC1243 and the limitation on the lateral addition of floor area located below the Local Elevation Standard. With respect to both aspects, as well as the entire proposed Ordinance, Staff's intent was to develop regulations that were as equally stringent as possible compared to current regulations and mapping; it is an option to make the regulations more stringent or less stringent with respect to either of these aspects.

It is important to note that Staff's intent was understood to be consistent with a resolution adopted by the Board of Commissioners on March 1, 2017 (attached) that noted that the preliminary Flood Insurance Rate Maps "underrepresented the flood risk for a significant portion of the Town," potentially resulting in, without the adoption of more stringent local regulations (compared to minimum requirements), "new construction and/or improvements to existing buildings that would be at risk of

flooding....” At least one additional impact beyond flooding, also cited in the resolution, concerned the potential future increase in insurance premiums, as “buildings constructed outside of the Special Flood Hazard Area are not grandfathered for flood insurance purposes and, if later mapped into a flood zone, may realize significant flood insurance premium increases if not constructed in compliance with new flood damage prevention regulations.”

Proposed 10’ LES

In determining the recommended 10’ LES for areas west of NC12 and NC1243, Staff concluded that it was appropriate based upon property elevations/grades, the elevation of structures, the heights of flood waters associated with recent events, and the effect of existing regulations; with respect to this last consideration, it is notable that AE flood zones in this area provide for Base Flood Elevations of 8’, 9’, 10’, or 11’. Based upon the intent of ensuring that regulations are as equally stringent as possible compared to current regulations, Staff determined that a 10’ LES would meet this intent, compared to an 8’ LES. An 8’ LES would essentially regulate property similarly to an AE-7, of which there are no areas within the Town. An LES of 8’ is an option, which would result in the 2,498 properties located in an AE-8, AE-9, AE-10, or AE-11 being regulated less stringently than they are currently. By contrast, an LES of 10’ would regulate 20 properties more stringently, 952 properties equally as stringently, and 1,526 less stringently.

Staff also noted that it may be helpful to visualize current regulations compared to proposed regulations. Attached are diagrams indicating the effect of current AE-9 and AE-10 regulations compared to the proposed 10’ LES. Essentially, the proposed 10’ LES regulates properties in AE-9 equally. As depicted, the reference level (a point discussed at the Board’s May 6 meeting) is identified as being the same between current and proposed regulations; due to both Flood Ordinance and Building Code requirements for the use of flood resistant materials and/or floodproofing, there is no functional difference in the location of the reference level between current and proposed regulations.

Lateral Additions

Currently, within regulated flood zones and with respect to post-FIRM structures, no lateral addition is allowed below the Regulatory Flood Protection Elevation (“RFPE”; the Base Flood Elevation plus 1’ freeboard). Additionally, within these zones, conditioned space below the RFPE would be considered noncompliant; Staff estimates that approximately 622 structures currently within regulated flood zones have conditioned space below the RFPE. Under the new Flood Map, most of these properties would now be in an X flood zone. With the proposed 10’ LES, these structures would have been precluded from making a lateral addition of current conditioned space without the exemption proposed by Staff.

The exemption proposed by Staff would allow, where there is existing conditioned space below the 10’ LES, this conditioned space to be expanded by up to 25%.

Currently, when located within a regulated flood zone, conditioned space below the RFPE would not be allowed to be expanded. Staff proposed a limit of 25% to allow for some flexibility, but to limit potential exposure and risk from loss as many of these properties continue to be susceptible to flooding. This concern is potentially exacerbated by these properties no longer being required to maintain flood insurance due to their location in the X flood zone.

Staff Recommendation

Staff continues to recommend adoption of the text amendments as proposed, based upon the intent to regulate properties as close as possible to current regulations. The Board certainly has the latitude to consider adopting regulations which are less stringent than current with respect to these aspects of the Ordinance. As a reminder, reiterated in the attached letter from FEMA dated May 15, 2020, the Town has until June 19, 2020 to adopt an updated Flood Damage Prevention Ordinance meeting minimum NFIP requirements.

With regard to the Board of Commissioners' review and action, Staff recommends consideration of the following UDO provisions:

3.5.3. Action by the Planning Board.

3.5.3.1. Every proposed amendment, UDO text amendment or zoning map amendment, shall be referred to the Planning Board for its recommendation and report. The Board of Commissioners is not bound by the recommendations, if any, of the Planning Board.

3.5.3.2. Prior to the consideration by the Board of Commissioners of a proposed UDO text amendment or zoning map amendment, the Planning Board shall advise and comment on whether the proposed amendment is consistent with the Comprehensive Plan. The Planning Board shall provide a written recommendation, certified by the UDO Administrator, to the Board of Commissioners that addresses plan consistency and other matters as deemed appropriate by the Planning Board, but a comment by the Planning Board that a proposed amendment is inconsistent with the Comprehensive Plan shall not preclude consideration or approval of the proposed amendment by the Board of Commissioners.

3.5.3.3. Members of the Planning Board shall not vote on recommendations regarding any UDO text amendment or zoning map amendment where the outcome of the mater being considered is reasonably likely to have a direct, substantial, and readily identifiable financial impact on the member.

3.5.4. Action by the Board of Commissioners.

Action upon an UDO text amendment or zoning map amendment, including the scheduling of a public hearing, will be at the discretion of the Board of Commissioners.

3.5.4.1. Before an item is placed on the consent agenda to schedule a public hearing, the Planning Board's recommendation on each proposed amendment must be received by the Board of Commissioners. If no recommendation is received from the Planning Board within 30 days from the date when submitted to the Planning Board, the petitioner may take the proposal to the Board of Commissioners without a recommendation from the Planning Board. However, the Planning Board may request the Board of Commissioners to delay final action on the amendment until such time as the Planning Board can present its recommendations. No such limitations shall apply to applications or requests submitted by Town staff or any Town Board.

3.5.4.2. After receiving a recommendation from the Planning Board on a proposed amendment, the Board of Commissioners may proceed to vote on the proposed ordinance, refer it to a committee for further study, or take any other action consistent with its usual rules of procedure.

3.5.4.3. The Board of Commissioners is not required to take final action on a proposed amendment within any specific period of time. Final action on an UDO text amendment or zoning map amendment submitted by third parties will be taken within a reasonable time. Final action taken within 90 days of the public hearing before the Board of Commissioners shall be presumptively reasonable.

3.5.4.4. No member of the Board of Commissioners shall vote on any zoning map amendment or UDO text amendment where the outcome of the matter being considered is reasonably likely to have a direct, substantial and readily identifiable financial impact.

3.5.4.5. Prior to adopting or rejecting any UDO text and/or map amendment, the Board of Commissioners shall adopt one of the following statements which shall not be subject to judicial review.

3.5.4.5.1. A statement approving the amendment and describing its consistency with the adopted Comprehensive Plan and explaining why the action taken is reasonable and in the public interest.

3.5.4.5.2. A statement rejecting the amendment and describing its inconsistency with the adopted Comprehensive Plan and

explaining why the action taken is reasonable and in the public interest.

3.5.4.5.3. A statement approving the amendment and containing at least all of the following:

3.5.4.5.3.1. A declaration that the approval is also deemed an amendment to the Comprehensive Plan. The Board of Commissioners shall not require any additional request or application for amendment to the Comprehensive Plan.

3.5.4.5.3.2. An explanation of the change in conditions the Board of Commissioners took into account in amending the UDO to meet the development needs of the community.

3.5.4.5.3.3. Why the action was reasonable and in the public interest.

3.5.4.6. In deciding whether to adopt a proposed amendment to this UDO, the central issue before the Board of Commissioners is whether the proposed amendment advances the public health, safety, or welfare. When considering proposed map amendments:

3.5.4.6.1. The Board of Commissioners shall consider the entire range of permitted uses in the requested classification.

Attachments:

1. Proposed Text Amendment Ordinance;
2. Email from Sue Rice;
3. Resolution No. 17-03-005;
4. Diagrams comparing AE-9 and AE-10 to 10’ LES; and
5. Letter from Rachel Sears, Director, FEMA Floodplain Management Division, dated May 15, 2020

AN ORDINANCE AMENDING THE CODE OF ORDINANCES OF THE TOWN OF NAGS HEAD, NORTH CAROLINA PERTAINING TO FLOOD DAMAGE PREVENTION

ARTICLE I. Purpose(s) and Authority.

WHEREAS, The Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Article 6 of Chapter 153A; Article 8 of Chapter 160A; and Article 7, 9, and 11 of Chapter 160D (Effective January 1, 2021) of the North Carolina General Statutes, delegated to local governmental units the authority to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, The flood prone areas of the Town are subject to periodic inundation which results in loss of life, property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare; and

WHEREAS, The Town of Nags Head desires to protect human life, safety and health; minimize expenditure of public money for costly flood control projects; minimize the need for rescue and relief efforts associated with flooding; minimize prolonged business losses and interruptions; minimize damage to public facilities and utilities; minimize damage to private and public property due to flooding; maintain the natural and beneficial functions of floodplains; and mitigate flood risks in Nags Head by implementing local elevation standards for all Special Flood Hazards Areas and Shaded X and X flood zones.

WHEREAS, The Town of Nags Head 2017 Comprehensive Plan includes goals and policies that support the Town's continued participation in the National Flood Insurance Program (NFIP) and ensure the Town is a disaster resilient community that can survive, recover from, and thrive after a natural or man-made disaster; and

WHEREAS, the Board of Commissioners finds that these text amendments are consistent with the goals, objectives and policies of the Town's adopted Comprehensive Plan, and that this action is reasonable and in the public interest, and is in the interest of and not contrary to the public's health, safety, morals and general welfare for the Town to amend the Towns Unified Development Ordinance as stated below.

ARTICLE II. Amendment of the Unified Development Ordinance.

NOW, THEREFORE, BE IT ORDAINED by the Board of Commissioners of the Town of Nags Head, North Carolina, that the Unified Development Ordinance of the Town Code shall be amended as follows:

PART I. That **Article 11, Environmental Regulations**, **Part III. Flood Damage Prevention** shall be deleted in its entirety and replaced with the following:

PART III. FLOOD DAMAGE PREVENTION

SECTION 11.41 STATUTORY AUTHORIZATION, FINDINGS OF FACT, PURPOSE AND OBJECTIVES.

11.41.1. Statutory Authorization.
The Legislature of the State of North Carolina has in Part 6, Article 21 of Chapter 143; Article 6 of Chapter 153A; Article 8 of Chapter 160A; and Article 7, 9, and 11 of Chapter 160D (Effective January 1, 2021) of the North Carolina General Statutes, delegated to local governmental units the authority to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry. Therefore, the Board of Commissioners does ordain as follows in this Article 11, Part III.

11.41.2. Findings of Fact.

> ***11.41.2.1.*** The flood prone areas of the Town are subject to periodic inundation which results in loss of life, property, health and safety hazards, disruption of commerce and governmental services, extraordinary public expenditures for flood protection and relief, and impairment of the tax base, all of which adversely affect the public health, safety and general welfare.
>
> ***11.41.2.2.*** These flood losses are caused by the cumulative effect of obstructions in floodplains causing increases in flood heights and velocities, and by the occupancy in flood prone areas of uses vulnerable to floods or other hazards.

11.41.3. Statement of Purpose.
It is the purpose of this Article 11, Part III to promote the public health, safety and general welfare and to minimize public and private losses due to flood conditions within flood prone areas by provisions designed to:

> ***11.41.3.1.*** Restrict or prohibit uses which are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
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> ***11.41.3.2.*** Require that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;
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> ***11.41.3.3.*** Control the alteration of natural floodplains, stream channels, and natural protective barriers which are involved in the accommodation of floodwaters;
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> ***11.41.3.4.*** Control filling, grading, dredging and other development which may increase erosion or flood damage; and
>
> ***11.41.3.5.*** Prevent or regulate the construction of flood barriers which will unnaturally divert floodwaters, or which may increase flood hazards to other lands.

11.41.4. Objectives.
The objectives of this article are to:

> ***11.41.4.1.*** Protect human life, safety and health;

11.41.4.2. Minimize expenditure of public money for costly flood control projects;

11.41.4.3. Minimize the need for rescue and relief efforts associated with flooding and generally undertaken at the expense of the general public;

11.41.4.4. Minimize prolonged business losses and interruptions;

11.41.4.5. Minimize damage to public facilities and utilities, such as water and gas mains, electric, telephone, cable and sewer lines, streets and bridges, located in flood prone areas;

11.41.4.6. Minimize damage to private and public property due to flooding;

11.41.4.7. Make flood insurance available to the community through the National Flood Insurance Program (NFIP);

11.41.4.8. Maintain the natural and beneficial functions of floodplains;

11.41.4.9. Help maintain a stable tax base by providing for the sound use and development of flood-prone areas; and

11.41.4.10. To ensure that potential homebuyers are notified that property is in a Special Flood Hazard Area (SFHA) or other areas prone to flooding.

11.41.4.11. Mitigate flood risks in Nags Head by implementing local elevation standards for all Special Flood Hazards Areas and Shaded X and X flood zones.

SECTION 11.42 GENERAL PROVISIONS.

11.42.1. Lands to Which this Article 11, Part III Applies.

This Article 11, Part III shall apply to all areas within the jurisdiction of the Town, including Extra-Territorial Jurisdictions (ETJs) as allowed by law.

11.42.2. Basis for Establishing the Special Flood Hazard Areas.

The special flood hazard areas are those identified under the Cooperating Technical State (CTS) agreement between the State of North Carolina and FEMA in its Flood Insurance Study (FIS) dated June 19, 2020 for Town of Nags Head, Dare County and associated DFIRM panels, including any digital data developed as part of the FIS, which are adopted by reference and declared a part of this ordinance, and all revisions thereto after January 1, 2021. Future revisions to the FIS and DFIRM panels that do not change flood hazard data within the jurisdictional authority of the Town of Nags Head are also adopted by reference and declared a part of this ordinance. Subsequent Letter of Map Revisions (LOMRs) and/or Physical Map Revisions (PMRs) shall be adopted within 3 months.

11.42.3. Establishment of a Local Elevation Standard (LES)

The Local Elevation Standard means a locally adopted elevation level used as the Regulatory Flood Protection Elevation (RFPE) to mitigate flood hazards in the Shaded X, X, AE, AO, VE, as depicted on the FIRMs for Nags Head. These areas may be vulnerable to flooding from storm surge, wind-driven tides, and excessive rainfall. Many of these areas have repetitively flooded and continue to remain at risk to flooding. Therefore, an elevation standard and other floodplain development standards are needed to meet the objectives of this Section as identified in 11.41.4.

11.42.3.1. In Nags Head the RFPE is as defined as:

11.42.3.1.1. Coastal High Hazard Areas (CHHA)- Properties located to the east of NC 12 and SR 1243 are located in an active oceanfront environment that is vulnerable to storm surge, erosion, sea level rise, and other hazards. These areas have special flood hazards associated with high velocity waters from storm surges or seismic activity and, therefore, the RFPE is 12 feet NAVD 1988.

11.42.3.1.2. Properties west of NC 12 and SR 1243- The RFPE for properties located west of NC 12 and SR 1243 and in flood zones Shaded X, X, or AE, is 10 feet NAVD 1988. This includes properties abutting US 64, also known as the Causeway.

11.42.4. Establishment of Floodplain Development Permit.
A floodplain development permit shall be required in conformance with the provisions of this Part prior to the commencement of any development activities within the AE, AO, VE, Shaded X or X zone.

11.42.5. Compliance.
No structure or land shall hereafter be located, extended, converted, altered or developed in any way without full compliance with the terms of this Part and other applicable regulations.

11.42.6. Abrogation and Greater Restrictions.
This Part is not intended to repeal, abrogate or impair any existing easements, covenants or deed restrictions. However, where this Part and another provision conflict or overlap, whichever imposes the more stringent restrictions shall prevail.

11.42.7. Interpretation.
In the interpretation and application of this Part, all provisions shall be considered as minimum requirements; liberally construed in favor of the Board of Commissioners; and deemed neither to limit nor repeal any other powers granted under state statutes.

11.42.8. Warning and Disclaimer of Liability.
The degree of flood protection required by this Part is considered reasonable for regulatory purposes and is based on scientific and engineering considerations. Larger floods can and will occur; actual flood heights may be increased by manmade or natural causes. This Part does not imply that land outside the special flood hazard areas or uses permitted within such areas will be free from flooding or flood

damages. This Part shall not create liability on the part of the Town or by an officer or employee thereof for any flood damages that result from reliance on this Part or any administrative decision lawfully made thereunder.

11.42.9. Penalties for Violations.
Violation of the provisions of this Part or failure to comply with of its requirements, including violation of conditions and safeguards established in connection with grants of variance or special exceptions, shall constitute a Class 1 misdemeanor pursuant to NC G.S. § 143-215.58. Any person who violates this article or fails to comply with any of its requirements shall, upon conviction thereof, be fined not more than $500.00 or imprisoned for not more than 30 days, or both. Each day such violation continues shall be considered a separate offense. Nothing herein contained shall prevent the Town from taking such other lawful action as it necessary to prevent or remedy any violation. Other lawful actions may include, but shall not be limited to, those provisions in Section 1.10, Violation of UDO Regulations.

SECTION 11.43 ADMINISTRATION.

11.43.1. Designation of Floodplain Administrator.
The Chief Building Inspector or his designee, hereinafter referred to as the "Floodplain Administrator", is hereby appointed to administer and implement the provisions of this Part. In instances where the Floodplain Administrator receives assistance from others to complete tasks to administer and implement this ordinance, the Floodplain Administrator shall be responsible for the coordination and community's overall compliance with the National Flood Insurance Program and the provisions of this ordinance.

11.43.2. Duties and Responsibilities of the Floodplain Administrator.
Duties of the floodplain administrator shall include, but not be limited to:

> ***11.43.2.1.*** Review all floodplain development applications and issue permits for all proposed development Shaded X, X, AE, AO, and VE flood zones to assure that all requirements of this Part have been satisfied.
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> ***11.43.2.2.*** Review all proposed development to assure that all necessary local, state and federal permits have been received, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334.
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> ***11.43.2.3.*** Notifying adjacent communities and the North Carolina Department of Public Safety, Division of Emergency Management, State Coordinator for the National Flood Insurance Program prior to any alterations or relocation of a watercourse and submitting evidence of such notification to FEMA.
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> ***11.43.2.4.*** Assuring that maintenance is provided within the altered or relocated portion of such watercourse so that the flood-carrying capacity is maintained.

11.43.2.5. Obtaining the actual elevation (in relation to NAVD 1988) of the reference level (including the basement) and all attendant utilities of all new or substantially improved structures in accordance with subsection 11.43.5.1 of this section.

11.43.2.6. Obtaining the actual elevation (in relation to NAVD 1988) to which all new or substantially improved structures and utilities have been floodproofed in accordance with subsection 11.43.5.1 of this section.

11.43.2.7. Obtain actual elevation (in relation to NAVD 1988) of all public utilities in accordance with subsection 11.43.5.1 of this section.

11.43.2.8. When floodproofing is utilized for a particular structure, the floodplain administrator shall obtain certifications from a registered professional engineer or architect in accordance with subsection 11.43.5.2 of this section and subsection 11.44.2.2.

11.43.2.9. Where interpretation is needed as to the exact location of the boundaries of the special flood hazard areas (for example, where there appears to be a conflict between a mapped boundary and actual field conditions) or Shaded X or X flood zones, the floodplain administrator shall make the necessary interpretation. The person contesting the location of the boundary shall be given a reasonable opportunity to appeal the interpretation as provided in this Part.

11.43.2.10. When the lowest floor and the lowest adjacent grade of a structure or the lowest ground elevation of a parcel or structure in a special flood hazard area is above the base flood elevation, advise the property owner of the option to apply for a letter of map amendment (LOMA) from FEMA. However, if the property is to be removed from the V Zone it must not be located seaward of the landward toe of the primary frontal dune. Maintain a copy of the letter of map amendment (LOMA) issued by FEMA in the floodplain development permit file.

11.43.2.11. Making on-site inspections of work in progress. As the work pursuant to a floodplain development permit progresses, the floodplain administrator shall make as many inspections of the work as may be necessary to ensure that the work is being done according to the provisions of this article and terms of the permit. In exercising this power, the floodplain administrator has a right, upon presentation of proper credentials, to enter on any premises within the jurisdiction of the Town at any reasonable hour for the purposes of inspection or other enforcement action.

11.43.2.12. Issue stop work orders as required. Whenever a building or part thereof is being constructed, reconstructed, altered, or repaired in violation of this Part, the floodplain administrator may order the work to be immediately stopped. The stop-work order shall be in writing and directed to the person doing the work. The stop-work order shall state the specific work to be stopped, the specific reasons(s) for the stoppage, and the conditions(s) under

which the work may be resumed. Violation of a stop-work order constitutes a misdemeanor.

11.43.2.13. Revoke floodplain development permits as required. The floodplain administrator may revoke and require the return of the floodplain development permit by notifying the permit holder in writing stating the reason(s) for the revocation. Permits shall be revoked for any substantial departure from the approved application, plans, or specifications; for refusal or failure to comply with the requirements of state or local laws; or for false statements or misrepresentations made in securing the permit. Any floodplain development permit mistakenly issued in violation of any applicable state or local law may be revoked.

11.43.2.14. Permanently maintain all records pertaining to the administration of this Part and making these records available for public inspection, recognizing that such information may be subject to the Privacy Act of 1974, as amended.

11.43.2.15. Providing the North Carolina Department of Public Safety, Division of Emergency Management, State Coordinator for the National Flood Insurance Program with two copies of the maps delineating new corporate limits within six months from date of annexation or change in corporate boundaries.

11.43.2.16. Make periodic inspections throughout the jurisdiction of the Town. The floodplain administrator and each member of his or her inspections department shall have a right, upon presentation of proper credentials, to enter on any premises within the territorial jurisdiction of the department at any reasonable hour for the purposes of inspection or other enforcement action.

11.43.2.17. Follow through with corrective procedures of subsection 11.43.6.

11.43.2.18. Review, provide input, and make recommendations for variance requests.

11.43.2.19. Maintain a current map repository to include, but not limited to, historical and effective FIS report, historical and effective FIRM and other official flood maps and studies adopted in accordance with subsection 11.42.2 of this Part, including any revisions thereto including letters of map change, issued by FEMA. Notify state and FEMA of mapping needs.

11.43.2.20. Coordinate revisions to FIS reports and FIRMS, including letters of map revision based on fill (LOMR-F) and letters of map revision (LOMR).

11.43.3. Floodplain Development Application Requirements.
Application for a floodplain development permit shall be made to the floodplain administrator on forms prior to any development activities. The following items shall

be presented to the floodplain administrator to apply for a floodplain development permit:

11.43.3.1. Two copies of a plot plan drawn to scale, along with an electronic version, which shall include, but shall not be limited to, the following specific details of the proposed floodplain development; at the discretion of the floodplain administrator, such plot plans shall be certified by a North Carolina registered land surveyor or professional engineer:

11.43.3.1.1. The nature, location, dimensions, and elevations of the area of development/disturbance; existing and proposed structures, utility systems, grading/pavement areas, location of fill materials, storage areas, drainage facilities, and other development;

11.43.3.1.2. The boundary of any special flood hazard area or any Shaded X or X Zone as delineated on the FIRM or other flood map as determined in subsection 11.42.2 or a statement that the entire lot is within the special flood hazard area;

11.43.3.1.3. Flood zone(s), including any Shaded X or X zone, designation of the proposed development area as determined on the FIRM or other flood map as determined in subsection 11.42.2;

11.43.3.1.4. The base flood elevation (BFE) and/or the Regulatory Flood Protection Elevation (RFPE) where provided as set forth in subsection 11.42.2;

11.43.3.1.5. The old and new location of any watercourse that will be altered or relocated as a result of proposed development; and

11.43.3.1.6. The boundary and designation date of the CBRS area or OPA, if applicable.

11.43.3.2. Proposed elevation, and method thereof, of all development including but not limited to:

11.43.3.2.1. The elevation in relation to NAVD 1988 of the proposed reference level (including the basement) of all new and substantial improvements; and

11.43.3.2.2. Elevation in relation to NAVD 1988 to which any non-residential structure in zone AE, AO, Shaded X, or X Zone will be floodproofed; and

11.43.3.2.3. Elevation in relation to NAVD 1988 to which any proposed utility systems will be elevated or floodproofed.

11.43.3.3. If floodproofing, a floodproofing certificate (FEMA Form 086-0-34) with supporting data, an operational plan, and an inspection and maintenance

plan that includes, but is not limited to, installation, exercise, and maintenance of floodproofing measures.

11.43.3.4. A foundation plan, drawn to scale, which shall include details of the proposed foundation system to ensure all provisions of this Part are met. These details include but are not limited to:

11.43.3.4.1. The proposed method of elevation, if applicable (i.e., fill, solid foundation perimeter wall, solid backfilled foundation, open foundation, open foundation on columns/posts/piers/piles/shear walls).

11.43.3.4.2. Openings to facilitate equalization of hydrostatic flood forces on walls in accordance with subsection 11.44.2.4 when solid foundation perimeter walls are used in zones AE or Shaded X or X Zone.

11.43.3.4.3. The following, in coastal high hazard areas, in accordance with subsection 11.44.2.4.4 and subsection 11.44.3:

11.43.3.4.3.1. V-Zone certification with accompanying plans and specifications verifying the engineered structure and any breakaway wall designs (breakaway wall designs are only for accessory structures). In addition, prior to the Certificate of Compliance/Occupancy issuance, the floodplain administrator may require a registered professional engineer or architect to certify that the finished construction is compliant with the design, specifications and plans for VE Zone construction if determined necessary.

11.43.3.4.3.2. Plans for open wood lattice or insect screening, if applicable.

11.43.3.4.3.3. Plans for non-structural fill, if applicable. If non-structural fill is proposed, it must demonstrate through coastal engineering analysis that the proposed fill would not result in any increase in the base flood elevation or otherwise cause adverse impacts by wave ramping and deflection onto the subject structure or adjacent properties.

11.43.3.5. Usage details of any enclosed areas below the regulatory flood protection elevation.

11.43.3.6. Plans and/or details for the protection of public utilities and facilities such as sewer, gas, electrical, and water systems to be located and constructed to minimize flood damage.

11.43.3.7. Certification that all other local, state and federal permits required prior to floodplain development permit issuance (wetlands, endangered

species, erosion and sedimentation control, Coastal Area Management Act (CAMA), riparian buffers, mining, etc.) have been received.

11.43.3.8. Documentation for placement of recreational vehicles and/or temporary structures, when applicable, to ensure subsections 11.44.2.3 and 11.44.2.5 of this Part are met.

11.43.3.9. A description of proposed watercourse alteration or relocation, when applicable, including an engineering report on the effects of the proposed project on the flood-carrying capacity of the watercourse and the effects on properties located both upstream and downstream; and a map (if not shown on the plot plan) showing the location of the proposed watercourse alteration and relocation.

11.43.3.10. In Shaded X and X zones, a survey prepared by a licensed North Carolina surveyor may be used to demonstrate the natural grades of the parcel relative to the RFPE.

11.43.4. Floodplain Development Permit Requirements.
The Floodplain Development Permit shall include, but not be limited to:

11.43.4.1. A complete description of all the development to be permitted under the floodplain development permit. (e.g. house, garage, pool, septic, bulkhead, cabana, pier, bridge, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials, etc.).

11.43.4.2. The flood zone determination for the proposed development per available data specified in subsection 11.42.2.

11.43.4.3. The regulatory flood protection elevation required for the reference level and all attendant utilities.

11.43.4.4. The regulatory flood protection elevation required for the protection of all public utilities.

11.43.4.5. All certification submittal requirements with timelines.

11.43.4.6. The flood openings requirements, if in zones AE, Shaded X, or X Zone.

11.43.4.7. Limitations of use of the enclosures below the lowest floor, not to exceed 300 square feet in area, (i.e. parking, building access and limited storage only).

11.43.4.8. A statement, if in zone VE, that there shall be no alteration of sand dunes which would increase potential flood damage.

11.43.4.9. A statement, if in zone VE, that there shall be no fill used for structural support.

11.43.4.10 A statement, that all materials below BFE/RFPE must be flood resistant materials.

11.43.5. Floodplain Development Certification Requirements.

11.43.5.1. Elevation Certificates for AE, AO, VE, Shaded X, and X Zones.

11.43.5.1.1. An elevation certificate (FEMA Form 086-0-33) may be required prior to the actual start of any new construction if determined necessary by the floodplain administrator. It shall be the duty of the permit holder to submit to the floodplain administrator a certification of elevation of the reference level, in relation to NAVD 1988. The floodplain administrator shall review the certificate data submitted. Deficiencies detected by such review shall be corrected by the permit holder prior to the beginning of construction. Failure to submit the certification or failure to make required corrections shall be cause to deny a floodplain development permit.

11.43.5.1.2. An elevation certificate (FEMA 086-0-33) is required after the reference level is established. Within 21 calendar days of establishment of the reference level elevation, it shall be the duty of the permit holder to submit to the floodplain administrator a certification of the elevation of the reference level, in relation to NAVD 1988. Any work done within the 21 calendar-day-period and prior to submission of the certification shall be at the permit holder's risk. The floodplain administrator shall review the certificate data submitted. Deficiencies detected by such review shall be corrected by the permit holder immediately and prior to further work being permitted to proceed. Failure to submit the certification or failure to make the required corrections shall be cause to issue a stop-work order for the project.

11.43.5.1.3. A final Finished Construction elevation certificate (FEMA 086-0-33) is required after construction is completed and prior to certificate of compliance/occupancy issuance. It shall be the duty of the permit holder to submit to the floodplain administrator a certification of final as-built construction of the elevation of the reference level and all attendant utilities. The floodplain administrator shall review the certificate data submitted. Deficiencies detected by such review shall be corrected by the permit holder immediately and prior to certificate of compliance/occupancy issuance. In some instances, another certification may be required to certify corrected as-built construction. Failure to submit the certification or failure to make required corrections shall be cause to withhold the issuance to a certificate of compliance/occupancy. The Finished Construction Elevation Certificate certifier shall provide at least 2 photographs showing the front and rear of the building taken within 90 days from the date of certification. The photographs must be taken with views confirming the building description and diagram number provided in Section A. To the

extent possible, these photographs should show the entire building including foundation. If the building has split-level or multi-level areas, provide at least 2 additional photographs showing side views of the building. In addition, when applicable, provide a photograph of the foundation showing a representative example of the flood openings or vents. All photographs must be in color and measure at least 3" × 3". Digital photographs are acceptable.

11.43.5.1.4. For Shaded X and X flood zones east of NC 12 and SR 1243, the submission of the under construction elevation certificate may be waived if a survey of the parcel was used to certify the natural grade of the parcel was to or above 12 feet at the time of permit application. For Shaded X and X flood zones west of NC 12 and SR 1243, the submission of the under construction elevation certificate may be waived if a survey of the parcel was used to certify the natural grade of the parcel was to or above 10 feet at the time of permit application. In all cases, a finished construction elevation certificate is required at the completion of the project.

11.43.5.2. Floodproofing Certificate. If non-residential floodproofing is used to meet the regulatory flood protection elevation requirements, a floodproofing certificate (FEMA 086-0-33), with supporting data, an operational plan, and an inspection and maintenance plan is required prior to the actual start of any new construction. It shall be the duty of the permit holder to submit to the floodplain administrator a certification of the floodproofed design elevation of the reference level and all attendant utilities in relation to NAVD 1988. Floodproofing certification shall be prepared by or under the direct supervision of a professional engineer or architect and certified by same. The floodplain administrator shall review the certificate data, the operational plan, and the inspection and maintenance plan. Deficiencies detected by such review shall be corrected by the applicant prior to permit approval. Failure to submit the certification or failure to make required corrections shall be cause to deny a floodplain development permit. Failure to construct in accordance with the certified design shall be cause to withhold the issuance of a certificate of compliance/occupancy.

11.43.5.3. A final Finished Construction Floodproofing Certificate (FEMA Form 086-0-34), with supporting data, an operational plan, and an inspection and maintenance plan are required prior to the issuance of a Certificate of Compliance/Occupancy. It shall be the duty of the permit holder to submit to the Floodplain Administrator a certification of the floodproofed design elevation of the reference level and all attendant utilities, in relation to NAVD 1988. Floodproofing certificate shall be prepared by or under the direct supervision of a professional engineer or architect and certified by same. The Floodplain Administrator shall review the certificate data, the operational plan, and the inspection and maintenance plan. Deficiencies detected by such review shall be corrected by the applicant prior to Certificate of Occupancy. Failure to submit the certification or failure to make required corrections shall be cause to deny a Floodplain Development Permit. Failure to construct in

accordance with the certified design shall be cause to deny a Certificate of Compliance/Occupancy.

11.43.5.4. If a watercourse is to be altered or relocated, a description of the extent of the watercourse alteration or relocation, a professional engineer's certified report on the effects of the proposed project on the flood-carrying capacity of the watercourse and the effects to properties located both upstream and downstream; and a map showing the location of the proposed watercourse alteration or relocation shall be submitted by the permit applicant prior to issuance of a floodplain development permit.

11.43.5.5. Certification Exemptions. The following structures, if located within zones AE, AO, and Shaded X or X, are exempt from the elevation/floodproofing certification requirements specified in subsections 11.43.5.1.1 and 11.43.5.1.2 above:

> ***11.43.5.5.1.*** Recreational vehicles meeting requirements of subsection 11.44.2.3;
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> ***11.43.5.5.2.*** Temporary structures meeting requirements of subsection 11.44.2.5; and
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> ***11.43.5.5.3.*** Accessory structures less than 150 square feet meeting or $5,000 or less and meeting requirements of requirements of subsection 11.44.2.6.

11.43.5.6. A V-Zone certification with accompanying design plans and specifications is required prior to issuance of a floodplain development permit within coastal high hazard areas. It shall be the duty of the permit applicant to submit to the floodplain administrator said certification to ensure the design standards of this Part are met. A registered professional engineer or architect shall develop or review the structural design, plans and specifications for construction and certify that the design and methods of construction to be used are in accordance with accepted standards of practice for meeting the provisions of this Part. This certification is not a substitute for an elevation certificate. In addition, prior to the Certificate of Compliance/Occupancy issuance, the floodplain administrator may require a registered professional engineer or architect to shall certify that the finished construction is compliant with the design, specifications and plans for VE Zone construction if determined necessary.

11.43.5.7. Determinations for existing buildings and structures. For applications for building permits to improve buildings and structures, including alterations, movement, enlargement, replacement, repair, change of occupancy, additions, rehabilitations, renovations, substantial improvements, repairs of substantial damage, and any other improvement of or work on such buildings and structures, the Floodplain Administrator, in coordination with the Building Official, shall:

11.43.5.7.1. Estimate the market value, or require the applicant to obtain an appraisal of the market value prepared by a qualified independent appraiser, of the building or structure before the start of construction of the proposed work; in the case of repair, the market value of the building or structure shall be the market value before the damage occurred and before any repairs are made;

11.43.5.7.2. Compare the cost to perform the improvement, the cost to repair a damaged building to its pre-damaged condition, or the combined costs of improvements and repairs, if applicable, to the market value of the building or structure;

11.43.5.7.3 Determine and document whether the proposed work constitutes substantial improvement or repair of substantial damage; and

11.43.5.7.4. Notify the applicant if it is determined that the work constitutes substantial improvement or repair of substantial damage and that compliance with the flood resistant construction requirements of the NC Building Code and this ordinance is required.

11.43.6. Corrective Procedures.

11.43.6.1. Violations to be corrected. When the floodplain administrator finds violations of applicable state and local laws, it shall be his duty to notify the owner or occupant of the building of the violation. The owner or occupant shall immediately remedy each of the violations of law cited in such notification.

11.43.6.2. Actions in event of failure to take corrective action. If the owner of a building or property shall fail to take prompt corrective action, the floodplain administrator shall give the owner written notice, by certified or registered mail, to his last known address or by personal service that:

11.43.6.2.1. The building or property is in violation of the flood damage prevention regulations;

11.43.6.2.2. A hearing will be held before the floodplain administrator at a designated place and time, not later than ten (10) working days after the date of the notice, at which time the owner shall be entitled to be heard in person or by counsel and to present arguments and evidence pertaining to the matter; and

11.43.6.2.3. Following the hearing, the floodplain administrator may issue such order to alter, vacate or demolish the building; or to remove fill as appears appropriate.

11.43.6.3. Order to take corrective action. If, upon a hearing held pursuant to the notice prescribed above, the floodplain administrator shall find that the

building or development is in violation of this Part, he or she shall issue an order in writing to the owner, requiring the owner to remedy the violation within such period not less than sixty (60) days, nor more than one hundred and eighty (180) calendar days, as the floodplain administrator may prescribe; provided, however, that where the floodplain administrator finds that there is imminent danger to life or other property, he or she may issue an order that corrective action be taken in such lesser period as may be feasible.

11.43.6.4. Appeal. Any owner who has received an order to take corrective action may appeal the order to the board of adjustment by giving notice of appeal in writing to the floodplain administrator and the Town Clerk within ten (10) days following issuance of the final order. In the absence of an appeal, the order of the floodplain administrator shall be final. The Board of Adjustment shall hear an appeal within a reasonable time and may affirm, modify and affirm, or revoke the order.

11.43.6.5. Failure to comply with order. If the owner of a building or property fails to comply with an order to take corrective action from which no appeal has been taken, or fails to comply with an order of the board of adjustment following an appeal, the owner shall be guilty of a misdemeanor and shall be punished in the discretion of the court.

11.43.7. Variance Procedures.

Variance procedures shall be applied in AE, AO, VE, and Shaded X and X flood zones in accordance with Section 3.10, Variances of this UDO and the following additional provisions:

11.43.7.1. The Board of Adjustment, as established by the Town, shall hear and decide requests for variances from the requirements of this Part.

11.43.7.2. Any person aggrieved by the decision of the Board of Adjustment may appeal such decision to superior court, as provided in NCGS Chapter 7A.

11.43.7.3. Variances may be issued for:

11.43.7.3.1. The repair or rehabilitation of historic structures upon the determination that the proposed repair or rehabilitation will not preclude the structure's continued designation as a historic structure and the variance is the minimum necessary to preserve the historic character and design of the structure.

11.43.7.3.2. Functionally dependent facilities if determined to meet the definition as stated in Appendix A, provided provisions of subsections 11.43.7.10.2 and 11.43.7.10.3 have been satisfied, and such facilities are protected by methods that minimize flood damages during the base flood and create no additional threats to public safety; or

11.43.7.3.3. Any other type of development provided it meets the requirements stated in this section.

11.43.7.4. In passing upon variances, the Board of Adjustment shall consider all technical evaluations, all relevant factors, all standards specified in other sections of this Part and the:

11.43.7.4.1. Danger that materials may be swept onto other lands to the injury of others;

11.43.7.4.2. Danger to life and property due to flooding or erosion damage;

11.43.7.4.3. Susceptibility of the proposed facility and its contents to flood damage and the effect of such damage on the individual owner;

11.43.7.4.4. Importance of the services provided by the proposed facility to the community;

11.43.7.4.5. Necessity to the facility of a waterfront location as defined under Appendix A as a functionally dependent facility, where applicable;

11.43.7.4.6. Availability of alternative locations, not subject to flooding or erosion damage, for the proposed use;

11.43.7.4.7. Compatibility of the proposed use with existing and anticipated development;

11.43.7.4.8. Relationship of the proposed use to the Town's Comprehensive Plan and floodplain management program for that area;

11.43.7.4.9. Safety of access to the property in times of flood for ordinary and emergency vehicles;

11.43.7.4.10. Expected heights, velocity, duration, rate of rise and sediment transport of the floodwaters and the effects of wave action, if applicable, expected at the site; and

11.43.7.4.11. Costs of providing governmental services during and after flood conditions including maintenance and repair of public utilities and facilities such as sewer, gas, electrical and water systems, and streets and bridges.

11.43.7.5. A written report addressing each of the above factors shall be submitted with the application for a variance.

11.43.7.6. Upon consideration of the factors listed in subsection 11.43.7.4 of this Part and the purposes of this Part, the Board of Adjustment may attach such conditions to the granting of variances as it deems necessary to further the purposes of this Part.

11.43.7.7. Any applicant to whom a variance is granted shall be given written notice specifying the difference between the RFPE and the elevation to which the structure is to be built and that such construction below the RFPE increases risks to life and property, and that the issuance of a variance to construct a structure below the RFPE will result in increased premium rates for flood insurance up to $25.00 per $100.00 of insurance coverage. Such notification shall be maintained with a record of all variance actions, including justification for their insurance.

11.43.7.8. The floodplain administrator shall maintain the records of all appeal actions and report any variances to the Federal Emergency Management Agency and the State of North Carolina upon request.

11.43.7.9. Conditions for variances.

11.43.7.9.1. Variances shall not be issued when the variance will make the structure in violation of other federal, state or local laws, regulations or ordinances.

11.43.7.9.2. Variances shall only be issued upon a determination that the variance is the minimum necessary, considering the flood hazard, to afford relief.

11.43.7.9.3. Variances shall only be issued prior to development permit approval.

11.43.7.9.4. Variances shall only be issued upon:

11.43.7.9.4.1. A showing of good and sufficient cause;

11.43.7.9.4.2. A determination that failure to grant the variance would result in exceptional hardship; and

11.43.7.9.4.3. A determination that the granting of a variance will not result in increased flood heights, additional threats to public safety, or extraordinary public expense, create nuisance, cause fraud on or victimization of the public, or conflict with existing local laws or ordinances

11.43.7.10. A variance may be issued for solid waste disposal facilities or sites, hazardous waste management facilities, salvage yards, and chemical storage facilities that are located in special flood hazard areas provided that all of the following conditions are met:

11.43.7.10.1. The use serves a critical need in the community;

11.43.7.10.2. No feasible locations exist for the use outside the SFHA;

11.43.7.10.3. The reference level of any structure is elevated or floodproofed to at least the RFPE;

11.43.7.10.4. The use complies with all other applicable federal, state and local laws; and

11.43.7.10.5. The Town has notified the Secretary of the North Carolina Department of Public Safety of its intention to grant a variance at least 30 calendar days prior to granting the variance.

SECTION 11.44 PROVISIONS FOR FLOOD HAZARD REDUCTION.

11.44.1. General Standards.
The following provisions are required in Shaded X, X, AE, AO, and VE flood zones:

11.44.1.1. All new construction and substantial improvements shall be designed (or modified) and adequately anchored to prevent flotation, collapse or lateral movement of the structure.

11.44.1.2. All new construction or substantial improvements shall be constructed with materials and utility equipment resistant to flood damage in accordance with the FEMA Technical Bulletin 2, Flood Damage-Resistant Materials Requirements.

11.44.1.3. All new construction or substantial improvements shall be constructed by methods and practices that minimize flood damages.

11.44.1.4. All new electrical, heating, ventilation, plumbing, air conditioning equipment and other service facilities shall be located at or above the RFPE or designed and/or installed so as to prevent water from entering or accumulating within the components during occurrence of base flood. These include, but are not limited to, HVAC equipment, water softener units, bath/kitchen fixtures, ductwork, electric/gas meter panels/boxes, utility, cable boxes, appliances (washers, dryers, refrigerators, freezers, freezers, etc.), hot water heaters, and electric outlets/switches.

11.44.1.4.1. Replacements that are part of a substantial improvement, electrical, heating, ventilation, plumbing, air conditioning equipment, and other service equipment shall also meet the above provisions.

11.44.1.4.2. Replacements that are for maintenance and not part of a substantial improvement, may be installed at the original location provided the addition and/or improvements only comply with the

standards for new construction consistent with the code and requirements for the original structure.

11.44.1.5. All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems.

11.44.1.6. New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of floodwaters into the systems and discharges from the systems into floodwaters.

11.44.1.7. On-site waste disposal systems shall be located and constructed to avoid impairment to them or contamination from them during flooding.

11.44.1.8. Nothing in this ordinance shall prevent the repair, reconstruction, or replacement of a building or structure existing on the effective date of this ordinance and located totally or partially within the floodway, non-encroachment area, or stream setback, provided there is no additional encroachment below the Regulatory Flood Protection Elevation in the floodway, non-encroachment area, or stream setback, and provided that such repair, reconstruction, or replacement meets all of the other requirements of this ordinance.

11.44.1.9. New solid waste disposal facilities and sites, hazardous waste management facilities, salvage yards, and chemical storage facilities shall not be permitted except by variance as specified in subsection 11.43.7.10. A structure or tank for chemical or fuel storage incidental to an allowed use or to the operation of a water treatment plant or wastewater treatment facility may be located in an SFHA only if the structure or tank is either elevated or floodproofed to at least the regulatory flood protection elevation and certified according to subsection 11.43.5 of this Part.

11.44.1.10. All subdivision proposals and other development proposals shall be consistent with the need to minimize flood damage.

11.44.1.11. All subdivision proposals and other development proposals shall have public utilities and facilities such as sewer, gas, electrical, and water systems located and constructed to minimize flood damage.

11.44.1.12. All subdivision proposals and other development proposals shall have adequate drainage provided to reduce exposure to flood hazards.

11.44.1.13. All subdivision proposals and other development proposals shall have received all necessary permits from those governmental agencies for which approval is required by federal or state law, including Section 404 of the Federal Water Pollution Control Act Amendment of 1972, 33 U.S.C. 1334.

11.44.1.14. When a structure is partially located in a Special Flood Hazard Area or Shaded X or X flood zone, the entire structure shall meet the requirements for new construction and substantial improvements.

11.44.1.15. When a structure is located in multiple flood hazard zones or in a flood hazard risk zone with multiple base flood elevations, the provisions for the more restrictive flood hazard risk zone and the highest RFPE shall apply.

11.44.2. Specific Standards.
In Shaded X, X, AE, AO, and VE flood zones as set forth in subsection 11.42.2 and 11.42.3, the following provisions, in addition to subsection 11.44.1 of this section are required:

11.44.2.1. Residential Construction. New construction or substantial improvement of any residential structure shall have the reference level, including the basement, elevated no lower than the regulatory flood protection elevation, as defined in Appendix A.

11.44.2.2. Non-Residential Construction. New construction and substantial improvement of any commercial, industrial, or other non-residential structure shall have the reference level, including basement, elevated no lower than the regulatory flood protection elevation, as defined in Appendix A. Structures located in AE, AO, Shaded X, and X zones may be floodproofed to the regulatory flood protection elevation in lieu of elevation provided that all areas of the structure, together with attendant utility and sanitary facilities, below the regulatory flood protection elevation are watertight with walls substantially impermeable to the passage of water, using structural components having the capability of resisting hydrostatic and hydrodynamic loads and the effect of buoyancy. For AO Zones, the floodproofing elevation shall be in accordance Section 11.44.3. and 11.44.5. A registered professional engineer or architect shall certify that the standards of this subsection are satisfied. Such certification shall be provided to the floodplain administrator as set forth in subsection 11.43.5, along with the operational and the inspection and maintenance plan.

11.44.2.3. Recreational Vehicles. Recreational vehicles placed on sites shall either:

11.44.2.3.1. Be on-site for fewer than 180 days; or

11.44.2.3.2. **Be** fully licensed and ready for highway use (a recreational vehicle is ready for highway use if it is on its wheels or jacking system, is attached to the site only by quick-disconnect type utilities, and has no permanently attached additions); or

11.44.2.3.3. Meet all the requirements for new construction, including anchoring and elevation requirements of subsection 11.42.3 and subsections 11.44.1 of this section.

11.44.2.4. Elevated Buildings. Fully enclosed areas of new construction and substantially improved structures, which are below the regulatory flood protection elevation in AE, AO, Shaded X, or X Zones:

11.44.2.4.1. Shall not be designed or used for human habitation, but shall only be used for parking of vehicles, building access, or limited storage of maintenance equipment used in connection with the premises. Access to the enclosed area shall be the minimum necessary to allow for parking of vehicles (garage door) or limited storage of maintenance equipment (standard exterior door), or entry to the living area (stairway or elevator). The interior portion of such enclosed area shall not be finished or partitioned into separate rooms, except to enclose storage areas;

11.44.2.4.2. Shall not be temperature-controlled or conditioned Non-temperature controlled dehumidifiers may be used in enclosed areas and shall not result in the enclosed area being determined to be conditioned space;

11.44.2.4.3. Shall be constructed entirely of flood-resistant materials, up to the regulatory flood protection elevation;

11.44.2.4.4. Shall not, in areas governed by the local elevation standard, exceed 300 "square feet in area" below the reference level with the exception of crawl space construction, and shall also include flood openings to automatically equalize hydrostatic flood forces on walls by allowing for the entry and exit of floodwaters. For the purposes of this requirement, enclosures shall be measured to the outside of the wall framing (to calculate floor area) excluding the thickness of sheathing, siding, or trim applied to the outside of the framing. To meet this requirement, the openings must either be certified by a professional engineer or architect or meet or exceed the following minimum design criteria:

> ***11.44.2.4.4.1.*** A minimum of two flood openings on different sides of each enclosed area subject to flooding;
>
> ***11.44.2.4.4.2.*** The total net area of all flood openings must be at least one square inch for each square foot of enclosed area subject to flooding or a minimum of one engineered square inch for each square foot of enclosed area for an engineered opening;
>
> ***11.44.2.4.4.3.*** If a building has more than one enclosed area, each enclosed area must have flood openings to allow floodwaters to automatically enter and exit;
>
> ***11.44.2.4.4.4.*** The bottom of all required flood openings shall be no higher than one foot above the adjacent grade;

11.44.2.4.4.5. Flood openings may be equipped with screens, louvers, or other coverings or devices, provided they permit the automatic flow of floodwaters in both directions; and

11.44.2.4.4.6. Enclosures made of flexible skirting are not considered enclosures for regulatory purposes, and, therefore, do not require flood openings. Masonry or wood underpinning, regardless of structural status, is considered an enclosure and requires flood openings as outlined above.

11.44.2.4.5. Shall allow, in coastal high hazard areas (zones VE), open wood latticework or insect screening, provided it is not part of the structural support of the building and is designed so as to breakaway, under abnormally high tides or wave action, without causing damage to the structural integrity of the building.

11.44.2.4.6. Property owners shall be required to execute and record a non-conversion agreement prior to issuance of a building permit declaring that the area below the lowest floor shall not be improved, finished or otherwise converted to habitable space; The Town of Nags Head will have the right to inspect the enclosed area .This agreement shall be recorded with the Dare County Register of Deeds and shall transfer with the property in perpetuity.

11.44.2.4.7*.* Release of restrictive covenant. If a property which is bound by a non-conversion agreement is modified to remove enclosed areas below BFE, then the owner may request release of restrictive covenant after staff inspection and submittal of confirming documentation.

11.44.2.5. Temporary Non-Residential Structures. Prior to the issuance of a floodplain development permit, for a temporary structure, all applicants must submit to the floodplain administrator a plan for the removal of such structures in the event of a hurricane, flash flood or other type of flood warning notification. The following information shall be submitted in writing to the floodplain administrator for review and written approval:

11.44.2.5.1. A specified time period for which the temporary use will be permitted. The time specified should not exceed three months, renewable up to one year;

11.44.2.5.2. The name, address and phone number of the individual responsible for the removal of the temporary structure;

11.44.2.5.3. The time frame prior to the event at which a structure will be removed (i.e.: minimum of 72 hours before landfall of a hurricane or immediately upon flood warning notification);

11.44.2.5.4. A copy of the contract or other suitable instrument with a trucking company to ensure the availability of removal equipment when needed; and

11.44.2.5.5. Designation, accompanied by documentation, of a location outside the Special Flood Hazard Area to which the temporary structure will be moved.

11.44.2.6. Accessory Structure. Accessory structures (sheds, detached garages, etc.), shall meet the following criteria:

11.44.2.6.1. Accessory structures with floor area located below the regulatory flood protection elevation shall not be used for human habitation, (including working, sleeping, living, cooking or restroom areas).

11.44.2.6.2. Accessory structures shall not be temperature controlled.

11.44.2.6.3. Any portion of an accessory structure located below the regulatory flood protection elevation shall not exceed 300 "square feet in area."

11.44.2.6.4. Accessory structures shall be designed to have low flood damage potential.

11.44.2.6.5. Accessory structures shall be constructed and placed on the building site so as to offer the minimum resistance to the flow of floodwaters.

11.44.2.6.6. Accessory structures shall be firmly anchored in accordance with subsection 11.44.1.1 of this section.

11.44.2.6.7. All service facilities such as electrical and heating equipment shall be installed in accordance with subsection 11.44.1.4 of this section.

11.44.2.6.8. Flood openings to facilitate automatic equalization of hydrostatic flood forces shall be provided below regulatory flood protection elevation in conformance with subsection 11.44.2.4.3 of this section.

11.44.2.6.9. An accessory structure with a footprint less than 150 square feet or that is a minimal investment of $5,000 or less and that satisfies the criteria outlined above does not require an elevation or floodproofing certificate. Elevation or floodproofing certifications are required for all other accessory structures in accordance with subsection 11.43.5.

11.44.2.6.10. Other secondary structures located on the same parcel, in

addition to a principal use structure, which feature conditioned, temperature-controlled areas elevated above the regulatory flood protection elevation shall be constructed consistent with Section 11.44.1. General Standards and 11.44.2. Specific Standards. The certification requirements of 11.43.5.1. Elevation Certificates shall apply.

11.44.2.6.11. Accessory structures, regardless of the size or cost, shall not be placed below elevated buildings in Coastal High Hazard Areas (CHHA).

11.44.2.7. Additions/Improvements/Conversions.

11.44.2.7.1. Additions and/or improvements to pre-FIRM structures when the addition and/or improvements in combination with any interior modifications to the existing structure are:

11.44.2.7.1.1. Not a substantial improvement, the addition and/or improvements must be designed to minimize flood damages and must not be any more nonconforming than the existing structure.

11.44.2.7.1.2. A substantial improvement, with modifications/rehabilitations/improvements to the existing structure or the common wall is structurally modified more than installing a doorway, both the existing structure and the addition and/or improvements must comply with the standards for new construction.

11.44.2.7.2. Additions to pre-FIRM or post-FIRM structures with no modifications to the existing structure other than a standard door in the common wall shall require only the addition to comply with the standards for new construction.

11.44.2.7.3. Additions and/or improvements to post-FIRM structures when the addition and/or improvements in combination with any interior modifications to the existing structure are:

11.44.2.7.3.1. Not a substantial improvement, the addition and/or improvements only must comply with the standards for new construction consistent with the code and requirements for the original structure.

11.44.2.7.3.2. A substantial improvement, both the existing structure and the addition and/or improvements must comply with the standards for new construction.

11.44.2.7.4. Where an independent perimeter load-bearing wall is provided between the addition and the existing building, the addition(s)

shall be considered a separate building and only the addition must comply with the standards for new construction.

11.44.2.7.5. Any combination of repair, reconstruction, rehabilitation, addition or improvement of a building or structure taking place during a 365 day period, the cumulative cost of which equals or exceeds 50 percent of the market value of the structure before the improvement or repair is started must comply with the standards for new construction. For each building or structure, the 365 day period begins on the date of the first improvement or repair of that building or structure subsequent to the effective date of this ordinance. If the structure has sustained substantial damage, any repairs are considered substantial improvement regardless of the actual repair work performed. The requirement does not, however, include either:

11.44.2.7.6. Any project for improvement of a building required to correct existing health, sanitary or safety code violations identified by the building official and that are the minimum necessary to assume safe living conditions.

11.44.2.7.7. Any alteration of a historic structure provided that the alteration will not preclude the structure's continued designation as a historic structure.

11.44.2.7.8. Areas in existing structures shall not be converted for use as conditioned, temperature controlled space unless the reference level is located to or above the RFPE.

11.44.2.7.9. Additional Standards in Shaded X and X Flood Zones

11.44.2.7.9.1. The substantial improvement/substantial damage definitions as established in Appendix A, Definitions, do not apply to Shaded X and X zones.

11.44.2.7.9.2. In structures located west of NC 12 and SR 1243 where the reference level of existing conditioned, temperature controlled space is located below the RFPE, such space may be increased by 25% at the same level, without having to be elevated to or above the RFPE.

11.44.2.7.9.3. Remodeling or renovations of existing habitable area in structures with the reference level located below the current applicable RFPE that do not increase the footprint of the structure may be authorized at the existing reference level or higher.

11.44.2.7.9.4. Reconstruction of damaged portions of a structure may be authorized at the existing reference level or higher. However, if a structure is entirely demolished, for

whatever reason, the replacement structure shall be constructed to or above the RFPE.

11.44.2.7.9.5. Structures that are relocated on the same site or to another site shall be elevated to or above the applicable RFPE of the lot or to or above the RFPE of the new site.

11.44.2.7.9.6. Areas in existing structures shall not be converted for use as conditioned, temperature controlled space unless the reference level is located to or above the RFPE.

11.44.2.8. Tanks. When gas and liquid storage tanks are to be placed within the Shaded X, X, AE, AO, or VE flood zones, the following criteria shall be met:

11.44.2.8.1. **Underground tanks.** Underground tanks in flood hazard areas shall be anchored to prevent flotation, collapse or lateral movement resulting from hydrodynamic and hydrostatic loads during conditions of the design flood, including the effects of buoyancy assuming the tank is empty;

11.44.2.8.2. **Above-ground tanks, elevated.** Above-ground tanks in flood hazard areas shall be elevated to or above the Regulatory Flood Protection Elevation on a supporting structure that is designed to prevent flotation, collapse or lateral movement during conditions of the design flood. Tank-supporting structures shall meet the foundation requirements of the applicable flood hazard area;

11.44.2.8.3. **Above-ground tanks, not elevated.** Above-ground tanks that do not meet the elevation requirements of Section 11.44.2.2. of this ordinance shall not be permitted in V or VE Zones. Tanks may be permitted in other flood hazard areas provided the tanks are designed, constructed, installed, and anchored to resist all flood-related and other loads, including the effects of buoyancy, during conditions of the design flood and without release of contents in the floodwaters or infiltration by floodwaters into the tanks. Tanks shall be designed, constructed, installed, and anchored to resist the potential buoyant and other flood forces acting on an empty tank during design flood conditions.

11.44.2.8.4. **Tank inlets and vents.** Tank inlets, fill openings, outlets and vents shall be:

11.44.2.8.4.1. At or above the Regulatory Flood Protection Elevation or fitted with covers designed to prevent the inflow of floodwater or outflow of the contents of the tanks during conditions of the design flood; and

11.44.2.8.4.2. Anchored to prevent lateral movement resulting from hydrodynamic and hydrostatic loads, including the effects

of buoyancy, during conditions of the design flood.

11.44.3. Coastal High Hazard Areas (Zones VE) and Properties East of NC 12 and SR 1243.

Coastal high hazard areas are special flood hazard areas established in subsection 11.42.2 and designated as zones VE.–Properties located to the east of NC 12 and SR 1243 are located in an active oceanfront environment that is vulnerable to storm surge, erosion, sea level rise, and other hazards. These areas have special flood hazards associated with high velocity waters from storm surges or seismic activity and, therefore, in addition to meeting all requirements of Part III Flood Damage Prevention, the following provisions shall apply:

11.44.3.1 All new construction and substantial improvements shall:

11.44.3.1.1. Be located landward of the reach of mean high tide;

11.44.3.1.2. Be located landward of the first line of stable natural vegetation; and

11.44.3.1.3. Comply with all applicable Coastal Area Management Act (CAMA) setback requirements.

11.44.3.2. All new construction and substantial improvements shall be elevated so that the bottom of the lowest horizontal structural member of the lowest floor (excluding pilings or columns) is no lower than the regulatory flood protection elevation. Floodproofing shall not be utilized on any structures in VE zones to satisfy the regulatory flood protection elevation requirements."

11.44.3.3. All new construction and substantial improvements, including properties with elevations above the regulatory flood protection elevation, shall have the space below the bottom of the lowest horizontal structural member of the lowest floor either be free of obstruction or constructed with open wood latticework or insect screening so as not to impede the flow of floodwaters, provided they are not part of the structural support of the building and are designed so as to breakaway, under abnormally high tides or wave action without causing damage to the elevated portion of the building or supporting foundation system or otherwise jeopardizing the structural integrity of the building in accordance with subsection 11.43.3. The following design specifications shall be met:

11.44.3.3.1. Design plans shall be submitted in accordance with subsection 11.43.3.

11.44.3.3.2. Material shall consist of open wood or plastic lattice having at least 40 percent of its area open, or insect screening.

11.44.3.4. All new construction and substantial improvements shall be securely anchored to an open "pile or column foundation" to allow floodwaters and waves to pass beneath the structure. "All pilings and columns and the structures attached thereto shall be anchored to resist flotation, collapse and lateral movement due to the effect of wind and water loads acting simultaneously on all building components."

> ***11.44.3.4.1.*** Water loading values used shall be those associated with the base flood.
>
> ***11.44.3.4.2.*** Wind loading values used shall be those required by the current edition of the North Carolina State Building Code.

11.44.3.5. All new construction, initiated after the adoption of this UDO, located east of NC 12 and SR 1243 shall limit the total enclosed habitable living space of individual structures to 5,000 square feet. Enclosed habitable living space for large residential dwellings shall also include any enclosed habitable space that may be present in any accessory structure or accessory dwelling that is located on the same lot as the principal structure.

11.44.3.6. For concrete pads, including patios, decks, parking pads, walkways, driveways, pool decks, etc. the following is required:

> ***11.44.3.6.1.*** Shall be structurally independent of the primary structural foundation system of the structure and shall not adversely affect structures through redirection of floodwaters or debris; and
>
> ***11.44.3.6.2.*** Shall be constructed to breakaway cleanly during design flood conditions, shall be frangible, and shall not produce debris capable of causing damage to any structure. (The installation of concrete in small segments (approximately 4 feet x 4 feet) that will easily break up during the base flood event, or score concrete in 4 feet x 4 feet maximum segments is acceptable to meet this standard); and
>
> ***11.44.3.6.3.*** Reinforcing, including welded wire fabric, shall not be used in order to minimize the potential for concreted pads being a source of debris; and
>
> ***11.44.3.6.4.*** Pad thickness shall not exceed 4 inches; or
>
> ***11.44.3.6.5.*** Provide a Design Professional's certification stating the design and method of construction to be used meet the applicable criteria of this section.

11.44.3.7. For swimming pools and spas, the following is required:

> ***11.44.3.7.1.*** Be designed to withstand all flood-related loads and load combinations.

11.44.3.7.2. Be elevated so that the lowest horizontal structural member is elevated above the RFPE; or

11.44.3.7.3. Be designed and constructed to break away during design flood conditions without producing debris capable of causing damage to any structure; or

11.44.3.7.4. Be sited to remain in the ground during design flood conditions without obstructing flow that results in damage to any structure.

11.44.3.7.5. Registered design professionals must certify to local officials that a pool or spa beneath or near a VE Zone building will not be subject to flotation or displacement that will damage building foundations or elevated portions of the building or any nearby buildings during a coastal flood.

11.44.3.7.6. Pool equipment shall be located above the RFPE whenever practicable. Pool equipment shall not be located beneath an elevated structure.

11.44.3.8. All elevators, vertical platform lifts, chair lifts, etc., the following is required:

11.44.3.8.1. Elevator enclosures must be designed to resist hydrodynamic and hydrostatic forces as well as erosion, scour, and waves.

11.44.3.8.2. Utility equipment in Coastal High Hazard Areas (VE Zones) must not be mounted on, pass through, or be located along breakaway walls.

11.44.3.8.3. The cab, machine/equipment room, hydraulic pump, hydraulic reservoir, counter weight and roller guides, hoist cable, limit switches, electric hoist motor, electrical junction box, circuit panel, and electrical control panel are all required to be above RFPE. When this equipment cannot be located above the RFPE, it must be constructed using flood damage-resistant components.

11.44.3.8.4. Elevator shafts/enclosures that extend below the RFPE shall be constructed of reinforced masonry block or reinforced concrete walls and located on the landward side of the building to provide increased protection from flood damage. Drainage must be provided for the elevator pit.

11.44.3.8.5. Flood damage-resistant materials can also be used inside and outside the elevator cab to reduce flood damage. Use only stainless steel doors and door frames below the BFE. Grouting in of door frames and sills is recommended.

11.44.3.8.6. If an elevator is designed to provide access to areas below the BFE, it shall be equipped with a float switch system that will activate during a flood and send the elevator cab to a floor above the RFPE.

11.44.3.9. Accessory structures, regardless of size or cost, shall not be permitted below elevated structures.

11.44.3.10. A registered professional engineer, professional land surveyor, or architect shall certify that the design, specifications and plans for construction are in compliance with the provisions contained in subsection 11.43.2, subsections 11.44.3.1 and 11.44.3.2, subsection 11.44.3.4 and subsection 11.44.3.6 of this Part on the current version of the North Carolina "National Flood Insurance Program V-Zone Certification" form or equivalent local version. In addition, prior to the Certificate of Compliance/Occupancy issuance, the floodplain administrator may require a registered professional engineer or architect to-certify the finished construction is compliant with the design, specifications and plans for VE Zone construction if determined necessary.

11.44.3.11. Fill/Grading

11.44.3.11.1. The placement of site-compatible, non-structural fill under or around an elevated building is limited to two (2) feet. Fill greater than two (2) feet must include an analysis prepared by a qualified registered design professional demonstrating no harmful diversion of floodwaters or wave runup and wave deflection that would increase damage to adjacent elevated buildings and structures. Excavated material moved or relocated onsite is considered fill.

11.44.3.11.2. The fill material must be similar and consistent with the natural soils in the area.

11.44.3.11.3. Minor grading and the placement of minor quantities of nonstructural fill, outside the areas referenced in 11.44.3.11.1., may be permitted for landscaping and for drainage purposes under and around buildings and for support of parking slabs, pool decks, patios and walkways.

11.44.3.11.4. Nonstructural fill with finished slopes that are steeper than five (5) units horizontal to one (1) unit vertical shall be permitted only if an analysis prepared by a qualified registered design professional demonstrates no harmful diversion of floodwaters or wave runup and wave deflection that would increase damage to adjacent elevated buildings and structures.

11.44.3.12. There shall be no alteration of sand dunes or mangrove stands which would increase potential flood damage.

11.44.3.13. Recreational vehicles may be permitted in coastal high hazard areas provided that they meet the recreational vehicle criteria of subsection 11.44.2.3 of this section and the temporary structure provisions of subsection 11.44.2.5 of this section.

11.44.3.14. A deck that is structurally attached to a building or structure shall have the bottom of the lowest horizontal structural member at or above the Regulatory Flood Protection Elevation and any supporting members that extend below the Regulatory Flood Protection Elevation shall comply with the foundation requirements that apply to the building or structure, which shall be designed to accommodate any increased loads resulting from the attached deck. The increased loads must be considered in the design of the primary structure and included in the V-Zone Certification required under Section 11.43.5.6.

11.44.3.15. A deck or patio that is located below the Regulatory Flood Protection Elevation shall be structurally independent from buildings or structures and their foundation systems, and shall be designed and constructed either to remain intact and in place during design flood conditions or to break apart into small pieces to minimize debris during flooding that is capable of causing structural damage to the building or structure or to adjacent buildings and structures.

11.44.3.16. In coastal high hazard areas, development activities other than buildings and structures shall be permitted only if also authorized by the appropriate state or local authority; if located outside the footprint of, and not structurally attached to, buildings and structures; and if analyses prepared by qualified registered design professionals demonstrate no harmful diversion of floodwaters or wave runup and wave deflection that would increase damage to adjacent buildings and structures. Such other development activities include but are not limited to:

11.44.3.16.1. Bulkheads, seawalls, retaining walls, revetments, and similar erosion control structures;

11.44.3.16.2. Solid fences and privacy walls, and fences prone to trapping debris, unless designed and constructed to fail under flood conditions less than the design flood or otherwise function to avoid obstruction of floodwaters.

11.44.3.16.3. Docks, piers, and similar structures.

11.44.3.17. No more than four (4) electrical outlets and no more than four (4) electrical switches may be permitted below RFPE unless required by building code.

11.44.5. Standards for Areas Of Shallow Flooding (Zone AO). Located within the Special Flood Hazard Areas established in Article 3, Section B, are areas

designated as shallow flooding areas. These areas have special flood hazards associated with base flood depths of one (1) to three (3) feet where a clearly defined channel does not exist and where the path of flooding is unpredictable and indeterminate. In addition to Sections 11.44.1. and 11.44.2., all new construction and substantial improvements shall meet the requirements of Section 11.44.3. Coastal High Hazard Areas (Zones VE) and Properties East of NC 12 and SR 1243.

SECTION 11.45 REMEDIES.

Any violation of this Article 11, Part III shall be subject to the remedies as stated in Section 1.10, Violation of UDO Regulations of this UDO.

SECTION 11.46 LEGAL STATUS PROVISIONS.

11.46.1. Effect on Rights and Liabilities Under the Existing Flood Damage Prevention Ordinance.

This Article 11, Part III in part comes forward by re-enactment of some of the provisions of the flood damage prevention ordinance enacted February 3, 1975 as amended, and it is not the intention to repeal but rather to re-enact and continue to enforce without interruption of such existing provisions, so that all rights and liabilities that have accrued thereunder are reserved and may be enforced. The enactment of this Article 11, Part III shall not affect any action, suit or proceeding instituted or pending. All provisions of the flood damage prevention ordinance of the Town of Nags Head enacted on February 3, 1975, as amended, which are not reenacted herein are repealed.

11.46.2. Effect Upon Outstanding Floodplain Development Permits.
Nothing herein contained shall require any change in the plans, construction, size, or designated use of any development or any part thereof for which a floodplain development permit has been granted by the floodplain administrator or his or her authorized agents before the time of passage of this Article 11, Part III; provided, however, that when construction is not begun under such outstanding permit within a period of six (6) months subsequent to the date of issuance of the outstanding permit, construction or use shall be in conformity with the provisions of this Article 11, Part III.

11.46.3. Severability.
If any section, clause, sentence, or phrase of the Ordinance is held to be invalid or unconstitutional by any court of competent jurisdiction, then said holding shall in no way effect the validity of the remaining portions of this Ordinance.

SECTION 11.47 EFFECTIVE DATE.
This ordinance shall become effective June 19, 2020.

SECTION 11.48 ADOPTION CERTIFICATION.
I hereby certify that this is a true and correct copy of the Flood Damage Prevention Ordinance as adopted by the Board of Commissioners of the Town of Nags Head, North Carolina, on the Day (number or text) day of Month, 2020.

WITNESS my hand and the official seal of insert Name, Title, this the Day (number or text) day of Month, 2020.

_____

(signature)

<u>SECTION 11.49 – 11.50 RESERVED.</u>

PART II. That **Appendix A. Definitions** be amended with the addition of the following new terms and definitions in appropriate alphabetical order:

Breakaway wall means a wall that is not part of the structural support of the building and is intended through its design and construction to collapse under specific lateral loading forces without causing damage to the elevated portion of the building or the supporting foundation system (for the purposes of Article 11, Part III, Flood Damage Prevention).

Enclosure/Enclosed Area means that portion of an elevated building below the lowest elevated floor that is either partially or fully shut in by rigid/solid walls and is located either partially or fully below the RFPE.

Local Elevation Standard means a locally adopted elevation level used as the Regulatory Flood Protection Elevation (RFPE) to mitigate flood hazards in the Shaded X, X, AE, AO, VE, as depicted on the FIRMs for Nags Head. These areas may be vulnerable to flooding from storm surge, wind-driven tides, and excessive rainfall. Many of these areas have repetitively flooded and continue to remain at risk to flooding.

Map Repository means the location of the official flood hazard data to be applied for floodplain management. It is a central location in which flood data is stored and managed; in North Carolina, FEMA has recognized that the application of digital flood hazard data products carries the same authority as hard copy products. Therefore, the NCEM's Floodplain Mapping Program websites house current and historical flood hazard data. For effective flood hazard data, the NC FRIS website (http://FRIS.NC.GOV/FRIS) is the map repository, and for historical flood hazard data the FloodNC website (http://FLOODNC.GOV/NCFLOOD) is the map repository.

Secondary Structure means a structure that features habitable conditioned space above the RFPE located on the same parcel as a primary use structure. A secondary structure is not an accessory structure as defined in this section. A secondary structure is subject to the same standards as a primary use structure.

Shaded X Zone means areas of moderate flood hazard shown on the FIRM and are the areas between the limits of the base flood and the 0.2% annual chance for flood. Also commonly referred to as the 500-year flood.

X Zone means the areas of minimal flood hazard shown on the FIRM which are areas outside of the Special Flood Hazards Areas and higher than the elevation of the 0.2% annual flood chance. Also referred to as Unshaded X zone.

PART III. That **Appendix A. Definitions** be amended by deleting the existing definitions for the following terms and replacing with the definitions as provided:

Building means any structure enclosed and isolated by exterior walls constructed or used for residence, business, industry or other purposes. For the purposes of Article 11, Part III, Flood Damage Prevention, see the definition for Structure.

Coastal high hazard area means a Special Flood Hazard Area extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms or seismic sources. The area is designated on a FIRM, or other adopted flood map as determined in Article 11, Part III, Flood Damage Prevention, as Zone VE, or any property east of NC 12 and SR 1243.

Development means any land disturbing activity that increases the amount of built-upon area or that otherwise decreases the infiltration of precipitation into the soil or any man-made change to improved or unimproved real estate including buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, or storage of equipment or materials, not including existing residential or commercial development already in place.

Existing building and existing structure means any building and/or structure for which the “start of construction” commenced before the community entered the NFIP, dated November 10, 1972.

Fill is the depositing of soil, rock or other earthen materials by artificial means, but not including poured slab, asphalt, porous pavement, Turfstone™, or other manmade materials or surfaces designed in association with construction. Excavated material moved or relocated onsite is considered fill.

Flood Insurance Rate Map (FIRM) means an official map of a community issued by the Federal Emergency Management Agency on which both the special flood hazard areas and the risk premium zones applicable to the community are delineated (also see DFRIM).

Floodway encroachment analysis means an engineering analysis of the impact that a proposed encroachment into a floodway or non-encroachment area is expected to have on the floodway boundaries and flood levels during the occurrence of the base flood discharge. The evaluation shall be prepared by a qualified North Carolina licensed engineer using standard engineering methods and hydraulic models meeting the minimum requirement of the National Flood Insurance Program.

Freeboard means the height added to the BFE to account for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, blockage of bridge

or culvert openings, storm surge or precipitation exceeding the base flood and the hydrological effects of urbanization on the watershed. The base flood elevation plus the freeboard establishes the "regulatory flood protection elevation."

Height means the vertical distance measured from the tallest part of a building to the ground at the base of the building. Typically, height is measured from the tallest portion of the roof to the top of the concrete slab. In cases where a concrete slab is not present, height is measured from the tallest part of the roof to the average finished grade using the corners at the base of the building.

- In Shaded X, X, or AE special flood hazard area west of NC 12 and SR 1243, as defined in 11.42.3.1.2, height will be measured from the regulatory flood protection elevation or finished grade, whichever is higher. In cases where there is a ground floor enclosure below the regulatory flood protection elevation, height shall be measured from finished grade.

- In coastal high hazard areas and VE zones east of NC 12 and SR 1243 as defined in 11.42.3.1.1., height shall be measured from regulatory flood protection elevation (lowest horizontal structural member). In cases where the finished grade elevation is above the regulatory flood protection elevation, height shall be measured at approximately eighteen (18) inches above the highest, undisturbed, finished grade directly beneath the structure (free-of-obstruction).

Existing manufactured home park or manufactured home subdivision means a manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, either final site grading or the pouring of concrete pads, and the construction of streets) was completed before February 3, 1975 (for the purposes of Article 11, Part III, Flood Damage Prevention).

Post-FIRM means construction or other development for which the start of construction occurred on or after December 31, 1974, the effective date of the initial Flood Insurance Rate Map.

Pre-FIRM means construction or other development for which the start of construction occurred before November 10, 1972, the effective date of the initial Flood Insurance Rate Map.

Recreational vehicle (RV) means a vehicle which is built on a single chassis; 400 square feet or less when measured at the largest horizontal projection; designed to be self-propelled or permanently towable by a light-duty truck; designed primarily not for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel or seasonal use; and is fully licensed and ready for highway use.

Reference level is:

(1) The reference level is the bottom of the lowest floor or the bottom of the lowest attendant utility including ductwork, whichever is lower, with only

flood resistant materials located below the reference level west of NC 12 and SR 1243.

(2) The reference level is the bottom of the lowest horizontal structural member of the lowest floor for structures in Coastal High Hazard Areas (CHHA) east of NC 12 and SR 1243.

Regulatory flood protection elevation means the Local Elevation Standard (LES). *The Local Elevation Standard is a locally adopted elevation level used as the Regulatory Flood Protection Elevation (RFPE) to mitigate flood hazards in the Shaded X, X, AE, AO, VE, as depicted on the FIRMs for Nags Head. These areas may be vulnerable to flooding from storm surge, wind-driven tides, and excessive rainfall. Many of these areas have repetitively flooded and continue to remain at risk to flooding.*

Coastal High Hazard Areas (CHHA) - Properties located to the east of NC 12 and SR 1243 are located in an active oceanfront environment that is vulnerable to storm surge, erosion, sea level rise, and other hazards. These areas have special flood hazards associated with high velocity waters from storm surges or seismic activity and, therefore, the RFPE is 12 feet NAVD 1988.

Properties west of NC 12 and SR 1243 - The RFPE for properties located west of NC 12 and SR 1243 and in flood zones Shaded X, X, or AE, is 10 feet NAVD 1988. This includes properties abutting US 64, also known as the Causeway.

Substantial improvement means any combination of repairs, reconstruction, rehabilitation, addition or other improvement of a structure, taking place during any one-year period for which the cost equals or exceeds 50 percent of the market value of the structure before the "start of construction" of the improvement. This term includes structures which have incurred "substantial damage," regardless of the actual repair work performed. The term does not, however, include either:

(1) Any correction of existing violations of state or local health, sanitary or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to ensure safe living conditions; or

(2) Any alteration of a historic structure, provided that the alteration will not preclude the structure's continued designation as a historic structure and the alteration is approved by variance issued pursuant to 11.43.7. Variance Procedures.

Technical bulletin and technical fact sheet mean a FEMA publication that provides guidance concerning the building performance standards of the NFIP, which are contained in Title 44 of the U.S. Code of Federal Regulations at Section 60.3. The bulletins and fact sheets are intended for use primarily by State and local officials responsible for interpreting and enforcing NFIP regulations and by members

of the development community, such as design professionals and builders. New bulletins, as well as updates of existing bulletins, are issued periodically as needed. The bulletins do not create regulations; rather they provide specific guidance for complying with the minimum requirements of existing NFIP regulations. It should be noted that Technical Bulletins and Technical Fact Sheets provide guidance on the minimum requirements of the NFIP regulations. State or community requirements that exceed those of the NFIP take precedence. Design professionals should contact the community officials to determine whether more restrictive State or local regulations apply to the building or site in question. All applicable standards of the State or local building code must also be met for any building in a flood hazard area.

PART IV. That **Article 4. Development Review Process, Section 4.11 Permit Types** be deleted and replaced with the following:

4.11.3. Floodplain Development Permit.
Floodplain Development Permits are can be issued in combination with a zoning, land disturbance, and/or building permit or as a stand-alone permit for any development within the Special Flood Hazard Area (SFHA) Shaded X, X, AE, AO, and VE flood zones.

PART V. That **Section 4.12.2.1., For All Types of Development Activity**, be deleted and replaced with the following:

4.12.2.1 For All Types of Development Activity.

- Site plan/survey
  - Property information- address, ownership, lot number/map book/page reference
  - Existing and proposed development including but not limited to streets, topographic and natural features, and drainage
- Coastal Area Management Act (CAMA) Permit.
- Wastewater approval from Dare County Health Department or NC Department of Environmental Quality.
- Erosion control approval is issued with general development for projects disturbing more than 5,000 square feet (see Article 11, Part II).
- Flood (if in a Special Flood Hazard Area, Shaded X, or X Zone, see Article 11, Part III).
- Stormwater management (for projects which propose filling greater than one foot or for all new commercial construction, see Article 11, Part I).

- Architecture (for residential structures greater than 3,500 square feet, see UDO Section 7.4., Dwelling, Large Residential).

- Utility connections (see Town Code Chapter 44).

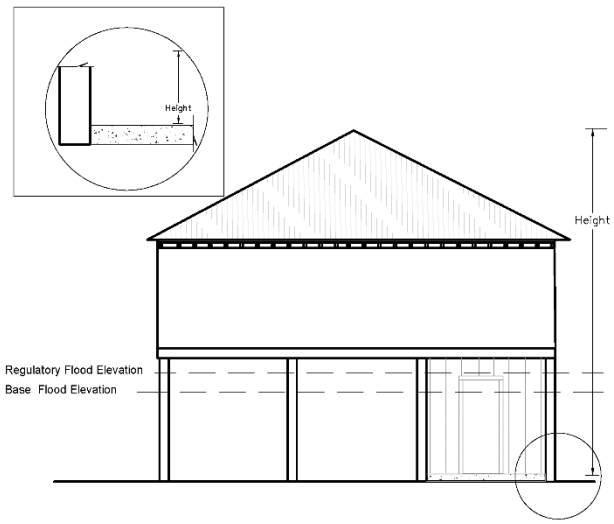
- Any other State or Federal Permits

PART VI. That **Section 8.6.4. Building Height and the subsections thereof** be deleted and replaced with the following:

8.6.4. Building Height.

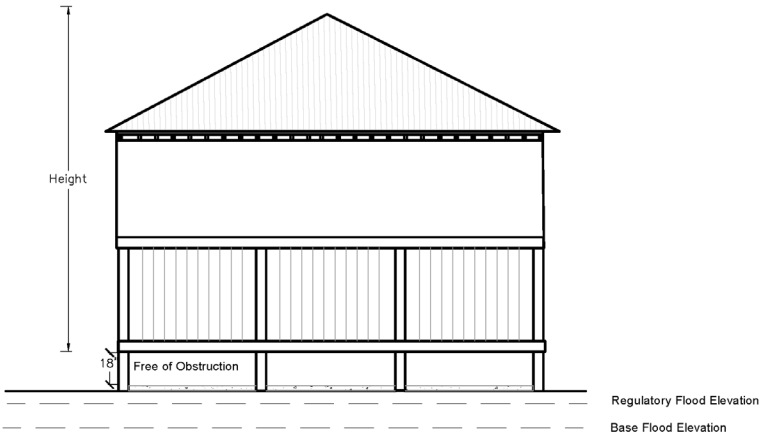
8.6.4.1. Measurement of height. Height means the vertical distance measured from the tallest part of a building to the ground at the base of the building. Typically, height is measured from the tallest portion of the roof to the top of the concrete slab. In cases where a concrete slab is not present, height is measured from the tallest part of the roof to the average finished grade using the corners at the base of the building.

8.6.4.1.1. In Shaded X, X, or AE special flood hazard area west of NC 12 and SR 1243, as defined in 11.42.3.1.2., height will be measured from the regulatory flood protection elevation or finished grade, whichever is higher. In cases where there is a ground floor enclosure below the regulatory flood protection elevation, height shall be measured from finished grade.



8.6.4.1.1. West of NC 12 and SR 1243: Flood Zone- Height

8.6.4.1.2. In coastal high hazard areas and VE zones east of NC 12 and SR 1243 in as defined in 11.42.3.1.1., height shall be measured from regulatory flood protection elevation (lowest horizontal structural member). In cases where the finished grade elevation is above the regulatory flood protection elevation, height shall be measured at approximately eighteen (18) inches above the highest, undisturbed, finished grade directly beneath the structure (free-of-obstruction).



8.6.4.1.2. East of NC 12 and SR 1243: Flood Zone- Height

PART VII. That **Section 11.5.3. Standard for Depth or Elevation of Fill and the subsections thereof** be deleted and replaced with the following:

11.5.3. Standard for Depth or Elevation of Fill.
Any residential or duplex development or redevelopment which utilizes fill shall be limited to the following standards:

11.5.3.1. Properties East of NC 12 and SR 1243.

11.5.3.1.1. Fill shall be subject to the provisions of Section 11.44.3.11.

11.5.3.1.2. Areas of fill exceeding the height of existing grade shall not exceed ten (10) percent of the lot area (see Article 8, District Development Standards), excluding the footprint of the active drainfield and septic system as approved by the Dare County Health Department in accordance with the septic permit. Lot area is defined as that portion of the lot landward of the first line of stable vegetation as defined by CAMA.

11.5.3.1.3. No bulkheads are allowed.

11.5.3.2. Properties West of NC 12 and SR 1243.

11.5.3.2.1. In areas where the most recent Flood Insurance Rate Map (FIRM) provides a base flood elevation for a subject property, fill shall not be permitted to exceed the base flood elevation except in cases where it is placed directly beneath a slab that is designed to meet the base flood

elevation depicted on the FIRM. In these instances, fill may exceed the base flood elevation by up to twelve inches (12”) to support a turn-down or thickened edge slab or beneath a slab that is supported by a ring-wall style foundation. Fill placed above the base flood elevation shall not extend beyond the outside edge of the slab.

11.5.3.2.1. In areas where the most recent Flood Insurance Rate Map (FIRM) provides no base flood elevation, fill shall not exceed the amount required for wastewater permits required by the Dare County Health Department, or two feet (2’) above pre-development surface elevation, whichever is greater.

ARTICLE III. Severability.

All Town ordinances or parts of ordinances in conflict with this ordinance amendment are hereby repealed. Should a court of competent jurisdiction declare this ordinance amendment or any part thereof to be invalid, such decision shall not affect the remaining provisions of this ordinance amendment nor the Unified Development Ordinance or Town Code of the Town of Nags Head, North Carolina which shall remain in full force and effect.

ARTICLE IV. Effective Date.

This ordinance amendment shall be in full force and effect upon the date of adoption by the Board of Commissioners.

_____
Benjamin Cahoon, Mayor
Town of Nags Head

ATTEST: _____
Carolyn F. Morris, Town Clerk

APPROVED AS TO FORM:
Town Attorney
Date adopted: _____
Motion to adopt by Commissioner _____
Motion seconded by Commissioner _____
Vote: ____ AYES ____ NAYS

From: Michael Zehner
To: srice@ricesterling.com
Cc: Cliff Ogburn; Ben Cahoon
Subject: RE: Thank you
Date: Wednesday, May 20, 2020 4:52:00 PM
Attachments: 2020 May letter from FEMA.pdf
image003.png

Hello Sue,
I hope you are well. Mayor Cahoon suggested that I respond to your questions, as my staff and I have been working on the update of the Flood Maps and the Town's Flood Ordinance. First, let me say that I greatly appreciate your interest and concerns. If you need me to clarify anything, because there are a lot of factors at play, please do not hesitate to let me know. I'm happy to discuss by phone as well. I've included your comments and questions below, with my response in red:

1. "one issue seems to be cause for concern among the property owners is the proposed change in the flood plan elevation." Why is Nags Head proposing a regulation different from the county? That is not making sense to us.

   We (Town Staff) are proposing a 10' Local Elevation Standard for areas west of NC12 and NC1243, and a 12' Local Elevation Standard for areas east (i.e. oceanfront). Essentially, the Local Elevation Standard serves the same purpose as the current Base Flood Elevation; for example an AE-9 flood zone has a Base Flood Elevation of 9'. Currently, an AE-9 flood zone would require a 1' freeboard, so the habitable area (and any elements that could not be floodproofed, would need to be elevated to at least 10'. So, the proposed 10' Local Elevation Standard has the same regulatory impact as a current AE-9 flood zone. As you note, the County and other municipalities, with the exception of Nags Head and Duck, are considering (or have adopted) a Local Elevation Standard of 8' for area west of the Beach Road (they are considering the same 12' Local Elevation Standard for areas east). A Local Elevation Standard of 8' would be equivalent to the regulation of an AE-7 flood zone.

   In proposing the 10' Local Elevation Standard west of NC12 , we have taken into account existing flood zones within this area of the Town, existing elevations of properties and structures, and flooding events and heights that have occurred within recent years. Additionally, we are of the opinion that the mapping of flood zones on the new Flood Maps are less accurate in terms of their protection of properties from flooding, and are therefore proposing regulations that are intended to regulate properties as close as possible to current regulations, not more so or less so. In our opinion, a Local Elevation Standard of 8' would result in a significant reduction in the number of properties protected. This is in large part to the fact that we have seen regular and recent flooding events in these areas of Town up to an elevation of 10', but also because the majority of the properties in this area of Town have an elevation of 10' or greater if currently in an X zone, or are currently subject to a flood zone of AE-9, AE-10, or AE-11 (we have a small area of AE-8 on the backside of Jockey's Ridge that extends northward along the Sound).

   I cannot speak for the rational of the County and other towns in considering an 8' Local Elevation Standard, presumably they took the same factors into consideration. However, it is

notable that between Kill Devil Hills, Kitty Hawk, and Southern Shores, there are no AE-11 zones, only a small area of AE-10 within Kitty Hawk, the majority of properties in Kill Devil Hills and Kitty Hawk are in an AE-8, and the majority of properties in Southern Shores are in an AE-7. In short, a Local Elevation Standard of 10' more closely matches our existing regulatory conditions, and perhaps a Local Elevation Standard of 8' more closely matches the regulatory conditions in those towns.

It may also be helpful for me to relate this to your own property. Your property is currently located within an AE-10 and, with a 1' freeboard, would be required to have an elevation of 11'. The proposed 10' Local Elevation Standard would actually regulate your property less stringently than current regulations.

2. Given how little time NRPO's were allowed on the beach this spring we are requesting that this decision be moved to the fall so we can have adequate time to meet with our insurance agents in the fall and understand this completely.

   Unfortunately, delaying adoption of the Town's updated Flood Ordinance later than June 18 would have numerous negative impacts, including suspension from the National Flood Insurance Program. The attached letter that we received from FEMA this week does a better job than I could in explaining the impacts that this would have on both the Town and property owners.

   Not that it is any great consolation, but we shared your concern and attempted in mid-March, when we began to see how the Pandemic would impact our ability to hold meetings and hearings, to have the June 19 effective date of the new Flood Maps extended. I personally reached out to one of our U.S. Senator's offices to ask for some consideration, to no avail. Eventually, our message back from FEMA and the State NFIP Coordinators was that the process to put the maps into effect had been set in motion, that the process to reverse course or extend would be more complicated and not a priority, and that, regardless, there were protocols in place to allow our boards to meet and hold public hearings with remote participation. I think I would agree that we have had to proceed under less than ideal circumstances, but, as the attached letter indicates, to not do so would result in perhaps greater costs and impacts.

   I also want to mention that the adoption of the proposed updated Ordinance should not have any impact on your insurance rate, at least not a negative impact. The Town participates in the Community Rating System which provides insurance premium rate discounts based on our regulations and program meeting certain *points*. The proposed Ordinance attempts to maintain our standing in this program, resulting in lower rates than other communities might see. In any case, the requirement for insurance is based on the Flood Map, rather than the Town's regulations; this is another point of concern because so many properties currently in a flood zone will no longer be in a mapped flood zone, and therefore not likely required by their mortgage company to hold flood insurance. But, the mapping of flood zones is not something that our local regulations would dictate or change; ultimately, the mapping of zones, and therefore any insurance requirements, is determined

by FEMA. Any delay by the Town to adopt the new Flood Ordinance would not result in a change to the Flood Map; in other words (ignoring the effects of not meeting the deadline), a delay would not likely result in any change with respect to insurance.

3. It also seems that many of the business trade groups are opposed to this regulation. Why is this necessary at this time when we are recovering from the pandemic to change this regulation and add extra burdens on the Owners.

   You are correct, both the Outer Banks Home Builders and Realtors have indicated their objection to the proposed 10' Local Elevation Standard and are advocating for a standard that would be identical for all jurisdictions. I do not think I could accurately explain their motivations. But, given the reasons I've noted above, I think the positions of these groups fail to recognize the conditions and factors present in the Town. We have unique topographic, drainage, and regulatory conditions, as do all of the other municipalities. I am not sure I would serving the Town well if I did not take these conditions and factors into account, or if I were to recommend regulations solely on the basis that it is what other jurisdictions were doing.

   Hopefully my answer to point 2 addresses why it is necessary for us to proceed now, despite the conditions resulting from the Pandemic, and hopefully all of my answers clearly show that the proposed regulations do not necessarily result in a change to existing regulations or an extra burden compared to current regulations.

I hope I have been able to address your concerns and questions. Again, please do not hesitate to let me know if you have any further questions or would like any clarifications.

Best,
Michael

Michael Zehner, AICP
Director of Planning & Development
Town of Nags Head, NC

Phone: 252-449-6044
Email: michael.zehner@nagsheadnc.gov

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CENSUS 2020 | NATIONAL CENSUS DAY | APRIL 1ST
my2020census.gov/

From: Susan Rice <srice@ricesterling.com>
Date: May 20, 2020 at 1:47:42 PM EDT
To: Ben Cahoon <Ben.Cahoon@nagsheadnc.gov>
Subject: Re: Thank you

Mayor Cahoon,

In my new found role of being more involved in the Outer Banks Government since the NRPO decision one issue seems to be cause for concern among the property owners is the proposed change in the flood plan elevation.

We are not experts in his field and we are attempting to educate our owner friends on the importance of this issue. Given that we have three questions and concerns:

1. Why is Nags Head proposing a regulation different from the county? That is not making sense to us.

2. Given how little time NRPO's were allowed on the beach this spring we are requesting that this decision be moved to the fall so we can have adequate time to meet with our insurance agents in the fall and understand this completely.

3. It also seems that many of the business trade groups are opposed to this regulation. Why is this necessary at this time when we are recovering from the pandemic to change this regulation and add extra burdens on the Owners.

As always thank you for your service. I know it is not easy.

Regards,

Sue Rice

RESOLUTION REQUESTING THAT THE FEDERAL EMERGENCY MANAGEMENT AGENCY REVISE THE COASTAL FLOODPLAIN MAPPING MODEL AND CONSIDER SHALLOW FLOODING AND OTHER SOURCES OF FLOOD RISK AS PART OF THE PROCESS TO UPDATE FLOOD INSURANCE RATE MAPS

WHEREAS, the Town of Nags Head has been a member of the National Flood Insurance Program since 1972; AND

WHEREAS, the Town of Nags Head strongly believes that the National Flood Insurance Program, through the use of Flood Insurance Rate Maps and associated regulations, has been one of the primary and most effective ways to minimize flood damage to properties within the Town and communicate flood risk to the general public; AND

WHEREAS, the Town of Nags Head received preliminary Flood Insurance Rate Maps on June 30, 2016 as part of the North Carolina Floodplain Mapping Program's most recent effort to update flood maps in partnership with the Federal Emergency Management Agency (FEMA); AND

WHEREAS, the Town has compared the proposed Special Flood Hazard Areas and associated Base Flood Elevations to previous maps as well as local historical storm records and documented flooding; AND

WHEREAS, a large portion of the Town has been removed from the Special Flood Hazard Area and the remaining non-VE zone Special Flood Hazard Areas have a Base Flood Elevation of 4 feet above mean sea level, which is generally lower than the land surface elevations in much of the Town; AND

WHEREAS, based on this analysis, the Town has determined that the preliminary Flood Insurance Rate Maps underrepresent the flood risk for a significant portion of the Town, including areas flooded and/or damaged in Hurricanes Isabel, Irene, Matthew as well as Tropical Storm Beryl; AND

WHEREAS, the preliminary maps, if adopted without modification, would allow new construction and/or improvements to existing buildings that would be at risk of flooding from storms of similar intensity and/or duration as the aforementioned events; AND

WHEREAS, buildings constructed outside of the Special Flood Hazard Area are not grandfathered for flood insurance purposes and, if later mapped into a flood zone, may realize significant flood insurance premium increases if not constructed in compliance with new flood damage prevention regulations; AND

WHEREAS, the Town has consulted with North Carolina Emergency Management, the North Carolina Floodplain Mapping Program, NC Sea Grant and conducted other research to collect information on how the maps were developed including the models and analyses used to develop Special Flood Hazard Areas and associated Base Flood Elevations; AND

WHEREAS, the Town believes that the coastal models used by FEMA to develop Flood Insurance Rate Maps has inherent flaws which are reflected in the Special Flood Hazard Areas and Base Flood Elevations shown on the preliminary maps; AND

WHEREAS, the modeling process is highly quantitative and dependent on simulations which reduces the ability to make inferences from historical storm and storm gage records; AND

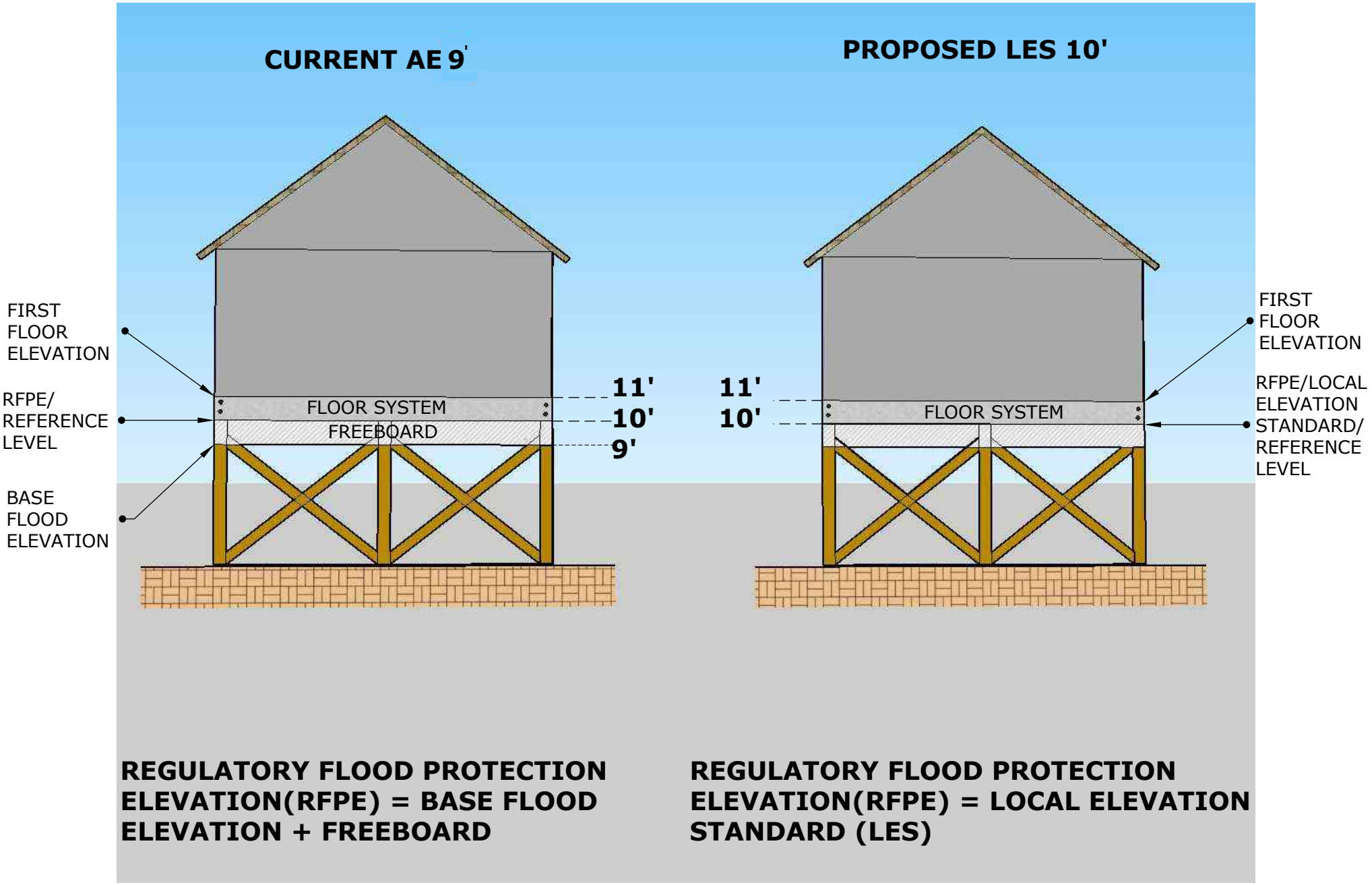
WHEREAS, the key to improving coastal flood maps lies in improving the coastal flood models that are used to calculate the areas subject to flood inundation, Base Flood Elevations, as well as improving estimates of storm return period and consideration of areas of shallow flooding.

NOW, THEREFORE BE IT RESOLVED that the Nags Head Board of Commissioners calls upon our Federal and State representatives to request that the Federal Emergency Management Agency revise the models used to generate the Flood Insurance Rate Maps and consider all appropriate sources of flooding to better and more accurately reflect the risk from flooding and storm surge, particularly in coastal communities.

This the 1st day of March 2017.

Robert C. Edwards, Mayor
Town of Nags Head

ATTEST:
Carolyn F. Morris, Town Clerk


CURRENT AE 9'
PROPOSED LES 10'
FIRST FLOOR ELEVATION
RFPE/ REFERENCE LEVEL
BASE FLOOD ELEVATION
FLOOR SYSTEM
FREEBOARD
11'
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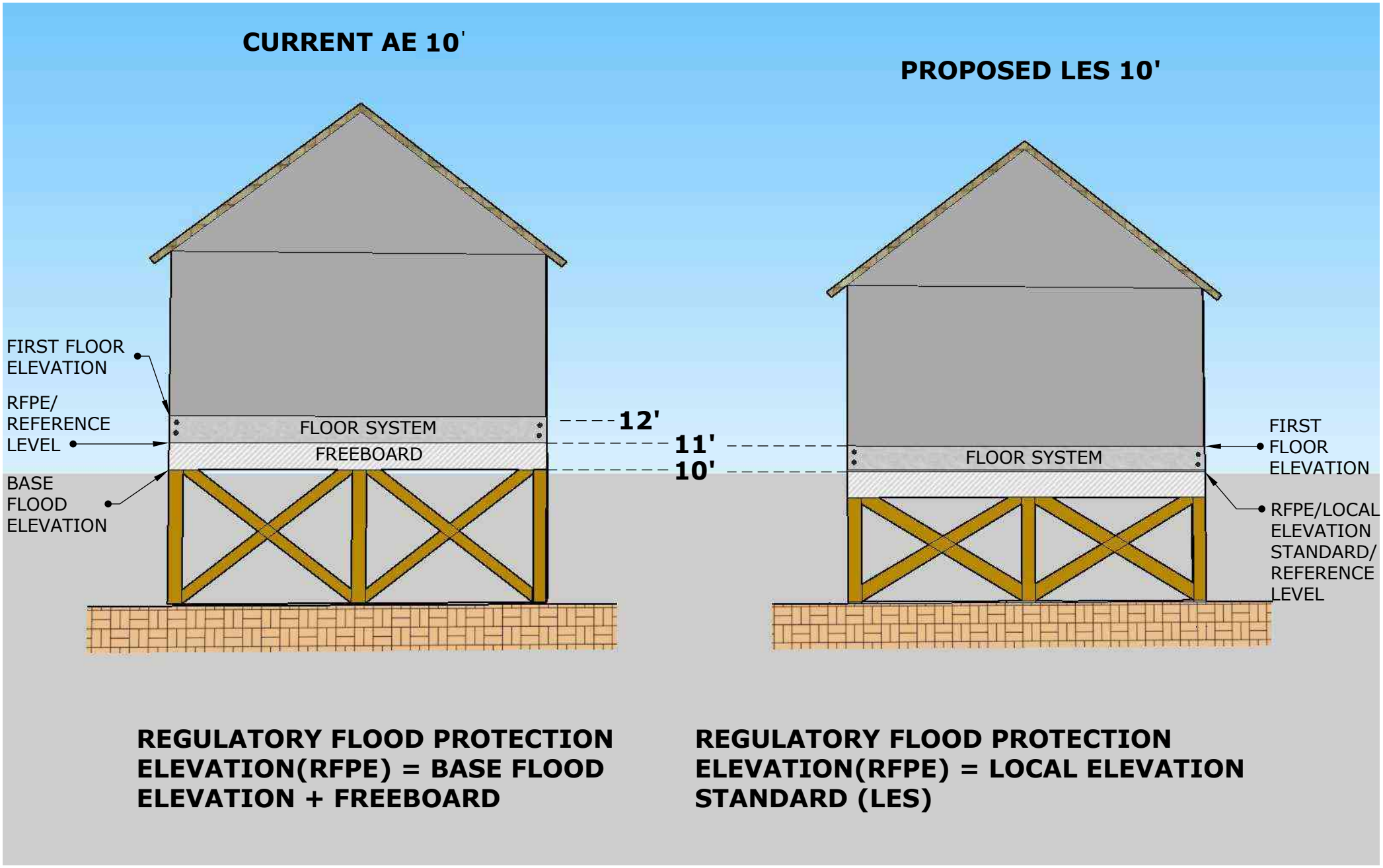
FLOOR SYSTEM
FIRST FLOOR ELEVATION
RFPE/LOCAL ELEVATION STANDARD/ REFERENCE LEVEL
REGULATORY FLOOD PROTECTION ELEVATION(RFPE) = BASE FLOOD ELEVATION + FREEBOARD
REGULATORY FLOOD PROTECTION ELEVATION(RFPE) = LOCAL ELEVATION STANDARD (LES)


CURRENT AE 10'
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RFPE/LOCAL ELEVATION STANDARD/ REFERENCE LEVEL
REGULATORY FLOOD PROTECTION ELEVATION(RFPE) = BASE FLOOD ELEVATION + FREEBOARD
REGULATORY FLOOD PROTECTION ELEVATION(RFPE) = LOCAL ELEVATION STANDARD (LES)

U.S. Department of Homeland Security
500 C Street, SW
Washington, DC 20472

FEMA

May 15, 2020

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

The Honorable Ben Cahoon
Mayor, Town of Nags Head
Post Office Box 99
Nags Head, North Carolina 27959

Dear Mayor Cahoon:

I am writing this letter as an official reminder that the Town of Nags Head, North Carolina, has until June 19, 2020, to adopt and have the Department of Homeland Security's Federal Emergency Management Agency (FEMA) Regional Office approve floodplain management measures that satisfy 44 Code of Federal Regulations (CFR) Section 60.3(e) of the National Flood Insurance Program (NFIP) regulations.

The Town of Nags Head must adopt floodplain management measures, such as a floodplain management ordinance, that meet or exceed the minimum NFIP requirements (copy enclosed) by June 19, 2020, to avoid suspension from the NFIP. If suspended, your community becomes ineligible for flood insurance through the NFIP, new insurance policies cannot be sold, and existing policies cannot be renewed.

Under the Flood Disaster Protection Act of 1973, as amended, flood insurance must be purchased by property owners seeking any Federal financial assistance for construction or acquisition of buildings in Special Flood Hazard Areas (SFHAs). This financial assistance includes certain federally guaranteed mortgages and direct loans, federal disaster relief loans and grants, as well as other similarly described assistance from FEMA and other agencies.

In addition, all loans individuals obtain from Federally regulated, supervised, or insured lending institutions that are secured by improved real estate located in SFHAs are also contingent upon the borrower obtaining flood insurance coverage on the building. However, purchasing and maintaining flood insurance coverage on a voluntary basis is frequently recommended for properties located outside SFHAs.

Your NFIP State Coordinator and FEMA would like to assist the Town of Nags Head to ensure it remains in good standing with the NFIP and avoids suspension from the Program. If your community is suspended, it may regain its eligibility in the NFIP by enacting the floodplain management measures established in 44 CFR Section 60.3 of the NFIP regulations. As stated in my previous correspondence, I recommend you contact your NFIP State Coordinator or the FEMA Regional Office if the Town of Nags Head is encountering difficulties in enacting its measures.

I recognize that your community may be in the final adoption process or may have recently adopted the appropriate floodplain management measures. Please submit these measures to the Floodplain Management Program at the North Carolina Department of Public Safety, Risk Management Section. John D. Brubaker, P.E., CFM, the NFIP State Coordinator, is accessible by telephone at (919) 825-2300, in writing at 4218 Mail Service Center, Raleigh, North Carolina 27699-4218, or by electronic mail at dan.brubaker@ncdps.gov.

The FEMA Regional staff in Atlanta, Georgia, is also available to assist you with your floodplain management measures. The FEMA Regional Office may be contacted by telephone at (770) 220-5200 or in writing. Please send your written inquiries to the Director, Mitigation Division, FEMA Region IV, at 3003 Chamblee Tucker Road, Atlanta, Georgia 30341.

In the event your community does not adopt and/or submit the necessary floodplain management measures that meet or exceed the minimum NFIP requirements, I must take the necessary steps to suspend your community from the NFIP. This letter is FEMA's final notification before your community is suspended from the Program.

Sincerely,

Rachel Sears

Rachel Sears, Director
Floodplain Management Division
Mitigation Directorate | FEMA

Enclosure

cc: Gracia Szczech, Regional Administrator, FEMA Region IV
John D. Brubaker, P.E., CFM, NFIP State Coordinator, North Carolina Department of Public Safety, Risk Management Section
Cory Tate, Chief Building Inspector, Town of Nags Head

Agenda Item Summary Sheet

Item No: **G-2**
Meeting Date: **June 3, 2020**

Item Title: From May 6th Board meeting – Discussion of scope of work from Moffat & Nichol – Beach Nourishment Project Coastal Engineering and Design

Item Summary:

Attached please see professional service proposals from Moffat & Nichol related to the Beach Nourishment Coastal Engineering and Design Services and McKim & Creed for Beach Surveying Services. The fee proposals are being provided in response to the Request for Qualifications the Town had recently advertised. The Beach Monitoring Surveys, Summer 2020 submitted by McKim & Creed encompasses services necessary to complete the annual beach condition survey in accordance with the Town's Beach Monitoring and Maintenance Plan. The scope of work includes the base project data acquisition of 126 profiles in conjunction with additional transect information data acquisition north of the project area, south of the project area and within reaches 3 and 4. Acquisition of the additional survey information will provide a more comprehensive data set for modelling and planning of future nourishment projects.

The Year 1 (2020) Coastal Engineering and Consulting Proposal submitted by Moffat & Nichol divides the proposal into four main tasks: Task 1- Annual Beach Monitoring and Analysis (Year 1), Trask 2-Beach Nourishment Master Plan (Year 1), Task 3-Coastal Storm Damage Mitigation Grant Application support and Task 4-Post-Dorian Beach Restoration Engineering Services.

Available funding can support the 2020 Beach Monitoring Survey and Tasks 1-3 of the Coastal Engineering Proposal. Task 4 will be considered at a later date, once the new Beach Nourishment Capital Budget Ordinance has been established.

Number of Attachments: 2

Specific Action Requested: Authorize the Town Manager to execute professional service contracts with McKim & Creed totaling $63,100 and with Moffat & Nichol totaling $279,499, (Tasks 1,2 and 3), upon review from the Town Attorney.

Submitted By: David Ryan, Town Engineer Date: May 27, 2020

Finance Officer Comment: Budgeted funds from the current open beach nourishment capital project ordinance will be used to fund tasks 1-3. Capital monitoring, mitigation, and a beach study were all planned for and budgeted items under this current ordinance. No amendment is necessary; however, contract approval is requested for these items.

A new capital project ordinance for Hurricane Dorian beach nourishment restoration will be brought for Board consideration and approval along with task 4 contract approval tentatively set for July 1, 2020.

Signature: Amy Miller Date: May 27, 2020

Town Attorney Comment:

Signature: John Leidy Date: May 27, 2020

Town Manager Comment and/or Recommendation:

Signature: Cliff Ogburn Date: May 27, 2020

moffatt & nichol

4700 Falls of Neuse Road, Ste 300
Raleigh, NC 27609

(919) 781-4626 Fax (919) 781-4869
www.moffattnichol.com

May 27, 2020

Mr. David Ryan, PE
Town Engineer, Town of Nags Head
PO Box 99
Nags Head, NC 27959

RE: Work Order Proposal: Year 1 (2020) Coastal Engineering and Consulting Services for the Town of Nags Head, NC

Dear Mr. Ryan:

Moffatt & Nichol (M&N) presents this proposal to the Town of Nags Head, NC, to provide professional services for a range of tasks assisting the Town to maintain and enhance the protective and recreational capacity of its beach and dune system. As requested, this proposal includes a group of four main Tasks that each have a distinct focus, timeframe and sets of deliverables. The four Tasks are described briefly below:

1. Task 1 – Annual Beach Monitoring and Analysis program for 2020. Task 1 includes the preparation of the annual beach monitoring report, with all associated shoreline and volume change calculations, analysis of beach system performance and its relationship to long-term trends, along with recommendations for future actions. The primary purpose of the beach monitoring is to determine the condition of the beaches, measure shoreline change and volumetric rates of erosion and accretion, and evaluate the performance of beach nourishment and other restoration efforts.
    - Please note that Task 1 includes optional subtasks for post-storm monitoring surveys, and preparation of documentation for FEMA requesting post-storm beach restoration funds. These subtasks would only be utilized, and their associated fees would only be billed, if the Town chooses and provides written authorization to conduct these tasks in the event of a hurricane or other severe coastal storm erosion event. These tasks provide for expedited authorization for M&N to conduct post-storm beach monitoring analysis and subsequent support to the Town in coordinating with the Federal Emergency Management Agency (FEMA) following a significant coastal storm event.
2. Task 2 – Multi-Decadal Beach Nourishment Master Plan (Year 1). Task 2 provides the professional services for the first year of preparation of a Master Plan for beach nourishment in the Town of Nags Head. Year 1 tasks generally include project planning, meetings and coordination, data collection and review, and initial modeling and development of preliminary nourishment trigger estimates.
3. Task 3 – Coastal Storm Damage Mitigation (CSDM) Fund Grant Application Support. Task 3 provides professional services to compile necessary documents and technical data, maps

and tables required by the State's CSDM application form to support the Town's request for CSDM funds. The CSDM request is for funds to supplement expected Federal funding of the Town's beach nourishment and repair project for damages incurred by Hurricane Dorian.

4. Task 4 – Post-Dorian Restoration Beach Nourishment Engineering Services. Task 4 provides the engineering design, permitting coordination, preparation of construction documents and bidding and construction phase engineering support to the Town as it implements its Post-Dorian beach restoration project.

Detailed scopes of work for each main Task, along with schedules and a breakdown of the fees for each Task, are provided in the attachments to this letter.

M&N fees for Task 1, 2, 3 and 4 services are lump sum by Task, and the fee for each task is summarized in the table below. M&N proposed to invoice the Town monthly on a percent complete basis by Task. Our invoice format can be tailored to meet the Town's requirements and preferences, and the invoice would generally be accompanied by a cover letter or cover sheet summarizing progress on each Task during the invoice period.

Task	**M&N Fee**
Task 1: Beach Monitoring Analysis, Reporting and Post-Storm FEMA Support (2020)	
Task 1.1 – Completion of Annual Monitoring Report	$57,119
Task 1.2 – Completion of Post Storm Survey and Report (OPTIONAL)	$57,119
Task 1.3 – Documentation for FEMA Category G Project Funding (OPTIONAL)	$33,660
Task 2: Multi-decadal Beach Nourishment Master Plan – Year 1	$208,100
Task 3: Coastal Storm Damage Mitigation (CSDM) Grant Application Support (2020)	$14,280
Task 4: Post-Dorian Beach Renourishment Design and Construction Phase Support	$717,512
Total for Tasks 1 through 4 (Excluding Optional Tasks)	**$997,011**
Total Optional Tasks Only	**$90,779**

Brian Joyner and I will be the Town's primary points of contact for this contract. Please don't hesitate to reach out to either or both of us by phone or email at the numbers and addresses provided below. We are excited to begin providing services to the Town and look forward to continue developing our partnership.

Sincerely,
MOFFATT & NICHOL

Johnny Martin, P.E.
Vice President
(919) 781-4626 (office)
(919) 538-6033 (cell)
jmartin@moffattnichol.com

Brian Joyner, P.E.
Senior Engineer
(757) 271-1063 (office)
(757) 613-4020 (cell)
bjoyner@moffattnichol.com

Attachments: Detailed scopes of work and fee tables for Tasks 1, 2, 3 and 4

TASK 1 INTRODUCTION

Task 1 includes professional services to conduct the Town of Nags Head Beach Monitoring and Analysis program for one year, generally including the summer 2020 annual monitoring survey period and the 2020 hurricane season to early 2021 winter storm season. The Town's Beach Monitoring and Analysis program represents a continued effort of conducting beach monitoring surveys and providing analyses, building upon past efforts by Town of Nags Head from 2012 through 2019 in association with the 2011 and 2019 Nags Head Beach Nourishment post-construction monitoring. The primary purpose of the beach monitoring is to determine the condition of the beaches, measure shoreline change and volumetric rates of erosion and accretion, maintain eligibility for designation as a FEMA engineered beach, estimate when future maintenance activities may be warranted, and evaluate the performance of beach nourishment and other restoration efforts.

In addition to the primary Annual (Summer 2020) monitoring analysis and report, this Scope of Work includes two optional tasks to conduct, if necessary, analysis and reporting on post-storm monitoring surveys, and preparation of documentation to FEMA requesting post-storm beach restoration funds.

It is understood that McKim & Creed will be conducting the monitoring surveys under a separate contract with the Town. M&N has been coordinating with McKim & Creed to ensure that their survey scope and M&N's analysis scope are in alignment. Under this proposed scope of work, M&N will be responsible for receiving the survey data products from McKim & Creed, writing and production of the reports, and the shoreline/volumetric analyses associated with the reports.

TASK 1 SCOPE OF WORK

As stated above, the proposed Scope of Work is for the 2020 Town of Nags Head Beach Monitoring and Analysis. In general, the tasks include preparation of an annual report and presentation to summarize the shoreline and volume change analysis of 174 profiles along the Town of Nags Head shoreline that will be surveyed under a separate contract between the Town and McKim & Creed. Those surveying efforts include capturing topographic data at 126 transects that have been part of the 2011 through 2019 beach monitoring and analysis. After discussions with the Town it has been decided that an additional 48 transects will be surveyed to capture a better understanding of the project area and longshore transport outside the project area. Two optional tasks have been developed to supplement the annual beach profile analysis including (1) a post-storm survey and analysis and (2) preparation of documentation in support of application for FEMA post-storm beach restoration funds which would only be completed if authorized in writing by Town staff. A more detailed outline of project tasks is as follows.

Task 1.1 – Completion of Annual Surveys and Report

(A) Survey Scheduling and Client Coordination - The monitoring schedule for each year typically includes a comprehensive survey of the transects conducted by late spring/early summer to ensure seasonal differences in the beach profile are consistently measured from year to year,

and to document annual pre-hurricane season beach conditions. **M&N** will coordinate with **McKim & Creed** and the Town to verify that the surveys are collected during this time period. The project team will coordinate with the Town concerning the time and approaches to be followed for each survey.

(B) Survey Profiles – Survey transect stationing established in 2012 for the 2011 Nags Head Beach Nourishment post-construction monitoring along 126 transects will be used to ensure continuity of comparison with future surveys. **M&N** has coordinated with the Town and with McKim & Creed to introduce 48 additional transects to better track sand movement at southern and northern end of the beach nourishment project and hotspots.

(C) Data Analysis and Reporting - Using data provided by **McKim & Creed**, **M&N** will perform the following annual monitoring analysis:

Annual Shoreline Change

M&N will compute shoreline changes between subsequent surveys for the MHW elevation of +1.18 ft NAVD88. **M&N** will report these results at each transect as well as the average changes for each of the previously established subreaches.

Annual Volume Change

M&N will compute volume changes above several strategically selected elevations to ensure the complete tracking of sand movement along the profile. **M&N** expects to calculate these volume changes in accordance with previous monitoring efforts from 2012 through 2019 from a landward point on the back of the dune out to the seaward edge of the nourishment berm (+6 ft NAVD88), above -6 ft NAVD (wading depth), and above -19 ft NAVD (depth of closure). M&N intends to add additional calculation lenses above MHW (+1.18 ft NAVD88), approximately above -14 ft NAVD88 (capturing the offshore bar), and above -30 ft NAVD (seaward extent of surveys). M&N may revise these elevations after the historical data and trends have been reviewed. The Town will be consulted concerning these elevations for final approval prior to completion of the calculations for the monitoring report. **M&N** will report these results at each transect as well as the overall changes for each of the previously established subreaches.

Beach Nourishment Project Performance

The volumetric change calculations performed during the annual analyses will be used to track the performance of any Beach Nourishment or other maintenance projects. Annual changes from each placement area will be documented throughout the nourishment cycle to gain an understanding of actual volume lost, providing insight into future volume need. Upon development of nourishment triggers (covered under a separate task order), comparisons will be made between the current condition of the beach and the calculated triggers, allowing for estimates of when the next nourishment will be needed.

Background Erosion Rates

The volumetric change calculations performed during the annual analyses will be used to determine the background erosion or accretion rates. These are erosion rates that would be expected if no Beach nourishment or maintenance projects were to occur.

Dune Behavior
The volumetric change calculations performed during the annual analyses will be used to determine the dune growth/erosion trends, allowing for identification of areas vulnerable to overwash or exhibiting significant dune growth.

Long-term Trends
The volumetric change calculations performed during the annual analyses will be used to develop long term trends by incorporating the current datasets with those acquired during the 2012 through 2019 monitoring efforts. Annual volume changes from each year (excluding nourishment) will be averaged and plotted for each transect, allowing for identification of long-term stable locations and erosional hotspots in each survey reach as compared to annual changes that may vary significantly from year to year.

In addition, nodal zones established during previous modeling efforts will be analyzed with respect to volume changes in these areas, providing insight into longshore sediment transport patterns and optimal future nourishment placement locations.

Reporting
Once all of the analyses are completed, the resulting calculations and analysis will be included within the annual report. One (1) copy of the draft report will be submitted to the Town by September 15, 2020 (or six weeks after receiving all survey products from **McKim & Creed**) for Town review and comment. The report will include sections such as introduction, methodology, results/conclusions, and appendices. **M&N** will submit four (4) hard copies of the final report (including profiles print outs) to the Town by October 15, 2020. **M&N** will also develop, attend and provide a presentation to the Town's Board of Commissioners at one of their monthly, regularly scheduled meetings. Eight (8) hard copies of the report (including profiles print outs) and one (1) electronic copy of the report, the annual presentation, and all data collected for each survey event, etc. will also be provided on a USB flash drive.

Task 1.2 – Completion of Post Storm Survey and Report (OPTIONAL TASK)

This task will only be completed if authorized by Town staff.

In the event of a significant coastal storm, and if authorized by the Town, **M&N** will complete a post-storm field reconnaissance trip to document storm effects. It is understood that McKim & Creed will provide post-storm surveying under separate contract between the Town and McKim & Creed. **M&N** will assist the Town to coordinate the survey with McKim & Creed. Following receipt of the survey data products from McKim & Creed, M&N will prepare a Post-Storm monitoring report documenting the shoreline and volume change due to the storm, and making recommendations on needs for renourishment to address the storm impacts. Shoreline and volume changes will be calculated to assess storm related damages.

Task 1.3 – Preparation of Documentation for FEMA Category G Project Funding (OPTIONAL TASK)

This task will only be completed if authorized by Town staff.

In the event of a significant coastal storm and a subsequent Federal disaster declaration that provides for Category G Public Assistance, and if authorized by the Town, **M&N** will prepare the supporting documents to show eligibility of the beach for the FEMA Category G post storm restoration funding, reporting previous beach monitoring and maintenance efforts, storm event volume losses, potential sand sources, restoration project cost estimates and schedule. M&N will utilize the post-storm survey and analysis report resulting from Task 1.3 above to support the preparation of documents for FEMA submittal. In association with this subtask, M&N anticipates attending up to two additional in-person meetings in Nags Head and up to four (4) virtual meetings or teleconferences with Federal, State and Town representatives to coordinate the agencies' review of the Category G funding request.

TASK 1 PROJECT COST

The total estimated fee for the 2020 Town of Nags Head Beach Monitoring and Analysis is a lump sum of **$57,119,** including expenses for travel for a site visit and reproduction. If a storm event were to occur, post storm monitoring and analysis would total a lump sum of **$57,119,** including expenses for travel for a site visit and reproduction, and support for FEMA post-storm beach restoration funds would total a lump sum **$33,660** in the event that these tasks were authorized by the Town.

M&N proposes to invoice the Town monthly on a percent complete basis by Task. Our invoice format can be tailored to meet the Town's requirements and preferences, and the invoice would generally be accompanied by a cover letter or cover sheet summarizing progress on the Task during the invoice period.

The fees for each of these subtasks are summarized below:

Task 1: **Beach Monitoring Analysis, Reporting and Post-Storm FEMA Support (2020)**	**M&N Fee**
Task 1.1 – Completion of Annual Surveys and Report	$57,119
Task 1.2 – Completion of Post Storm Survey and Report (OPTIONAL TASK)	$57,119
Task 1.3 – Preparation of Documentation for FEMA Category G Project Funding (OPTIONAL TASK)	$33,660

TASK 2 INTRODUCTION

Moffatt & Nichol (M&N) is pleased to present this scope of work and fee estimate for Year 1 services needed for the Multi-Decadal Master Plan. Although the Master Plan is expected to take three to five years to complete, the following Scope of Work details services to be completed during the 2020-2021 fiscal year, and this Year 1 effort will provide the basis for outlining efforts for subsequent years.

The scope of work below is focused on developing preliminary estimates of the following items after data collection and review are completed:

1) revised beach reaches (based on dune/berm shape and morphology as well as documented erosional/accretional trends),
2) the level of protection currently provided along these reaches as well as the volumes needed to provide different levels of protection in various storm events, in order to determine preliminary nourishment triggers, and
3) estimates of long-term sand needs over 50 years.

The above items will initially be estimated based upon analytical calculations and preliminary modeling that will be refined during later design phases. After discussions with Town staff, M&N believes that it is important to complete this work initially in a preliminary and cost-effective manner so that the Town can see the potential implications of this master plan approach before significant investments are made in more detailed modeling and engineering as well as field investigations and environmental studies, documentation and permitting.

It is currently estimated that the master plan process as a whole could cost between $1M-$3M depending on alternatives developed (and the level of environmental documentation/permitting needed for these alternatives), the overall sand volume needed for the 50 year horizon, and the amount of additional field work (geotechnical and environmental clearances) needed for the borrow sites to permit that 50 year volume of material. The products from this proposed Year 1 scope of work will provide a preliminary road map for the Town to see what the potential range of those volumes are, the locations where the sand is needed and how often, and the potential effects of this master plan approach on current and future funding options for projects.

TASK 2 SCOPE OF WORK

This Scope of Work defines the services to be provided during Year 1 of the multi-year Master Plan process. These tasks generally include project planning, meetings and coordination, data collection and review, and initial modeling and development of preliminary nourishment trigger estimates.

Task 2.1 – Project Planning, Meetings and Coordination – YEAR 1

M&N will attend meetings and provide coordination services for the project as needed. It is intended that the meetings and coordination included in Task 2.1 will discuss progress, findings and recommendations related to Task 2.2, Task 2.3 and Task 2.4 work items. As part of the project, M&N expects the following in-person meetings and virtual meetings / teleconferences to occur in Year 1 of the Master Plan process (Town fiscal year 2020-2021):

- Four (4) in-person meetings in Nags Head with Town staff to discuss the various coastal engineering professional services tasks
- Attendance and presentation at two (2) Board of Commissioners meetings to update the Board on

the progress of the various engineering, monitoring and master plan tasks

- Standing one-hour progress calls / virtual meetings with Town staff, anticipated to occur in months without in-person meetings, for a total of eight (8) such calls.

It is expected that each in-person meeting will include two M&N staff attendance in Nags Head along with their time and supporting staff time to prepare materials for the meetings and to provide meeting notes and summaries.

It is expected that the calls and virtual meetings will include more of the M&N project team and any number of Town staff or other stakeholders that the Town decides to invite to those calls.

This anticipated number of in-person meetings and standing calls does not exclude or limit additional calls between the Town and M&N's points of contact as specific questions and coordination needs arise.

Task 2.2 –Data Collection and Review of Existing Engineered Beach Monitoring/Maintenance Plan and Triggers– YEAR 1

M&N will gather and assess the available relevant data for the Town of Nags Head to provide a basis for understanding historical beach and shoreline behaviors and trends. M&N will collect and review the following data:

- Wave and Water Levels (Normal and Storm) – (as available from NOAA & USACE)
- Available Sediment Resource Data
- Engineering Activities (Nourishment/Dredging/Etc. – Volumes and Extents) – (as available from Town & other Consultants)
- Monitoring Data – (as available from Town & other Consultants)
- Current Engineered Beach Monitoring and Maintenance Plan
- Project Aerials – (as available from Town & other Consultants)

As applicable, selected available geo-referenced mapped data will be placed by M&N in GIS format for ease of analysis and future tasks. As part of this effort, M&N will also review the data for quality and applicability for use in study modeling and analyses. M&N will import these datasets into formats appropriate for our inclusion within our modeling packages and well as analytical spreadsheet and other tools.

In addition, M&N will review the Town's current Engineered Beach Monitoring/Maintenance Plan and current triggers. M&N will evaluate the plan and maintenance triggers versus the preliminary ones developed in Task 2.3 below.

Task 2.3 – Initial Modeling and Development of Preliminary Nourishment Triggers – YEAR 1

1. Develop and Calibrate Cross-Shore Beach Profile Models for Town of Nags Head – M&N will use available offshore wave data and beach profiles taken from the survey monitoring data to develop and calibrate cross-shore models in USACE's CSHORE software. Alternatively, the XBEACH software may be used, and the decision on model software will be made during the initial setup and calibration of the models. CSHORE and XBEACH simulate erosion of the beach and dune profile caused by storm surge and waves, including dune overwash. M&N will employ a combination of storm conditions for model calibration/verification and sensitivity analysis to provide assurance of the necessary robustness for the models' applicability for a wide range of conditions for the Level of Protection assessment. For the CSHORE/XBEACH model, up to twenty (20) representative survey profile sections will be used by M&N to estimate cross-shore transport and profile change during storms. The representative profiles will be

developed considering variations in existing profiles (i.e. beach width, dune height, etc.) and in existing apparent vulnerability of landward areas to storm impacts; these choices will be discussed and confirmed with Town staff.

2. Confirm Background Erosion Rates – M&N will use a combination of data evaluation / analytical techniques and the available beach profile monitoring data to determine background erosion rates, and erosion rates immediately subsequent to beach nourishment projects, within the Town of Nags Head.
3. Determine Current Level of Protection Provided by the Beach Profiles – M&N will use historical storm data to develop a suite of design storms (return periods of 2 yr, 5 yr, 10 yr, 25 yr, 50 yr, and 100 yr) from which to determine the current level of protection from storm surge and waves afforded by the dune and berm system in the Town of Nags Head. The representative survey profile sections utilized in Task 2.3.2 above will be used for these analyses. The extent of damages from each return period storm will be qualified at each representative transect to determine the largest return period storm for which the existing system is providing adequate protection to the first row of structures. It is expected that the level of protection currently provided by the beach and dune will vary throughout the Town of Nags Head, and this stage of the analysis will document which reaches have greater and lesser protection to inform subsequent tasks in the master plan workflow.
4. Determine Desired Level of Protection – Based on the current level of protection analysis, M&N will discuss with the Town if they desire to increase the current level of protection across the whole project or in any specific areas by developing some estimates of what volume and cost would be required to increase and maintain the additional level of protection.
5. Development of Optimal Nourishment Triggers - Once the desired level of protection is determined, M&N will use the calibrated CSHORE/XBEACH cross-shore profile models to determine the minimum volume required at each representative transect to provide adequate protection to the first row of infrastructure. In cases where the existing level of protection is equal or greater than the desired level of protection, the minimum volume will be calculated by "eroding" the profile in the model until it just provides protection against the desired level of design storm – this provides an estimate of how low the profile volume could get before the desired level of protection would be lost. In cases where the existing level of protection is desired to be increased above current levels, the profiles will be "built out" in the model until they just provide the desired level of protection. These minimum volumes will then be used to define nourishment triggers by which to determine the need for a project and a maintenance criteria by which to maintain and describe the Town's "engineered beach" plan to FEMA. These triggers may be adjusted throughout the course of the Master Plan development if additional modeling (longshore transport, 2D/3D nearshore models, etc.) or statistical analysis indicates a need to adjust. During later project phases, M&N will assist the Town to coordinate with FEMA representatives to discuss how the proposed nourishment triggers will be incorporated into the engineered beach maintenance.
6. Develop and Calibrate a GENCADE Longshore Transport and Shoreline Change Model - M&N will use available offshore wave data and shoreline positions taken from the survey monitoring data to develop and calibrate a GENCADE model covering the limits of the Town of Nags Head and a sufficient distance north and south of the Town to account for model boundary effects. The purpose of developing and calibrating the model in YEAR 1 is to have this model ready to utilize early in YEAR 2 to begin evaluating the relative benefits of different beach nourishment phasing strategies. This can include looking at optimizing hot spot management in collaboration with neighboring towns, or otherwise staging different reaches of the beach to receive nourishment on different cycles, with the intent to

optimize long-term spending on dredge mobilization and other fixed costs. This evaluation is also useful for illustrating the benefits to each reach and subreach for developing funding and financing plans. M&N will employ a combination of long-term and storm conditions for model calibration/verification and sensitivity analysis to provide assurance of the necessary robustness for the models' applicability for a wide range of conditions for the alternatives assessment.

7. Estimate Long Term Sand Needs – M&N will use the results of the prior subtasks to develop an initial estimate of the long-term needs for nourishment sand to provide the discussed levels of protection while keeping up with anticipated background erosion rates, expected significant storm events. M&N will use analytical / statistical techniques – such as the Oracle Crystal Ball techniques M&N has utilized successfully elsewhere – to project out sand needs based on the historical erosion rates calculated from the historical beach monitoring data. These estimates will be confirmed in later project phases with detailed modeling.

Task 2.4 – YEAR 1 Interim Report

At the conclusion of Task 2.3, M&N will prepare an interim report that documents YEAR 1 findings and recommendations. This report will serve as the basis for future master planning efforts and include recommendations regarding additional field data to be collected and the steps necessary to acquire permits. Draft and final versions will be submitted to the Town.

TASK 2 PROJECT COST

The total estimated fee for the project for Master Plan Year 1 tasks inclusive of all efforts is lump sum of **$208,100,** including expenses for travel to the Town for meetings and reproduction.

M&N proposes to invoice the Town monthly on a percent complete basis by Task. Our invoice format can be tailored to meet the Town's requirements and preferences, and the invoice would generally be accompanied by a cover letter or cover sheet summarizing progress on the Task during the invoice period.

The fees for each of these subtasks are summarized below:

Task 2: Master Plan Year 1 (2020-2021)	**M&N Fee**
Task 2.1 – Project Planning, Meetings, and Coordination	$38,520
Task 2.2 – Data Collection and Review of Existing Engineered Beach Monitoring/Maintenance Plan and Triggers	$52,920
Task 2.3 – Initial Modeling and Development of Preliminary Nourishment Triggers	$96,340
Task 2.4 – Year 1 Interim Report	$20,320
Total for Task 2	**$208,100**

TASK 3 INTRODUCTION

Moffatt & Nichol (M&N) is pleased to present this scope of work to support the Town's application for Coastal Storm Damage Mitigation (CSDM) application for funding due to damages to the beach from Hurricane Dorian.

TASK 3 SCOPE OF WORK

This Scope of Work defines the services to be provided in support of the Town's Coastal Storm Damage Mitigation Fund application to support funding of a beach nourishment and repair project for damages incurred by Hurricane Dorian.

Additional meeting time and coordination is included to allow for review of documents by the Town.

Task 3.1 – CSDM Application Support

M&N will prepare the CSDM application package for submittal to NC Department of Environmental Quality (DEQ). The application package will include documents collected during Task 1. Additional documents to be prepared include project maps, identification of borrow area, opinion of probable cost, and project schedule.

TASK 3 PROJECT COST

The total estimated fee for the project for the CSDM Application Support tasks inclusive of all efforts is lump sum of **$14,280**.

M&N proposes to invoice the Town monthly on a percent complete basis by Task. Our invoice format can be tailored to meet the Town's requirements and preferences, and the invoice would generally be accompanied by a cover letter or cover sheet summarizing progress on the Task during the invoice period.

The fees for each of these subtasks are summarized below:

Task 3: CSDM Application Support	**M&N Fee**
Task 3.1 – CSDM Application Support	$14,280

TASK 4 INTRODUCTION

The Town of Nags Head incurred damages to its recently constructed beach nourishment project when Hurricane Dorian impacted the area in September 2019. Approximately 508,070 cubic yards (cy) of sand volume was lost from the project area, and the Town submitted a request to FEMA for Category G reimbursement. In addition, the Town has submitted an application for funding from the State Coastal Storm Damage Mitigation (CSDM) grant program to augment the post-Dorian restoration project with an additional 141,150 cy. If both funding requests are granted in full, the Town plans to construct a beach nourishment project in the summer of 2022 that would place approximately 650,000 cy within a 10-mile long project area, for an average profile volume nourishment of approximately 12.3 cy/ft. The scope of Task 4 is proposed to provide for the engineering design, permitting coordination, preparation of construction documents and bidding and construction phase engineering support to the Town as it implements this Post-Dorian beach restoration project.

TASK 4 SCOPE OF WORK

M&N will provide professional services as described in the subtasks below to assist the Town to execute its Nags Head Post-Dorian Category G Restoration Project in accordance with FEMA guidelines for federal cost reimbursement. The project requires the following tasks:

Task 4.1 – Meetings and Coordination with Agencies and Stakeholder Groups

In addition to the specific meetings and standing calls with Town staff and elected officials described under the Task 2, M&N will attend meetings and provide coordination services for the Post-Dorian nourishment project as needed for project development, acquiring the necessary permits and addressing citizen and other stakeholder concerns. These will include meetings with Town staff and elected officials, regulatory and other governmental agencies such as NCDCM, USACE, NCDEM and FEMA, potential construction contractors, as well as interested or concerned citizens. M&N's proposed fee for Task 4 includes an assumption of up to four (4) in-person meetings in Nags Head or in Washington and up to four (4) virtual meetings during the course of the Post-Dorian project development. Time to develop presentations for some of these meetings (when needed) are included.

Task 4.2 – Coastal Engineering, Design, Environmental Permitting and Preliminary Plan Development

M&N will compile existing data available for the project including available beach surveys and geotechnical information collected by others.

M&N will perform one site visit to determine the current condition of the beach and shorefront properties throughout the Post-Dorian Category G Restoration Project area. M&N will first develop a new digital elevation model of the current survey at the time (expected to be the summer 2020 annual monitoring survey) to serve as the base map for the permit drawings and preliminary construction drawings. M&N will then develop the permit drawings consisting of preliminary plans and typical cross-sections for a proposed project that restores the berm with an equal fill density of material along the Project area. The proposed berm width will vary along the Project area to achieve this equal distribution of alongshore fill density.

M&N will utilize the after-dredge survey from the 2019 Nags Head Beach Renourishment Project to verify the remaining volume of beach compatible material available for use from the Borrow Area 3A and Borrow Area 4 as borrow sources for the Restoration Project.

M&N will also be responsible for preparing application packages for the Town to acquire state and federal permits for the project. Agency coordination and stakeholder interaction is expected to be an important part of this project. M&N will participate in an agency pre-project scoping meeting to determine appropriate documentation necessary to support permitting and regulatory review. M&N staff will be available for one additional agency meeting, if necessary, as the project progresses, or for public input.

M&N will work with the Town and with the U.S. Army Corps of Engineers, NC Division of Coastal Management and NC Division of Water Resources to obtain a permit modifications to existing permits to allow the Project to proceed more quickly. The design of the berm restoration and the construction procedures to be followed will be in accordance with agency requirements. M&N will work closely with permit personnel to identify their requirements and restrictions.

Deliverables from Task 4.2 to the Town will include:

- Permit drawings consisting of preliminary plans and typical cross-sections and construction notes, along with a project narrative for coordination with permitting agencies
- Notes / minutes of meetings and coordination with permitting agencies
- Applications / letters requesting permit modification
- Preliminary construction plans and specifications at an approximate 70% level of completion, for Town review and comment prior to preparation of final plans and specifications for project bidding.

Task 4.3 – Final Plans and Specifications and Bid Documents

M&N will develop a complete set of bid documents for advertisement by the Town. This will include a complete set of construction drawings, technical specifications, general provisions, and other necessary documents that form the complete bid package, and the Engineer's Opinion of Probable Cost confirming M&N's opinion that the project can be constructed within the Town's available funds for the project. The preliminary plans will be revised based on the updated monitoring survey from summer 2021. It is assumed that the Town will be responsible for any right-of- way/easement acquisitions as well as identification of staging areas.

Deliverables from Task 4.3 to the Town will include:

- A Prefinal set of plans and specifications for final review by the Town before submittal of the Final signed and sealed bid documents.
- Final bid documents, signed and sealed as necessary by a licensed North Carolina Professional Engineer, for the Town to use in project bidding and construction.

Task 4.4 – Project Bidding, Negotiation and Award

M&N will lead coordination with contractors, with assistance from the Town, during the bidding/construction award phase of the project. These tasks will include: leading an industry day virtual conference 2-3 months before the bid announcement, developing a bid announcement, advertising the bid in local papers and with known contractors and plan rooms, leading a pre-bid conference with the Town, providing construction bid packages to the various contractors and plan rooms, answering bidding contractors' questions, providing addendums, and helping the Town evaluate bids and providing a bid tab and summary with recommendations concerning the contract award. In the event that the bids exceed the project budget, M&N will assist the Town in negotiating with the apparent low bid contractor to evaluate options that will meet the project budget.

Task 4.5 – Construction Observations and Administration

After contract award, M&N will provide construction observation and assist the Town with administrative services for the project. M&N will lead a pre-construction meeting with the Town, resource and permit agency representatives, stakeholders and the selected contractor to go over the project reporting and pay request protocols as well as operational expectations and permitting compliance items that must be completed by the contractor. M&N will also go over the contractor requirement for a pre-construction survey to be submitted before contractor mobilization so that M&N can, if needed, revise the beach placement plan based on significant changed conditions between the beach profiles that were the basis for the design and the actual conditions at the start of the project.

M&N will also review contractor submittals (such as the QA/QC Plan, Work Plan, Environmental Plan, etc.) and address contractor Requests For Information (RFIs). It is expected that the construction period will require approximately three months during May 2022-July 2022. Because of the rapid pace of construction activities that we are expecting and based on our successful experience in other NC beach communities, we anticipate having M&N staff on-site for construction observation during two to three days per week, with weekly contractor meetings occurring during those two to three days. M&N will also coordinate with the contractor to facilitate having required environmental submittals and reports provided to agencies within appropriate timeframes.

M&N will review regular interim construction surveys and post-construction surveys, to be provided by the contractor, and M&N will compute pay volumes to verify that the fill is placed in accordance with the bid documents. M&N will also work with the contractor to make "real-time" adjustments to the nourishment template if needed. It has been established through experience that this real-time check and adjustment is necessary to avoid construction delays and volume over-runs, to keep the possibilities of contract conflicts to a minimum and to work through issues in an efficient, but adaptive way. M&N will also review and approve contractor pay requests and will coordinate with the contractor as needed.

Lastly, M&N will develop a final report summarizing the project, field visits, meetings, pay requests and other applicable project documentation and lessons learned for submittal to the Town and FEMA. M&N will also provide a final presentation to the Town summarizing the project.

TASK 4 PROJECT COST

The total estimated fee for the project for Post-Dorian Category G Restoration Project tasks inclusive of all efforts is lump sum of **$717,512,** including expenses for reproduction and travel to the Town for meetings, site visits, and construction observation. This fee excludes additional geotechnical or environmental field investigations. If these are deemed necessary during design and permitting of the project, an additional scope and fee will be submitted to the Town for review and approval.

M&N proposes to invoice the Town monthly on a percent complete basis by Task. Our invoice format can be tailored to meet the Town's requirements and preferences, and the invoice would generally be accompanied by a cover letter or cover sheet summarizing progress on the Task during the invoice period.

The fees for each of these subtasks are summarized below:

Task 4: Post-Dorian Category G Restoration Project	**M&N Fee**
Task 4.1 – Meetings and Coordination with Agencies and Stakeholder Groups	$77,004
Task 4.2 – Coastal Engineering, Design, Environmental Permitting and Preliminary Plan Development	$253,238
Task 4.3 – Final Plans and Specifications and Bid Documents	$97,730
Task 4.4 – Project Bidding, Negotiation and Award	$39,530
Task 4.5 – Construction Observations and Administration	$250,010
Total for Task 4	**$717,512**

TASK 4 PROJECT SCHEDULE

The total project duration is expected to be approximately **18-21 months** to complete design, permitting, bidding and award, and construction with an end date of July 2022.

McKIM&CREED

ENGINEERS

SURVEYORS

PLANNERS

May 20, 2020 192690_1

David Ryan, PE
Town Engineer
Town of Nags Head
PO Box 99
Nags Head, NC 27959

Re: Town of Nags Head – Beach Monitoring Surveys, Summer 2020

David,

McKim & Creed would like to present our proposal for professional surveying services in connection with the referenced project. We understand the scope of work from our conversations with your coastal engineer, Moffatt & Nichol. Our Scope of work is based on performing a beach monitoring profile survey this summer for the base bid and 3 options.

We understand the the profiles generally begin at the landward toe of the primary dune or historic baseline and extend across the dunes and beach face to distance of approximately three thousand five hundred feet or -30 ft NAVD 88, whichever is achieved first.

This project includes 174 beach profile monitoring lines; Base bid includes 126, Option 1 includes 13, Option 2 include 14, Option 3 includes 21.

In the event of a Post-Storm survey, we can mobilize within 48 hours or as soon as safely possible with a minimum of one land crew and one hydrographic survey crew.

243 North Front Street

Wilmington, NC 28401

910.343.1048

Fax 910.251.8282

www.mckimcreed.com

<u>Scope of Work</u>

- All survey work will be performed to the Standards of Practice for Land Surveying in North Carolina.

- Hydrographic surveys will be performed to meet or exceed the minimum performance standards for the Corps of Engineers Hydrographic Surveys, USACE specifications manual EM 1110-2-1003.
- Horizonatal data will be referenced to NC Grid NAD83/2011 or to existing control datum and Vertical datum will be NAVD88.
- Conduct a coordination meeting with the Town of Nags Head and Moffatt & Nichol prior to beginning work. We will maintain open communication in addition to weekly project progress reports and updates.
- Over land data will be captured using Trimble R8/R10 dual frequency GNSS receivers beginning at the Landward toe of the Primary dune and extend out to the surf zone at wading depth (wading will occur at low tide). Land survey crews will survey grade GNSS receivers mounted on fixed height rover poles that are equipped with topo shoes (flat rod tips that do not sink in the sand). The data collectors are clamped onto the pole; the system is lightweight and ideal for one person. To move up and down the beach efficiently, we will use Side by Side utility vehicles (Kawasaki Mule). Crew trucks are painted with our company logo, field crews wear highly visible orange/yellow shirts and vests.
- Hydrographic surveys will be collected from -30 ft NAVD88 to the surf zone (during the high tide cycle) to achieve overlapping data as weather/sea conditions allow. Our survey vessels ranged from 22' to 28' in length and are equipped with Inertial Navigation systems that include survey grade dual frequency sonar, IMU, VRS RTK GNSS and sound velocity probes, all of which compensates for depth, heave, pitch, roll, positon, heading and the speed of sound. Prior to beginning work, we perform a bar check to insure the accuracy of our sonar and we perform a sound velocity checks periodically during the survey.
- Hydrographic survey vessesls are fully equipped to meet USACE specifications manual EM 1110-2-1003 including sonar, imu, position, heading and sound velocity.
- We will provide the following deliverables:
    - AutoCAD Civil 3D file
    - XYZ files of the Land, Wade, and Hydro data
    - Signed and Sealed PDF of Final Survey Data Set on Title Block
    - Survey Report detailing the project understanding, planning, methods and procedures used, communication between teams, QA/QC checksand final results
    - Digital text file with (alongshore) Station and/or Profile ID, coordinates X,Y,Z, and Distance to Baseline (DBL).
    - Digital text file in BMAP direct import format.

- ESRI GIS format floating-point grid or TIN file of the Digital Elevation Model (DEM, surface file), with one combined surface made from all the survey data (on land and underwater).
- Mean High Water (MHW) contour extracted from the DEM, in ESRI GIS shapefile or geodatabase.

Accuracy

- Land: The integrated GNSS system (Trimble R8) that we use is rated at a precision of .02' horizontal and .05' vertically. Based on the conditions and stability of the sand, we can provide an accuracy of 0.1' horizontally and less than 0.2' vertically.
- Hydro: Our equipment is well within the requirements of the USACE Hydrographic Survey Standards. Our soundings will be accurate to within 3' horizontal and 0.25' vertically.

Schedule

We estimate approximately 3-4 weeks to collect all data sets. We can provide the final deliveries and reports within 2-3 weeks of completion of field work.

For services described in the above Scope of Work, the lump sum fee will be **$63,100.00** *(Sixty-three thousand One-hundred dollars)* inclusive of reimbursable expenses. The option fees are based on performing them at the same time as the base bid.

Base Bid (126 profiles) ……..$47,000.00
Option 1 (13 profiles) ……$4,400.00
Option 2 (14 profiles) …….$4,700.00
Option 3 (21 profiles) …….$7,000.00
Total……...$63,100.00

Post-storm survey……..$63,100.00 per event
(Includes same scope of work and detail of the annual survey)

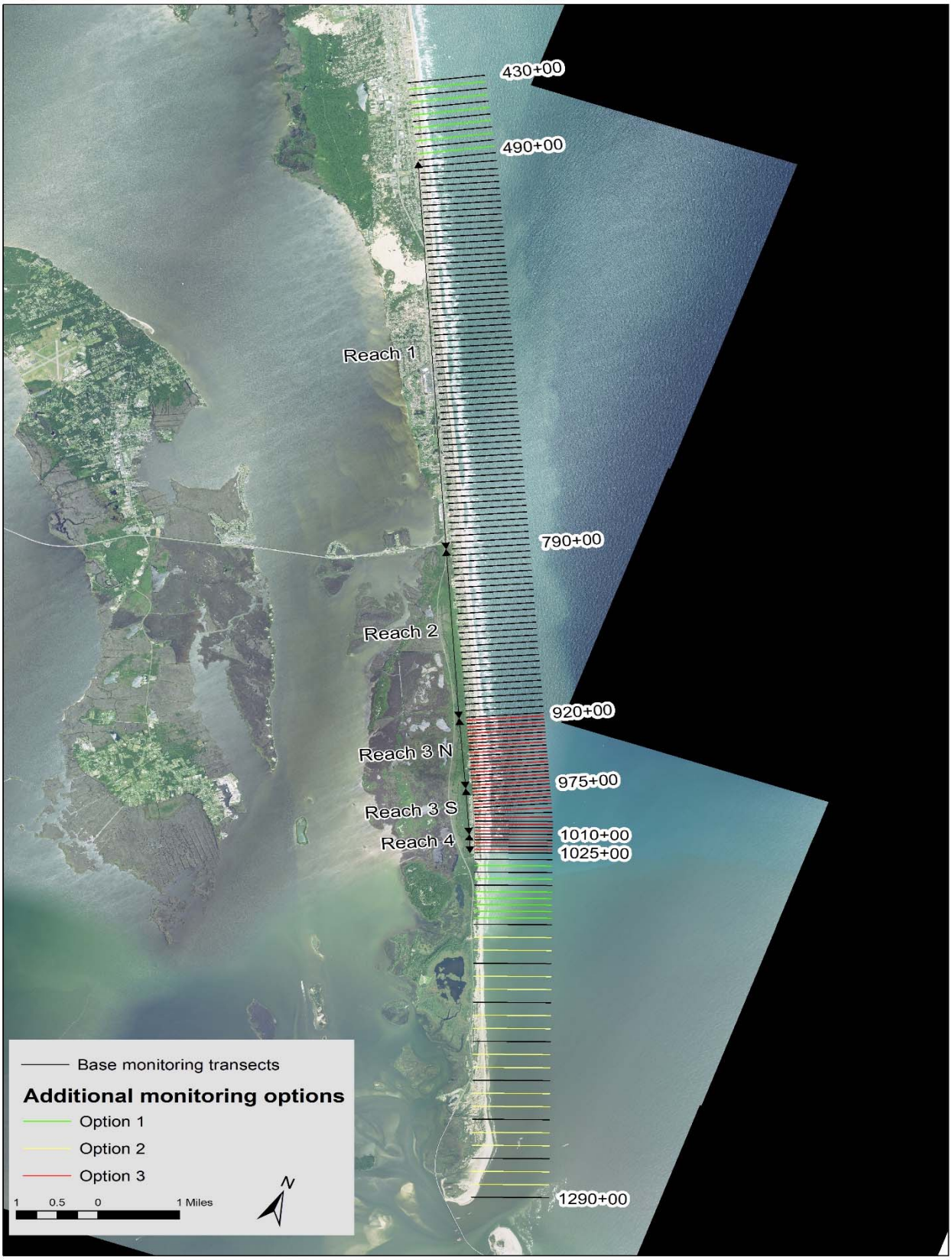
This proposal is submitted contingent upon the negotiation of a contract with mutually acceptable terms and conditions prior to the commencement of any work.

We appreciate the opportunity to provide this proposal to you and look forward to working on the project with you.

Sincerely,

McKIM & CREED, INC.

David Jones, PLS
Geomatics Regional Manager/VP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McKIM&CREED

Agenda Item Summary Sheet

Item No: **H-1**
Meeting Date: **June 3, 2020**

Item Title: Committee Reports

Item Summary:

At the June 3rd Board of Commissioners meeting, Board members will provide reports from meetings they have attended on behalf of the Town.

Number of Attachments: 0

Specific Action Requested:

Provided for Board update.

Submitted By: Administration Date: May 28, 2020

Finance Officer Comment:

No unbudgeted fiscal impact.

Signature: Amy Miller Date: May 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: May 28, 2020

Town Manager Comment and/or Recommendation:

N/A

Signature: Cliff Ogburn Date: May 28, 2020

Agenda Item Summary Sheet

Item No: **L-1**
Meeting Date: **June 3, 2020**

Item Title: Mayor Ben Cahoon – Future of Nags Head - from the Jan 23-24, 2020 Board Retreat

Item Summary:

One of the topics of discussion at the January 2020 Board of Commissioners Retreat concerned envisioning the future of Nags Head.

While this item will remain as a standing agenda item, discussion will continue once the Board can resume normal meetings.

Number of Attachments: 0

Specific Action Requested:

Provided for Board discussion.

Submitted By: Administration Date: May 28, 2020

Finance Officer Comment:

Insufficient information to determine fiscal impact.

Signature: Amy Miller Date: May 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: May 28, 2020

Town Manager Comment and/or Recommendation:

I will participate in the discussion as necessary.

Signature: Cliff Ogburn Date: May 28, 2020

Agenda Item Summary Sheet

Item No: **L-2**
Meeting Date: **June 3, 2020**

Item Title: Mayor Ben Cahoon – Request for Closed Session

Item Summary:

At the June 3rd Board of Commissioners meeting, Mayor Cahoon will request a Closed Session, in accordance with GS 143-318.11(a)(6), to discuss a personnel matter.

Number of Attachments: 0

Specific Action Requested:

Provided for Board discussion.

Submitted By: Administration Date: May 28, 2020

Finance Officer Comment:

N/A

Signature: Amy Miller Date: May 28, 2020

Town Attorney Comment:

N/A

Signature: John Leidy Date: May 28, 2020

Town Manager Comment and/or Recommendation:

N/A

Signature: Cliff Ogburn Date: May 28, 2020