

**SITE DATA**  
 PROPERTY OWNER: ECHO FARM APARTMENTS, LLC  
 PROJECT ADDRESS: 4010 CAROLINA BEACH ROAD  
 PIN NUMBER: R06500-004-001-000 & R06500-004-001-002  
 ZONING DISTRICT: MF-M  
 FLOOD AREA: THE TRACT IS NOT WITHIN ANY SPECIAL FLOOD HAZARD BOUNDARY REFERENCE NC FIRM MAP #3720312500J, EFFECTIVE APRIL 1, 2006 (PER PRELIMINARY PLAT-SITE INVENTORY BY WITHERS & RAVENEL, DATED 11/06/06)  
 MAXIMUM ALLOWABLE BUILDING HEIGHT (BASED ON REQUIRED SETBACK WIDTHS): 45'  
 MAXIMUM PROPOSED BUILDING HEIGHT (AVG. EX. GROUND ELEV. TO HALFWAY BETWEEN HIGHEST PEAK & EAVE): 43.74' (BLDG #6)  
 BUILDING SETBACKS, REQUIRED (DUE TO BUILDING HEIGHT): FRONT-35', REAR-29', INTERIOR SIDE-24', CORNER LOT SIDE-34'  
 BUILDING SETBACKS, PROPOSED (MIN.): FRONT-36.65', INTERIOR SIDE-25'  
 SITE AREA: 475,805 SF = 10.92 ACRES ±  
 MAXIMUM ALLOWABLE DENSITY: 17 UNITS/ACRE x 10.92 ACRES = 185.64 UNITS, 186 UNITS  
 TOTAL UNITS: 184 (ONE BEDROOM)  
 PROPOSED BUILDING AREA (FOOTPRINT, EXCLUDES PORCHES, PATIOS, BALCONIES, & ROOF OVERHANGS): 50,677.28 SF  
 MAXIMUM ALLOWABLE LOT COVERAGE: 30%  
 PROPOSED LOT COVERAGE: 50,677.28 / 475,805 x 100% = 10.65%  
 NUMBER OF PROPOSED BUILDINGS: 10  
 BUILDING SIZE (AREA & UNITS ARE PER BUILDING):

BUILDING	SQUARE FOOTAGE (1ST STORY)	SQUARE FOOTAGE (2ND STORY)	SQUARE FOOTAGE (3RD STORY)	NUMBER OF UNITS (1 BEDROOM)
1-2	6,034.06	6,034.06	6,034.06	20
3-8	6,034.06	6,034.06	6,034.06	24
CLUBHOUSE	1,924.90	N/A	N/A	N/A
MAINTENANCE	480.00	N/A	N/A	N/A

**TOTAL AMOUNT & PERCENT OF IMPERVIOUS SURFACE AREAS ON-SITE:**

BEFORE DEVELOPMENT			AFTER DEVELOPMENT			
AREA (SF)	% OF SITE		EX. (SF)	PROPOSED (SF)	TOTAL (SF)	% OF SITE
BUILDINGS	5,450	1.15	BUILDINGS (INCLUDES ROOF OVERHANG)	0	59,250	12.45
DRIVEWAY	14,100	2.96	PARKING (CONVENTIONAL)	0	70,518	14.82
OTHER	954	0.20	PARKING (PERVIOUS PAVEMENT, 75% CREDIT)	0	10,836	2.28
TOTAL	20,504	4.31	SIDEWALK	0	13,909	2.93
			OTHER	0	5,722	1.20
			TOTAL	0	160,235	33.68

**OFF STREET PARKING CALCULATIONS (RESIDENTIAL):**  
 MIN. PARKING REQ. = 1.5 SPACES/UNIT x 184 UNITS = 276 SPACES  
 MAX. PARKING REQ. = 2.5 SPACES/UNIT x 184 UNITS = 460 SPACES  
 NUMBER OF PROPOSED PARKING SPACES = 288  
 MIN. NUMBER OF REQ. HANDICAPPED SPACES PER ADA STANDARDS FOR ACCESSIBLE DESIGN = 11  
 NUMBER OF PROPOSED HANDICAPPED SPACES = 17 SPACES  
 NUMBER OF REQ. BICYCLE PARKING SPACES = 20  
 NUMBER OF PROPOSED BICYCLE PARKING SPACES = 24  
 THE TRACT IS NOT WITHIN ANY SPECIAL HIGHWAY OVERLAY DISTRICT OR ANY OTHER ZONING OVERLAY DISTRICT  
 PER THE CITY OF WILMINGTON ZONING MAPS (MAPS 3125-2 & 3125-4, DATED: MAY 8, 2015)  
 CAMA LAND USE CLASSIFICATION PER THE 2006 CAMA PLAN UPDATE LAND CLASSIFICATION MAP IS URBAN.

**CITY OF WILMINGTON STANDARD NOTES**

- PRIOR TO ANY CLEARING, GRADING OR CONSTRUCTION ACTIVITY, TREE PROTECTION FENCING WILL BE INSTALLED AROUND PROTECTED TREES OR GROVES OF TREES & NO CONSTRUCTION WORKERS, TOOLS, MATERIALS, OR VEHICLES ARE PERMITTED WITHIN THE TREE PROTECTION FENCING.
- NO LAND DISTURBANCE INCLUDING TREE REMOVAL IS TO OCCUR OUTSIDE THE LIMITS OF DISTURBANCE SHOWN ON THE PLANS.
- NO EQUIPMENT IS ALLOWED ON THE SITE UNTIL ALL TREE PROTECTION FENCING AND SILT FENCING HAS BEEN INSTALLED & APPROVED.
- PROTECTIVE TREE FENCING IS TO BE MAINTAINED THROUGHOUT THE DURATION OF THE PROJECT.
- LAND CLEARING AND CONSTRUCTION CONTRACTORS SHALL RECEIVE ADEQUATE INSTRUCTION ON TREE PROTECTION REQUIREMENTS & METHODS.
- ALL PAVEMENT MARKINGS IN PUBLIC RIGHTS-OF-WAY & FOR DRIVEWAYS ARE TO BE THERMOPLASTIC & MEET CITY AND/OR NCDOT STANDARDS.
- IT SHALL BE THE RESPONSIBILITY OF THE SUBDIVIDER TO ERECT OFFICIAL STREET NAME SIGNS AT ALL INTERSECTIONS ASSOCIATED WITH THE SUBDIVISION IN ACCORDANCE WITH THE TECHNICAL STANDARDS AND SPECIFICATIONS MANUAL. CONTACT TRAFFIC ENGINEERING AT 341-7888 TO DISCUSS INSTALLATION OF TRAFFIC AND STREET NAME SIGNS. PROPOSED STREET NAMES MUST BE APPROVED PRIOR TO INSTALLATION OF STREET NAME SIGNS.
- TRAFFIC CONTROL DEVICES (INCLUDING SIGNS AND PAVEMENT MARKINGS) IN AREAS OPEN TO PUBLIC TRAFFIC ARE TO MEET MUTCD (MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES) STANDARDS.
- CALL TRAFFIC ENGINEERING AT 341-7888 TO ENSURE THAT ALL TRAFFIC SIGNAL FACILITIES AND EQUIPMENT ARE SHOWN ON THE PLAN.
- CALL TRAFFIC ENGINEERING AT 341-7888 FORTY-EIGHT HOURS PRIOR TO ANY EXCAVATION IN THE RIGHT OF WAY.
- ANY BROKEN OR MISSING SIDEWALK PANELS, DRIVEWAY APRON PANELS, OR CURB AND GUTTER SECTIONS SHALL BE REPLACED.
- CONTACT TRAFFIC ENGINEERING AT 341-7888 TO DISCUSS STREET LIGHTING OPTIONS.
- PROJECT SHALL COMPLY WITH CFPWA CROSS CONNECTION CONTROL REQUIREMENTS. WATER METER(S) CANNOT BE RELEASED UNTIL ALL REQUIREMENTS ARE MET AND THE STATE HAS GIVEN THEIR FINAL APPROVAL. CALL 332-6558 FOR INFORMATION.
- IF THE CONTRACTOR DESIRES CFPWA WATER FOR CONSTRUCTION HE SHALL APPLY IN ADVANCE FOR THIS SERVICE & MUST PROVIDE A REDUCED PRESSURE ZONE (RPZ) BACKFLOW PREVENTION DEVICE ON THE DEVELOPER'S SIDE OF THE WATER METER BOX.
- ANY IRRIGATION SYSTEM SUPPLIED BY CFPWA WATER SHALL COMPLY WITH THE CFPWA CROSS CONNECTION CONTROL REGULATIONS. CALL 332-6558 FOR INFORMATION.
- ANY BACKFLOW PREVENTION DEVICES REQUIRED BY CFPWA WILL NEED TO BE ON THE LIST OF APPROVED DEVICES BY USCFCOCHR OR ASSE.
- ALL TRAFFIC CONTROL SIGNS & MARKINGS OFF THE RIGHT-OF-WAY ARE TO BE MAINTAINED BY THE PROPERTY OWNER IN ACCORDANCE WITH MUTCD STANDARDS.
- ALL PAVEMENT MARKINGS REGULATING TRAFFIC FLOW MUST BE THERMOPLASTIC.
- A UTILITY CUT PERMIT IS REQUIRED FOR EACH OPEN CUT OF A CITY STREET (CONTACT 341-5888 FOR MORE DETAILS). IN CERTAIN CASES, AN ENTIRE RESURFACING OF THE AREA BEING OPEN CUT MAY BE REQUIRED.
- TRAFFIC ENGINEERING MUST APPROVE OF PAVEMENT MARKING LAYOUT PRIOR TO ACTUAL STRIPING.
- A LANDSCAPING PLAN INDICATING THE LOCATION OF REQUIRED STREET TREES SHALL BE SUBMITTED TO THE CITY OF WILMINGTON TRAFFIC ENGINEERING DIVISION AND PARKS AND RECREATION DEPARTMENT FOR REVIEW AND APPROVAL PRIOR TO THE RECORDING OF THE FINAL PLAT.
- CONTACT THE NORTH CAROLINA ONE CALL CENTER PRIOR TO DOING ANY DIGGING. 1-800-632-4949.
- ALL PARKING STALL, MARKINGS AND LANE ARROWS WITHIN THE PARKING AREAS SHALL BE WHITE.
- INSTALL REFLECTORS PER CITY AND NCDOT STANDARDS.

**FIRE AND LIFE SAFETY NOTES**

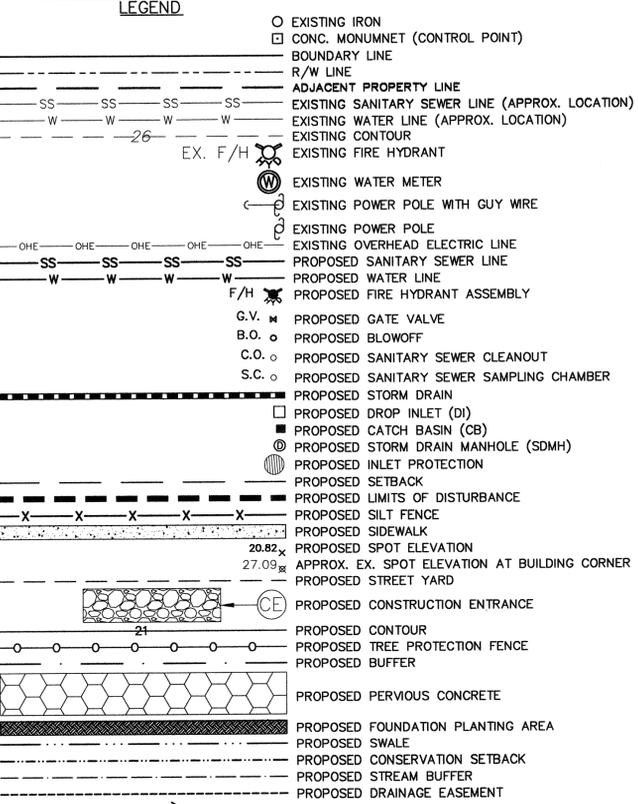
- PARKING AND LANDSCAPING CANNOT BLOCK FIRE HYDRANTS OR FDC'S. A 3-FOOT CLEAR SPACE SHALL BE MAINTAINED AROUND THE CIRCUMFERENCE OF THE HYDRANT AND FDC.
- FIRE HYDRANTS CANNOT BE FURTHER THAN 8' FROM THE CURB.
- NEW HYDRANTS MUST BE BROUGHT INTO SERVICE PRIOR TO COMBUSTIBLE MATERIALS BEING DELIVERED TO THE JOB SITE.
- ALL WEATHER CONDITIONS MUST BE MAINTAINED AROUND CONSTRUCTION SITE AT ALL TIMES.
- PRIVATE UNDERGROUND FIRE LINES REQUIRE A SEPARATE UNDERGROUND FIRE LINE PERMIT FROM THE WILMINGTON FIRE & LIFE SAFETY DIVISION AT 910-343-0696.
- A MINIMUM OF 5' SHALL SEPARATE UNDERGROUND FIRE LINES OR PRIVATE WATER MAINS FROM OTHER UNDERGROUND UTILITIES.
- FDC'S CAN BE NO FURTHER THAN 150' FROM A FIRE HYDRANT.
- FDC'S CAN BE NO FURTHER THAN 40' FROM FIRE DEPARTMENT VEHICLE PLACEMENT.
- BUILDING CONSTRUCTION TYPE ACCORDING TO THE INTERNATIONAL BUILDING CODE IS V-B.
- SMOKER SWITCHES SHALL BE INSTALLED ON ALL VALVES THAT ARE CAPABLE OF TURNING THE WATER SUPPLY OFF TO THE SPRINKLER SYSTEMS.

**SITE INVENTORY NOTES**

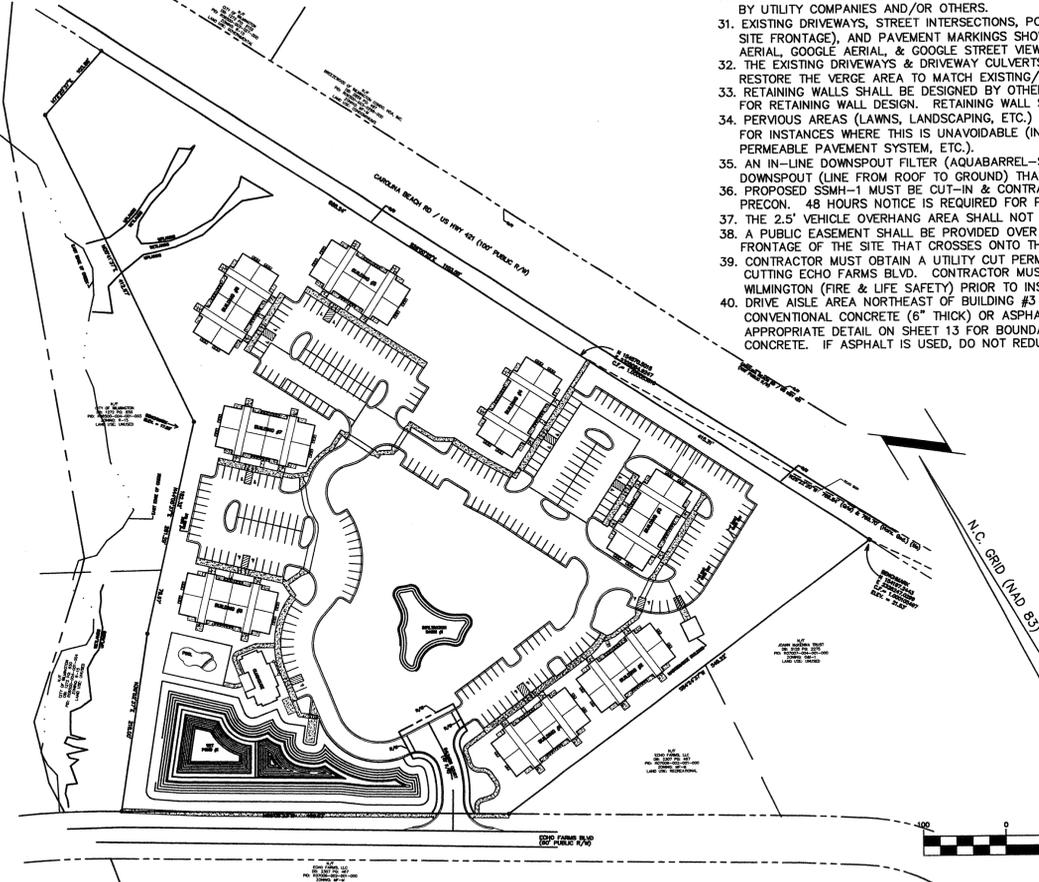
- SOIL TYPES: Jo (JOHNSTON), Le (LEON), Ly (LYNN HAVEN), & Kr (KUREB).
- THIS SITE IS NOT LOCATED WITHIN A CAMA AEC (PER ECS CAROLINAS, LLP).
- A 25' CONSERVATION SETBACK IS REQUIRED FROM THE WETLANDS WHICH IS CONSIDERED SWAMP FOREST (PER ECS CAROLINAS, LLP).
- THIS SITE IS NOT RECOGNIZED AS A LOCAL, STATE OR FEDERALLY HISTORIC OR ARCHEOLOGICAL SITE (PER ECS CAROLINAS, LLP).
- NO CEMETERIES, BURIAL SITES, OR BURIAL GROUNDS LOCATED ON THE SITE (PER ECS CAROLINAS, LLP).
- WETLANDS DELINEATED BY ECS CAROLINAS, LLP (SEE EXISTING CONDITIONS MAP).
- THE PROJECT WILL NOT ADVERSELY AFFECT THREATENED OR ENDANGERED SPECIES (OPINION PER ECS CAROLINAS, LLP). ECS CAROLINAS, LLP OBSERVED SUMMER HABITAT FOR THE NORTHERN LONG-EARED BAT ON THE SITE AND RECOMMENDS ANY PROPOSED CLEARING FOR THE SITE BE CONDUCTED DURING THE WINTER MONTHS.
- EXISTING VEGETATION HAS BEEN LOCATED AND IS LABELED (SEE EXISTING CONDITIONS MAP).
- THE SITE IS NOT LOCATED WITHIN THE 100-YEAR FLOOD PLAIN (PER ECS CAROLINAS, LLP).
- SEE EXISTING CONDITIONS MAP & SITE PLAN FOR PRESENCE OR NON-PRESENCE OF EXISTING OR PROPOSED THROUGHFARES, BIKE ROUTES, PEDESTRIAN SIDEWALKS, OR TRAILS & TRANSIT FACILITIES.
- THE TRACT IS WITHIN THE CAPE FEAR RIVER BASIN & DRAINS TO BARNARDS CREEK (C.S.W).
- THE SITE IS CLASSIFIED AS URBAN PER THE CAMA LAND CLASSIFICATION WITH AN OFF-SITE CONSERVATION AREA LOCATED TO THE NORTHWEST OF THE SITE (PER ECS CAROLINAS, LLP).

**LIST OF CONDITIONS AS APPROVED BY THE PLANNING COMMISSION ON 2/3/16**

- THE USE & DEVELOPMENT OF THE SUBJECT PROPERTY SHALL COMPLY WITH ALL REGULATIONS & REQUIREMENTS IMPOSED BY THE LAND DEVELOPMENT CODE, THE CITY OF WILMINGTON TECHNICAL STANDARDS & SPECIFICATIONS MANUAL & ANY OTHER APPLICABLE FEDERAL, STATE OR LOCAL LAW, ORDINANCE OR REGULATION, AS WELL AS ANY CONDITION STATED BELOW. IN THE EVENT OF A CONFLICT, THE MORE STRINGENT REQUIREMENT OR HIGHER STANDARD SHALL APPLY.
- APPROVAL OF THIS PRELIMINARY PLAN DOES NOT CONSTITUTE TECHNICAL APPROVAL OF THE SITE PLAN. FINAL APPROVAL BY THE TECHNICAL REVIEW COMMITTEE & THE ISSUANCE OF ALL REQUIRED PERMITS MUST OCCUR PRIOR TO RELEASE OF THE PROJECT FOR CONSTRUCTION.
- IF, FOR ANY REASON, ANY CONDITION FOR APPROVAL IS FOUND TO BE ILLEGAL OR INVALID OR IF THE APPLICANT SHOULD FAIL TO ACCEPT ANY CONDITION FOLLOWING APPROVAL, THE APPROVAL OF THE SITE PLAN FOR THE DISTRICT SHALL BE NULL & VOID & OF NO EFFECT & PROCEEDINGS SHALL BE INSTITUTED TO REZONE THE PROPERTY TO ITS PREVIOUS ZONING CLASSIFICATION.
- THE USE & DEVELOPMENT OF THE SUBJECT PROPERTY SHALL BE IN ACCORDANCE WITH THE PRELIMINARY PLAN AS SUBMITTED OCTOBER 13, 2015 & APPROVED.
- THE USE OF PINE STRAW AS GROUND COVER SHALL BE PROHIBITED WITHIN 10 FEET OF ANY PROPOSED COMBUSTIBLE EXTERIOR CONSTRUCTION.
- ALL EXISTING & PROPOSED PUBLIC & NON-MUNICIPAL EASEMENTS SHALL BE ADDED TO THE PRELIMINARY PLAN AS NECESSARY.
- ALL CONSTRUCTION TRAFFIC ASSOCIATED WITH THE SITE SHALL ACCESS THE SITE FROM ECHO FARMS BOULEVARD.
- REQUIREMENTS OF THE APPROVED TRAFFIC IMPACT ANALYSIS (TIA) MUST BE COMPLETED PRIOR TO ISSUANCE OF A CERTIFICATE OF OCCUPANCY.
- THE REQUIRED SIDEWALK ALONG THE CAROLINA BEACH ROAD FRONTAGE SHALL BE WAIVED & AN EQUAL AMOUNT OF SIDEWALK, BASED ON AN APPROVED COST ESTIMATE, SHALL BE PROVIDED ALONG ECHO FARMS BOULEVARD WHICH CONNECTS THE SUBJECT SITE TO THE EXISTING SIDEWALK NETWORK.



- NOTES**
- BOUNDARY & TOPOGRAPHICAL SURVEY BY BATEMAN CIVIL SURVEY COMPANY, 200 N. MAIN STREET, HOLLY SPRINGS, NC 27540, PHONE: 919-577-1080.
  - ALL ELEVATIONS ARE IN FEET UNLESS OTHERWISE INDICATED.
  - ALL CITY, STATE, & FEDERAL REGULATIONS SHALL BE FOLLOWED.
  - PRIOR TO INSTALLATION OF WATER OR SANITARY SEWER MAINS CONTRACTOR SHALL NOTIFY THE ENGINEER WITH MALPASS ENGINEERING & SURVEYING, P.C. AT 910-392-5243.
  - EXISTING SANITARY SEWER MAINS ARE OWNED BY CFPWA. PROPOSED PVC SANITARY SEWER MAINS SHALL BE AWWA C900 CLASS 150 (DR-18) UNLESS OTHERWISE INDICATED. PROPOSED DIP SANITARY SEWER MAINS SHALL CONFORM TO AWWA C151 CLASS 350 AND LINED WITH PROTECTO 401.
  - EXISTING WATER MAINS ARE OWNED BY CFPWA. PROPOSED PVC WATER MAINS SHALL BE AWWA C900 CLASS 150 (DR-18) UNLESS OTHERWISE INDICATED. PROPOSED DIP WATER MAINS SHALL CONFORM TO AWWA C150 PRESSURE CLASS 350.
  - DOMESTIC WATER MAIN SHALL BE PUBLIC FROM THE EXISTING WATER MAIN IN ECHO FARMS BLVD THROUGH THE WATER METER & PRIVATE AFTER THE WATER METER. FIRE LINE SHALL BE PUBLIC FROM THE EXISTING WATER MAIN IN ECHO FARMS BLVD TO THE BACKFLOW PREVENTER & PRIVATE BEGINNING AT THE BACKFLOW PREVENTER.
  - PROPOSED SANITARY SEWER MAINS SHALL BE 8" & PROPOSED SEWER SERVICES SHALL BE 6". PROPOSED SEWER ON SITE & ON ADJACENT CITY PROPERTY SHALL BE PRIVATE, & PROPOSED SEWER WITHIN ECHO FARMS BLVD SHALL BE PUBLIC.
  - PROPOSED WATER & FIRE LINES SIZES PER PLAN. PROPOSED WATER & FIRE LINES ON SITE SHALL BE PRIVATE & PROPOSED WATER & FIRE LINES OFF-SITE SHALL BE PUBLIC.
  - LIMITS OF DISTURBANCE = 419,416 SF = 9.63 ACRES.
  - DISTURBED AREAS WITHIN ADJACENT RIGHTS-OF-WAY (EXCEPT FOR SWALES #1 & 2) & ON ADJACENT CITY OF WILMINGTON PROPERTY SHALL BE IMMEDIATELY SEEDED & STABILIZED WITH MULCH OR EXCELISOR MAT PRIOR TO ANY RAINFALL EVENT. SEE SWALE #1 & 2 DETAILS FOR SEEDING & STABILIZATION OF SWALES #1 & 2.
  - UPON COMPLETION OF ANY PHASE OF ACTIVITY SIDE SLOPES WILL BE SEEDED/STABILIZED IN ACCORDANCE WITH GROUND STABILIZATION CHART ON SHEET 11.
  - SLOPE ON HANDICAP SPACES SHALL BE 1:50 OR FLATTER.
  - PROPOSED OFF-SITE IMPERVIOUS SURFACE AREA IS 3,438 SF.
  - TACTILE WARNING MATS ARE TO BE INSTALLED ON ALL WHEELCHAIR (HANDICAP) RAMPS.
  - ANYTHING WITHIN THE SIGHT TRIANGLES SHALL NOT INTERFERE WITH CLEAR VISUAL SIGHT LINES FROM 30'-10'.
  - ALL PARKING STALL MARKINGS AND LANE ARROWS WITHIN THE PARKING AREAS SHALL BE WHITE.
  - ALL DEVELOPMENT SHALL BE IN ACCORDANCE WITH THE CITY OF WILMINGTON LAND DEVELOPMENT CODE & TECHNICAL STANDARDS MANUAL, EXCEPT WHERE EXEMPTED OR VARIANCES ARE OBTAINED.
  - THE PROPOSED CURB IS 4" MEDIAN VERTICAL CURB & GUTTER, 4" VERTICAL CURB & GUTTER, VALLEY CURB, & REVERSE VALLEY CURB (SD-11).
  - IT IS THE DEVELOPER'S/CONTRACTOR'S RESPONSIBILITY TO BE COMPLIANT WITH ALL APPLICABLE ADA REQUIREMENTS.
  - ALL PLANTED & RETAINED LIVING MATERIAL REQUIRED TO MEET THE PROVISIONS OF THE CITY OF WILMINGTON LAND DEVELOPMENT CODE, SHALL BE PERPETUALLY PROTECTED & MAINTAINED TO PROFESSIONALLY ACCEPTED STANDARDS BY JOINT & SEVERAL RESPONSIBILITY OF THE OWNER, OCCUPANT, TENANT, & RESPECTIVE AGENTS OF THE PROPERTY ON WHICH THE MATERIAL IS LOCATED.
  - STORM DRAIN MANHOLES, CATCH BASINS, & DROP INLETS SHALL BE SIZED APPROPRIATELY TO ACCOMMODATE OVERSIZED PIPES AND FRAME & GRATE.
  - ALL DROP INLETS TO HAVE HEAVY DUTY 2'x3' FRAME & GRATE (GENERAL FOUNDRIES INC., ITEM #24364 OR EQUIVALENT).
  - NO PIPE JOINTS SHALL BE INSIDE ANY INTERFERENCE MANHOLE.
  - A RECORDED DRAINAGE EASEMENT SHALL BE PROVIDED FOR WET POND #1 & INFILTRATION BASIN #1 INCLUDING ACCESS TO THE NEAREST RIGHT-OF-WAY.
  - BUILDING RUNOFF SHALL BE DIRECTED TO DRAIN TO APPROPRIATE LOCATION (SEE SHEETS 13 & 14). USE DOWNSPOUT PIPING AS NECESSARY. DOWNSPOUT PIPING SHALL BE DESIGNED BY OTHERS. MAXIMUM ALLOWABLE ROOF AREA PER DOWNSPOUT PIPING DISCHARGE POINT INTO PERMEABLE PAVEMENT SYSTEM IS 1,000 SF.
  - DURING CONSTRUCTION WET POND #1 WILL SERVE AS A SEDIMENT BASIN. A FAIRCLOTH SKIMMER SHALL BE INSTALLED & CONNECTED TO THE OUTLET STRUCTURE (SEE SKIMMER DETAIL & CHART FOR SKIMMER & ORIFICE SIZE). THE FAIRCLOTH SKIMMER IS TEMPORARY. ONCE THE ENTIRE AREA DRAINING TO THE POND HAS BEEN STABILIZED THE SKIMMER SHALL BE REMOVED & THE ORIFICE PIPE (SEE POND DETAIL & CHART FOR SIZE) SHALL BE INSTALLED.
  - A MINIMUM COVER OF 2 FEET FROM TOP OF PIPE TO BOTTOM OF STONE SHALL BE PROVIDED OVER STORM DRAIN PIPE UNDER THE PARKING/DRIVE AISLES & PRIVATE STREET UNLESS CLASS IV RCP IS USED.
  - ALL PROPOSED ON-SITE UTILITY LINES SHALL BE UNDERGROUND.
  - LOCATION OF ANY SITE LIGHTS, ELECTRIC LINES, TELEPHONE LINES, AND/OR NATURAL GAS LINES TO BE DETERMINED BY UTILITY COMPANIES AND/OR OTHERS.
  - EXISTING DRIVEWAYS, STREET INTERSECTIONS, POWER/TRAFFIC SIGNAL POLES & OVERHEAD WIRES (EXCEPT ALONG SITE FRONTAGE), AND PAVEMENT MARKINGS SHOWN ON PLAN WERE TRACED/APPROXIMATED FROM NHC GIS 2010 AERIAL, GOOGLE AERIAL, & GOOGLE STREET VIEW.
  - THE EXISTING DRIVEWAYS & DRIVEWAY CURBS OFF CAROLINA BEACH ROAD TO THE SITE SHALL BE REMOVED. RESTORE THE VERGE AREA TO MATCH EXISTING/PROPOSED.
  - RETAINING WALLS SHALL BE DESIGNED BY OTHERS. MALPASS ENGINEERING & SURVEYING, P.C. IS NOT RESPONSIBLE FOR RETAINING WALL DESIGN. RETAINING WALL SHALL BE CONSTRUCTED OF KEYSTONE BLOCK.
  - PERVIOUS AREAS (LAWNS, LANDSCAPING, ETC.) SHALL NOT DRAIN TO THE PERMEABLE PAVEMENT SYSTEMS EXCEPT FOR INSTANCES WHERE THIS IS UNAVOIDABLE (INTERIOR PARKING LOT ISLAND, AREA BETWEEN BUILDING & PERMEABLE PAVEMENT SYSTEM, ETC.).
  - AN IN-LINE DOWNSPOUT FILTER (AQUABARREL-SLIM LINE, OR SIMILAR) MUST BE INSTALLED ON EVERY ROOF DOWNSPOUT (LINE FROM ROOF TO GROUND) THAT DRAINS TO A PERMEABLE PAVEMENT SYSTEM.
  - PROPOSED SSMH-1 MUST BE CUT-IN & CONTRACTOR MUST PROVIDE A BYPASS PLAN TO THE CFPWA PRIOR TO THE PRECON. 48 HOURS NOTICE IS REQUIRED FOR PRECON.
  - THE 2.5' VEHICLE OVERHANG AREA SHALL NOT BE PLANTED WITH SHRUBS.
  - A PUBLIC EASEMENT SHALL BE PROVIDED OVER ANY PORTION OF THE PROPOSED 5' WIDE SIDEWALK ALONG THE FRONTAGE OF THE SITE THAT CROSSES ONTO THE SITE.
  - CONTRACTOR MUST OBTAIN A UTILITY CUT PERMIT FROM THE CITY OF WILMINGTON (ENGINEERING) PRIOR TO OPEN CUTTING ECHO FARMS BLVD. CONTRACTOR MUST OBTAIN AN UNDERGROUND FIRE LINE PERMIT FROM THE CITY OF WILMINGTON (FIRE & LIFE SAFETY) PRIOR TO INSTALLING THE FIRE LINE.
  - DRIVE AISLE AREA NORTHEAST OF BUILDING #3 BETWEEN PERMEABLE PAVEMENTS SYSTEMS SHALL BE EITHER CONVENTIONAL CONCRETE (6" THICK) OR ASPHALT (2" SF9.5A ASPHALT OVER 6" COMPACTED ABC STONE). USE APPROPRIATE DETAIL ON SHEET 13 FOR BOUNDARY BETWEEN ASPHALT/CONVENTION CONCRETE & PERVIOUS CONCRETE. IF ASPHALT IS USED, DO NOT REDUCE THE PERVIOUS CONCRETE AREAS TO PROVIDE CONCRETE CURB.



**APPROXIMATE FINISHED FLOOR ELEVATION (CONTRACTOR TO CONSULT WITH ARCHITECT & DEVELOPER REGARDING FFE PRIOR TO CONSTRUCTING BUILDING PAD)**

BUILDING	FFE (FEET)
1	23.96
2	27.30
3-4	28.67
5-6	27.73
7	27.79
8	17.43
CLUBHOUSE	16.58
MAINTENANCE	28.28

**NOTE WELL**  
 DEVELOPER TO PROVIDE SIDEWALK ALONG ECHO FARMS BLVD, IN ADDITION TO PROPOSED FRONTAGE SIDEWALK, IN LIEU OF PROVIDING FRONTAGE SIDEWALK ALONG CAROLINA BEACH ROAD PER PLANNING COMMISSION CONDITIONAL APPROVAL.

**OPEN SPACE**  
 TOP OF STORMWATER POND AREA = 22,178 SF  
 REQUIRED OPEN SPACE = 0.35 \* (475,805 - 22,178) = 158,769 SF = 3.64 ACRES  
 PROVIDED OPEN SPACE (INCLUDES ACTIVE & PASSIVE RECREATION AREA) = 160,238 SF = 3.68 ACRES  
 PROVIDED ACTIVE OR PASSIVE RECREATION AREA = 0.5 \* 158,769 = 79,385 SF = 1.82 ACRES  
 PROVIDED ACTIVE RECREATION AREA = 6,072 SF = 0.14 ACRES  
 PROVIDED PASSIVE RECREATION AREA = 80,725 SF = 1.85 ACRES  
 PROVIDED TOTAL RECREATION AREA = 86,797 SF = 1.99 ACRES

**Approved Construction Plan**

Name: \_\_\_\_\_ Date: 3/1/16

Planning: \_\_\_\_\_ Date: 3-2-16

Traffic: \_\_\_\_\_ Date: 3-2-16

Fire: \_\_\_\_\_ Date: 3-2-16

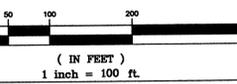
**CITY OF WILMINGTON**  
 NORTH CAROLINA  
 Public Services • Engineering Division  
 APPROVED STORMWATER MANAGEMENT PLAN  
 Date: 2/3/16 Permit # 2016 010  
 Signed: \_\_\_\_\_

**WATER & SEWER CAPACITY**

EXISTING WATER CAPACITY:	2 HOUSES x 400 GPD/HOUSE = 800 GPD
EXISTING SEWER CAPACITY:	2 HOUSES x 360 GPD/HOUSE = 720 GPD
PROPOSED WATER CAPACITY:	184 UNITS x 400 GPD/UNIT + 50 PEOPLE x 10 GPD/PERSON = 74,100 GPD
PROPOSED SEWER CAPACITY:	184 UNITS x 240 GPD/UNIT + 50 PEOPLE x 10 GPD/PERSON = 44,660 GPD

TOTAL LENGTH OF PUBLIC SANITARY SEWER MAIN = 46.32 LF  
 TOTAL LENGTH OF PRIVATE SANITARY SEWER MAIN = 692.07 LF  
 TOTAL LENGTH OF PUBLIC WATER MAIN (DOMESTIC & FIRE LINE) = 38 LF  
 TOTAL LENGTH OF PRIVATE WATER LINE (DOMESTIC & FIRE LINE, INCLUDING LINES TO EACH BUILDING) = 4,354 LF

**PRELIMINARY PLAT**  
 NOT FOR RECORDATION,  
 CONVEYANCES, OR SALES



REV. NO.	DESCRIPTION	DATE
1	REVISED FOR BID SUBMITTAL	8-2-15
2	REVISED FOR DESIGN CONTROL SUBMITTAL	10-1-15
3	REVISED TO SHOW PRIVATE STREET	10-13-15
4	REVISED FOR PRELIMINARY BID	10-16-15
5	REVISED FOR SUBMITTAL	10-29-15
6	REVISED FOR DESIGN CONTROL COMMENTS	11-3-15
7	REVISED PER TIA COMMENTS	11-19-15
8	REVISED PER CITY TO SAVE ADDITIONAL TREES	11-24-15
9	REVISED TO ADJUST NOTES RE-13 & 26, PROVIDE SIDEWALK ALONG CAROLINA BEACH RD. & ADD STREET LIGHT ELEVATION NOTES	12-14-15
10	REVISED PER CITY	2-4-16
11	REVISED PER CITY	2-16-16

**COVER SHEET**  
 4010 CAROLINA BEACH ROAD  
**ECHO FARM APARTMENTS**  
 WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

DATE: 7-22-15  
 SCALE: 1"=100'  
 DRAWN: JCB  
 CHECKED: JEM  
 PROJECT NO: 260  
 SHEET NO: 1  
 OF: 22

MALPASS ENGINEERING & SURVEYING, P.C.  
 1134 SHIPYARD BOULEVARD  
 WILMINGTON, NORTH CAROLINA 28412  
 Phone 910-382-8245  
 Fax 910-392-6200 License No. C-2320

Developer: ECHO FARM APARTMENTS, LLC  
 10 S. CAROLINA DRIVE  
 WILMINGTON, NORTH CAROLINA 28403  
 PHONE: 910-251-5030



MATCHLINE  
SEE SHEET 4

MATCHLINE  
SEE SHEET 4

N/F  
CITY OF WILMINGTON  
DB: 1272 PG: 650  
PID: R06500-004-001-003  
ZONING: R-15  
LAND USE: UNUSED

BENCHMARK  
ELEV. = 17.55'

EX. SSMH  
TOP=17.55'  
INV.=5.96'

EX. SSMH  
TOP=13.46'  
INV.=5.06'

N/F  
CITY OF WILMINGTON  
DB: 1272 PG: 650  
PID: R06500-004-001-004  
ZONING: R-15  
LAND USE: UNUSED

CONSERVATION  
SETBACK

50'  
VEGETATIVE  
BUFFER

EX. SSMH  
TOP=13.46'  
INV.=5.06'

EX. SSMH  
TOP=11.08'  
INV. IN 3.86'  
INV. OUT 3.66'

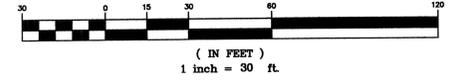
EX. SSMH  
TOP=11.08'  
INV. IN 3.57'  
INV. OUT 3.57'

N/F  
ECHO FARMS, LLC  
DB: 2307 PG: 467  
PID: R07006-002-001-000  
ZONING: MF-M  
LAND USE: RECREATIONAL

N/F  
ECHO FARMS, LLC  
DB: 2307 PG: 467  
PID: R07006-002-001-000  
ZONING: MF-M  
LAND USE: RECREATIONAL

N/F  
JOANN McKENNA TRUST  
DB: 5128 PG: 2275  
PID: R07007-004-001-000  
ZONING: O&I-1  
LAND USE: UNUSED

GRAPHIC SCALE



Approved Construction Plan  
Name: [Signature] Date: 3/1/16  
Planning: [Signature] 3-216  
Traffic: [Signature] 3-216  
Fire: [Signature] 3-216

CITY OF WILMINGTON  
NORTH CAROLINA  
Public Services • Engineering Division  
APPROVED STORMWATER MANAGEMENT PLAN  
Date: 3/1/16 Permit # 2016010  
Signed: [Signature]

EXISTING CONDITIONS & DEMOLITION PLAN  
4010 CAROLINA BEACH ROAD  
ECHO FARM APARTMENTS  
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA



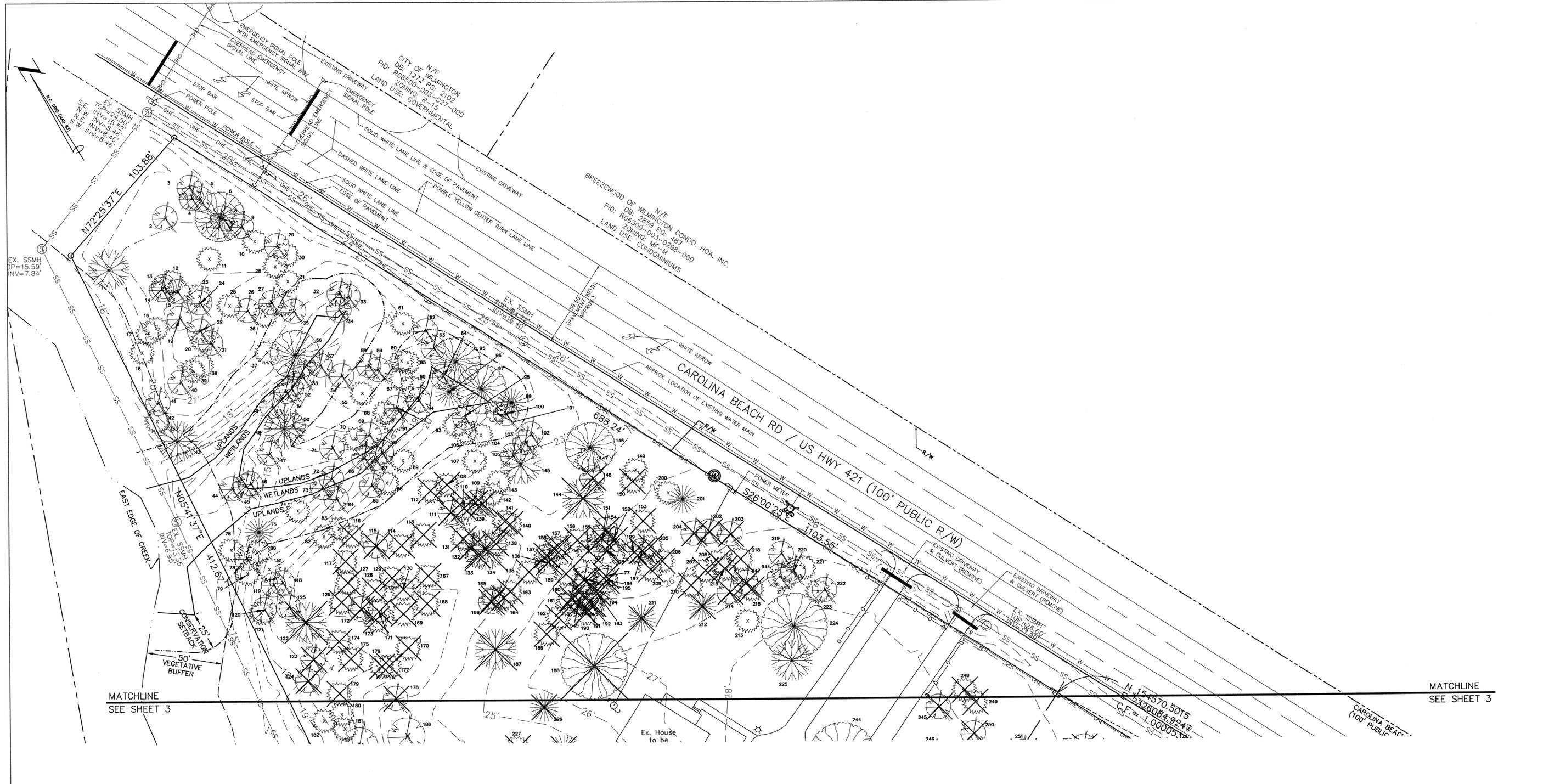
MALPASS ENGINEERING & SURVEYING, P.C.  
1134 SHIPYARD BOULEVARD  
WILMINGTON, NORTH CAROLINA 28412  
Phone 910-362-5243  
Fax 910-362-5209 License No. C-2380

Developer: ECHO FARM APARTMENTS, LLC  
10 S. CAROLINA DRIVE  
WILMINGTON, NORTH CAROLINA 28403  
PHONE: 910-251-5030

DATE: 7-22-15  
SCALE: 1"=30'  
DRAWN: JSM  
PROJECT NO: 260  
CHECKED: JSM  
SHEET NO: 3  
OF: 22

REV. NO.	DESCRIPTION	DATE
1	REVISED FOR SRB SUBMITTAL	8-2-15
2	REVISED TO PROVIDE ADJUSTED SURVEY DATA	10-12-15
3	REVISED FOR PRELIMINARY BID	10-18-15
4	REVISED FOR THE COMMENTS	11-12-15
5	REVISED TO SHOW EXISTING POWER POLES	11-20-15
6	REVISED PER CITY TO SHOW ADDITIONAL TREES	11-24-15

PRELIMINARY PLAT  
NOT FOR RECORDATION,  
CONVEYANCES, OR SALES

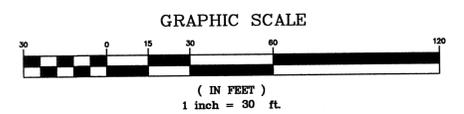


MATCHLINE  
SEE SHEET 3

MATCHLINE  
SEE SHEET 3

**Approved Construction Plan**  
 Name: *[Signature]* Date: 7/1/16  
 Planning: *[Signature]*  
 Traffic: *[Signature]* 3-2-16  
 Fire: *[Signature]* 3-2-16

**WILMINGTON**  
 NORTH CAROLINA  
 Public Services • Engineering Division  
 APPROVED STORMWATER MANAGEMENT PLAN  
 Date: 3/2/16 Permit # 2016010  
 Signed: *[Signature]*



REV NO.	DESCRIPTION	DATE
1	REVISED FOR SRB SUBMITTAL	8-2-15
2	REVISED TO PROVIDE ADJUSTED SURVEY DATA	10-12-15
3	REVISED FOR PRELIMINARY IM	10-14-15
4	REVISED FOR THE COMMENTS	11-12-15
5	REVISED TO SHOW EXISTING POWER POLES	11-20-15
6	REVISED PER CITY TO SAVE ADDITIONAL TREES	11-24-15

**EXISTING CONDITIONS & DEMOLITION PLAN**  
**ECHO FARM APARTMENTS**  
 WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

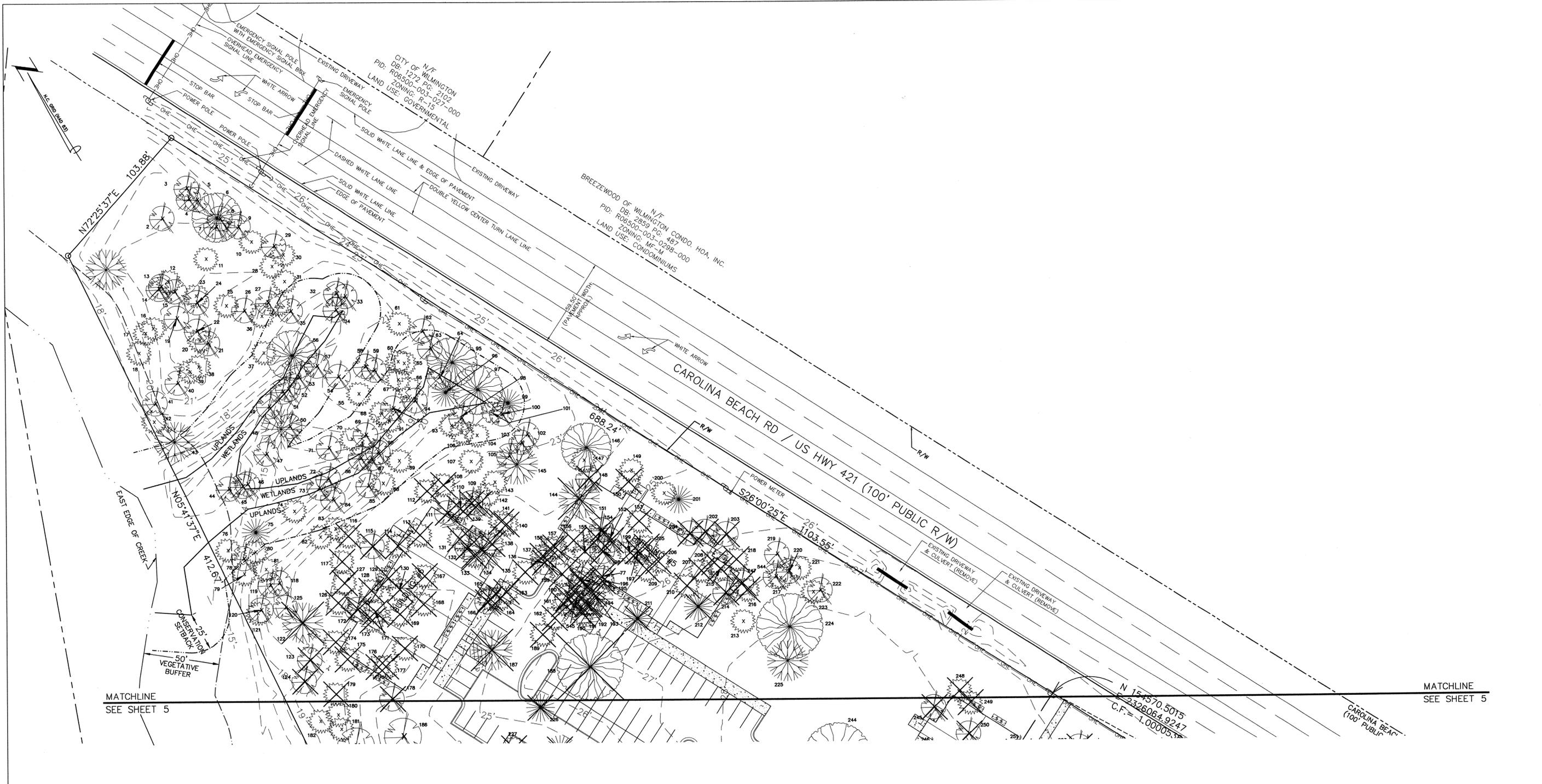
**MALPASS ENGINEERING & SURVEYING, P.C.**  
 1154 SHEPARD BOULEVARD  
 WILMINGTON, NORTH CAROLINA 28412  
 Phone 910-392-8843 License No. C-2320  
 Fax 910-392-5228

Developer: ECHO FARM APARTMENTS, LLC  
 10 S. CARDINAL DRIVE  
 WILMINGTON, NORTH CAROLINA 28403  
 PHONE: 910-291-5030

DATE: 7-22-15  
 SCALE: 1"=30'  
 DRAWN: JCB  
 CHECKED: JEM  
 PROJECT NO: 260  
 SHEET NO: 4  
 OF: 22

PRELIMINARY PLAT  
 NOT FOR RECORDATION,  
 CONVEYANCES, OR SALES



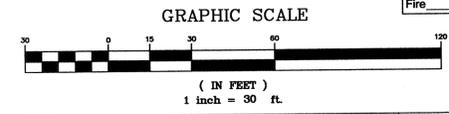


MATCHLINE  
SEE SHEET 5

MATCHLINE  
SEE SHEET 5

Approved Construction Plan  
 Name: *[Signature]* Date: 7/1/16  
 Planning: *[Signature]* 3-2-16  
 Traffic: *[Signature]* 3-2-16  
 Fire: *[Signature]* 3-2-16

**CITY OF WILMINGTON**  
 NORTH CAROLINA  
 Public Services • Engineering Division  
 APPROVED STORMWATER MANAGEMENT PLAN  
 Date: 7/2/16 Permit # 2016010  
 Signed: *[Signature]*



REV. NO.	DESCRIPTION	DATE
1	REVISED FOR S&B SUBMITTAL	8-2-15
2	REVISED TO PROVIDE ADJUSTED SURVEY DATA	10-12-15
3	REVISED FOR PRELIMINARY BID	10-18-15
4	REVISED PER TRC COMMENTS	11-17-15
5	REVISED TO SHOW EXISTING POWER POLES	11-20-15
6	REVISED PER CITY TO SAVE ADDITIONAL TREES	11-24-15
7	REVISED TO PROVIDE SIDEWALK ALONG CAROLINA BEACH RD.	12-14-15
8	REVISED PER CITY	2-9-16

SITE INVENTORY  
 4010 CAROLINA BEACH ROAD  
**ECHO FARM APARTMENTS**  
 WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA



**MALPASS ENGINEERING & SURVEYING, P.C.**  
 1134 SHEPHERD BOULEVARD  
 WILMINGTON, NORTH CAROLINA 28412  
 Phone 910-392-6243 License No. C-2320  
 Fax 910-392-6203

Developer: ECHO FARM APARTMENTS, LLC  
 10 S. CARDINAL DRIVE  
 WILMINGTON, NORTH CAROLINA 28403  
 PHONE: 910-251-5030

DATE: 7-22-15  
 SCALE: 1"=30'  
 DRAWN: JCB  
 CHECKED: JEM  
 PROJECT NO: 260  
 SHEET NO: 6  
 OF: 22

PRELIMINARY PLAT  
 NOT FOR RECORDATION,  
 CONVEYANCES, OR SALES

N/F  
CITY OF WILMINGTON  
DB: 1272 PG: 650  
PID: R06500-004-001-003  
ZONING: R-15  
LAND USE: UNUSED

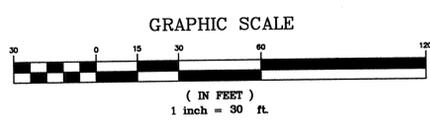
BENCHMARK  
ELEV. = 17.55'

N/F  
CITY OF WILMINGTON  
DB: 272 PG: 650  
PID: R06500-004-001-004  
ZONING: R-15  
LAND USE: UNUSED

ACTIVE RECREATION AREA  
6,072 SF  
N39°52'37"E  
218.00'

N/F  
JOANN MCKENNA TRUST  
DB: 5123 PG: 2275  
PID: R07007-004-001-000  
ZONING: O&I-1  
LAND USE: UNUSED

N/F  
ECHO FARMS, LLC  
DB: 2307 PG: 467  
PID: R07006-002-001-000  
ZONING: MF-M  
LAND USE: RECREATIONAL



Approved Construction Plan

Planning	Name	Date
Traffic	Stowers	3-2-16
Fire	Stowers	3-2-16

**CITY OF WILMINGTON**  
NORTH CAROLINA  
Public Services • Engineering Division  
APPROVED STORMWATER MANAGEMENT PLAN  
Date: 3/2/16 Permit # 2016010  
Signed: [Signature]

SITE PLAN  
4010 CAROLINA BEACH ROAD  
**ECHO FARM APARTMENTS**  
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

DATE: 7-22-15  
SCALE: 1"=30'  
DRAWN: JCB  
CHECKED: JEM  
PROJECT NO: 260

MALPASS ENGINEERING & SURVEYING, P.C.  
1134 SHIPYARD BOULEVARD  
WILMINGTON, NORTH CAROLINA 28412  
Phone: 910-392-5845  
Fax: 910-392-6203 License No. C-2820

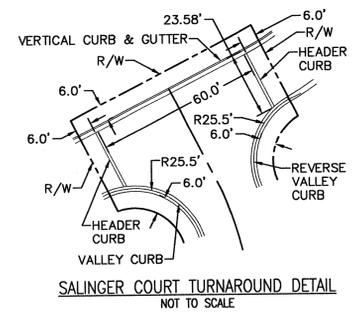
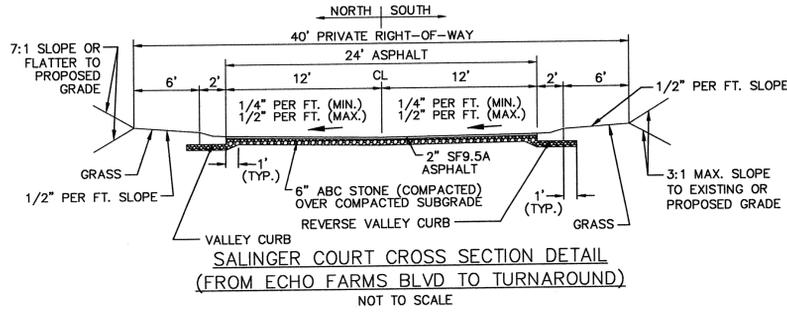
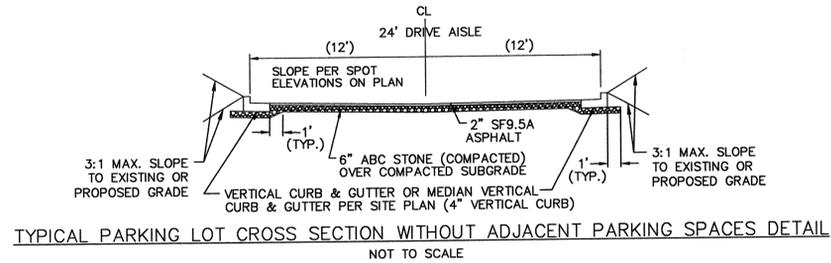
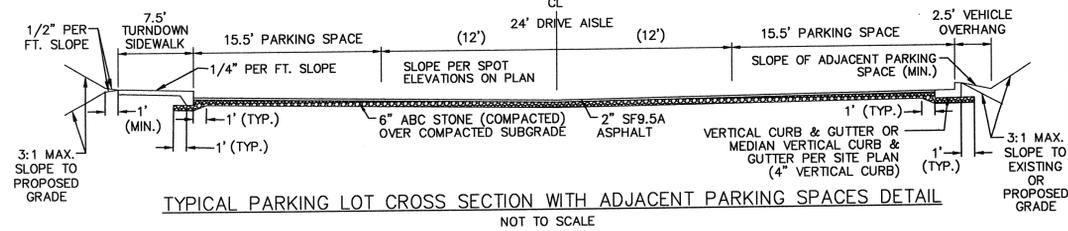
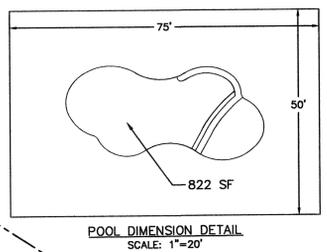
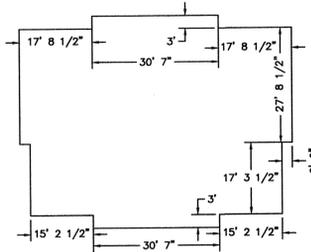
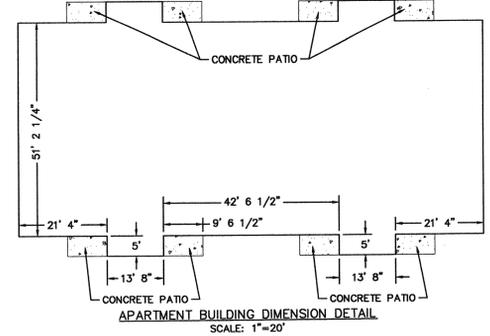
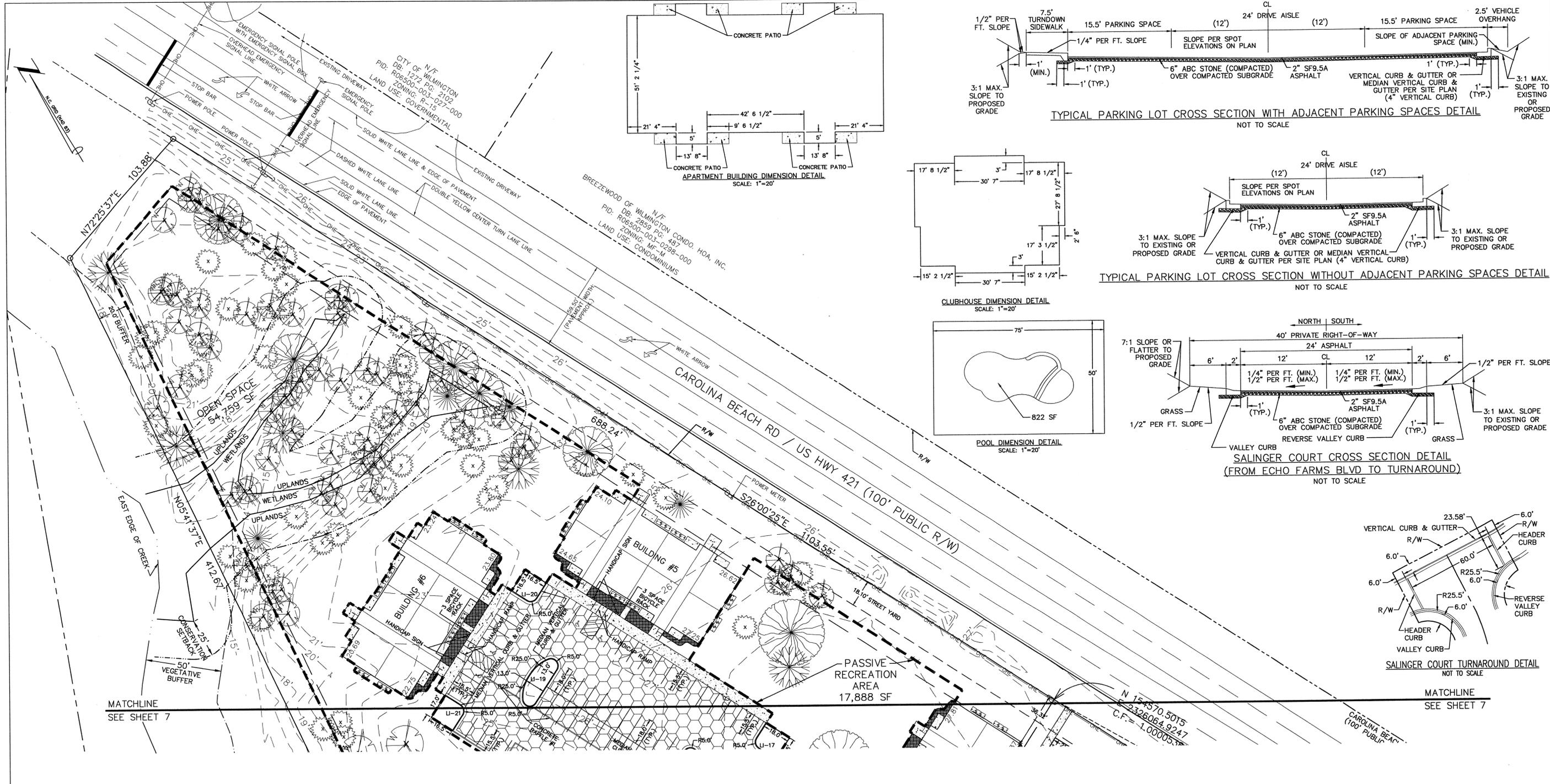
Developer: ECHO FARM APARTMENTS, LLC  
10 S. CAROLINA DRIVE  
WILMINGTON, NORTH CAROLINA 28403  
PHONE: 910-251-5030

SHEET NO: 7  
OF: 22

REV. NO.	DESCRIPTION	DATE
1	REVISED FOR PERMITS	9-2-15
2	REVISED TO SHOW PRIVATE STREET	10-12-15
3	REVISED FOR PRELIMINARY PERMITS	10-18-15
4	REVISED PER THE COMMENTS	11-12-15
5	REVISED PER CITY TO SAVE ADDITIONAL TREES	11-24-15
6	REVISED TO PROVIDE SIDEWALK ALONG CAROLINA BEACH RD & CURB CUT NORTH OF BUILDING #8	12-14-15
7	REVISED PER CITY	2-9-16

PRELIMINARY PLAT  
NOT FOR RECORDATION,  
CONVEYANCES, OR SALES

N/F  
ECHO FARMS, LLC  
DB: 2307 PG: 467  
PID: R07006-002-001-000  
ZONING: MF-M  
LAND USE: RECREATIONAL



LANDSCAPE ISLAND	TOTAL AREA (SF)	IMPERVIOUS AREA (SF)	PERCENT IMPERVIOUS
LI-1	224.80	0	0
LI-2	288.80	0	0
LI-3	225.12	0	0
LI-4	220.13	0	0
LI-5	248.52	0	0
LI-6	281.12	0	0
LI-7	282.65	0	0
LI-8	339.15	0	0
LI-9	287.15	0	0
LI-10	378.84	0	0
LI-11	378.84	0	0
LI-12	353.84	0	0
LI-13	491.09	0	0
LI-14	609.04	0	0
LI-15	229.59	0	0
LI-16	283.78	0	0
LI-17	292.85	0	0
LI-18	378.84	0	0
LI-19	378.84	0	0
LI-20	267.90	0	0
LI-21	276.15	0	0
LI-22	397.14	0	0
LI-23	367.99	0	0
LI-24	378.84	0	0
LI-25	378.84	0	0
LI-26	276.15	0	0
LI-27	276.15	0	0
LI-28	1,171.14	147.53	12.60
LI-29	278.99	0	0
LI-30	224.31	0	0
LI-31	223.15	0	0
LI-32	217.52	0	0
LI-33	221.34	0	0
LI-34	223.06	0	0
LI-35	288.90	0	0
LI-36	216.67	0	0

**INTERIOR LANDSCAPING ISLANDS**

TREES PER DISTURBED ACRE  
 9.63 ACRES \* 15 = 144.45, 144 TREES REQUIRED  
 \*SEE LANDSCAPING PLAN FOR PROVIDED TREES

**STREET YARD-CAROLINA BEACH ROAD (PRIMARY FRONTAGE)**  
 STREET FRONTAGE = 1,103.55 FT  
 REQUIRED STREET YARD = 18 \* 1,103.55 = 19,863.90 SF  
 PROVIDED STREET YARD = 19,337.57 SF  
 IMPERVIOUS AREA = 90.51 SF  
 PERCENT IMPERVIOUS = 90.51 / 19,337.57 \* 100% = 0.46%  
 PROVIDED FOUNDATION PLANTING (BUILDINGS #1 & 3-5) = 508.48 SF  
 \*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

**STREET YARD-ECHO FARMS BLVD (SECONDARY FRONTAGE)**  
 STREET FRONTAGE = 469.83 - 37.53 = 432.30 FT  
 REQUIRED STREET YARD = 18 \* 432.30 / 2 = 3,890.70 SF  
 PROVIDED STREET YARD = 3,461.82 + 578.81 = 4,040.63 SF  
 IMPERVIOUS AREA = 233.20 SF  
 PERCENT IMPERVIOUS = 233.20 / 4,040.63 \* 100% = 5.78%  
 PROVIDED FOUNDATION PLANTING (BUILDINGS #1 & 3-5) = 508.48 SF  
 PROVIDED FOUNDATION PLANTING (BUILDING #7) = 287.45 SF  
 PROVIDED FOUNDATION PLANTING (BUILDING #8) = 280.41 SF  
 \*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

**FOUNDATION PLANTING-FRONT OF BUILDINGS #1-8 (PER FRONT OR REAR OF BUILDING ADJACENT TO PARKING/DRIVE AISLE)**  
 REQUIRED FOUNDATION PLANTING = [(30.73' x 112.54') + (0.5' x 10.62' x 31.86')] \* 0.12 = 231.43 SF  
 PROVIDED FOUNDATION PLANTING (BUILDINGS #1 & 2) = 262.12 SF  
 PROVIDED FOUNDATION PLANTING (BUILDINGS #3 & 4) = 236.31 SF  
 PROVIDED FOUNDATION PLANTING (BUILDING #7) = 287.45 SF  
 PROVIDED FOUNDATION PLANTING (BUILDING #8) = 280.41 SF  
 \*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

**FOUNDATION PLANTING-SIDE OF BUILDINGS #1, 2, 3, 4, 7, & 8 (PER SIDE OF BUILDING ADJACENT TO PARKING/DRIVE AISLE)**  
 REQUIRED FOUNDATION PLANTING = [(31.44' x 51.19') + (0.5' x 12.63' x 50.53')] \* 0.12 = 231.43 SF  
 PROVIDED FOUNDATION PLANTING (BUILDINGS #1 & 2) = 262.12 SF  
 PROVIDED FOUNDATION PLANTING (BUILDINGS #3 & 4) = 236.31 SF  
 PROVIDED FOUNDATION PLANTING (BUILDING #7) = 287.45 SF  
 PROVIDED FOUNDATION PLANTING (BUILDING #8) = 280.41 SF  
 \*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

**FOUNDATION PLANTING-FRONT OF CLUBHOUSE**  
 REQUIRED FOUNDATION PLANTING = [(8.98' x 14.09') + (11.31' x 31.43') + (8.98' x 19.98') + (13.81' x 4.61' x 0.5) + 87.47 SF] \* 0.12 = 93.69 SF  
 PROVIDED FOUNDATION PLANTING = 189.84 SF  
 \*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

**FOUNDATION PLANTING-FRONT OF MAINTENANCE BUILDING**  
 REQUIRED FOUNDATION PLANTING = [(10.00' x 20.00') + (0.5' x 6.67' x 20.00')] \* 0.12 = 32 SF  
 PROVIDED FOUNDATION PLANTING = 33.42 SF  
 \*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

**FOUNDATION PLANTING-FRONT OR REAR OF BUILDINGS #1-8 (PER FRONT OR REAR OF BUILDING ADJACENT TO PARKING/DRIVE AISLE)**  
 REQUIRED FOUNDATION PLANTING = [(30.73' x 112.54') + (0.5' x 10.62' x 31.86')] \* 0.12 = 231.43 SF  
 PROVIDED FOUNDATION PLANTING (BUILDINGS #1 & 3-5) = 508.48 SF  
 \*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

**FOUNDATION PLANTING-SIDE OF BUILDINGS #1, 2, 3, 4, 7, & 8 (PER SIDE OF BUILDING ADJACENT TO PARKING/DRIVE AISLE)**  
 REQUIRED FOUNDATION PLANTING = [(31.44' x 51.19') + (0.5' x 12.63' x 50.53')] \* 0.12 = 231.43 SF  
 PROVIDED FOUNDATION PLANTING (BUILDINGS #1 & 2) = 262.12 SF  
 PROVIDED FOUNDATION PLANTING (BUILDINGS #3 & 4) = 236.31 SF  
 PROVIDED FOUNDATION PLANTING (BUILDING #7) = 287.45 SF  
 PROVIDED FOUNDATION PLANTING (BUILDING #8) = 280.41 SF  
 \*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

**FOUNDATION PLANTING-FRONT OF CLUBHOUSE**  
 REQUIRED FOUNDATION PLANTING = [(8.98' x 14.09') + (11.31' x 31.43') + (8.98' x 19.98') + (13.81' x 4.61' x 0.5) + 87.47 SF] \* 0.12 = 93.69 SF  
 PROVIDED FOUNDATION PLANTING = 189.84 SF  
 \*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

**FOUNDATION PLANTING-FRONT OF MAINTENANCE BUILDING**  
 REQUIRED FOUNDATION PLANTING = [(10.00' x 20.00') + (0.5' x 6.67' x 20.00')] \* 0.12 = 32 SF  
 PROVIDED FOUNDATION PLANTING = 33.42 SF  
 \*SEE LANDSCAPING PLAN FOR PROVIDED PLANTINGS

**INTERIOR SHADING**  
 PARKING FACILITY AREA (PARKING LOT AREA TO BACK OF CURB (OR BACK OF SIDEWALK ADJACENT TO PARKING SPACES) MINUS LANDSCAPE ISLANDS PLUS PRIVATE STREET (INCLUDING PORTION WITHIN ECHO FARMS BLVD R/W))  
 = 124,085 SF  
 PROVIDED INTERIOR SHADING (IS) = 0.2 \* 124,085 = 24,817 SF  
 \*SEE LANDSCAPING PLAN FOR PROVIDED INTERIOR SHADING & TREES

GRAPHIC SCALE  
 1 inch = 30 ft.

REV. NO.	DESCRIPTION	DATE
1	REVISED FOR DRG SUBMITTAL	8-2-15
2	REVISED TO PROVIDE ADJUSTED SURVEY DATA	10-12-15
3	REVISED FOR PRELIMINARY DRG	10-16-15
4	REVISED PER THE COMMENTS	11-13-15
5	REVISED PER CITY TO SHOW ADDITIONAL TREES	11-24-15
6	REVISED TO PROVIDE SIDEWALK ALONG CAROLINA BEACH RD, STREET YARD CALC, & TREE CALC.	12-14-15
7	REVISED PER CITY	2-8-16
8	REVISED TO CORRECT IMPERVIOUS AREA IN STREET YARD ALONG CAROLINA BEACH ROAD	2-15-16

**Approved Construction Plan**

Name: \_\_\_\_\_ Date: 7/1/16

Planning: \_\_\_\_\_ 5-2-16

Traffic: \_\_\_\_\_ 3-2-16

Fire: \_\_\_\_\_ 3-2-16

Signed: \_\_\_\_\_

**WILMINGTON**  
 NORTH CAROLINA  
 Public Services • Engineering Division  
 APPROVED STORMWATER MANAGEMENT PLAN  
 Date: 7/1/16 Permit # 2016-010  
 Signed: \_\_\_\_\_

**SITE PLAN**  
 4010 CAROLINA BEACH ROAD  
**ECHO FARM APARTMENTS**  
 WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

**MALPASS ENGINEERING & SURVEYING, P.C.**  
 1154 SHIPPARD BOULEVARD  
 WILMINGTON, NORTH CAROLINA 28412  
 Phone 910-398-8843  
 Fax 910-398-8803 License No. C-2820

Developer: ECHO FARM APARTMENTS, LLC  
 10 S. CAROLINA DRIVE  
 WILMINGTON, NORTH CAROLINA 28403  
 PHONE: 910-251-5030

DATE: 7-22-15  
 SCALE: 1"=30'  
 DRAWN: JCB  
 CHECKED: JEM  
 PROJECT NO: 260  
 SHEET NO: 8  
 OF: 22

PRELIMINARY PLAT  
 NOT FOR RECORDATION,  
 CONVEYANCES, OR SALES

MATCHLINE  
SEE SHEET 10

MATCHLINE  
SEE SHEET 10

SIDEWALK GRADING NEAR  
SOUTHEAST CORNER OF BLDG #7  
SCALE: 1"=20'

SIDEWALK GRADING NEAR BLDG #1  
& PRIVATE STREET  
SCALE: 1"=20'

**Approved Construction Plan**

Name: ECHO FARMS, LLC Date: 7/1/16

Planning: W. Starnes 3-2-16

Traffic: S. Hawn 3-2-16

Fire: S. Hawn 3-2-16

**City of WILMINGTON**  
NORTH CAROLINA  
Public Service • Engineering Division  
APPROVED STORMWATER MANAGEMENT PLAN  
Date: 7/1/16 Permit # 2016010  
Signed: [Signature]

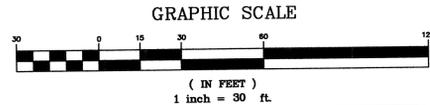
EROSION CONTROL, STORMWATER, & UTILITY PLAN  
4010 CAROLINA BEACH ROAD  
**ECHO FARM APARTMENTS**  
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

**MALPASS ENGINEERING & SURVEYING, P.C.**  
1134 SHIPYARD BOULEVARD  
WILMINGTON, NORTH CAROLINA 28412  
Phone 910-392-6243 Fax 910-392-6203 License No. C-2380

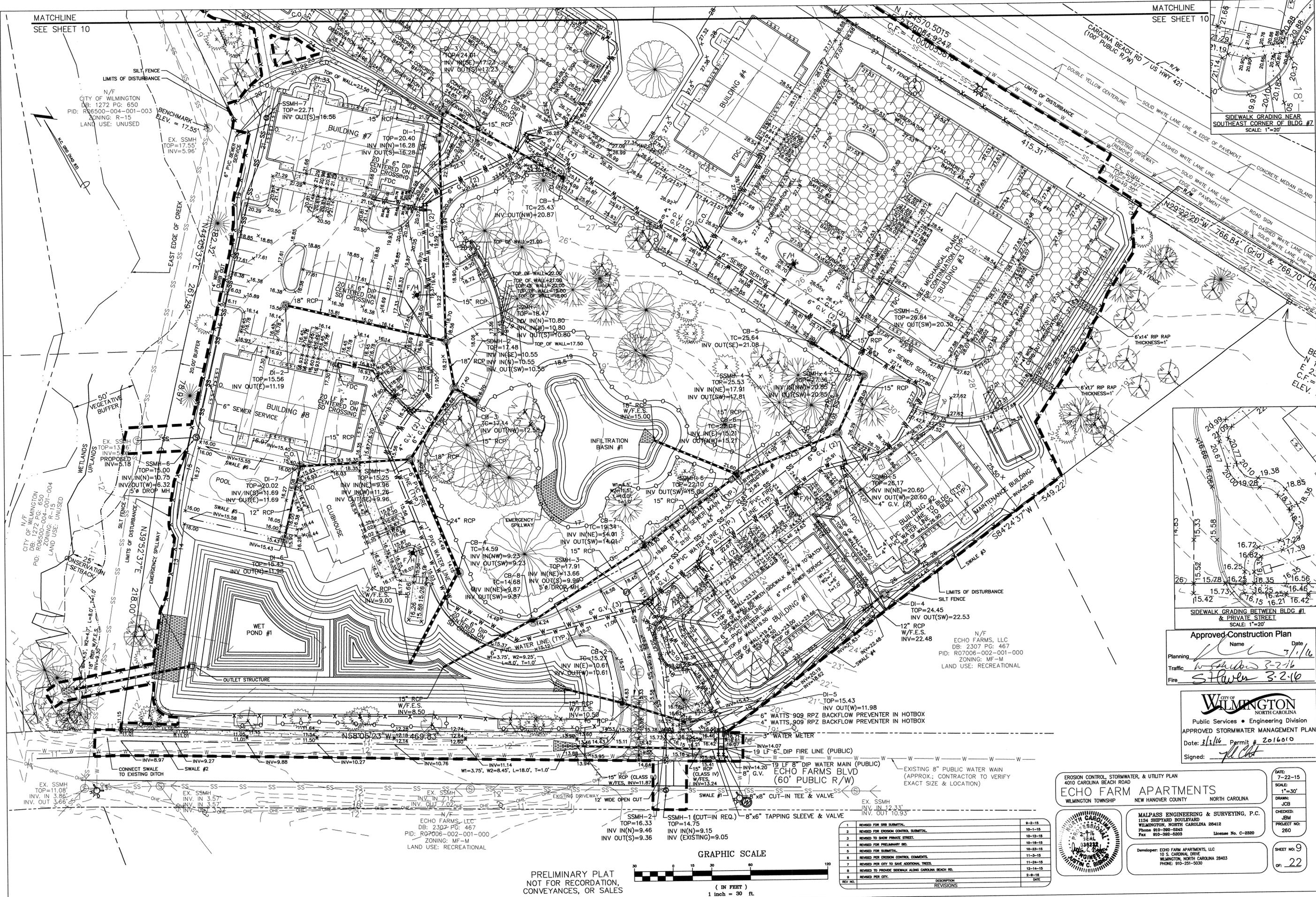
Developer: ECHO FARM APARTMENTS, LLC  
10 S. CARDINAL DRIVE  
WILMINGTON, NORTH CAROLINA 28403  
PHONE: 910-251-5030

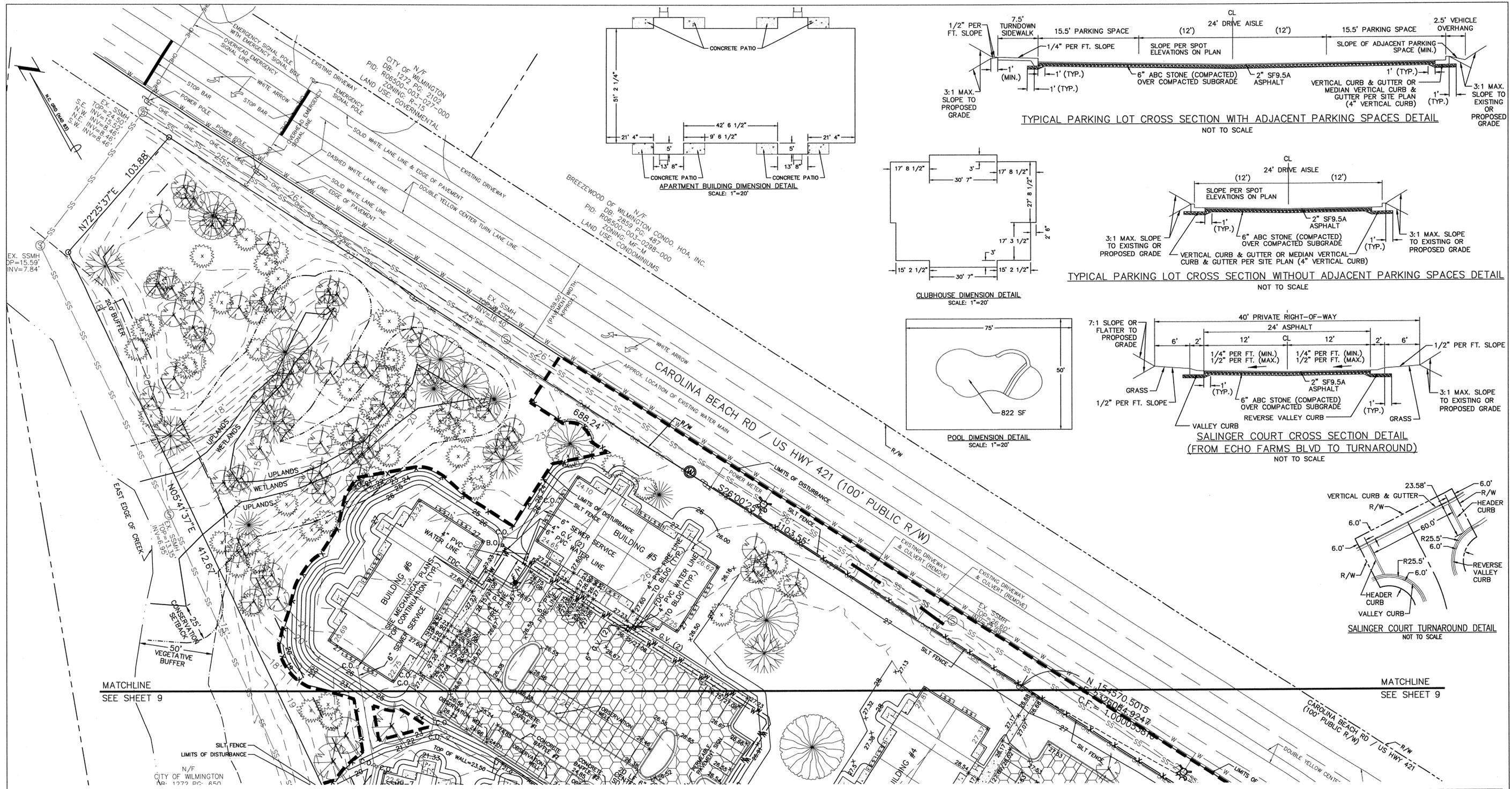
DATE: 7-22-15  
SCALE: 1"=30'  
DRAWN: JCB  
CHECKED: JBM  
PROJECT NO: 260  
SHEET NO: 9  
OF: 22

REV. NO.	DESCRIPTION	DATE
1	REVISED FOR DRB SUBMITTAL	8-2-15
2	REVISED FOR EROSION CONTROL SUBMITTAL	10-1-15
3	REVISED TO SHOW PRIVATE STREET	10-15-15
4	REVISED FOR PRELIMINARY DRP	10-23-15
5	REVISED FOR SUBMITTAL	10-23-15
6	REVISED PER EROSION CONTROL COMMENTS	11-3-15
7	REVISED PER CITY TO SAVE ADDITIONAL TREES	11-24-15
8	REVISED TO PROVIDE SIDEWALK ALONG CAROLINA BEACH RD.	12-14-15
9	REVISED PER CITY	2-8-16



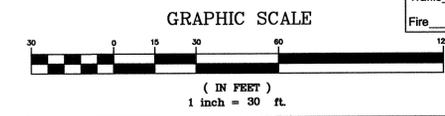
PRELIMINARY PLAT  
NOT FOR RECORDATION,  
CONVEYANCES, OR SALES





- UTILITY SEPARATION NOTES**
1. WATER MAINS SHALL HAVE A MINIMUM COVER OF 3'.
  2. SANITARY SEWER MAINS SHALL HAVE A MINIMUM COVER OF 3' OR D.I.P. SHALL BE USED.
  3. HORIZONTAL SEPARATION BETWEEN WATER AND SANITARY SEWER SHALL BE 10' BETWEEN EDGE OF PIPES.
  4. VERTICAL SEPARATION BETWEEN WATER AND SANITARY SEWER:  
WATER OVER SANITARY SEWER: >18" BETWEEN PIPES OR USE D.I.P. (ON BOTH) 10' ON EITHER SIDE OF CROSSING.  
SANITARY SEWER OVER WATER: USE D.I.P. (ON BOTH) 10' ON EITHER SIDE OF CROSSING.
  5. HORIZONTAL SEPARATION BETWEEN STORM SEWER & SANITARY SEWER SHALL BE 5' BETWEEN EDGE OF PIPES.
  6. A 24" VERTICAL SEPARATION BETWEEN PIPES SHALL BE PROVIDED BETWEEN STORM SEWER AND SANITARY SEWER. WHERE SEPARATION IS LESS THAN 24" & SANITARY IS OVER STORM USE D.I.P. ON SANITARY SEWER 10' ON EITHER SIDE OF CROSSING. WHERE SEPARATION IS LESS THAN 12" & STORM IS OVER SANITARY BRIDGING IS REQUIRED (SEE SANITARY SEWER DETAIL). WHERE SEPARATION IS 12"-24" & STORM IS OVER SANITARY BRIDGING OR D.I.P. ON SANITARY SEWER 10' ON EITHER SIDE OF CROSSING.
  7. HORIZONTAL SEPARATION BETWEEN WATER AND STORM SEWER SHALL BE 5' BETWEEN EDGE OF PIPES.
  8. VERTICAL SEPARATION BETWEEN WATER AND STORM SEWER:  
WATER OVER STORM SEWER: >18" BETWEEN PIPES OR USE D.I.P. ON WATER 10' ON EITHER SIDE OF CROSSING.  
STORM SEWER OVER WATER: USE D.I.P. ON WATER 10' ON EITHER SIDE OF CROSSING.

9. ALL SANITARY SEWER MANHOLES WITH A DROP OF 30" OR GREATER SHALL HAVE AN INSIDE DIAMETER OF 5' WITH AN INSIDE DROP STRUCTURE.
10. GRAVITY SANITARY SEWER WITHIN 50' OF WETLANDS SHALL BE D.I.P. AND MEET WATER MAIN MATERIALS, TESTING METHODS AND ACCEPTABILITY STANDARDS §15A NCAC 18C.
11. SANITARY SEWER MANHOLES MUST BE GREATER THAN 50' FROM WETLANDS, AS MEASURED TO THE CLOSEST OUTSIDE EDGE.



REV. NO.	DESCRIPTION	DATE
1	REVISED FOR SUB SUBMITTAL	8-2-15
2	REVISED FOR EROSION CONTROL SUBMITTAL	10-1-15
3	REVISED TO PROVIDE ADJUSTED SURVEY DATA	10-12-15
4	REVISED FOR PRELIMINARY INFO.	10-16-15
5	REVISED FOR SUBMITTAL	10-23-15
6	REVISED PER EROSION CONTROL COMMENTS.	11-3-15
7	REVISED PER CITY TO SHOW ADDITIONAL TREES.	11-24-15
8	REVISED TO PROVIDE SEWERAL ALONG CAROLINA BEACH RD.	12-14-15
9	REVISED PER CITY.	2-8-16

**Approved Construction Plan**

Name: \_\_\_\_\_ Date: 3/1/16

Planning: \_\_\_\_\_ Date: 3-2-16

Traffic: \_\_\_\_\_ Date: 3-2-16

Fire: \_\_\_\_\_ Date: 3-2-16

**CITY OF WILMINGTON**  
NORTH CAROLINA

Public Services • Engineering Division

**APPROVED STORMWATER MANAGEMENT PLAN**

Date: 3/2/16 Permit #: 2016010

Signed: \_\_\_\_\_

**EROSION CONTROL, STORMWATER, & UTILITY PLAN**  
4010 CAROLINA BEACH ROAD  
**ECHO FARM APARTMENTS**  
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA



**MALPASS ENGINEERING & SURVEYING, P.C.**  
1154 SHIPYARD BOULEVARD  
WILMINGTON, NORTH CAROLINA 28412  
Phone 910-392-0243  
Fax 910-392-0203 License No. C-2320

Developer: ECHO FARM APARTMENTS, LLC  
10 S. CAROLINA DRIVE  
WILMINGTON, NORTH CAROLINA 28403  
PHONE: 910-251-5030

DATE: 7-22-15  
SCALE: 1"=30'  
DRAWN: JCB  
CHECKED: JSM  
PROJECT NO: 260  
SHEET NO: 10  
OF: 22

PRELIMINARY PLAN  
NOT FOR RECORDATION,  
CONVEYANCES, OR SALES

**Permanent Seeding**  
 Specifications #6.11 - Specifications  
 (Specifications are as per the "Erosion and Sediment Control Planning and Design Manual" of the state of North Carolina)

Table 6.11p - Seeding No. 10P for: Well-to Poorly Drained soils with Good Moisture Retention; Low Maintenance

Seeding mixture  
 Species Rate (lb/acre)  
 Rye (grain) 80  
 Pensacola Bahiagrass 50  
 Sericea lespedeza 30  
 Koste lespedeza 10

Seeding Notes  
 1. From Sept. 1 - Mar. 1, use unscarified sericea seed.  
 2. On poorly drained sites omit sericea and increase Koste to 30 lb/acre.  
 3. Where a neat appearance is desired, omit sericea and increase Koste to 40 lb/acre.

Nurse plants  
 Between Apr. 15 & Aug. 15, add 10 lb/acre German millet or 15 lb/acre Sudangrass. Prior to May 1 or after Aug. 15, add 25 lb/acre rye (grain).

Soil amendments - Apply lime and fertilizer according to soil tests, or apply 3,000-5,000 lb/acre ground agricultural limestone (use the lower rate on sandy soils) and 1,000 lb/acre 10-10-10 fertilizer.  
 Mulch - Apply 4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor straw by tacking with asphalt, netting, or riving or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.  
 Maintenance - If growth is less than fully adequate, reseed, refer to the second year, according to soil tests or topdress with 500 lb/acre 10-10-10 fertilizer. Mow as needed when sericea is omitted from the mixture. Reseed, fertilize, and mulch damaged areas immediately.

Table 6.11q - Seeding No. 20P for: Well-to Poorly Drained soils with Good Moisture Retention; High Maintenance

Seeding mixture  
 Species Rate (lb/acre)  
 Tall fescue (blend of two or three improved varieties) 200  
 Rye (grain) 25

Seeding dates  
 Best: Sept. 15 - Oct. 15  
 Possible: Sept. 1 - Oct. 31 or Feb. 15 - Apr. 30

Soil amendments - Apply lime and fertilizer according to soil tests, or apply 3,000-5,000 lb/acre ground agricultural limestone (use the lower rate on sandy soils) and 1,000 lb/acre 10-10-10 fertilizer.  
 Mulch - Apply 4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor straw by tacking with asphalt, netting, or riving or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.  
 Maintenance - Fertilize according to soil tests or apply 40 lb/acre nitrogen in Jan. or Feb., 40 lb in Sept. and 40 lb in Nov. from a 12-4-8, 16-4-8, or similar turf fertilizer. Avoid fertilizer applications during warm weather, as this increases stand losses to disease. Reseed, refer to, and mulch damaged areas immediately. Mow to a height of 2.5-3.5 inches as needed.

Table 6.11r - Seeding No. 30P for: Dry Sands to Sandy Loams; High Maintenance, Fine Turf

Seeding mixture  
 Species Rate (lb/1,000 ft<sup>2</sup>)  
 Timothy or Tifway II Minimum: 3  
 hybrid Bermudagrass Rapid cover: 10

Seeding Notes  
 1. Sprig or sod (Practice 6.12, Sodding). Moisture is essential during initial establishment. Sod must be kept well watered for 2-3 weeks, but can be planted earlier or later than sprigs.  
 2. Common Bermuda can be seeded or sprigged but does not produce a high-quality turf. It is also less cold tolerant than the hybrids, more weed prone, and a pest in flower beds and specimen plantings.

Soil amendments - Apply lime and fertilizer according to soil tests, or apply 3,000 lb/acre ground agricultural limestone and 500 lb/acre 10-10-10 fertilizer, or 50 lb/acre nitrogen from turf-type slow-release fertilizer. Add 25-50 lb/acre nitrogen at 2- to 3-week intervals through midsummer.  
 Sprigging - Plant sprigs in furrows with a tractor-drawn transplanter, or broadcast by hand.  
 Furrows should be 4-6 inches deep and 2 ft apart. Place sprigs about 2 ft apart in the row with one end at or above ground level (Figure 6.11d).  
 Broadcast at rates shown above, and press sprigs into the top 1/2-2 inches of soil with a disk set straight so that sprigs are not brought back toward the surface.  
 Mulch - Do not mulch.  
 Maintenance - Water as needed and mow to 3/4- to 1-inch height. Topdress with 40 lb/acre nitrogen in Apr., 50 lb in May, 50 lb in June, 30 lb in July, and 25-50 lb in Aug.

Table 6.11s - Seeding No. 40P for: Well-Drained Sandy Loams to Dry Sands, Coastal Plain and Eastern Edge of Piedmont; Low-to Medium-Care Lawns

Seeding mixture  
 Species Rate  
 Centipedegrass 10-20 lb/acre (seed) or 33 bu/acre (sprigs)

Seeding dates  
 Mar. - June  
 (Sprigging can be done through July where water is available for irrigation.)

Soil amendments - Apply lime and fertilizer according to soil tests, or apply 300 lb/acre 10-10-10.  
 Sprigging - Plant sprigs in furrows with a tractor-drawn transplanter, or broadcast by hand.  
 Furrows should be 4-6 inches deep and 2 ft apart. Place sprigs about 2 ft apart in the row with one end at or above ground level (Figure 6.11d).  
 Broadcast at rates shown above, and press sprigs into the top 1/2-2 inches of soil with a disk set straight so that sprigs are not brought back toward the surface.  
 Mulch - Do not mulch.  
 Maintenance - Fertilize very sparingly - 20 lb/acre nitrogen in spring with no phosphorus. Centipedegrass cannot tolerate high pH or excess fertilizer.

Table 6.11t - Seeding No. 50P for: Well-Drained Sandy Loams to Dry Sands; Low Maintenance

Seeding mixture  
 Species Rate (lb/acre)  
 Pensacola Bahiagrass 50  
 Sericea lespedeza 50  
 Common Bermudagrass 10  
 German millet 10

Soil amendments - Apply lime and fertilizer according to soil tests, or apply 3,000 lb/acre ground agricultural limestone and 500 lb/acre 10-10-10 fertilizer.  
 Mulch - Apply 4,000 lb/acre grain straw or equivalent cover of another suitable mulch. Anchor by tacking with asphalt, riving, or netting or by crimping with a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.  
 Maintenance - Refer to the following Apr. with 50 lb/acre nitrogen. Repeat as growth requires. May be mowed only once a year. Where a neat appearance is desired, omit sericea and mow as often as needed.

Table 6.11u - Seeding No. 70P for: Grass-lined Channels; Coastal Plain, Lower Piedmont, and Dry Soils in the Central Piedmont

Seeding mixture  
 Species Rate (lb/acre)  
 Common Bermudagrass 40-80 (1-2 lb/1,000 ft<sup>2</sup>)

Soil amendments - Apply lime and fertilizer according to soil tests, or apply 3,000 lb/acre ground agricultural limestone and 500 lb/acre 10-10-10 fertilizer.  
 Mulch - Use jute, excelsior matting, or other effective channel lining material to cover the bottom of channels and ditches. The lining should extend above the highest calculated depth of flow. On channel side slopes above this height, and in drainages not requiring temporary linings, apply 4,000 lb/acre grain straw and anchor straw by tacking with asphalt, netting, or riving or by crimping with a mulch anchoring tool. Mulch and anchoring materials must not be allowed to wash down slopes where they can clog drainage devices.  
 Maintenance - A minimum of 3 weeks is required for establishment. Inspect and repair mulch frequently. Refer to Appendix 8.02 for botanical names.

**Temporary Seeding**  
 Specifications #6.10 - Specifications  
 (Specifications are as per the "Erosion and Sediment Control Planning and Design Manual" of the state of North Carolina)

Table 6.10a - Temporary Seeding Recommendations for Late Winter and Early Spring

Seeding mixture  
 Species Rate (lb/acre)  
 Rye (grain) 120  
 Annual lespedeza (Kobe in Piedmont and Coastal Plain, Korean in Mountains) 50

Seeding dates  
 Mountains - Above 2500 ft: Feb. 15-May 15  
 Below 2500 ft: Feb. 1-15  
 Piedmont - Jan. 1-May 1  
 Coastal Plain - Dec. 1-Apr. 15

Mulch amendments - Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.  
 Mulch - Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.  
 Maintenance - Refer to the following Apr. with 50 lb/acre nitrogen. Repeat as growth requires. May be mowed only once a year. Where a neat appearance is desired, omit sericea and mow as often as needed.

Table 6.10b Temporary Seeding Recommendations for Summer

Seeding mixture  
 Species Rate (lb/acre)  
 German millet 40

In the Piedmont and Mountains, a small-stemmed Sudangrass may be substituted at a rate of 50 lb/acre.

Soil amendments - Follow recommendations of soil tests or apply 2,000 lb/acre ground agricultural limestone and 750 lb/acre 10-10-10 fertilizer.  
 Mulch - Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.  
 Maintenance - Refer to the following Apr. with 50 lb/acre nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb/acre Kobe (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.

Table 6.10c Temporary Seeding Recommendations for Fall

Seeding mixture  
 Species Rate (lb/acre)  
 Rye (grain) 120

Soil amendments - Follow soil tests or apply 2,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.  
 Mulch - Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.  
 Maintenance - Refer to the following Apr. with 50 lb/acre nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb/acre Kobe (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.

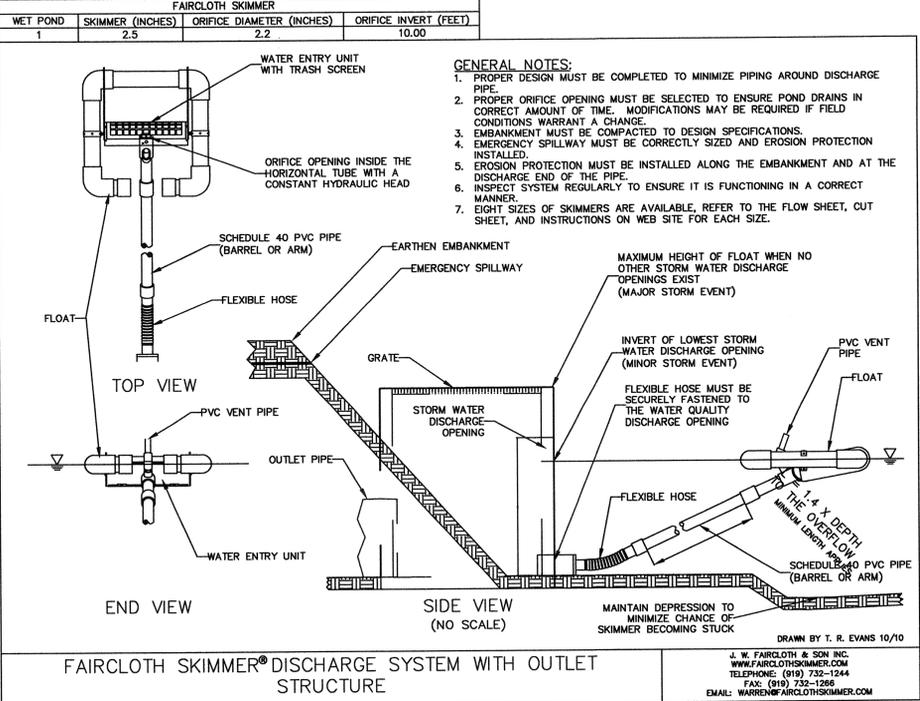
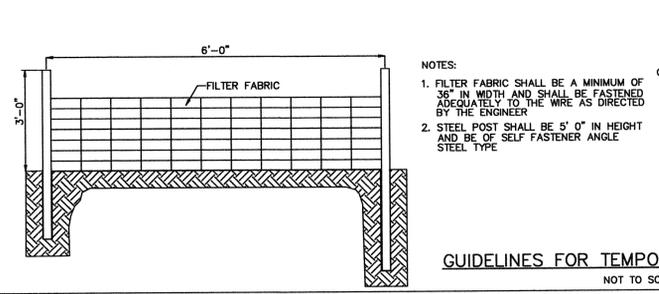
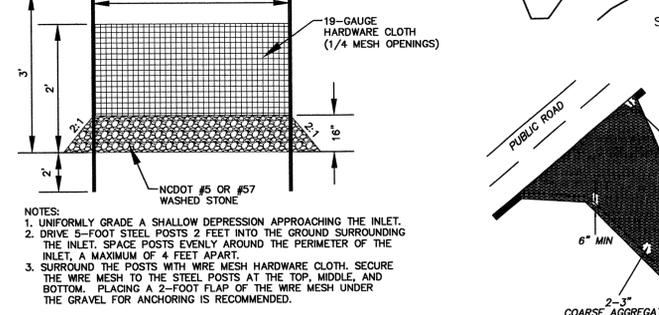
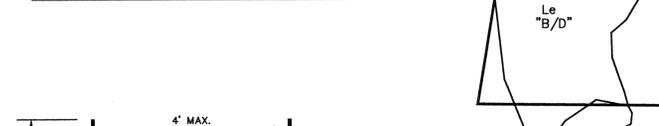
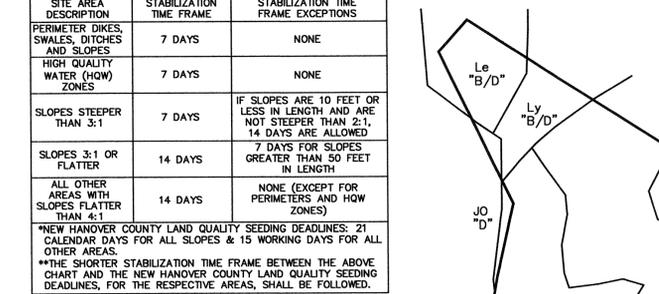
Table 6.10d Temporary Seeding Recommendations for Spring

Seeding mixture  
 Species Rate (lb/acre)  
 Rye (grain) 120

Soil amendments - Follow soil tests or apply 2,000 lb/acre ground agricultural limestone and 1,000 lb/acre 10-10-10 fertilizer.  
 Mulch - Apply 4,000 lb/acre straw. Anchor straw by tacking with asphalt, netting, or a mulch anchoring tool. A disk with blades set nearly straight can be used as a mulch anchoring tool.  
 Maintenance - Refer to the following Apr. with 50 lb/acre nitrogen in March. If it is necessary to extend temporary cover beyond June 15, overseed with 50 lb/acre Kobe (Piedmont and Coastal Plain) or Korean (Mountains) lespedeza in late February or early March.

Table 6.11v - Seeding No. 30P for: Dry Sands to Sandy Loams; High Maintenance, Fine Turf

Seeding mixture  
 Species Rate (lb/1,000 ft<sup>2</sup>)  
 Timothy or Tifway II Minimum: 3  
 hybrid Bermudagrass Rapid cover: 10



FAIRCLOTH SKIMMER			
WET POND	SKIMMER (INCHES)	ORIFICE DIAMETER (INCHES)	ORIFICE INVERT (FEET)
1	2.5	2.2	10.00

SWALE #1			
SECTION	DOWNSTREAM INVERT (FT)	UPSTREAM INVERT (FT)	SLOPE (FT/FT)
1	12.98	13.81	0.072
2	13.81	14.20	0.053

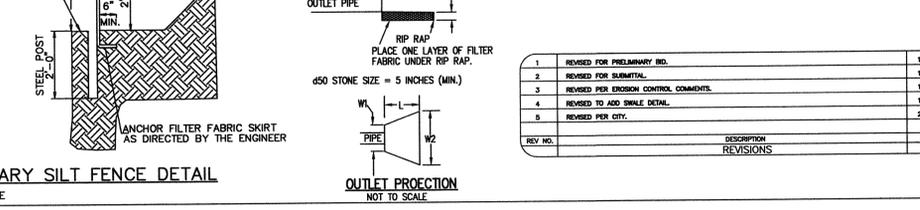
SWALE #2			
SECTION	DOWNSTREAM INVERT (FT)	UPSTREAM INVERT (FT)	SLOPE (FT/FT)
1	9.87	9.27	0.0071
2	9.27	9.88	0.0108
3	9.88	10.27	0.0072
4	10.27	10.76	0.0082
5	10.76	11.14	0.0068
6	11.14	11.87	0.0084

SWALE #3			
SECTION	DOWNSTREAM INVERT (FT)	UPSTREAM INVERT (FT)	SLOPE (FT/FT)
1	24.45	25.00	0.0051

SWALE #4			
SECTION	DOWNSTREAM INVERT (FT)	UPSTREAM INVERT (FT)	SLOPE (FT/FT)
1	15.43	20.19	0.0600
2	20.19	22.48	0.0253

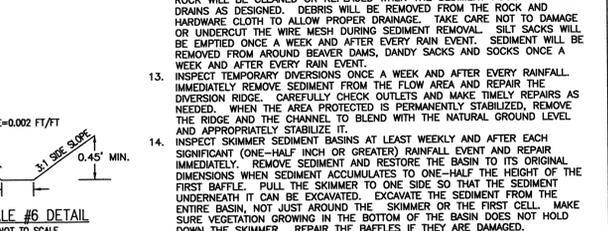
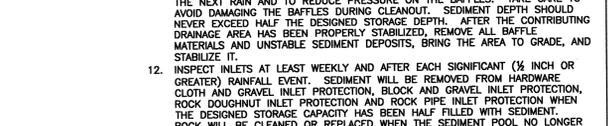
SWALE #5			
SECTION	DOWNSTREAM INVERT (FT)	UPSTREAM INVERT (FT)	SLOPE (FT/FT)
1	15.43	20.19	0.0600
2	20.19	22.48	0.0253

SWALE #6			
SECTION	DOWNSTREAM INVERT (FT)	UPSTREAM INVERT (FT)	SLOPE (FT/FT)
1	15.43	20.19	0.0600
2	20.19	22.48	0.0253



**MAINTENANCE PLAN**

1. ALL EROSION CONTROL MEASURES WILL BE CHECKED EVERY 7 DAYS OR AFTER EACH RAIN PRODUCING 1/2 INCHES OR MORE WHICH EVER COMES FIRST.
2. SEDIMENT WILL BE REMOVED FROM BEHIND SILT FENCES WHERE SEDIMENT IS 0.5 FEET DEEP AND REPAIR FABRIC IF TORN, WEAR, OR MISSING.
3. ALL POINTS OF EGRESS WILL HAVE CONSTRUCTION ENTRANCES THAT WILL BE PERIODICALLY TOP-DRESSED WITH AN ADDITIONAL 2 INCHES OF #4 STONE TO MAINTAIN PROPER DEPTH. THEY WILL BE MAINTAINED IN A CONDITION TO PREVENT MUD OR SEDIMENT FROM LEAVING THE SITE. IMMEDIATELY REMOVE OBJECTIONABLE MATERIAL SPILLED, WASHED, OR TRACKED ONTO THE CONSTRUCTION ENTRANCE OR ROADWAYS.
4. CHECK SEDIMENT BASINS AFTER PERIODS OF SIGNIFICANT RUNOFF. REMOVE SEDIMENT AND RESTORE THE BASIN TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT ACCUMULATES TO ONE-HALF THE DESIGN DEPTH. CHECK THE EMBANKMENT, SPILLWAYS, AND OUTLET FOR EROSION DAMAGE. AND INSPECT THE EMBANKMENT FOR PIPING AND SETTLEMENT. MAKE ALL NECESSARY REPAIRS IMMEDIATELY. REMOVE ALL TRASH AND OTHER DEBRIS FROM THE RISER AND POOL AREA. GRAVEL WILL BE CLEANED OR REPLACED WHEN THE SEDIMENT POOL NO LONGER DRAINS PROPERLY OR IF THE ROCK IS DISLOADED.
5. INSPECT TEMPORARY SEDIMENT TRAPS AFTER EACH SIGNIFICANT RAINFALL. REMOVE SEDIMENT AND RESTORE THE TRAP TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE-HALF THE DESIGN DEPTH OF THE TRAP. PLACE THE SEDIMENT THAT IS REMOVED IN THE DESIGNED DISPOSAL AREA AND REPLACE THE CONTAMINATED PART OF THE GRAVEL FACING. CHECK THE STRUCTURE FOR DAMAGE FROM EROSION OR PIPING. PERIODICALLY CHECK THE DEPTH OF THE SPILLWAY TO ENSURE IT IS A MINIMUM OF 1.5 FT BELOW THE LOW POINT OF THE EMBANKMENT. IMMEDIATELY FILL ANY SETTLEMENT OF THE EMBANKMENT SLIGHTLY ABOVE GRADE. ANY RIPRAP DISPLACED FROM THE SPILLWAY MUST BE REPLACED IMMEDIATELY. AFTER ALL SEDIMENT-PRODUCING AREAS HAVE BEEN PERMANENTLY STABILIZED, REMOVE THE STRUCTURE AND ALL UNSTABLE SEDIMENT. SMOOTH THE AREA TO BLEND WITH THE ADJOINING AREAS AND STABILIZE PROPERLY.
6. INSPECT RIPRAP OUTLET STRUCTURES AFTER HEAVY RAINS TO SEE IF ANY EROSION AROUND OR BELOW THE RIPRAP HAS TAKEN PLACE OR IF STONES HAVE BEEN DISLOADED. IMMEDIATELY MAKE ALL NEEDED REPAIRS TO PREVENT FURTHER DAMAGE.
7. RIP RAP SHOULD BE INSPECTED PERIODICALLY FOR SCOUR OR DISLOADED STONES. CONTROL OF WEED AND BRUSH GROWTH MAY BE NEEDED IN SOME LOCATIONS.
8. ROCK DAM: CHECK SEDIMENT AFTER EACH RAINFALL. REMOVE SEDIMENT AND RESTORE ORIGINAL VOLUME WHEN SEDIMENT ACCUMULATES TO ABOUT ONE-HALF THE DESIGN VOLUME. CHECK THE STRUCTURE FOR EROSION, PIPING, AND ROCK DISPLACEMENT AFTER EACH SIGNIFICANT RAINFALL AND AFTER RAINSTORMS TO CHECK FOR RILL EROSION, DISLOCATION, OR FAILURE. WHERE EROSION IS OBSERVED, APPLY ADDITIONAL MULCH. IF FAILURE OCCURS, REPAIR THE SLOPE GRADE, RESEED, AND REINSTALL MULCH. CONTINUE INSPECTIONS UNTIL VEGETATION IS FIRMLY ESTABLISHED.
9. INSPECT CHECK DAMS AND CHANNELS FOR DAMAGE AFTER EACH RUNOFF EVENT. ANTICIPATE SUBMERGENCE AND DEPOSITION ABOVE THE CHECK DAM AND EROSION FROM HIGH FLOWS AROUND THE EDGES OF THE DAM. CORRECT ALL DAMAGE IMMEDIATELY. IF SIGNIFICANT EROSION OCCURS BETWEEN DAMS, INSTALL A PROTECTIVE RIPRAP LINER IN THAT PORTION OF THE CHANNEL. REMOVE SEDIMENT ACCUMULATED BEHIND THE DAMS AS NEEDED TO PREVENT DAMAGE TO CHANNEL VEGETATION, ALLOW THE CHANNEL TO DRAIN THROUGH THE STONE CHECK DAM AND PREVENT LARGE FLOWS FROM CARRYING SEDIMENT OVER THE DAM SECTION. CHECK DAMS AS NEEDED TO MAINTAIN DESIGN HEIGHT AND CROSS SECTION.
10. INSPECT BAFFLES AT LEAST ONCE A WEEK AND AFTER EACH RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY. BE SURE TO MAINTAIN ACCESS TO THE BAFFLES. SHOULD THE FABRIC OF A BAFFLE COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE, REPLACE IT WITH EQUIVALENT MATERIAL. CHECK DEPTH WHEN IT REACHES HALF THE DESIGN STORAGE VOLUME. TAKE CARE TO PREVENT THE NEXT RAIN AND TO REDUCE PRESSURE ON THE BAFFLES. TAKE CARE TO AVOID DAMAGING THE BAFFLES DURING CLEANOUT. SEDIMENT DEPTH SHOULD NEVER EXCEED HALF THE DESIGN STORAGE DEPTH. AFTER EACH RAINFALL, CHECK DAMS AND CHANNELS TO BLEND WITH THE NATURAL GROUND LEVEL AND APPROPRIATELY STABILIZE IT.
11. INSPECT INLETS AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (1/2 INCH OR GREATER) RAINFALL EVENT. SEDIMENT WILL BE REMOVED FROM HARDWARE CLOTH AND GRAVEL INLET PROTECTION, BLOCK AND GRAVEL INLET PROTECTION, ROCK DOUGHNUT INLET PROTECTION AND ROCK PIPE INLET PROTECTION WHEN THE DESIGNED STORAGE CAPACITY HAS BEEN HALF FILLED WITH SEDIMENT. ROCK WILL BE CLEANED OR REPLACED WHEN THE SEDIMENT POOL NO LONGER DRAINS AS DESIGNED. DEBRIS WILL BE REMOVED FROM THE ROCK AND HARDWARE CLOTH TO ALLOW PROPER DRAINAGE. TAKE CARE NOT TO DAMAGE OR UNDERCUT THE WIRE MESH DURING SEDIMENT REMOVAL. SILT SACKS WILL BE EMPLOYED ONCE A WEEK AND AFTER EVERY RAIN EVENT. SEDIMENT WILL BE REMOVED FROM AROUND BEAVER DAMS, DANDY SACKS AND SOCKS ONCE A WEEK AND AFTER EVERY RAIN EVENT.
12. INSPECT TEMPORARY DIVERSIONS ONCE A WEEK AND AFTER EVERY RAINFALL. IMMEDIATELY REMOVE SEDIMENT FROM THE FLOW AREA AND REPAIR THE DIVERSION RIDGE. CAREFULLY CHECK OUTLETS AND MAKE TIMELY REPAIRS AS NEEDED. WHEN THE AREA PROTECTED IS PERMANENTLY STABILIZED, REMOVE THE RIDGE AND THE CHANNEL TO BLEND WITH THE NATURAL GROUND LEVEL AND APPROPRIATELY STABILIZE IT.
13. INSPECT SKIMMER SEDIMENT BASINS AT LEAST WEEKLY AND AFTER EACH SIGNIFICANT (ONE-HALF INCH OR GREATER) RAINFALL EVENT AND REPAIR IMMEDIATELY. REMOVE SEDIMENT AND RESTORE THE BASIN TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT ACCUMULATES TO ONE-HALF THE HEIGHT OF THE FIRST BAFFLE. PULL THE SKIMMER TO ONE SIDE SO THAT THE SEDIMENT UNDERNEATH IT CAN BE EXCAVATED. EXCAVATE THE SEDIMENT FROM THE ENTIRE BASIN, NOT JUST AROUND THE SKIMMER OR THE FIRST CELL. MAKE SURE VEGETATION GROWING IN THE BOTTOM OF THE BASIN DOES NOT HOLD UNDERNEATH IT. REPAIR THE BAFFLES IF THEY ARE DAMAGED. RE-ANCHOR THE BAFFLES IF WATER IS FLOWING UNDERNEATH OR AROUND THEM. IF THE SKIMMER IS CLOGGED WITH TRASH AND THERE IS WATER IN THE BASIN, USUALLY JACKING ON THE ROCK WILL MAKE THE SKIMMER BOU UP AND DOWN AND DISLODGE THE DEBRIS. IF THE SKIMMER ARM OR BARREL PIPE IS CLOGGED, THE ORIFICE CAN BE REMOVED AND THE OBSTRUCTION CLEARED WITH A PLUMBER'S SNAKE OR BY FLUSHING WITH WATER. CHECK THE EMBANKMENT, SPILLWAYS, AND OUTLET FOR EROSION DAMAGE. AND INSPECT THE EMBANKMENT FOR PIPING AND SETTLEMENT. MAKE ALL NECESSARY REPAIRS IMMEDIATELY. REMOVE ALL TRASH AND OTHER DEBRIS FROM THE SKIMMER AND POOL AREAS. FREEZING WEATHER CAN RESULT IN ICE FORMING IN THE BASIN. SOME SPECIAL PRECAUTIONS SHOULD BE TAKEN IN THE WINTER TO PREVENT THE SKIMMER FROM PLUGGING WITH ICE.
14. ALL SEEDING AREAS WILL BE FERTILIZED, RESEED AS NECESSARY, AND MULCHED ACCORDING TO SPECIFICATIONS IN THE VEGETATIVE PLAN TO MAINTAIN A VIGOROUS, DENSE VEGETATIVE COVER. SEE GROUND STABILIZATION CHART FOR STABILIZATION TIME FRAME.



**Approved Construction Plan**

Name: \_\_\_\_\_ Date: 3/1/16

Planning: \_\_\_\_\_

Traffic: \_\_\_\_\_ 3-2-16

Fire: \_\_\_\_\_ 3-2-16

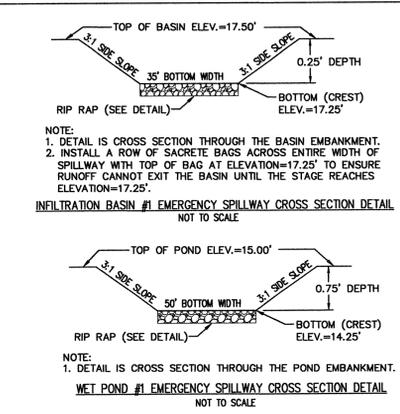
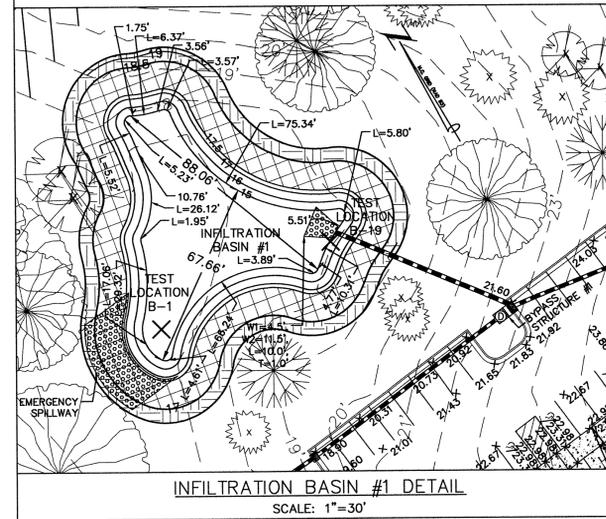
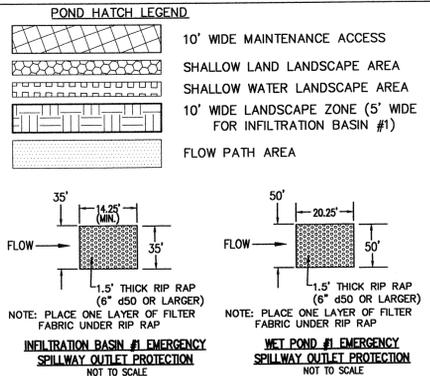
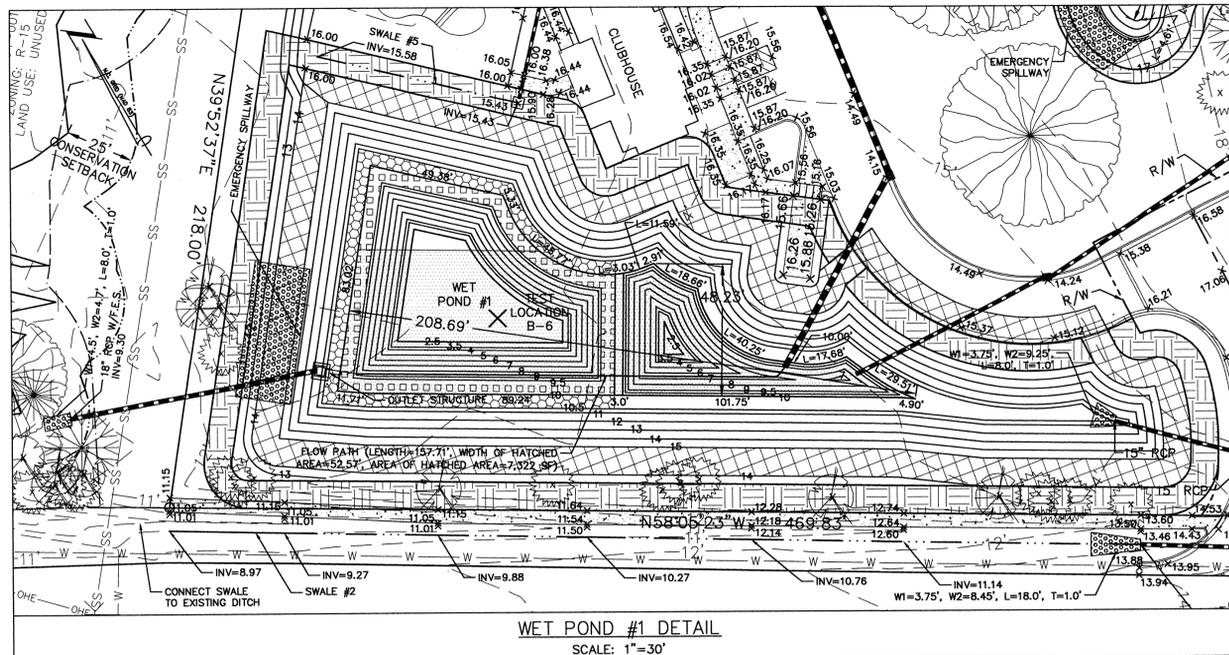
Public Services • Engineering Division  
 APPROVED STORMWATER MANAGEMENT PLAN  
 DATE: 3/2/16 Permit # 2016010  
 Signed: \_\_\_\_\_

EROSION CONTROL & STORMWATER DETAIL SHEET  
 400 CAROLINA BEACH ROAD  
**ECHO FARM APARTMENTS**  
 WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

DATE: 10-1-15  
 SCALE: N.T.S.  
 DRAWN: JCB  
 CHECKED: JEM  
 PROJECT NO: 260  
 SHEET NO: 11  
 OF: 22

MALPASS ENGINEERING & SURVEYING, P.C.  
 1134 SHIPBOARD BOULEVARD  
 WILMINGTON, NORTH CAROLINA 28412  
 Phone 910-382-6843  
 Fax 910-382-0203 License No. C-2320

Developer: ECHO FARM APARTMENTS, LLC  
 10 S. CARDINAL DRIVE  
 WILMINGTON, NORTH CAROLINA 28403  
 PHONE: 910-251-5030



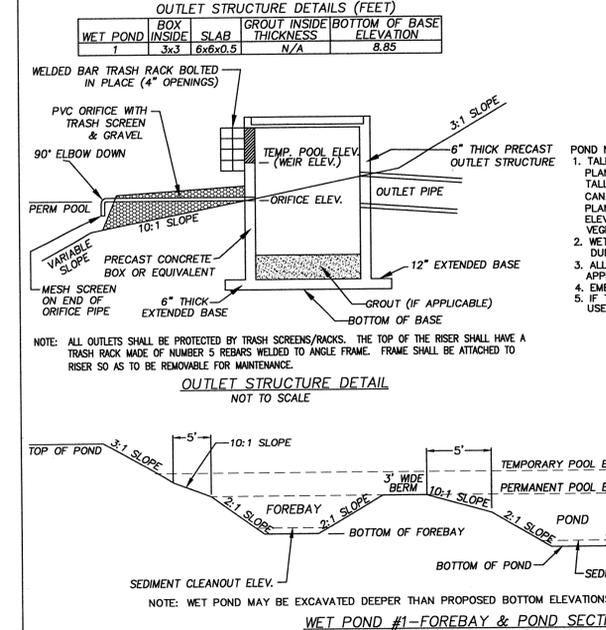
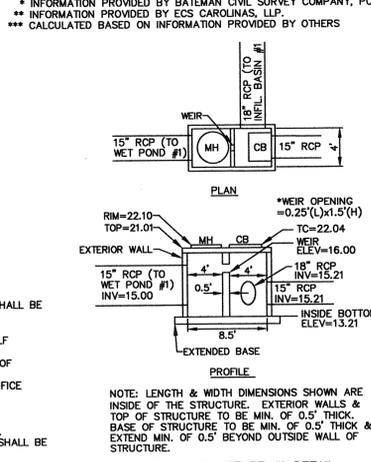
**SEASONAL HIGH WATER TABLE RESULTS**

TEST LOCATION ID	EXISTING GROUND ELEVATION (FEET)*	SHWT (INCHES BELOW GROUND SURFACE)**	SHWT ELEVATION (FEET)**
B-1	16.60	48	12.60
B-2	20.96	38	17.80
B-3	27.98	60	22.98
B-4	26.17	36	23.17
B-5	24.67	66	19.17
B-6	12.47	10	11.64
B-7	14.50	30	12.00
B-8	14.79	36	11.79
B-9	18.18	60	13.18
B-10	27.03	48	23.03
B-11	25.73	16	24.40
B-12	25.47	18	23.97
B-13	26.32	36	23.32
B-14	25.48	48	21.48
B-15	25.71	42	22.21
B-16	25.48	42	21.98
B-17	24.73	42	21.23
B-18	25.57	44	21.91
B-19	17.76	66	12.26
B-20	27.02	52	22.69
B-21	27.05	50	22.69
B-22	26.29	38	23.13
B-23	26.30	42	22.80

\* INFORMATION PROVIDED BY BATEMAN CIVIL SURVEY COMPANY, PC.  
\*\* INFORMATION PROVIDED BY ECS CAROLINAS, LLP.  
\*\*\* CALCULATED BASED ON INFORMATION PROVIDED BY OTHERS.

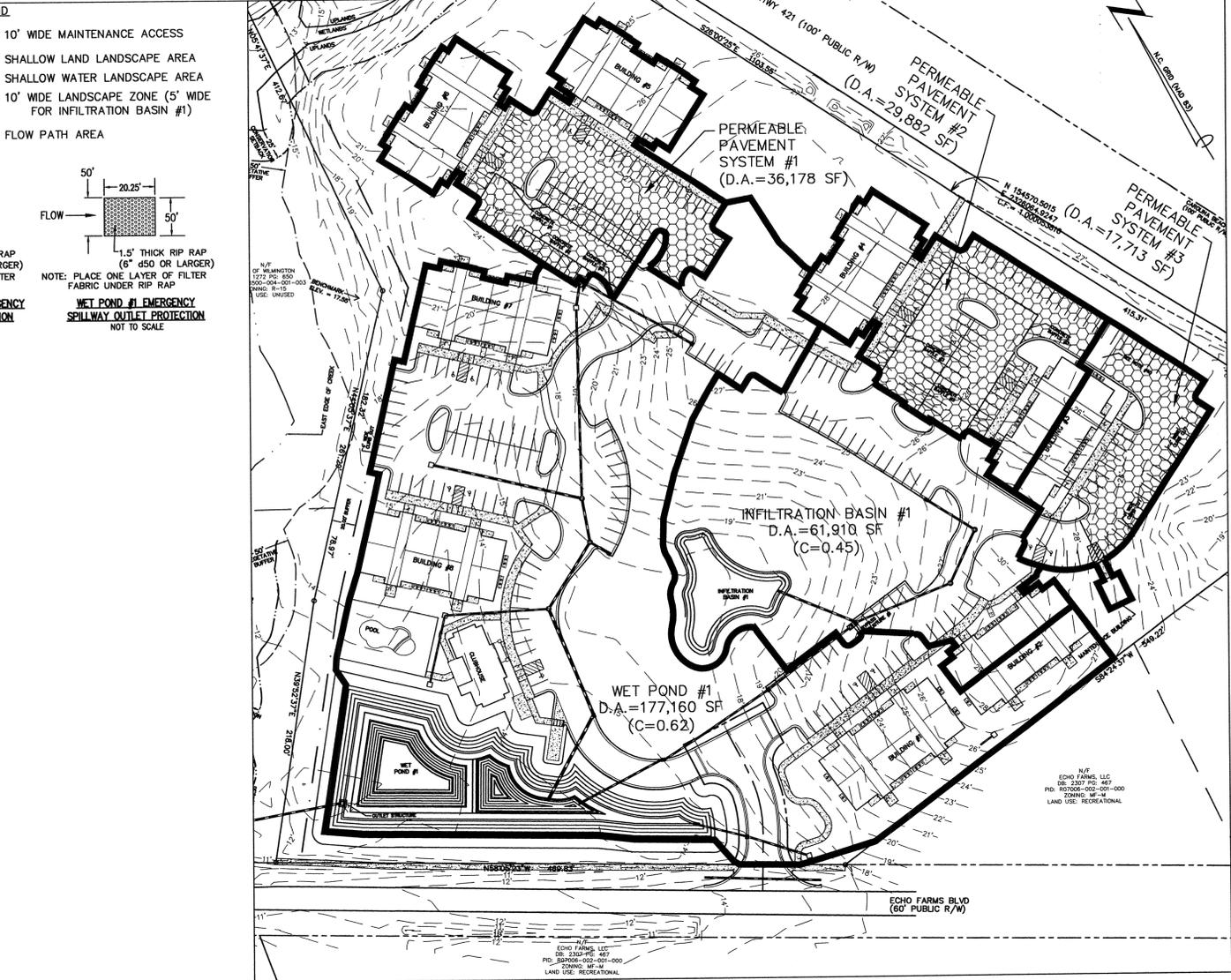
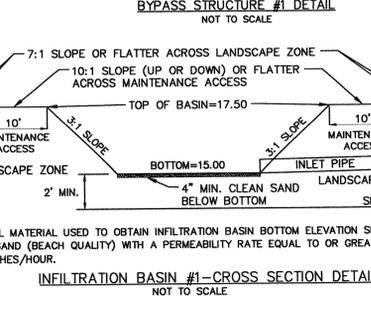
**WET POND #1**

ELEV. (FT)	AREA (SQ. FT.)	INCREMENTAL VOLUME (CU. FT.)	CUMULATIVE VOLUME (CU. FT.)
10.00	8,713	0	0
10.50	11,799	5,128	5,128
11.00	12,867	6,166	11,294
12.00	15,068	13,968	25,262
13.00	17,351	16,209	41,471
14.00	19,720	18,536	60,007
15.00	22,178	20,949	80,956



**INFILTRATION BASIN #1**

ELEV. (FT)	AREA (SQ. FT.)	INCREMENTAL VOLUME (CU. FT.)	CUMULATIVE VOLUME (CU. FT.)
15.00	2,925	0	0
15.50	3,364	1,572	1,572
16.00	3,817	1,795	3,367
16.50	4,283	2,025	5,392
17.00	4,764	2,262	7,654
17.50	5,260	2,506	10,160



**VEGETATIVE SHELF PLANT SCHEDULE**

LOCATION	PLANT VARIETIES BOTANICAL NAME (COMMON NAME)	SPACING	SIZE	HATCHED SHELF AREA (SF)	PLANTINGS REQUIRED (MIN. 50 PER 200 SF)	PLANTINGS PROVIDED (MIN. 50 PER 200 SF)
*SHALLOW WATER (VEGETATIVE SHELF BELOW PERMANENT POOL ELEVATION; ELEV.=9.50' TO ELEV.=10.00')	Acorus subcordatum (Sweetflag), Alisma subcordatum (Water plantain), Hydrocotyle quadrivalvis (Waterwort), Iris virginica (Blue flag iris), Juncus effusus var. pyloei or solutus (Soft rush), Ludwigia spp. (Primrose willow), Petalandra virginica (Arrow arum), Pontederia cordata (Pickerelweed), Sagittaria latifolia (Duck Potato), Sagittaria lancifolia (Bulltongue), Saururus cernuus (Lizard's tail), Schoenoplectus tabernaemontani (Soft stem bulrush), Schoenoplectus americanus (Three-square bulrush), Scirpus operinus (Woolgrass), Zizaniopsis millicea (Giant cutgrass)	2' O.C. STAGGERED	5-6" PLUG	1,554.90	389	389
**SHALLOW LAND (VEGETATIVE SHELF ABOVE PERMANENT POOL ELEVATION; ELEV.=10.00' TO ELEV.=10.50')	Asclepias incarnata (Swamp Milkweed), Carex tenera (Quill sedge), Chelone glabra (White Turtlehead), Eupatorium dubium (Dwarf Joe Pye Weed), Eupatorium fistulosum (Joe Pye Weed), Eupatorium maculatum (Spotted trumpetweed), Hibiscus coccineus (Scarlet rose mallow), Hibiscus laevis (Halberd leaf rosemallow), Kostelezkyia virginica (Seashore Mallow), Lobelia cardinalis (Cardinal flower), Lobelia elongata (longleaf lobelia), Lobelia alphitoea (Great blue Lobelia), Rhyssospora colorata (Starburst whitecap), Saccharum baldwinii (Narrow plumegrass)	2' O.C. STAGGERED	5-6" PLUG	1,490.12	373	373

\*AT LEAST 3 DIFFERENT SHALLOW WATER PLANT VARIETIES MUST BE PLANTED.  
\*\*AT LEAST 3 DIFFERENT SHALLOW LAND PLANT VARIETIES MUST BE PLANTED.

**Approved Construction Plan**

Name: W. J. ... Date: 3-1-16

Planning: W. J. ... 3-2-16

Traffic: W. J. ... 3-2-16

Fire: W. J. ... 3-2-16

Signed: W. J. ...

**ECHO FARM APARTMENTS**  
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

**WILMINGTON CAROLINA PROFESSIONAL SEAL**  
W. J. ...

**MALPASS ENGINEERING & SURVEYING, P.C.**  
1134 SHIPYARD BOULEVARD  
WILMINGTON, NORTH CAROLINA 28412  
Phone: 910-388-8848 Fax: 910-388-8803 License No. C-2380

Developer: ECHO FARM APARTMENTS, LLC  
10 S. CARDINAL DRIVE  
WILMINGTON, NORTH CAROLINA 28403  
Phone: 910-251-5030

DATE: 10-1-15  
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DRAWN: JCB  
CHECKED: JBM  
PROJECT NO: 260  
SHEET NO: 12  
OF: 22

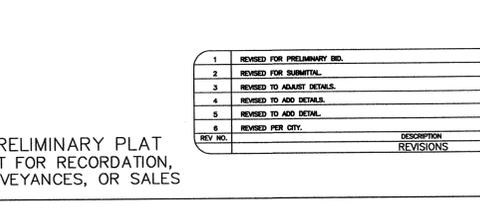
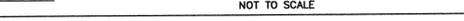
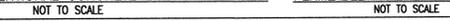
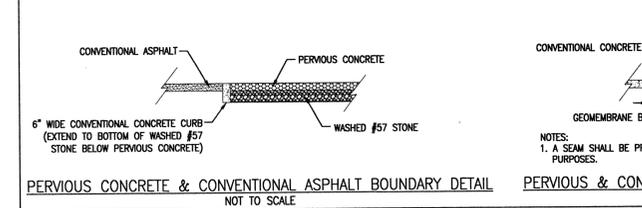
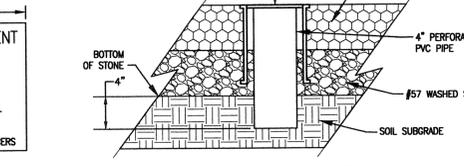
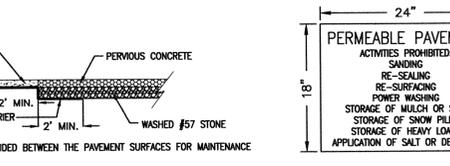
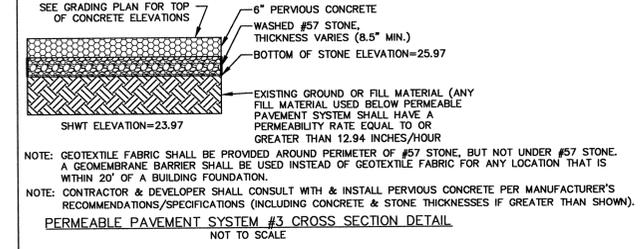
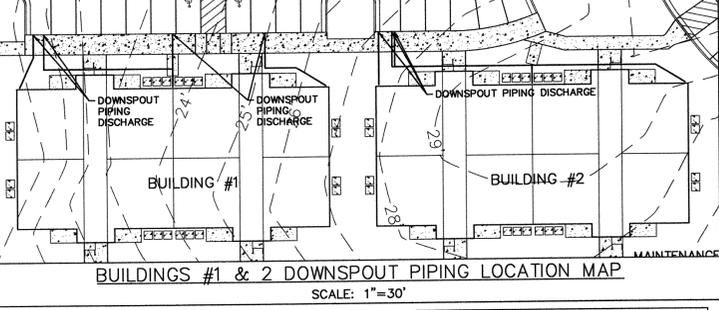
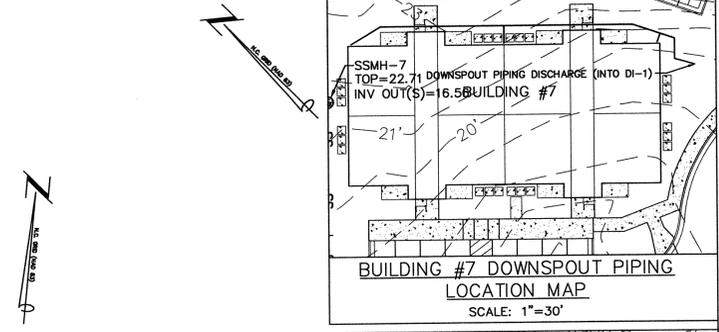
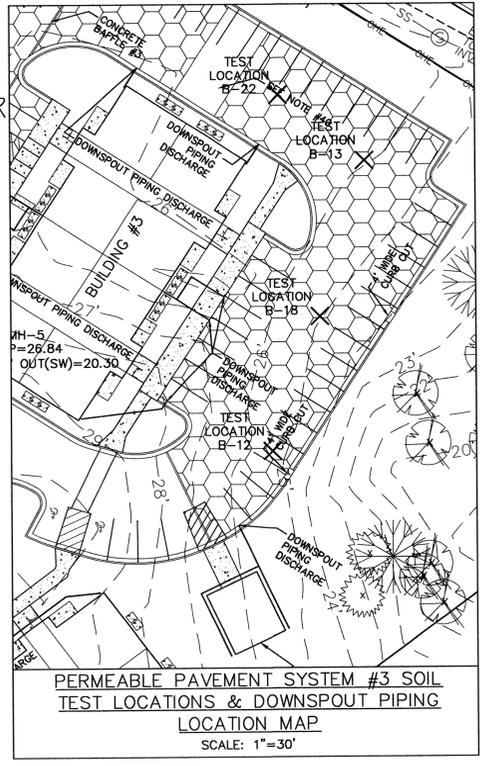
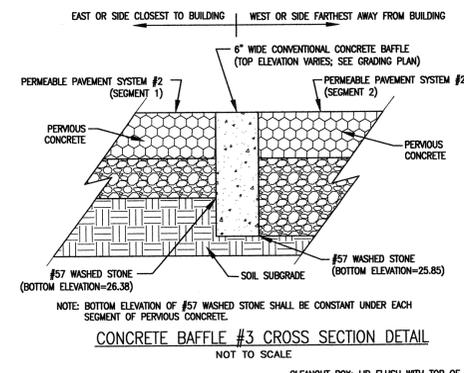
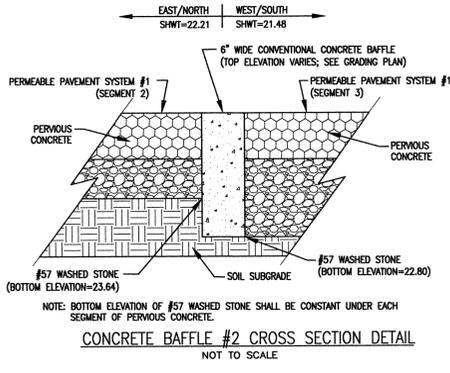
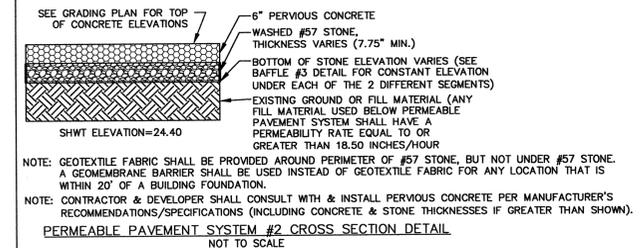
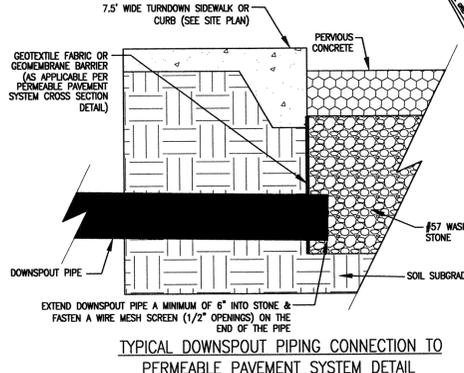
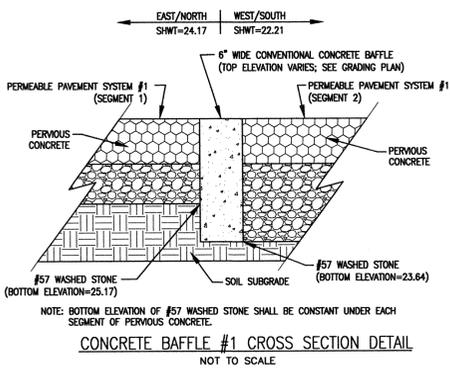
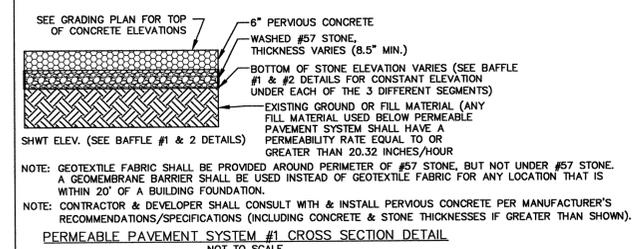
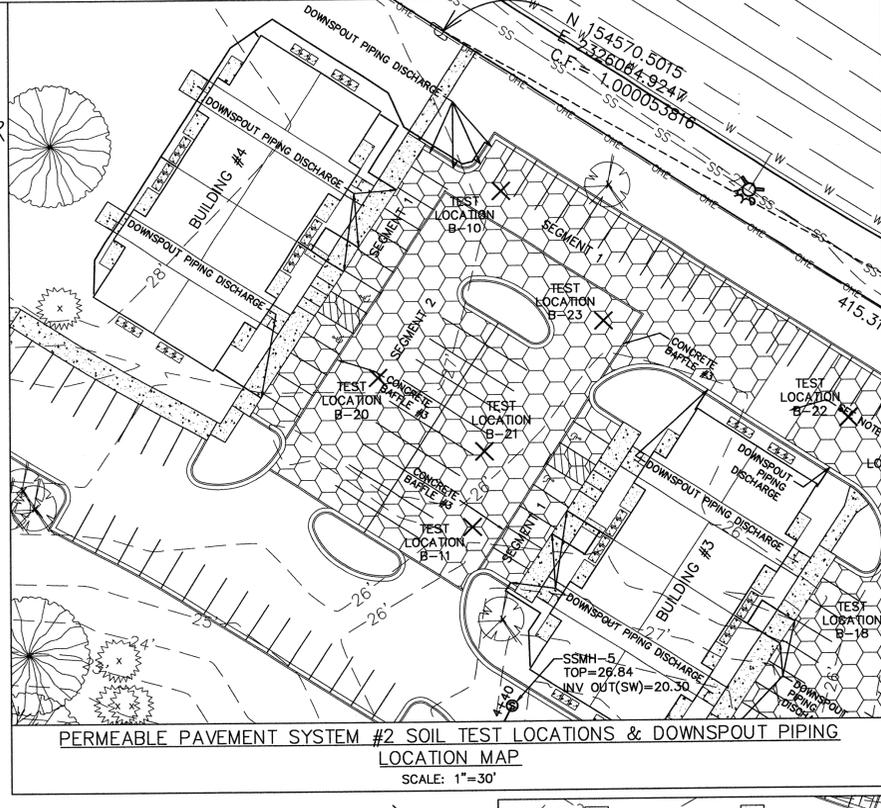
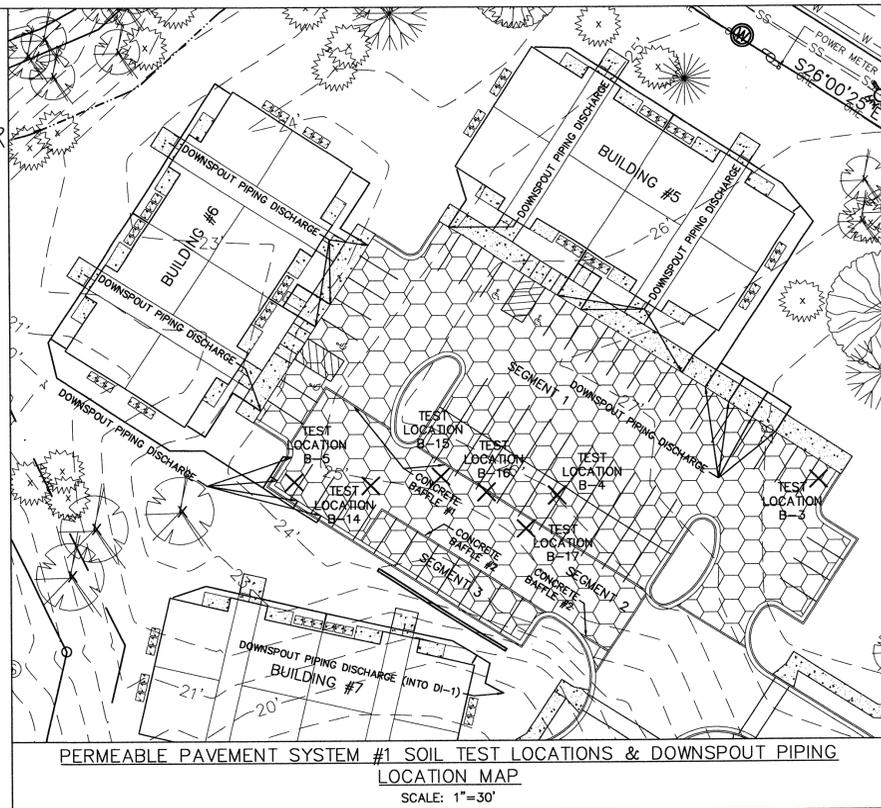
**WET POND #1-FOREBAY & POND SECTION DETAIL**

WET POND	TEMP. POOL	VEGETATED FOREBAY	FOREBAY BOTTOM	SEDIMENT CLEANOUT ELEV.	FOREBAY BOTTOM	SEDIMENT CLEANOUT ELEV.	WET POND TOP	WET POND BOTTOM	ORIFICE	OUTLET	EMERGENCY SPILLWAY	IMPERVIOUS AREAS (SQUARE FEET)	OTHER	OFFSITE	TOTAL
1	15.00	10.00	11.20	9.50-10.50	2.50	2.50	3.50	3.50	11.75	10.5	11.20	11.20	N/A	1.5	108,674

PRELIMINARY PLAT NOT FOR RECORDATION, CONVEYANCES, OR SALES

**CONSTRUCTION SEQUENCE FOR INSTALLATION OF PERMEABLE PAVEMENT (NCDENR STORMWATER BMP MANUAL CHAPTER 18)**

- ENSURE ACCEPTABLE CONDITIONS FOR CONSTRUCTION
  - PERVIOUS SURFACES MUST BE GRADED TO DRAIN AWAY FROM THE PERMEABLE PAVEMENT, EXCEPT WHERE THIS IS UNAVOIDABLE, SUCH AS PARKING ISLANDS AND AREA BETWEEN BUILDINGS & PARKING LOT.
  - IMPERVIOUS AREAS THAT WILL DRAIN TO THE PERMEABLE PAVEMENT ARE COMPLETED.
  - AREAS ADJACENT TO THE PERMEABLE PAVEMENT ARE STABILIZED (VEGETATION, MULCH, STRAW, FIBER BLANKETS, ETC.) IN ORDER TO PREVENT EROSION & POSSIBLE CONTAMINATION WITH SEDIMENTS.
  - CONSTRUCTION ACCESS TO OTHER PORTIONS OF THE SITE IS ESTABLISHED SO THAT NO CONSTRUCTION TRAFFIC PASSES THROUGH THE PERMEABLE PAVEMENT SITE DURING INSTALLATION. INSTALL BARRIERS/FENCES AS NEEDED.
  - WEATHER FORECAST CALLS FOR A WINDOW OF DRY WEATHER TO PREVENT EXCESS COMPACTION OR SMEARING OF THE SOIL SUBGRADE WHILE IT IS EXPOSED.
  - ALL PERMEABLE PAVEMENT AREAS ARE CLEARLY MARKED ON THE SITE.
- EXCAVATE PERMEABLE PAVEMENT AREA & PREPARE SUBGRADE SURFACE
  - EXCAVATE IN DRY SUBGRADE CONDITIONS & AVOID EXCAVATING IMMEDIATELY AFTER STORMS WITHOUT A SUFFICIENT DRYING PERIOD.
  - DO NOT ALLOW EQUIPMENT TO CROSS THE PAVEMENT AREA AFTER EXCAVATION HAS BEGUN.
  - OPERATE EXCAVATION EQUIPMENT FROM OUTSIDE THE EXCAVATION AREA OR FROM UNEXCAVATED PORTIONS OF THE AREA USING AN EXCAVATION STAGING AREA.
  - USE EQUIPMENT WITH TRACKS RATHER THAN TIRES TO MINIMIZE SOIL COMPACTION WHEN EQUIPMENT ON THE SUBGRADE SURFACE IS UNAVOIDABLE.
  - DIG THE FINAL 8 TO 12 INCHES BY USING THE TEETH OF THE EXCAVATOR BUCKET TO LOOSEN SOIL & DO NOT SMEAR THE SUBGRADE SOIL SURFACE. FINAL GRADING OR SMOOTHING OF SUBGRADE SHOULD BE DONE BY HAND IF POSSIBLE.
  - THE FINAL SUBGRADE SLOPE SHALL NOT EXCEED 0.5%. THE FINAL SUBGRADE SHALL BE SURVEYED BEFORE PROCEEDING WITH INSTALLATION.
  - MINIMIZE THE DISTANCE BETWEEN EXCAVATION AND PLACEMENT OF THE AGGREGATE.
  - AFTER THE SUBGRADE SLOPE IS VERIFIED, SCARIFY THE SOIL SUBGRADE SURFACE TO MAINTAIN THE SOILS PRE-DISTURBANCE INFILTRATION RATE.
  - TO SCARIFY THE PAVEMENT, USE THE EXCAVATOR BUCKET'S TEETH TO RAKE THE SURFACE OF THE SUBGRADE.
- TEST THE SUBGRADE SOIL INFILTRATION RATE (INFILTRATION SYSTEMS ONLY)
  - IMMEDIATELY AFTER EXCAVATION & BEFORE THE AGGREGATE IS PLACED, CONDUCT A DIRECT MEASUREMENT OF THE SOIL'S INFILTRATION RATE. INFILTRATION TESTING SHALL BE PERFORMED BY AN APPROPRIATELY-QUALIFIED PROFESSIONAL.
  - RESULTS OF THE INFILTRATION TESTING SHALL BE PROVIDED TO THE ENGINEER.
  - IF THE SOIL TEST SHOWS INFILTRATION RATE(S) THAT ARE LOWER THAN THE RATE(S) USED IN THE DESIGN, THEN ADDITIONAL SCARIFICATION, RIPPING, OR TRENCHING OF THE SOIL WILL BE NEEDED.
  - CONTRACTOR SHALL CONTACT & RECEIVE APPROVAL FROM ENGINEER OF RECORD TO CONTINUE INSTALLATION OF PERMEABLE PAVEMENT.
- PLACE GEOTEXTILES AND GEOMEMBRANE (IF APPLICABLE)
  - FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR THE APPROPRIATE OVERLAP BETWEEN ROLLS OF MATERIAL. SECURE THE MATERIAL TO ENSURE IT DOES NOT MOVE OR WRINKLE WHEN PLACING AGGREGATE.
- PLACE OBSERVATION WELLS(S)
  - PLACE OBSERVATION WELL(S) ACCORDING TO THE PLAN AND VERIFY THAT THE ELEVATIONS ARE CORRECT.
- PLACE & COMPACT AGGREGATE BASE
  - INSPECT ALL AGGREGATES TO ENSURE THEY ARE CLEAN, FREE OF FINES, AND CONFORM TO THE PLANS.
  - IF AGGREGATE DELIVERED TO THE SITE CANNOT BE IMMEDIATELY PLACED INTO THE EXCAVATION, THEY SHOULD BE STOCKPILED ON AN IMPERVIOUS SURFACE, GEOTEXTILE, OR ON IMPERVIOUS MATERIAL TO KEEP THE AGGREGATE FREE OF SEDIMENT.
  - IF AGGREGATE BECOMES CONTAMINATED WITH SEDIMENT, THEN IT SHALL BE REPLACED WITH CLEAN AGGREGATE.
  - BEFORE PLACING THE AGGREGATE BASE, REMOVE ANY ACCUMULATION OF SEDIMENTS ON THE FINISHED SOIL SUBGRADE.
  - IF THE EXPOSED SUBGRADE HAS BEEN SUBJECTED TO RAINFALL BEFORE PLACEMENT OF THE AGGREGATE, THEN THE SUBGRADE SURFACE MUST BE SCARIFIED TO BREAK UP THE RESULTING SURFACE CRUST.
  - SLOPES & ELEVATIONS SHALL BE CHECKED ON THE SOIL SUBGRADE AND THE FINISHED ELEVATION OF BASE (AFTER COMPACTION) OR BEDDING MATERIALS TO ASSURE THEY CONFORM TO THE PLANS AND SPECIFICATIONS.
  - THE AGGREGATE SHALL BE SPREAD (NOT DUMPED) BY A FRONT-END LOADER OR FROM DUMP TRUCKS DEPOSITING FROM NEAR THE EDGE OF THE EXCAVATED AREA OR DIRECTLY ON DEPOSITED AGGREGATE PILES. MOISTEN AND SPREAD THE WASHED STONE WITHOUT DRIVING ON THE SOIL SUBGRADE. BE CAREFUL NOT TO DAMAGE THE OBSERVATION WELLS DURING COMPACTION.
  - FOLLOW COMPACTION RECOMMENDATIONS BY THE PERMEABLE PAVEMENT MANUFACTURER OR THAT FROM INDUSTRY GUIDELINES.
  - BE SURE THAT CORNERS, AREAS AROUND UTILITY STRUCTURES AND OBSERVATION WELLS, & TRANSITION AREAS TO OTHER PAVEMENTS ARE ADEQUATELY COMPACTED.
  - DO NOT CRUSH AGGREGATES DURING COMPACTION.
- INSTALL CURB RESTRAINTS AND PAVEMENT BARRIERS
  - EDGE RESTRAINTS AND BARRIERS BETWEEN PERMEABLE IMPERVIOUS PAVEMENT SHALL BE INSTALLED PER THE PLAN. BEFORE MOVING ON TO CONSTRUCTION STEP 8, BE CERTAIN THE DESIGN AND INSTALLATION ARE CONSISTENT.
- INSTALL PAVEMENT COURSE
  - PERVIOUS CONCRETE SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST VERSION OF ACI 522.1 SPECIFICATION FOR PERVIOUS CONCRETE.
  - INSTALLATION OF THE PERVIOUS CONCRETE MAY BE ACCOMPLISHED USING EITHER THE ONE-STEP OR TWO-STEP METHOD.
- PROTECT THE PAVEMENT THROUGH PROJECT COMPLETION
  - IF IT IS NOT POSSIBLE TO INSTALL THE PERMEABLE PAVEMENT AT THE END OF THE SITE CONSTRUCTION TIMELINE, THEN PROTECT THE PAVEMENT UNTIL PROJECT COMPLETION. THIS SHALL BE DONE BY:
    - ROUTING CONSTRUCTION ACCESS THROUGH OTHER PORTIONS OF THE SITE SO THAT NO CONSTRUCTION TRAFFIC PASSES THROUGH THE PERMEABLE PAVEMENT SITE (INSTALL BARRIERS/FENCES AS NEEDED).
    - IF THIS IS NOT POSSIBLE, PROTECT THE PAVEMENT PER THE CONSTRUCTION DOCUMENTS. PROTECTION TECHNIQUES THAT MAY BE USED INCLUDE MATS, PLASTIC SHEETING, BARRIERS TO LIMIT ACCESS, OR MOVING THE STABILIZED CONSTRUCTION ENTRANCE.
    - SCHEDULE STREET SWEEPING DURING AND AFTER CONSTRUCTION TO PREVENT SEDIMENT FROM ACCUMULATING ON THE PAVEMENT.



PRELIMINARY PLAT NOT FOR RECORDATION, CONVEYANCES, OR SALES

REV. NO.	DESCRIPTION	DATE
1	REVISED FOR PRELIMINARY BID.	10-16-15
2	REVISED FOR SUBMITTAL.	10-23-15
3	REVISED TO ADD DETAILS.	11-16-15
4	REVISED TO ADD DETAILS.	11-24-15
5	REVISED TO ADD DETAIL.	12-14-15
6	REVISED PER CITY.	2-8-16

Approved Construction Plan

Name: *[Signature]* Date: 3-1-16

Planning: *[Signature]* 3-2-16

Traffic: *[Signature]* 3-2-16

Fire: *[Signature]* 3-2-16

City of Wilmington Public Services • Engineering Division

APPROVED STORMWATER MANAGEMENT PLAN

Date: 3/3/16 Permit #

Signed: *[Signature]*

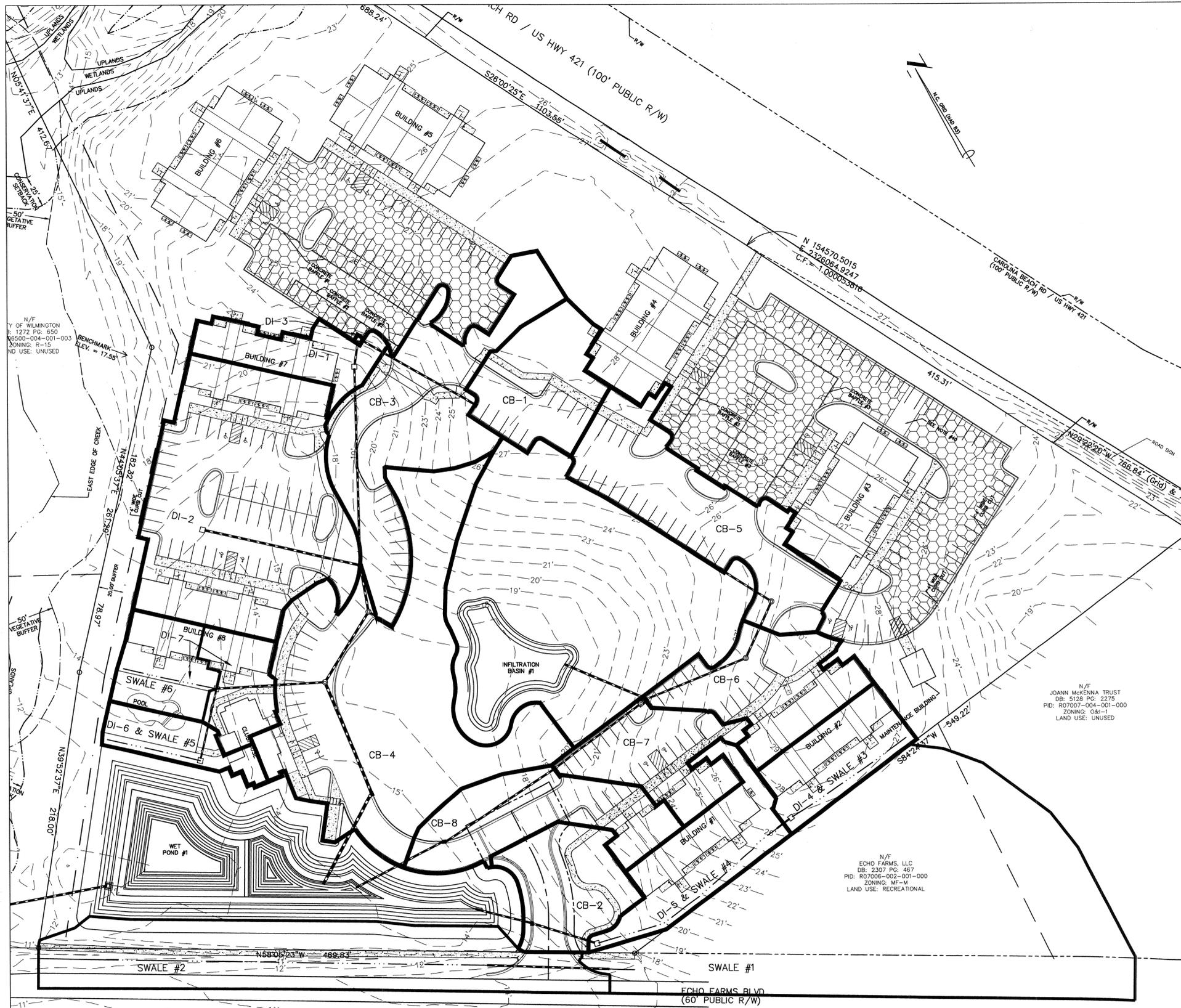
STORMWATER DETAIL SHEET  
4010 CAROLINA BEACH ROAD

**ECHO FARM APARTMENTS**  
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.  
1134 SHIPTARD BOULEVARD  
WILMINGTON, NORTH CAROLINA 28412  
Phone 910-392-0243 License No. C-2320  
Fax 910-392-0233

Developer: ECHO FARM APARTMENTS, LLC  
10 S. CAROLINA DRIVE  
WILMINGTON, NORTH CAROLINA 28403  
PHONE: 910-251-5030

DATE: 10-1-15  
SCALE: VARIES  
DRAWN: JCS  
CHECKED: JEM  
PROJECT NO: 260  
SHEET NO: 13 OF 22



**INLET DRAINAGE AREA CHART**

INLET	DRAINAGE AREA (ACRES)
CB-1	0.20
CB-2	0.18
CB-3	0.42
CB-4	0.77
CB-5	0.34
CB-6	0.23
CB-7	0.19
CB-8	0.24
DI-1	0.13
DI-2	0.66
DI-3	0.01
DI-4 & SWALE #3	0.16
DI-5 & SWALE #4	0.36
DI-6 & SWALE #5	0.091
DI-7	0.23
SWALE #1	1.21
SWALE #2	1.71
SWALE #6	0.119

\*DI-5 D.A. INCLUDES DI-4 D.A.  
\*\*SWALE #2 D.A. INCLUDES SWALE #1 D.A.

**Pipe Table - System #1**

From	To	Size	Length	Slope	D.S. Invert	U.S. Invert
CB-8	Pond	15	78	1.78%	8.50	9.87
CB-7	CB-8	15	103	4.05%	9.87	14.01
SDMH-6	CB-7	15	81	1.19%	14.01	15.00

**Pipe Table - System #2**

From	To	Size	Length	Slope	D.S. Invert	U.S. Invert
CB-4	Pond	24	78	0.29%	9.00	9.23
SDMH-3	CB-4	24	92	0.78%	9.23	9.96
SDMH-2	SDMH-3	18	62	0.91%	9.96	10.55
SDMH-1	SDMH-2	18	34	0.68%	10.55	10.80
DI-2	SDMH-1	18	125	0.31%	10.80	11.19
DI-7	SDMH-3	15	85	0.50%	11.26	11.69
DI-6	DI-7	12	57	0.50%	11.69	11.98
CB-3	SDMH-2	15	16	11.95%	10.55	12.58
DI-1	SDMH-1	15	154	3.51%	10.80	16.28
DI-3	DI-1	15	20	4.25%	16.28	17.23
CB-1	DI-3	15	104	3.46%	17.23	20.87

**Pipe Table - System #3**

From	To	Size	Length	Slope	D.S. Invert	U.S. Invert
CB-6	Pond	18	69	0.31%	15.00	15.21
SDMH-5	CB-6	15	81	6.43%	15.21	20.60
SDMH-4	SDMH-5	15	46	0.51%	20.60	20.85
CB-5	SDMH-4	15	44	0.50%	20.85	21.08

**Pipe Table - System #4**

From	To	Size	Length	Slope	D.S. Invert	U.S. Invert
CB-2	Pond	15	46	0.23%	10.50	10.61
DI-5	CB-2	15	50	2.62%	10.61	11.98

**Pipe Table - System #5**

From	To	Size	Length	Slope	D.S. Invert	U.S. Invert
DI-4	Swale	12	13	0.36%	22.48	22.53

**Pipe Table - Driveway Culvert**

From	To	Size (in)	Length (ft)	Slope (%)	D.S. Invert (ft)	U.S. Invert (ft)
Upstream	Downstream	15 (Class IV)	96	1.43	11.87	13.24

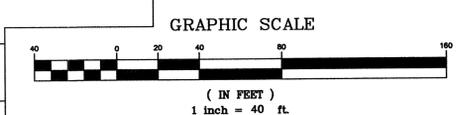
**Pipe Table - Wet Pond #1 Outfall**

From	To	Size (in)	Length (ft)	Slope (%)	D.S. Invert (ft)	U.S. Invert (ft)
Pond	Downstream	18	92	0.60	9.30	9.85

**Pipe Table - Culvert Downstream of Swale #7**

From	To	Size (in)	Length (ft)	Slope (%)	D.S. Invert (ft)	U.S. Invert (ft)
Swale #7	Downstream	15	21	2.20	22.70	23.16

**DRAINAGE AREA MAP-INLETS**  
SCALE: 1"=40'



REV NO.	DESCRIPTION	DATE
1	REVISED TO ADD SWALE #7 DRAINAGE AREA & PIPE CHART.	12-14-15
2	REVISED PER CITY.	2-9-16

**Approved Construction Plan**

Name: *[Signature]* Date: 7/1/16

Planning: *[Signature]* Date: 3-2-16

Traffic: *[Signature]* Date: 3-2-16

Fire: *[Signature]* Date: 3-2-16

Signed: *[Signature]*

**DRAINAGE AREA MAP**  
4010 CAROLINA BEACH ROAD  
**ECHO FARM APARTMENTS**  
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

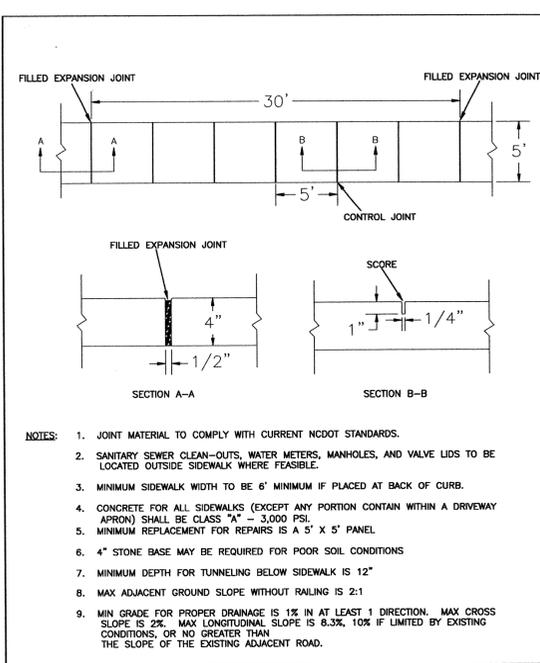
**MALPASS ENGINEERING & SURVEYING, P.C.**  
1154 SHIPYARD BOULEVARD  
WILMINGTON, NORTH CAROLINA 28412  
Phone 910-392-6848 License No. C-2830  
Fax 910-392-6859

Developer: ECHO FARM APARTMENTS, LLC  
10 S. CARDINAL DRIVE  
WILMINGTON, NORTH CAROLINA 28403  
PHONE: 910-251-0000

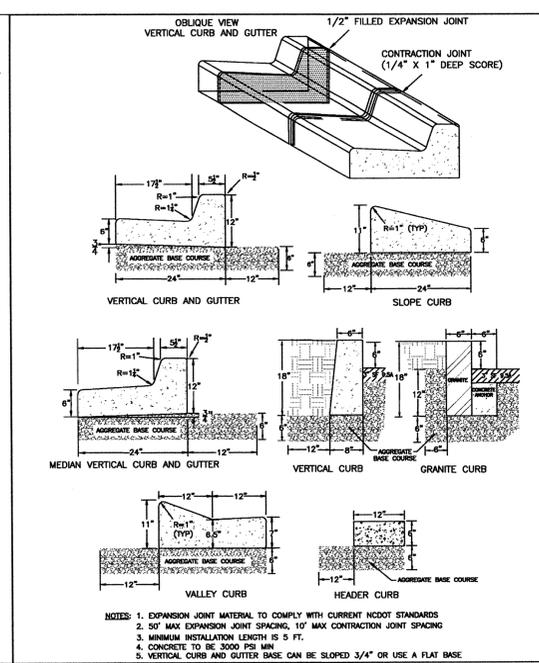
DATE: 11-24-15  
SCALE: 1"=40'  
DRAWN: JCB  
CHECKED: JEM  
PROJECT NO: 260  
SHEET NO: 14  
OF: 22

PRELIMINARY PLAT  
NOT FOR RECORDATION,  
CONVEYANCES, OR SALES

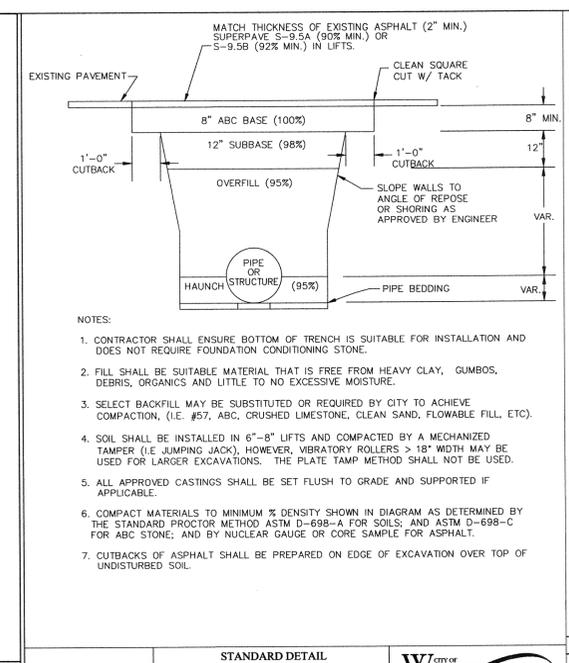




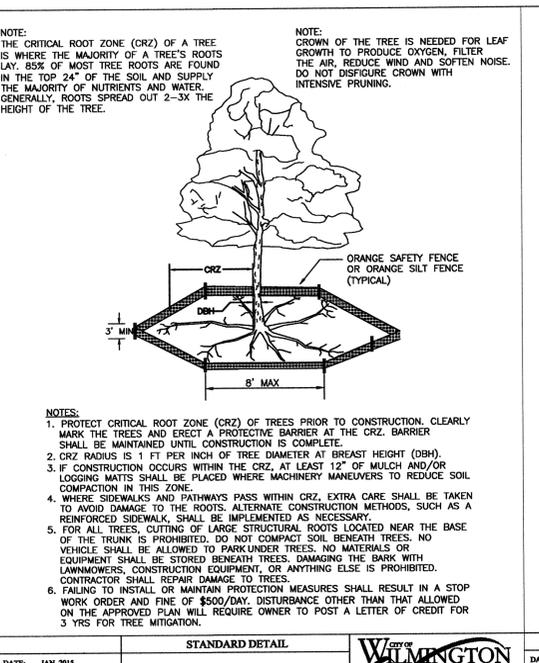
STANDARD DETAIL		CITY OF WILMINGTON	
DATE: OCTOBER, 2010	DRAWN BY: PBR/SR	CITY OF WILMINGTON ENGINEERING	SD 3-10
CHECKED BY: DEC	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
SIDWALK			



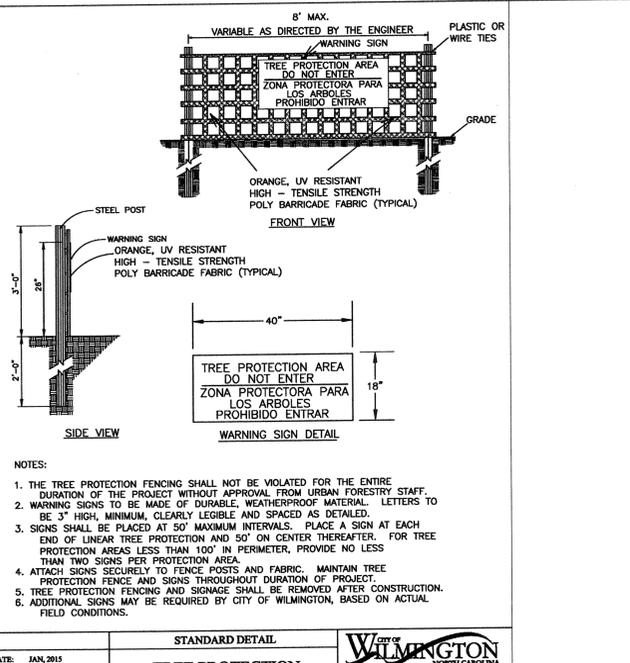
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DATE: AUGUST, 2011	DRAWN BY: PBR/SR	CITY OF WILMINGTON ENGINEERING	SD 3-11
CHECKED BY: DEC	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
CURBING			



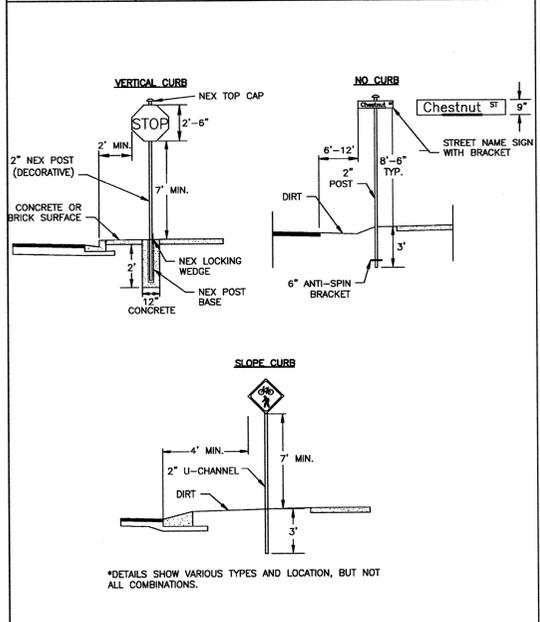
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DATE: MAY, 2013	DRAWN BY: JSR	CITY OF WILMINGTON ENGINEERING	SD 1-05
CHECKED BY: D.E.C., P.E.	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
PAVEMENT REPAIRS - UTILITY CUTS			



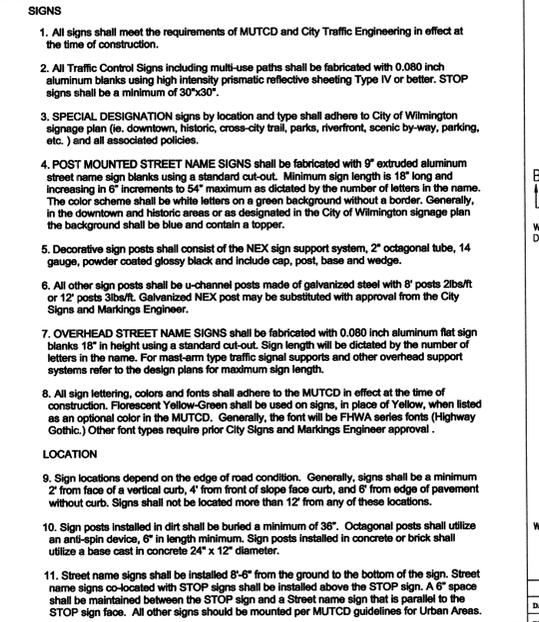
STANDARD DETAIL		CITY OF WILMINGTON	
DATE: JAN, 2015	DRAWN BY: JSR	CITY OF WILMINGTON ENGINEERING	SD 15-09
CHECKED BY: RDK, P.E.	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
TREE PROTECTION DURING CONSTRUCTION		SHEET 1 of 2	



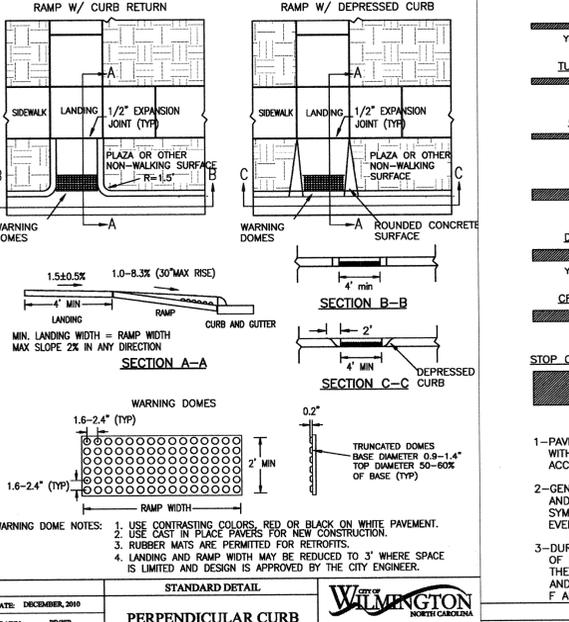
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DATE: JAN, 2015	DRAWN BY: JSR	CITY OF WILMINGTON ENGINEERING	SD 15-09
CHECKED BY: RDK, P.E.	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
TREE PROTECTION DURING CONSTRUCTION		SHEET 2 of 2	



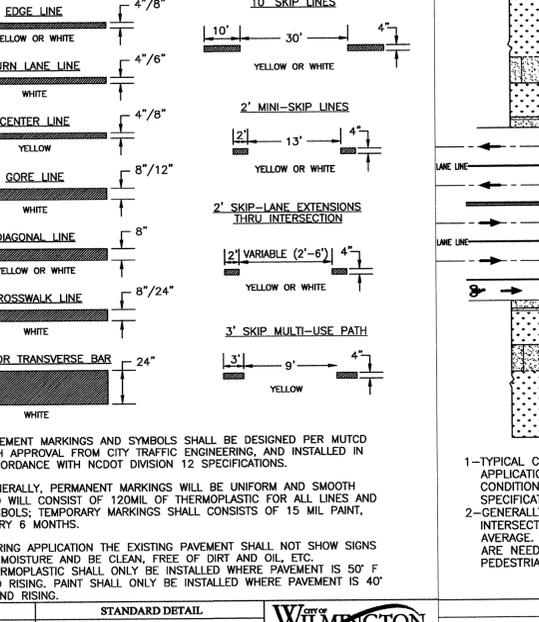
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DATE: NOVEMBER, 2011	DRAWN BY: JSR	CITY OF WILMINGTON ENGINEERING	SD 15-03
CHECKED BY: RDK, P.E.	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
STREET SIGNS AND LOCATION		SHEET 1 of 2	



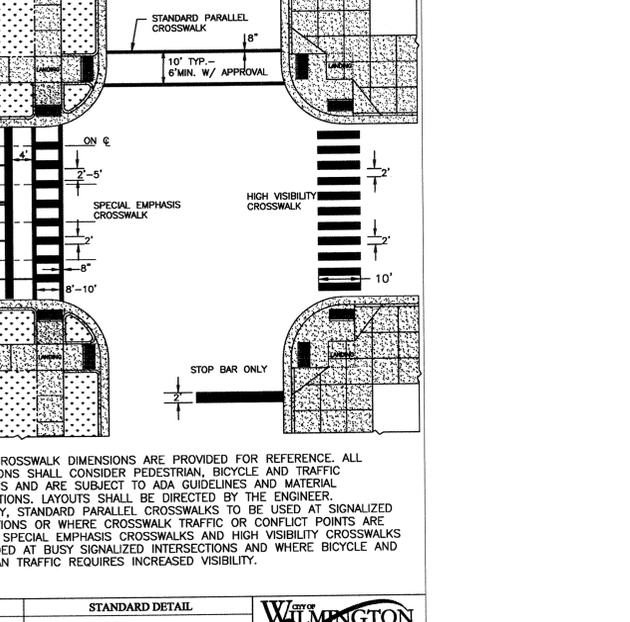
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DATE: NOVEMBER, 2011	DRAWN BY: JSR	CITY OF WILMINGTON ENGINEERING	SD 15-03
CHECKED BY: RDK, P.E.	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
STREET SIGNS AND LOCATION		SHEET 2 of 2	



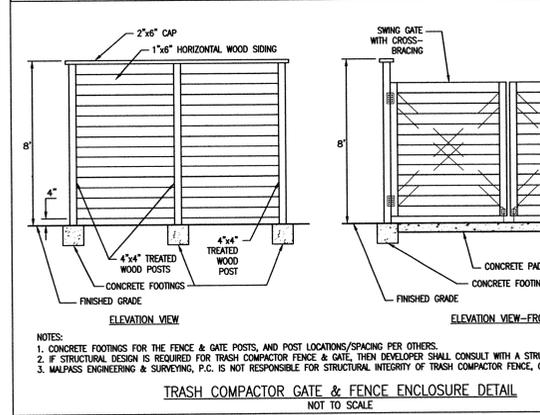
STANDARD DETAIL		CITY OF WILMINGTON	
DATE: DECEMBER, 2010	DRAWN BY: PBR/SR	CITY OF WILMINGTON ENGINEERING	SD 3-08
CHECKED BY: DEC	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
PERPENDICULAR CURB RAMP ADJACENT TO PLAZA			



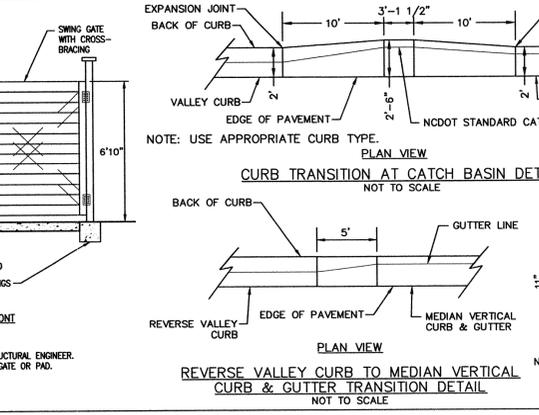
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DATE: DECEMBER, 2011	DRAWN BY: JSR	CITY OF WILMINGTON ENGINEERING	SD 11-01
CHECKED BY: RDK, P.E.	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
PAVEMENT MARKINGS LINE TYPES			



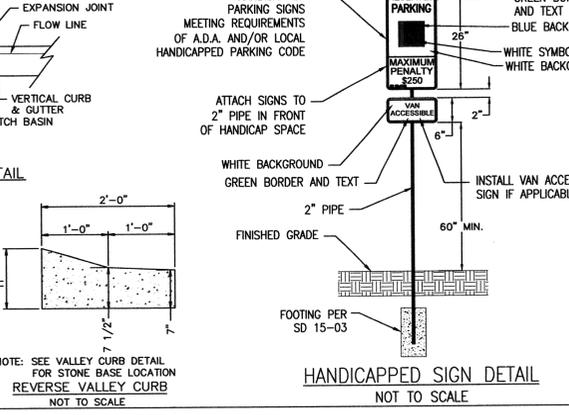
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DATE: FEBRUARY, 2012	DRAWN BY: JSR	CITY OF WILMINGTON ENGINEERING	SD 11-11
CHECKED BY: RDK, P.E.	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
CROSSWALK PAVEMENT MARKINGS			



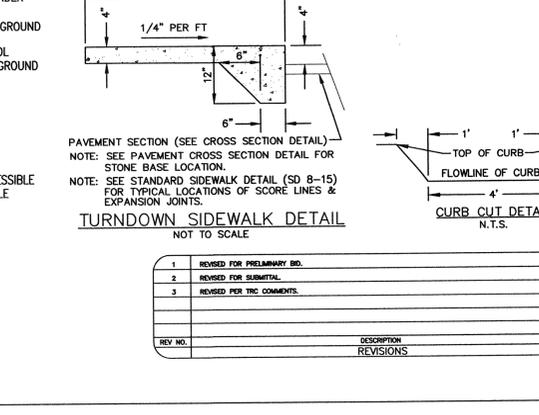
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DATE: NOVEMBER, 2011	DRAWN BY: JSR	CITY OF WILMINGTON ENGINEERING	SD 15-03
CHECKED BY: RDK, P.E.	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
TRASH COMPACTOR GATE & FENCE ENCLOSURE DETAIL		NOT TO SCALE	



STANDARD DETAIL		CITY OF WILMINGTON	
DATE: NOVEMBER, 2011	DRAWN BY: JSR	CITY OF WILMINGTON ENGINEERING	SD 15-03
CHECKED BY: RDK, P.E.	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
CURB TRANSITION AT CATCH BASIN DETAIL		NOT TO SCALE	



STANDARD DETAIL		CITY OF WILMINGTON	
DATE: DECEMBER, 2010	DRAWN BY: PBR/SR	CITY OF WILMINGTON ENGINEERING	SD 3-08
CHECKED BY: DEC	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
HANDICAPPED SIGN DETAIL		NOT TO SCALE	



STANDARD DETAIL		CITY OF WILMINGTON	
DATE: DECEMBER, 2011	DRAWN BY: JSR	CITY OF WILMINGTON ENGINEERING	SD 11-01
CHECKED BY: RDK, P.E.	SCALE: NOT TO SCALE	PO BOX 1810 WILMINGTON, NC 28402	(910) 341-7807
TURNDOWN SIDEWALK DETAIL		NOT TO SCALE	

**Approved Construction Plan**

Name: \_\_\_\_\_ Date: 3/1/16

Planning: \_\_\_\_\_

Traffic: \_\_\_\_\_ 3-216

Fire: \_\_\_\_\_ 3-216

Public Services • Engineering Division  
APPROVED STORMWATER MANAGEMENT PLAN  
Date: 3/1/16 Permit # 2016 010  
Signed: \_\_\_\_\_

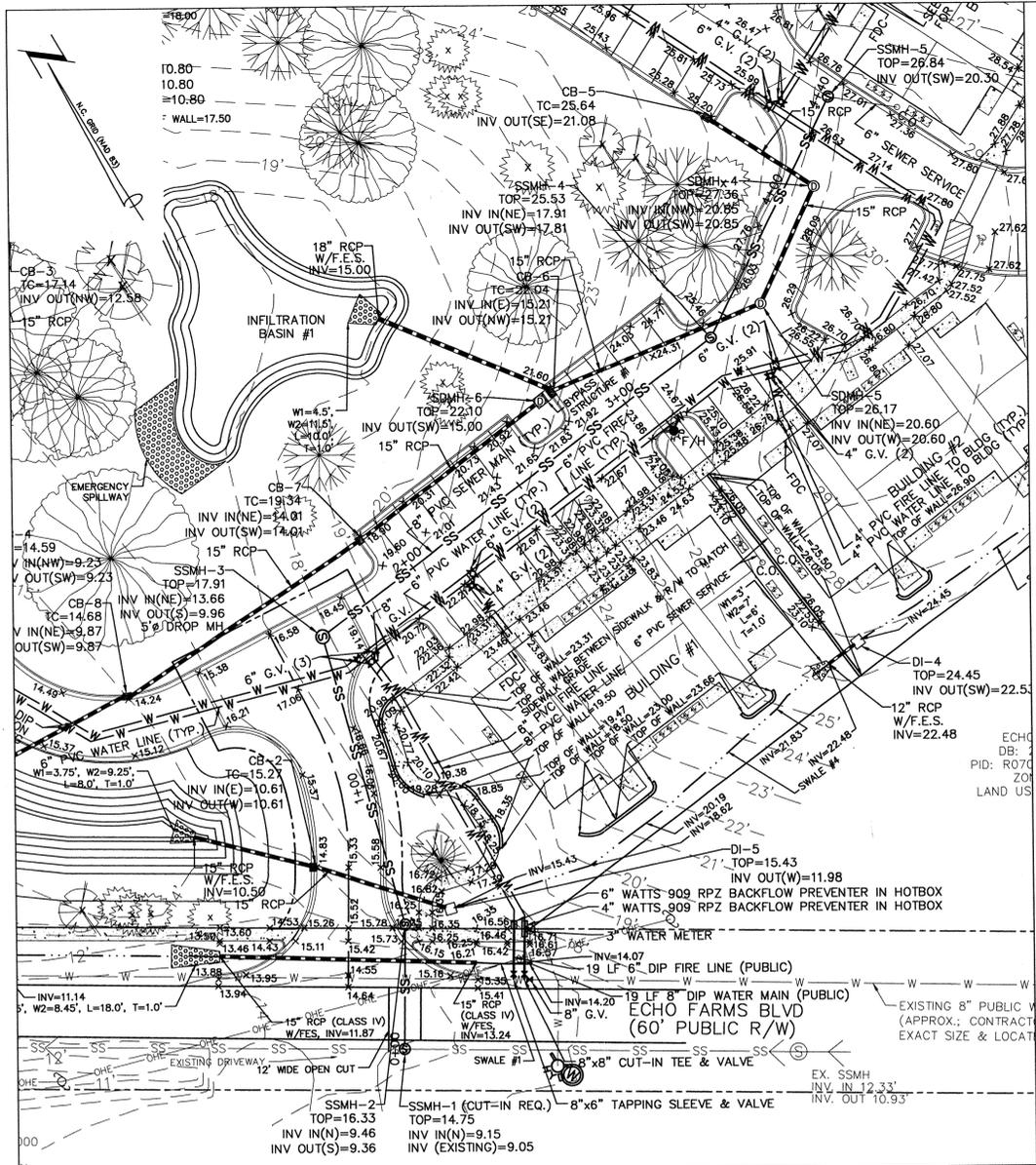
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**ECHO FARM APARTMENTS**

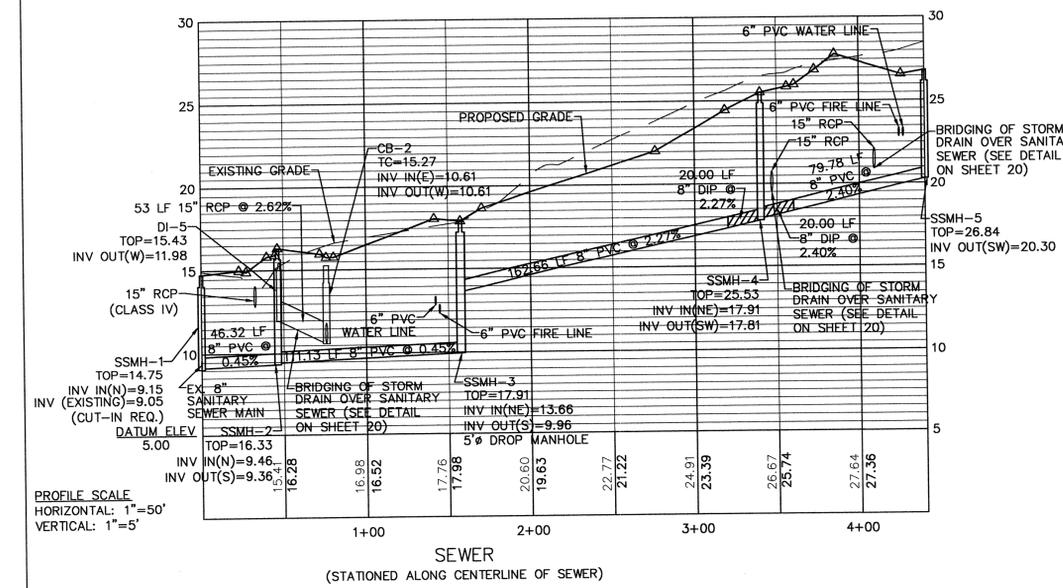
1154 SHEPARD BOULEVARD  
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

Developer: ECHO FARM APARTMENTS, LLC  
10 S. CAROLINA DRIVE  
WILMINGTON, NORTH CAROLINA 28403  
PHONE: 910-251-5030

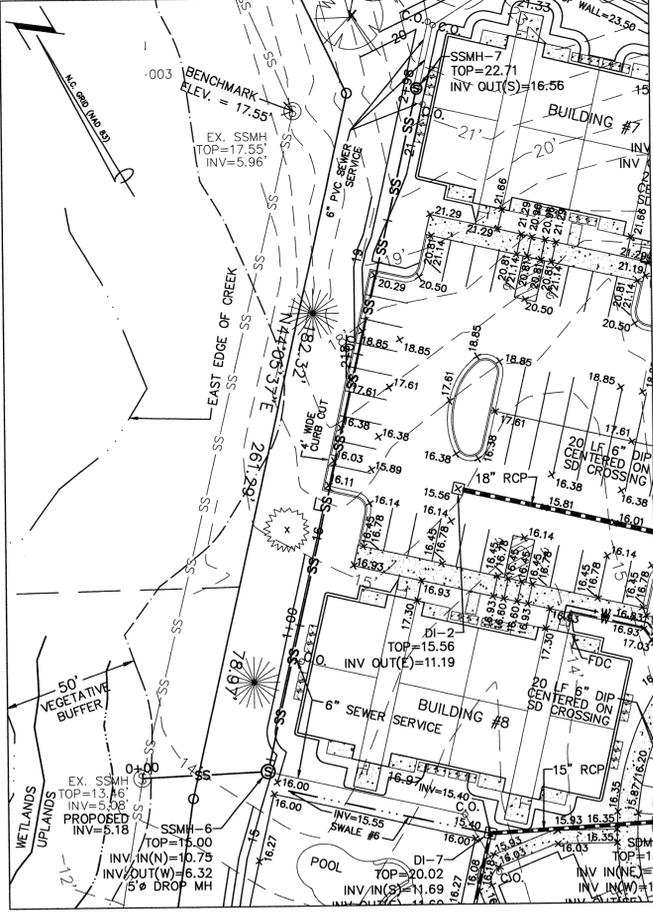
SHEET NO: 16  
OF: 22



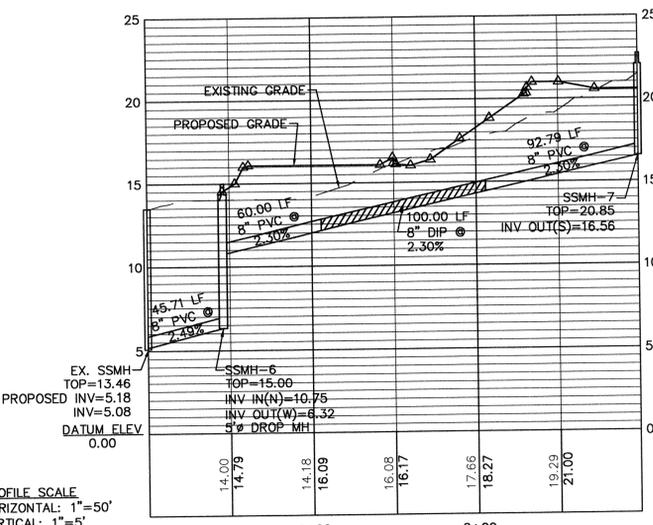
PLAN VIEW SCALE: 1"=30'



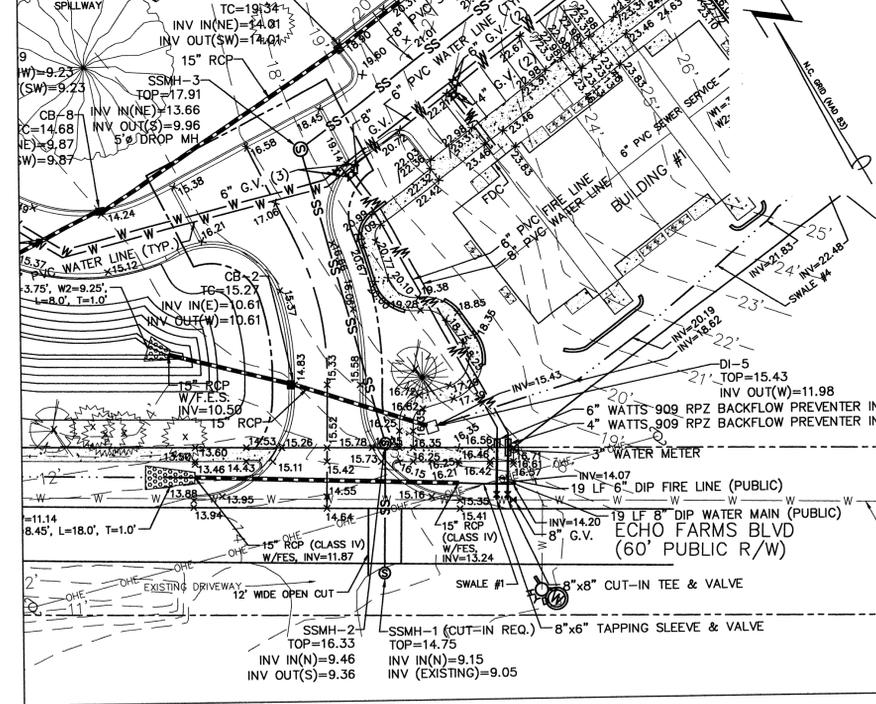
PROFILE SCALE  
HORIZONTAL: 1"=50'  
VERTICAL: 1"=5'



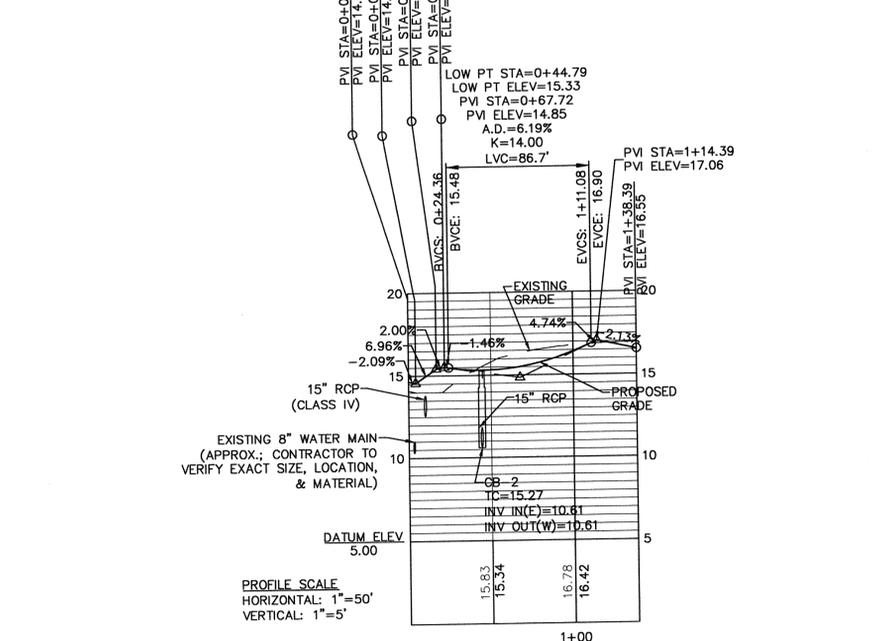
PLAN VIEW SCALE: 1"=30'



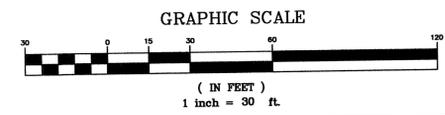
PROFILE SCALE  
HORIZONTAL: 1"=50'  
VERTICAL: 1"=5'



PLAN VIEW SCALE: 1"=30'



PROFILE SCALE  
HORIZONTAL: 1"=50'  
VERTICAL: 1"=5'



REV. NO.	DESCRIPTION	DATE
1	REVISED PER CITY.	2-8-18

**Approved Construction Plan**

Name: *[Signature]* Date: 3/1/16

Traffic: *[Signature]* 3-2-16

Fire: *[Signature]* 3.2.16

City of Wilmington  
Public Services • Engineering Division  
APPROVED STORMWATER MANAGEMENT PLAN  
Date: 3/1/16 Permit # 2016010  
Signed: *[Signature]*

PLAN PROFILE  
4010 CAROLINA BEACH ROAD  
**ECHO FARM APARTMENTS**  
WILMINGTON TOWNSHIP NEW HANOVER COUNTY NORTH CAROLINA

MALPASS ENGINEERING & SURVEYING, P.C.  
1134 SHIPYARD BOULEVARD  
WILMINGTON, NORTH CAROLINA 28412  
Phone 910-382-5243 Fax 910-382-5203 License No. C-2820

Developer: ECHO FARM APARTMENTS, LLC  
10 S. CAROLINA DRIVE  
WILMINGTON, NORTH CAROLINA 28403  
PHONE: 910-251-5030

CHECKED: JEM  
PROJECT NO: 260  
SHEET NO: 17  
OF: 22

CAROLINA BEACH RD / US HWY 421  
(100' PUBLIC R/W)

N/F  
CITY OF WILMINGTON  
DB: 1272 PG: 650  
PID: R06500-004-001-003  
ZONING: R-15  
LAND USE: UNUSED

N/F  
JOANN McKENNA TRUST  
DB: 5128 PG: 2275  
PID: R07007-004-001-000  
ZONING: O&I-1  
LAND USE: UNUSED

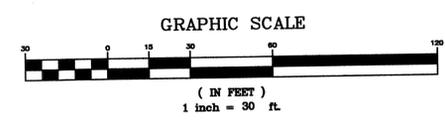
N/F  
CITY OF WILMINGTON  
DB: 1272 PG: 650  
PID: R06500-004-001-004  
ZONING: R-15  
LAND USE: UNUSED

N/F  
ECHO FARMS, LLC  
DB: 2307 PG: 467  
PID: R07006-002-001-000  
ZONING: MF-M  
LAND USE: RECREATIONAL

TREE MITIGATION PLANTINGS			
SYMBOL	QTY	BOTANICAL NAME / COMMON NAME	CALIPER
	9	DIOSPYROS VIRGINIANA / COMMON PERSIMMON	2" (MIN.)
	166	ILEX VOMITORIA / YAUPON HOLLY	2" (MIN.)
	83	PINUS PALUSTRIS / LONGLEAF PINE	PLUGS

Approved Construction Plan  
Name: \_\_\_\_\_ Date: 3/2/16  
Planning: \_\_\_\_\_ Date: 3-2-16  
Traffic: \_\_\_\_\_ Date: 3-2-16  
Fire: \_\_\_\_\_ Date: 3-2-16

**CITY OF WILMINGTON**  
NORTH CAROLINA  
Public Services • Engineering Division  
APPROVED STORMWATER MANAGEMENT PLAN  
Date: 3/3/16 Permit # 2016010  
Signed: \_\_\_\_\_



**ECHO FARM APARTMENTS**

4010 CAROLINA BEACH ROAD  
WILMINGTON TOWNSHIP  
NEW HANOVER COUNTY  
NORTH CAROLINA

LAND-DESIGN SOUTH  
Landscape Architect-Architect  
106 B CORAL DRIVE  
WILMINGTON BEACH, N.C. 28400  
910 550 8798

LANDSCAPE PLAN

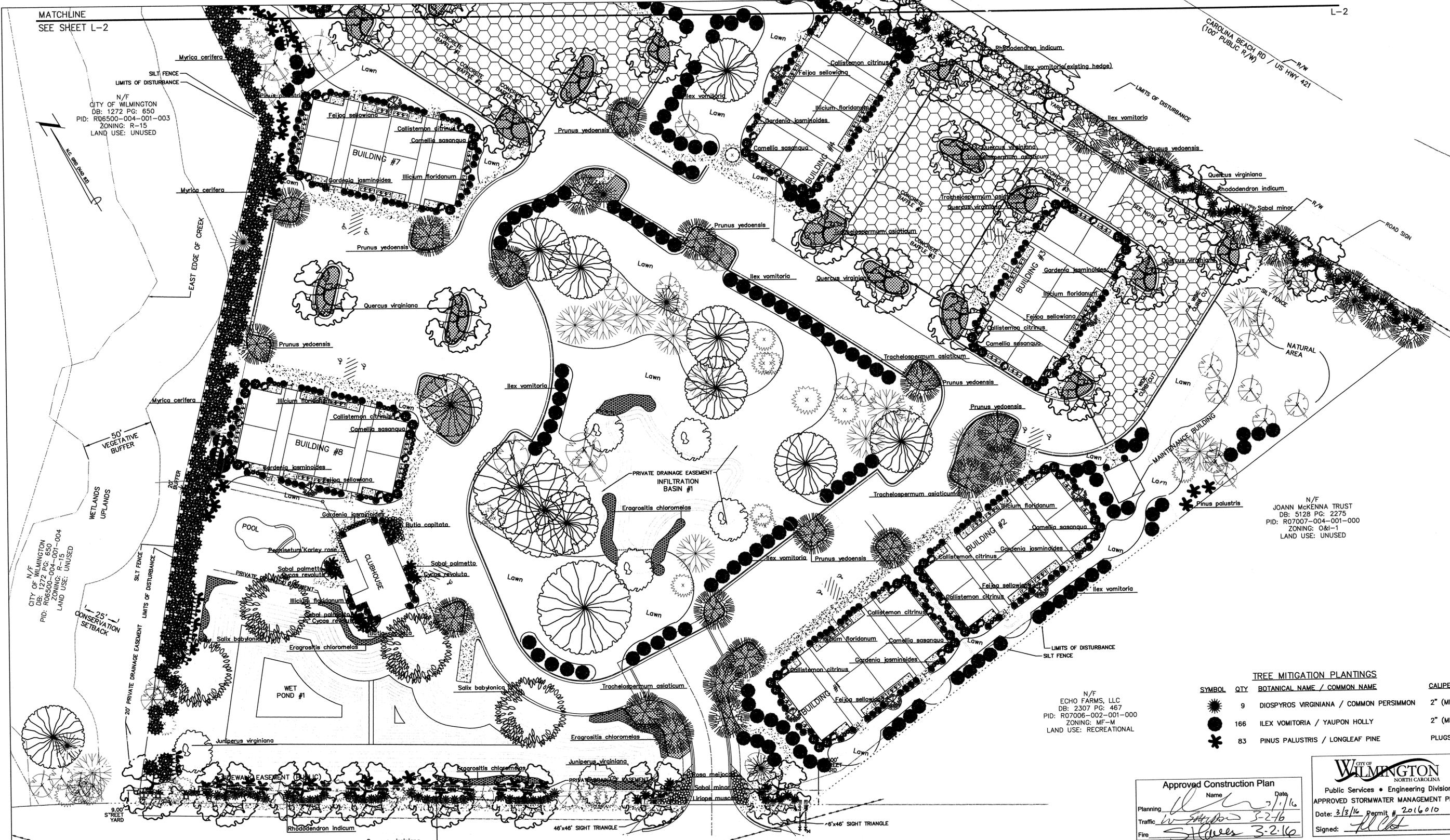
Developer: ECHO FARM APARTMENTS, LLC  
10 S. CAROLINA DRIVE  
WILMINGTON, NORTH CAROLINA 28403  
PHONE: 910-251-5030

DATE: 2-18-2016  
SCALE: 1"=30'  
DRAWN BY: DDC  
REVISION DATE: 2-23-2016

SHEET NO: L-1

N/F  
ECHO FARMS, LLC  
DB: 2307 PG: 467  
PID: R07006-002-001-000  
ZONING: MF-M  
LAND USE: RECREATIONAL

ECHO FARMS BLVD  
(60' PUBLIC R/W)



9.00' STREET YARD

25' CONSERVATION SETBACK

50' VEGETATIVE BUFFER

EAST EDGE OF CREEK

SILT FENCE LIMITS OF DISTURBANCE

CONCRETE BATTLE #1

CONCRETE BATTLE #2

CONCRETE BATTLE #3

CONCRETE BATTLE #4

CONCRETE BATTLE #5

CONCRETE BATTLE #6

CONCRETE BATTLE #7

CONCRETE BATTLE #8

CONCRETE BATTLE #9

CONCRETE BATTLE #10

CONCRETE BATTLE #11

CONCRETE BATTLE #12

CONCRETE BATTLE #13

CONCRETE BATTLE #14

CONCRETE BATTLE #15

CONCRETE BATTLE #16

CONCRETE BATTLE #17

CONCRETE BATTLE #18

CONCRETE BATTLE #19

CONCRETE BATTLE #20

CONCRETE BATTLE #21

CONCRETE BATTLE #22

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CONCRETE BATTLE #194

CONCRETE BATTLE #195

CONCRETE BATTLE #196

CONCRETE BATTLE #197

CONCRETE BATTLE #198

CONCRETE BATTLE #199

CONCRETE BATTLE #200

# LANDSCAPE NOTES

1. CONTRACTOR SHALL IDENTIFY ALL UNDERGROUND UTILITIES PRIOR TO LANDSCAPE INSTALLATION.
2. TREES SHALL BE LOCATED A MINIMUM OF 5' FROM SEWER/WATER CONNECTIONS.
3. ALL PLANT MATERIALS SHALL CONFORM TO THE STANDARDS OF THE AMERICAN ASSOCIATION OF NURSERYMEN.
4. ALL SHRUB BEDS AND PLANTING AREAS, EXCLUDING SEEDED AREAS SHALL BE MULCHED WITH 2" OF DOUBLE SHREDDED HARDWOOD MULCH.
5. MIX EXISTING SOIL WITH THE SOIL AMENDMENTS AND SLOW RELEASE FERTILIZER IN THE QUANTITIES RECOMMENDED BY THE SOIL TESTING LABORATORY.
6. ANY AND ALL PLANT SUBSTITUTIONS SHALL BE APPROVED BY LANDSCAPE ARCHITECT.
7. THE CONTRACTOR SHALL PREPARE ALL SEEDED AREAS TO ASSURE THAT THE SUBGRADE HAS BEEN ROLLED TO ACCEPT THE SEED. ALL TURF AREAS MUST BE IRRIGATED OR HAND WATERED AND SHOULD PROVIDE A SMOOTH SURFACE FREE OF UNLEVEL GROUND.
8. IRRIGATION SHALL BE DESIGNED AND INSTALLED BY A LICENSED IRRIGATION CONTRACTOR IN THE STATE OF NORTH CAROLINA.
9. STREET TREES SHALL BE PLANTED AS CLOSE TO THE CITY REGULATIONS AS POSSIBLE. HOWEVER SITE CONDITIONS INCLUDING THE LOCATIONS OF SIGNS, ETC. MAY REQUIRE ADJUSTMENT FROM PROPOSED PLAN.
10. PROPOSED POND BANK STABILIZATION WILL INCLUDE ORNAMENTAL GRASSES FROM TOP OF BANK TO WATER LEVEL AND WILL COMPLY WITH CITY OF WILMINGTON STANDARD SD 15-16.
11. ALL PROPOSED PLANTINGS WITHIN SIGHT DISTANCE TRIANGLES SHALL NOT INTERFERE WITH CLEAR VISUAL SIGHTLINES FROM 30"-10' IN ACCORDANCE WITH SECTION 18-556 OF THE CITY OF WILMINGTON LAND DEVELOPMENT CODE. IN CASES WHERE SIGHT TRIANGLES INTERFERE WITH OTHER REQUIRED BUFFER OR PLANTING AREAS, THE SIGHT DISTANCE TRIANGLES SHALL BE MAINTAINED TO ALLOW FOR PROPER SIGHT LINES.
12. ALL TREES SHALL BE ADJUSTED AS NEEDED WITH ALL LIGHT LOCATIONS.

## Plant Table

Quantity	Symbol	Scientific Name	Common Name	Planting Size
31	●	<i>Prunus yedoensis</i>	Yoshino Cherry	2" cal
4	●	<i>Salix babylonica</i>	Babylon weeping willow	2" cal

Quantity	Symbol	Scientific Name	Common Name	Planting Size
94	●	<i>Camellia sasanqua</i>	Dark pink camellia	3-gal
11	●	<i>Cycas revoluta</i>	Sago palm	3-gal
10	●	<i>Feijoa sellowiana</i>	Pineapple guava	3-gal
96	●	<i>Gardenia jasminoides</i>	'August beauty' gardenia	3-gal
297	●	<i>Illicium floridanum</i>	Florida anise	3-gal
37	●	<i>Quercus virginiana</i>	Southern live oak	2" cal
13	●	<i>Rosa meijocosa</i>	Red drift rose	3-gal
140	●	<i>Rhododendron indicum</i>	George Tabor azalea	3-gal
156	●	<i>Myrica cerifera</i>	Southern wax myrtle	6'
47	●	<i>Callistemon citrinus</i>	Bottlebrush	3-gal
66	●	<i>Ilex vomitoria</i>	Yaupon holly (Existing hedge)	HEDGE

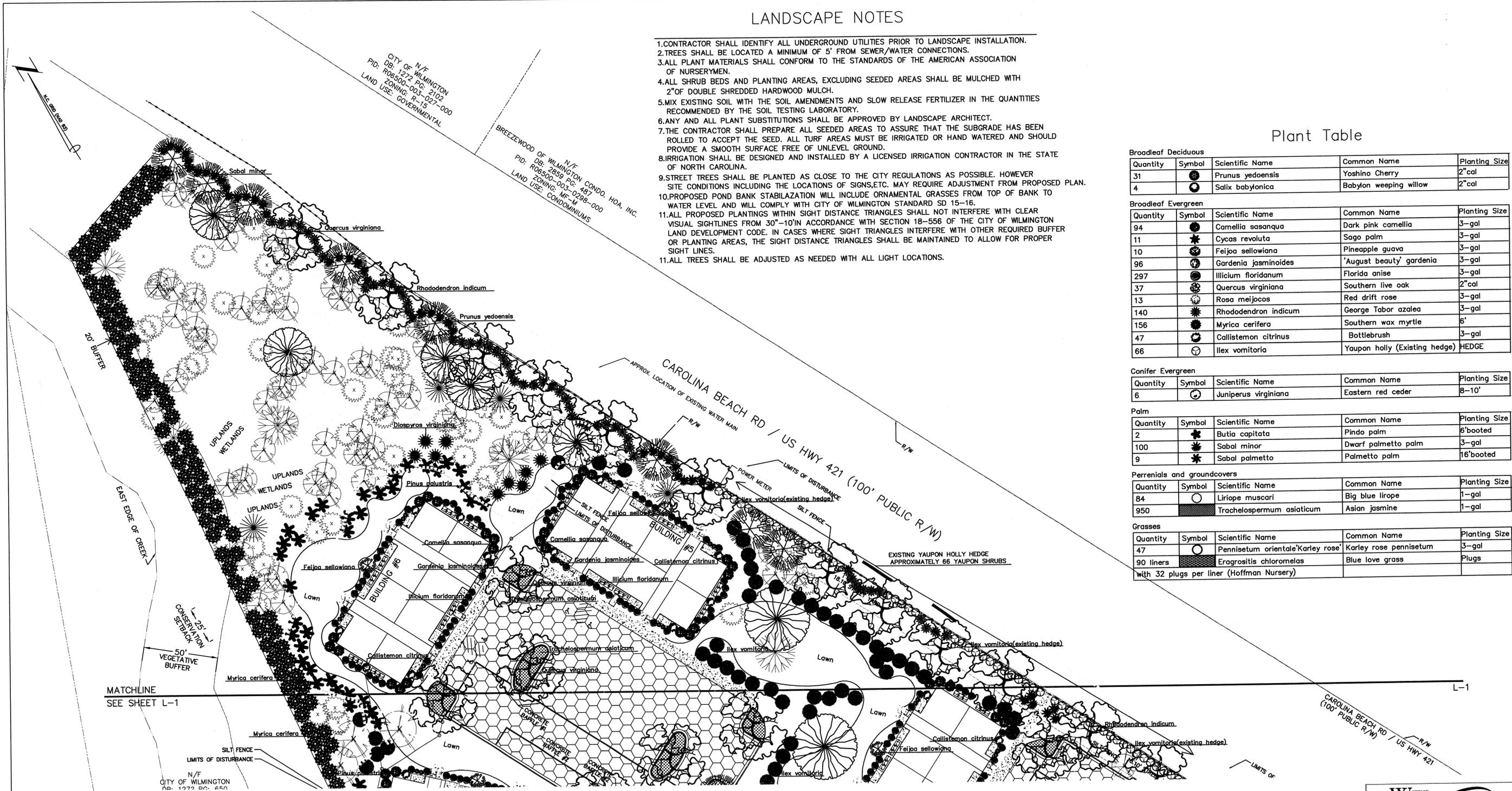
Quantity	Symbol	Scientific Name	Common Name	Planting Size
6	●	<i>Juniperus virginiana</i>	Eastern red cedar	8-10'

Quantity	Symbol	Scientific Name	Common Name	Planting Size
2	●	<i>Butia capitata</i>	Pindo palm	6'booted
100	●	<i>Sabal minor</i>	Dwarf palmetto palm	3-gal
9	●	<i>Sabal palmetto</i>	Palmetto palm	16'booted

Quantity	Symbol	Scientific Name	Common Name	Planting Size
84	●	<i>Liriope muscari</i>	Big blue liriope	1-gal
950	●	<i>Trachelospermum asiaticum</i>	Asian jasmine	1-gal

Quantity	Symbol	Scientific Name	Common Name	Planting Size
47	●	<i>Pennisetum orientale</i>	Karley rose pennisetum	3-gal
90 liners	●	<i>Eragrostis chloromelas</i>	Blue love grass	Plugs

with 32 plugs per liner (Hoffman Nursery)



**LANDSCAPE CALCULATIONS:**

**TREES PER DISTURBED ACRE**  
 9.63 ACRES X 15 = 144.45, 144 TREES REQUIRED

**STREET YARD - CAROLINA BEACH ROAD (PRIMARY FRONTAGE)**  
 STREET FRONTAGE = 1,103.55 FT  
 REQUIRED STREET YARD = 18 X 1,103.55 = 19,863.90 SF  
 PROVIDED STREET YARD = 19,937.57 SF  
 IMPERVIOUS AREA = 90.51 SF  
 PERCENT IMPERVIOUS = 90.51/19,937.57 X 100% = 0.46%  
 REQUIRED PLANTING = 90.51/600 = 33.25, 33 CANOPY TREES (OR 3 UNDERSTORY TREES PER 1 CANOPY TREE)  
 33.25 X 6 = 199.38, 199 SHRUBS  
 PROVIDED PLANTING = 30 TREES & 3 EXISTING TREES TO REMAIN = 33 TREES  
 306 SHRUBS

**STREET YARD - ECHO FARM BLVD. (SECONDARY FRONTAGE)**  
 STREET FRONTAGE = 469.85 - 37.53 = 432.30 FT  
 REQUIRED STREET YARD = 18 X 432.30/2 = 3,880.70 SF  
 PROVIDED STREET YARD = 3,461.82 + 578.81 = 4,040.63 SF  
 IMPERVIOUS AREA = 233.20  
 PERCENT IMPERVIOUS = 233.20/4,040.63 X 100% = 5.78%  
 REQUIRED PLANTING = 4,040.63/600 = 6.74, 7 CANOPY TREES (OR 3 UNDERSTORY TREES PER 1 CANOPY TREE)  
 6.74 X 6 = 40.44, 40 SHRUBS  
 PROVIDED PLANTING = 8 TREES & 8 EXISTING TREES TO REMAIN = 16 TREES  
 53 SHRUBS

**LANDSCAPE CALCULATIONS:**

**INTERIOR SHADING**  
 PARKING FACILITY AREA [PARKING LOT AREA TO BACK OF CURB (OR BACK OF SIDEWALK ADJACENT TO PARKING DRIVE AISLE) MINUS LANDSCAPE ISLANDS PLUS PRIVATE STREET (INCLUDING PORTION WITHIN ECHO FARM BLVD ROW)] = 124,085 SF  
 REQUIRED INTERIOR SHADING (IS) = 0.2 X 124,085 = 24,817 SF  
 PROVIDED INTERIOR SHADING (IS) = 17 LIVE OAKS @ 707 = 12,019  
 16 YOSHINO CHERRY @ 707 = 11,312  
 1 EXISTING PINE @ 353 = 353  
 4 EXISTING HARDWOODS @ 707 = 2,828  
 TOTAL (IS) = 26,512

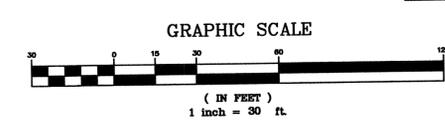
**LANDSCAPE CALCULATIONS:**

**FOUNDATION PLANTING - FRONT OR REAR OF BUILDINGS #1-8 (PER FRONT OR REAR OF BUILDING ADJACENT TO PARKING DRIVE AISLE)**  
 REQUIRED FOUNDATION PLANTING = [(30.73' X 112.54') + (0.5' X 10.62' X 31.86') + (0.5' X 10.62' X 31.86')] X 0.12 = 455.61 SF  
 PROVIDED FOUNDATION PLANTING (BUILDING #1 & 3-8) = 508.48 SF  
 PROVIDED FOUNDATION PLANTING (BUILDING #2) = 560.10 SF

**FOUNDATION PLANTING - SIDE OF BUILDINGS #2, 3, 4, 7, & 8 (PER SIDE OF BUILDING ADJACENT TO PARKING DRIVE AISLE)**  
 REQUIRED FOUNDATION PLANTING = [(31.44' X 51.19') + (0.5' X 12.63' X 50.53')] X 0.12 = 231.43 SF  
 PROVIDED FOUNDATION PLANTING (BUILDINGS #1 & 2) = 262.12 SF  
 PROVIDED FOUNDATION PLANTING (BUILDINGS #3 & 4) = 236.31 SF  
 PROVIDED FOUNDATION PLANTING (BUILDING #7) = 267.45 SF  
 PROVIDED FOUNDATION PLANTING (BUILDING #8) = 280.41 SF

**FOUNDATION PLANTING - FRONT OF CLUBHOUSE**  
 REQUIRED FOUNDATION PLANTING = [(8.98' X 14.09') + (11.31' X 31.43') + (8.98' X 19.98') + (13.81' X 4.61' X 0.5) + 87.47 SF] X 0.12 = 93.69 SF  
 PROVIDED FOUNDATION PLANTING = 169.94 SF

**FOUNDATION PLANTING - FRONT OF MAINTENANCE BUILDING**  
 REQUIRED FOUNDATION PLANTING = [(10.00' X 20.00') + (0.5' X 6.67' X 20.00')] X 0.12 = 32 SF  
 PROVIDED FOUNDATION PLANTING = 33.42 SF



**Approved Construction Plan**

Name: \_\_\_\_\_ Date: 7/1/16  
 Planning: \_\_\_\_\_ Traffic: \_\_\_\_\_ Fire: \_\_\_\_\_

Public Services • Engineering Division  
**APPROVED STORMWATER MANAGEMENT PLAN**  
 Date: 3/2/16 Permit # 2016010  
 Signed: \_\_\_\_\_

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**ECHO FARM APARTMENTS**

4010 CAROLINA BEACH ROAD  
 WILMINGTON TOWNSHIP  
 NEW HANOVER COUNTY  
 NORTH CAROLINA

DATE: 2-18-2016  
 SCALE: 1"=30'  
 DRAWN BY: DDC  
 REVISION DATE: 2-23-2016

LAND-DESIGN SOUTH  
 LANDSCAPE ARCHITECT-ASLA  
 105 B CORAL DRIVE  
 WRIGHTSVILLE BEACH, N.C. 28480  
 910 500 8700

LANDSCAPE PLAN

Developer: ECHO FARM APARTMENTS, LLC  
 10 S. CAROLINA DRIVE  
 WILMINGTON, NORTH CAROLINA 28403  
 PHONE: 910-251-5030

SHEET NO:  
**L-2**