Attachment 1

SUMMIT
DESIGN AND ENGINEERING SERVICES

919.732.3883 SUMMIT-ENGINEER.COM
504 Meadowland Drive, Hillsborough, NC 27278

Letter of Transmittal

TO Orange County Planning Department
131 W. Margaret Lane
Hillsborough, NC 27278

ATTN Patrick Mallett
Planner II

DATE 03/18/19	PROJ. NO. 18-0248.010
RE: Occoneechee Hills Concept Plan Application	

WE ARE SENDING YOU:

■ Attached ☐ Under Separate Cover ☐ Transmitted Via Hand Delivered
☐ Prints ☐ Reproducible ☐ Specifications ☐ Shop Drawings
☐ Copy of Letter ☐ Change Order ☐ _____

COPIES	DRAWING	DATE	DESCRIPTION
20	C-1 thru C-3	03/18/19	Subdivision Concept Plan – (Full Size)
1	C-1 thru C-3	03/18/19	Subdivision Concept Plan – (11x17 Reduced Sized Set)
1	N/A	03/18/19	Major Subdivision Concept Plan Application
1	N/A	03/18/19	Chandler Soils Report
1	N/A	03/18/19	Duncklee Dunham Report

TRANSMITTED:

☐ For Approval ☐ As Requested ☐ For Your Use ■ For Review and Comment

COMMENTS

COPY TO

Tinty A. Sith

SIGNATURE:

APPLICATION FOR MAJOR SUBDIVISION CONCEPT PLAN APPROVAL

9/06

DATE: 3/18/19

SUBDIVISION NAME: Fairway Hills

LOCATION: 2715 US 70 E, Hillsborough, NC 27278

OWNER/DEVELOPER: Old NC 86 Partners, LLC c/o Jim Parker

ADDRESS: 504 Meadowlands Drive PHONE # 919-732-3883

Hillsborough, NC 27278

AGENT/CONTACT: Jim Parker PHONE # 919-730-5741

A **SUMMARY INFORMATION**

PIN: 9884323275 & 9884319874

Orange County Tax Map N/A Block _____ Lot(s) _____ Twp _____ Total acreage: 41.97 acres

Zoning R-1 Total Lots 20 Bonus Units 0 Open Space 14.89 acres

Acreage in road right-of-way 2.92 acres, Linear feet in new roads 2,390, Public X Private N/A Class N/A

Adjacent zoning and land uses: R-1 Zoning; Residential Land Use

Water Supply: _____ Public (Provider: _____), _____ Community, or X Individual

Wastewater Disposal: _____ Public (Provider: _____), _____ Community, or X Individual

Fire District: Eno School District Orange County

B. **SUBMITTAL REQUIREMENTS**

- X Orange County Tax Map showing the location of the subject property
- X Stamped envelopes addressed to each property owner within 500 feet of the subject property
- X Application fee ($250.00 + $5.00/lot)
- X Twenty-five (25) copies of the Concept Plan and Site Analysis Map at a scale not less than 1"=200'
- --- Comparison of potential impacts of Conventional versus Flexible Development Plan (see reverse)

Applicants may submit a three-part Concept Plan including a Site Analysis Map, Conventional Subdivision Plan, and a Flexible Development Plan **OR** a combined Site Analysis and Flexible Development Plan. **Each Concept Plan submittal must include the following information:**

1. **GENERAL INFORMATION:** Each Site Analysis Map and Development Plan shall contain:
   - X Sketch vicinity map
   - X Plotted boundaries of the tract from deeds or recorded plats.
   - X Total acreage to be subdivided
   - --- Tax map, block, and lot number reference
   - X Name, address and telephone number of the subdivider the person responsible for the subdivision design
   - X Scale, north arrow, and date of plan preparation
   - X Subdivision name

2. **SITE ANALYSIS MAP** – *Refer to Section V-B.2. of the Subdivision Regulations*

   Primary Conservation Areas including:
   - X Ten-foot contours with slope analysis showing 7.5%-15% slopes and slopes > 15%
   - X Soil types from the USDA Soil Survey or a soils map prepared by a soil scientist
   - X Hydrology including drainage patterns, wetlands, streams, ponds, floodplains, etc.
   - X Identified natural areas, habitats, and wildlife corridors
   - X Historic and archaeological sites (National Register, Study List, local landmark, etc.)

   Secondary Conservation Areas including:
   - X Vegetation including open and wooded areas described by dominant species and age
   - X Current land use and land cover including pasture, cropland, structures, cemeteries, etc.
   - N/A Scenic views on site as well as from the site to off-site features
   - N/A Historic and archaeological sites

   Transportation and Utility Systems:
   - N/A Railroad and road rights-of-way
   - X Easements for roads and utilities
   - X Public and private water and sewer lines, storm drainage facilities

3. **CONVENTIONAL SUBDIVISION PLAN** In addition to General Information listed above, shall include:
____ Proposed street layout, travelway and right-of-way widths, connections to existing roads
N/A Proposed arrangement of the lots, including size and number
____ Location of soils suitable for individual septic systems

4. **FLEXIBLE DEVELOPMENT PLAN** In addition to General Information listed under Item #1 above,
X Proposed street layout, travelway and right-of-way widths, connections to existing roads
X Proposed arrangement of the lots, including size and number
X Location, type, and acreage of proposed open space, whether part of individual lots or in a separate lot dedicated to a homeowners association, or other public or private entity
X Preliminary soil suitability analyses for 50% of the proposed lots with soils map prepared in consultation with the Orange County Health Department

Density Bonuses Total bonus units proposed NONE units
Location: _____Transition Area (2.5 units/acre maximum density without rezoning)
(*check 1*) _____Utility Service Area, Utility Provider _____ (1.3 units/acre max)
_____Within ¾ mile of interstate, HOV, busway route (2.5 units/acre maximum)
_____Within half mile of transit station as shown on regional transit plan (5 units/acre max)
_____ Acres of open space over 33% located on site = 1 bonus unit/acre over 33%
_____ Acres of open space over 33% @ off-site location Tax Map Ref. _____, Zoning _____
_____acres Primary Conservation Area x 1 bonus unit/5 acres = _____ bonus units
_____acres Secondary Conservation Area in 2-ac. zoning district x 1 unit/2 ac.=___bonus units
_____acres Secondary Conservation Area in 1-ac. zoning district x 1 bonus unit/ac.=_____units
_____ % Units designated for affordable housing _____ on site or _____ off site (*see Article 6.28*)

5. **COMPARISON OF POTENTIAL IMPACTS FROM DEVELOPMENT OF CONCEPT PLAN**

	Conventional Subdivision	**versus**	**Flexible Development**
Linear feet of new roads	_____ linear feet		2,390 linear feet
Number of stream crossings	_____		0
Acres of farmland lost	_____ acres		0 acres
Habitat/Natural area lost	N/A acres		±20 acres
Acres of woodland lost	_____ acres		±15 acres
Wetlands destroyed	_____ acres		0 acres
Slopes > 15% disturbed	_____ acres		±0.1 acres
Historic/archaeological sites disturbed	_____ sites		0 sites
Visual change (circle 1)	significant / moderate / minimal		significant / moderate / minimal

I certify that to the best of my knowledge the information contained above, and in the supporting documents, is a factual representation of the proposed development. I acknowledge that by signing this application, the Orange County Planning and Inspections Department is authorized, pursuant to N.C. Gen. Stat. Section 153a-360, to make as many inspections of the subject property as may be necessary to verify that the proposed work outlined herein is consistent with the provisions of all applicable State and local laws, ordinances and regulations. By signing this application, I acknowledge and agree that inspectors, zoning officers, erosion control officers, and other staff of the Orange County Planning & Inspections Department have a right, upon presentation of proper credentials, to enter the subject property at any reasonable hour for the purposes of inspection or other enforcement action.

APPLICANT'S SIGNATURE	3/18/19 **DATE**	**OWNER'S SIGNATURE**	3/18/19 **DATE**

FEES: Amount _____ **Date Paid** _____ **Receipt #** _____

DUNCKLEE
& DUNHAM

ENVIRONMENTAL GEOLOGISTS & ENGINEERS
511 KEISLER DRIVE – SUITE 102
CARY, NORTH CAROLINA 27518
OFFICE: (919) 858–9898
WWW.DUNCKLEEDUNHAM.COM

MEMORANDUM

To:	Tim Smith
From:	Matt Flinchum WMF
CC:	Rick Leone; Rick Kolb
Date:	3/18/2019
Re:	Limited Review of Available Data

Mr. Parker,

Duncklee & Dunham is pleased to submit this summary in accordance with our *Proposal for Environmental Services* dated March 13, 2019. This proposal included a review of water-supply information in the Hillsborough area. Please feel free to contact Matt Flinchum at 919-858-9898 or matt@dunckleedunham.com if you have any questions.

Impacted Wells Identified Near the Subject Parcels

Based on a review of well-construction and water-quality information provided by the Orange County Health Department, groundwater in several water-supply wells southeast, south and southwest of the subject parcels has been adversely affected by chemical compounds that included tetrachloroethene (PCE) and trichloroethene (TCE). These compounds are typically associated with chlorinated solvents. The program ID for this release established by the North Carolina Department of Environmental Quality (NCDEQ) is NONCD0002203. This program ID can be entered into NCDEQ's Laserfiche portal to view the published reports and available data (https://deq.nc.gov/about/divisions/waste-management/waste-management-rules-data/e-documents). A table prepared by others that summarizes test results for samples collected from nearby water-supply wells is included in Attachment 1. The North Carolina Department of Environment and Natural Resources, now known as NCDEQ, conducted a soil-vapor and groundwater assessment in 2015. Some of the impacted water-supply wells associated with this release have been sampled on multiple occasions. The NCDEQ conducted Health Risk Assessments for some of these properties and determined that water from multiple nearby wells was not suitable for drinking and cooking. Additional investigation on this matter would be required to determine the current status of water quality in these impacted wells.

Geologic Map Review

The North Carolina Geological Survey published a geologic map of the Hillsborough 7.5-Minute Quadrangle in 2005 as open file Report 2005-02 (Attachment 2). Based on this map, the subject parcels are underlain by:

- mostly andesitic to dacitic lavas and tuffs of Poplar Ridge area,
- smaller portions of felsic tuffs west of Piney Grove, and
- joints reported to be oriented as N56°W that dip 80°NE and N41°E that dip 66°SE in the area of the subject parcels.

Based on a review of the topographic features in the area (Attachment 3), Duncklee & Dunham identified an unnamed intermittent stream that intersects the subject parcels and flows generally from east to west, beneath U.S. 70 and to the Occoneechee Golf Club.

Source Water Assessment Reports Review

Select available Source Water Assessment Program (SWAP) reports show two water-supply wells are located within approximately 1 mile from the subject parcels. Copies of the SWAP reports for these two wells are in Attachment 4. More details about these wells are presented below based on the SWAP reports included in Attachment 4.

- PWS ID 0368485: This well is identified as being a part of the Palmer's Grove UMC transient water system, is approximately ½ mile north northeast of the subject parcels, is of an unknown depth, and yields 50 gallons per minute.
- PWS ID 0368147: This well is approximately 1 mile north northwest of the subject parcels, is identified as a part of the Woodland Park community water system, is 700 feet deep and yields 4 gallons per minute.

Groundwater Protection Rules for Orange County Review

Duncklee & Dunham reviewed the Groundwater Protection Rules for Orange County (Attachment 5). In addition to other items, these rules include the following statements:

- The source of water for any water supply well shall not be from a water bearing zone or aquifer that is contaminated.
- If a well is constructed to obtain water from an unconsolidated rock formation, prior approval from the Orange County Health Department (OCHD) shall be required.

The rules specify yield tests shall be conducted by using the following methods:

- Pump Method: recording discharge rates and depth to water for a period of at least 1 hour.
- Air Rotary Method: record rate of water being injected into well, rate of water being discharged during drilling process, and the rate of discharge after drilling operations are complete for at least 30 minutes.
- Air Lift Method: record discharge rate and water levels for at least 1 hour.

Duncklee & Dunham did not identify minimum requirements for well yield to be considered a viable water supply well.

Orange County Health Department Well Records Review

Duncklee & Dunham contacted Joan Melton at the OCHD and requested well construction records for over 30 parcels located near the subject parcels. Copies of the documents OCHD provided are in Attachment 6. Copies of the documents provided by the OCHD that did not include well-construction information, based on our review, are in Attachment 7. A figure that summarizes the findings related to well construction, well yields, and most recent detections of contaminants associated with chlorinated solvents, based on the data available, is also included in Attachment 8.

Average Quantities of Water Used in an Average American Household

According to Wikipedia, in the United States, a nationwide compilation of these metered quantities by the United States Geological Survey (USGS) shows average domestic water deliveries (for both indoor and outdoor purposes) by public water suppliers to single-family and multifamily dwellings were about 89 gallons (337 liters) per person per day in 2010 and 83 gallons (314 liters) in 2015.
Link to source: https://en.wikipedia.org/wiki/Residential_water_use_in_the_U.S._and_Canada

An evaluation of groundwater use in North Carolina, published by the National Groundwater Association, indicates that this region had 4,360,000 households served by residential wells, with an average of 2.55 persons per household. Additionally, the USGS estimates the population of self-supplied water supply users in North Carolina to be 3,300,000. The NGWA states in this evaluation that groundwater usage for individual households totaled 231,000,000 gallons per day. Therefore, based on these assumptions, one can calculate that the average water usage for a self-supplied water-supply user in North Carolina to be approximately 50 to 70 gallons per day.
Link to source: https://www.ncgwa.org/contento/uploads/2016/08/Groundwater-Use-in-NC.pdf

Well yields in the Carolina Slate Belt, where the subject sites are located, range from 2 to 100 gallons per minute (gpm), with a median flow of 28 gpm.
Link to source: https://pubs.usgs.gov/ha/ha730/ch_g/jpeg/Gtab1.jpeg

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Attachment 1

Allen Ln Contaminated Wells - NONCD0002203

Sample Date	Sample By	Well ID#	No Detects (ND)	PCE 2L= 0.7 MCL= 5 RAL= 100	TCE 2L= 3 MCL= 5 RAL= 8	1,4-Dioxane 2L= 3 MCL= RAL= 611	Chloroform 2L= 70 MCL= 80 RAL= 100	1,1-DCA 2L= 6 MCL= RAL= 242	1,2-DCA 2L= 0.4 MCL= 5 RAL=	1,1-DCE 2L= 7 MCL= 7 RAL= 7	cis-1,2-DCE 2L= 70 MCL= 70 RAL=	Dibromochloroethane 2L= 0.4 MCL= RAL=	Xylenes (Total) 2L= 500 MCL= 10000 RAL= 10000	HRE Sent	Comments
11/25/2013	County				2.4										
6/10/2014	BAF				1.7									y	
7/17/2014	BAF				3.2									y	
10/29/2014	BAF				1.6										
3/5/2018	BAF				0.85										
10/27/2014	BAF		ND												
6/10/2014	BAF		ND												
3/5/2018	BAF		ND												
6/10/2014	BAF			5.3										y	
7/17/2014	BAF			4.2	1.3									y	
3/5/2018	BAF		ND												
6/10/2014	BAF														
6/10/2014	BAF		ND												
3/5/2018	BAF		ND												
6/10/2014	BAF		ND												
10/27/2014	BAF		ND												
6/10/2014	BAF												1.6	y	
6/10/2014	BAF		ND												
7/17/2014	BAF		ND												
1/16/2015	BAF		ND												
10/27/2014	BAF		ND												
10/27/2014	BAF		ND												
7/24/2014	BAF		ND												
10/27/2014	BAF			0.77											
10/27/2014	BAF			0.51											
10/27/2014	BAF		ND												
7/17/2014	BAF			0.91										y	
10/27/2014	BAF			1.3											
7/17/2014	BAF		ND												

Allen Ln Contaminated Wells - NONCD0002203

Sample Date	Sample By	Well ID#	No Detects (ND)	PCE 2L= 0.7 MCL= 5 RAL= 100	TCE 2L= 3 MCL= 5 RAL= 8	1,4-Dioxane 2L= 3 MCL= RAL= 611	Chloroform 2L= 70 MCL= 80 RAL= 100	1,1-DCA 2L= 6 MCL= RAL= 242	1,2-DCA 2L= 0.4 MCL= 5 RAL=	1,1-DCE 2L= 7 MCL= 7 RAL= 7	cis-1,2-DCE 2L= 70 MCL= 70 RAL=	Dibromochloroethane 2L= 0.4 MCL= RAL=	Xylenes (Total) 2L= 500 MCL= 10000 RAL= 10000	HRE Sent	Comments
7/17/2014	BAF				0.71										
1/16/2015	BAF				0.6										
1/16/2015	BAF			31	1.7			1.3			1.3	22			
4/24/2017	S&ME	Pre Filter		14.4	0.73						0.597				
4/24/2017	S&ME	Post GAC1	ND												
4/24/2017	S&ME	Post GAC2	ND												
10/27/2014	BAF		ND												
3/5/2018	BAF		ND												
10/27/2014	BAF		ND												
10/27/2014	BAF			22	1.3										
3/5/2018	BAF	Pre		8	0.53										
3/5/2018	BAF	Post	ND												
10/27/2014	BAF		ND												
3/5/2018	BAF		ND												
10/27/2014	BAF		ND												
3/5/2018	BAF	Pre	ND												
3/5/2018	BAF	Post	ND												
1/16/2015	BAF		ND												
3/5/2018	BAF		ND												

BOLD
BOLD
BOLD
BOLD
NOT BOLD

1,1-DCA = 1,1-Dichloroethane
1,1-DCE = 1,1-Dichloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
Chloromethane (AKA - Methyl Chloride)
PCE = Tetrachloroethene
TCE = Trichloroethene

item

Attachment 2

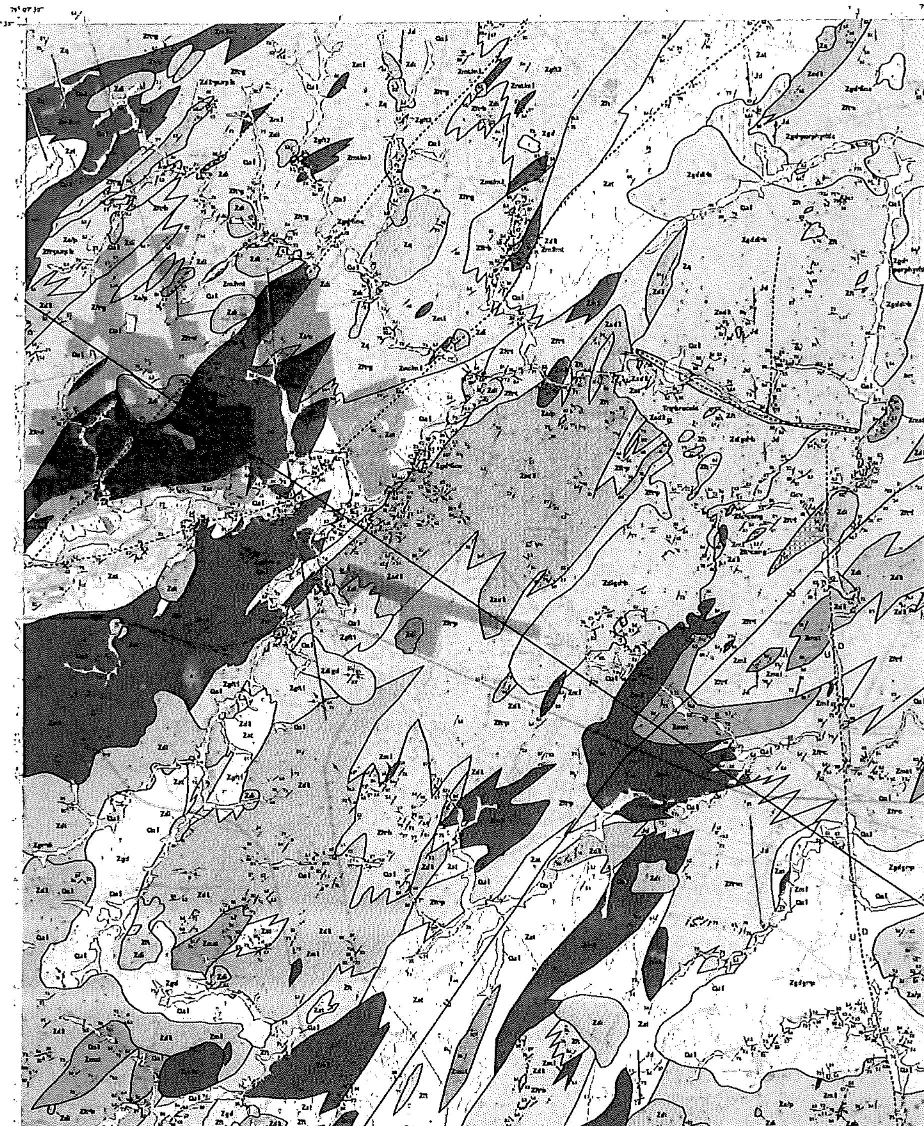
This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program

GEOLOGIC MAP OF THE HILLSBOROUGH 7.5-MINUTE QUADRANGLE, ORANGE COUNTY, NORTH CAROLINA

BY PHILIP J. BRADLEY AND NORMAN K. GAY

Digital representation by Michael A. Medina and Philip J. Bradley

2005



DESCRIPTION OF MAP UNITS

All pre-Mesozoic rocks of the Hillsborough quadrangle have been metamorphosed to at least the chlorite zone of the greenschist metamorphic facies. Many of the rocks display a weak to strong metamorphic foliation. Although subjected to metamorphism, the rocks retain relict igneous, pyroclastic, and sedimentary textures and structures that allow for the identification of protolith rocks. As such, the prefix "meta" is not included in the nomenclature of the pre-Mesozoic rocks described in the quadrangle.

The nomenclature of the International Union of Geological Sciences subcommission on igneous and volcanic rocks (IUGS) after Streckeisen (1973 and 1979) is used for classification and naming of the rocks. The classification and naming of the rocks is based on relict igneous textures, modal mineral assemblages, or normalized mineral assemblages when whole-rock geochemical data is available. Past workers in the Hillsborough quadrangle (Butler, 1964, Allen and Wilson, 1968, Sykes, 1976, Black, 1977, and Newton, 1983) have used various nomenclature systems for the igneous rocks. The raw data of these earlier workers was recalculated and plotted on ternary diagrams and classified based on IUGS nomenclature. Pyroclastic rock terminology follows that of Fisher and Schmincke (1984).

SEDIMENTARY UNITS

Qal — Qal • Alluvium: Unconsolidated clay, silt, sand and gravel to cobble-sized clasts, subrounded to angular, deposited in drainages.

Qcv — Qcv • Colluvium: Accumulations of angular cobbles and boulders.

INTRUSIVE AND META-INTRUSIVE UNITS

Jd — Jd • Olivine diabase: Black to greenish-black, fine to medium-grained, dense; consists primarily of plagioclase, augite, and olivine. Occurs as dikes up to 50 ft wide. Diabase typically occurs as spheroidally weathered boulders with a grayish-brown weathering rind. Red stations location indicates outcrop or boulders of diabase.

Zgd — Zgd • Granodiorite: Exhibits a variety of colors and textures ranging from grayish-white, fine- to medium-grained hornblende granodiorite; pinkish-white, medium-grained hornblende granodiorite; and gray, fine-grained granodiorite.

Zgdfine — Zgdfine • Fine-grained granodiorite: Light-gray to green; ranges from equigranular very fine-grained granodiorite to very fine-grained porphyritic granodiorite with plagioclase phenocrysts (1 mm to 4 mm). Black colored amphibole, when visible, occurs as phenocrysts (<1 mm to 1 mm) and as intergrowths with plagioclase; amphibole intergrowths distinguish rock from fine-grained tuffs.

Blackwater Creek Pluton (Newton, 1983)

Zgdd-b — Zgdd-b • Granodiorite and diorite: Composite pluton of dominantly medium-grained, hornblende granodiorite, lesser amounts of medium-grained hornblende diorite, fine-grained granodiorite, and diorite. Unit contains abundant xenoliths of volcanic rock and enclaves(?) of fine-grained granodiorite to diorite.

Zdigd-b — Zdigd-b • Diorite and granodiorite: Composite pluton of dominantly medium-grained hornblende diorite, lesser amounts of medium-grained hornblende granodiorite, fine-grained granodiorite, porphyritic diorite with plagioclase phenocrysts; minor amounts of porphyritic granodiorite with plagioclase phenocrysts, porphyritic granodiorite with potassium feldspar phenocrysts, and gabbro. Unit contains abundant xenoliths of volcanic rocks and enclaves(?) of fine-grained granodiorite to diorite.

Zgd porphyritic — Zgd porphyritic • Porphyritic granodiorite: Greenish-gray with a pinkish hue, amphibole-bearing, porphyritic granodiorite with plagioclase phenocrysts. Plagioclase phenocrysts are green from saussuritization and range from 2 to 8 mm in a matrix of very fine-grained quartz and alkali feldspar. Weathered surfaces exhibit a distinct strongly porphyritic texture. Porphyritic rhyolite of Newton (1983).

Zgdgrp — Zgdgrp • Granodiorite and granite of Piney Mountain Creek area: Composite pluton of dominantly medium-grained hornblende granodiorite with lesser amounts of medium-grained hornblende granite.

Zgrdi — Zgr-di • Granite to diorite: Composite pluton exhibiting a variety of rock types ranging from granite to diorite. Lithologies include grayish pink, medium- to coarse-grained granite; pinkish-white, medium-grained hornblende granodiorite; and dark-gray, fine- to coarse-grained diorite.

Zdi — Zdi • Diorite: Greenish-gray to gray, medium-grained, equigranular, hornblende diorite. Major minerals include plagioclase and hornblende. Greenish-white plagioclase crystals compose up to 50% of the rock and are typically sericitized and saussuritized.

Zdigd — Zdigd • Diorite and granodiorite: Small plutonic bodies of dominantly medium-grained hornblende diorite with lesser amounts of medium-grained hornblende granodiorite.

Zgb — Zgb • Gabbro: Fine-grained pyroxene gabbro dike.

METAVOLCANIC UNITS

Zelp — Zep • Mixed epiclastic-pyroclastic: Grayish-green to greenish-gray; tuffaceous, sandstones, siltstones and minor phyllite. The siltstones typically are weakly phyllitic. Unit contains lesser amounts of coarse tuff and lapilli tuff.

Zat — Zat • Altered tuffs: Very light-gray, light-greenish-gray to white, with red and yellow mottling; altered felsic tuffs. Alteration of felsic tuffs have produced sericite-quartz phyllite, pods of pyrophyllite, and quartz + pyrophyllite rock; all with common <1 mm to 2 mm diameter cubic pyrite aggregates and goethite-lined molds of pyrite crystals. Fine-grained porphyroblasts of chloritoid (<1 mm) and andalusite (up to 4 mm) are present in some pyrophyllite bearing rocks. Relict felsic clasts and kaolinitized feldspar crystal shards are visible in some outcrops. Relict structures are obliterated in heavily altered rocks. Mapped area contains boulders, up to several feet in diameter, and outcrops of massive milky quartz and quartzite-like rock. Occoneechee Mountain contains abundant white, beige, to reddish and tan, massive, sugary to porcelaneous very fine- to medium-grained quartzite-like rock. Quartzite-like rock is often mixed with micaceous sericite phyllite. The micaceous sericite phyllite gives the otherwise massive quartzite-like rock a foliation.

Zmat — Zmat • Matrix supported tuffs: Green-gray to green; weakly foliated to well foliated, matrix supported, polymictic lapilli tuffs and tuff breccias. Angular to subrounded, felsic fragments range from <1 mm up to 1 m diameter. Unit is interpreted as a resedimented syneruptive volcaniclastic deposit in which texturally unmodified volcaniclastic debris and extraclasts texturally more mature accidental clasts are incorporated into a rapidly re-sedimented package of sediment. May be emplaced via subaqueous mass flows, subaerial landslides and/or lahars. Outcrop in Few's Ford area of Eno River State Park has been interpreted as a lahar deposit (Allen and Wilson, 1968 and Rochester, 1976).

Zft — Zft • Felsic tuffs: Gray-green to green, massive to foliated coarse tuff and lapilli tuff. Locally plagioclase crystal-fragment-rich coarse tuffs are present.

Zftm — Zftm • Felsic tuffs west of Mt. Hermon Church: Grayish-green to greenish-gray; massive to foliated, thin to thickly layered fine to coarse tuff with lesser amounts of lapilli tuff. 1-5% accessory sulfide minerals commonly present. Outcrops and boulders typically display a white weathering rind.

Zftc — Zftc • Felsic tuffs of the Cellio quarry area: Greenish-gray, massive to strongly foliated, dense, plagioclase crystal-fragment-rich coarse tuffs. Strong foliation is interpreted to be result of primary volcanic welding and/or compaction. 1-5% accessory sulfide minerals commonly present. Outcrops and boulders typically display a white weathering rind.

Zftf — Zftf • Felsic tuffs of the Few's Ford area: Dominantly light-green to dark-green; massive to weakly foliated coarse tuffs. Interlayered with light-gray to gray, massive to weakly foliated lapilli tuff; a distinctive purple colored coarse tuff; polymict conglomerate (Zftfcong); and dark-gray to black, cryptocrystalline lava similar in appearance to the lavas present in the Zdlt unit. 1-5% accessory sulfide minerals commonly present.

Zftcong — Zftcong • Conglomerate interlayed in felsic tuffs of Few's Ford area (Zftf): Conglomerate composed of subrounded to rounded, polymictic clasts (up to 4 cm). Clast types include granodiorite and diorite, black, porphyritic lava with plagioclase phenocrysts, and fine to coarse tuff.

Zftp — Zftp • Felsic tuffs west of Piney Grove: Dominantly gray to green-gray; massive to weakly foliated; layered in places coarse tuff with lesser amounts of lapilli tuff. Minor interlayers of volcaniclastic sandstone and thinly bedded (possible burrowed?) siltstone are present. 1-5% accessory sulfide minerals commonly present especially near contact zone with the Blackwater Creek pluton.

Zftt — Zftt • Felsic tuffs east of Temple of Truth Church: Green to gray-green; massive to weakly foliated, layered in places coarse tuff with lesser amounts of lapilli tuff. Plagioclase crystal fragments compose 1-5% of typical sample.

Zfts — Zfts • Felsic tuffs at the St. Mary's Church area: Gray-green to gray, massive to weakly foliated coarse tuff with lesser amounts of lapilli tuff. Minor interlayers of very thinly bedded coarse tuff. Crystal fragments, when present, are dominantly plagioclase. Clast types include black, porphyritic lavas with plagioclase phenocrysts similar to the Zdlt lavas and gray fine tuff clasts.

Zftb — Zftb • Felsic tuffs of the Blackwood area: Green-gray to gray coarse tuff and lapilli tuff. Plagioclase crystals and crystal fragments are common. Lithic clast types includes dark-gray to black, magnetic, 1 to 70 mm, cryptocrystalline lava, or clasts of porphyritic lava with feldspar phenocrysts. Porphyritic clasts are identical to the porphyritic phases of unit Zdlt. Outcrops and thin sections show a prominent welding and/or compaction foliation with flattened-shaped clasts. Outcrops typically occur as very resistant fin-like outcrops.

Zftg — Zftg • Felsic tuffs of the Governor Burke's Grove area: Dominantly gray, greenish-gray, grayish-green; massive to strongly foliated, fine to coarse tuff and lapilli tuff. Plagioclase crystal fragment-rich coarse tuff and felsic lapilli tuff are common. Minor interlayers of strongly foliated muscovite sericite phyllite; welded/compacted lapilli tuffs with glassy eye-shaped quartz, and altered tuffs. Map scale interlayers of apparent epiclastic rocks (Zep) are present in unit.

Zftd — Zftd • Felsic tuffs of the Duke quarry area: Unit consists of massive to strongly foliated, greenish-gray to grayish-green, coarse plagioclase crystal tuff; light-green, welded, lapilli-bearing, plagioclase + quartz crystal tuff; greenish-gray to grayish-green, matrix supported lithic tuff; and gray microcrystalline ash tuff with pyrite. Minor lithologies include interlayers of amygdaloidal basalt, fine-grained mafic tuffs that have been altered to epidote-chlorite, and epiclastic rocks.

Zftpurple — Zftpurple • Purple felsic tuffs: Light-purplish-gray, reddish-light-purple, and gray; slaty cleavage parallel to bedding; matrix supported, polymictic lapilli tuff and tuff breccia. Interlayered with plagioclase- and quartz-crystal coarse tuff; welded tuff; quartz-crystal tuff; and slaty argillite. Lithic clast types include: angular, sericite-rich rock flattened parallel to the foliation; black, subangular to subrounded, porphyritic lava with plagioclase phenocrysts; and green, subangular, mafic tuff and/or lava. Plagioclase occurs in trace to minor amounts as angular fragments of crystals up to 3 mm in size. Welded phases of this unit contain flattened relict pumice fragments that are now altered to chert-like quartz.

Zgft1 — Zgft1 • Gray felsic tuffs of the Cates Creek area: Gray to dark-gray, massive to foliated fine to coarse tuff. Rare plagioclase crystal fragments are present. 5-10% accessory sulfide minerals commonly present. Rock is relatively featureless.

Zgft2 — Zgft2 • Gray felsic tuffs of the upper Little Creek area: Gray to light-greenish-gray, massive to foliated fine tuff. 1-5% accessory sulfide minerals commonly present.

Zq — Zq • Quartz bodies: White, beige, red, and tan; sugary to porcelaneous, very fine- to medium-grained quartzite-like rock. Outcrops are usually massive. Quartzite-like rock is occasionally mixed with sericite and/or pyrophyllite. The addition of sericite and/or pyrophyllite gives the otherwise massive quartzite-like rock a foliation. Pyrite is present as cubic crystals and empty cubic molds of crystals (up to 12 mm). Map areas contain boulders (up to several feet in diameter) and outcrops of white colored massive quartz.

Zdlt — Zdlt • Dacitic lavas and tuffs: Distinctive dark-gray to black; siliceous; cryptocrystalline lava, porphyritic lava with plagioclase phenocrysts, and flow banded dacitic lavas. Interlayered with gray to black welded and non-welded coarse tuff and lapilli tuff. Tuffs often contain black-colored fiamme, up to 13 cm, interpreted as flattened pumice. Clast types include black, cryptocrystalline lava and porphyritic lava with plagioclase phenocrysts. Differentiation between lavas and massive tuffs is difficult in hand sample in most cases. The lavas are interpreted to have been coherent magmas that were extrusive or very shallow intrusions associated with dacitic domes. Tuff interlayers are interpreted as epiclastic pyroclastic flow deposits and air fall tuffs generated during eruption of domes.

Zdlpurple — Zdlpurple • Dacitic lavas with distinctive purple color: Reddish-light-purple to lilac-colored, massive, microcrystalline to cryptocrystalline, porphyritic dacitic lava with plagioclase phenocrysts.

Zadlt — Zadlt • Andesitic to dacitic lavas and tuffs of Poplar Ridge area: Distinctive black; siliceous; massive, cryptocrystalline lava, porphyritic lava with plagioclase phenocrysts (up to 4 mm), and flow banded lava with local amygdules. Interlayered with the lavas are gray to black, welded and non-welded, coarse tuff, lapilli tuff, and tuff breccia. Tuffs range from massive to strongly welded tuff with flattened-shaped clasts up to 15 cm. Clast types include black cryptocrystalline lava and porphyritic lava with plagioclase phenocrysts. The lavas and tuffs are very resistant to weathering and typically have a whitish-gray weathering rind. Differentiation between lava and massive tuff is difficult in hand sample in most cases. The lavas are interpreted to have been coherent magmas that were extrusive or very shallow intrusions associated with dacitic to andesitic domes. Tuffs are interpreted as epiclastic pyroclastic flow deposits and air fall tuffs generated during eruption of domes.

Zml — Zml • Mafic lavas: Green, gray-green, black; amygdaloidal basalt, porphyritic basalt with plagioclase phenocrysts, and microcrystalline basalts. Interlayered with coarse plagioclase crystal tuff and coarse amphibole crystal tuff. Basalts are interpreted to be lava flows or shallow intrusives. The tuffs are fine-grained and contain plagioclase crystal fragments, commonly altered to epidote, and amphibole crystals as 1-2 mm prismatic crystal fragments.

Zmlc — Zmlc • Mafic lava of the Currie Hill area: Distinctive very dark-gray to black; very fine-grained, magnetic; mafic lava(?). In thin section the rock is composed of a very fine matrix of plagioclase laths and apparent relict amygdules infilled with epidote and quartz.

Zmlm — Zmlm • Mafic lava and tuffs: Dominantly very dark-gray, greenish-gray, black; massive, andesitic to basaltic, microcrystalline lava, amygdaloidal lava, and porphyritic lava with plagioclase phenocrysts. This unit contains minor plagioclase crystal-fragment coarse tuffs and amphibole crystal-fragment coarse tuffs. Interpreted pillow structures are present in some mafic lavas.

Zmtml — Zmtml • Mafic tuffs and lavas: Dominantly dark-green, greenish-gray, grayish-green; massive to foliated fine and coarse tuffs of andesitic(?) to basaltic(?) composition. Unit includes crystal-tuffs, fine tuffs, matrix supported, plagioclase- and amphibole-crystal-fragment coarse tuff, and crystal-lithic lapilli tuffs. Clasts are subangular up to 5 mm and dark green. Minor thin mafic lava flows with relict amygdules and interpreted pillow structures are present in unit.

FAULT ROCKS

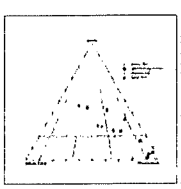
Trqbreccia — Trqbreccia • Quartz breccia: White, massive to brecciated, vuggy quartz. Typically contains angular clasts of altered volcanic rock suspended in a quartz matrix. Some zones exhibit a lacey pattern of intersecting quartz veins with a matrix of altered wall rock.

0.5 0 0.5 1 1.5 Miles
2,000 0 2,000 4,000 6,000 Feet
375 0 375 750 1,125 1,500 Meters

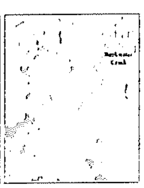
1:24,000 SCALE
CONTOUR INTERVAL 10 FEET
Base topographic map is digital raster graphic image of the Hillsborough 7.5-minute USGS quadrangle (1981)
North Carolina State Plane NAD 83 meters coordinate system

Research supported by the U.S. Geological Survey, National Cooperative Geologic Mapping Program, under USGS award number [illegible]. The views and conclusions contained in this document are those of the authors and should not be interpreted as necessarily representing the official policies, either expressed or implied, of the U.S. Government.

Disclaimer:
[illegible]

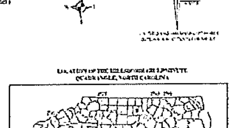


QAP PLOT OF NORMALIZED WHOLE ROCK ANALYSES OF PAST WORKERS



DISTRIBUTION OF PRE-MESOZOIC PLUTONIC ROCKS AND INFORMAL PLUTON NAMES

LOCATION OF THE HILLSBOROUGH 7.5-MINUTE QUADRANGLE, NORTH CAROLINA



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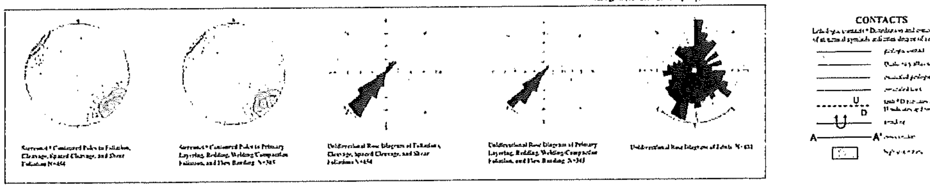
STRUCTURAL SYMBOLS

[illegible]

CONTACTS

[illegible]

U
D
A —— A'



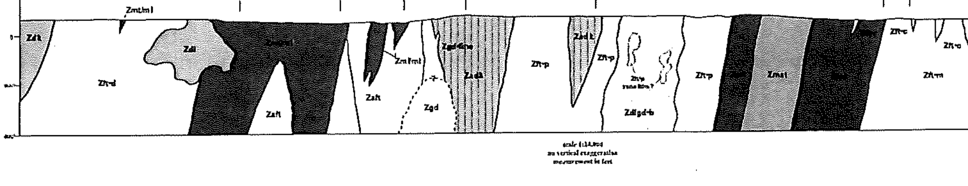
Stereonet • Contoured Poles to Foliation, Cleavage, Spaced Cleavage, and Shear Foliation N=454

Stereonet • Contoured Poles to Primary Layering, Bedding, Welding Compaction Foliation, and Flow Banding N=343

Unidirectional Rose Diagram of Foliation, Cleavage, Spaced Cleavage, and Shear Foliation N=454

Unidirectional Rose Diagram of Primary Layering, Bedding, Welding/Compaction Foliation, and Flow Banding N=343

Unidirectional Rose Diagram of Joints N=431

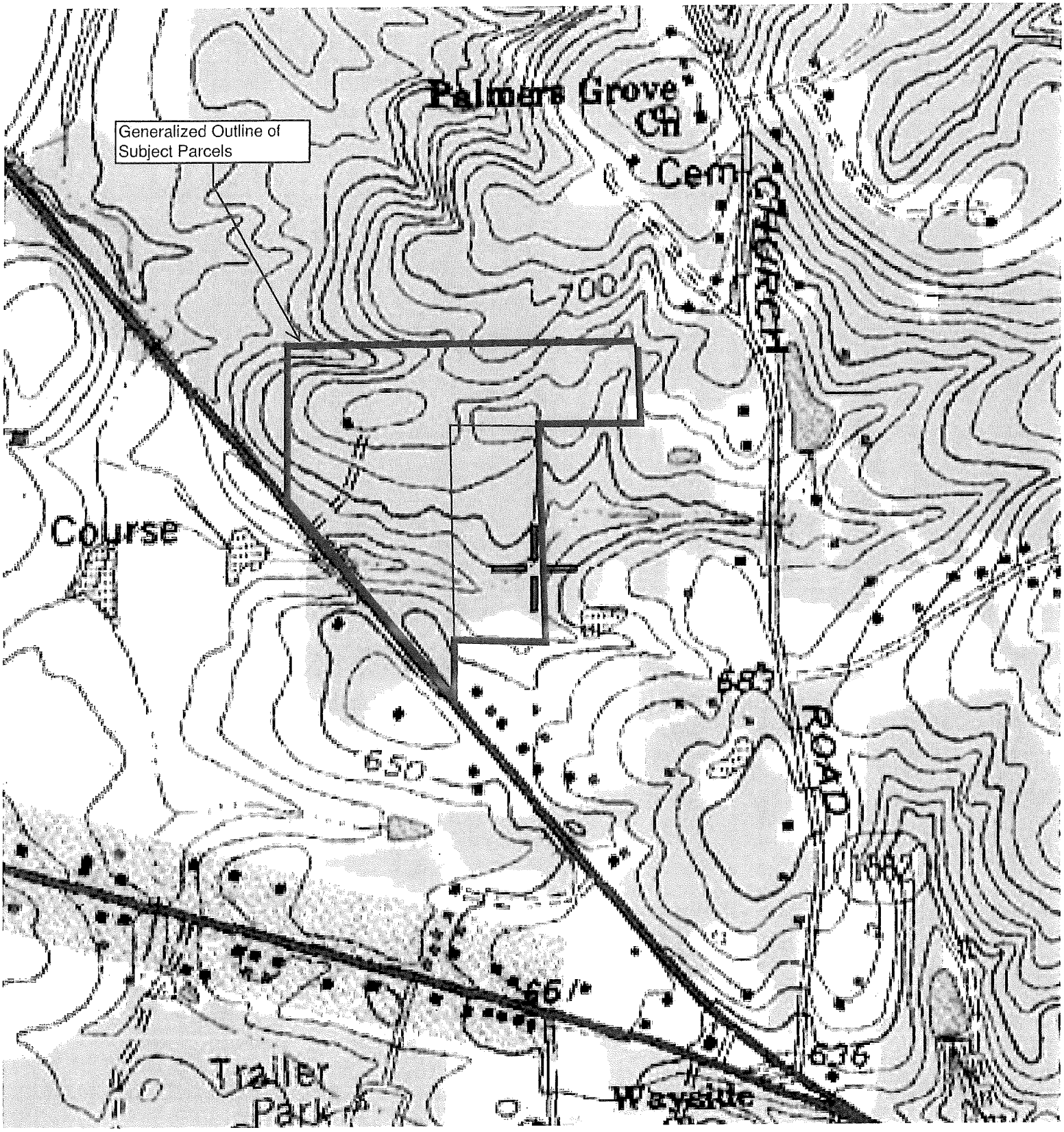


scale 1:24,000
no vertical exaggeration
measurement in feet

References for Map

Allen, E.P., and Wilson, W.F., 1968, Geology and mineral resources of Orange County, North Carolina, Division of Mineral Resources, North Carolina Department of Conservation and Development, Bulletin 81, 58 p.
Butler, J.R., 1964, Chemical analyses of rocks of the Carolina Slate belt, Southeastern Geology, v. 5, p. 101-112.
Black, W.W., 1977, The geochronology and geochemistry of the Carolina Slate belt of north-central North Carolina, Ph.D. thesis, University of North Carolina, Chapel Hill, 118 p.
Fisher, R.V. and Schmincke, H.-U., 1984, Pyroclastic rocks, Berlin, West Germany, Springer-Verlag, 472 p.
Newton, M.C., 1983, A late Precambrian resurgent caldera in the Carolina slate belt of North Carolina, U.S.A., M.S. thesis, Virginia Polytechnic Institute and State University, 54 p.
Rochester, L.L., 1976, A geologic investigation of the Carr Ford [Few's Ford] area, Orange County, North Carolina, unpublished Senior Thesis, University of North Carolina, Chapel Hill, 31 p.
Streckeisen, A.L., 1973, Plutonic rocks: Classification and nomenclature recommended by the IUGS subcommission on the systematics of Igneous rocks, Geotimes, v. 18, p. 26-31.
Streckeisen, A.L., 1979, Classification and nomenclature of volcanic rocks, lamprophyres, carbonatites, and melilitic: Recommendations and suggestions of the IUGS subcommission on the systematics of Igneous rocks, Geology, v. 7, p. 331-335.
Sykes, M.L., 1976, Pyrophyllite genesis in the Carolina slate belt: A study of the Hillsborough, North Carolina deposit, M.S. thesis, University of North Carolina, Chapel Hill, 52 p.

Attachment 3


Generalized Outline of Subject Parcels
Palmers Grove
Ch
Cem
CHURCH
700
Course
683
ROAD
650
661
636
Trailer Park
Wayside

Attachment 4

Source Water Assessment Program Report
for
WOODLAND PARK

Community Water System

Introduction: What is a Source Water Assessment?

The North Carolina Division of Water Resources, Public Water Supply (PWS) Section is responsible for implementing the Source Water Assessment Program (SWAP) and completing assessments for all public drinking water supplies in the state. The 1996 amendments to the Safe Drinking Water Act provided federal support and required states to conduct assessments of all public water systems. A source water assessment is a qualitative evaluation of the potential of a drinking water source to become contaminated by the identified potential contaminant sources (PCS) within the delineated area. In North Carolina there are more than 10,000 public water supply sources that were assessed by the state. The PWS Section has gathered information for each water supply and developed a process for completing the assessments. This process is summarized in the next few pages and detailed in Section 6 of this report.

This report provides a summary of the results for the **Source Water Assessment** for your drinking water source(s).

What is the Source of Your Drinking Water?

Everyone wants clean, safe drinking water and we assume this natural resource will always be available to us. However, drinking water wells can be threatened by many potential contaminant sources, including underground storage tanks for gasoline, permitted waste disposal sites, storm water runoff or improper handling of hazardous materials. Your drinking water source(s) is listed in Table 1. Protecting your water from becoming contaminated is a wise investment in public health and your community's future.

Table 1. Public Water Supply System Information

System Name	WOODLAND PARK
City	CHAPEL HILL
PWS ID	03-68-147
Source Name	WELL #1

Assessment Report Contents

This assessment report includes the following sections:

Section 1: Assessment Area Delineation

Section 2: Potential Contaminant Source Inventory and Map

Section 3: What is a Susceptibility Rating?

Section 4: Reviewing Your SWAP Results

Section 5: List of Maps, Tables and Figures for Your Well(s)

Section 6: North Carolina's SWAP Approach

Section 1: Assessment Area Delineation

The area delineated for your well(s) for the purpose of this assessment is the contributing area for the well(s). When a well is pumped, it begins to influence groundwater that is flowing through the subsurface and towards the well. The pumping of the well creates a contributing area around the well that supplies water to the well. This is the area through which contaminants, if released to the environment, can be reasonably expected to move through the ground and reach the well.

Section 2: Potential Contaminant Source Inventory and Map

The potential contaminant source inventory map shows the delineated area for your well(s). This is the area where potential contaminant sources, if released to the environment, could reasonably be expected to be a risk or a potential for contamination of your drinking water supply. A PCS in this assessment report is a facility or site regulated under a state or federal regulatory program. These facilities are identified in electronic databases that contain location information for each facility. Only databases that include information statewide were used for this source water assessment. Included in this report are:

1) A table of any PCS identified within the delineated assessment area; and
2) A map of the delineated assessment area showing PCSs, roads, jurisdictional boundaries and other pertinent information.

It is important to note that the PCSs identified in this report are only potential sources of contamination to your drinking water source. Environmental contamination is not likely to occur if harmful contaminants are managed properly.

Section 3: What is a Susceptibility Rating?

In North Carolina the susceptibility of any drinking water source is based on two components, a contaminant rating and an inherent vulnerability rating. Your well(s) was assigned a qualitative susceptibility rating of higher, moderate or lower based on the results of the contaminant rating and inherent vulnerability rating process as described in the following paragraphs.

Susceptibility Rating

The final susceptibility rating for your well(s) is determined by combining the contaminant rating and the inherent vulnerability rating. More detailed information on the susceptibility rating process can be found in Section 6 of this report

Contaminant Rating

The contaminant rating for your well(s) was determined based on the number and location of PCSs within the delineated area. Each PCS identified within the delineated area was assigned a risk rating of higher, moderate or lower. If a PCS is a facility regulated in an existing environmental program, it will receive a risk rating of higher. The number of PCSs that occur within the delineated area was determined and a contaminant rating of higher, moderate, or lower was assigned to your well(s).

Inherent Vulnerability Rating

The inherent vulnerability rating of your well(s) refers to the geologic characteristics or existing conditions of the well and its delineated assessment area. These characteristics include aquifer rating, unsaturated zone rating and well integrity/well construction rating. The aquifer rating is an assessment of the water transmitting characteristics of the aquifer. The unsaturated zone rating is an assessment of the likelihood that contaminants from surface and shallow sources will follow the path of aquifer recharge and reach the water table. The well integrity/construction rating is an assessment of the quality of the construction of the well. An inherent vulnerability rating of higher, moderate or lower was assigned to your well(s).

Table 2. SWAP Results Summary

Source Name	Inherent Vulnerability Rating	Contaminant Rating	Susceptibility Rating
WELL #1	Moderate	Lower	Moderate

It is important to understand that a susceptibility rating of higher does not imply poor water quality. Susceptibility is an indication of a water supply's potential to become contaminated by the identified PCSs within the assessment area.

Table 3. Well Information

Source Name	Well Yield (Gallons/Min)	Well Depth (Feet)
WELL #1	4	700

Section 4: Reviewing Your SWAP Results

Please review the information on your well(s) provided in this report. If you believe any of this information is incorrect please contact the Public Water Supply Section by e-mail at the following address: SWAP@ncdenr.gov. Or you may submit comments to us at:

SWAP
Public Water Supply Section
1634 Mail Service Center
Raleigh, NC 27699-1634

Or you may contact the Source Water Assessment staff by phone at 919-707-9098.

Chandler Soil Corporation

Septic and Well use in Fairway Hills

2715 US 70, Hillsborough, Orange County, NC

3/18/2019

During May through July of 2018, Chandler Soil Corporation evaluated the site and soil conditions for a 40+ acre plot of land at 2715 US 70, Hillsborough, Orange County, NC. The evaluation was conducted to determine the suitability of the soils for septic systems. We evaluated the soils suitability in accordance with the NC "Laws and Rules for Sewage Treatment and Disposal Systems" 15A NCAC 18A. 1900, and the Orange County addition to those rules—along with the 15A NCAC 2T.0600 regulations for "Waste Not Discharged to Surface Waters". We guarantee our work was performed to professional standards.

A little background:
Septic Systems have been around for approximately 150 years. This type of waste disposal along with the use of wells, keeps the use of water contained to the land. The well provides the water for the house, and the septic tank and drain field provide the cleaning up of the used water.

Phase one of Treatment
The principal is that the waste from the house (effluent) enters a septic tank, settling of the solids takes place and the first phase of treatment to clean up the watery waste gets underway. In this first phase, the microbes present, begin to consume the waste. These microbes, called anaerobes, do their specialized work without oxygen. The septic tank is just such a place.

Phase two of Treatment
The next phase begins when the anaerobic treated effluent, moves to the drain field, usually by gravity, but sometimes a pump is needed, depending on where the drain field lies in relation to the house. This drain field is what we are looking for when we do our investigations. This second phase of treatment requires that the effluent be cleaned by microbes that live in the presence of oxygen. They are called aerobes. Aerobic treatment is the fastest and most complete treatment the effluent can receive in the soil. In addition, some disease-causing germs cannot survive in aerobic conditions since oxygen kills them.

The Soil Scientist Role
We began our search by boring holes over the landscape. We bored over 165 holes on this acreage, about every 100 feet, to understand the soils on this lot. We looked for certain soil characteristics, that the rules and regulations require. These requirements ensure that the drain field will provide the

environment for the aerobic microbes to grow and consume the waste in the effluent. The water then returns to the ground water, cleaned, filtered, and ready to use again.

What soil characteristics do we look for? We want the soil to be bright in color, and the structure (the way the soil particles are stuck together) to be rounded and to have pathways throughout it so that the aerobes can attach themselves while consuming the waste in the effluent. We want the soil to be deep, to provide more area for the aerobes work. We check to makes sure that the uncleaned effluent does not meet any water table before its cleaned. All these soil requirements are stated in the rules and regulations.

Initial and Repair Areas

For additional insurance, every subsurface septic system in North Carolina requires an Initial area and a Repair area. The Initial area is used to install the septic system in the ground. The Repair area is used in case the Initial area fails at some point. The repair area must remain undisturbed for use, if ever the initial should fail.

Failure

In a failing septic system the effluent surfaces to the ground and may create pools. Failure can be the result of improper use of the system. Many people do not know that the health of the septic system depends on what is flushed down the toilet. Flushing objects other that human waste and toilet paper can be very problematic. Woman's hygiene products, baby wipes and diapers, prescription antibiotics and other prescriptions, grease, oil, Q-tips, cotton balls, are among items not suitable for wastes for this system. We have suggested that the Home Owners Association have an operation and maintenance contract to keep the systems in good working order.

Failures can also occur due to improper installation of the system, and improper understanding of the soil, and the landscape challenges. Since we began this business in 1994, we have witnessed only one failure of a system that we originally sited. The failure occurred when the drain field was installed in very wet conditions. To fix it, we suggested they wait for a drier time to work on the field, then till the soil to break up the compaction that occurred and re-install the system. Once this fix was completed, the system worked without issue.

Fairview Hills Proposal for use of Prefabricated Permeable Block Panel System

The proposal for Fairview Hills is to develop 20 lots. On each lot the owner will have a well and a septic system. The septic system we suggested is a Prefabricated, Permeable Block Panel System (PPBPS), because the soil is deep and well drained. It requires at least 34 inches of soil, and the trench features more access to the sidewalls of the trench. This extra side wall provides more surface area for the effluent and aerobes to interact. Because of this sidewall increase, the length of the trench can be shortened, and therefore only half of the trench length is needed compared to a simple gravel trench.

Remaining work to be completed.

We have further work to do on each lot. We will insure each lot has adequate space for the initial and repair area. We will also dig backhoe pits to examine the soil more in depth. The pits will show us what the sidewall material looks like in its natural state. If we find any reason to modify the system to fit the soil characteristics, we will make those modifications.

Additional testing might be required to ensure that the Long-Term Acceptance Rate (LTAR) of the soil is correct. The LTAR is assigned by matching the soils and site conditions with rates that the rules and regulations have established. If necessary, we would conduct a Hydraulic Conductivity Test, which describes how fast water moves through the soil. Once the results are obtained, it may be necessary to adjust the size of the field; increasing the size if our results show a slower rate of movement, or decreasing the size of the field if the results support a higher rate of movement.

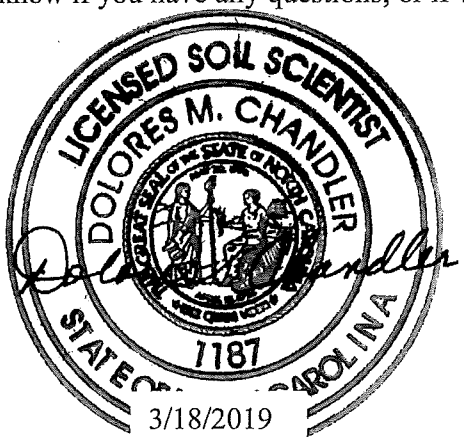
Also, we suggest, that before the installation of the drain field the soil should be checked for conditions that would compromise a good installation.

Thank you for your time. Please contact us to let us know if you have any questions, or if we can be of further assistance.

Sincerely,

Dolores M Chandler

Dolores Chandler
North Carolina Licensed Soil Scientist #1187



APPLICATION FOR ENVIRONMENTAL ASSESSMENT

Project Name Occoneechee Hills Subdivision - Class A SUP

Applicant Old NC 86 Partners, LLC
504 Meadowlands Drive
Hillsborough, NC 27278

Phone 919-730-5741

Owner Beth Porter and Thomas Bradford
Address 11810 Wakehurst Drive
North Chesterfield,VA

Phone

Location of Property 2715 US 70 E, Hillsborough, NC 27278

Acreage 41.97 acres **Township** Eno

Tax Map Reference **PIN(s)** 9884323275 & 9884319874

FOR DEPARTMENT USE ONLY

Date received **Reviewed by**

Date accepted/rejected

Summary Comments:

I. GENERAL SITE INFORMATION

TO BE COMPLETED BY APPLICANT, WITH ASSISTANCE FROM PLANNING DEPARTMENT AS NEEDED

A. Zoning and use of adjacent property.

North R-1; Residential South R-1; Residential

East R-1; Residential West R-1; Golf Course

B. Topography

Highest Elevation 677

Lowest Elevation 616

General direction of slope Primarily north to south

Estimated % of property with

0 – 5% slope _____

5 – 15% slope _____

15 – 25% slope _____

more than 25% slope _____

(Required only for the portion of the site associated with or impacted by the proposed activity)

C. Drainage

Are there any streams or drainage easements located on the property? Yes

Is any of the site located within a:

Watersupply Watershed Lower Eno Protected

Water Quality Critical Area N/A

Floodplain None

Describe _____

D. Does the property contain any of the following Inventory of Natural or Cultural Resources? (As identified in the "Inventory of Sites of Cultural, Historical, Recreational, Biological, and Geological Significance in the Unincorporated Portions of Orange County" or the "Inventory of Natural Areas and Wildlife Habitats of Orange County, North Carolina".)

		Yes	No
a.	cemeteries	____	X
b.	archaeological sites	____	X
c.	historic sites	____	X
d.	areas of geological significance	____	X
e.	designated natural areas	____	X
f.	designated habitat	____	X
g.	other	____	X

For each "yes" answer above, please indicate the location on site plan and complete the following, with the assistance of the Orange County Environmental Planner. Also complete Attachment A.

(1) Type of resource _____

Inventory reference no. or page _____

Description of Resource _____

_____

_____

_____

(2) Type of resource _____

Inventory reference no. or page _____

Description of Resource _____

_____

_____

_____

(Attach additional sheets if needed)

II. TO BE COMPLETED BY APPLICANT

A. PROJECT DESCRIPTION

1. Describe proposed use of property:

   Proposed 27-lot cluster subdivision with paved streets and individual well and septic sites. Lots will be served by paved streets with no curb and gutter.

2. Number of lots: 27
3. Number of structures: 27 proposed single family dwellings
4. Estimated square footage of area to be graded for development of attached residential units (excluding roads, but including parking areas) Not applicable
5. Estimated square footage of area to be graded for non-residential use (excluding roads) Not applicable
6. Estimated area to be graded for roads _____
7. Road Type: Public X Private
   Class A _____
   Class B _____
   Total road length 2,300 lf
8. Hours of operation for commercial or industrial use:
   N/A

B. STATE PERMITS REQUIRED

1. **Does the project involve the mining of earth products?** No
If so, how many cubic feet of material are expected to be excavated? _____

Has an application for a Mining Permit been submitted to NCDRCD? _____

Please attach map indicating expected extent of proposed activity.

2. **Does the project involve generation or storage of hazardous or toxic wastes, as identified by the Environmental Protection Agency?** (A listing of all hazardous materials is available from the Planning Department)

Describe the wastes to be generated. Household waste only

How much material is expected to be generated per month?

Will any material be treated onsite? _____
Volume? _____
Will any material be stored onside? _____
Volume? _____

Where will disposal of the material take place?

How will materials be transported to the disposal site?

What measures are proposed to protect water quality and air quality in case of spills?

3. **Will the project involve a land application system for treatment of wastewater?** No

If yes, describe _____

_____

Has an application for a non-discharge permit been submitted to the NC Department of Environmental Management or Orange County Department of Environmental Health?

4. **Is a septic tank system proposed which as a design capacity of more than 3000 gallons per day?** No

If yes, describe _____

_____

Has an application for a non-discharge permit been submitted to the NC Department of Environmental Management or Orange County Department of Environmental Health?

5. **Does the activity involve sludge disposal?** No

If yes, where is the source of the sludge? _____

_____

Describe where and how the sludge is being disposed.

_____

_____

Has a NPDES permit from the NC Division of Environmental Management been issued? _____

6. **Water Usage** (120 gal/bdrm/day x 4 bdrms = 480 gal/day/lot)

a. Estimated no. of employees N/A x 25 gpd = _____ gpd
b. Estimated water use for climate control = None gpd
c. Process water

_____ % consumed
_____ % discharged to septic system
_____ % discharged to surface (including storm sewers) (describe: _____)
_____ % evaporated
_____ % reclaimed/reused
_____ % other
100%

d. Water used for cooling, heating, etc., in association with production or manufacturing N/A

_____ % reused
_____ % consumed
_____ % discharged
(describe: _____)

100%

480 gpd/lot
Total Water Usage

e. Describe source of water

Individual wells

ATTACHEMENT A
TO BE COMPLETED ONLY IF INVENTORY SITES ARE IDENTIFIED IN I.E.

(ATTACH ADITIONAL SHEETS IF NECESSARY)

(1) a. Impact on Resource from Proposed Development

_____
_____
_____

b. Proposed Mitigation

_____
_____
_____

(2) a. Impact on Resource from Proposed Development

_____
_____
_____

b. Proposed Mitigation

_____
_____
_____

Trip Generation Summary

Alternative: Alternative 1
Phase:
Project: Hills at Occoneechee

Open Date: 11/16/2018
Analysis Date: 11/16/2018

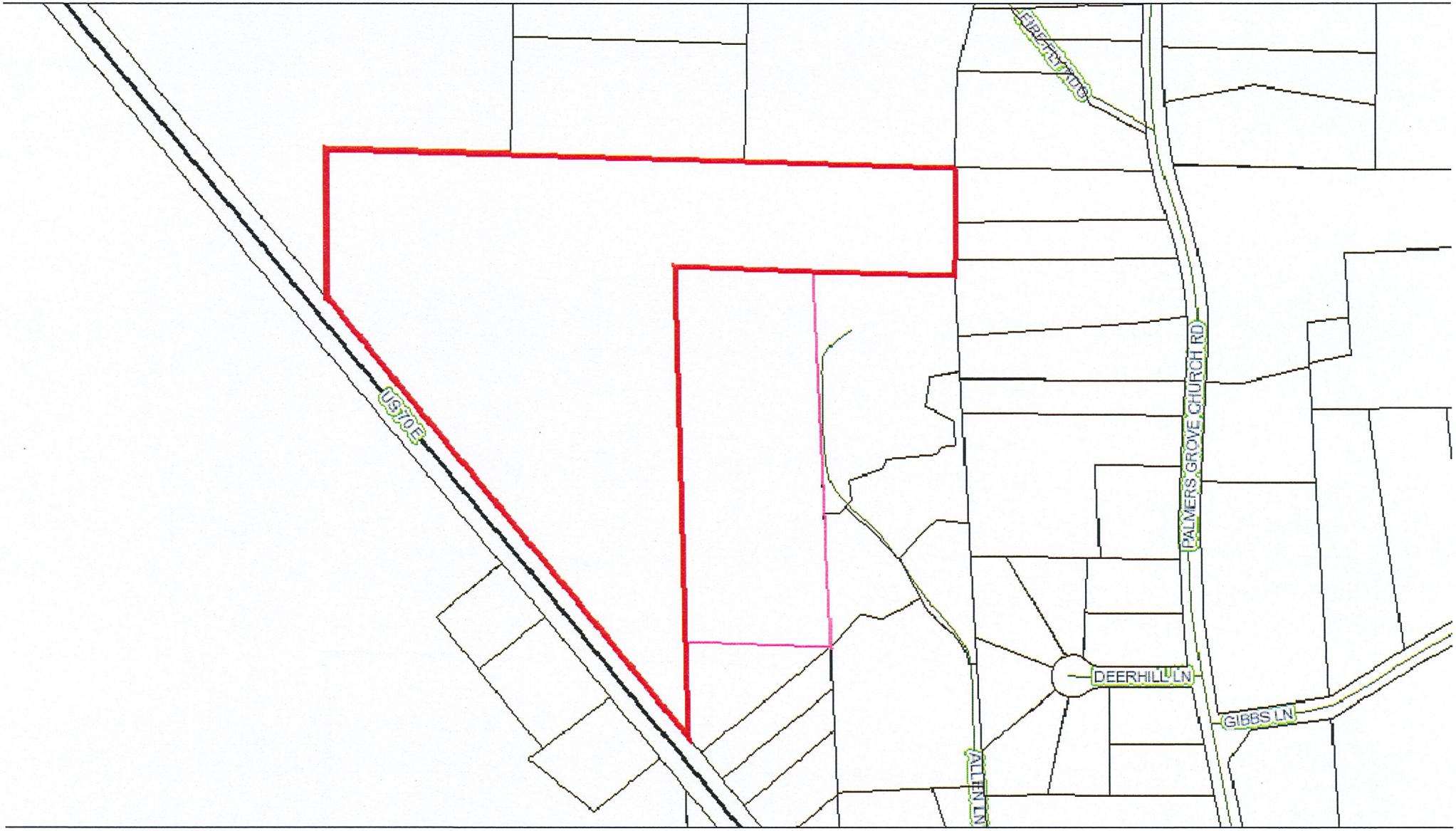
ITE	Land Use		Weekday Average Daily Trips			Weekday AM Peak Hour of Adjacent Street Traffic			Weekday PM Peak Hour of Adjacent Street Traffic		
		*	Enter	Exit	Total	Enter	Exit	Total	Enter	Exit	Total
210	SFHOUSE 1		156	156	312	6	18	24	18	11	29
	27 Dwelling Units										
Unadjusted Volume			156	156	312	6	18	24	18	11	29
Internal Capture Trips			0	0	0	0	0	0	0	0	0
Pass-By Trips			0	0	0	0	0	0	0	0	0
Volume Added to Adjacent Streets			156	156	312	6	18	24	18	11	29

Total Weekday Average Daily Trips Internal Capture = 0 Percent
Total Weekday AM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent
Total Weekday PM Peak Hour of Adjacent Street Traffic Internal Capture = 0 Percent

* - Custom rate used for selected time period.

Source: Institute of Transportation Engineers, Trip Generation Manual 10th Edition

Occoneechee Hills Subdivision



November 18, 2018

This map contains parcels prepared for the inventory of real property within Orange County, and is compiled from recorded deed, plats, and other public records and data.
Users of this map are hereby notified that the aforementioned public primary information sources should be consulted for verification of the information contained on this map.
The county and its mapping companies assume no legal responsibility for the information on this map.

PIN: 9884323275

OWNER 1: PORTER BETH M ETAL
OWNER 2: BRADFORD THOMASIN M
ADDRESS 1: 11810 WAKEHURST DR
ADDRESS 2:
CITY: NORTH CHESTERFIELD
STATE, ZIP: VA 23236
LEGAL DESC: A ROGER L MARSHALL P71/24

SIZE: 31.6 A
DEED REF:
RATECODE: 00
TOWNSHIP ENO
BLDG SQFT: 2286
YEAR BUILT: 1956

BUILDING COUNT: 1
LAND VALUE: $33,848
BLDG_VALUE: $214,700
USE VALUE: $183,872
TOTAL VALUE: $248,548
DATE SOLD: 11/2/2016
TAX STAMPS:

1:4,800
0 0.04 0.08 0.16 mi
0 0.05 0.1 0.2 km

ORANGE COUNTY
NORTH CAROLINA

DROOG	ROBERTUS B	26 WEDGEWOOD RD	CHAPEL HILL	NC	27514
MICOL	GIOVANNI ETAL	4926 HILLSBOROUGH RD	DURHAM	NC	27705
OCCONEECHEE LAND CO	LLC	P O BOX 759	HILLSBOROUGH	NC	27278
DUBOSE	JOHN MCNEELY	1020 LAWRENCE RD	HILLSBOROUGH	NC	27278
RAY	JAMES P	PO BOX 759	HILLSBOROUGH	NC	27278
CHEEK	CAROLYN T	3001 US 70 E	HILLSBOROUGH	NC	27278
MEDINA VIRAMONTES	REFUGIO	2901 US 70 E	HILLSBOROUGH	NC	27278
YOUNG	KARLA NEEMS	2707 US 70 E	HILLSBOROUGH	NC	27278
RAY	JAMES P	P O BOX 759	HILLSBOROUGH	NC	27278
RAY	JAMES P	P O BOX 759	HILLSBOROUGH	NC	27278
CARTER	JAMES DAVID ETAL	2818 US 70E	HILLSBOROUGH	NC	27278
PORTER	BETH M ETAL	11810 WAKEHURST DR	NORTH CHESTERFIELD	VA	23236
PORTER	BETH M ETAL	11810 WAKEHURST DR	NORTH CHESTERFIELD	VA	23236
MCLEOD	MICHAEL	1801 NEWKIRK RD	WILMINGTON	NC	28409
COOK	KENNETH K	626 FIRE FLY RIDGE	HILLSBOROUGH	NC	27278
TAYLOR	KENNETH S	3007 US 70 E	HILLSBOROUGH	NC	27278
CARTER	JAMES L	2818 US 70E	HILLSBOROUGH	NC	27278
COOK	KEVIN GENE	3005 US 70E	HILLSBOROUGH	NC	27278
ALLEN	CLARA	2902 US 70E	HILLSBOROUGH	NC	27278
CARTER	JAMES L	2818 US 70E	HILLSBOROUGH	NC	27278
HUSKETT	MARIE C	2126 DOUBLE OAK DR	HILLSBOROUGH	NC	27278
CARTER	JAMES L	2818 US 70E	HILLSBOROUGH	NC	27278
CAMPBELL	MICHELLE A	3000 US HWY 70 E	HILLSBOROUGH	NC	27278
ROE	DALE C	2816 US 70 E	HILLSBOROUGH	NC	27278
CARTER	JAMES LINDSEY	2818 US 70 E	HILLSBOROUGH	NC	27278
CARTER	JAMES L	2818 US 70E	HILLSBOROUGH	NC	27278
CARTER	JAMES L	2818 US 70E	HILLSBOROUGH	NC	27278
CARTER	JAMES L	2818 US 70E	HILLSBOROUGH	NC	27278
LOMAN	PAUL R II	2408 LANNIE DR	HILLSBOROUGH	NC	27278
CARTER	JAMES L	2818 US 70E	HILLSBOROUGH	NC	27278
TEJADA	SILVESTRE B	3100 DEER HILL LN	HILLSBOROUGH	NC	27278
BROCKWELL	ROY L	3104 DEERHILL LN	HILLSBOROUGH	NC	27278
SIMMONS	JAMES M	1519 PALMERS GROVE RD	HILLSBOROUGH	NC	27278
CARTER	JAMES L	2818 US 70E	HILLSBOROUGH	NC	27278
KOVACS	STEVE	1500 ALLEN LN	HILLSBOROUGH	NC	27278
KELLY	VICTORIA H	1405 PALMER GROVE CH RD	HILLSBOROUGH	NC	27278
KELLY	VICTORIA H	1405 PALMERS GROVE CH RD	HILLSBOROUGH	NC	27278
LOCKHART	ZELDA	P O BOX 1432	HILLSBOROUGH	NC	27278
NOE	PAUL D	1315 PALMERS GROVE CHURCH RD	HILLSBOROUGH	NC	27278
MCLEOD	MICHAEL	1801 NEWKIRK RD	WILMINGTON	NC	28409
MCLEOD	MICHAEL	1801 NEWKIRK RD	WILMINGTON	NC	28409
BERLAND	KELSAY S TRUSTEE	525 FIREFLY RIDGE	Hillsborough	NC	27278
POOLE	JOHN K JR	1303 PALMERS GROVE CH RD	HILLSBOROUGH	NC	27278
BAKER	RONNIE F	716 HARLEY DAVIDSON LANE	MEBANE	NC	27302
POOLE	JOHN K JR	1303 PALMERS GROVE RD	HILLSBOROUGH	NC	27278
PALMERS	GROVE UNITED	1211 PALMERS' GROVE CHURCH RD	HILLSBOROUGH	NC	27278
MERRITT	CARLTON WILLIAM	PO BOX 962	HILLSBOROUGH	NC	27278
EDELMAN	ERICA J	1527 PALMERS GROVE CHURCH RD	HILLSBOROUGH	NC	27278
SIMMONS	JAMES M	1519 PALMERS GROVE CH RD	HILLSBOROUGH	NC	27278
KEARNS	DONALD RAY	1528 PALMERS GROVE CH RD	HILLSBOROUGH	NC	27278
KEARNS	MATTHEW V	1510 PALMERS GROVE CH RD	Hillsborough	NC	27278
BAILEY	JOHNNY E	1505 PALMERS GROVE CHURCH RD	HILLSBOROUGH	NC	27278
ANDERSON	JONATHAN B	1501 PALMERS GROVE CH RD	Hillsborough	NC	27278
VECCIA	JUDY O	5690 HIGHWAY 60E	HENDERSON	KY	42420
CARTER	JAMES LARRY	PALMERS GROVE RD #1322	HILLSBOROUGH	NC	27278
DEBLANC	STEVEN R	1402 PALMERS GROVE CHURCH RD	HILLSBOROUGH	NC	27278
BAKER	RONNIE F	716 HARLEY DAVIDSON LANE	MEBANE	NC	27302
MANN	CYNTHIA BRITT	1413 AINSWORTH BLVD	HILLSBOROUGH	NC	27278
SYKES	KENNETH CHARLES	1316 PALMERS GROVE CH RD	HILLSBOROUGH	NC	27278
GROSS	AMY PROPER	1310 PALMERS GROVE CH RD	HILLSBOROUGH	NC	27278