OPERATIONS & MAINTENANCE PLAN

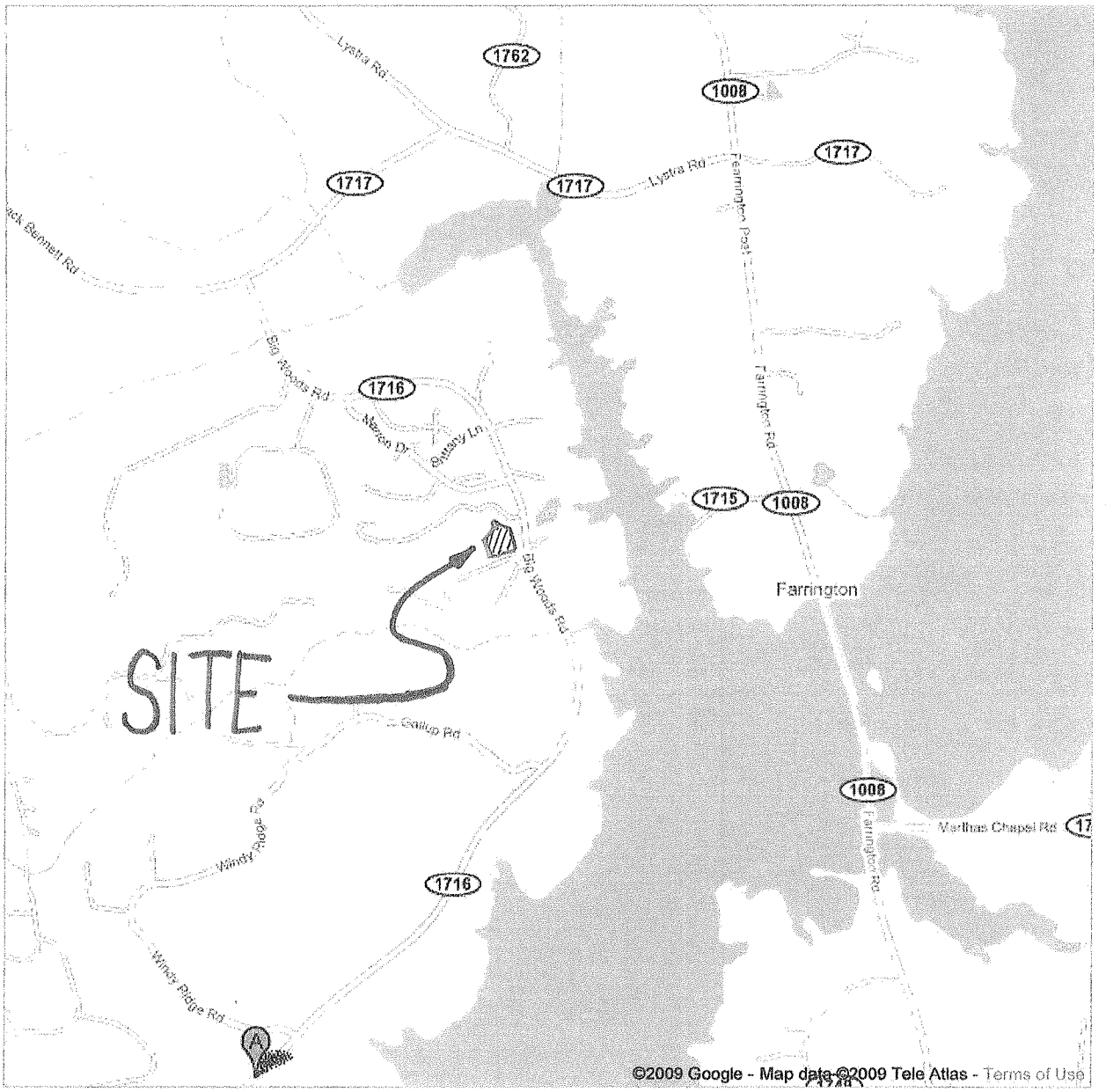
FOR

STONE LANDFILL EXPANSION

Date: September 3, 2009

JOHN W. HARRIS, P.E.
CONSULTING ENGINEER, Inc.
5112 Bur Oak Circle
RALEIGH, N.C. 27612
(919) 789-0744

Google maps Address **Big Woods Rd**
Chapel Hill, NC 27517



GENERAL INFORMATION

Stone Landfill Expansion is a proposed 2 acre expansion of an existing 2 acre LCID Landfill. The Landfill Expansion is located +/- 6000 LF southeast of the intersection of Jack Bennett Road and Big Woods Road. Stone Landfill Expansion is located in Chatham County. The owner of the site is Alan Stone of Stone Excavation, Inc., 348 Bush Creek Lane, Chapel Hill, NC 27517. Alan Stone is also the operator of Stone Landfill. The Engineer for the project is John W. Harris, P.E. Consulting Engineer, Inc., 5112 Bur Oak Circle, Raleigh, NC 27612, (919)789-0744. The Surveyor for the project is Smith and Smith Surveyors, P.O. Box 457, Apex, NC 27502, (919)362-7111.

OPERATIONS PLAN

WASTE MANAGEMENT

Alan Stone Landfill expects to receive anywhere between 50-100 tons of waste material daily. Waste accepted is limited to the following; stumps, brush, land debris, rock, dirt, asphalt and concrete. Waste shall be restricted to the smallest area possible and compacted as densely as possible before covering. Prior to dumping, the operator shall verify that the waste is acceptable for the facility.

Solid waste shall not be disposed of in water.

Open burning of solid waste is prohibited.

EXPLOSIVE GASES

The concentration of explosive gases generated by the facility shall not exceed:

-Twenty Five percent of the lower explosive limit for the gases in facility structures.

- The lower explosive limit for the gases at the property boundary.

CLEAN FILL AND COVER

Appropriate clean fill cover shall be applied monthly, or when the active dumping area reaches one acre in size, whichever occurs first.

120 Calendar days after completion of any phase of disposal operations, or upon revocation of a permit, the disposal area shall be covered with a minimum of one foot of suitable soil cover sloped to allow surface water runoff in a controlled manner.

Provisions for a ground cover sufficient to restrain erosion must be accomplished within 30 working days or 120 calendar days upon completion of any phase of landfill development.

EQUIPMENT

Equipment used on site will include excavators and bulldozers.

SECURITY

The site is fully surrounded by the owner's property, which is heavily wooded. The main gate will also remain cabled and locked while the landfill is not in operation.

TRAFFIC AND SIGNS

Incoming traffic will use the main (only) entrance and room will be made available for the carrier to circle or turn to exit after the waste is dumped. A sign will be posted at the entrance to direct the truck traffic and advise as to what types of waste are and are not allowed to be placed in this facility. Additionally, a sign will be posted to indicate the operational hours as well as the emergency contact number and the permit number.

EQUIPMENT OPERATORS

A qualified operator shall be on duty at this facility at all times while it is open. His responsibilities shall be, but are not limited to the following; assist in the placement of the waste, direct the incoming traffic, compact the waste, measure waste lift, place soil cap, etc.

EROSION & STORMWATER DEVICE

Stormwater will be handled by a detention and settling pond located at the lowest point of the facility. This basin will capture all surface water run-off and allow sediments to settle prior to release. All surface water will be diverted from the working face and shall not be impounded over waste.

RECORDKEEPING

All records, including site plans, operational manuals, permits, a daily log of who dumps on site, as well as daily dump tickets shall be keep on-site with the operator. The proposed construction modifications require an Erosion and Sedimentation Control Permit. A sedimentation and erosion control plan is required by Chatham County. And the permit will be kept on site. Sediment and erosion control is already in effect, silt fences and sediment basins already in place due to existing property.

FIRE PROTECTION

Fire safety precautions shall include the access of fire extinguishers, and water, as well as the safe storage of fuel and inflammables used in the maintenance and operation of the equipment.

MAINTENANCE PLAN

ROAD

Entrance road will be graveled and maintained monthly for weather conditions.

EQUIPMENT

The breakdown of equipment shall be handled by the owner. Additional mechanical pieces will be kept on site, no shut down of the facility will be necessary.

SEDIMENT BASIN

Inspect skimmer sediment basins at least weekly and after each significant (one-half inch or greater) rainfall event and repair immediately. Remove sediment and restore the basin to its original dimensions when sediment accumulates to one-half the height of the first baffle. Pull the skimmer to one side so that the sediment underneath it can be excavated. Excavate the sediment from the entire basin, not just around the skimmer of the first cell. Make sure vegetation growing in the bottom of the basin does not hold down the skimmer.

Repair the baffles if they are damaged. Re-anchor the baffles if water is flowing underneath or around them.

If the skimmer is clogged with trash and there is water in the basin, usually jerking on the rope will make the skimmer bob up and down and dislodge the debris and restore flow. If this does not work, pull the skimmer over to the side of the basin and remove the debris. Also check the orifice inside the skimmer to see if it is clogged; if so remove the debris.

If the skimmer arm or barrel pipe is clogged, the orifice can be removed and the obstruction cleared with at plumber's snake or by flushing with water. Be sure and replace the orifice before repositioning the skimmer.

Check the fabric lined spillway for damage and make any required repairs with fabric that spans the full width of the spillway. Check the embankment, spillways, and outlet for erosion damage, and inspect the embankment for piping and settlement. Make all necessary repairs immediately. Remove all trash and other debris from the skimmer and pool areas.

Freezing weather can result in ice forming in the basin. Some special precautions should be taken in the winter to prevent the skimmer from plugging with ice.

SEEDING

Reseed and mulch areas where seeding emergence is poor, or where erosion occurs, as soon as possible. Do not mow. Protect from traffic as much as possible. Generally, a stand of vegetation cannot be determined to be fully established until soil cover has been maintained for one full year from planting. Inspect seeded areas for failure and make necessary repairs and reseedings within the same season, if possible. Reseeding- if a stand has inadequate cover, re-evaluate choice of plant materials and quantities of lime and fertilizer. Re-establish the stand after seedbed preparation or over-seed the stand. Consider seeding temporary, annual species if the time of year is not appropriate for permanent seeding.

GRADING

Periodically check all graded areas and the supporting erosion and sedimentation control practices, especially after heavy rainfalls. Promptly remove all sediment from diversions and other water-disposal practices. If washouts or breaks occur, repair them immediately. Prompt maintenance of small eroded areas before they become significant gullies is an essential part of an effective erosion and sedimentation control plan.

BAFFLES

Inspect baffles at least once a week and after each rainfall. Make any required repairs immediately.

Be sure to maintain access to the baffles. Should the fabric of a baffle collapse, tear, decompose, or become ineffective, replace it promptly.

Remove sediment deposits when it reaches half full to provide adequate storage volume for the next rain and to reduce pressure on the baffles. Take care to avoid damaging the baffles during cleanout. Sediment depth should never exceed half the design storage depth.

After the contributing drainage area has been properly stabilized, remove all baffle materials and unstable sediment deposits, bring the area to grade, and stabilize it.

SILT FENCE

Inspect sediment fences at least once a week and after each rainfall. Make any required repairs immediately.

Should the fabric of a sediment fence collapse, tear, decompose or become ineffective, replace it promptly. Replace burlap every 60 days.

Remove sediment deposits as necessary to provide adequate storage volume for the next rain and to reduce pressure on the fence. Take care to avoid undermining the fence during clean out.

Remove all fencing materials and unstable sediment deposits and bring the area to grade and stabilize it after the contributing drainage area has been properly stabilized.

CONSTRUCTION ENTRANCE

Maintain the gravel pad in a condition to prevent mud or sediment from leaving the construction site. This may require periodic top dressing with 2-inch stone.

After each rainfall, inspect any structure used to trap sediment and clean it out as necessary. Immediately remove all objectionable materials spilled, washed, or tracked onto public roadways.

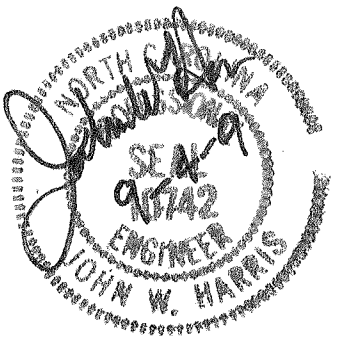
DESIGN REPORT & CALCULATIONS

FOR

STONE LANDFILL EXPANSION

CHATHAM COUNTY

DATE: September 3, 2009



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GENERAL INFORMATION

Alan Stone is the owner of Stone Landfill Expansion, which is an LCID Landfill located off of Big Woods Rd. in Chatham County. The expansion consists of 2.00 Acres being added onto an already existing 2.00 Acre Landfill.

The engineer for this project is John W. Harris, P.E. Consulting Engineers, Inc. 5112 Bur Oak Circle, Raleigh, NC 27612. All survey information was obtained from Smith and Smith Surveyors, P.O. Box 457, Apex, NC 27502.

There are no current existing structures on site, nor are there any existing utilities on site. Impervious areas are also not found on site. Stormwater currently drains from the middle of the site off to the east and west respectively.

There are two different types of soil on site, GoE (Goldston-Badin Complex) and NaC (Nanford-Badin Complex). GoE is generally located on 15-35 percent slopes, and the NaC is generally located on 6-10 percent slopes.

There are no proposed buildings, asphalt or concrete roads, impervious surfaces, or parking locations on site.

Along with no buildings or roads, there are also no proposed utilities on site.

All stormwater will be contained in a permanent, on site sediment basin. The basin will be used to capture all surface water run-off and allow sediments to settle prior to the release of the water.

Erosion control measures include the permanent sediment basin on site and temporary silt fencing lining the north and south ends of the proposed LCID waste dumping location.

The limits of disturbance surround all areas where land disturbing activity will take place. This includes not only the permanent sediment basin, but also the landfill expansion itself.

PROJECT NARRATIVE

Alan Stone Landfill is a 4.00 Acre site located off of Big Woods Rd. in Chatham County. This landfill is a Land Clearing and Inert Debris Landfill (LCID Landfill). Acceptable materials include the following; stumps, tree limbs, grass, untreated wood, unpainted concrete and concrete block, bricks, unpainted asphalt, and uncontaminated soil.

The proposed landfill is an expansion to the existing Alan Stone Landfill. The additional landfill material will be placed alongside the existing landfill in four (4) separate phases, and then covered with one (1) foot of clean fill from the stock pile area on site. All waste and clean fill will be placed at a 3:1 slope, with a slope liner placed on top of everything at a 3:1 slope or less.

Three (3) test pits were dug in the location where the proposed landfill expansion will be placed in order to ensure groundwater was not present. This procedure was done to ensure the Seasonal High Water Table was not within four (4) feet of the proposed landfill location.

Stormwater will be handled by a detention and settling pond located at the lowest point of the facility. This basin will capture all surface water run-off and allow sediments to settle prior to release. The Basin shall be inspected after each rainfall event and at a minimum of weekly with repairs performed immediately if needed. Silt fencing is used around the site to ensure sediment coming from the proposed 3:1 slopes does not make its way off site.

All traffic entering and exiting the site will cross over a temporary 50' x 25' Construction Entrance.

SITING CRITERIA

Alan Stone Landfill is located off of Big Woods Rd. in Chatham County. The landfill is 4.00 Acres in size, and will accept trash from the LCID (Land Clearing and Inert Debris) Category. Some things accepted at an LCID Landfill include stumps, tree limbs, grass, untreated wood, unpainted concrete and concrete block, bricks, unpainted asphalt, and uncontaminated soil. All siting criteria for Chatham County LCID Landfills have been met.

The facility is not located within the 100-year floodplain, nor does it cause or contribute to the taking of any endangered or threatened species of plants, fish, or wildlife. The facility does not result in the destruction of the critical habitat of endangered or threatened species as identified in 50 CFR Part 17. The facility does not damage or destroy any archeological or historical sites.

The facility does not cause an adverse impact on a state park, recreation or scenic area, or any other lands included in the state nature and historic preserve. The facility is also not located in any wetland as defined in the Clean Water Act, Section 404(b). Suitable soils will be stockpiled on site in order to provide adequate cover for the burial of LCID debris.

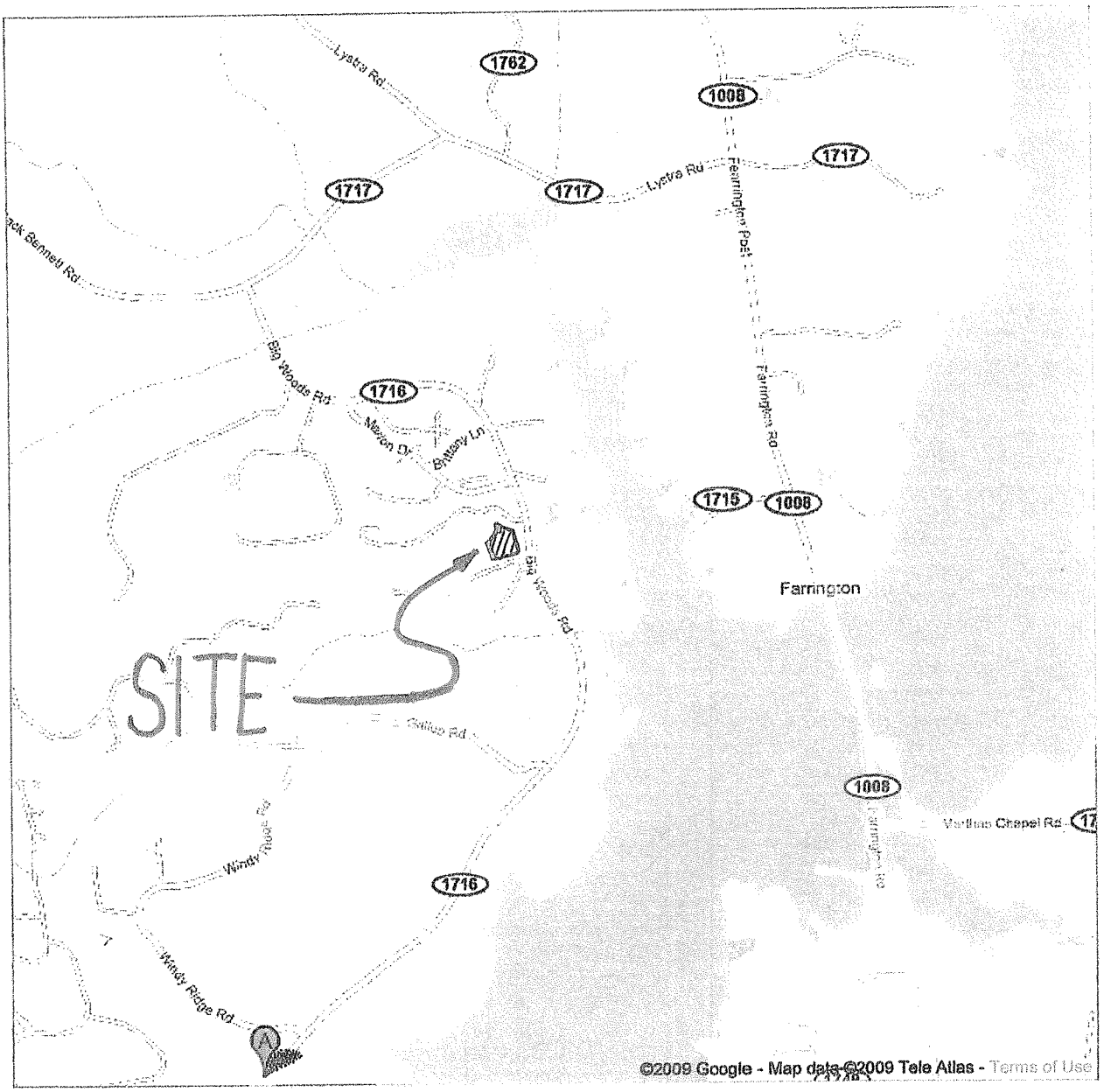
This facility does not cause a discharge of pollutants into waters of the state that are in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES), UNDER Section 402 of the Clean Water Act. The facility does not cause a discharge of dredged materials of fill material into waters of the state that are in violation of the requirements under Section 404 of the Clean Water Act. The facility does not cause non-point source pollution of waters of the state that violates assigned water quality standards. All waste in the landfill will be placed a minimum distance of four (4) feet above the Seasonal High Water Table elevation.

The facility meets the requirement of keeping all waste boundaries at least 50 feet from all surface waters. The facility also meets the requirement of keeping all waste boundaries at least 100 feet from property lines, residential dwellings, commercial or public buildings and wells.

This facility meets all requirements of any applicable zoning ordinance in Chatham County.

VICINITY MAP

Google maps Address **Big Woods Rd**
Chapel Hill, NC 27517



HYDROLOGY CHARTS

Table 8.03a
Value of Runoff Coefficient (C) for Rational Formula

Land Use	C
Business:	
Downtown areas	0.70-0.95
Neighborhood areas	0.50-0.70
Residential:	
Single-family areas	0.30-0.50
Multi units, detached	0.40-0.60
Multi units, attached	0.60-0.75
Suburban	0.25-0.40
Industrial:	
Light areas	0.50-0.80
Heavy areas	0.60-0.90
Parks, cemeteries	0.10-0.25
Playgrounds	0.20-0.35
Railroad yard areas	0.20-0.40
Unimproved areas	0.10-0.30
Streets:	
Asphalt	0.70-0.95
Concrete	0.80-0.95
Brick	0.70-0.85
Drives and walks	0.75-0.85
Roofs	0.75-0.95

Land Use	C
Lawns:	
Sandy soil, flat, 2%	0.05-0.10
Sandy soil, ave., 2-7%	0.10-0.15
Sandy soil, steep, 7%	0.15-0.20
Heavy soil, flat, 2%	0.13-0.17
Heavy soil, ave., 2-7%	0.18-0.22
Heavy soil, steep, 7%	0.25-0.35
Agricultural land:	
Bare packed soil	
Smooth	0.30-0.60
Rough	0.20-0.50
Cultivated rows	
Heavy soil no crop	0.30-0.60
Heavy soil with crop	0.20-0.50
Sandy soil no crop	0.20-0.40
Sandy soil with crop	0.10-0.25
Pasture	
Heavy soil	0.15-0.45
Sandy soil	0.05-0.25
Woodlands	0.05-0.25

NOTE: The designer must use judgment to select the appropriate C value within the range for the appropriate land use. Generally, larger areas with permeable soils, flat slopes, and dense vegetation should have lowest C values. Smaller areas with slowly permeable soils, steep slopes, and sparse vegetation should be assigned highest C values.

Source: American Society of Civil Engineers

Small lots; 1/4 - 15,000 SF
use 0.50
Large lots; 1/2-2 Acs
use 0.30 or 0.35

with heavy understory; use 0.05
with no underbrush; use 0.25

* Grassed: refer to Lawns 0.1 to 0.55 ≈ 0.20
Wooded: 0.15
roofs: 0.75
Asphalt: 0.70
Walks: 0.75
Gravel: 0.55

The overland flow portion of flow time may be determined from Figure 8.03a. The flow time (in minutes) in the channel can be estimated by calculating the average velocity in feet per minute and dividing the length (in feet) by the average velocity.

Step 4. Determine the rainfall intensity, frequency, and duration (Figures 8.03b through 8.03g—source: North Carolina State Highway Commission; Jan. 1973). Select the chart for the locality closest to your location. Enter the "duration" axis of the chart with the calculated time of concentration, Tc. Move vertically until you intersect the curve of the appropriate design storm, then move horizontally to read the rainfall intensity factor, I, in inches per hour.

Step 5. Determine peak discharge, Q (ft^3/sec), by multiplying the previously determined factors using the rational formula (*Sample Problem 8.03a*).

Raleigh, North Carolina 35.8706N 78.7764W

ARI* (years)	5 min.	10 min.	15 min.	30 min.	60 min.	120 min.	3 hr.	6 hr.	12 hr.	24 hr.
2	5.58	4.46	3.74	2.59	1.62	0.94	0.66	0.40	0.24	0.14
10	7.03	5.66	4.78	3.46	2.25	1.33	0.95	0.58	0.34	0.021
25	7.78	6.19	5.24	3.88	2.58	1.54	1.11	0.68	0.41	0.24
100	8.64	6.89	5.78	4.43	3.05	1.85	1.36	0.84	0.51	0.30

Fayetteville, North Carolina 35.0528N 78.8583W

ARI* (years)	5 min.	10 min.	15 min.	30 min.	60 min.	120 min.	3 hr.	6 hr.	12 hr.	24 hr.
2	6.11	4.88	4.09	2.83	1.77	1.04	0.74	0.44	0.26	0.15
10	7.96	6.36	5.36	3.88	2.53	1.54	1.10	0.66	0.39	0.23
25	8.94	7.13	6.02	4.46	2.97	1.83	1.32	0.80	0.47	0.28
100	10.44	8.29	6.99	5.35	3.69	2.29	1.69	1.03	0.62	0.36

Wilmington, North Carolina 34.2685N 77.9031W

ARI* (years)	5 min.	10 min.	15 min.	30 min.	60 min.	120 min.	3 hr.	6 hr.	12 hr.	24 hr.
2	7.39	5.92	4.98	3.42	2.15	1.28	0.91	0.56	0.33	0.19
10	9.70	7.75	6.54	4.74	3.06	1.94	1.39	0.87	0.51	0.30
25	10.98	8.75	7.40	5.48	3.65	2.38	1.73	1.08	0.64	0.38
100	12.92	10.27	8.65	6.63	4.56	3.18	2.37	1.49	0.89	0.53

Washington, North Carolina 35.5333N 77.0167W

ARI* (years)	5 min.	10 min.	15 min.	30 min.	60 min.	120 min.	3 hr.	6 hr.	12 hr.	24 hr.
2	6.41	5.12	4.29	2.96	1.86	1.10	0.78	0.47	0.27	0.16
10	8.38	6.70	5.65	4.00	2.68	1.64	1.19	0.72	0.42	0.25
25	9.48	7.55	6.38	4.73	3.15	1.99	1.46	0.88	0.52	0.31
100	11.16	8.87	7.47	5.72	3.94	2.58	1.93	1.16	0.70	0.42

Morehead Airport, North Carolina 34.9167N 76.7000W

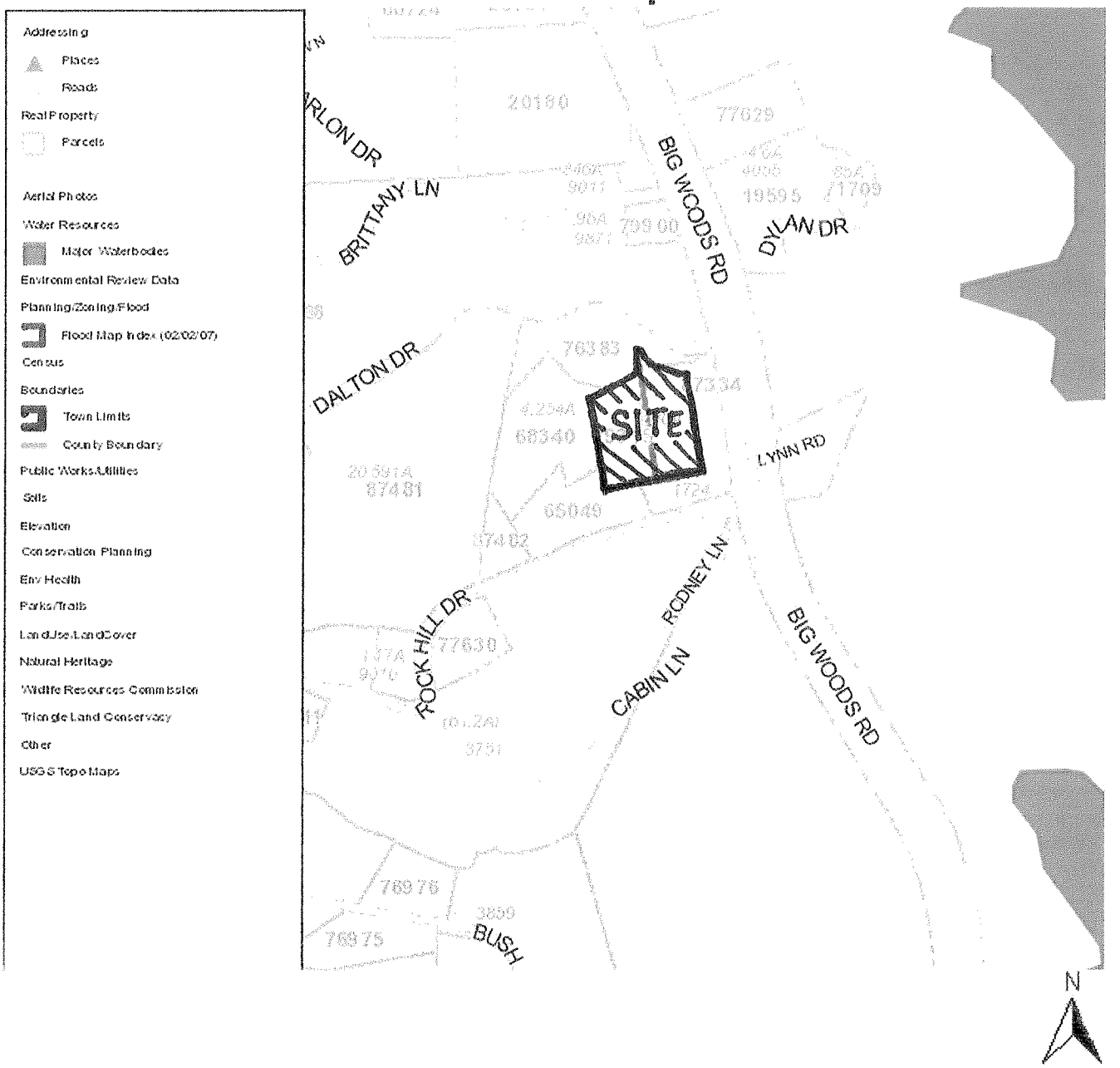
ARI* (years)	5 min.	10 min.	15 min.	30 min.	60 min.	120 min.	3 hr.	6 hr.	12 hr.	24 hr.
2	6.46	5.16	4.32	2.99	1.87	1.06	0.79	0.48	0.29	0.17
10	8.47	6.77	5.71	4.14	2.69	1.62	1.20	0.74	0.44	0.27
25	9.56	7.62	6.44	4.77	3.17	1.96	1.47	0.91	0.54	0.33
100	11.26	8.95	7.54	5.77	3.98	2.54	1.95	1.21	0.73	0.44

Cape Hatteras, North Carolina 35.2327N 75.6225W

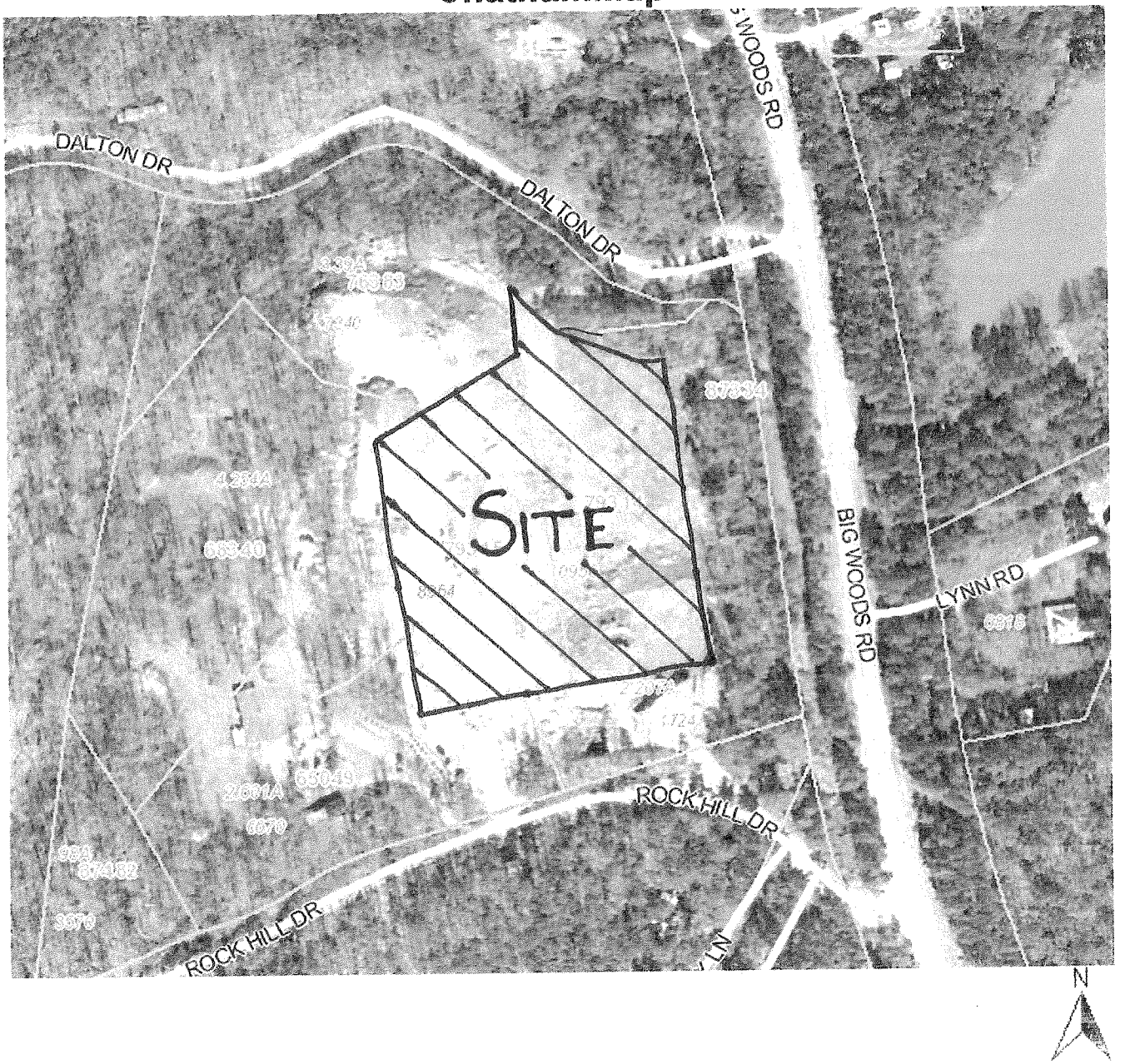
ARI* (years)	5 min.	10 min.	15 min.	30 min.	60 min.	120 min.	3 hr.	6 hr.	12 hr.	24 hr.
2	7.20	5.75	4.82	3.33	2.09	1.29	0.94	0.58	0.34	0.20
10	9.41	7.52	6.35	4.60	2.99	1.93	1.43	0.89	0.53	0.31
25	10.66	8.49	7.18	5.31	3.54	2.33	1.75	1.09	0.65	0.38
100	12.53	9.95	8.39	6.42	4.42	3.03	2.32	1.45	0.88	0.51

SITE MAPS

ChathamMap


Addressing
Places
Roads
Real Property
Parcels
Aerial Photos
Water Resources
Major Waterbodies
Environmental Review Data
Planning/Zoning/Flood
Flood Map Index (02/02/07)
Census
Boundaries
Town Limits
County Boundary
Public Works/Utilities
Soils
Elevation
Conservation Planning
Env Health
Parks/Trails
Land Use/Land Cover
Natural Heritage
Wildlife Resources Commission
Triangle Land Conservancy
Other
USGS Topo Maps
BRITTANY LN
BIG WOODS RD
DYLAN DR
DALTON DR
SITE
LYNN RD
ROCK HILL DR
RODNEY LN
CABIN LN
BIG WOODS RD
BUSH
N

ChathamMap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DALTON DR
WOODS RD
BIG WOODS RD
LYNN RD
SITE
ROCK HILL DR
ROCK HILL DR
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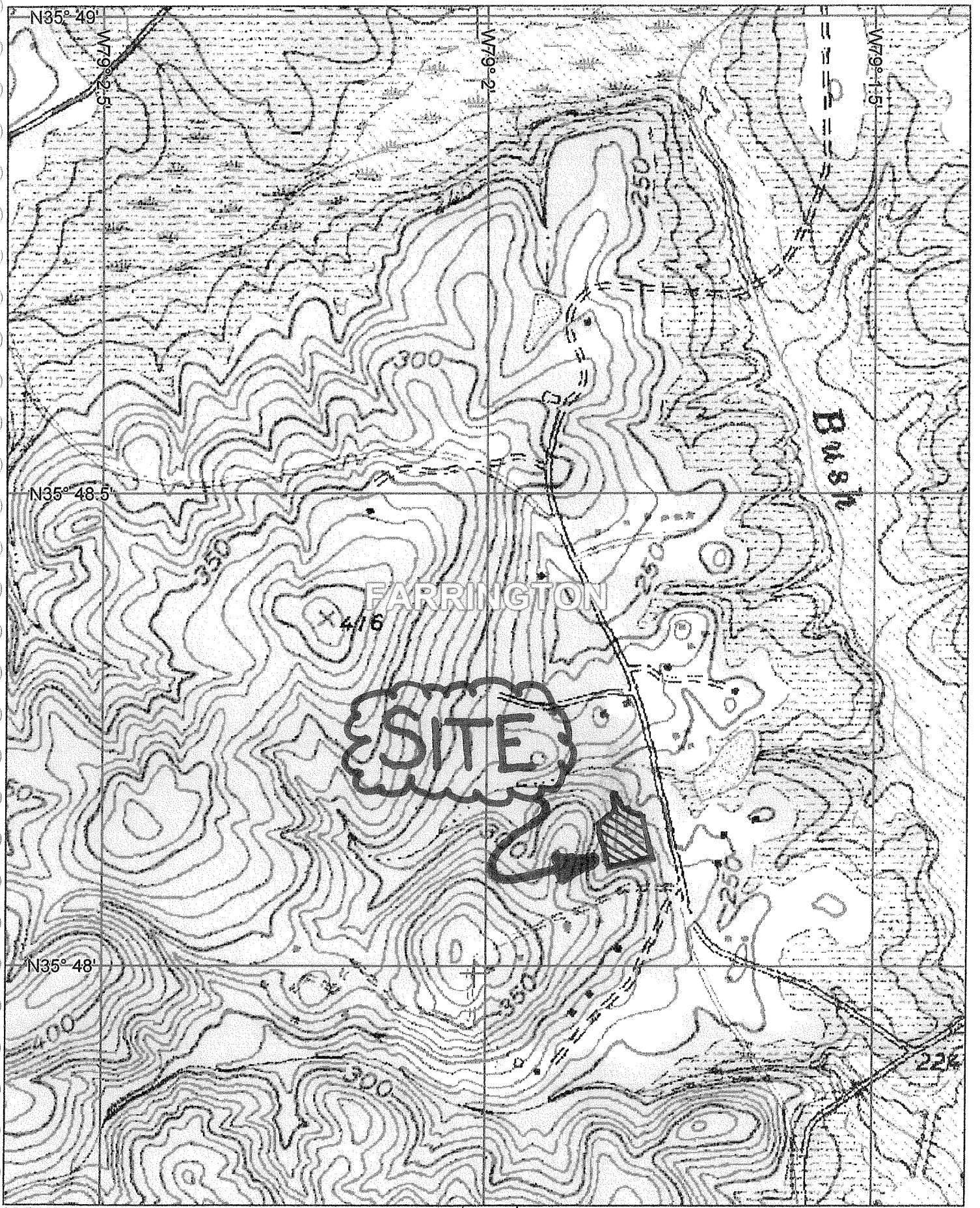
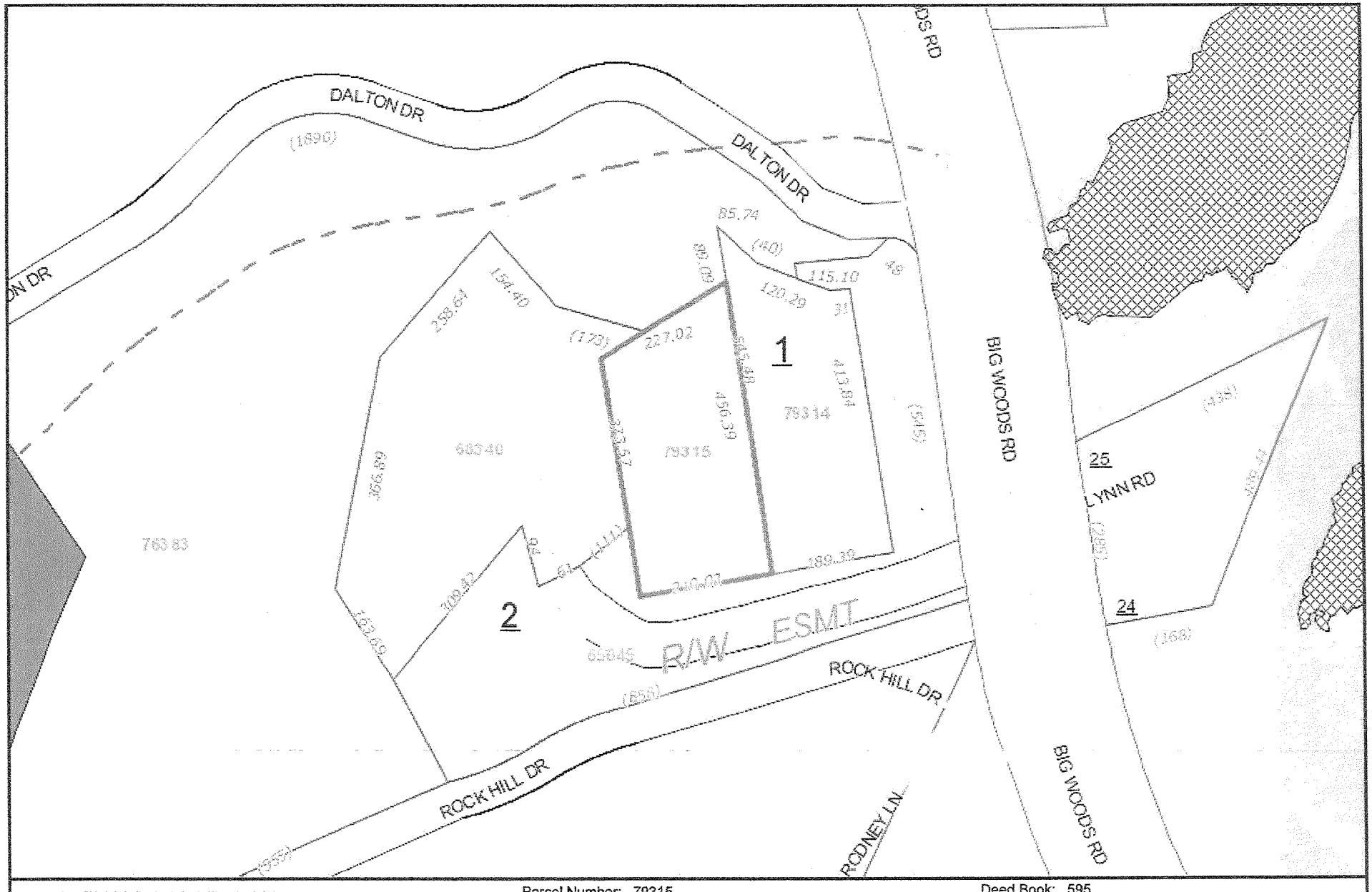


 350 ft Scale: 1 : 9,600 Detail: 13-4 Datum: NAD27



CHATHAM COUNTY, NC

PROPERTY MAP

Disclaimer:
The data provided on this map are prepared for the inventory of real property found within Chatham County, NC and are compiled from recorded plats, deeds, and other public records and data. This data is for informational purposes only and should not be substituted for a true title search, property appraisal, survey, or for zoning verification.

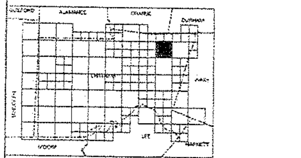
Parcel Number:	79315
Map Number:	9794-06-8964.000
Owner Name:	STONE ALLAN HUGH
Owner Address:	348 BUSH CREEK LN
Owner City:	CHAPEL HILL
Owner Address:	
Owner State:	NC
Owner Zip:	27517
Description:	O3-2B-2LF

Deed Book:	595
Deed Page:	0291
Plat Book::	2001
Plat Page:	0298
Deed Acres:	2
Physical Address:	BIG WOODS RD
Improvement Value:	0
Land Value:	16875
Fire District:	107
Township Code:	13

N

One Inch = 200 Feet

STATE OF NORTH CAROLINA FIRM PANEL LOCATOR DIAGRAM



DATUM INFORMATION

The **projection** used in the preparation of this map was the North Carolina State Plane (FIPSZONE 3200). The **horizontal datum** was the North American Datum of 1983, GRS80 ellipsoid. Differences in datum, ellipsoid, projection, or Universal Transverse Mercator zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdictional boundaries. These differences do not affect the accuracy of this FIRM. All coordinates on this map are in U.S. Survey Feet, where 1 U.S. Survey Foot = 1200/3937 Meters.

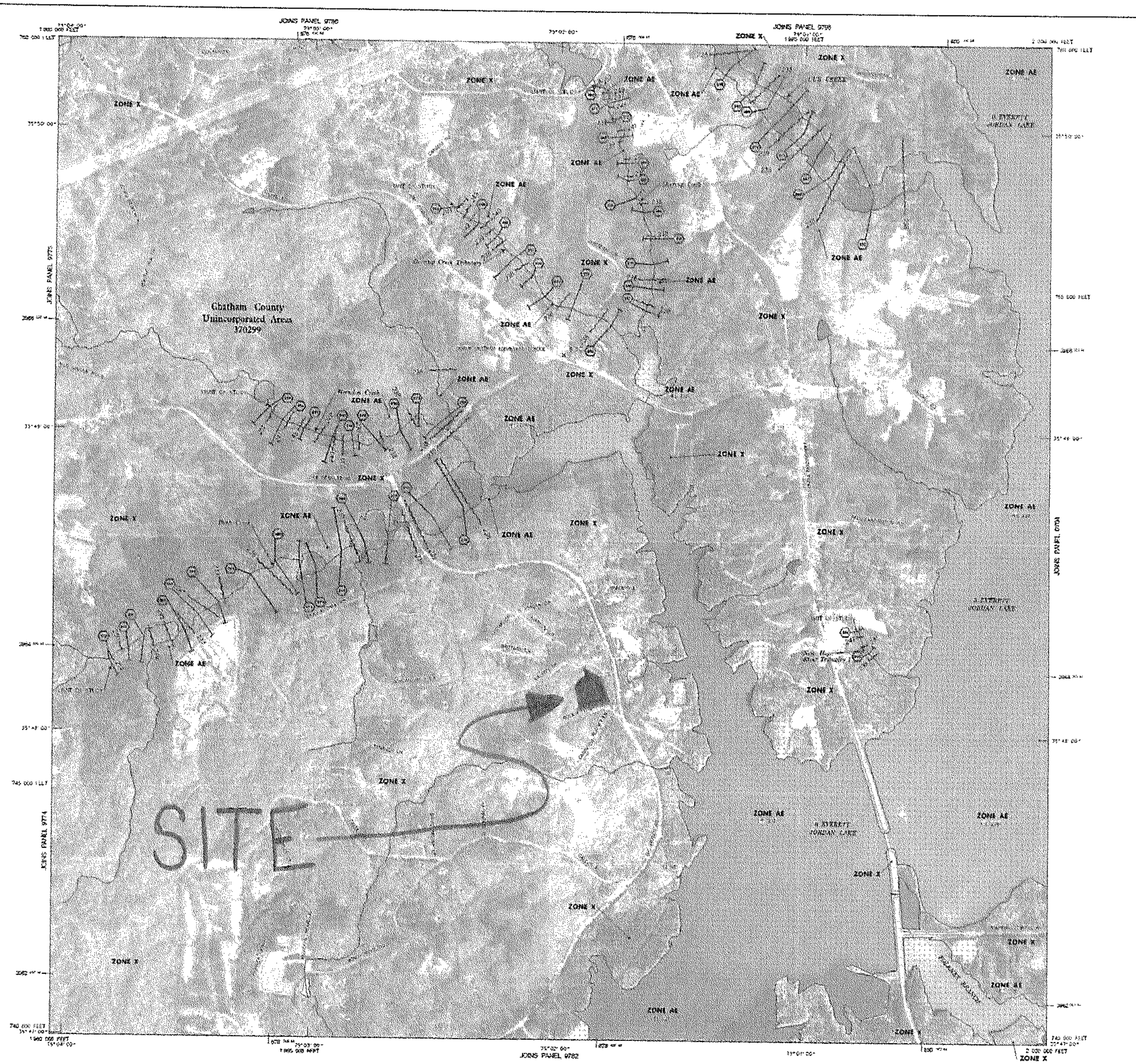
Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. An average offset between NAVD 88 and the National Geodetic Vertical Datum of 1929 (NGVD 29) has been computed for each North Carolina county. This offset was then applied to the NGVD 29 flood elevations that were not revised during the creation of this statewide format FIRM. The offsets for each county shown on this FIRM panel are shown in the vertical datum offset table below. Where a county boundary and a flooding source with unrevised NGVD 29 flood elevations are coincident, an individual offset has been calculated and applied during the creation of this statewide format FIRM. See Section 6.1 of the accompanying Flood Insurance Study report to obtain further information on the conversion of elevations between NAVD 88 and NGVD 29. To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the North Carolina Geodetic Survey at the address shown below. You may also contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at www.ngs.noaa.gov.

North Carolina Geodetic Survey
121 West Jones Street
Raleigh, NC 27601
(919) 733-3836
www.ncgs.state.nc.us

County Average Vertical Datum Offset Table

County	Vertical Datum Offset (ft)
Chatham	- 0.78
Example: NAVD 88 = NGVD 29 + (-0.78)	

All streams listed in the **Flood Hazard Data Table** below were studied by detailed methods using field survey. Other flood hazard data shown on this map may have been derived using either a coastal analysis or limited detailed riverine analysis. More information on the flooding sources studied by these analyses is contained in the Flood Insurance Study report.



LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

- **ZONE A** No Base Flood Elevations determined.
- **ZONE AE** Base Flood Elevations determined.
- **ZONE AH** Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
- **ZONE AO** Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
- **ZONE AR** Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
- **ZONE A99** Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
- **ZONE VE** Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

- **ZONE X** Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

- **ZONE X** Areas determined to be outside the 0.2% annual chance floodplain.
- **ZONE D** Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D Boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- ~~~513~~~ Base Flood Elevation line and value; elevation in feet*
- (EL 987) Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

- Cross section line
- Transect line
- 97°07'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4270 000m 1000-meter Universal Transverse Mercator grid ticks, zone 17
- 1 477 500 FEET 5000-foot grid values: North Carolina State Plane coordinate system (FIPSZONE 3200, State Plane NAD 83 feet)
- BM5510 × North Carolina Geodetic Survey bench mark (see explanation in the Datum Information section of this FIRM panel).
- BM5510 ⊗ National Geodetic Survey bench mark (see explanation in the Datum Information section of this FIRM panel).
- • M1.5 River Mile

GRID NORTH

MAP SCALE 1" = 1000' (1 : 12,000)

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles, Floodway Data, Limited Detailed Flood Hazard Data, and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Boundaries of **regulatory floodways** shown on the FIRM for flooding sources studied by detailed methods were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data for flooding sources studied by detailed methods as well as **non-encroachment widths** for flooding sources studied by limited detailed methods are provided in the FIS report for this jurisdiction. The FIS report also provides instructions for determining a floodway using non-encroachment widths for flooding sources studied by limited detailed methods.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 4.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

Base map information and geospatial data used to develop this FIRM were obtained from various organizations, including the participating local community(ies), state and federal agencies, and/or other sources. The primary base for this FIRM is aerial imagery acquired by Chatham County. The time period of collection for the imagery is 2002. Information and geospatial data supplied by the local community(ies) that met FEMA base map specifications were considered the preferred source for development of the base map. See geospatial metadata for the associated digital FIRM for additional information about base map preparation.

Base map features shown on this map, such as **corporate limits**, are based on the most up-to-date data available at the time of publication. **Changes in the corporate limits may have occurred since this map was published.** Map users should consult the appropriate community official or website to verify current conditions of jurisdictional boundaries and base map features. This map may contain roads that were not considered in the hydraulic analysis of streams where no new hydraulic model was created during the production of this statewide format FIRM.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels, community map repository addresses, and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at www.fema.gov.

An accompanying Flood Insurance Study report, Letter of Map Revision (LOMR) or Letter of Map Amendment (LOMA) revising portions of this panel, and digital versions of this FIRM may be available. Visit the **North Carolina Floodplain Mapping Program** website at www.ncfloodmaps.com, or contact the **FEMA Map Service Center** at 1-800-358-9616 for information on all related products associated with this FIRM. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at www.msc.fema.gov.

MAP REPOSITORY

Refer to listing of Map Repositories on Map Index or visit www.ncfloodmaps.com.

EFFECTIVE DATE OF FLOOD INSURANCE RATE MAP PANEL
FEBRUARY 2, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to statewide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent, the North Carolina Division of Emergency Management or the National Flood Insurance Program at the following phone numbers or websites:

NC Division of Emergency Management (919) 715-8000 www.ncdem.org
National Flood Insurance Program 1-800-638-6620 www.fema.gov/nfip

This digital Flood Insurance Rate Map (FIRM) was produced through a unique cooperative partnership between the State of North Carolina and the Federal Emergency Management Agency (FEMA). The State of North Carolina has implemented a long term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As a part of this effort, the State of North Carolina has joined in a Cooperating Technical State agreement with FEMA to produce and maintain this digital FIRM.

www.ncfloodmaps.com

NFIP
NATIONAL FLOOD INSURANCE PROGRAM

PANEL 9784J

FIRM
FLOOD INSURANCE RATE MAP
NORTH CAROLINA

PANEL 9784

(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

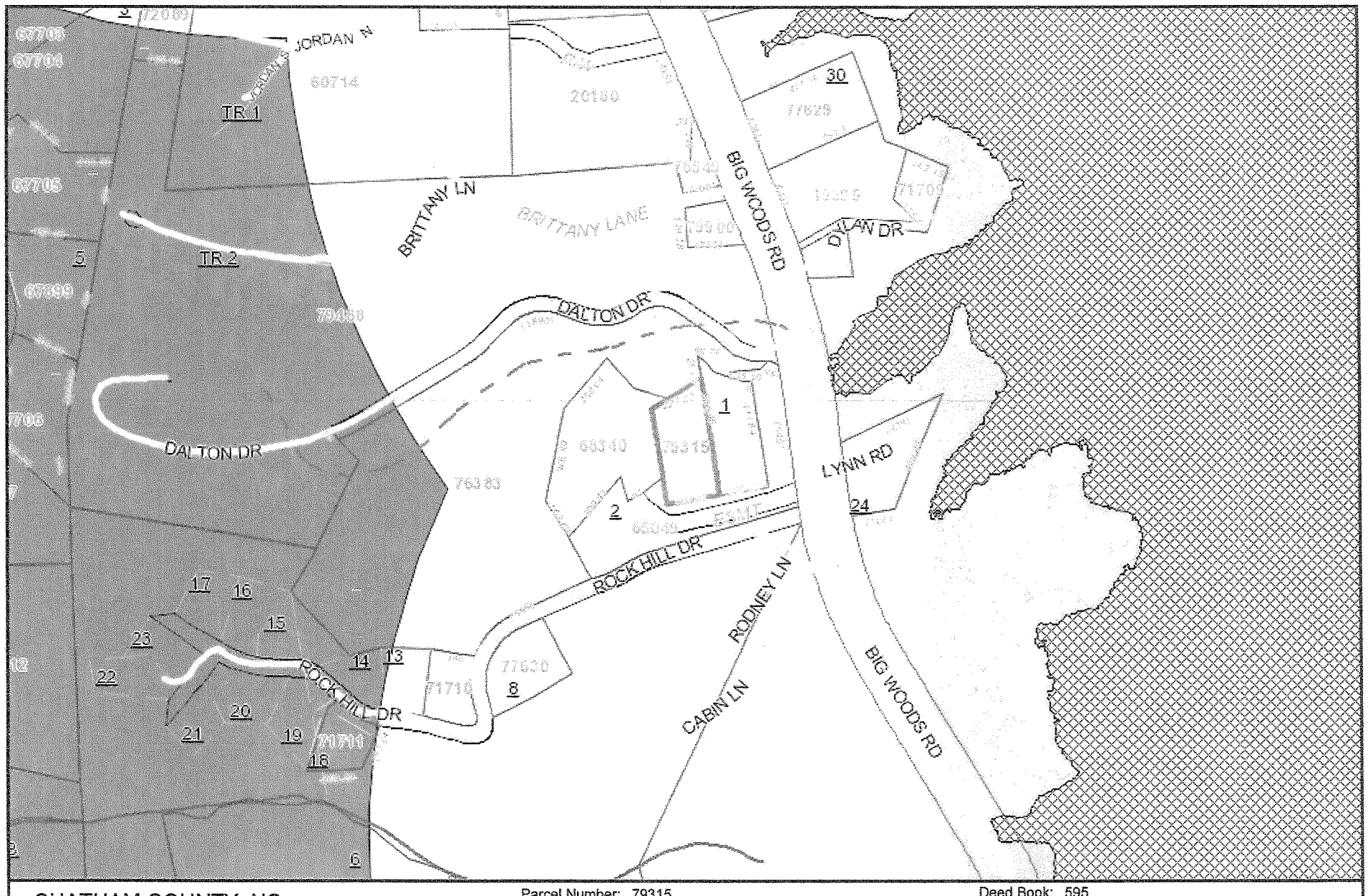
COMMUNITY	CID No.	PANEL	SUFFIX
CHATHAM COUNTY	370299	9784	J

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

EFFECTIVE DATE
FEBRUARY 2, 2007

MAP NUMBER
3710978400J

State of North Carolina
Federal Emergency Management Agency



CHATHAM COUNTY, NC

PROPERTY MAP

Disclaimer:
The data provided on this map are prepared for the inventory of real property found within Chatham County, NC and are compiled from recorded plats, deeds, and other public records and data. This data is for informational purposes only and should not be substituted for a true title search, property appraisal, survey, or for zoning verification.

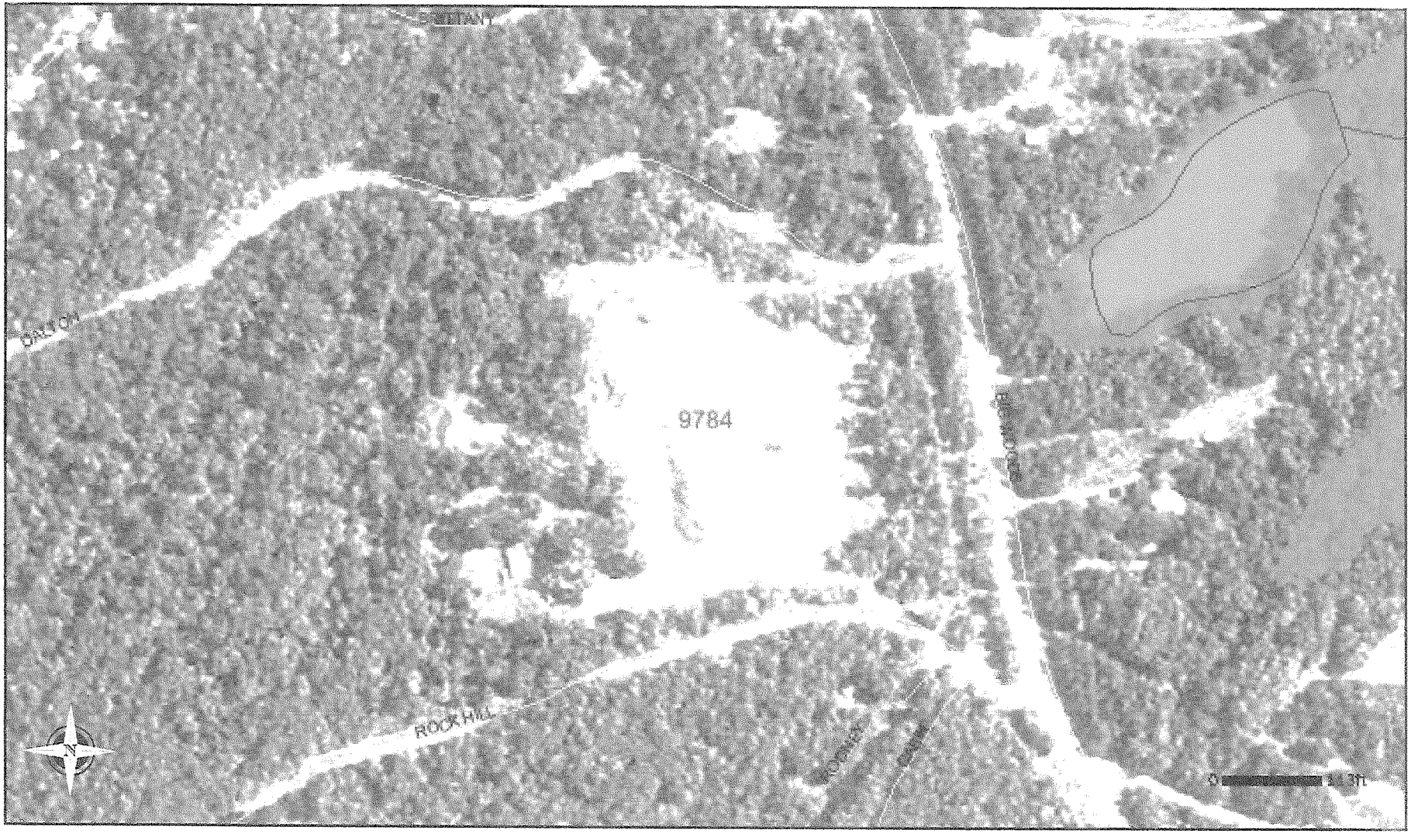
Parcel Number:	79315
Map Number:	9794-06-8964.000
Owner Name:	STONE ALLAN HUGH
Owner Address:	348 BUSH CREEK LN
Owner City:	CHAPEL HILL
Owner Address:	
Owner State:	NC
Owner Zip:	27517
Description:	O3-2B-2LF

Deed Book:	595
Deed Page:	0291
Plat Book::	2001
Plat Page:	0298
Deed Acres:	2
Physical Address:	BIG WOODS RD
Improvement Value:	0
Land Value:	16875
Fire District:	107
Township Code:	13

N

One Inch = 500 Feet

Stone Landfill



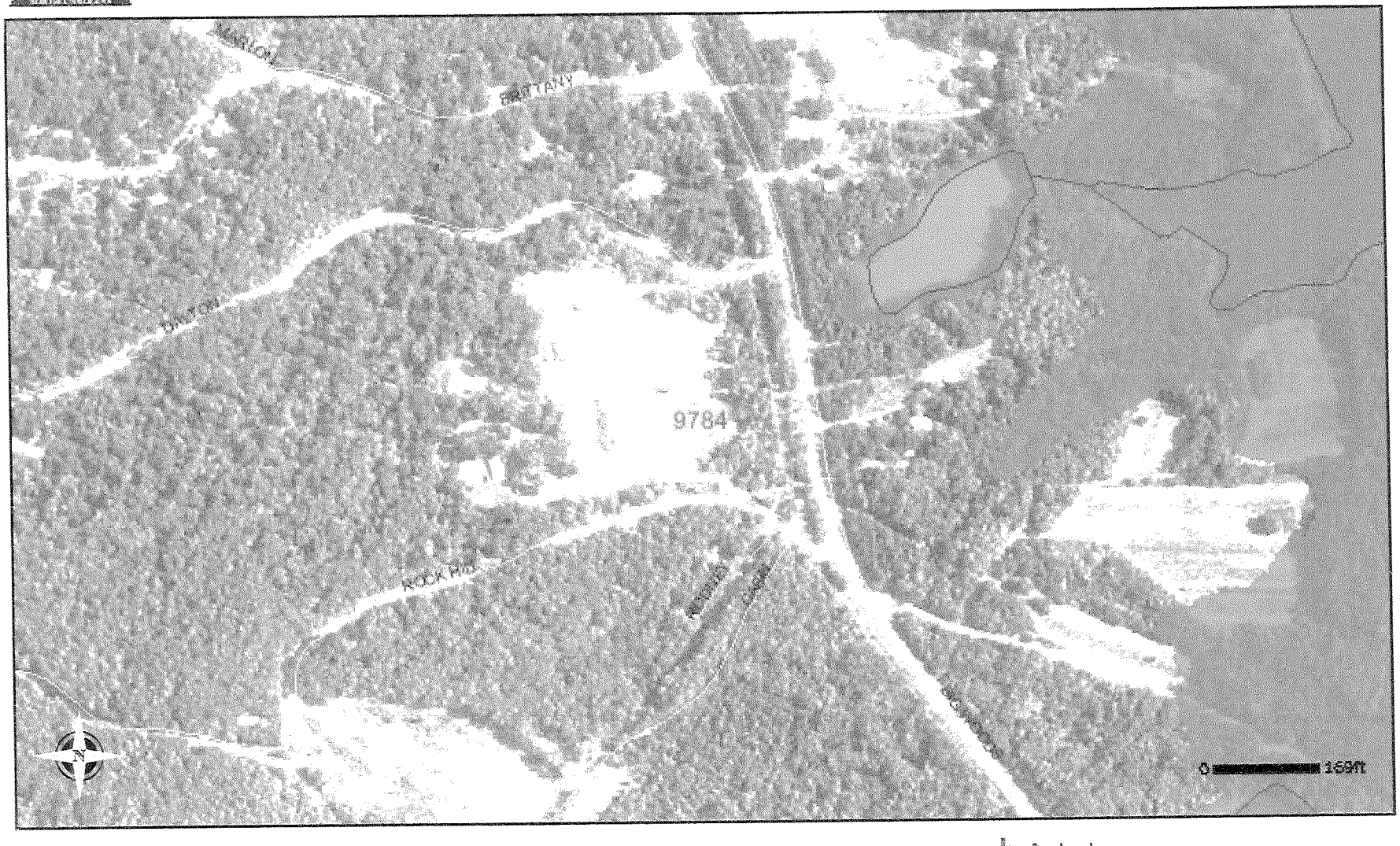
100yr Flooding - Has BFEs (AE)
100yr Flooding - Floodway (AE)
100yr Flooding - No BFEs (A)
100yr Flood - Velocity Zone (V or VE)
100yr Shallow Flooding (AO or AH)
100yr Future Conditions Flooding (X Future)
500yr Flooding (Shaded X)

DFIRM Grid
Cross Sections
Rivers and Streams
Coastal Sounds
Coastal Barrier Resource Systems (CBRS)

Major Cities
Urban Areas
Extra Territorial Jurisdictions
Interstate Highways
US Highways
NC Highways
Roads

Benchmarks
Transects
Parks, Gameland, Forests, Reserves and Open Space

Alan Stone



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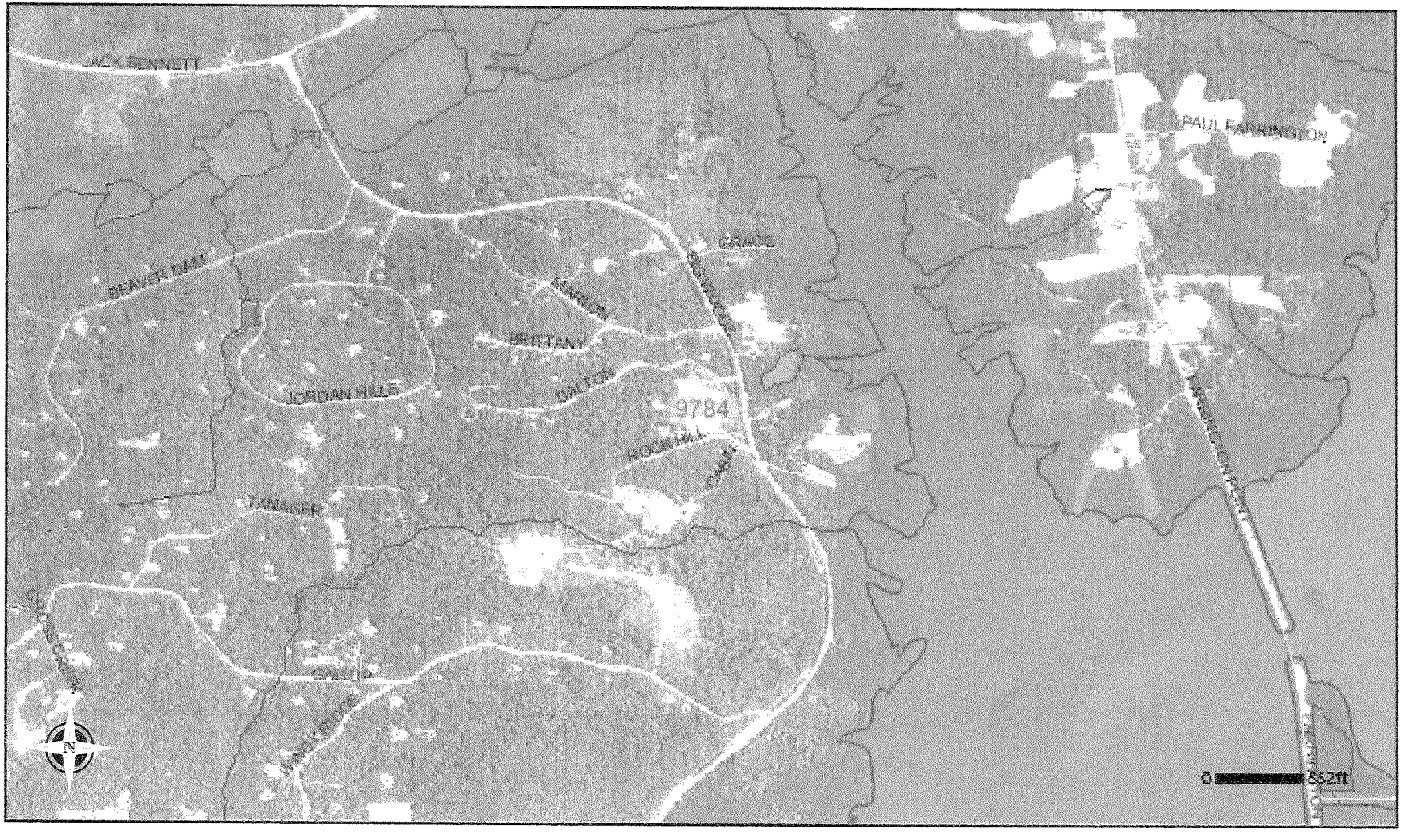
Alan Stone 2



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SOILS MAP


NaC
GoE
Dalton Dr
Big Woods Rd
Lynn Oak Dr
Rock Hill Dr
217ft

Chatham County, North Carolina

GoE—Goldston-Badin complex, 15 to 35 percent slopes

Map Unit Setting

- *Elevation:* 200 to 650 feet
- *Mean annual precipitation:* 37 to 60 inches
- *Mean annual air temperature:* 59 to 66 degrees F
- *Frost-free period:* 200 to 240 days

Map Unit Composition

- *Goldston and similar soils:* 55 percent
- *Badin and similar soils:* 30 percent
- *Minor components:* 5 percent

Description of Goldston

Setting

- *Landform:* Hillslopes on ridges
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Residuum weathered from metavolcanics and/or argillite

Properties and qualities

- *Slope:* 15 to 45 percent
- *Depth to restrictive feature:* 10 to 20 inches to paralithic bedrock; 20 to 40 inches to lithic bedrock
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 1.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Very low (about 1.2 inches)

Interpretive groups

- *Land capability (nonirrigated):* 7s

Typical profile

- *0 to 7 inches:* Very channery silt loam

- *7 to 11 inches:* Very channery silt loam
- *11 to 23 inches:* Weathered bedrock
- *23 to 80 inches:* Unweathered bedrock

Description of Badin

Setting

- *Landform:* Hillslopes on ridges
- *Landform position (two-dimensional):* Backslope
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Residuum weathered from metavolcanics and/or argillite

Properties and qualities

- *Slope:* 15 to 45 percent
- *Depth to restrictive feature:* 20 to 40 inches to paralithic bedrock; 40 to 80 inches to lithic bedrock
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 1.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Moderate (about 6.1 inches)

Interpretive groups

- *Land capability (nonirrigated):* 6e

Typical profile

- *0 to 2 inches:* Channery silt loam
- *2 to 9 inches:* Channery silt loam
- *9 to 21 inches:* Channery silty clay loam
- *21 to 36 inches:* Silty clay
- *36 to 45 inches:* Weathered bedrock
- *45 to 80 inches:* Unweathered bedrock

Minor Components

Tarrus

- *Percent of map unit:* 5 percent
- *Landform:* Hillslopes on ridges
- *Landform position (two-dimensional):* Backslope

- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex

Chatham County, North Carolina

NaC—Nanford-Badin complex, 6 to 10 percent slopes

Map Unit Setting

- *Elevation:* 300 to 650 feet
- *Mean annual precipitation:* 37 to 60 inches
- *Mean annual air temperature:* 59 to 66 degrees F
- *Frost-free period:* 200 to 240 days

Map Unit Composition

- *Nanford and similar soils:* 50 percent
- *Badin and similar soils:* 30 percent

Description of Nanford

Setting

- *Landform:* Hillslopes on ridges
- *Landform position (two-dimensional):* Shoulder, summit
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Residuum weathered from metavolcanics and/or argillite

Properties and qualities

- *Slope:* 6 to 10 percent
- *Depth to restrictive feature:* 40 to 60 inches to paralithic bedrock
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 1.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Moderate (about 7.9 inches)

Interpretive groups

- *Land capability (nonirrigated):* 3e

Typical profile

- *0 to 3 inches:* Silt loam
- *3 to 7 inches:* Silt loam
- *7 to 12 inches:* Silty clay

- *12 to 27 inches:* Silty clay
- *27 to 38 inches:* Silty clay loam
- *38 to 57 inches:* Silt loam
- *57 to 80 inches:* Weathered bedrock

Description of Badin

Setting

- *Landform:* Hillslopes on ridges
- *Landform position (two-dimensional):* Shoulder, summit
- *Landform position (three-dimensional):* Side slope
- *Down-slope shape:* Linear
- *Across-slope shape:* Convex
- *Parent material:* Residuum weathered from metavolcanics and/or argillite

Properties and qualities

- *Slope:* 6 to 10 percent
- *Depth to restrictive feature:* 20 to 40 inches to paralithic bedrock
- *Drainage class:* Well drained
- *Capacity of the most limiting layer to transmit water (Ksat):* Very low to high (0.00 to 1.98 in/hr)
- *Depth to water table:* More than 80 inches
- *Frequency of flooding:* None
- *Frequency of ponding:* None
- *Available water capacity:* Low (about 5.5 inches)

Interpretive groups

- *Land capability (nonirrigated):* 3e

Typical profile

- *0 to 6 inches:* Silt loam
- *6 to 24 inches:* Clay
- *24 to 32 inches:* Channery silty clay loam
- *32 to 80 inches:* Weathered bedrock

GROUNDWATER INFORMATION

JOHN W. HARRIS, P. E.

CONSULTING ENGINEER, Inc.
5112 Bur Oak Circle
Raleigh, N. C. 27612

Telephone (919) 789-0744
Fax (919) 789-0784

24, January 2008

Mr. Allan H. Stone
Stone Excavation, Inc
348 Bush Creek Lane
Chapel Hill, N.C. 27517

RE: Ground water

Dear Mr. Stone;

On January 15, 2008 Mr. Tim Drumm of my office conducted a field investigation on your property off Big woods Road in Chatham County, also noted as Parcel # 79315. The purpose of the inspection was to determine if ground water was present at a depth that would compromise your anticipated landfill bury depths. To verify the groundwater we asked you to excavate to a level of six (6) feet and allow a 24-hour time frame for any surrounding ground water to seep into the excavation. Our inspection found no ground water present and the soil at the bottom of the excavation was only moderately damp. Our inspector used his hands to check for any moisture and we documented the condition with photographs. It is my Professional opinion that groundwater in this area is not likely to be found within the top six (6) feet.

If you should have any questions or need additional information, please feel free to give me a call, at your convenience.

Sincerely:

John W. Harris. P.E.
Consulting Engineer

EROSION CONTROL PRACTICES

Practice No. 6.02

LAND GRADING

Reshaping the ground surface by grading is common in site development. It is also the primary cause of erosion and sedimentation from construction activities. Fitting a proposed development to the natural configurations of the landscape reduces the erosion potential of the site and the cost of installing control measures.

The grading plan forms the basis of the erosion and sedimentation control plan. What areas are to be graded, when the work will start and stop, the degree and length of finished slopes, where borrow will be needed, and how excess material will be wasted are key considerations that affect erosion and sedimentation.

The grading plan establishes drainage areas, directs drainage patterns, and affects runoff velocities. The plan should include all necessary erosion and sedimentation control measures such as sediment basins, diversions, mulching, vegetation, vegetated and lined waterways, grade stabilization structures, and surface and subsurface drains.

North Carolina Erosion and Sediment Control Planning and Design Manual

Practice No. 6.06

TEMPORARY GRAVEL CONSTRUCTION ENTRANCE/EXIT

A graveled area should be located where vehicles enter and leave a construction site to provide a buffer for the deposition of mud and sediment. This is especially important where vehicles exit construction areas directly onto public roads or other off-site paved areas.

Make the gravel pad the full width of the entrance area, sufficiently long for the vehicles to drop their mud and sediment and stable enough for construction traffic. Avoid entrances on steep grades or at curves in public roads.

In some cases it may be necessary to wash vehicle tires in this area. Stabilize the graveled area well at these points and provide drainage to a sediment trap.

North Carolina Erosion and Sediment Control Planning and Design Manual

Practice no. 6.80

CONSTRUCTION ROAD STABILIZATION

Properly located and stabilized construction roads can significantly reduce on-site erosion during construction.

Ensure that construction routes follow the natural contour of the terrain where possible. Avoid steep slopes, excessively wet areas, and highly erodible soils.

Controlling surface runoff from the road surface and adjoining area is a key erosion control consideration. Construction traffic routes are especially susceptible to erosion because they become compacted and rutted, and collect and convey runoff water along their surfaces, often at erosive velocities. Provide surface drainage, and divert excess runoff to stable areas.

Proper grading and stabilization of construction roads and parking areas with stone often saves money for the contractor by reducing erosion, avoiding dust problems, and improving the overall efficiency of the construction operation.

North Carolina Erosion and Sediment Control Planning and Design Manual

Practice No. 6.10

TEMPORARY SEEDING

Protective cover must be established in all disturbed areas within 30 days after a phase of grading is completed. Temporary seeding and mulching are the most common methods used to meet this requirement.

Annual plants that are adapted to site conditions and that sprout and grow rapidly should be used for temporary plantings. Proper seedbed preparation and the use of quality seed are also important.

Because temporary seedings provide protective cover for less than one year, areas must be reseeded annually or planted with perennial vegetation.

Temporary seeding is used to protect earthen sediment control practices and to stabilize denuded areas that will not be brought to final grade for several weeks or months. Temporary seeding can provide a nurse crop for permanent vegetation, provide residue for soil protection and seedbed preparation, and help prevent dust production during construction.

Practice No. 6.11

PERMANENT SEEDING

Permanent vegetation controls erosion by physically protecting a bare soil surface from raindrop impact, flowing water and wind. Vegetation binds soil particles together with a dense root system and reduces the velocity and volume of overland flow. It is the preferred method of surface stabilization wherever site conditions permit.

Permanent seeding of grasses and legumes is the most common and economical means of establishing protective cover. The advantages of seeding over other means of establishing plants include the relatively small initial cost, wide variety of grasses and legumes available, lower labor input, and ease of application. Problems to consider are potential for erosion during the establishment period, the need to reseed areas, seasonal limitations on seeding dates, weed competition, and the need for water during germination and early growth.

Give special attention to selecting the most suitable plant material for the site and intended purpose. Good seedbed preparation, adequate liming and fertilization, and timely planting and maintenance are also important.

North Carolina Erosion and Sediment Control Planning and Design Manual

Practice No. 6.62

SEDIMENT FENCE (Silt Fence)

A sediment fence is a permeable barrier on small disturbed areas to capture sediment from sheet flow. It is made of filter fabric buried at the bottom, stretched and supported by steel posts.

The sediment fence reduces the velocity of flow, allows deposition, and retains sediment. Because sediment fences are not designed to withstand high heads, the drainage area must be restricted and the fence located so that water depth does not exceed 1.5 feet at any point. Sediment fences may be designed to store all the runoff from the design storm, or located to allow bypass flow when the temporary sediment pool reaches a predetermined level. Sediment fences may also divert small volumes of flow to protected outlets.

In the design of a sediment fence exercise care to prevent failure from undercutting, overtopping, or collapsing. Ensure that flow bypass areas and overflow outlets are stable.

Check sediment fences after each significant rainfall, remove the necessary sediment, and make the repairs promptly. The design life of a synthetic sediment fence is 6 months or less.

Do not install sediment fence across streams or ditches where flows are concentrated.

North Carolina Erosion and Sediment Control Planning and Design Manual

Practice No. 6.17

ROLLED EROSION CONTROL PRODUCTS

Many different types of rolled erosion controlled products are used to prevent erosion and hold seed and mulch in place on steep slopes and in channels so that vegetation can become well established. These products are temporary degradable or long-term non-degradable material manufactured or fabricated into rolls designed to reduce soil erosion and assist in the growth, establishment and protection of vegetation. Use the RECP's to help permanent vegetative stabilization of slopes 2:1 or greater and with more than 10 feet of vertical relief, as well as, channels when runoff velocity exceeds 2 feet per second on bare earth during the 2-year rainfall event.

Installation is critical to the effectiveness of these products. When close ground contact is not properly achieved, runoff can concentrate under the product, causing significant erosion. Monitor the products on a regular basis to avoid significant problems caused by rainfall.

North Carolina Erosion and Sediment Control Planning and Design Manual

Practice no. 6.65

BAFFLES

Porous baffles are installed inside temporary sediment traps, rock dams, skimmer basins, and sediment basins to reduce the velocity and turbulence of the water flowing through the measure, and facilitate the settling of sediment from the water before discharge. Baffles improve the rate of sediment retention by distributing the flow and reducing turbulence. This process can improve sedimentation retention and allow the capture of soil particles 50 percent smaller than those that can be captured without baffles.

Recommended materials for the baffles include jute backed by coir erosion blankets, coir mesh, and tree protection fence folded over to reduce pore size. Installation is similar to a sediment fence. It is essential to install the measure securely to avoid blow outs and other malfunctions. Frequent inspections are required.

North Carolina Erosion and Sediment Control Planning and Design Manual

Practice No. 6.64

SKIMMER SEDIMENT BASIN

Skimmer sediment basins are an earthen embankment suitably located to capture sediment, with a trapezoidal spillway lined with an impermeable geo-textile or laminated plastic membrane, and equipped with a floating skimmer for dewatering. The skimmer is a sedimentation basin dewatering control device that withdraws water from the basin's water surface, thus removing the highest quality water for discharge downstream.

These practices are needed where drainage areas are too large for temporary sediment traps, and may require less volume and area than a temporary sediment trap or a rock dam. The maximum drainage area is 10 acres. Baffles should be installed in the sedimentation pool to maintain trapping efficiency.

Do not locate the skimmer sediment basin in intermittent or perennial streams.

All parts of the basin require frequent inspection and maintenance as needed to remain efficient and prevent failures.

SEDIMENT BASIN CALCULATION

ALAN STONE LANDFILL SEDIMENT BASIN DESIGN

* Based on 0.01 Ac./cfs

** Based on 1800 cf/acre w/skimmer

"C" of 0.4 is allowed for construction period,temporary sediment basins (Minimum size 10x20x3 to support spillway)

BASIN	DRAINAGE AREA	"C"	I25	AREA	Q25	SURFACE AREA REQUIRED*	VOLUME REQUIRED**	DEPTH	X-Y	Min. Weir Length	Limited Width x	Length based on Limited Width y	WxLxD
SB-1	DA-1	0.4	7.78	4.6	14.32	6235.70112	8280	1.3278379	78.9665	13.50491	55	113.376384	55 X 110 X 3

SKIMMER CALCULATION

Permanent Sediment Basin -SB1

	Okay
4	Disturbed Area (Acres)
7.78	Peak Flow from 25-year Storm (cfs)
7200	Required Volume ft^3
3389	Required Surface Area ft^2
41.2	Suggested Width ft
82.3	Suggested Length ft
55	Trial Top Width at Spillway Invert ft
110	Trial Top Length at Spillway Invert ft
3	Trial Side Slope Ratio Z:1
3	Trial Depth ft (2 to 13 feet above grade)
37	Bottom Width ft
92	Bottom Length ft
3404	Bottom Area ft^2
14019	Actual Volume ft^3 **Okay**
6050	Actual Surface Area ft^2 **Okay**

Use Spillway Capacity Sheet to Size Primary and Emergency Spillways

2.5	Skimmer Size (inches)
0.208	Head on Skimmer (feet)
2	Orifice Size (1/4 inch increments)
3.33	Dewatering Time (days)
	Suggest about 3 days

Skimmer Size (Inches)
1.5
2
2.5
3
4
5
6
8