Eastern Whip-poor-will Antrostomus vociferus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Kentucky Warbler Oporornis formosus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
King Rail Rallus elegans This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8936	Breeds May 1 to Sep 5
Prairie Warbler Dendroica discolor This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler Protonotaria citrea This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
Red-headed Woodpecker Melanerpes erythrocephalus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird Euphagus carolinus This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Wood Thrush Hylocichla mustelina This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in your project's counties during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

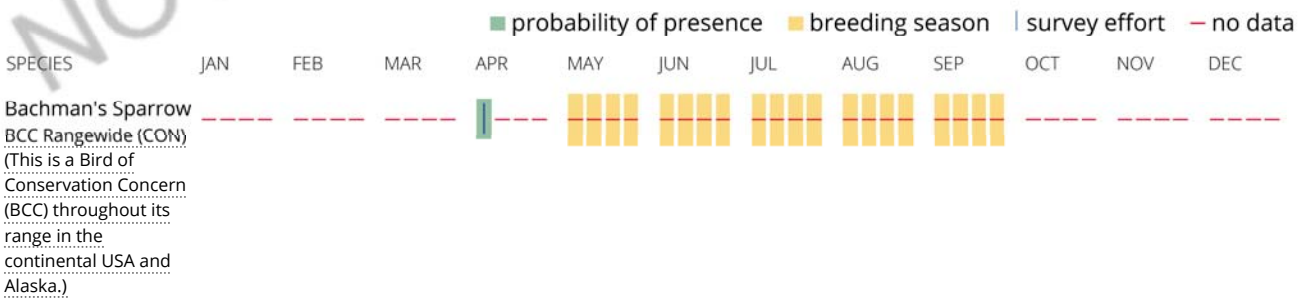
Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

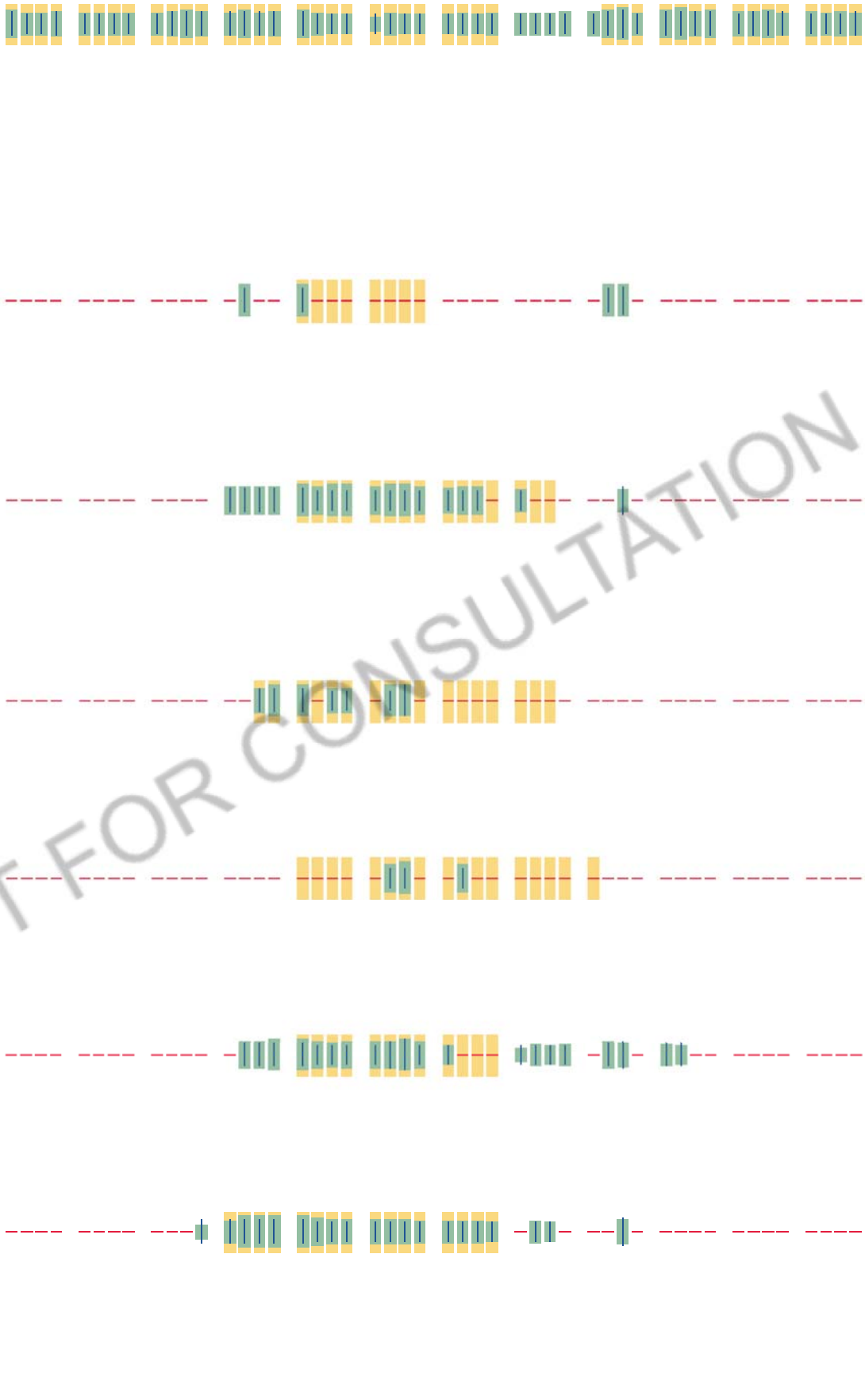
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the counties of your project area. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information.





Bald Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)

Blue-winged Warbler
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

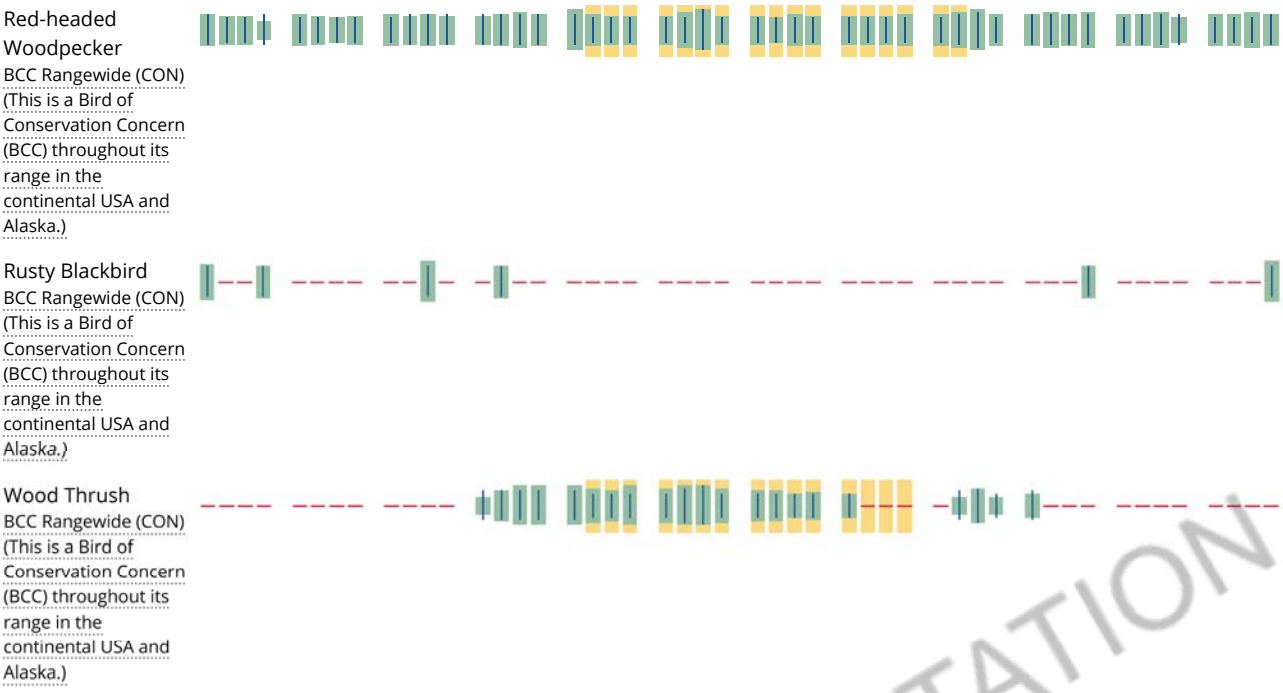
Eastern Whip-poor-will
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Kentucky Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

King Rail
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Prairie Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Prothonotary Warbler
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the counties which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird entry on your migratory bird species list indicates a breeding season, it is probable that the bird breeds in your project's counties at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the BGEPA should such impacts occur.

Facilities

Wildlife refuges and fish hatcheries

REFUGE AND FISH HATCHERY INFORMATION IS NOT AVAILABLE AT THIS TIME

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Exhibit 28

Legend

- Evaluation Area
- 1 Mile Radius
- 2017 NC Natural Heritage Program Elemental Occurences

WILKINSON CREEK
FALLEN OAK
GILMORE
CHESTNUT
GREENBRIAR
GRANITE RIDGE
MOUNTAIN VIEW
WOODBEND
STONE HILL
HUBBELL
TIMBER
TRAILWOOD
HIGHLAND
EAGLE ROCK
VALLEY
WOODCREEK
GLEN EDEN
TALL OAKS
POYTHRESS
JOVAN
CHATHAM
NORWOOD
PATTERSON
WILLIAMS
BLUEBERRY HILL
LAMONT NORWOOD
WINTERBERRY
RED PINE
WHITE OAK
ROCKY KNOLLS
MULBERRY
DOLLAR
WILLOW
LORLOLLY
GREENTREE
HALF DOLLAR
OAK LEAF
EAGLE POINT
PERSIMMON HILL
POLKS LANDING
TOBACCO
JAMESTOWN
CREEKS EDGE
POLKS
DORCURT HILLS
BLAKE
HAMLETS CHAPEL
OAK HILL
ANDREWS STORE
HACKBERRY
PLEASANT
MANNS CHAPEL
ROBERT
EASY
DENNY
MINT SPRINGS
HAWFIELD
RIVER FOREST
THOMPSON MHP
LOIS
FOSTER
FOREST CREEK
PARKER HERNDON
GLENDALE
MORRIS
GLADSTONE
AUBURN
KENTVIEW
BUCK BRANCH
A MOUNTAIN VIEW
GEORGE HELEN
PLEASANT SPRINGS
MOORE MOUNTAIN
RIVER VIEW
US 15-501
NCCGIA

NC Natural Heritage Program Map	Project No. 13203.W8	Ryan's Crossing Site Chatham County, NC Chatham County GIS NC OneMap
	Scale: 1 = 1000'	
	Project Mgr.: BZ	1/02/18
		Prepared by: DM

S&EC Soil & Environmental Consultants, PA
8412 Falls of Neuse Road, Suite 104, Raleigh, NC 27615 • Phone: (919) 846-5900 • Fax: (919) 846-9467
sandec.com

N W E S

Exhibit 29

HOME

Species/Community Search

(Data updated on November 15, 2017 with 2017-10 data set)

Search Parameters: County like 'Chatham', Protection Status is 'NC Listed' or 'Federally Listed'

(Searched on Wed Jan 10 2018)

Do another search

Download Results (https://www.google.com/fusiontables/exporttable?query=SELECT TAXONOMIC_GROUP, SCIENTIFIC_NAME, COMMON_NAME, STATE_STATUS, FEDERAL_STATUS, STATE_RANK, GLOBAL_RANK, HABITAT_COMMENT, COUNTY, COUNTY_STATUS FROM 1pRK5lW4IQurozNNX2puYaeBKrMGVWE6iPeQPVdI WHERE COUNTY CONTAINS IGNORING CASE 'Chatham' AND EITHER_STATUS = 'Y' ORDER BY SCIENTIFIC_NAME&o=csv) →

Show 100 **entries per page**

Filter search results:

Taxonomic Group	Scientific Name	Common Name	NC Status	Federal Status	State Rank	Global Rank	County	County Status
Freshwater Bivalve	Alasmidonta undulata	Triangle Floater	T	FSC	S3	G4	Chatham	Current
Freshwater Bivalve	Alasmidonta varicosa	Brook Floater	E	FSC	S3	G3	Chatham	Current
Freshwater Fish	Ambloplites cavifrons	Roanoke Bass	SR	FSC	S2	G3	Chatham	Current
Vascular Plant	Carex vestita	Velvet Sedge	SC-H		S1	G5	Chatham	Historical
Vascular Plant	Collinsonia tuberosa	Piedmont Horsebalm	SC-V		S1	G3G4	Chatham	Current
Vascular Plant	Echinacea purpurea	Purple Coneflower	SC-V		S1	G4	Chatham	Current
Freshwater Bivalve	Elliptio producta	Atlantic Spike	W3,W5	FSC	SU	G3Q	Chatham	Current

Taxonomic Group	Scientific Name	Common Name	NC Status	Federal Status	State Rank	Global Rank	County	County Status
Freshwater Bivalve	Elliptio roanokensis (syn. Elliptio judithae)	Roanoke Slabshell	T	FSC	S3	G3	Chatham	Current
Vascular Plant	Enemion biternatum	Eastern Isopyrum	SC-V		S2	G5	Chatham	Historical
Freshwater Fish	Etheostoma collis	Carolina Darter	SC	FSC	S3	G3	Chatham	Current
Freshwater Bivalve	Fusconaia masoni	Atlantic Pigtoe	E	FSC	S3	G2	Chatham	Current
Vascular Plant	Gillenia stipulata	Indian Physic	T		S2	G5	Chatham	Historical
Dragonfly or Damselfly	Gomphus septima	Septima's Clubtail	SR	FSC	S2S3	G2	Chatham	Current
Bird	Haliaeetus leucocephalus	Bald Eagle	T	BGPA	S3B,S3N	G5	Chatham	Current
Amphibian	Hemidactylium scutatum	Four-toed Salamander	SC		S3	G5	Chatham	Current
Vascular Plant	Isoetes virginica	Virginia Quillwort	SR-L	FSC	S1	G1	Chatham	Historical
Freshwater Bivalve	Lampsilis cariosa	Yellow Lampmussel	E	FSC	S3	G3G4	Chatham	Current
Freshwater Bivalve	Lampsilis radiata	Eastern Lampmussel	T		S3	G5	Chatham	Current
Freshwater Bivalve	Lampsilis sp. 2	Chameleon Lampmussel	SR	FSC	S2	G1	Chatham	Current
Freshwater Bivalve	Lampsilis splendida	Rayed Pink Fatmucket	SR	FSC	S1	G3	Chatham	Current
Bird	Lanius ludovicianus	Loggerhead Shrike	SC, W2		S3B,S3N	G4	Chatham	Current
Freshwater Bivalve	Ligumia nasuta	Eastern Pondmussel	T		S2	G4	Chatham	Current
Vascular Plant	Lindera subcoriacea	Bog Spicebush	SR-T	FSC	S2	G3	Chatham	Current

Taxonomic Group	Scientific Name	Common Name	NC Status	Federal Status	State Rank	Global Rank	County	County Status
Vascular Plant	Monotropsis odorata	Sweet Pinesap	SC-V		S3	G3	Chatham	Current
Freshwater Fish	Moxostoma sp. 3 (syn. Moxostoma sp. cf. erythrurum)	Carolina Redhorse	T	FSC	S2	G1G2Q	Chatham	Current
Freshwater Fish	Notropis mekistocholas	Cape Fear Shiner	E	E	S1	G1	Chatham	Current
Bird	Peucaea aestivalis	Bachman's Sparrow	SC	FSC	S3B,S2N	G3	Chatham	Current
Vascular Plant	Phacelia covillei	Buttercup Phacelia	SR-T	FSC	S3	G3	Chatham	Current
Bird	Picoides borealis	Red-cockaded Woodpecker	E	E	S2	G3	Chatham	Historical
Vascular Plant	Ptilimnium nodosum	Harperella	E	E	S1	G2	Chatham	Current
Vascular Plant	Scutellaria nervosa	Veined Skullcap	E		S1	G5	Chatham	Historical
Freshwater or Terrestrial Gastropod	Somatogyrus virginicus	Panhandle Pebblesnail	SR	FSC	S2S3	G2G3	Chatham	Current
Freshwater Bivalve	Strophitus undulatus	Creeper	T		S3	G5	Chatham	Current
Vascular Plant	Thermopsis mollis	Appalachian Golden-banner	SC-V		S2	G3G4	Chatham	Historical
Freshwater Bivalve	Toxolasma pullus	Savannah Lilliput	E	FSC	S2	G2	Chatham	Current
Vascular Plant	Trifolium reflexum	Buffalo Clover	T		S1S2	G3G4	Chatham	Historical
Freshwater Bivalve	Villosa constricta	Notched Rainbow	SC	FSC	S3	G3	Chatham	Current
Freshwater Bivalve	Villosa vaughaniana	Carolina Creekshell	E	FSC	S3	G2	Chatham	Current

Exhibit 30

Expected Wildlife On The Ryan's Crossing Site

Reptiles Associated with the Region

Common Name	*Scientific Name*	Observed Onsite
Black racer	*Coluber constrictor*	Yes
Broadhead skink	*Eumeces laticeps*	No
Brown snake	*Storeria dekayi*	No
Copperhead	*Agkistrondon contorix*	No
Corn snake	*Elaphe guttata*	No
Eastern box turtle	*Terrapene carolina*	Yes
Eastern garter snake	*Thamnophis sirtalis*	No
Eastern hognose snake	*Heterodon platirinos*	No
Eastern kingsnake	*Lampropeltis getulus*	No
Eastern mud turtle	*Kinosternon subrubrum*	No
Green anole	*Anolis carolinensis*	Yes
Ground skink	*Scincella lateralis*	No
Mole kingsnake	*Lampropeltis calligaster*	No
Northern fence swift	*Sceloporu undulatus*	No
Northern water snake	*Nerodia sipedon*	Yes
Rat snake	*Elaphe obsoleta*	No
Red-bellied snake	*Storeria occipitomaculata*	No
Ringneck snake	*Diadophis punctatus*	No
Rough green snake	*Opheodrys aestivus*	No
Scarlet kingsnake	*Lampropeltis triangulum*	No
Scarlet snake	*Cemophora coccinea*	No
Smooth earth snake	*Virginia valeriae*	No
Snapping turtle	*Chelydra serpentina*	Yes
Southeastern crowned snake	*Tantilla coronata*	No
Southeastern five-line skink	*Eumeces inexpectatus*	No
Stinkpot	*Sternotherus odoratus*	No
Timber rattlesnake	*Crotalus horridus*	No
Worm snake	*Carophophis amoenus*	No

Avifauna Associated with the Region

Common Name	*Scientific Name*	Observed Onsite
Acadian flycatcher	*Empidonax virescens*	No
American coot	*Fulica americana*	No
American goldfinch	*Carduelis tristes*	Yes
American kestrel	*Falco sparverius*	No
American redstart	*Setophaga ruticilla*	No

American woodcock	*Scolopox minor*	Yes
Barn swallow	*Hirundo rustica*	No
Barred owl	*Strix varia*	Yes
Belted kingfisher	*Megaceryle alcyon*	Yes
Black and white warbler	*Mniotilta varia*	No
Black-crowned night heron	*Nycticorax nycticorax*	No
Black Vulture	*Coragyps atratus*	Yes
Blue jay	*Cyanocitta cristata*	Yes
Blue-gray gnatcatcher	*Polioptila caerulea*	No
Brown creeper	*Certhia familiaris*	No
Brown thrasher	*Toxostoma rufum*	Yes
Brown-headed cowbird	*Molothrus ater*	No
Brown-headed nuthatch	*Sitta pusilla*	Yes
Canadian goose	*Branta canadensis*	Yes
Northern cardinal	*Cardinalis cardinalis*	Yes
Carolina chickadee	*Parus carolinensis*	Yes
Carolina wren	*Tyryothorus lucovicianus*	Yes
Cedar waxwing	*Bombycilla cedrorum*	Yes
Chipped sparrow	*Spizella passerina*	No
Common crow	*Corvus brachyrhynchos*	Yes
Common flicker	*Colaptes auratus*	No
Common nighthawk	*Chordeiles minor*	No
Dark-eyed junco	*Junco hyemalis*	Yes
Downy woodpecker	*Picoides pubescens*	Yes
Eastern phoebe	*Sayornis phoebe*	Yes
Eastern wood pewee	*Contopus virens*	Yes
Fish crow	*Corvus ossifragus*	No
Fox sparrow	*Passerella iliaca*	No
Golden-crowned kinglet	*Regulus satrapa*	No
Great blue heron	*Ardea herodias*	Yes
Great crested flycatcher	*Myriarchus crinitus*	No
Great horned owl	*Bubo virginianus*	No
Green heron	*Butorides sriatus*	No
Hairy woodpecker	*Picoides villosus*	No
Hermit thrush	*Catharus guttata*	No
Hooded warbler	*Wilsonia citrina*	No
House wren	*Troglodytes aedon*	Yes
Indigo bunting	*Passerina cyanea*	No
Kentucky warbler	*Oporornis formosus*	No
Mallard	*Anas platyrhynchos*	Yes
Myrtle warbler	*Dendroica coronata*	No
Northern waterthrush	*Seirurus motacilla*	No
Ovenbird	*Seiurus aurociapillus*	No
Parula warbler	*Parula americana*	No

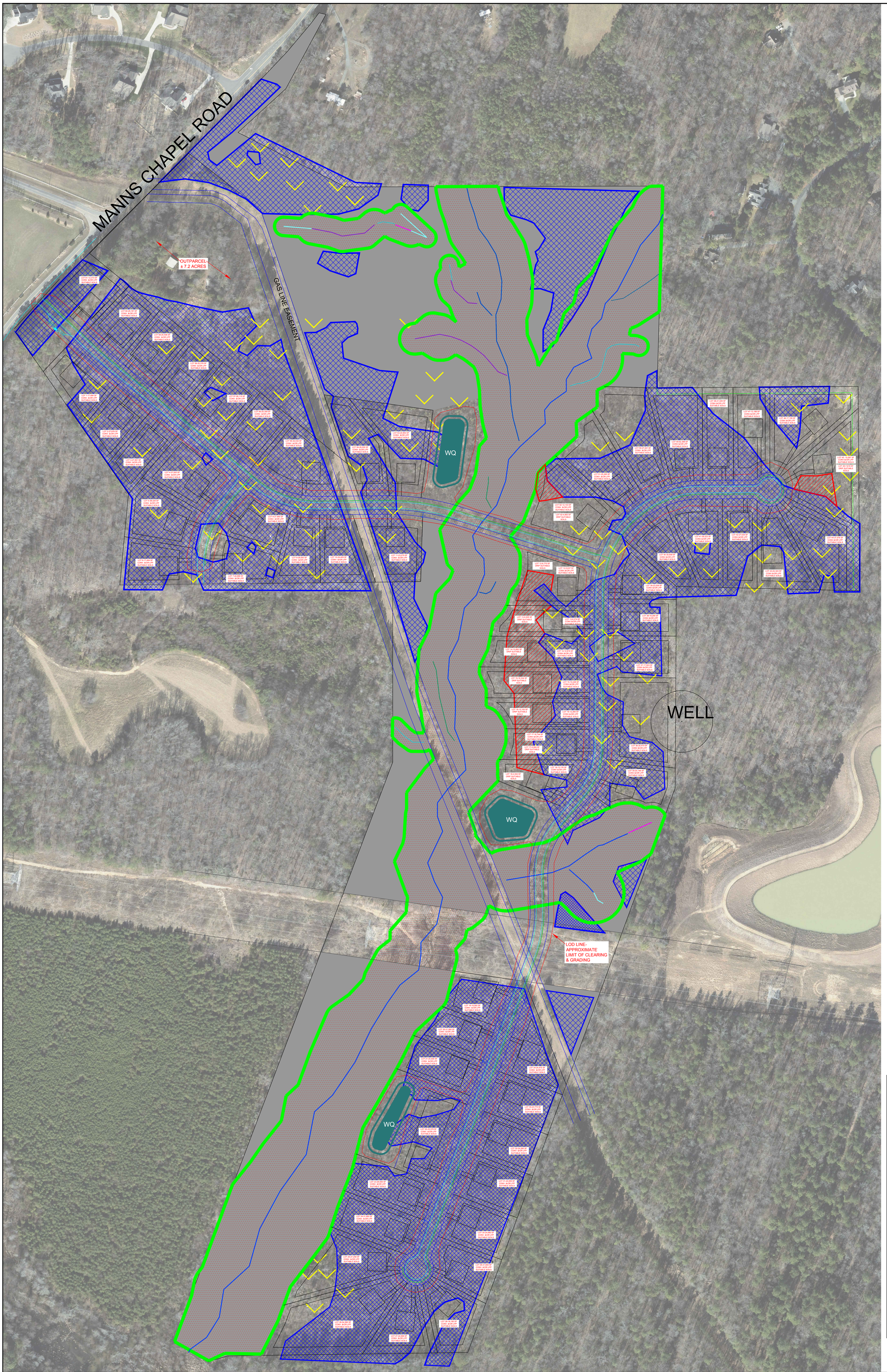
Pied-billed grebe	*Podilymbus podiceps*	No
Pine siskin	*Carduelis pinus*	No
Purple finch	*Carpodacus purpureus*	No
Purple martin	*Progne subis*	No
Red-bellied woodpecker	*Melanerpes carolinus*	No
Red cockaded woodpecker	*Picoides borealis*	No
Red-eyed vireo	*Vireo olivaceus*	No
Red-shouldered hawk	*Buteo lineatus*	No
Red-tailed hawk	*Buteo jamaicensis*	No
Red-winged blackbird	*Agelaius phoeniceus*	Yes
American robin	*Turdus migratorius*	Yes
Rough-winged swallow	*Stelgidopteryx ruficolis*	No
Ruby-crowned kinglet	*Regulus calendula*	No
Ruby-throated hummingbird	*Archilochus colubris*	No
Rufus-sided towhee	*Pipilo erthrophthalmus*	No
Rusty blackbird	*Euphagus carolinus*	No
Scarlet tanager	*Piranga olivacea*	No
Screech owl	*Otus asio*	No
Sharp-shinned hawk	*Accipiter striatus*	No
Song sparrow	*Melospiza melodia*	No
Spotted sandpiper	*Actitis maculdria*	No
Summer tanager	*Piranga rubra*	No
Swamp sparrow	*Melospiza georgiana*	No
Tree sparrow	*Spizella arborea*	No
Tufted titmouse	*Parus bicolor*	Yes
Turkey vulture	*Cathartes aura*	Yes
White-breasted nuthatch	*Sitta carolinenis*	No
White-crowned sparrow Wild turkey	*Zonotrichia albicolis*	No
Winter wren	*Meleagris gallopavo*	No
Wipoorwill	*Caprimulgus vociferus*	No
Wood thrush	*Hyclocichla mustelina*	No
Yellow warbler	*Dendroica petechia*	No
Yellow-bellied sapsucker	*Sphrypicus varius*	No
Yellow-billed cuckoo	*Coccyzus americanus*	No
Yellow-breated chat	*Icteria virens*	No
Yellow-throated warbler	*Dendroica dominica*	No

Mammals Associated with the Region

Common Name	***Scientific Name***	**Observed Onsite**
North American beaver	*Castor canadensis*	Yes

Big brown bat	*Eptesicus fuscus*	No
Eastern chipmunk	*Tamias striatus*	Yes
Eastern cottontail	*Sylvilagus floridanus*	Yes
Eastern gray squirrel	*Sciurus carolinesis*	Yes
Eastern mole	*Scalopus aquaticus*	No
Eastern pipistrel	*Pipistrellus subflavus*	No
Evening bat	*Nycticeius humeralis*	No
Golden mouse	*Ochrotomyss nutalli*	No
Gray fox	*Urocyon cinereoargenteus*	No
Hoary bat	*Lasiurus cinereus*	No
Long-tailed weasel	*Mustela frenata*	No
Meadow jumping mouse	*Zapus hudsonius*	No
Mink	*Mustela vison*	No
Muskrat	*Ondatra zibethicus*	No
Opossum	*Didelphis marsupialis*	No
Raccoon	*Procyon lotor*	No
Red bat	*Lasurius borealis*	No
Red fox	*Vulpes vulpes*	No
River otter	*Lutra canadensis*	No
Short-tailed shrew	*Blarina brevicauda*	No
Silver-haired bat	*Lasionycteris noctivigans*	No
Southern flying squirrel	*Glaucomys volans*	No
White-footed mouse	*Peromyscus leucopus*	No
White-tailed deer	*Odocoileus virginicus*	Yes
Woodland vole	*Microtus pinetorium*	No

Exhibit 31



N

W E

S

GRAPHIC SCALE
1" = 100'

100 0 100 200

PRELIMINARY SOIL/SITE EVALUATION.
SOIL LINES WERE DELINEATED IN THE FIELD BY S&EC PERSONNEL. THE SOIL LINES WERE SKETCHED ONTO THE MAP BASED ON TOPOGRAPHY, GPS POINTS, AND OTHER SITE FEATURES.

**NOTE: THIS PROPERTY HAS SEVERAL EXTREMELY ROCKY AREAS AND BACKHOE AREAS MAY BE NEEDED TO FURTHER EVALUATE THESE AREAS. THERE MAY BE INCLUSIONS OF UNSUITABLE SOIL WITHIN SUITABLE SOIL MAP UNITS DUE TO SOIL VARIABILITY, THICK VEGETATION, AND/OR ROCKY CONDITIONS.

**THIS MAP AND CORRESPONDING SITE EVALUATION IS NOT CONFORMANT TO THE ENGINEERED OPTION PERMIT (EOP) PROCESS. ADDITIONAL SITE TESTING AND EVALUATIONS WILL BE REQUIRED TO UTILIZE THE EOP PROCESS.

**SUITABLE FOR PRELIMINARY PLANNING PURPOSES ONLY. SITE WILL REQUIRE APPROVAL BY THE COUNTY HEALTH DEPARTMENT ON A CASE BY CASE BASIS. THIS MAP SHOULD BE USED AS A GENERAL GUIDE. SOME ADJUSTMENTS WILL BE NECESSARY IN THE FIELD DUE TO SOIL VARIABILITY AND TOPOGRAPHIC IRREGULARITIES. THIS MAP ONLY REFLECTS EXISTING SOIL SUITABILITY FOR ON-SITE SEPTIC TANK SYSTEMS. SOME OTHER CONSIDERATIONS THAT AFFECT SITE SUITABILITY THAT SHOULD BE CONSIDERED IN DEVELOPMENT DESIGN ARE:

1) 10' SETBACK FROM PROPERTY LINE
2) 100' SETBACK FROM ANY WELL
3) 25' SETBACK FROM DRAINAGE DITCHES.

SEE ACCOMPANYING S&EC REPORT.

NOT A SURVEY.
SITE INFORMATION AND SUBDIVISION PLAN FROM MCKIM & CREED ENGINEERING. 2017 AERIAL FROM NCONEMAP.COM.

LEGEND

Areas contain soils with 24 to 30 inches or more of useable material and have the potential for conventional, modified conventional, ultra-shallow and/or low pressure pipe septic systems. Approximate suitable soil square footage is listed on each lot.

Areas contain soils with 18 inches or more of useable material and have the potential for drip septic systems. These areas may contain deeper soils suitable for other septic system types but further evaluation will be needed after these areas are cleared. Approximate suitable soil square footage is listed on each lot.

Existing private well, (100' system & repair) septic system setback.

Extremely rocky areas; Backhoe pits maybe needed to further evaluate these areas.

Sheet No.: 1 of 1	Date: NOVEMBER 2017	Field Work: JM,CC	Drawn: CC	Project Manager: DW	Project No.: 13203.54	Project: RYAN'S CROSSING SUBDIVISION	Location: CHATHAM CO., NC
						Sheet Title: PRELIMINARY SOILS OVERLAID ON PRELIMINARY SITE PLAN	Client: ALEX BORROSO & GARY COLEN

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