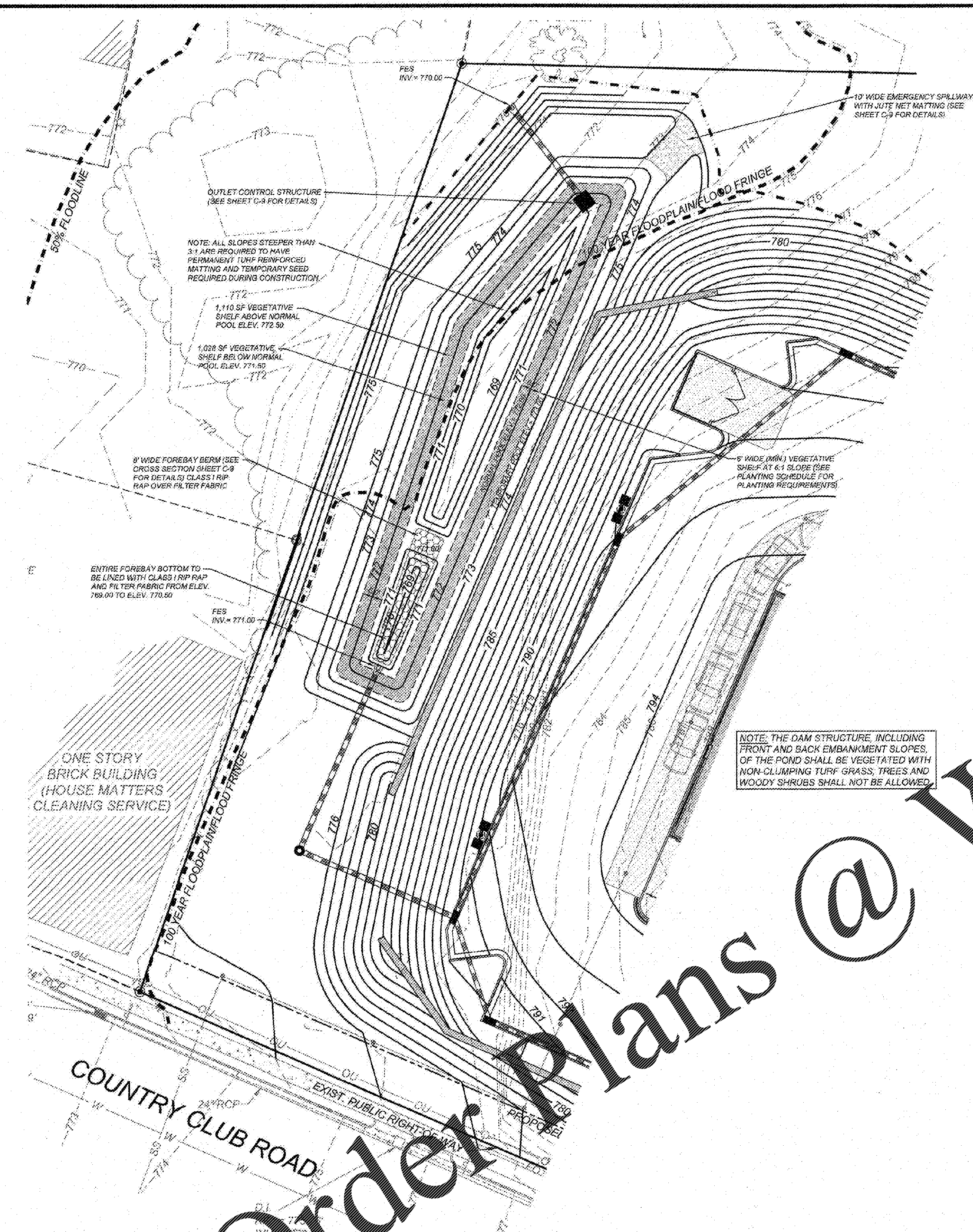

GRADING/EROSION CONTROL LEGEND

- DROP INLET
- CURB INLET
- STORM PIPE
- TOP OF CURB / BOTTOM OF CURB
- HANDICAP AREA (2% MAX. SLOPE)
- SPILL CURB
- TW=XXX.XX TW=GROUND AT TOP OF WALL; BW=XXX.XX BW=GROUND AT BOTTOM OF WALL
- INLINE DRAIN
- RD — ROOF DRAIN: 6" CORRUGATED PLASTIC, 3' MIN. COVER, 1% MIN. SLOPE, PVC IN TRAFFIC AREAS, CLEANOUTS LOCATED @ ALL BENDS
- SILT FENCE OUTLET
- INLET PROTECTION WITH SILT SACK AS INDICATED (SS)
- SF — SILT FENCE
- TP — TREE PROTECTION FENCE
- DIVERSION DITCH
- LD — LIMITS OF DISTURBANCE
- FLARED END SECTION
- CONSTRUCTION ENTRANCE (COG STD. 436)
- SEDIMENT TRAP

NOTE:

THE VEGETATED SHELF SHALL BE PLANTED WITH A MINIMUM OF THREE DIVERSE SPECIES OF HERBACEOUS NATIVE VEGETATION AT A MINIMUM DENSITY OF 50 PLANTS PER 200 SF OF SHELF AREA. CONTRACTOR IS ALLOWED TO SUBSTITUTE WETLAND PLANTS IN PLANTING SCHEDULE WITH INSPECTOR'S APPROVAL BUT ALSO NOTIFY ENGINEER OF ANY CHANGES BEFORE PURCHASING AND INSTALLATION.

PLANTING SCHEDULE

KEY	NUMBER	BOTANICAL NAME	COMMON NAME	HEIGHT	ROOT	COMMENTS
LC	712 SF X (50 PLANTS / 200 SF) = 178 PLANTS	LOBELIA CARDINALIS	CARDINAL FLOWER	PLUG	FLAT	WET POND (50 PLANTS / 200 SF)
EF	712 SF X (50 PLANTS / 200 SF) = 178 PLANTS	EUPATORIADELPHUS FISTULOSUS	JOE PYE WEED	PLUG	FLAT	WET POND (50 PLANTS / 200 SF)
AI	712 SF X (50 PLANTS / 200 SF) = 178 PLANTS	ASCLEPIAS INCARNATE	SWAMP MILKWEED	PLUG	FLAT	WET POND (50 PLANTS / 200 SF)

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BERM AND SOIL COMPACTION SPECIFICATIONS

1. ALL FILL MATERIALS TO BE USED FOR THE BERM EMBANKMENT SHALL BE TAKEN FROM BORROW AREAS APPROVED BY THE ONSITE GEOTECHNICAL ENGINEER. THE FILL MATERIAL SHALL BE FREE FROM ROOTS, STUMPS, WOOD, STONES GREATER THAN 6", AND FROZEN OR OTHER OBJECTIONABLE MATERIAL. THE FOLLOWING SOIL TYPES ARE SUITABLE FOR USE AS FILL WITHIN THE BERM EMBANKMENT AND KEY TRENCH: ML AND CL. IF OTHER SOIL TYPES ARE DETERMINED TO BE SUITABLE BY THE ONSITE GEOTECHNICAL ENGINEER, DOCUMENTATION SHALL BE RETAINED FOR FUTURE AS-BUILT SUBMITTALS.
2. FILL PLACEMENT SHALL NOT EXCEED A MAXIMUM 8" LIFT (UNCOMPACTED). EACH LIFT SHALL BE CONTINUOUS FOR THE ENTIRE LENGTH OF EMBANKMENT. BEFORE PLACEMENT OF FILL FOR THE BERM SECTION, ALL UNSUITABLE MATERIAL SHALL BE REMOVED AND THE SURFACE PROPERLY PREPARED FOR FILL PLACEMENT.
3. ALL FILL SOILS USED IN THE EMBANKMENT AND KEY TRENCH CONSTRUCTION SHALL BE COMPACTED TO AT LEAST 95% OF THE STANDARD PROCTOR MAXIMUM DRY DENSITY (ASTM-698). THE FILL SOILS SHALL BE COMPACTED AT A MOISTURE CONTENT WITHIN -1 TO +3 PERCENT OF ITS OPTIMUM MOISTURE CONTENT. COMPACTION TESTS SHALL BE PERFORMED BY THE ONSITE GEOTECHNICAL ENGINEER DURING CONSTRUCTION TO VERIFY THAT THE PROPER COMPACTION LEVEL HAS BEEN REACHED. THE FILL SHOULD BE COMPACTED USING A SHEEPSFOOT TYPE COMPACTOR. IN ORDER TO PREVENT DAMAGE TO THE PIPE, NO COMPACTION EQUIPMENT SHALL CROSS ANY PIPE UNTIL MINIMUM COVER IS ESTABLISHED ALONG THE PIPE.
4. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE COMPACTION TESTING AND TO ENSURE COMPACTION TESTS ARE PROPERLY PERFORMED DURING CONSTRUCTION.
5. TESTING OF THE NEW FILL MATERIALS SHALL BE PERFORMED TO VERIFY THAT THE RECOMMENDED LEVEL OF COMPACTION IS ACHIEVED DURING CONSTRUCTION. THEREFORE, ONE DENSITY TEST SHALL BE PERFORMED FOR EVERY 2,500 SQUARE FEET OF AREA FOR EVERY LIFT OF FILL OR AS DIRECTED BY THE ONSITE GEOTECHNICAL ENGINEER.
6. TESTING WILL BE REQUIRED ALONG THE 15" OUTLET BARREL AT A FREQUENCY OF ONE TEST PER 25 LF OF PIPE PER VERTICAL FOOT OF FILL OR AS DIRECTED BY THE ONSITE GEOTECHNICAL ENGINEER.

SOIL MEDIA SPECIFICATIONS

SOILS USED WITHIN A STORMWATER BMP MUST ADHERE TO THE FOLLOWING REQUIREMENTS:

1. THE SOIL MIX MUST BE UNIFORM AND FREE OF STONES, STUMPS, ROOTS, OR OTHER SIMILAR MATERIAL GREATER THAN 2 INCHES IN DIAMETER.
2. THE PH SHOULD BE BETWEEN 4.5 AND 7.0. IF THE PH FALLS OUTSIDE OF THIS RANGE, IT MAY BE MODIFIED WITH LIME TO INCREASE THE PH OR IRON SULFATE AND SULFUR TO LOWER THE PH. THE LIME OR IRON SULFATE MUST BE MIXED UNIFORMLY INTO THE SOIL PRIOR TO USE.
3. TOPSOIL STOCKPILE LOCATION (IF USING ON-SITE SOILS) OR SOURCE OF TOPSOIL IF IMPORTED TO THE SITE. SOIL ANALYSIS FOR ALL TOPSOIL TO BE USED WITHIN A BMP FACILITY.
4. SOIL AMENDMENTS SHOULD BE INCORPORATED AT THE END OF THE SITE DEVELOPMENT PROCESS TO PREVENT SEDIMENT FROM ENTERING THE BMP FACILITY. THE BMP SHOULD BE SEEDED AND MULCHED IMMEDIATELY AFTER AMENDING THE SOIL TO STABILIZE THE SITE AS SOON AS POSSIBLE.
5. NEWLY INSTALLED PLANT MATERIAL REQUIRES WATER IN ORDER TO RECOVER FROM THE SHOCK OF BEING TRANSPLANTED. BE SURE THAT SOME SOURCE OF WATER IS PROVIDED, ESPECIALLY DURING DRY PERIODS. THIS WILL REDUCE PLANT LOSS AND PROVIDE THE NEW PLANT MATERIALS WITH A CHANCE TO ESTABLISH ROOT GROWTH.
6. IN GENERAL, FALL AND WINTER ARE OPTIMAL FOR PLANTING IN NORTH CAROLINA. THERE ARE SOME EXCEPTIONS. SHALLOW WATER PLANTS SHOULD BE INSTALLED BETWEEN APRIL 1 AND JUNE 15 IN NORTH CAROLINA. WINTER PLANTING IS DIFFICULT WITH SHALLOW WATER PLANTS.
7. MINIMIZE OR ELIMINATE THE USE OF PESTICIDES AND FERTILIZERS. A ONE-TIME APPLICATION OF FERTILIZED IS ALLOWABLE TO HELP ESTABLISHMENT.

GENERAL CONTRACTOR:
PRIOR TO BEGINNING ANY CONSTRUCTION, THE CONTRACTOR IS RESPONSIBLE TO FIELD VERIFY LOCATION, DEPTH, SIZE, MATERIAL, AND CONDITION OF UTILITIES AND STORM DRAINAGE SYSTEM CONNECTIONS SHOWN AND NOTIFY ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

STATEMENT OF RESPONSIBILITY

1. ALL REQUIRED MAINTENANCE AND INSPECTIONS OF THIS FACILITY SHALL BE THE RESPONSIBILITY OF THE OWNER PER THE EXECUTED OPERATION AND MAINTENANCE AGREEMENT FOR THIS FACILITY.

GENERAL NOTES

1. PRIOR TO CONSTRUCTION, THE ONSITE GEOTECHNICAL ENGINEER SHALL VERIFY THE SUITABILITY OF THE PROPOSED FILL FOR USE IN THE BERM EMBANKMENT.
2. THE ONSITE GEOTECHNICAL ENGINEER SHALL INSPECT THE KEY TRENCH EXCAVATION PRIOR TO PLACEMENT OF ANY BACKFILL WITHIN THE KEY TRENCH.
3. DURING THE INITIAL STAGES OF CONSTRUCTION, DRY DETENTION POND WILL BE USED AS A SEDIMENT BASIN FOR EROSION CONTROL PURPOSES. THE CONTRACTOR SHALL FOLLOW THE GENERAL CONTRUCTION SEQUENCE.
   A. THE CONTRACTOR SHALL CONSTRUCT THE ENTIRE FACILITY (PERMANENT OUTLET STRUCTURE, BERM, ETC.) WITH THE EXCEPTION OF THE INTERIOR GRADING. THE INTERIOR GRADING WILL BE CONSTRUCTED ONCE THE EROSION CONTROL PHASE IS COMPLETE.
   B. ONCE THE UPSTREAM DRAINAGE AREA IS STABILIZED AND THE EROSION CONTROL INSPECTOR APPROVES THE REMOVAL OF THE SEDIMENT BASIN; THE CONTRACTOR SHALL REMOVE THE TEMPORARY SKIMMER AND CLEAN OUT THE BASIN. ALL SEDIMENT, TRASH, ETC. SHALL BE DISPOSED OF PROPERLY (I.E. - PLACED IN A LANDFILL) AND NOT STOCKPILED IN AN AREA WHERE WATER QUALITY COULD BE ADVERSELY AFFECTED.
4. ONCE THE BASIN IS CLEANED OUT, AND ALL EROSION CONTROL DEVICES REMOVED, THE CONTRACTOR SHALL CONSTRUCT THE INTERIOR GRADING SHOWN ON THIS SHEET.
5. ANY REMOVED TOPSOIL SHALL BE STOCKPILED FOR USE (PLANTING/SEEDING) ON THE BERM EMBANKMENT ONCE FINAL GRADES (AS SHOWN ON THE GRADING PLAN) HAVE BEEN ESTABLISHED WITH COMPACTED FILL. PRIOR TO TOPSOIL INSTALLATION, THE CONTRACTOR SHALL SCARIFY THE THE TOP 2"-3" OF THE BERM SECTION TO PROMOTE BONDING OF THE TOPSOIL WITH THE COMPACTED FILL. THE TOPSOIL DEPTH SHALL RANGE FROM [illegible]" ON THE BERM EMBANKMENT.
6. THE CONTRACTOR SHALL FURNISH, INSTALL, OPERATE, AND MAINTAIN ANY PUMPING EQUIPMENT NEEDED FOR REMOVAL OF WATER FROM VARIOUS PARTS OF DRY DETENTION POND SITE. IT IS ANTICIPATED THAT PUMPING WILL BE NECESSARY IN THE EXCAVATION AREAS. DURING PLACEMENT OF FILL THE CONTRACTOR SHALL KEEP THE WATER LEVEL BELOW THE BOTTOM OF THE EXCAVATION SUCH THAT THE EXCAVATION BOTTOM AND SIDESLOPES ARE STABLE.

WET POND MAINTENANCE GUIDE

WET PONDS FOR STORMWATER DETENTION MUST BE INSPECTED AND MAINTAINED AT REGULAR INTERVALS FOR PURPOSES OF PERFORMANCE AND LONGEVITY.

INSPECTION

INSPECTION IS THE KEY TO EFFECTIVE MAINTENANCE OF DETENTION SYSTEMS. ONGOING, QUARTERLY INSPECTIONS IS REQUIRED. THE RATE AT WHICH THE SYSTEM COLLECTS POLLUTANTS WILL DEPEND MORE ON SITE SPECIFIC ACTIVITIES RATHER THAN THE SIZE OR CONFIGURATION OF THE SYSTEM.

POLLUTANT TRANSPORT AND DEPOSITION MAY VARY FROM YEAR TO YEAR AND REGULAR INSPECTIONS WILL HELP ENSURE THAT THE SYSTEM IS CLEANED OUT AT THE APPROPRIATE TIME. AT A MINIMUM, INSPECTIONS SHOULD BE PERFORMED TWICE PER YEAR (E.G. SPRING AND FALL) HOWEVER MORE FREQUENT INSPECTIONS MAY BE NECESSARY IN CLIMATES WHERE WINTER SANDING OPERATIONS MAY LEAD TO RAPID ACCUMULATIONS, OR IN EQUIPMENT WASHDOWN AREAS. INSTALLATIONS SHOULD ALSO BE INSPECTED MORE FREQUENTLY WHERE EXCESSIVE AMOUNTS OF TRASH ARE EXPECTED.

THE VISUAL INSPECTION SHOULD ASCERTAIN THAT THE SYSTEM COMPONENTS ARE IN WORKING ORDER AND THAT THERE ARE NO BLOCKAGES OR OBSTRUCTIONS IN THE OUTLET CONTROL STRUCTURE OR INLET PIPES. THE INSPECTION SHOULD ALSO QUANTIFY THE ACCUMULATION OF HYDROCARBONS, TRASH, AND SEDIMENT IN THE SYSTEM. MEASURING POLLUTANT ACCUMULATION CAN BE DONE WITH A CALIBRATED DIPSTICK, TAPE MEASURE OR OTHER MEASURING INSTRUMENT. IF ABSORBENT MATERIAL IS USED FOR ENHANCED REMOVAL OF HYDROCARBONS, THE LEVEL OF DISCOLORATION OF THE SORBENT MATERIAL SHOULD ALSO BE IDENTIFIED DURING INSPECTION. IT IS USEFUL AND OFTEN REQUIRED AS PART OF AN OPERATING PERMIT TO KEEP A RECORD OF EACH INSPECTION.

INSPECTIONS SHOULD BE PERFORMED MORE OFTEN IN EQUIPMENT WASHDOWN AREAS, IN CLIMATES WHERE SANDING AND/OR SALTING OPERATIONS TAKE PLACE, AND IN OTHER VARIOUS INSTANCES IN WHICH ONE WOULD EXPECT HIGHER ACCUMULATIONS OF SEDIMENT OR ABRASIVE/CORROSIVE CONDITIONS. A RECORD OF EACH INSPECTION IS TO BE MAINTAINED FOR THE LIFE OF THE SYSTEM.

MAINTENANCE AND CLEANING

STORMWATER DETENTION SYSTEMS SHOULD BE CLEANED WHEN AN INSPECTION REVEALS ACCUMULATED SEDIMENT OR TRASH IS CLOGGING DISCHARGE FLOW RATES. THE FOREGOING INSPECTION AND MAINTENANCE EFFORTS HELP ENSURE STORMWATER STORAGE CONTINUE TO FUNCTION AS INTENDED BY IDENTIFYING RECOMMENDED REGULAR INSPECTION AND MAINTENANCE PRACTICES.

ALL SYSTEMS SHALL PROVIDE AN ACCESS FOR INSPECTION MAINTENANCE REQUIRED. ACCUMULATED SEDIMENT AND TRASH NEED TO BE REMOVED. IF MAINTENANCE IS NOT PERFORMED AS RECOMMENDED, SEDIMENT AND TRASH MAY ACCUMULATE IN FRONT OF THE OUTLET ORIFICE AND OTHER AREAS. MANHOLE COVERS SHOULD BE SECURELY SEALED FOLLOWING CLEANING ACTIVITIES.

SYSTEMS ARE TO BE RINSED, INCLUDING ABOVE THE SPRING LINE, ANNUALLY SOON AFTER THE SPRING THAW, AND AFTER ANY ADDITIONAL USE OF SALTING AGENTS, AS PART OF THE MAINTENANCE PROGRAM FOR ALL SYSTEMS WHERE SALTING AGENTS MAY ACCUMULATE INSIDE THE PIPES.

MAINTAINING A WET POND SYSTEM IS EASIEST WHEN THERE IS NO FLOW ENTERING THE SYSTEM. FOR THIS REASON, IT IS A GOOD IDEA TO SCHEDULE THE CLEANOUT DURING DRY WEATHER.

THE STORMWATER SYSTEM SHOULD BE CLEANED WHEN THE LEVEL OF SEDIMENT HAS REACHED 75% OF CAPACITY, OR WHEN AN APPRECIABLE LEVEL OF HYDROCARBONS AND TRASH HAS ACCUMULATED. THE USE OF A VACUUM TRUCK IS GENERALLY THE MOST EFFECTIVE AND CONVENIENT METHOD OF REMOVING POLLUTANTS FROM THE DRAINAGE STRUCTURES. SIMPLY REMOVE THE COVERS AND INSERT THE VACUUM HOSE INTO THE SUMP. THE SYSTEM SHOULD BE COMPLETELY DRAINED DOWN AND THE SUMPS FULLY REMOVED OF SEDIMENT.

GENERAL STORM DRAINAGE SYSTEM REQUIREMENTS

1. CATCH BASINS, CURB INLETS, AND OUTFALLS MUST BE CLEANED TO REMOVE TRASH/DEBRIS AND SEDIMENT IF PRESENT, A MINIMUM OF 2 TIMES PER YEAR.
2. CURB AND GUTTER SYSTEMS MUST BE CLEANED A MINIMUM OF 4 TIMES PER YEAR.
3. THE WET POND IS REQUIRED TO BE MAINTAINED AND INSPECTED ANNUALLY. UNCLOG THE OUTLET PIPE IF NEEDED AND REPAIR AND REPLACE IF DAMAGED OR CRACKED.
4. IF ANY SEDIMENT ONSITE HAS ACCUMULATED REMOVE AND DISPOSE IN A LOCATION WHERE IT WILL NOT CAUSE IMPACTS DOWNSTREAM.
5. IF ANY STRUCTURAL DAMAGE HAS OCCURRED TO STORM DRAINAGE SYSTEM, REPAIR OR REPLACE COMPONENTS AS NEEDED.
6. CLOGGING AT OUTLET CONTROL STRUCTURE BY SEDIMENT OR TRASH/DEBRIS SHALL BE REMOVED IMMEDIATELY.

VEGETATION MAINTENANCE

VEGETATION MAINTENANCE IS AN IMPORTANT COMPONENT OF ANY MAINTENANCE PROGRAM. THE GRASSES AND PLANTS REQUIRE REGULAR ATTENTION. THE DEVELOPMENT OF DISTRESSED VEGETATION, BARE SPOTS, AND RILLS INDICATES THAT A WET POND IS NOT FUNCTIONING PROPERLY. ALL DEAD PLANTS SHOULD BE REMOVED AND DISPOSED OF PROPERLY AND REPLACED. BEFORE VEGETATION THAT HAS FAILED ON A LARGE SCALE IS REPLACED, THE CAUSE OF FAILURE SHOULD BE INVESTIGATED. IF THE CAUSE CAN BE DETERMINED, IT SHOULD BE ADDRESSED BEFORE ANY REINSTALLATION.

MULCHING SHOULD BE USED TO MAINTAIN SOIL TEMPERATURE AND MOISTURE. A HALF-INCH LAYER IS TYPICALLY ADEQUATE.

THINNING DENSE VEGETATION MAY BE NECESSARY TO REDUCE FLOW OBSTRUCTIONS, AND TO INCREASE THE ABILITY OF MAINTENANCE FOR ACCESS TO THE WET POND.

BASED ON MONITORING OBSERVATIONS, EITHER INSECTICIDES OR (PREFERABLY) ORGANIC MEANS OF PEST AND FUNGAL CONTROL SHOULD BE USED.

THE PERMANENT POOL CONDITIONS NEED TO BE REGULARLY MONITORED AND MANAGED TO PROMOTE A HEALTHY AQUATIC ENVIRONMENT.

SEAL 26411

GRAPHIC SCALE
1 inch = 20 ft.

REVISIONS

NO.	DATE	DESCRIPTION	BY

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RALEIGH, NORTH CAROLINA 27613
(919) 848-6121 FAX: (919) 848-3741
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210 WEST FOURTH STREET
SUITE 200
WINSTON-SALEM, NC 27101

RETAIL DEVELOPMENT
4809 COUNTRY CLUB ROAD
WINSTON-SALEM, NORTH CAROLINA

STORM WATER BMP PLAN

PROJECT NO.	GEM-1808
FILENAME:	DTL4
DRAWN BY:	RCN
SCALE:	1" = 20'
DATE:	01-17-19
SHEET NO.	C-8