The Coastal Experts

Waterside Villages of Currituck

POPLAR BRANCH TOWNSHIP, CURRITUCK COUNTY, NORTH CAROLINA

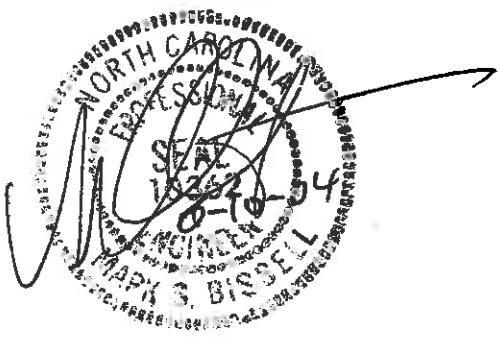
STORMWATER MANAGEMENT DESIGN DATA

10 YEAR-24 HOUR DESIGN STORM EVENT

PREPARED BY:

BISSELL PROFESSIONAL GROUP
4417 N. CROATAN HWY.
P.O. BOX 1068
KITTY HAWK, NC 27949
(252)-261-3266

DATE:
June 7, 2004



The Coastal Experts

Waterside Villages of Currituck

POPLAR BRANCH TOWNSHIP, CURRITUCK COUNTY, NORTH CAROLINA

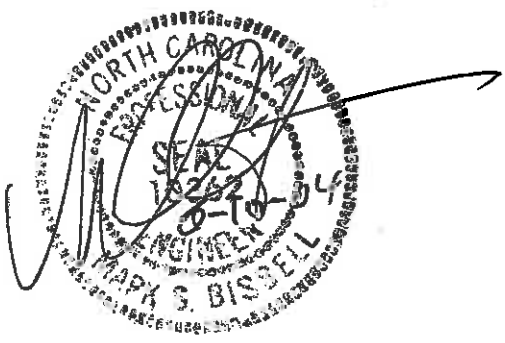
STORMWATER MANAGEMENT DESIGN DATA

10 YEAR-24 HOUR DESIGN STORM EVENT

PREPARED BY:

BISSELL PROFESSIONAL GROUP
4417 N. CROATAN HWY.
P.O. BOX 1068
KITTY HAWK, NC 27949
(252)-261-3266

DATE:
June 7, 2004



INDEX

Sections

Appendices

Stormwater Narrative

III. STORMWATER MANAGEMENT NARRATIVE:

PROPOSED DEVELOPMENTAL ACTIVITIES

The following developmental activities require a stormwater management permit under Rule .1003 of the NCDENR Division of Water Quality Administrative Code for Stormwater Management, 15A NCAC 2H.1000. Developmental activities will result in the project being permitted pursuant with Rule .1005 (2) (b), High Density Projects, with proposed built-upon area of 30% or greater, with best management practices being employed via; vegetative buffers, grassed swales, and wet detention basins. The intent of this application, to the maximum extent possible, is to employ best management practices for all proposed developmental activities. The project will consist of the construction of utility, parking and drainage infrastructure improvements to service the proposed Waterside Villages of Currituck Residential / Wastewater Treatment Facility Development that is located approximately 0.25 miles southeast of Grandy on US Highway, in Poplar Branch Township, Currituck County, North Carolina.

The proposed developmental activities are as follows;

a) Construction of (150) 7,500 s.f.,(avg.) single family residential homesites.
b) Construction of 8 residential condominium buildings.
c) Construction of a 90,000 gpd wastewater treatment facility and associative infrastructure to service the proposed development.
d) Construction of approximately 9.14 ac. of proposed asphalt access roadway with asphalt ingress/egress drives.
e) Construction of approximately 0.74 ac. of concrete sidewalks and pathways.

SITE SOILS

SOIL DESCRIPTION

On-site visits were conducted by David Meyer of Protocol Environmental Services, Inc. during the month of December 2003 to investigate the existing groundwater profiles through on-site soil borings and water surface elevation observations via monitoring wells. Based on the investigation of the soil profiles and water table observations made it was discovered that the seasonal high water level was approximately 2.5' below the existing ground surface on the northwestern section of the property and 1.5' below the existing ground surface on the southeastern half of the tract. The soil investigation provided the useful information necessary in determining the size, type, and location of stormwater drainage improvements for the associative developmental activities. The following is a summary of the soils typically found within the project boundary limits;

SOIL DESCRIPTION

CnA: Conetoe loamy sand: Well drained soil on smooth to slightly rounded low ridges along streams and the Currituck and Albemarle Sounds. The permeability is moderate with the seasonal high water table greater than six feet below the surface. Permeability is described as being 2 in/hr – 6 in/hr.

Ds Dragston fine loamy sand: This is a nearly level, somewhat poorly drained soil on low ridges along the streams that flow into Currituck Sound. The permeability is moderately rapid with the seasonal high water table 1 foot to 2-1/2 feet below the existing ground surface. Permeability is described as being 2 in/hr – 6 in/hr.

Pt: Portsmouth fine sandy loam: This is a nearly level, poorly drained soil on broad flats and in slightly depressed drainageways. The permeability is slow with the seasonal high water table 0 to 1 feet below the existing ground surface. Permeability is described as being 0.6 in/hr – 2 in/hr.

- *Information referenced from United States Department of Agriculture, Soil Conservation Service, Soil Survey of Currituck County, North Carolina*

Site Topography

The topography of the site is relatively flat with a small ridge that runs north to south within the western quadrant of the site. The northwestern corner contains the highest elevations of the site that gently slope to the east and the lower elevations of the site prior to transitioning into the Currituck Sound. The southeastern quadrant contains "404" jurisdictional wetlands that are mainly encompassed entirely within the woodland areas. The tract predominately slopes from west to east with average ground elevations ranging from approximately 13' to 3' m.s.l. The site was formerly operated as Yogi Bear campground with an existing asphalt roadway in the central portion of the site in conjunction with a clubhouse amenity area and soundfront pavilion. An existing drainage network is located within the southeastern section conveying runoff to an existing canal that outlets into the Currituck Sound. The outer periphery of the tract is currently lined with native trees that provide a vegetative buffer between the adjoining properties.

Basis of Design

All development activities are to be designed in conformity with the requirements for application and issuance of permits for stormwater management systems in pursuant with rules .1003 and .1005 in accordance with G.S. 143-215.1 and 15A NCAC 2H .0200 as set forth. These requirements are designed to control pollutants associated with stormwater runoff applicable to development of land for residential, commercial, industrial, or institutional uses. The developmental activities as described above have been designed in compliance with the requirements as set forth in stormwater management within coastal counties Rule .1005, section 3, subparagraph B:

(i) Control systems must be infiltration systems, wet detention ponds, or alternative stormwater management control systems designed in accordance with Rule .1008;
(ii) Control systems must be designed to control runoff from all surface generated by one inch of rainfall.

Design of the active stormwater management measures are based on the design criteria indicated in .1008(e) Wet Detention Pond Requirements, under the NCDENR Division of Water Quality Administrative Code for Stormwater Management,15A NCAC 2H.1000.

Design of the conveyance measures are based on the design criteria indicated in .1008(f) *Design of Stormwater Management Measures, Vegetative Filter Requirements,* under the NCDENR Division of Water Quality Administrative Code for Stormwater Management,15A NCAC 2H.1000.

Additionally, the stormwater design is based on meeting the Currituck County standards of storing stormwater runoff and releasing at a rate as calculated for predevelopment conditions. The associative calculations are based on the TR-55 Method, Urban Hydrology for Small Watersheds, for a 10-yr-24-hr design storm event. An analysis was also conducted on the existing drainage features located downstream of the project to evaluate the capacity of these features in conjunction with the associative development. A review of the post-development conditions as compared to the pre-development conditions in association with the downstream analysis of the existing drainage features will determine

the proposed release rate of stormwater runoff off-site. The storm event design is based upon the storage being provided above the seasonal high water table that represents the worst-case design scenario.

The project will consist of the construction of utility, parking and drainage infrastructure improvements to service the proposed Waterside Villages of Currituck Residential Development / Wastewater Treatment Facility Development that is located approximately 0.25 miles southeast of Grandy on US Highway, in Poplar Branch Township, Currituck County, North Carolina.
The proposed developmental activities will consist of the previously itemized activities as outlined in the Proposed Development Activities Section. Rainfall runoff from the proposed impervious surfaces will primarily sheet flow overland into vegetative conveyances located on either side property line. Rainfall from the proposed roadways will be collected via slotted drains located within the curb section and deposited into vegetative conveyance swales. Flow will be diverted to vegetative conveyance swales and routed to wet detention basins located on the eastern and western portions of the tract. Stormwater runoff from the proposed impervious surfaces will receive treatment in the form of vegetative buffers, grassed swales, and wet detention basins. A majority of the proposed stormwater measures will be connected via vegetative conveyances to aid in pollutant removal in association with the allowance for additional stormwater storage capacity. Rip-Rap check dams and culvert inlet/outlet protection will be placed at various outlet/inlet points for velocity dissipation an to aid in infiltration and sediment removal. The site has been divided into (2) drainage basins in order to accommodate the rainfall runoff from the developmental activities as described above.

Vegetative buffers will be provided, to the maximum extent possible, for pollutant filtration. The vegetative buffer is described as a passive best management practice that provides a small degree of filtration and pollutant removal from stormwater runoff. Grassed swales consist mainly of broad, shallow, vegetative filters constructed with approximately 3:1 side slopes. Longitudinal slopes are kept relatively flat, to provide for low velocity flow, thereby aiding infiltration and sediment removal. Enhanced removal efficiency from stormwater conveyed into this measure is achieved through a minimum filtration length of 100 feet. This practice is also described as a passive in accordance with best management practices. Stormwater wet detention basin design capacity is capable of storage of the 10-yr, 24-hr design storm event in association with the controlled release of stormwater runoff downstream via an outlet device/ swale. The basin shelf will be planted with vegetation as described in the Soil Sedimentation & Erosion Control Plan for the purpose of filtrating small particulate matter and pollutants. This measure is described as an active best management practice in the treatment of stormwater runoff.

The intent of the design is to provide adequate pollutant filtration measures from stormwater runoff resulting from the corresponding high-density pockets created by the associative developmental activities. To achieve this, measures were designed, to the maximum extent possible, to treat runoff from the impervious surfaces in accordance with best management practices. It is anticipated, that with the proposed drainage improvements, this will enhance the pollutant removal efficiency and provide sufficient protection to the adjoining surface waters in conjunction with the combination of on-site storage and controlled release rate that post development conditions will not exceed the predevelopment runoff rate for a 10year-24-hour design storm event as described in Section 922 of the Currituck County Unified Development Ordinance.

METHODOLOGY

Based on the approved methods of calculating stormwater runoff as described in Section 922 of the Currituck County Unified Development Ordinance, the TR-55 Method, Urban Hydrology for Small Watersheds, was chosen for this application for a 10-yr-24-hr design storm event. This is the preferred method based upon its accuracy in determining the possible watershed effects of all developmental activities as well as design and implementation of measures that will minimize its adverse effects on

adjoining properties. In order to establish the extent of this effect, an analysis was performed in determining the probable post-development watershed conditions in respect to the pre-development watershed conditions. The corresponding results aid in the design of stormwater measures to capture, convey, control and disperse runoff in such a manner as to not adversely effect the proposed development and the surrounding lands.

METHODOLOGY

PRE-DEVELOPMENT RUNOFF

The method utilized for the analyzation of stormwater runoff for the existing & proposed developmental activities is the TR-55 Method, Urban Hydrology for Small Watersheds, for the 10-yr-24-hr design storm event. The existing ground features were examined based on soil type, vegetation, existing drainage measures and topography to determine the path of stormwater runoff. Based on the above referenced criterion, it was determined that the site could be broken down into (1) one drainage area,. Below is a list of design parameters utilized in the design calculations for the TR-55 Method, Urban Hydrology for Small Watersheds;

⇒ Area = 76.05 ac. attached pre-development calculations)
⇒ Weighted Runoff Curve = 76, (see attached pre-development calculations)
⇒ Time of Concentration (T_c) = 36 min., (see attached pre-development calculations)
⇒ Soil Type: varies, (see attached pre-development drainage basin delineation plat)
⇒ Overland Slopes = .02 to .05 (predominately)
⇒ Rainfall, P (24 hours) = 6.2 inches
⇒ Rainfall Distribution = Type III
⇒ Rainfall Frequency = 10yr. 24hr Storm Event

The resulting calculations provided a result of **103.48 cfs** of associative stormwater runoff from the existing site conditions.

DOWNSTREAM ANALYSIS

After review of the pre-development conditions, a secondary analysis was performed on the major drainage outlets that serve the site. Two (2) overflow outlets were identified, (1) located on the west side of the site that is proposed to outlet into the adjoining stormwater collection system on U.S. Hwy. 158 and (1) in the northeast corner of the site that outlets into an adjoining ditch that outlets into the Currituck Sound. An on-site investigation was conducted to locate the water surface elevations in conjunction with determining their storage carrying capacity, (see attached calculations for results). Based on these results, the release rate of runoff off-site from the proposed developmental activities will be controlled to less than that of full flow capacity of these measures.

STORMWATER COLLECTION

POST-DEVELOPMENT RUNOFF

The method utilized for the analyzation of stormwater runoff for the proposed developmental activities is the TR-55 Method, Urban Hydrology for Small Watersheds, for the 10-yr-24-hr design storm event. The existing ground features were examined based on existing soil type, proposed vegetation, proposed drainage measures and topography to determine the path of stormwater runoff. Based on the above referenced criterion, it was determined that the site could be broken down into (2) separate drainage areas, (reference attached post-development drainage basin delineation plat). All proposed and improved stormwater devices storage carrying capacities were measured in each individual basin in the determination of the proposed water surface elevations during the design storm event. The detention basin storage indication method was utilized from the TR-55 Method, Urban Hydrology for

detention basin storage indication method was utilized from the TR-55 Method, Urban Hydrology for Small Watersheds, in the calculation of the proposed water surface elevations, (see associative calculations attached herein). Below is a list of design parameters utilized in the design calculations for the TR-55 Method, Urban Hydrology for Small Watersheds;

⇒ Area = varies, (see attached post-development calculations)
⇒ Weighted Runoff Curve # = varies, (see attached post-development calculations)
⇒ Time of Concentration (T_c) = varies, (see attached post-development calculations)
⇒ Soil Type: varies, (see attached post-development drainage basin delineation plat)
⇒ Overland Slopes = .02 to .05 (predominately)
⇒ Rainfall, P (24 hours) = 6.2 inches
⇒ Rainfall Distribution = Type III
⇒ Rainfall Frequency = 10yr. 24hr Storm Event

The following is a summary of the corresponding peak discharge conditions from the (2) drainage basin based upon the existing site conditions;

Drainage Basin #1: 15.57 cfs (south quadrant)
Drainage Basin #2: 73.63 cfs (north quadrant)

The resulting calculations provided a result of **89.20 cfs** of associative stormwater runoff from the existing site conditions.

BASIN #1

The 23.59 acre area delineated as Drainage Area #1 of the Waterside Villages Development will consist of the construction of a 45' wide asphalt roadway entrance to U.S. Highway 158 transitioning into a 25' residential street to service the 150-lot residential subdivision. Fifty-nine residential lots will be located in this drainage area, (lots 1-59) for the associative homesite development. The existing topography consists of a ridge located along the western boundary line to an existing drainageway located on the southeastern portion of the site. The intent is to utilize the existing topography in conjunction with best management practices to manage & treat stormwater runoff. Runoff from the residential development will sheet flow into vegetative filters located along the east and west side property lines. Drainage will be conveyed towards the rear of the lots, to grassed swales running parallel to the road. Slotted drainpipes located within the roadway section will receive roadway runoff and outlet into vegetative conveyance swales that will divert flow into Pond 1, via culvert piping and velocity dissipaters. Pond 1 will collect sediment with its forebay section prior to transitioning into the main pond section that will be connected, via (2) 24" diameter culvert pipes, to Pond 1A. The pipe connection will allow for even distribution of stormwater runoff in conjunction with the provision of greater storage capacity. The wet detention basins, (pond 1 and 1A), will accommodate approximately 1.60 ac.-ft. of stormwater storage prior to overflowing into the shallow outlet swale/drawdown device on the western end of Pond 1A. The outlet swale will deposit residual runoff into the existing drainage collection system located on U.S. Highway 158. *(Reference the attached Drainage Basin Layout on Sheet DR1 for delineation of the drainage area boundaries)*

BASIN #2

The 52.03 acre area delineated as Drainage Area #2 of the Waterside Villages Development will consist of the construction of a 25'wide residential street to service the 150-lot residential subdivision. Eighty-nine residential lots will be located in this drainage area, (lots 60-148) in conjunction with (8) condominium buildings, WWTP facility, and a clubhouse facility for the associative homesite development. The existing topography slopes from west to east to an existing drainage way located on the southeastern portion of the site. The intent is to utilize

the existing topography in conjunction with best management practices to treat and manage stormwater runoff. Runoff from the residential development will sheet flow into vegetative filters located along the east and west side property lines. Drainage will be conveyed towards the rear of the lots, to grassed swales running parallel to the road. Slotted drainpipes located within the roadway section will receive roadway runoff that outlet into vegetative conveyance swales that will divert flow into the existing 3' deep ditch network, via culvert piping and velocity dissipaters. The stormwater collection within the existing ditch network will be conveyed, via culvert piping, into Pond 2. Pond 2 will serve as a forebay and collect sediment prior to being conveyed to the existing lagoon on the western portion of the tract. The pipe connection to the lagoon will allow for even distribution of stormwater runoff in conjunction with the provision of greater storage capacity. The wet detention basins, (pond 1 and 1A), will accommodate approximately 3.0 ac-ft. plus of stormwater storage prior to overflowing into the shallow outlet swale on the southeastern end of Pond 2A. The outlet swale will deposit residual runoff into the existing canal located on the eastern boundary line. A drawdown device will not be provided at this location as a result of the Division of Coastal Managements current rules on direct discharge to surface waters. An overswale swale will be provided to divert runoff in excess of a 10-yr design storm event that outlets into the adjoining canal. It is anticipated that the Lagoon is in such close proximity to the adjoining surface waters that drawdown of the basin will occur hydraulically through the permeable soils and into the surrounding surface waters (*Reference the attached Drainage Basin Layout on Sheet Dr1 for delineation of the drainage area boundaries)*

STORMWATER STORAGE

Stormwater runoff from all impervious surfaces will receive a form of pollutant and sediment removal as described in best management practices. The following information is in conformance with the regulations as specified for high-density development:

1) Proposed impervious coverage of 33.02% over the total development area
2) Provision of vegetative conveyances along all proposed roadways to collect and transport stormwater runoff from all impervious surfaces.
3) Provision of a 30-foot wide vegetative buffer.
4) Provision of wet detention basins for temporary stormwater storage for the design storm event in conjunction with 85% pollutant removal.

STORMWATER DISPOSAL

The following measures will be provided to control the conveyance of stormwater from the proposed high-density development:

1) Proposed impervious coverage of 33.02% over the total development area
2) Provision of vegetative filters with relatively flat longitudinal slopes aiding in infiltration and sediment removal.
3) Utilization of vegetative buffers to aid in filtration & sediment removal
4) Provision of wet detention basins for temporary stormwater storage for the design storm event in conjunction with 85% pollutant removal.

POST-DEVELOPMENT RUNOFF SUMMARY

The resulting calculations provided a result of **89.20 cfs** of associative stormwater runoff from the proposed developmental activities, this figure is approximately 13 cfs less than the predevelopment

runoff.. Of approximately which **23.20 cfs** will be retained within the wet detention basins and conveyance devices and remaining amount of **63.00 cfs** being conveyed off-site. In drainage Basin #1, approximately **9.57** cfs will be retained on-site with **6.00** cfs being conveyed off-site, with the anticipated water surface elevations peaking at 10.45' msl, approximately 1.55' below the proposed minimum 1st floor elevations. Drainage Basin # 2 will store **16.63 cfs** within the wet detention basins increasing the water surface elevation to approximately **2.75'**, approximately **3.25'** below the residential 1st floor elevations.

MINIMUM FIRST-FLOOR ELEVATIONS

The minimum established first floor elevations will be 12.00' msl. within drainage basin #1 and 6.00' msl. within drainage basin #2. This first floor elevation will be in excess of the required 18" separation from the proposed water surface elevation during design storm event conditions. Fill to establish the minimum first floor elevations will be installed within the following locations;

Lots 20-22 – avg. fill amount: 0.5'
Lots 1,2,7,19,19,27,28,47-50,51-56,57-65,66-81,81,83-88,89-111,128,129,114-119,145-148 – avg. fill amount: 1.0'
Lots 3-6 – avg. fill amount: 1.5'
Lots 29-41,44-46,130,131 – avg. fill amount: 2.0'

OPERATION & MAINTENANCE

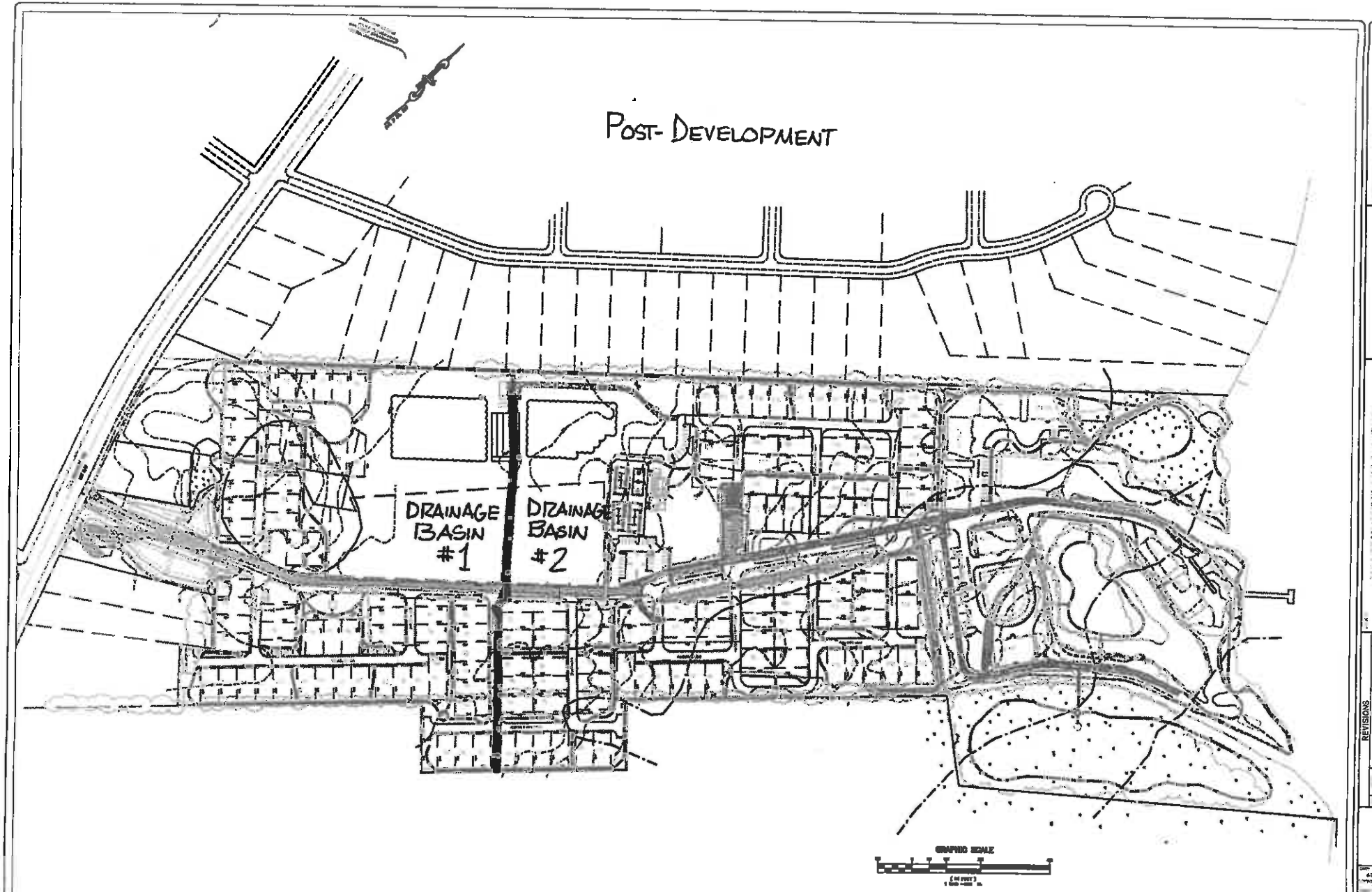
SCHEDULE OF COMPLIANCE

The developer shall maintain the responsibility for the stormwater management collection system until at which time a property owner's association has been established and will assume responsibility of the drainage system as denoted on the Waterside Villages Roadway, Drainage and Utility Infrastructure Improvements Construction Drawings. This responsibility will also include the roadway drainage swales that will be maintained by the developer until the property owner's association assumes responsibility for maintenance of the right-of-way. The stormwater measures are to be installed and maintained as follows;

- **A.** Swales and other vegetated conveyances shall be constructed in their entirety, vegetated, and be operational for their intended use prior to the construction of any built-upon surface except roads.
- **B.** During construction, erosion shall be kept to a minimum and any eroded areas of the swales or other vegetated conveyances will be repaired immediately.
- **C.** The following measures must perform the following operation & maintenance measures for optimum efficiency of the stormwater management system;
    1. Inspections- at least (1) every 6 months or after any significant rainfall event.
    2. Sediment removal- at least (1) every 6 months or after any significant rainfall event.
    3. Mowing, and revegetating of the side slope- once a month.
    4. Immediate repair of eroded slopes.
    5. General maintenance of side slopes in accordance with approved plans & specifications.

The developer will be responsible for cleaning out and maintaining any existing ditches to be utilized, as denoted on the Waterside Villages Roadway, Drainage and Utility Infrastructure Improvements Construction Drawings, for the purpose of stormwater drainage.

Post-Development Drainage Basin Delineation


POST- DEVELOPMENT
DRAINAGE BASIN #1
DRAINAGE BASIN #2
GRAPHIC SCALE

Pre-Development Design Calculations

Worksheet 2: Runoff curve number and runoff

Project WATERFORD VILLAGE By [illegible] Date [illegible]

Location GRANBY, MO Checked _____ Date _____

Circle one: Present Developed PRE-DEVELOPMENT

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Fig. 2-3	CN 1/ Fig. 2-4	Area ☒ acres ☐ mi² ☐ %	Product of CN x area
FORKTON D	OPEN SPACE < 50% GROUND COVER	80			2.94 AC	764.66
CONETOE A	OPEN SPACE < 50% GROUND COVER	68			38.99 AC	2,651.32
EX PAVEMENT / BUILDING	PAVEMENT/BLDGS.	98			3.75 AC	367.20
DRAGSTON C	OPEN SPACE < 50% GROUND COVER	86			8.36 AC	718.96
DRAGSTON C	WOODLANDS	73			4.50 AC	328.68
CONABY/ CUZRITUCK D	WOODLANDS	83			6.10 AC	506.19
CONABY/ CUZRITUCK D	OPEN SPACE < 50% GROUND COVER	89			6.33 AC	563.37
				Totals =	70.97	5,397.38

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{5397.38}{70.97} = 76.05$; Use CN = 76

2. Runoff

Storm #1	Storm #2	Storm #3
10 YR-24 HR		
6.20 IN		
3.50 IN		

Frequency ..... yr

Rainfall, P (24-hour) ..... in

Runoff, Q ..... in
(Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project Wakeside Villages By DMR Date 5/11/04

Location Granby, NC Checked _____ Date _____

Circle one: Present Developed Pre-Development

Circle one: T_c T_t through subarea _____

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)		Segment ID				
1. Surface description (table 3-1)			DENSE GRASS			
2. Manning's roughness coeff., n (table 3-1)			0.24			
3. Flow length, L (total L ≤ 300 ft)	ft		300			
4. Two-yr 24-hr rainfall, P_2	in		4.1			
5. Land slope, s	ft/ft		.0637			
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr		.3184	+		=
Shallow concentrated flow		Segment ID				
7. Surface description (paved or unpaved)			UNPAVED			
8. Flow length, L	ft		665.2187			
9. Watercourse slope, s	ft/ft		.0121			
10. Average velocity, V (figure 3-1)	ft/s		1.77			
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr		.1044	+		=
Channel flow		Segment ID				
12. Cross sectional flow area, a	ft^2		3395			
13. Wetted perimeter, p_w	ft		17.62			
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft		1.93			
15. Channel slope, s	ft/ft		.001			
16. Manning's roughness coeff., n			.020			
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s		3.64			
18. Flow length, L	ft		2264			
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr		.1730	+		=
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)	hr					0.680

36 MIN.

Worksheet 4: Graphical Peak Discharge method

Project Waterside Villages By DMK Date 5/11/04

Location Granby, NC Checked ______ Date ______

Circle one: Present Developed Predevelopment

1. Data:

Drainage area .... A_m = 0.1109 mi^2 (acres/640)

Runoff curve number .... CN = 76 (From worksheet 2)

Time of concentration .. T_c = 0.60 hr (From worksheet 3)

Rainfall distribution type = III (I, IA, II, III)

Pond and swamp areas spread throughout watershed ...... = ______ percent of A_m (3.54 acres or mi^2 covered) OR .0055

		Storm #1	Storm #2	Storm #3
2. Frequency	yr	10 yr 24 hr		
3. Rainfall, P (24-hour)	in	3.60		
4. Initial abstraction, I_a .... (Use CN with table 4-1.)	in	0.632		
5. Compute I_a/P		0.1756		
6. Unit peak discharge, q_u .... (Use T_c and I_a/P with exhibit 4-III)	csm/in	360		
7. Runoff, Q .... (From worksheet 2).	in	3.60		
8. Pond and swamp adjustment factor, F_p .... (Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area.)		.72		
9. Peak discharge, q_p .... (Where $q_p = q_u A_m Q F_p$)	cfs	103.48		

B1 B2

2.58 AC-FT 5.87 AC-FT

112,444 ft³ [illegible]

78,[illegible] 147,[illegible]

Post-Development Design Calculations

Worksheet 2: Runoff curve number and runoff

Project: Waterside Village By: DMR Date: 5/12/04

Location: Granby, NY Checked: ______ Date: ______

Circle one: Present Developed Basin # 1

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN [1/] Table 2-2	CN [1/] Fig. 2-3	CN [1/] Fig. 2-4	Area ☒ acres ☐ mi^2 ☐ %	Product of CN x area
Portsmouth D	Open Space 50-75% Grass Cover	84			0.79 AC	66.36
Colton A	Open Space 50-75% Grass Cover	49			12.50 AC	612.50
Portsmouth D	Paved Streets W/ Curbs	98			0.24 AC	23.52
Colton A	Paved Streets W/ Curbs	98			2.95 AC	289.10
Portsmouth D	Residential Lots 1/8 Acre in Size	92			1.43 AC	131.56
Colton A	Residential Lots 1/8 Acre in Size	77			4.64 AC	357.28
				Totals =	22.55	1,480.32

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{1480.32}{22.55} = 65.64$; Use CN = 66

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr	10 yr 24 hr		
Rainfall, P (24-hour)	in	6.10		
Runoff, Q (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)	in	2.59		

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project W[illegible] Village By [illegible] Date [illegible]

Location Grandy, NC Checked ____ Date ____

Circle one: Present Developed Basin # 1

Circle one: (T_c) T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)	Unit	Segment	Segment	Total
Segment ID		—		
1. Surface description (table 3-1)		Bermuda Grass		
2. Manning's roughness coeff., n (table 3-1) ..		0.41		
3. Flow length, L (total L ≤ 300 ft)	ft	50		
4. Two-yr 24-hr rainfall, P_2	in	4.1		
5. Land slope, s	ft/ft	.02		
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	0.19	+	=

Shallow concentrated flow	Unit	Segment	Segment	Total
Segment ID		—		
7. Surface description (paved or unpaved)		Unpaved		
8. Flow length, L	ft	—		
9. Watercourse slope, s	ft/ft	—		
10. Average velocity, V (figure 3-1)	ft/s	—		
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	—	+	=

Channel flow	Unit	Segment	Segment	Total
Segment ID		—		
12. Cross sectional flow area, a	ft^2	6.82		
13. Wetted perimeter, p_w	ft	9.57		
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft	0.71		
15. Channel slope, s	ft/ft	.001		
16. Manning's roughness coeff., n		.075		
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s	0.50		
18. Flow length, L	ft	1567		
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	0.87	+	=

20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19) .... hr 1.06

Worksheet 4: Graphical Peak Discharge method

Project Waterside Villages By DMC Date 5/12/04

Location Granby, NC Checked _____ Date _____

Circle one: Present Developed Basin 1

1. Data:

Drainage area ..... A_m = .0313 mi^2 (acres/640)

Runoff curve number .... CN = 66 (From worksheet 2)

Time of concentration .. T_c = 1.96 hr (From worksheet 3)

Rainfall distribution type = III (I, IA, II, III)

Pond and swamp areas spread throughout watershed ..... = 4.16 percent of A_m (.0245 acres or mi^2 covered)

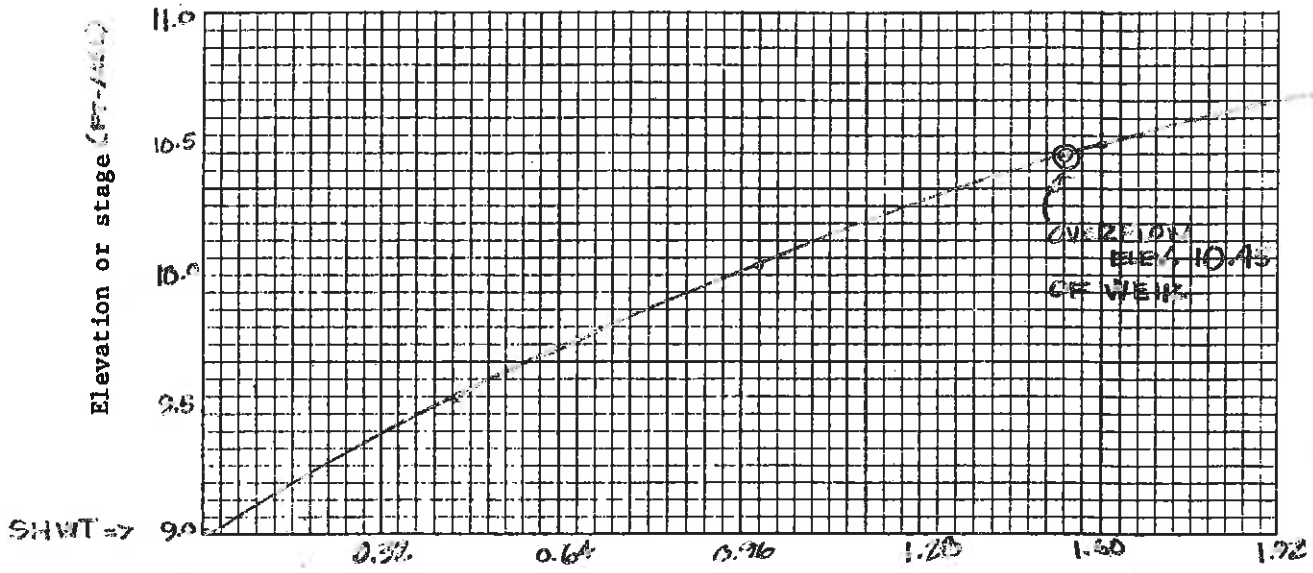
			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10 yr 24 hr		
3.	Rainfall, P (24-hour)	in	6.20		
4.	Initial abstraction, I_a ..... (Use CN with table 4-1.)	in	1.175		
5.	Compute I_a/P		.1895		
6.	Unit peak discharge, q_u ..... (Use T_c and I_a/P with exhibit 4-II)	csm/in	260.00		
7.	Runoff, Q ..... (From worksheet 2).	in	2.59		
8.	Pond and swamp adjustment factor, F_p .... (Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area.)		0.7284		
9.	Peak discharge, q_p ..... (Where $q_p = q_u A_m Q F_p$)	cfs	15.57		

Worksheet 6a: Detention basin storage, peak outflow discharge (q_o) known

Project WATERSIDE VILLAGES By DMK Date 5/12/24

Location GRANITE, NORTH CAROLINA Checked ____ Date ____

Circle one: Present Developed BASIN #1



		1st stage	2nd stage
1.	Data: Drainage area ..... A_m = .0352 mi^2; Rainfall distribution type (I, IA, II, III) = III		
2.	Frequency ..... yr	10 YR	
3.	Peak inflow discharge, q_i .... cfs (From worksheet 4 or 5b)	15.57	
4.	Peak outflow discharge, q_o .... cfs 1/	6	
5.	Compute $\frac{q_o}{q_i}$	0.385	
6.	$\frac{V_s}{V_r}$ ..... (Use $\frac{q_o}{q_i}$ with figure 6-1)	0.525	
7.	Runoff, Q ..... in (From worksheet 2)	2.59	
8.	Runoff volume, V_r ..... ac-ft ($V_r = QA_m 53.33$)	4.86	
9.	Storage volume, V_s ..... ac-ft ($V_s = V_r(\frac{V_s}{V_r})$)	1.60	
10.	Maximum stage, E_{max} (From plot)	10.45	

1/ 2nd stage q_o includes 1st stage q_o.

WIDTH: V-SHAPED SWALE
INV. ELEV: 9.65'
6:1 SIDE SLOPES
DEPTH OF FLOW: 0.8' = 10.45'
V= 2.54 FPS

Worksheet 2: Runoff curve number and runoff

Project WATERSIDE VILLAGE By DHE Date 5/12/04

Location GRANDY, NC Checked ____ Date ____

Circle one: Present Developed BASIN #2

1. Runoff curve number (CN)

Soil name and hydrologic group (appendix A)	Cover description (cover type, treatment, and hydrologic condition; percent impervious; unconnected/connected impervious area ratio)	CN 1/ Table 2-2	CN 1/ Fig. 2-3	CN 1/ Fig. 2-4	Area ☒ acres ☐ mi² ☐ %	Product of CN x area
CONETOE A	OPEN SPACE 50% - 75% GRASS COVER	49			8.70 AC	426.30
DONGSTON C	OPEN SPACE WOODS < 50% GRASS COVER	82			7.79 AC	637.96
CONABY CURRITUCK D	OPEN SPACE WOODS < 50% GRASS COVER	86			11.45 AC	985.41
CONETOE DRAGSTON CONABY CURRITUCK	PAVED ROADWAYS W/ CURB & STORM COLLECTION	98			6.33 AC	620.34
CONETOE A	RESIDENTIAL LOTS 1/8 ACRE IN SIZE	77			10.05 AC	773.90
DRAGSTON C	RESIDENTIAL LOTS 1/8 ACRE IN SIZE	90			3.78 AC	340.64
CONABY CURRITUCK D	TOWNHOMES *(65% IMPERVIOUS AREA)	92			0.33 AC	30.36
				Totals =	48.42	3814.81

1/ Use only one CN source per line.

CN (weighted) = $\frac{\text{total product}}{\text{total area}} = \frac{3814.81}{48.42} = 78.78$; Use CN = **79**

2. Runoff

		Storm #1	Storm #2	Storm #3
Frequency	yr	10 YR - 24 HR		
Rainfall, P (24-hour)	in	6.30		
Runoff, Q (Use P and CN with table 2-1, fig. 2-1, or eqs. 2-3 and 2-4.)	in	3.86		

Worksheet 3: Time of concentration (T_c) or travel time (T_t)

Project WATERSIDE VILLAGE By DMB Date 6/12/14

Location GRANDY, NC Checked ____ Date ____

Circle one: Present Developed BASIN 2

Circle one: (T_c) T_t through subarea

NOTES: Space for as many as two segments per flow type can be used for each worksheet.

Include a map, schematic, or description of flow segments.

Sheet flow (Applicable to T_c only)		Segment ID		
1. Surface description (table 3-1)		BERMUDA GRASS		
2. Manning's roughness coeff., n (table 3-1) ..		0.41		
3. Flow length, L (total L ≤ 300 ft)	ft	50		
4. Two-yr 24-hr rainfall, P_2	in	4.1		
5. Land slope, s	ft/ft	.02		
6. $T_t = \frac{0.007\ (nL)^{0.8}}{P_2^{0.5}\ s^{0.4}}$ Compute T_t	hr	.1852	+	=

Shallow concentrated flow		Segment ID		
7. Surface description (paved or unpaved)		–		
8. Flow length, L	ft	–		
9. Watercourse slope, s	ft/ft	–		
10. Average velocity, V (figure 3-1)	ft/s	–		
11. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	–	+	=

Channel flow		Segment ID		
12. Cross sectional flow area, a	ft^2	6.8182		
13. Wetted perimeter, p_w	ft	9.5731		
14. Hydraulic radius, $r = \frac{a}{p_w}$ Compute r	ft	0.7122		
15. Channel slope, s	ft/ft	0.001		
16. Manning's roughness coeff., n		.0075		
17. $V = \frac{1.49\ r^{2/3}\ s^{1/2}}{n}$ Compute V	ft/s	0.50		
18. Flow length, L	ft	981.37		
19. $T_t = \frac{L}{3600\ V}$ Compute T_t	hr	0.5449	+	=
20. Watershed or subarea T_c or T_t (add T_t in steps 6, 11, and 19)	hr			0.7284

Worksheet 4: Graphical Peak Discharge method

Project WALKERTOWN VILLAGES By DMK Date 3/12/14

Location GRANITE, NC Checked _____ Date _____

Circle one: Present Developed EXISTING #2

1. Data:

Drainage area ..... A_m = 0.0157 mi^2 (acres/640)

Runoff curve number .... CN = 79 (From worksheet 2)

Time of concentration .. T_c = 0.729 hr (From worksheet 3)

Rainfall distribution type = III (I, IA, II, III)

Pond and swamp areas spread throughout watershed ..... = 26.05% percent of A_m (13.66 acres or mi^2 covered)

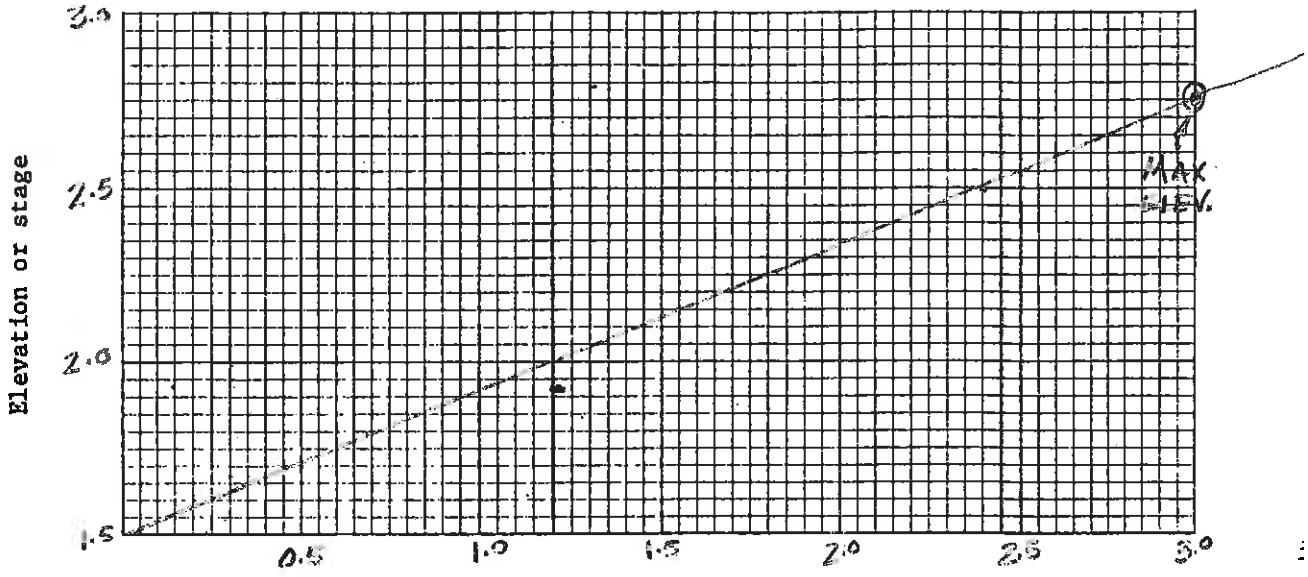
			Storm #1	Storm #2	Storm #3
2.	Frequency	yr	10-YR 24-HR		
3.	Rainfall, P (24-hour)	in	6.20		
4.	Initial abstraction, I_a ..... (Use CN with table 4-1.)	in	0.532		
5.	Compute I_a/P		.0858		
6.	Unit peak discharge, q_u ..... (Use T_c and I_a/P with exhibit 4-III)	csm/in	350.00		
7.	Runoff, Q ..... (From worksheet 2).	in	3.86		
8.	Pond and swamp adjustment factor, F_p .... (Use percent pond and swamp area with table 4-2. Factor is 1.0 for zero percent pond and swamp area.)		0.72		
9.	Peak discharge, q_p ..... (Where $q_p = q_u A_m Q F_p$)	cfs	73.63		

Worksheet 6a: Detention basin storage, peak outflow discharge (q_o) known

Project WATERCOLOR VILLAGE By DMK Date _____

Location GRANBY, N.C. Checked _____ Date _____

Circle one: Present Developed BASIN #7



Detention basin storage

1. Data:
   Drainage area ..... A_m = .0757 mi^2
   Rainfall distribution type (I, IA, II, III) = III

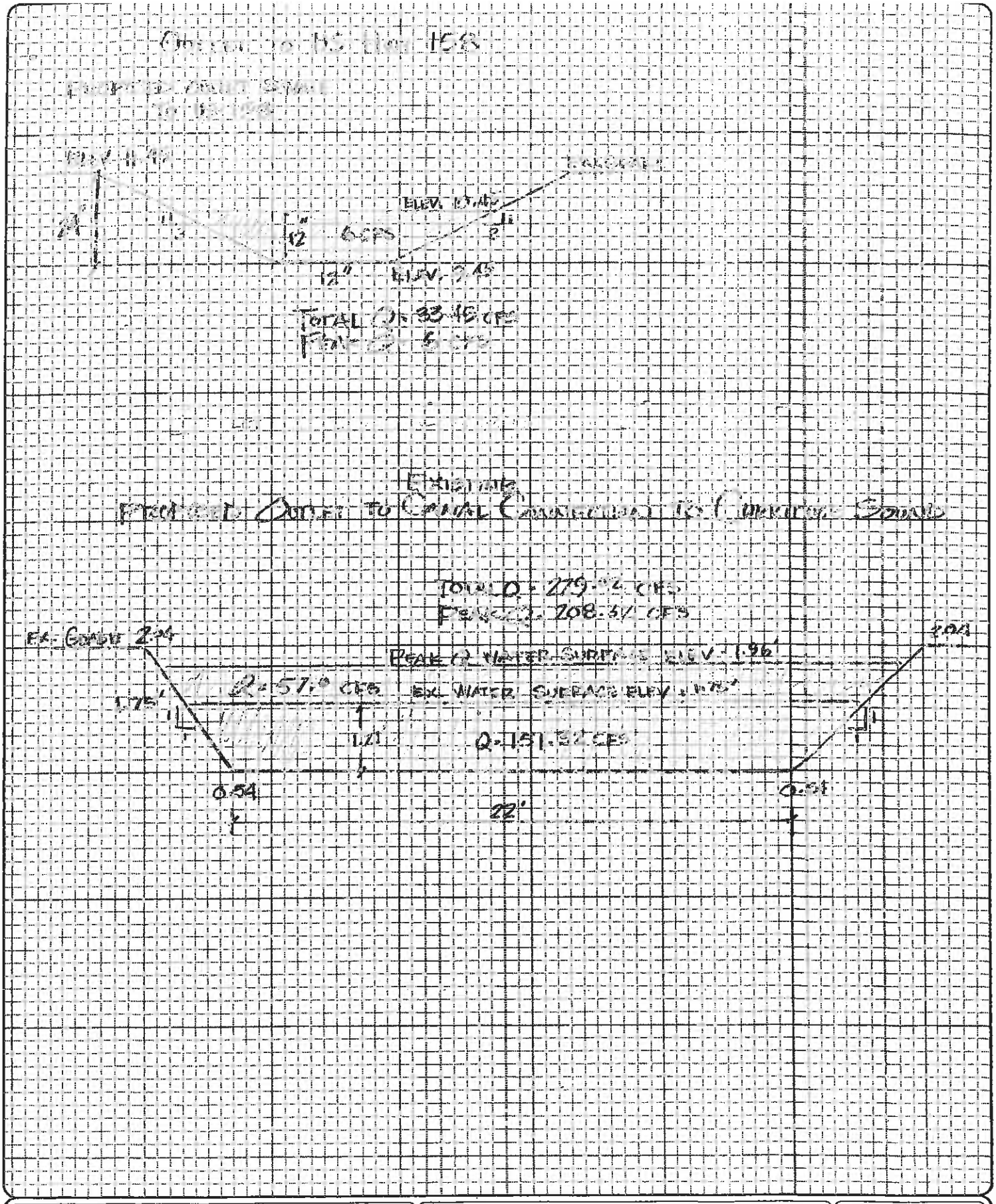
	1st stage	2nd stage
2. Frequency ..... yr	10 YR 24 HR.	
3. Peak inflow discharge, q_i .... cfs (From worksheet 4 or 5b)	73.63	
4. Peak outflow discharge, q_o .... cfs 1/	57	
5. Compute $\frac{q_o}{q_i}$	0.774	
6. $\frac{V_s}{V_r}$ ..... (Use $\frac{q_o}{q_i}$ with figure 6-1)	0.182	
7. Runoff, Q ..... in (From worksheet 2)	3.86	
8. Runoff volume, V_r ..... ac-ft ($V_r = QA_m 53.33$)	15.53	
9. Storage volume, V_s ..... ac-ft ($V_s = V_r(\frac{V_s}{V_r})$)	2.84	
10. Maximum stage, E_{max} (From plot)	2.75'	

WEIR: 5:1 _____ /3:1

INV. ELEV. 1.50'

1/ 2nd stage q_o includes 1st stage q_o.

Downstream Analysis Cross-Sections



DESCRIPTION

PROJECT NAME Waterside Village

DESIGNED BY DMB DATE 6/7/04

CHECKED BY _____ DATE _____

APPROVED BY _____ DATE _____

BISSELL PROFESSIONAL GROUP
Engineers, Planners, Surveyors and Environmental Specialists
4417 North Croatan Highway
P.O. Box 1068
Kitty Hawk, North Carolina 27949
(252) 261-3225 or 261-3266
FAX (252) 261-1760

PROJECT # 401

SHEET 1 OF 1

DATE 6/7/04

December 5, 2024

TO: **SAGA Construction Inc.**
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Attn: Mr. Fred Vollat

RE: Construction Materials Testing Services
Waterside Villages Phases 2 &4
Grandy, North Carolina
Terracon Project No: K5241002
Report No. 1

Dear Mr. Vollat:

As requested, a representative of **Terracon** visited the project site between the dates of April 17, 2024, and November 11, 2024. The purpose of our visits was to observe and evaluate the roadway construction activities with respect to Aggregate Base Course (ABC) and Asphalt placement.

The roadway pavement section is understood to require at least 6 inches of ABC materials overlain by 2 inches of surface mix asphalt (Type RS-9.5B). The project specifications required testing of the ABC and asphalt materials be performed for quality assurance, in accordance with the NCDOT requirements. As such, this report includes the evaluation of the ABC materials and asphalt materials placed within the roadway alignment as they relate to thickness, density, aggregate gradation, and asphalt content. The requested scope of services did not include the evaluation of the existing subgrade soils and/or structural fill materials placed to establish the design grade elevations, if required.

SCOPE OF SERVICES

For this project, **Terracon** has performed the following tasks:

- Performed bulk soil sampling from the on-site stockpile of the imported structural fill and aggregate base course materials used as ABC within the observed roadway alignments. The sample was returned to our Elizabeth City, NC laboratory for natural moisture, full sieve, and Proctor testing in general accordance with NCDOT requirements. The laboratory test results indicated the imported ABC materials were in general accordance with NCDOT requirements with respect to gradation. The results of these testing procedures are provided on the "Moisture Density Relationship Proctor Curve" and "Particle Size Distribution" test report sheets attached to this report.

- During our April 17, 2024 site visit, compaction testing was performed on the in place structural fill placed for the project. The test results indicated an the materials were compacted to at least 99%.

- During our June 3, 2024 and November 11, 2024 site visits, compaction and thickness testing procedures were performed and indicated that the ABC materials were compacted to 100%. The thickness test results indicated an in-place ABC thickness ranging from approximately 6 inches to 6.25 inches.

- Performed coring operations at fourteen (14) locations with the use of a 6-inch diameter core barrel within the requested roadway alignment. The core locations were randomly established in the field by a **Terracon** representative prior to initiating the coring operations.

- Performed laboratory testing procedures at **Terracon's** laboratory located in Elizabeth City, NC. The laboratory testing procedures consisted of average core specimen thickness and bulk specific gravity as well as asphalt content and asphalt aggregate gradation analysis. The laboratory test procedures were executed in general accordance with NCDOT testing procedures. The specific gravity (density) and thickness test results are provided in the following table (Table I – Asphalt Laboratory Test Results). The asphalt content test results are provided in "Table II – Asphalt Content Test Results" and the asphalt aggregate gradation analysis test results are provided on the attached "Particle Size Distribution" sheets.

Table I– Asphalt Laboratory Test Results

Sample #	Sample Location [1]	Asphalt Type	Average Sample Thickness (in.)	Specific Gravity	Percent Compaction (Min. 90%)[2-5]
C-1	See Location Plan	RS-9.5B	1.77	2.132	89.3%
C-2	See Location Plan	RS-9.5B	2.61	2.313	96.8%
C-3	See Location Plan	RS-9.5B	3.37	2.270	95.0%
C-4	See Location Plan	RS-9.5B	3.76	2.194	91.8%
C-5	See Location Plan	RS-9.5B	3.18	2.178	91.2%
C-6	See Location Plan	RS9.5B	2.40	2.212	92.6%
C-7	See Location Plan	RS-9.5B	2.08	2.237	93.6%
C-8	See Location Plan	RS-9.5B	2.59	2.174	91.0%
C-9	See Location Plan	RS-9.5B	1.88	2.232	93.4%
C-10	See Location Plan	RS-9.5B	2.60	2.255	94.4%
C-11	See Location Plan	RS-9.5B	2.14	2.200	92.1%
C-12	See Location Plan	RS-9.5B	2.54	2.180	91.3%

C-13	See Location Plan	RS-9.5B	2.52	2.158	90.3%
C-14	See Location Plan	RS-9.5B	2.84	2.172	90.9%
Average		**RS-9.5B**	**2.59**	**2.207**	**92.4%**

Note (1) = Locations provided in the table above are considered to be approximate.
Note (2) = Percent compaction based on the Rice specific gravity values of 2.389 for Type RS-9.5B (JMF: 20-0508-031), furnished by Allan Myers Chesapeake.
Note (4) = Minimum percent compaction requirement: 90% for Types RS-9.5B.

Table II – Asphalt Content Test Results

Sample # and Asphalt Type	Sample Location	Asphalt Content (%)[1]
C-2 RS-9.5B	See Location Plan	5.3
C-5 RS-9.5B	See Location Plan	5.3
C-10 RS-9.5B	See Location Plan	5.2
C-14 RS-9.5B	See Location Plan	5.3

Note (1) = Percent asphalt requirement for Type RS-9.5B is 6.3% +/- 0.7% per the JMF: 20-0508-031 furnished by Allan Myers Chesapeake and the NCDOT allowable tolerance.

We appreciate the opportunity to offer our services to you, and trust that you will call our Elizabeth City office with any questions that you may have.

Respectfully Submitted,
Terracon

Gerald W. Stalls Jr., P.E.
Senior Project Engineer
NC Lic. #034336

Brad Gallop

Isaac B. Gallop
Department Manager Materials

Attachments: Moisture Density Relationship Proctor Curve(s)
Particle Size Distribution Test Report(s):
Aggregate Base Course (ABC)
Asphalt Cores C-2, C-5, C-10, & C-14

SAMPLE PICK-UP REPORT

Report Number: K5241002.0003
Service Date: 04/17/24
Report Date: 12/05/24 Revision 1 - update
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

As requested, a representative of Terracon was onsite on this date to obtain a proctor sample. A Tan sand proctor was picked up and returned to our laboratory for testing.

Services: Pickup samples from the project site and return them to the office for testing and/or processing.

Terracon Rep.: Christian Mitchell
Reported To:
Contractor: SAGA
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By: _____

Brad Gallop
Project Manager

FIELD DENSITY TEST REPORT

Report Number: K5241002.0004
Service Date: 04/17/24
Report Date: 12/05/24 Revision 1 - Proctor
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

Material Information

Mat. No.	Proctor Ref. No.	Classification and Description	Laboratory Test Method	Lab Test Data: Opt. Water Content (%)	Lab Test Data: Max. Lab Density (pcf)	Project Requirements: Water Content (%)	Project Requirements: Compaction (%)
2	K5241002.0011	Tan Silty SAND	ASTM D698	13.2	113.0		Min 95.0

Field Test Data

Test No.	Test Location	Lift / Elev.	Mat. No.	Probe Depth (in)	Wet Density (pcf)	Water Content (pcf)	Water Content (%)	Dry Density (pcf)	Percent Compaction (%)
	Roadway subgrade								
1	Bridge View Drive South	6" BFG	2	12	118.9	6.2	5.5	112.7	99.7
2	Bridge View Drive South	6" BFG	2	12	121.1	5.8	5.0	115.3	100+
3	admirals view drive	6" BFG	2	12	121.6	7.4	6.5	114.2	100+
4	cove lane	6" BFG	2	4	120.1	5.4	4.7	114.7	100+
5	cove lane	6" BFG	2	12	121.1	5.9	5.1	115.2	100+
6	genoa court	6" BFG	2	12	120.6	6.7	5.9	113.9	100+
7	keel drive	6" BFG	2	12	121.6	8.6	7.6	113.0	100.0
8	yacht club lane south	6" BFG	2	4	122.8	7.4	6.4	115.4	100+
9	transom drive south	6" BFG	2	4	119.9	7.1	6.3	112.8	99.8
10	transom drive south	6" BFG	2	12	120.0	4.9	4.3	115.1	100+

Datum: **Std. Cnt. M:** 687 **Std. Cnt. D:** 2158
S/N: 75685 **Make:** Troxler **Model:** 3430 **Last Cal. Date:** 02/01/2024
Comments: **Test and/or retest results on this report meet project requirements as noted above.**

Services: Perform in-place moisture and density retests as requested or as required by the project specifications to determine degree of compaction and material moisture condition.
Terracon Rep.: Christian Mitchell
Reported To:
Contractor: SAGA
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By:
Brad Gallop
Project Manager

Test Methods: ASTM D6938

FIELD DENSITY TESTING REPORT

Report Number: K5241002.0004
Service Date: 04/17/24
Report Date: 12/05/24 Revision 1 - Proctor
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

Services: Perform in-place moisture and density retests as requested or as required by the project specifications to determine degree of compaction and material moisture condition.

Terracon Rep.: Christian Mitchell
Reported To:
Contractor: SAGA
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By: _____

Brad Gallop
Project Manager

FIELD DENSITY TEST REPORT

Report Number: K5241002.0006
Service Date: 06/03/24
Report Date: 06/05/24
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

Material Information

Mat. No.	Proctor Ref. No.	Classification and Description	Laboratory Test Method	Lab Test Data: Opt. Water Content (%)	Lab Test Data: Max. Lab Density (pcf)	Project Requirements: Water Content (%)	Project Requirements: Compaction (%)
1	K5241002.0001	PENDING PROCTOR		16.0	119.5		

Field Test Data

Test No.	Test Location	Lift / Elev.	Mat. No.	Probe Depth (in)	Wet Density (pcf)	Water Content (pcf)	Water Content (%)	Dry Density (pcf)	Percent Compaction (%)
1	Stone Road base	FG	1	4	133.7	4.5	3.5	129.2	100+
2	Stone road base	FG	1	4	136.8	5.6	4.3	131.2	100+
3	Stone road base	FG	1	4	133.4	4.8	3.7	128.6	100+
4	Stone road base	FG	1	4	136.5	5.9	4.5	130.6	100+
5	Stone road base	FG	1	4	135.0	5.6	4.3	129.4	100+
6	Stone Rock base	FG	1	4	138.5	5.3	4.0	133.2	100+
7	Stone Road Base	FG	1	4	130.6	6.0	4.8	124.6	100+
8	Stone road base	FG	1	4	133.2	5.6	4.4	127.6	100+

Datum: Final grade **Std. Cnt. M:** 717 **Std. Cnt. D:** 1803
S/N: 32487 **Make:** Troxler **Model:** 3430 **Last Cal. Date:** 07/01/2023
Comments: Proctor not Completed.

Services: Perform in-place moisture and density retests as requested or as required by the project specifications to determine degree of compaction and material moisture condition.
Terracon Rep.: Jb Griffin
Reported To:
Contractor: S&S
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By:
Brad Gallop
Project Manager

Test Methods: ASTM D6938

SAMPLE PICK-UP REPORT

Report Number: K5241002.0007
Service Date: 06/03/24
Report Date: 06/05/24
Task: Earthwork and Site Paving

106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

Sample Information

Terracon was requested to perform a sample pickup of the following materials:

Material Type/ Description	Source	Sample Location	Sample Type	Sampling Procedure	Proposed Use
Aggregate -ABC Stone	On site	Stock pile	Bulk	Stockpile	Road base

Sample Delivery

Samples were obtained and delivered to a Terracon laboratory on 6/3/2024 for testing as requested.

Services: Pickup samples from the project site and return them to the office for testing and/or processing.

Terracon Rep.: Jb Griffin
Reported To:
Contractor:
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By: _____

Brad Gallop
Project Manager

SAMPLE PICK-UP REPORT

Report Number: K5241002.0007
Service Date: 06/03/24
Report Date: 06/05/24
Task: Earthwork and Site Paving

106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

Sample Information

Terracon was requested to perform a sample pickup of the following materials:

Material Type/ Description	Source	Sample Location	Sample Type	Sampling Procedure	Proposed Use
Aggregate -ABC Stone	On site	Stock pile	Bulk	Stockpile	Road base

Sample Delivery

Samples were obtained and delivered to a Terracon laboratory on 6/3/2024 for testing as requested.

Services: Pickup samples from the project site and return them to the office for testing and/or processing.

Terracon Rep.: Jb Griffin
Reported To:
Contractor:
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By: _____

Brad Gallop
Project Manager

PARTICLE SIZE DISTRIBUTION REPORT

Report Number: K5241002.0008
Service Date: 06/17/24
Report Date: 06/21/24
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

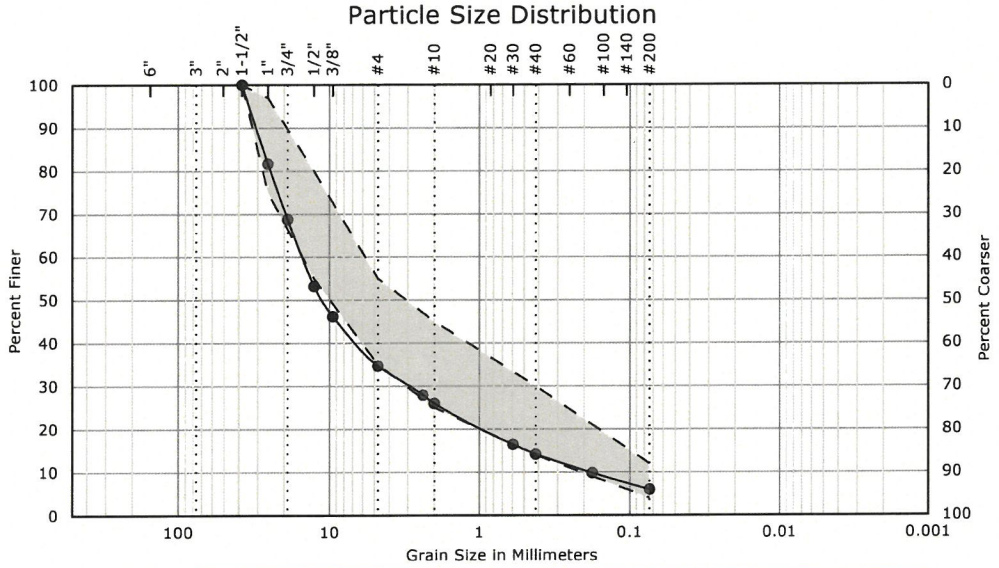
Sample Information

Sample Type: Bulk
Sample Location:
Sample Description: ABC Stone
USCS: Well-graded gravel with silt and sand (GW-GM)

Laboratory Test Data

Test Method: ASTM D6913
Method: B
Atterberg Limits: Non-Plastic
Sample Preparation: Oven Dried
Sieving Method: Single Sieve-Set Sieving

Sieve Size	Percent Finer	Spec.*	Pass (X=Fail)
1-1/2"	100	100-100	
1"	82	75-97	
3/4"	69		
1/2"	53	55-80	x
3/8"	46		
#4	35	35-55	
#8	28		
#10	26	25-45	
#30	16		
#40	14	14-30	
#80	10		
#200	6	4-12	



% Cobbles	% Gravel - 65.3		% Sand - 28.7			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	31.2	34.1	8.7	11.8	8.2	6.0

* | D_{60} = 15.31 | D_{30} = 2.90 | D_{10} = 0.185 | C_c = 3.0 | C_u = 82.9 | FM =

Comments:

Services:
Terracon Rep.: Kim Overton
Reported To:
Contractor: S&S
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By:

Brad Gallop
Project Manager

Test

LABORATORY COMPACTION CHARACTERISTICS OF SOIL REPORT

Report Number: K5241002.0009
Service Date: 06/17/24
Report Date: 12/05/24 Revision 1 - proctor
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

Material Information

Source of Material:
Proposed Use: Road Subgrade

Sample Information

Sample Date:
Sampled By:
Sample Location:

Sample Description: ABC Stone

Laboratory Test Data

Test Procedure: ASTM D1557
Test Method: Method C
Sample Preparation: Wet
Rammer Type: Manual

	Result	Specifications
Liquid Limit:	Non-plastic	
Plastic Limit:	Non-plastic	
Plasticity Index:	Non-plastic	
In-Place Moisture (%):	2.7	
Passing #200 (%):	6.0	

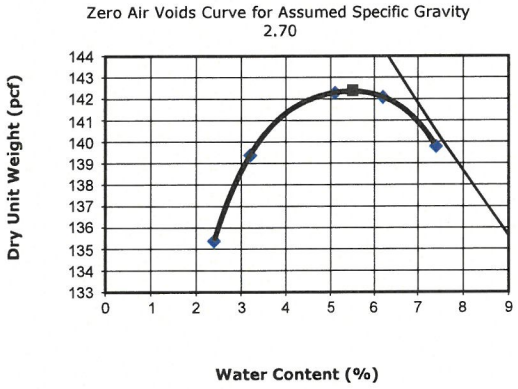
USCS:

Oversized Particles (%): 30.4
Moisture (%): 1.3
Sieve for Oversize Fraction: 3/4

Assumed Bulk Specific Gravity of Oversized Particles: 2.7

Corrected for Oversized Particles (ASTM D4718)
Maximum Dry Unit Weight (pcf): **142.4**
Optimum Water Content (%): **5.5**

Uncorrected Values
Maximum Dry Unit Weight (pcf): **133.3**
Optimum Water Content (%): **7.4**



Comments:

Services: Moisture-Density Relations

Terracon Rep.: Kim Overton
Reported To:
Contractor: SAGA
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By: _____

Brad Gallop
Project Manager

Test Methods: ASTM D698, ASTM D4318, ASTM D4647, ASTM D4718

PARTICLE SIZE DISTRIBUTION REPORT

Report Number: K5241002.0010
Service Date: 06/21/24
Report Date: 06/21/24
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

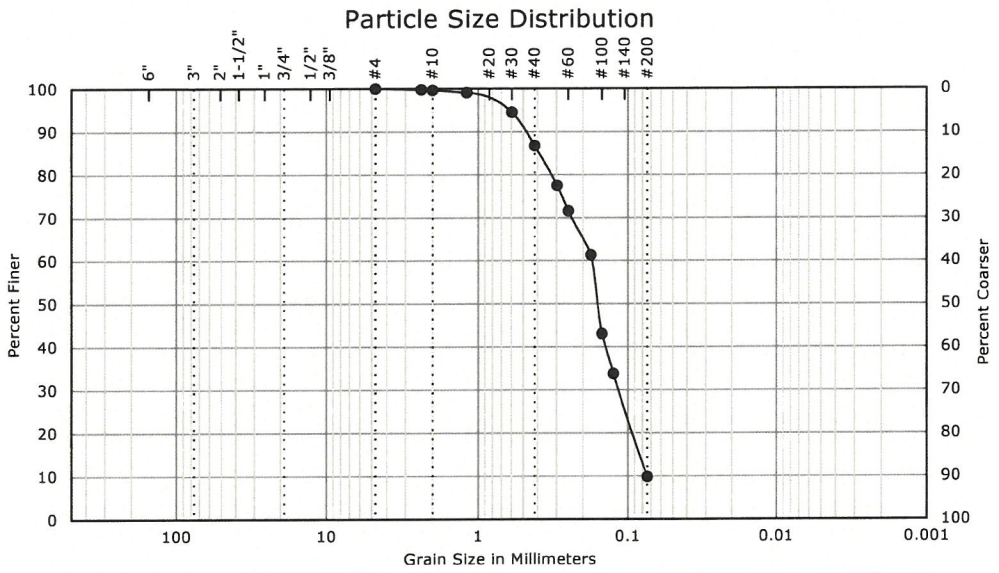
Sample Information

Sample Type: Bulk
Sample Location: Stockpile
Sample Description: Tan Silty SAND
USCS: Poorly-graded sand with silt (SP-SM)

Laboratory Test Data

Test Method: ASTM D6913
Method: B
Atterberg Limits: Non-Plastic
Sample Preparation: Oven Dried
Sieving Method: Single Sieve-Set Sieving

Sieve Size	Percent Finer	Spec.*	Pass (X=Fail)
#4	100		
#8	100		
#10	100		
#16	99		
#30	95		
#40	87		
#50	77		
#60	72		
#80	61		
#100	43		
#120	34		
#200	10		



% Cobbles	% Gravel - 0.0		% Sand - 90.1			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0		0.3	12.9	76.9	9.9

* | D_{60} = 0.17 | D_{30} = 0.12 | D_{10} = 0.074 | C_c = 1.1 | C_u = 2.3 | FM = 0.86

Comments:

Services:
Terracon Rep.: Kim Overton
Reported To:
Contractor:
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By:

Brad Gallop
Project Manager

Test

LABORATORY COMPACTION CHARACTERISTICS OF SOIL REPORT

Report Number: K5241002.0011
Service Date: 06/21/24
Report Date: 12/05/24 Revision 1 - Proctor
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

Material Information

Source of Material:
Proposed Use: Site Fill

Sample Information

Sample Date:
Sampled By:
Sample Location: Stockpile

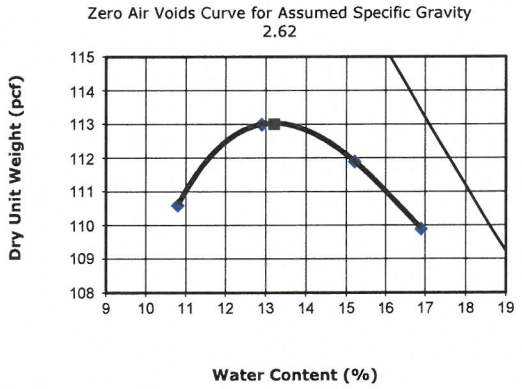
Sample Description: Tan Silty SAND

Laboratory Test Data

Test Procedure: ASTM D698
Test Method: Method A
Sample Preparation: Wet
Rammer Type: Manual
Maximum Dry Unit Weight (pcf): **113.0**
Optimum Water Content (%): **13.2**

	Result	Specifications
Liquid Limit:		
Plastic Limit:		
Plasticity Index:		
In-Place Moisture (%):	2.4	
Passing #200 (%):	4.2	

USCS:



Comments:

Services: Moisture-Density Relations

Terracon Rep.: Kim Overton
Reported To:
Contractor: SAGA
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By: _____

Brad Gallop
Project Manager

Test Methods: ASTM D698, ASTM D4318, ASTM D4647, ASTM D4718

FIELD DENSITY TEST REPORT

Report Number: K5241002.0012
Service Date: 11/05/24
Report Date: 12/05/24 Revision 1 - detail
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

Material Information

Mat. No.	Proctor Ref. No.	Classification and Description	Laboratory Test Method	Lab Test Data: Opt. Water Content (%)	Lab Test Data: Max. Lab Density (pcf)	Project Requirements: Water Content (%)	Project Requirements: Compaction (%)
1	K5241002.0009	ABC Stone	ASTM D698	5.5	142.4		

Field Test Data

Test No.	Test Location	Lift / Elev.	Mat. No.	Probe Depth (in)	Wet Density (pcf)	Water Content (pcf)	Water Content (%)	Dry Density (pcf)	Percent Compaction (%)
	Phases 2 & 4								
1	Bridgeview dr south; near lot 51	2"BFG	1	6	150.3	7.8	5.5	142.5	100+
2	Bridgeview dr south; near lot 69	2"BFG	1	6	150.7	8.3	5.8	142.4	100.0
3	Admerils view dr; near lot 59	2"BFG	1	6	152.5	8.5	5.9	144.0	100+
4	Admerils view dr; near lot 63	2"BFG	1	6	151.4	8.3	5.8	143.1	100+
5	Cove lane; near lot 79	2"BFG	1	6	151.2	7.7	5.4	143.5	100+
6	Cove lane; near lot 71	2"BFG	1	6	152.2	8.1	5.6	144.1	100+
7	Genoa Court between lots 89 & 90	2"BFG	1	6	152.7	8.0	5.5	144.7	100+
8	Keel drive 50' from intersection of Genoa Court	2"BFG	1	6	152.6	8.0	5.5	144.6	100+
9	Keel drive near lot 86	2"BFG	1	6	151.8	8.5	5.9	143.3	100+
10	Yacht Club lane south; near lot 96	2"BFG	1	6	151.7	8.2	5.7	143.5	100+
11	Yacht club lane south	2"BFG	1	6	152.8	8.0	5.5	144.8	100+
12	Howyard lane	2"BFG	1	6	152.2	8.1	5.6	144.1	100+
13	Bowsprit lane south	2"BFG	1	6	152.8	8.0	5.5	144.8	100+

Datum: Final grade **Std. Cnt. M:** 5 **Std. Cnt. D:** 142
S/N: 32487 **Make:** Troxler **Model:** 3430 **Last Cal. Date:** 07/01/2023
Comments:

Services: Perform in-place moisture and density retests as requested or as required by the project specifications to determine degree of compaction and material moisture condition.
Terracon Rep.: John Berry
Reported To:
Contractor: SAGA
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By:
Brad Gallop
Project Manager

Test Methods: ASTM D6938

CORING-THICKNESS REPORT

Report Number: K5241002.0013
Service Date: 11/11/24
Report Date: 11/13/24
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

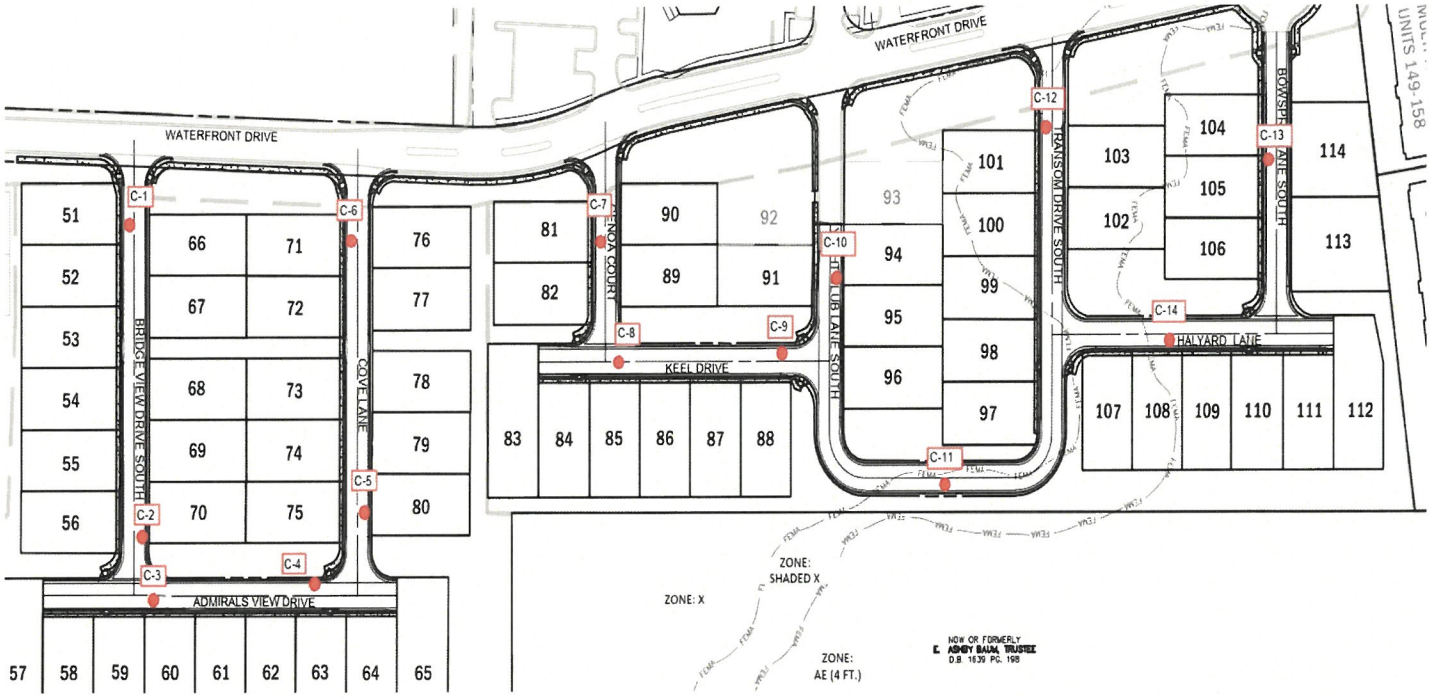
Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002



Services:

Terracon Rep.: Christian Mitchell
Reported To:
Contractor:
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By: _____

Brad Gallop
Project Manager

PARTICLE SIZE DISTRIBUTION REPORT

Report Number: K5241002.0014
Service Date: 12/02/24
Report Date: 12/05/24
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

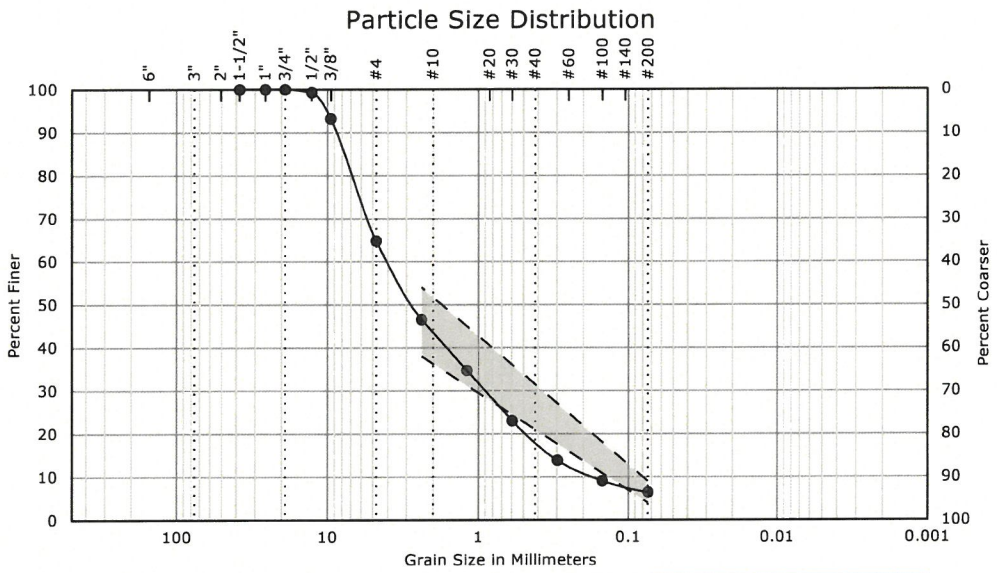
Sample Information

Sample Type: Core
Sample Location: C-2
Sample Description: RS9.5B
USCS: Well-graded sand with silt and gravel (SW-SM)

Laboratory Test Data

Test Method: ASTM D6913
Method: B
Atterberg Limits: Non-Plastic
Sample Preparation: Oven Dried
Sieving Method: Single Sieve-Set Sieving

Sieve Size	Percent Finer	Spec.*	Pass (X=Fail)
1-1/2"	100		
1"	100		
3/4"	100		
1/2"	99		
3/8"	93		
#4	65		
#8	47	38-54	
#16	35		
#30	23		
#50	14		
#100	9		
#200	6	4-9	



% Cobbles	% Gravel - 35.2		% Sand - 58.4			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	35.2				6.4

* D_{60} = 4.07 D_{30} = 0.90 D_{10} = 0.177 C_c = 1.1 C_u = 23.0 FM = 4.15

Comments: Asphalt Content 5.3% JMF 20-0508-031

Services:
Terracon Rep.: Kim Overton
Reported To:
Contractor: SAGA
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By:

Brad Gallop
Project Manager

Test

PARTICLE SIZE DISTRIBUTION REPORT

Report Number: K5241002.0015
Service Date: 12/02/24
Report Date: 12/05/24
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

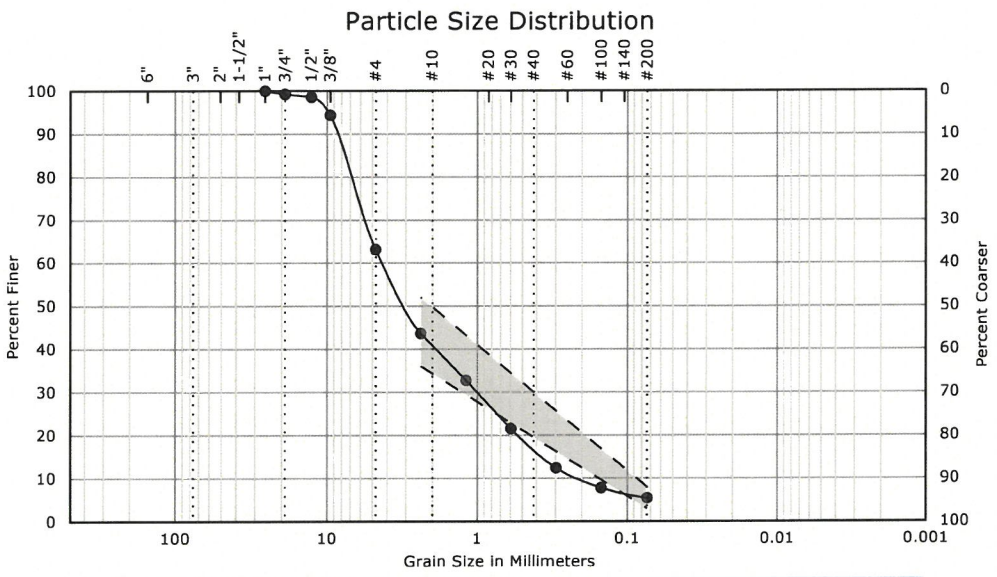
Sample Information

Sample Type: Core
Sample Location: C-5
Sample Description: RS 9.5B
USCS: Well-graded sand with silt and gravel (SW-SM)

Laboratory Test Data

Test Method: ASTM D6913
Method: B
Atterberg Limits: Non-Plastic
Sample Preparation: Oven Dried
Sieving Method: Single Sieve-Set Sieving

Sieve Size	Percent Finer	Spec.*	Pass (X=Fail)
1"	100		
3/4"	99		
1/2"	99		
3/8"	94		
#4	63		
#8	44	36-52	
#16	33		
#30	21		
#50	12		
#100	8		
#200	5	3-8	



% Cobbles	% Gravel - 36.9		% Sand - 57.7			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.8	36.2				5.4

* D_{60} = 4.35 D_{30} = 1.00 D_{10} = 0.223 C_c = 1.0 C_u = 19.5 FM = 4.25

Comments: Asphalt Content 5.3% JMF 20-0508-031

Services:
Terracon Rep.: Kim Overton
Reported To:
Contractor: SAGA
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By:

Brad Gallop
Project Manager

Test

PARTICLE SIZE DISTRIBUTION REPORT

Report Number: K5241002.0016
Service Date: 12/02/24
Report Date: 12/05/24
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

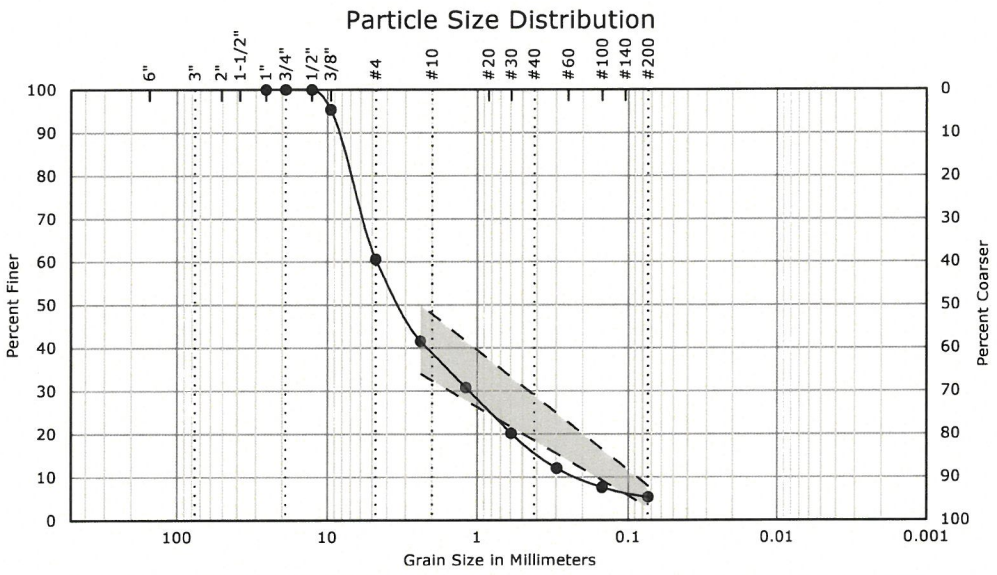
Sample Information

Sample Type: Core
Sample Location: C-10
Sample Description: RS 9.5B
USCS: Well-graded sand with silt and gravel (SW-SM)

Laboratory Test Data

Test Method: ASTM D6913
Method: B
Atterberg Limits: Non-Plastic
Sample Preparation: Oven Dried
Sieving Method: Single Sieve-Set Sieving

Sieve Size	Percent Finer	Spec.*	Pass (X=Fail)
1"	100		
3/4"	100		
1/2"	100		
3/8"	95		
#4	61		
#8	42	34-50	
#16	31		
#30	20		
#50	12		
#100	8		
#200	5	3-8	



% Cobbles	% Gravel - 39.4		% Sand - 55.2			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	39.4				5.4

* D_{60} = 4.69 | D_{30} = 1.13 | D_{10} = 0.228 | C_c = 1.2 | C_u = 20.6 | FM = 4.32

Comments: Asphalt Content 5.2% JMF 20-0508-031

Services:
Terracon Rep.: Kim Overton
Reported To:
Contractor: SAGA
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By:

Brad Gallop
Project Manager

Test

PARTICLE SIZE DISTRIBUTION REPORT

Report Number: K5241002.0017
Service Date: 12/02/24
Report Date: 12/05/24
Task: Earthwork and Site Paving

Terracon
106 Capital Trace, Unit E
Elizabeth City, NC 27909-7731
252-335-9765

Client

SAGA Construction Inc
Attn: Fred Vollat
1314 S Croatan Hwy
Kill Devil Hills, NC 27948

Project

Waterside Villages Phases 2 & 4
101 Bowsprit Lane
Grandy, NC

Project Number: K5241002

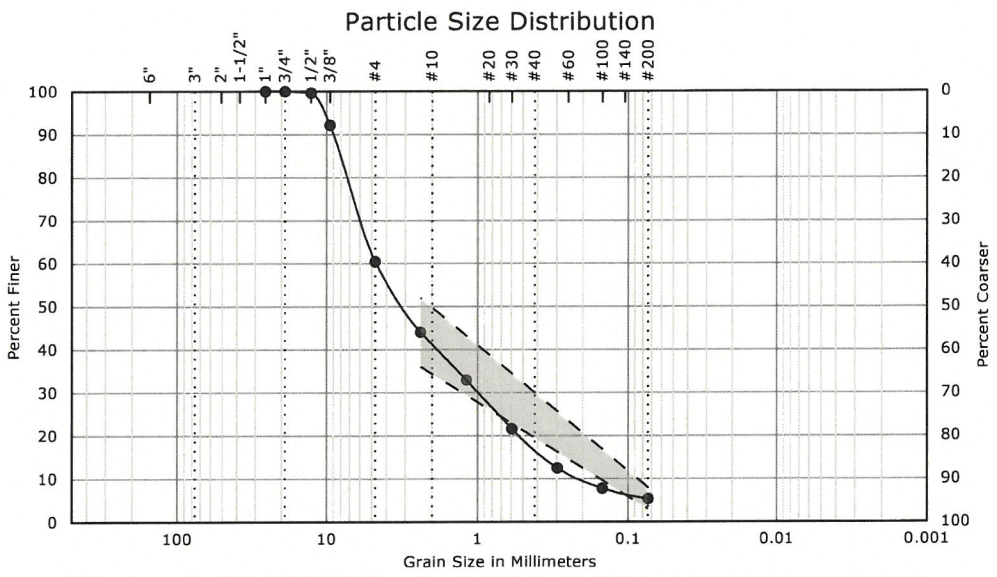
Sample Information

Sample Type: Core
Sample Location: C-10
Sample Description: RS 9.5B
USCS: Poorly-graded sand with silt and gravel (SP-SM)

Laboratory Test Data

Test Method: ASTM D6913
Method: B
Atterberg Limits: Non-Plastic
Sample Preparation: Oven Dried
Sieving Method: Single Sieve-Set Sieving

Sieve Size	Percent Finer	Spec.*	Pass (X=Fail)
1"	100		
3/4"	100		
1/2"	100		
3/8"	92		
#4	60		
#8	44	36-52	
#16	33		
#30	22		
#50	12		
#100	8		
#200	5	3-8	



% Cobbles	% Gravel - 39.6		% Sand - 55.0			% Fines
	Coarse	Fine	Coarse	Medium	Fine	
0.0	0.0	39.6				5.4

* D_{60} = 4.69 | D_{30} = 0.99 | D_{10} = 0.218 | C_c = 1.0 | C_u = 21.5 | FM = 4.29

Comments: Asphalt Content 5.3% JMF 20-0508-031

Services:
Terracon Rep.: Kim Overton
Reported To:
Contractor: SAGA
Report Distribution:
(1) SAGA Construction Inc, Fred Vollat

Reviewed By:

Brad Gallop
Project Manager

Test

Currituck County
Public Services Department

Will Rumsey, Utilities Manager

444 Maple Rd.
Maple NC 27956
Phone 252-232-6061
Fax 252-453-3721
Email: will.rumsey@CurrituckCountyNC.gov

Dec 5 ,2024
Waterside Villages
New Sections #2 and #4
Grandy, NC 27939

This letter serves notice that HHLD, LLC performed a pressure test, vacuum test and mandrel test on Sections #2 and #4 of the newly constructed collections system underground utility on 5/20/24 and 5/21/24. The test required passed. Cleaning of laterals and trunk lines was completed on all sections and the old section was inspected by Currituck County and is in good working order.

However, let it be noted that damage has occurred to collections system since these tests HHLD, LLC performed. County staff is working with SAGA Homes and HHLD, LLC to correct these damages caused by an outside contractor. County staff will camera the lines and laterals again to make sure no damage has occurred underground as well as check for sand and dirt entering the collections system. Testing again may be an option once the collections system is checked for damages. This will be a collaborative decision made by Currituck County, Saga Homes and HHLD, LLC.

Sincerely,

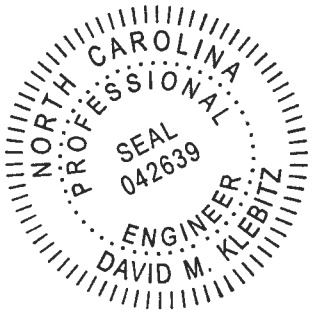
Will Rumsey
Utilities Manager
Currituck County

Fast Track Engineering Certification

Permit No. WQ0024044

_X_ Partial ___ Final

To: N.C. Division of Water Quality
Washington Regional Office
943 Washington Square Mall
Washington, NC 27889



I, David M. Klebitz, as a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe periodically the construction of the project,

Wastewater Collection System Extension to serve Phase 4 of Waterside Villages of Currituck, Currituck County, North Carolina

for the Permittee hereby state that, to the best of my abilities, due care and diligence was used in the observation of the construction such that the wastewater collection system extension described above was observed to be built within substantial compliance and intent of this permit; 15A NCAC 2H .200; the Division of Water Quality's Gravity Sewer Minimum Design Criteria adopted February 12, 1996 as applicable; the Division's Minimum Design Criteria for the Fast-Track Permitting of Pump Stations and Force Mains adopted June 1, 2000 as applicable; and other supporting materials.

Attached are the following documents, in accordance with the fast-track certification procedures:

- One copy of the project record drawings of two wastewater collection system extensions installed along Bridge View Drive South, Admirals View Drive and Cove Lane in Phase 4 of Waterside Villages of Currituck. The extensions connect to the development's existing gravity sewer system and include (4) manholes, approximately 892 linear feet of 8" gravity main and (30) service connections.
- It is to be noted that, after satisfactory testing of the extensions was complete, installation of a separate underground utility by an outside contractor resulted in damage to multiple service laterals. The utility and property owner are working to correct these damages and additional inspections and testing may be required by the utility prior to the extensions being placed in service.

Signature _____ Registration No. 042639

Date 12/6/2024

April 10, 2017

Ms. Donna Voliva, Senior Planner
Currituck County Department of Planning & Inspections
153 Courthouse Road, Suite 110
Currituck, NC 27929

Re: Waterside Villages Lot 92 Open Space

Dear Donna:

This is to affirm that WSV Holdings agrees to plat and dedicate the open space associated with the Waterside recreation site in connection with the approval of the next lots that will be platted in this phase of the development, and that no additional lots will be platted (other than the exempt parcel that will be platted temporarily for building permit purposes, which will become the future Lot 91) until the required additional open space has been dedicated.

We agree that this will be a condition of the approval to record lot 92.

Sincerely yours,

WSV Holdings, LLC

By _____

BK 1792 PG 844 - 848 (5) DOC# 392610
This Document eRecorded: 12/06/2024 11:47:17 AM
Tax: $0.00 Fee: $26.00
Currituck County, North Carolina
Natalie R. Twiddy, Register of Deeds

Currituck County Land Transfer Tax: 0.00 County Excise Tax: 1985 Sessions Law Chapter 670 (HB 215)

LAND TRANSFER NUMBER: _____
1% LAND TRANSFER FEE: $0.00
EXCISE TAX: $0.00
PARCEL NO. 108E000CLUB0000
REAL ESTATE TAXES PAID: Paid through 2023

Prepared by and return to:
E. Crouse Gray, Jr., Attorney at Law,
a licensed North Carolina Attorney.
Delinquent taxes, if any are to be paid by the closing attorney to the County Tax Collector upon disbursement of closing proceeds.
GRAY & LLOYD, L.L.P.
3120 North Croatan Highway, Suite 101
Kill Devil Hills, North Carolina 27948
www.grayandlloyd.com
File No. 12337-008

All or a portion of the property conveyed herein does not include the primary residence of the Grantor.

NORTH CAROLINA, CURRITUCK COUNTY

THIS NON-WARRANTY DEED made this the 5th day of December, 2024, by and between **WSV HOLDINGS, LLC, a North Carolina limited liability company** and **WSV DEVELOPMENT, LLC, a North Carolina limited liability company**, PO Box 90, Kill Devil Hills, NC 27948 Grantors and **WATERSIDE VILLAGES OF CURRITUCK COMMUNITY ASSOCIATION, INC.,** PO Box 1807, Nags Head, North Carolina 27959, Grantee:

The designation Grantor and Grantee as used herein shall include said parties, their heirs, and successors and assigns, and shall include singular, plural, masculine, feminine or neuter as required by context.

WITNESSETH:

THAT the Grantor, for a valuable consideration paid by the Grantee, the receipt of which is hereby acknowledged, has and by these presents does grant, bargain, sell and convey, unto the Grantee in fee simple, all that certain lot or parcel of land situated in Poplar Branch Township, Currituck County, North Carolina, and more particularly described as follows:

See Exhibit "A" (attached)

TO HAVE AND TO HOLD the aforesaid lot or parcel of land and all privileges and appurtenances thereto belonging to the Grantee in fee simple.

The Grantor makes no warranty, expressed or implied, as to title to the property hereinabove described.

IN WITNESS WHEREOF, the Grantors have hereunto set their hands and seals the day and year first above written.

WSV Holdings, LLC

By:_____ (SEAL)
Prem Gupta, Manager

STATE OF NORTH CAROLINA
COUNTY OF Dare

I, a Notary Public of the State aforesaid, hereby certify that **Prem Gupta** personally came before me this day and acknowledged the execution of the foregoing instrument, all in his capacity as a manager in, and in the name and for and on behalf of WSV Holdings, LLC, a limited liability company organized under the laws of the State of North Carolina.

Witness my hand and official stamp or seal this the 5th day of December, 2024.

Gracelyn Baker Mirick
NOTARY PUBLIC

SEAL/STAMP

GRACELYN BAKER MIRICK
Notary Public, North Carolina
Dare County
My Commission Expires
12.5.2026

My Commission Expires: 12.5.2026
Registration Number:_____

WSV Development, LLC

By:_____(SEAL)
Prem Gupta, Manager

STATE OF NORTH CAROLINA
COUNTY OF Dare

I, a Notary Public of the State aforesaid, hereby certify that **Prem Gupta** personally came before me this day and acknowledged the execution of the foregoing instrument, all in his capacity as a manager in, and in the name and for and on behalf of WSV Development, LLC, a limited liability company organized under the laws of the State of North Carolina.

Witness my hand and official stamp or seal this the 5th day of December, 2024.

GRACELYN BAKER MIRICK
Notary Public, North Carolina
Dare County
My Commission Expires
[illegible]

Gracelyn Baker Mirick
NOTARY PUBLIC

My Commission Expires: 12.5.2026
Registration Number:_____

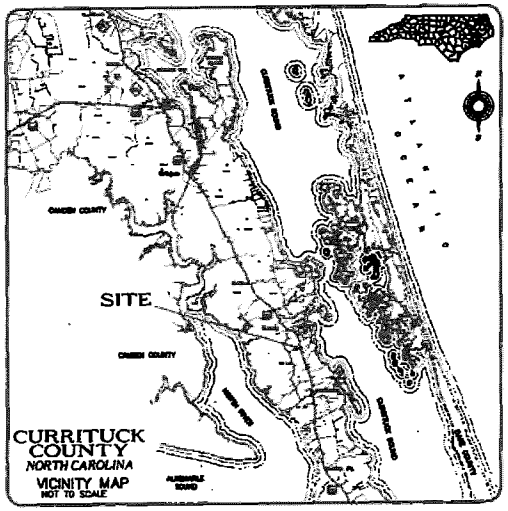
EXHIBIT" A" - CLUBHOUSE PARCEL

BEGINNING at an iron rod or other monument, said iron rod or other monument being located in and on the northwestern edge of the 45' right-of-way of Waterfront Drive, as the same is intersected by the northeastern property line of that lot or parcel of land now or formerly owned by Walnut Island Sanitary District as recorded in Deed Book 327, Page 98, Currituck County Public Registry.

From said beginning point turning and running along the northeastern boundary line of the Walnut Island Sanitary District north 46 deg 11 min 53 sec West 293.45' to a point; thence turning and running north 41 deg 09 min 37 sec East 20.19' to a point; thence turning and running north 41 deg 04 min 05 sec West 53.19' to a point; thence and turning and running north 03 deg 55 min 55 sec East 16.97' to a point; thence turning and running north 48 deg 42 min 16 sec East 63.06' to a point; thence turning and running north 43 deg 06 min 05 sec West 39.39' to a point, thence turning and running along a curve to the left, said curve having a radius of 69.00' for an arc length of 167.03 feet, being a tangent of 183.07' on a chord of 129.13' with a chord bearing of north 26 deg 26 min 01 sec East, to a point; thence turning and running north 43 deg 32 min 46 sec West 20.59' to a point; thence turning and running north 46 deg 27 min 01 sec East 7.23' to a point, said point being located in the corner of Lot 163, Phase 1A, Waterside Villages as shown on map or plat recorded in Plat Cabinet I, Slide 365, Currituck County Public Registry; thence turning and running along the property line of Lot 163, Phase 1A, south 43 deg 32 min 46 sec East 100.00 feet to a point; thence turning and running along the boundary line of Lot 163, Phase 1A, north 46 deg 27 min 14 sec East 52.00 feet to a point, said point being located on the boundary line of Lot 132, Phase 1, Waterside Villages, as shown on map or plat recorded in Plat Cabinet I, Slide 256, Currituck Public Registry; thence turning and running along the boundary line of Lot 132 Phase 1, south 43 deg 32 min 46 sec East, 44.45' to a point; thence turning and running along the boundary line of Lot 132, Phase 1, north 46 deg 27 min 14 sec East 100.00 ' to a point, said point being located on the southwestern edge of the 30' right-of way of Yacht Club Lane North; thence turning and running along the southwestern edge of the 30' right-of way of Yacht Club Lane North, South 43 deg 32 min 46 sec East 210.17' to a point; thence turning and running along a curve to the right, said curve having a radius of 25.00' for an arc length of 33.74' being a tangent of 20' with a chord of 31.24' and a chord bearing of south 04 deg 52 min 58 sec East to a point, said point being located on the northwestern edge of the 45' right-of way of Waterfront Drive; thence turning and running south 33 deg 46 min 50 sec West 126.46' to a point; thence turning along a curve to the left, then continuing along the northwestern edge of the 45' right-of way of Waterfront Drive, said curve having a radius of 492.50' for an arc length of 96.99' being a tangent of 48.65' on a chord of 96.83' with a chord bearing of south 28 deg 08 min 19 sec West to a point; thence continuing along a curve to the right, said curve having a radius of 277.50' for an arc length of 112.79' being a tangent of 57.19' with a chord of 112.02' on a chord bearing of south 34 deg 08 min 28 sec West to a point; thence continuing along the northwestern edge of the 45' right-of-way of Waterfront Drive south 45 deg 47 min 07 sec West 20.95' to the point and place of BEGINNING.

References made to that certain map or plat entitled in part "Waterside Villages Clubhouse, Poplar Branch Township, Currituck County", North Carolina as built survey by Bissell Professional Group which is attached hereto as Exhibit "B" and incorporated in by reference.

Exhibit B



NOTES:
1. AREA DETERMINED BY COORDINATE METHOD.
2. IRON PINS AT ALL LOT CORNERS UNLESS OTHERWISE NOTED HEREON.
3. UNDERGROUND UTILITIES, IF ANY, WERE NOT LOCATED BY THIS SURVEY, FURTHER EVALUATION MAY BE REQUIRED.
4. NO RECOVERABLE NCGS MONUMENTS APPEAR TO BE WITHIN 2000' OF THE SUBJECT PROPERTY SHOWN HEREON.
5. THIS SURVEY IS SUBJECT TO ANY FACTS THAT MAY BE DISCLOSED BY A FULL AND ACCURATE TITLE SEARCH.
6. F.I.R.M. ZONE: ZONE X, PANEL #3700789921 J
REVISION DATE: 12/16/2005
(SUBJECT TO CHANGE BY FEMA)
7. LOT COVERAGE:

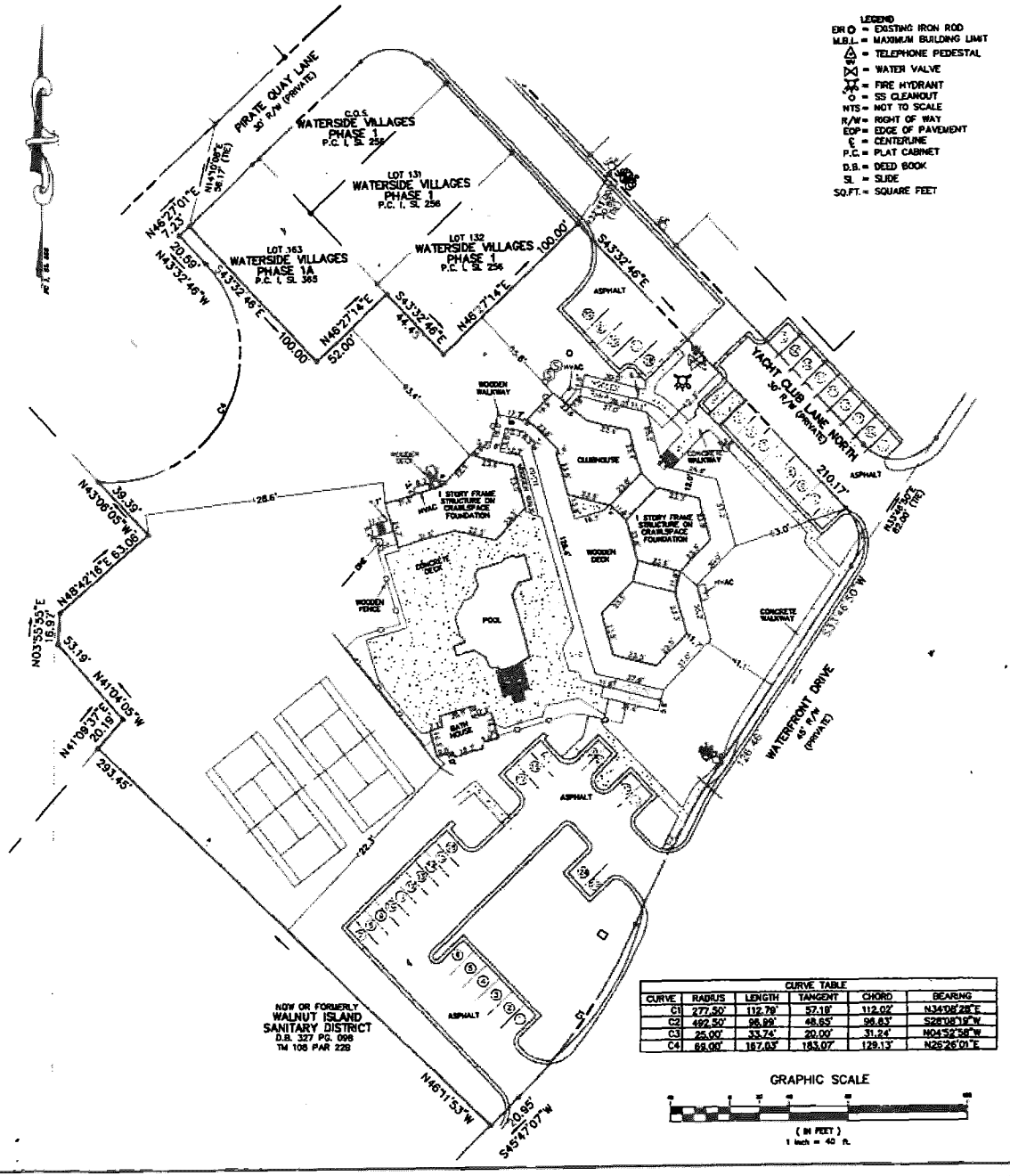
BUILDINGS:	8,209.00 SQ.FT.
CONCRETE:	12,451.71 SQ.FT.
ASPHALT:	14,123.08 SQ.FT.
POOL:	1,924.72 SQ.FT.
TOTAL COVERAGE:	36,708.81 SQ.FT.

SURVEYORS CERTIFICATE
I, James W. Huggins, certify that this plat was drawn under my supervision from an actual survey made under my supervision from P.C. I, SL. 256; that the ratio of precision as calculated by latitudes and departures is 1:10,000 +, that the boundaries not actually surveyed are shown as broken lines plotted from information found in existing records and that this map was prepared in accordance with section .1600 of the State Board of Registration Rules "Standards of Practice".

Witness my hand and seal this 18th day of December, 20 06

NORTH CAROLINA PROFESSIONAL SEAL L-4586 SURVEYOR JAMES WESLEY HUGGINS

L-4586



CURVE TABLE

CURVE	RADIUS	LENGTH	TANGENT	CHORD	BEARING
C1	277.50'	112.79'	57.18'	112.02'	N34°08'28"E
C2	492.50'	96.89'	48.65'	96.63'	S28°08'19"W
C3	25.00'	33.74'	20.00'	31.24'	N04°52'58"W
C4	69.00'	167.03'	183.07'	129.13'	N26°26'01"E

Bissell Professional Group
Engineers, Planners, Surveyors and Environmental Specialists
BISSELL

PROJECT: WATERSIDE VILLAGES CLUBHOUSE
POPLAR BRANCH TOWNSHIP CURRITUCK COUNTY NORTH CAROLINA
AS BUILT SURVEY

REVISIONS

NO.	DATE	DESCRIPTION	BY

DATE: 12-18-06
SCALE: 1"=40'
BPG
JWH
QMW
BPG
SHEET: 1 OF 1
CAD FILE: 4018-CLUBHOUSE-COMPLETE
PROJECT NO: 4018

"THIS MAP MAY NOT BE A CERTIFIED SURVEY AND HAS NOT BEEN REVIEWED BY A LOCAL GOVERNMENT AGENCY FOR COMPLIANCE WITH ANY APPLICABLE LAND DEVELOPMENT REGULATIONS AND HAS NOT BEEN REVIEWED FOR COMPLIANCE WITH RECORDING REQUIREMENTS FOR PLATS."

DRAFT

WATERSIDE VILLAGES PHASE 2 & 4 BOND COMPUTATION

12-11-24

PH 2 Street Trees: (55) Trees x $150/tree	= $8,250 x 115%	=$ 9,487.50
PH 4 Street Trees: (44) Trees x $150/tree	=$6,600 x 115%	=$ 7,590.00
Street Lights: (Receipt Attached): =		=$ 0.00
PH 2 Property Line Swales: (27) swales x $200/swale	= $5,400 x 115%	=$ 6,210.00
PH 4 Property Line Swales: (22) swales x $200/swale	= $4,400 x 115%	=$ 5,060.00
	TOTAL:	**$28,347.50**

ALPHA-ADVANTAGE INC.
891 Emeline Ln
Kitty Hawk, NC 27949 USA
2524413766
alphaadvantage@yahoo.com
www.alpha-advantage.com

Estimate

ADDRESS
WATERSIDE VILLAGE
SAGA CONSTRUCTION
PO BOX 90
KILL DEVIL HILLS, NC 27948

ESTIMATE # 3025
DATE 12/10/2024

PROJECT ADDRESS
Waterside Village Grandy

ACTIVITY	QTY	RATE	AMOUNT
**WATERSIDE PHASE 2 & 4*			
LANDSCAPING:PLANT INSTALLATION INSTALLATION OF PLANT MATERIAL - INSTALLATION OF (1) SHADE OR ORNAMENTAL TREE WITH 1.5" CALIPER AS REQUIRED BY CURRITUCK COUNTY. INCLUDES DELIVERY, INSTALLATION, SOIL ENHANCER & TIME RELEASED FERTILIZER.	1	150.00	150.00

SUBTOTAL	150.00
TAX	0.00
TOTAL	**$150.00**

Accepted By

Accepted Date

ALPHA-ADVANTAGE INC.
891 Emeline Ln
Kitty Hawk, NC 27949 USA
2524413766
alphaadvantage@yahoo.com
www.alpha-advantage.com

Estimate

ADDRESS
WATERSIDE VILLAGE
SAGA CONSTRUCTION
PO BOX 90
KILL DEVIL HILLS, NC 27948

ESTIMATE # 3024
DATE 12/10/2024

PROJECT ADDRESS
Waterside Village Grandy

ACTIVITY	QTY	RATE	AMOUNT
**WATERSIDE PHASE 2 & 4*			
LANDSCAPING:LANDSCAPE PREP LANDSCAPE PREP - CREATE SWALES PER COMMON PROPERTY LINE AS SHOWN ON APPROVED SITE PLAN. PRICE IS PER SHARED SWALE BETWEEN HOUSES ALONG PROPERTY LINE AND AT THE BEGINNING OR END OF A GROUP OF HOUSES TOGETHER.	1	200.00	200.00

SUBTOTAL	200.00
TAX	0.00
TOTAL	**$200.00**

Accepted By

Accepted Date

February 29, 2024

Construction Payment Invoice

WSV HOLDINGS, LLC
WATERFRONT
GRANDY, NC 27939

Dominion Energy Information
Work Request No. 10671972
Point of Contact: Morgen S Hand

Total Amount Due: $5,599.25
Account No : 250000648205

To avoid delay in the start of your project please pay upon receipt.

Payment Options

U.S. Mail

Include "Account No." on your check and mail payment to:

Dominion Energy North Carolina
P.O. Box 26543
Richmond, VA 23290-0001

Authorized Payment Centers

For an Authorized Payment Center near you visit DominionEnergy.com and search "Payment Centers," or call 1-866-366-4357.

Convenience fee of $1.50 will be charged by a third-party service provider.

All Authorized Payment locations accept cash and money order.

Some locations may accept personal or business checks at their discretion.

Obtain a paper receipt for your records.

*Credit Card, Debit Card, Purchasing Card or eCheck**

Pay online at DominionEnergy.com, search "Pay My Bill," or call 1-866-366-4357.

Convenience fee and transaction limits.

- $14.95 per transaction for non-residential customers (up to $15,000 per transaction)
- Fee charged by Paymentus Corporation, a third-party vendor.

Retain your payment confirmation number for your records.

*eCheck Option only available over the phone

Please detach and return this payment coupon with your check made payable to Dominion Energy North Carolina .

Construction Payment Coupon

Notification Date: February 29, 2024

Please Pay Upon Receipt
$5,599.25

Amount Enclosed

Account No. 250000648205

WSV HOLDINGS, LLC
WATERFRONT
GRANDY, NC 27939

Send Payment to:

Dominion Energy North Carolina
P.O. BOX 26543
RICHMOND, VA 23290-0001

222 250000648205 3000559925 3000559925 61

davek@bissellprofessionalgroup.com

From: DoNotReplyDominionEnergy@paymentus.com
Sent: Friday, March 22, 2024 10:16 AM
To: Asta Gudmundsdottir
Subject: Payment Confirmation for Dominion Energy Virginia / North Carolina

Thank you for your payment to Dominion Energy. It has been accepted.

Confirmation number:	**3538970546**
Payment date:	**Mar 22, 2024, 10:16:25 AM**
Payment amount:	**$5,599.25**
Service fee:	**$14.95**
Total amount charged:	**$5,614.20**
Payment status:	**ACCEPTED**

Account Information

Account type	**Non-Residential (VA NC)**
Account number:	**250000648205**
Payment method:	**Credit Card**

Payment Method Information

Card type:	**Visa**
Card number:	**************2216**

Please do not reply to this email. This message was sent to you using an automated system. It is not monitored for replies. View our Privacy Policy and Legal Terms and Conditions. Questions? Contact Us.

EXHIBIT "B"

BASIS FOR STREET TREE BONDING

● IN PLACE AS OF 9/2012

LEGEND

SHADE TREES

- BALD CYPRESS
- DARLINGTON OAK
- GINKO 'PRINCETON SEN
- GOLDEN RAIN TREE
- LIVE OAK
- LOBLOLLY PINE
- 'BLOODGOOD' LONDON PLANE
- 'GREEN VASE' ZELKOVA

PLEASE CREATE A FOLDER WITH FILE: OVERALL TREE PLANTING PLAN

ORNAMENTAL TREES

- BURFORD HOLLY
- WEEPING CHERRY
- PURPLE CREPE MYRTLE
- RED BUCKEYE
- KWANSAN CHERRY
- SAUCER MAGNOLIA
- SWEET BAY MAGNOLIA
- VITEX
- WAX MYRTLE
- TREE-FORM WAX MYRTLE

62 trees = planted on this page

MISCELLANEOUS

- STREET LIGHT

● PH 4 STREET TREES - 14

SISKA AURAND
landscape architecture
master planning
site design
323 West 24th Street
Norfolk, Virginia 23517
757.627.1407
e-mail: design@siskaaurand.com

OFFICIAL SEAL

NOT FOR CONSTRUCTION

-STREET TREES-

WATERSIDE VILLAGES OF CURRITUCK

CURRITUCK COUNTY NORTH CAROLINA

SCALE	1"=50'-0"
DRAFTER	JTB
DESIGNER	CDA
CHECKED	CDA
DATE	01/30/04
REVISION	11/08/04

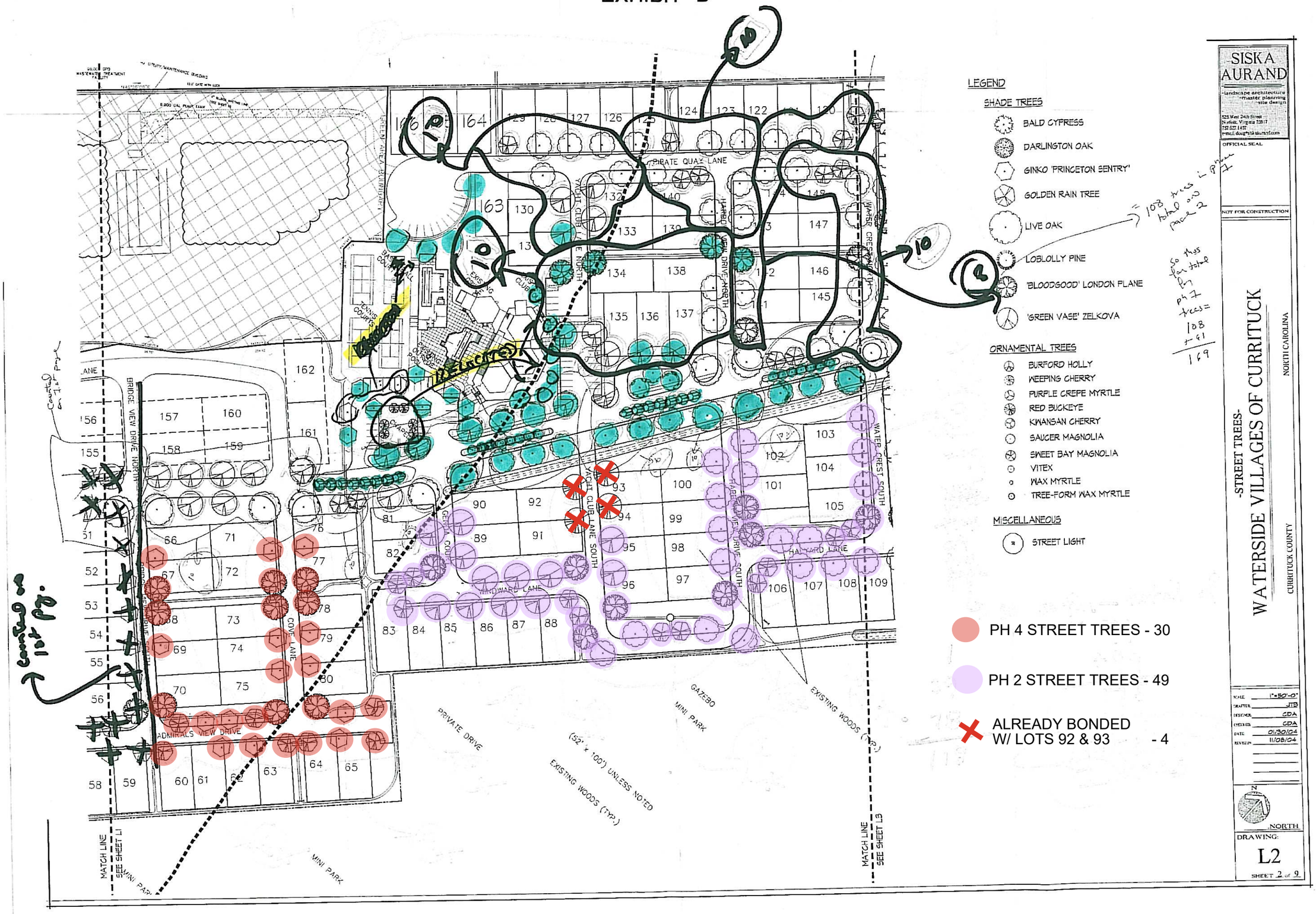
NORTH

DRAWING:

L1

SHEET 1 of 9

EXHIBIT "B"


PIRATE QUAY LANE
WATER CREST SOUTH
HARBOR DRIVE NORTH
HARBOR DRIVE SOUTH
HARBOR LANE
CLUB LANE SOUTH
CLUB LANE NORTH
BRIDGE VIEW DRIVE NORTH
COVE LANE
WINDWARD LANE
ADMIRALS VIEW DRIVE
TENNIS COURTS
SWIMMING POOL
CLUBHOUSE
GAZEBO
MINI PARK
PRIVATE DRIVE
EXISTING WOODS (TYP.)
(52' x 100') UNLESS NOTED
MATCH LINE SEE SHEET L1
MATCH LINE SEE SHEET L3
LEGEND
SHADE TREES
BALD CYPRESS
DARLINGTON OAK
GINKO 'PRINCETON SENTRY'
GOLDEN RAIN TREE
LIVE OAK
LOBLOLLY PINE
'BLOODGOOD' LONDON PLANE
'GREEN VASE' ZELKOVA
ORNAMENTAL TREES
BURFORD HOLLY
WEEPING CHERRY
PURPLE CREPE MYRTLE
RED BUCKEYE
KWANSAN CHERRY
SAUCER MAGNOLIA
SWEET BAY MAGNOLIA
VITEX
WAX MYRTLE
TREE-FORM WAX MYRTLE
MISCELLANEOUS
STREET LIGHT
PH 4 STREET TREES - 30
PH 2 STREET TREES - 49
ALREADY BONDED W/ LOTS 92 & 93 - 4
SISKA AURAND
landscape architecture
master planning
site design
OFFICIAL SEAL
NOT FOR CONSTRUCTION
-STREET TREES-
WATERSIDE VILLAGES OF CURRITUCK
CURRITUCK COUNTY
NORTH CAROLINA
SCALE 1"=50'-0"
DRAFTER JTB
DESIGNER GDA
CHECKED GDA
DATE 01/30/04
REVISION 11/08/04
NORTH
DRAWING: L2
SHEET 2 of 9

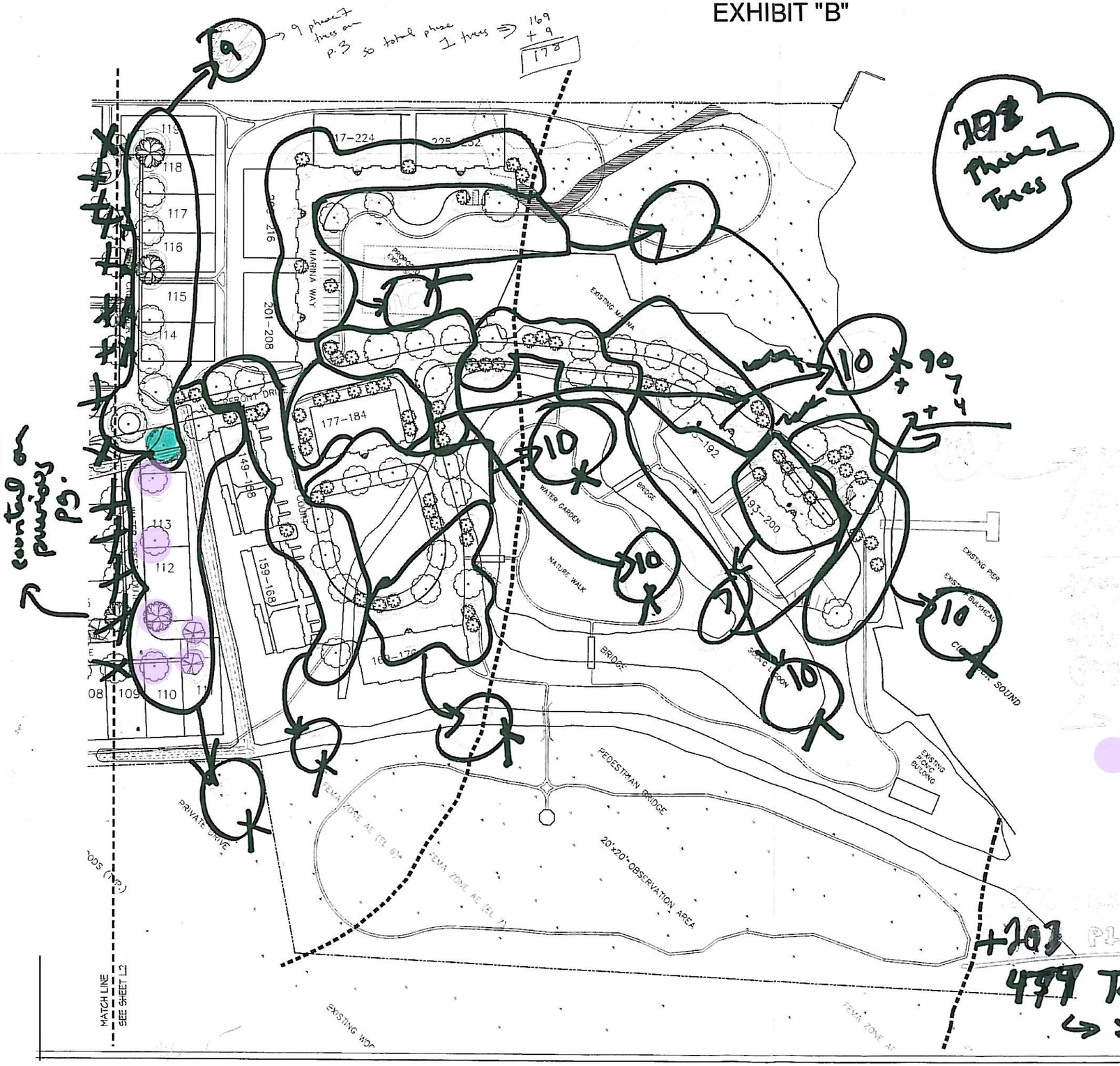


EXHIBIT "B"

→ 9 phase 1 trees on p.3 so total phase 1 trees ⇒ 169 + 9 = 178

202 Phase 1 Trees

10 + 90 + 7 + 4 + 2

counted on previous pg.

+202 P1 trees

479 Total trees

<-> 20% of ph 1 trees = 39.2%

U.S. HIGHWAY 158

BINNACLE LANE

COMPASS DRIVE NORTH

COMPASS DRIVE SOUTH

WATERFRONT DRIVE

WATERFRONT DRIVE

TREASURE RUN

MIZZENMAST WAY

BRIDGE VIEW DRIVE SOUTH

COVE LANE

GENOA COURT

KEEL DRIVE

ADMIRALS VIEW DRIVE

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 89 90 130 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166

LEGEND

- EXISTING WALKWAY
- FUTURE WALKWAY
- FUTURE CROSSWALK
- BUILDING THROUGHWAY

THIS PLAN IS NOT FOR CONSTRUCTION, IS NOT A SURVEY AND IS INTENDED FOR REVIEW PURPOSES ONLY. THE PLAN ILLUSTRATES APPROXIMATE LOCATIONS OF EXISTING AND PROPOSED PEDESTRIAN WALKWAY IMPROVEMENTS THROUGHOUT THE COMMUNITY AND IS INTENDED TO PROVIDE GENERAL GUIDANCE FOR PEDESTRIAN CIRCULATION.

60 0 30 60 120 240

1" = 60'

GRAPHIC SCALE

Bissell Professional Group
Firm License # C-956
3512 North Boston Highway
Kitty Hawk, North Carolina 27949
P.O. Box 2826
PHONE (252) 261-3235
FAX (252) 261-1760

BISSELL PROFESSIONAL GROUP
Engineers, Planners, Surveyors and Environmental Specialists

DEVELOPMENT OVERVIEW

PROJECT: WATERSIDE VILLAGES — NORTH CAROLINA

POPLAR BRANCH TOWNSHIP CURRITUCK COUNTY

PEDESTRIAN CIRCULATION SYSTEM MAP

REVISIONS

NO	DESCRIPTION	DATE	BY

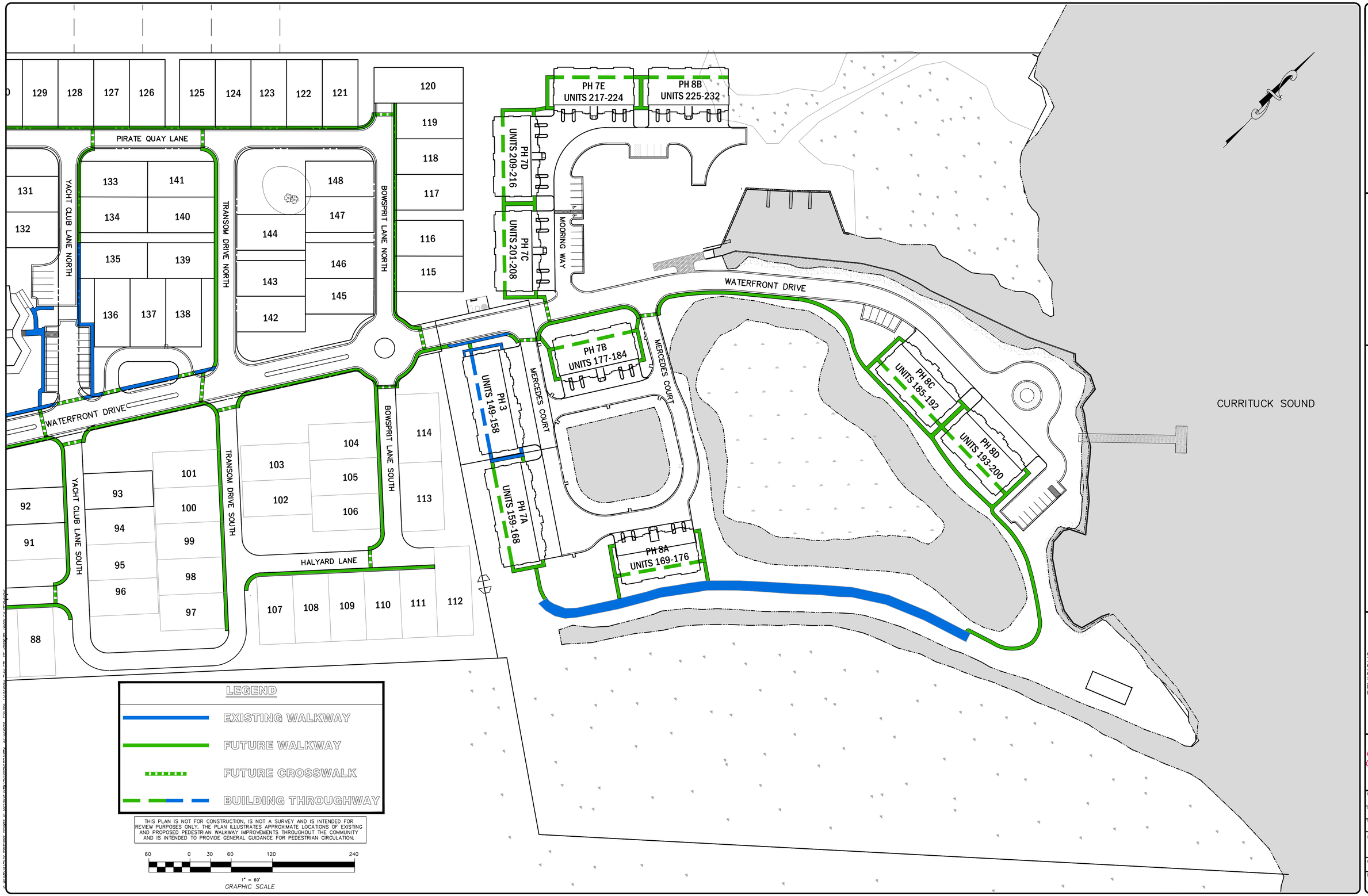
PRELIMINARY
DO NOT USE FOR CONSTRUCTION

DATE: 2-13-18	SCALE: 1"=60'
DESIGNED: BPG	CHECKED: MDB
DRAWN: DMK	APPROVED: MSB

SHEET: 1 OF 2

CAD FILE: 4018WALKWAY

PROJECT NO: 4018



Bissell Professional Group
Firm License # C-956
303 North Croatan Highway
Kitty Hawk, North Carolina 27949
(252) 261-2808
FAX (252) 261-1760

BISSELL PROFESSIONAL GROUP

Engineers, Planners, Surveyors
and Environmental Specialists

DEVELOPMENT OVERVIEW

PROJECT

WATERSIDE VILLAGES

NORTH CAROLINA

POPLAR BRANCH TOWNSHIP CURRITUCK COUNTY

PEDESTRIAN CIRCULATION SYSTEM MAP

REVISIONS

NO.	DATE	DESCRIPTION	BY
1	11-23-20	WALK TO WEST SIDE TRANSOM DR N.	DMK

PRELIMINARY
DO NOT USE FOR CONSTRUCTION

DATE: 2-13-18	SCALE: 1"=60'
DESIGNED: BPG	CHECKED: MDB
DRAWN: DMK	APPROVED: MSB
SHEET: 2 OF 2	
CAD FILE: 4018WALKWAY	
PROJECT NO: 4018	

ROY COOPER
Governor
MARY PENNY KELLEY
Secretary
RICHARD E. ROGERS, JR.
Director

NORTH CAROLINA
Environmental Quality

December 11, 2024

CURRITUCK COUNTY WATER DEPARTMENT
ATTN: DONALD I. MCREE, COUNTY MANAGER
153 COURTHOUSE ROAD
CURRITUCK, NC 27929

Re: **Final Approval**
Final Approval Date: December 11, 2024
WATERSIDE VILLAGES PHASES 2 & 4
Serial No.: 22-00999
Water System Name: CURRITUCK COUNTY WATER SYSTEM
Water System No.: NC0427010
Currituck County

Dear Sir/Madam:

The Department received an Engineer's Certification statement and an Applicant's Certification concerning the above referenced project. The Engineer's Certification verifies that the construction of the referenced project has been completed in accordance with the engineering plans and specifications approved under Department Serial Number 22-00999. The Applicant's Certification verifies that an Operation and Maintenance Plan and Emergency Management Plan have been completed and are accessible to the operator at all times and available to the department upon request and that the system will have a certified operator as required by 15A NCAC 18C .1300.

The Department has determined that the requirements specified in 15A NCAC 18C .0303(a) and (c) have been met, and therefore, issues this **Final Approval** in accordance with Rule .0309(a).

Please contact us at (919) 707-9100 if you have any questions or need additional information.

Sincerely,

RBSadosky

Rebecca Sadosky, Ph.D., Chief
Public Water Supply Section
Division of Water Resources, NCDEQ

cc: JAMIE MIDGETTE, P.E., Regional Engineer
Currituck County Health Department
BISSELL PROFESSIONAL GROUP

MARK S. BISSELL
BISSELL PROFESSIONAL GROUP
P.O. BOX 1068
KITTY HAWK, NC 27949

ENGINEER'S PARTIAL CERTIFICATION OF INSTALLED STORMWATER MANAGEMENT SYSTEM

I, David M. Klebitz, a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe construction on a periodic basis for the following project:

Waterside Villages of Currituck – Phases 2 & 4

(Project name)

High-Density Stormwater Management Permit No. SW7040511

(Project Description)

Township of Poplar Branch, Currituck County, N.C.

(Project location)

WSV Holdings, LLC

(Project Developer)

Hereby state that, to the best of my knowledge and belief, due care and diligence were used in the observation of the construction of the existing system such that the construction was observed to have been completed by the Contractor in substantial accordance with the intent of the approved plans and specifications. This certification serves as a supplement to a Partial Engineer's Certification previously issued by David M. Ryan, P.E. for Phases 1, 1A, 3, 5, 6 and the Clubhouse, dated 9-23-09. Based on the construction observations documented, the following items were noted in the recently constructed Phases 2 & 4 of the development;

1. Phase 2
    a. Relocation of (1) 5,200 sf residential lot from Phase 1 to Phase 2.
    b. Installation of typical NCDOT frame and grate catch basins in place of slotted drains within the curb & gutter systems of the subdivision roadways.
    c. Installation of additional pipe conveyances and drop inlets to avoid deep swales in areas of limited space. Shallow swales are still utilized above the pipes to convey runoff from lots to drop inlets.
    d. Minor deviations to alignments and grades, as shown on the record drawings.

2. Phase 4
    a. Installation of typical NCDOT frame and grate catch basins in place of slotted drains within the curb & gutter systems of the subdivision roadways.
    b. Installation of additional pipe conveyances and drop inlets to avoid deep swales in areas of limited space. Shallow swales are still utilized above the pipes to convey runoff from lots to drop inlets.
    c. The open space swale installed between Lot 51 and Waterfront Drive was reversed to flow east through a culvert under the entrance to Bridge View Drive South. This was done because a culvert was not installed downstream under Mizzenmast Way during the construction of Phase 5.

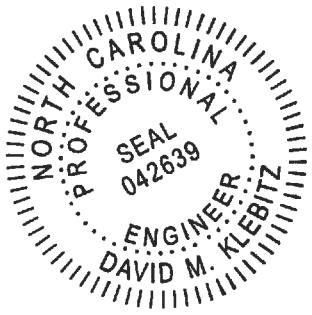
d. The open space swale installed between Lot 56 and Admirals View Drive was reversed to flow east through a culvert under Bridge View Drive South. This was done to minimize swale depths and better work within the local topography.
e. The open space swale installed behind Lots 57-59 was reversed to flow east through the swale continuing behind Lot 60-65. This was done to minimize swale depths and better work with the local topography.
f. Minor deviations to alignments and grades, as shown on the record drawings.

3. Drainage Area Modifications
   a. The flow reversals described in Phase 4 above have resulted in a modification to the drainage divide between the project's two drainage areas as designed, Drainage Area #1 and Drainage Area #2.
   b. Drainage Area #1 encompasses the western portion of the development and is managed by existing Ponds 1 & 1A. The overall area of Drainage Area #1 has decreased by around 1 acre, from approximately 23.4 acres to 22.4 acres, or near 4%. Given this reduction in drainage area, and associative built-upon area, the modification to Drainage Area #1 is believed to maintain compliance with the intent of the project's stormwater management permit.
   c. Drainage Area #2 encompasses the eastern portion of the development and is managed by existing Ponds 2 & 2A. The overall area of Drainage Area #2 has increased by around 1 acre, from approximately 51.1 acres to 52.1 acres, or near 2%. A built-upon area analysis was conducted within Phases 2 & 4 and it was determined that, if all lots are built out to the maximum 65% limit, approximately 18,250 sf of additional impervious coverage may occur within the amended drainage area. This equates to a 2.5% increase relative to the 716,126 sf of total built-upon area allocated for Drainage Area #2. In a letter from Bissell Professional Group to NCDEQ, dated July 23, 2009, it was explained that Pond 2 was determined to have an actual surface area of 183,011 sf and an actual storage volume of 357,978 cubic feet. These quantities are 4 and 5 times greater than the 45,559 sf and 63,168 cubic feet required by permit. Given the relatively minor increase in built-upon area and the excess capacities available in the receiving stormwater Pond 2, the modification to Drainage Area #2 is believed to maintain compliance with the intent of the project's stormwater management permit.

Signature _____

Registration No. 042639

Date 12/11/24



BISSELL PROFESSIONAL GROUP

ENGINEER'S PARTIAL CERTIFICATION OF INSTALLED STORMWATER MANAGEMENT SYSTEM

I, David M. Ryan, a duly registered Professional Engineer in the State of North Carolina, having been authorized to observe construction on a periodic basis for the following project:

Waterside Villages of Currituck – Phases 1, 1A, 3, 5, 6, & Clubhouse

(Project name)

High-Density Stormwater Management Permit No. SW7040511

(Project Description)

Township of Poplar Branch, Currituck County, N.C.

(Project location)

VOC, LLC

(Project Developer)

Hereby state that, to the best of my knowledge and belief, due care and diligence were used in the observation of the construction of the existing system such that the construction was observed to have been completed by the Contractor in substantial accordance with the intent of the approved plans and specifications. This certification serves as a supplement to the engineer's certifications that were previously issued by Mark S. Bissell, P.E.. Based on the construction observations documented, the following items were noted;

1. Phases 1 & 1A
    a. Modification of the drawdown device, overflow pipe and swale in pond No. 1 in order to match field conditions.
    b. Substitution of 18" HDPE pipe for swale along rear of lots 136-138 in order to improve project aesthetics.
    c. Some lot grades will need to be adjusted at the time of commencement of home construction in order to comply with the minimum pad elevation requirements.
    d. Minor deviations to alignments and grades, as shown on the record drawings.

2. Phase 3
    a. Modification of flow direction of vegetated swale behind building 3, which, as modified, achieves the design intent to as great or greater degree than as shown on the approved plans.
    b. Minor deviations to alignments and grades, as shown on the record drawings.

3. Phases 5 & 6
    a. Minor deviations to alignments and grades, as shown on the record drawings.

4. Clubhouse
    a. Addition of 2 drop inlets adjacent to the clubhouse to relieve ponding from a low area discovered during construction.
    b. Minor deviations to alignments and grades, as shown on the record drawings.

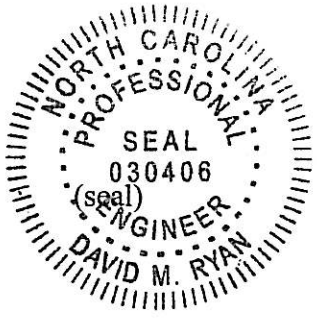
P.O. Box 1068 ■ 3512 N. Croatan Hwy. ■ Kitty Hawk, NC 27949
252-261-3266 ■ Fax: 252-261-1760 ■ E-mail: bpg@bissellprofessionalgroup.com

5. Post-Construction Corrective Actions
    a. Following the performance of several post-construction site observations, a corrective action plan was prepared illustrating several maintenance and minor improvement modifications that needed to be performed to bring the system into compliance. (A copy of the Corrective Action Plan dated 7/22/09 is provided herewith.) The corrective actions as illustrated include the following:
        i. Removal of vegetation and debris identified within drop inlets and primary conveyance measures.
        ii. Removal of woody vegetation, debris and sediment accumulation identified within the wet-detention ponds.
        iii. Revegetation of isolated areas of identified escarpments and erosion.
        iv. Installation of periphery swale around building 7A.
        v. Installation of rock check dam at rear of Lot 112.
        vi. Redirecting flow of an existing curb-flume installation from the main pool section to the forebay of Pond 1.
        vii. Although indicated on the plans, installation of the overflow swale for Pond 2A was excluded from the corrective actions. It has been determined that this improvement may be unnecessary as described in the attached justification letter.
    b. Performance of the corrective actions were reviewed and determined to be implemented in substantial conformation with corrective action plan.

Signature _____

Registration No. 030406

Date SEPT. 23, 2009



BISSELL PROFESSIONAL GROUP

The Coastal Experts

TO: Bill Moore
NCDENR – Division of Water Quality
943 Washington Square Mall
Washington, NC 27889

FROM: David Ryan
Bissell Professional Group

DATE: July 23, 2009

SUBJECT: Waterside Villages
Stormwater Permit No. SW7040511

On behalf of our client, Wachovia Bank, we our submitting for your review the justification for a deviation from the approved stormwater management system at Waterside Villages in Currituck County. A high-density stormwater management permit was issued on July 28, 2004, SW7040511, for the development of a residential development. As per item #6 under the Schedule of Compliance, an engineer's certificate of completion shall be provided for your review. During the post-construction inspection of the facilities it was discovered that the requisite emergency overflow swale from pond 2A (lagoon) to the adjacent canal was never constructed. The following is a summary of this investigation;

1. The permanent pool elevation observed for pond 2A (lagoon) was observed to be at 0.25' msl, approximately 1.25' below the approximated 1.50' msl permanent pool elevation.
2. The permanent pool elevation observed for pond 2 was observed to be at 0.65' msl, approximately 0.85' below the approximated 1.50' msl permanent pool elevation.
3. A topographic study had not been performed on the upland portion of "high ground" that is located on the interior of pond 2A (lagoon). This upland portion area was excluded from the original design based upon the lack of information available at that time. The minimum exterior ground elevations that exist along the periphery of the lagoon are approximately 3.0' msl, (the limiting factor in the design). Since the permit approval, additional information has been acquired in this area that depicts an average ground elevation of approximately 1.62' msl. If the emergency overflow outlet for the lagoon was to be removed, this area could be accounted in the ultimate storage capacity, minus the upland areas.
4. The soils testing that was referenced within the narrative of the stormwater permit application was taken from on-site testing that was performed by Protocol Sampling Service for design of the wastewater disposal system. The testing that was conducted was primarily located to the west of this location and may not have been wholly indicative of groundwater and/or surface water elevations in this specific location.
5. A groundwater lowering system was installed in conjunction with that of the wastewater treatment and disposal site which is located towards the center of the project. It appears as though the performance of this system has impacted groundwater elevations in and around the development area. This is evidenced by the entrance detention basins which are approximately 3'-3.5' lower than the design permanent pool elevations.

P.O. Box 1068 ■ 3512 N. Croatan Hwy. ■ Kitty Hawk, NC 27949
252-261-3266 ■ Fax: 252-261-1760 ■ E-mail: bpg@bissellprofessionalgroup.com

After further investigation it is our belief that the overflow swale is not necessary for this drainage system to function properly. The basis for this conclusion is as follows;

1. The permitted required storage volume for basin 2 is 63,168 c.f. The actual provided storage volume for basin 2 is 357,978 c.f. This is the equivalent of a 5.67 in. rainfall event, or nearly the amount of the 10 year 24 hour rainfall for this area of 6.2 inches.
2. The permitted surface area for basin 2 is 45,559 s.f. The actual provided surface area for basin 2 is 183,011 s.f., approximately four times the required surface area.
3. The proposed rip-rap lined emergency overflow swale that is connected to pond 2A and discharges to the adjoining canal was designed and approved prior to the CAMA permits being issued for this project. This swale discharge may conflict with current CAMA policies. It appears that there may not be any alternative discharge points without creating short circuiting or direct discharges to surface waters.

Please reference the attached Stormwater Management System As-Built drawing and Corrective Action Plan that depicts these conditions. You may contact me directly at (252) 261-3266 x228 if should have any comments or concerns pertaining to this information. We thank you for your time and consideration in this matter.

Thank you,

David Ryan, P.E.
Project Engineer

Energy, Mineral & Land Resources
ENVIRONMENTAL QUALITY

ROY COOPER
Governor

MICHAEL S. REGAN
Secretary

WILLIAM E. (TOBY) VINSON, JR.
Interim Director

March 9, 2018

WSV Holdings, LLC
Attention: Prem Gupta, Registered Agent
P.O. Box 90
Kill Devil Hills, NC 27948

Subject: **Stormwater Permit No. SW7040511 Renewal/Ownership Change**
Waterside Villages
High Density Project
Currituck County

Dear Prem Gupta:

The Washington Regional Office received a complete Stormwater Renewal and Ownership Change Application for the wet detention pond system serving Waterside Villages located at Grandy NC on January 29, 2018. Staff review of the applications has determined that the permit can be renewed. We are forwarding Permit No. SW7040511 for two wet detention ponds serving this project.

This permit, upon its effective date, will replace all previous State Stormwater permits for this site. This permit shall be effective from March 9, 2018 until July 28, 2026, and shall be subject to the conditions and limitations as specified therein. Please pay special attention to the Operation and Maintenance requirements in this permit. Failure to establish an adequate system for operation and maintenance of the stormwater management system will result in future compliance problems. The issuance of this permit does not resolve any previous violations of the stormwater rules.

If any parts, requirements, or limitations contained in this permit are unacceptable, you have the right to request an adjudicatory hearing upon written request within thirty (30) days following receipt of this permit. This request must be in the form of a written petition, conforming to Chapter 150B of the North Carolina General Statutes, and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, NC 27699-6714. Unless such demands are made this permit shall be final and binding.

If you have any questions, or need additional information concerning this matter, please contact me at (252) 948-3923.

Sincerely,

Roger K. Thorpe
Environmental Engineer

STATE OF NORTH CAROLINA

DEPARTMENT OF ENVIRONMENTAL QUALITY
DIVISION OF ENERGY, MINERAL, AND LAND RESOURCES

STATE STORMWATER MANAGEMENT PERMIT

HIGH DENSITY DEVELOPMENT

In accordance with the provisions of Article 21 of Chapter 143, General Statutes of North Carolina as amended, and other applicable Laws, Rules, and Regulations

PERMISSION IS HEREBY GRANTED TO

WSV Holdings, LLC

Waterside Villages

Currituck County

FOR THE

construction, operation and maintenance of two stormwater wet detention pond systems in compliance with the provisions of 15A NCAC 2H .1000 (hereafter referred to as the *"stormwater rules"*) and the approved stormwater management plans and specifications and other supporting data as attached and on file with and approved by the Division of Energy, Mineral, and Land Resources and considered a part of this permit.

This permit shall be effective from the March 9, 2018 until July 28, 2026, and shall be subject to the following specified conditions and limitations:

I. DESIGN STANDARDS

1. This permit is effective only with respect to the nature and volume of stormwater described in the application and other supporting data.

2. This stormwater system has been approved for the management of stormwater runoff as described in Section I.6 of this permit. The stormwater control has been designed to handle the runoff from a total of 1,070,704 square feet of impervious area.

3. The tract will be limited to the amount of built-upon area indicated in Section I.6 of this permit, and per approved plans.

4. All stormwater collection and treatment systems must be located in either dedicated common areas or recorded easements. The final plats for the project will be recorded showing all such required easements, in accordance with the approved plans.

5. The runoff from all built-upon area within the permitted drainage area of this project must be directed into the permitted stormwater control system.

6. The following design criteria have been provided in the wet pond system and must be maintained at design condition:

		Drainage Area # 1	Drainage Area # 2
a.	Drainage Area, ft^2 :	1,027,372	2,266,596
b.	Total Impervious Surfaces, ft^2:	354,578	716,126
c.	Design Storm, inches:	1.0	1.0
d.	Permanent Pool Elevation, FMSL:	9.50	1.50
e.	Permanent Pool Surface Area, ft^2:	29,938	95,827
f.	Permitted Storage Volume, ft^3:	78,391	147,565
g.	Temporary Storage Elev., FMSL:	10.60	2.16
h.	Controlling Orifice:	1.0 "Ø pipe	N/A
i.	Pond Depth, ft.:	4.0	4.0
j.	Receiving Stream:	Currituck Sound	
k.	Classification of Water Body:	"SC"	

II. SCHEDULE OF COMPLIANCE

1. The stormwater management system shall be constructed in its entirety, vegetated and operational for its intended use prior to the construction of any built-upon surface.

2. During construction, erosion shall be kept to a minimum and any eroded areas of the system will be repaired immediately.

3. The permittee shall at all times provide the operation and maintenance necessary to assure the permitted stormwater system functions at optimum efficiency. The approved Operation and Maintenance Plan must be followed in its entirety and maintenance must occur at the scheduled intervals including, but not limited to:

   a. Semiannual scheduled inspections (every 6 months).
   b. Sediment removal.
   c. Mowing and revegetation of slopes and the vegetated filter.
   d. Immediate repair of eroded areas.
   e. Maintenance of all slopes in accordance with approved plans and specifications.
   f. Debris removal and unclogging of outlet structure, orifice device, flow spreader, catch basins and piping.
   g. Access to the outlet structure must be available at all times.

4. Records of maintenance activities must be kept and made available upon request to authorized personnel of the Division. The records will indicate the date, activity, name of person performing the work and what actions were taken.

5. The facilities shall be constructed as shown on the approved plans. This permit shall become voidable unless the facilities are constructed in accordance with the conditions of this permit, the approved plans and specifications, and other supporting data.

6. If the stormwater system was used as an Erosion Control device, it must be restored to design condition prior to operation as a stormwater treatment device, and prior to occupancy of the facility.

7. Access to the stormwater facilities shall be maintained via appropriate easements at all times.

8. The permittee shall submit to the Director and shall have received approval for revised plans, specifications, and calculations prior to construction, for any modification to the approved plans, including, but not limited to, those listed below:

   a. Any revision to any item shown on the approved plans, including the stormwater management measures, built-upon area, details, etc.
   b. Project name change.
   c. Transfer of ownership.
   d. Redesign or addition to the approved amount of built-upon area or to the drainage area.
   e. Further subdivision, acquisition, lease or sale of all or part of the project area. The project area is defined as all property owned by the permittee, for which Sedimentation and Erosion Control Plan approval or a CAMA Major permit was sought.
   f. Filling in, altering, or piping of any vegetative conveyance shown on the approved plan.

9. A copy of the approved plans and specifications shall be maintained on file by the Permittee at all times.

10. Upon completion of construction, prior to issuance of a Certificate of Occupancy, and prior to operation of this permitted facility, a certification must be received from an appropriate designer for the system installed certifying that the permitted facility has been installed in accordance with this permit, the approved plans and specifications, and other supporting documentation. Any deviations from the approved plans and specifications must be noted on the Certification. A modification may be required for those deviations.

11. The Director may notify the permittee when the permitted site does not meet one or more of the minimum requirements of the permit. Within the time frame specified in the notice, the permittee shall submit a written time schedule to the Director for modifying the site to meet minimum requirements. The permittee shall provide copies of revised plans and certification in writing to the Director that the changes have been made.

III. GENERAL CONDITIONS

1. This permit is not transferable except after notice to and approval by the Director. In the event of a change of ownership, or a name change, the permittee must submit a formal permit transfer request to the Division, accompanied by a completed name/ownership change form, documentation from the parties involved, and other supporting materials as may be appropriate. The approval of this request will be considered on its merits and may or may not be approved. The permittee is responsible for compliance with all permit conditions until such time as the Division approves the transfer request.

2. Failure to abide by the conditions and limitations contained in this permit may subject the Permittee to enforcement action by the Division, in accordance with North Carolina General Statute 143-215.6A to 143-215.6C.

3. The issuance of this permit does not preclude the Permittee from complying with any and all statutes, rules, regulations, or ordinances, which may be imposed by other government agencies (local, state, and federal) having jurisdiction.

4. In the event that the facilities fail to perform satisfactorily, including the creation of nuisance conditions, the Permittee shall take immediate corrective action, including those as may be required by this Division, such as the construction of additional or replacement stormwater management systems.

5. The permittee grants DEQ Staff permission to enter the property during normal business hours for the purpose of inspecting all components of the permitted stormwater management facility.

6. The permit may be modified, revoked and reissued or terminated for cause. The filing of a request for a permit modification, revocation and reissuance or termination does not stay any permit condition.

7. Unless specified elsewhere, permanent seeding requirements for the stormwater control must follow the guidelines established in the North Carolina Erosion and Sediment Control Planning and Design Manual.

8. Approved plans and specifications for this project are incorporated by reference and are enforceable parts of the permit.

9. The permittee shall notify the Division any name, ownership or mailing address changes within 30 days.

10. This permit shall be effective from the March 9, 2018 until July 28, 2026. Application for permit renewal shall be submitted 180 days prior to the expiration date of this permit and must be accompanied by the processing fee.

Permit issued this the 9 th day of March 2018.

NORTH CAROLINA ENVIRONMENTAL MANAGEMENT COMMISSION

_____ *for*
William E. (Toby) Vinson, Jr., Interim Director
Division of Energy, Mineral, and Land Resources
By Authority of the Environmental Management Commission

Permit No. SW7040511

SUPPLEMENTAL DECLARATION OF COVENANTS, CONDITIONS AND RESTRICTIONS FOR WATERSIDE VILLAGES OF CURRITUCK (LOTS 51-80, PHASE 4)

THIS SUPPLEMENTAL DECLARATION OF COVENENTS, CONDITIONS AND RESTRICTIONS FOR WATERSIDE VILLAGES OF CURRITUCK ("Supplemental Declaration") is made this _____ day of _____, 2024, by WSV HOLDINGS, LLC, a North Carolina limited liability company (the "Declarant").

RECITALS:

A. Declarant is the Declarant under the Declaration of Covenants, Conditions and Restrictions for Waterside villages of Currituck, which is recorded in Book 908 at Page 872 in the Office of the Register of Deeds of Currituck County, North Carolina, as previously supplemented and amended (the "Declaration"). The capitalized terms and definitions in this Supplemental Declaration shall be the same as set forth in the Declaration unless otherwise defined herein.

B. Declaration is the fee owner of fee simple of the real property described in Exhibit "A" which is attached hereto and incorporated herein by reference ("Lots 51-80, being Phase 4"), said real property being part of the "Contiguous Property."

C. Pursuant to Section 9.1 of the Declaration, Declarant desires to annex Lots 51-80 into the Project and subject it to the provisions of the Declaration and the jurisdiction of the Association.

NOW, THEREFORE, Declarant, exercising its right to annex Contiguous Property pursuant to Section 9.1 of the Declaration, does hereby declare that all of Lots 51-80 shall be held, sold, used and conveyed subject to the Declaration and all easements, restrictions, covenants, conditions and benefits described therein; and further, the Lots 51-80 are hereby subjected to the jurisdiction of the Association and all Association Documents.

IN WITNESS WHEREOF, Declarant has executed this Supplemental Declaration this ____ day of _____, 2024.

WSV HOLDINGS, LLC, a North Carolina limited liability company

By:_____

Name:_____

Title:_____

STATE OF NORTH CAROLINA

COUNTY OF _____

I certify that the following person(s) personally appeared before me this day, acknowledging to me that he or she voluntarily signed the foregoing document for the purpose stated therein and in the capacity indicated: _____.
(Name of Principal(s)

Date:_____

_____
Official Signature of Notary Public

_____
Notary Printed or Typed Name

OFFICIAL SEAL

My Commission Expires:_____

EXHIBIT "A"

Being located in Currituck County, North Carolina, and being more particularly described as follows:

Lot 92 of Waterside Villages of Currituck as shown on Final Plat thereof entitled "Waterside Villages of Currituck – Phase 2 – Lot 92" as recorded in Plat Cabinet _____ at Slides _____ in the Office of the Register of Deeds of Currituck County, North Carolina.

WATERSIDE VILLAGES

OPEN SPACE CALCULATIONS

February 8, 2007
Updated March 23, 2017 (Lots 92 & 93)
Updated December 12, 2024 (PH 7A, 2 & 4)

PHASE	TOTAL AREA	OPEN SPACE DEDICATIONS
1	9.18 Ac.	2.40 Ac.
1A	0.90 Ac.	0.09 Ac.
CLUB	2.69 Ac.	2.69 Ac.
5	5.28 Ac.	1.35 Ac.
6	4.86 Ac.	1.12 Ac.
3	0.71 Ac.	0.19 Ac.
Lot 93	0.12 Ac.	0
Lot 92	0.14 Ac.	0
7A	0.79 Ac.	0
2	7.62 Ac.	2.39 Ac.
4	6.06 Ac.	1.66 Ac.
Total	38.35 Ac.	11.89 Ac. (31.00%)