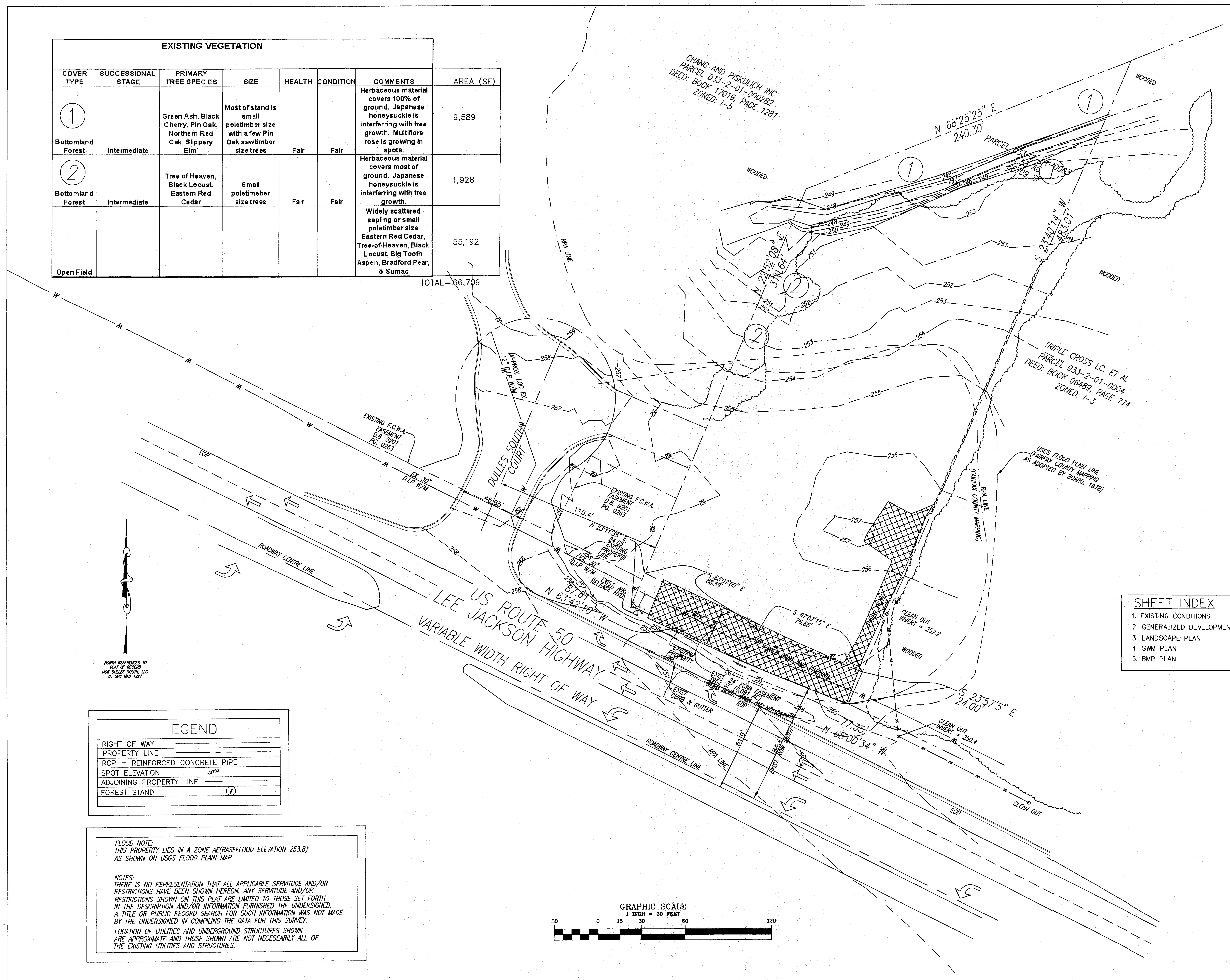
EXISTING VEGETATION

COVER TYPE	SUCCESSIONAL STAGE	PRIMARY TREE SPECIES	SIZE	HEALTH	CONDITION	COMMENTS	AREA (SF)
(1) Bottomland Forest	Intermediate	Green Ash, Black Cherry, Pin Oak, Northern Red Oak, Slippery Elm`	Most of stand is small poletimber size with a few Pin Oak sawtimber size trees	Fair	Fair	Herbaceous material covers 100% of ground. Japanese honeysuckle is interferring with tree growth. Multiflora rose is growing in spots.	9,589
(2) Bottomland Forest	Intermediate	Tree of Heaven, Black Locust, Eastern Red Cedar	Small poletimeber size trees	Fair	Fair	Herbaceous material covers most of ground. Japanese honeysuckle is interferring with tree growth.	1,928
Open Field						Widely scattered sapling or small poletimber size Eastern Red Cedar, Tree-of-Heaven, Black Locust, Big Tooth Aspen, Bradford Pear, & Sumac	55,192
						TOTAL=	66,709



LEGEND

RIGHT OF WAY	———— — — ————
PROPERTY LINE	———— — — ————
RCP = REINFORCED CONCRETE PIPE	
SPOT ELEVATION	x373.1
ADJOINING PROPERTY LINE	——— — — ———
FOREST STAND	(1)

FLOOD NOTE:
THIS PROPERTY LIES IN A ZONE AE(BASEFLOOD ELEVATION 253.8) AS SHOWN ON USGS FLOOD PLAIN MAP

NOTES:
THERE IS NO REPRESENTATION THAT ALL APPLICABLE SERVITUDE AND/OR RESTRICTIONS HAVE BEEN SHOWN HEREON. ANY SERVITUDE AND/OR RESTRICTIONS SHOWN ON THIS PLAT ARE LIMITED TO THOSE SET FORTH IN THE DESCRIPTION AND/OR INFORMATION FURNISHED THE UNDERSIGNED. A TITLE OR PUBLIC RECORD SEARCH FOR SUCH INFORMATION WAS NOT MADE BY THE UNDERSIGNED IN COMPILING THE DATA FOR THIS SURVEY.

LOCATION OF UTILITIES AND UNDERGROUND STRUCTURES SHOWN ARE APPROXIMATE AND THOSE SHOWN ARE NOT NECESSARILY ALL OF THE EXISTING UTILITIES AND STRUCTURES.

SHEET INDEX

NO.	DATE	REVISION
1.	MAY-07-2007	LOADING DOCK
2.	MAY-16-2007	COUNTY REVIEW COMMENTS
3.	JUNE-05-2007	PER COUNTY REVIEW COMMENTS
4.	JUNE-11-2007	SITE TABULATION AND FAR

CIVILAND, LLC
P.O. BOX 650206 STERLING, VIRGINIA 20165
(703) 404-0363 • Fax (703) 404-0443
fmojgani@earthlink.net

DESIGN BY: FM | CHKD BY: FM | DATE OCT-2006

COMMONWEALTH OF VIRGINIA
FARHANG MOJGANI
Lic. No. 016844
6/11/07
PROFESSIONAL ENGINEER

SCALE: 1": 30'

EXISTING CONDITIONS

RED FOX PLAZA
RZ#2007-SU-006

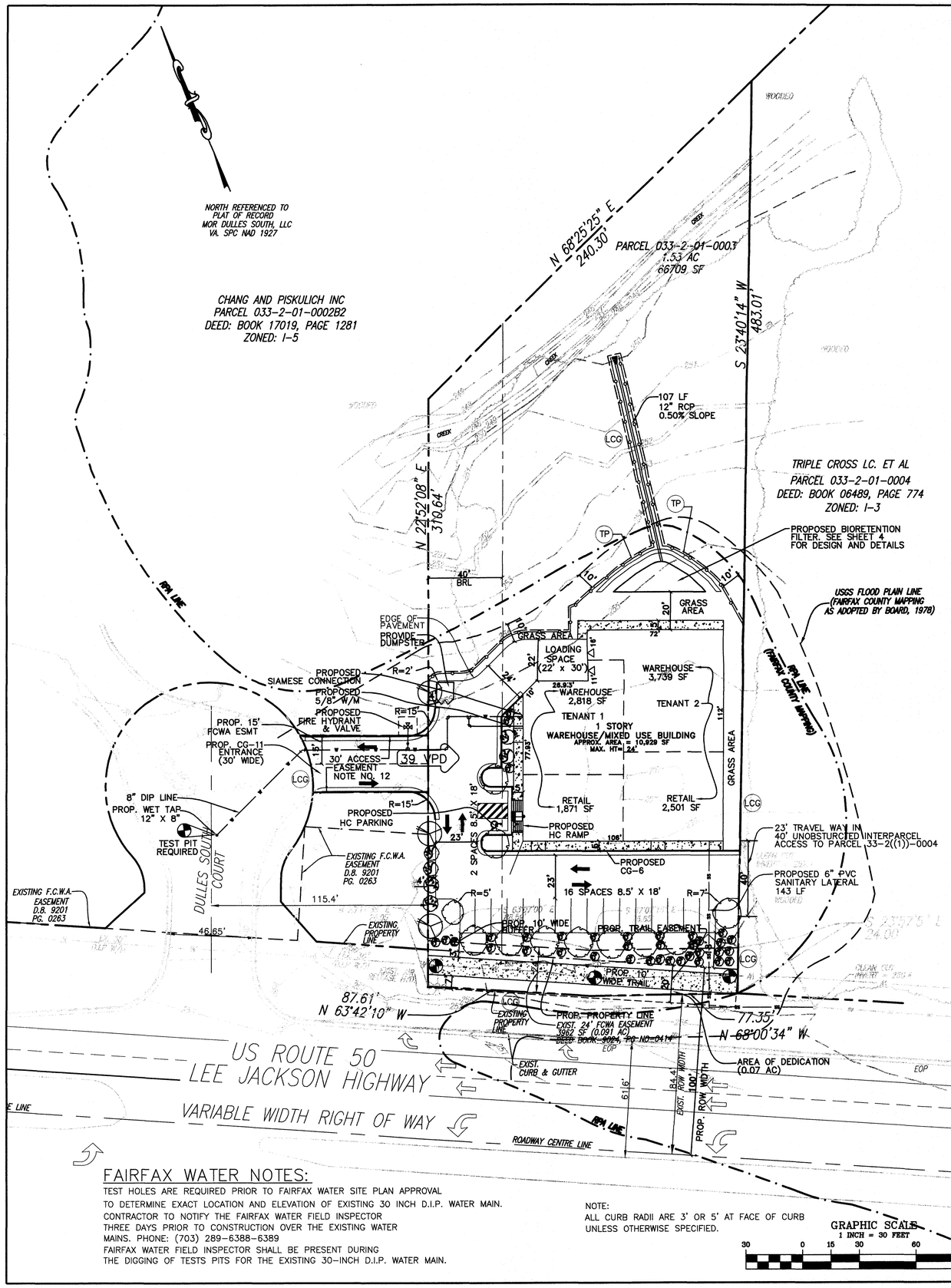
SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

RECEIVED
Department of Planning & Zoning
JUN 1 2 2007
Zoning Evaluation Division

Application No. RZ-2007-SU-006 Staff S.McKnight
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP)
SEE PROFFERS DATED 8-13-2007
Date of (BOS) (PC) approval 9-10-2007

Sheet 1 of 5

SHEET NO. 1 OF 5
FILE. NO. 05-32

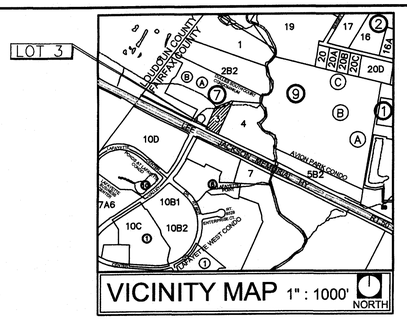


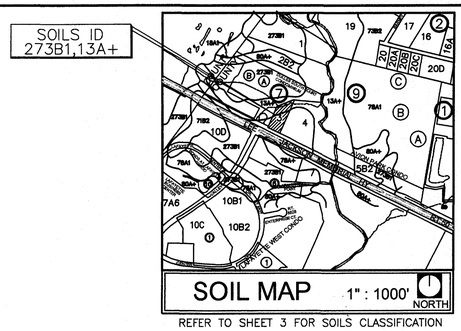
FAIRFAX WATER NOTES:

TEST HOLES ARE REQUIRED PRIOR TO FAIRFAX WATER SITE PLAN APPROVAL
TO DETERMINE EXACT LOCATION AND ELEVATION OF EXISTING 30 INCH D.I.P. WATER MAIN.
CONTRACTOR TO NOTIFY THE FAIRFAX WATER FIELD INSPECTOR
THREE DAYS PRIOR TO CONSTRUCTION OVER THE EXISTING WATER
MAINS. PHONE: (703) 289-6388-6389
FAIRFAX WATER FIELD INSPECTOR SHALL BE PRESENT DURING
THE DIGGING OF TESTS PITS FOR THE EXISTING 30-INCH D.I.P. WATER MAIN.

NOTE:
ALL CURB RADII ARE 3' OR 5' AT FACE OF CURB UNLESS OTHERWISE SPECIFIED.

GRAPHIC SCALE
1 INCH = 30 FEET
30 0 15 30 60 120





REFER TO SHEET 3 FOR SOILS CLASSIFICATION

SITE TABULATION

I.	Total Site Area	1.53 Ac (+66,709 SF)
	Exist. FCWA Easement	0.089 Ac (+3,914 SF)
	ROW Dedication	0.067 Ac (2,930 SF)
	Site Area after Dedication	1.463 Ac (63,779 SF)
II.	Building Data	
	Warehouse: Number of Stories	1
	Gross Floor Area	6,557 S.F.
	Associated Retail Furniture & Carpet Store:	
	Number of Stories	1
	Gross Floor Area	4,372 S.F.
	Maximum Height	24 Feet
III.	Percent Open Space Required	15%
	Area of Open Space Required	0.23 Acres
	Area of Open Space Provided	0.92 Acres or 40,305 S.F.
	Percent Open Space Provided	60%
IV.	Total Building Area	10,929.00 S.F.

FLOOR AREA RATIO

USE	FAR PROVIDED
WAREHOUSE = 6,557 (60% OF TOTAL BUILDING AREA)	
ASSOCIATED RETAIL-FURNITURE & CARPET STORE: = 4,372 (40% OF TOTAL BUILDING AREA)	
TOTAL FAR FOR SITE	10,929/ 63,779 = 0.171

LEGEND

- PROPOSED CURB & GUTTER
- PROPOSED EDGE OF PAVEMENT
- BUILDING RESTRICTION LINE
- PROPERTY LINE
- DIRECTION OF TRAFFIC
- PROPOSED SIDEWALK
- EXISTING SANITARY
- EXISTING WATER LINE
- PROPOSED SANITARY
- PROPOSED WATER LINE
- PROPOSED TREES & SHRUBS
- PROPOSED ENTRY/EXIT
- TEST PIT REQUIRED
- TP — TREE PROTECTION

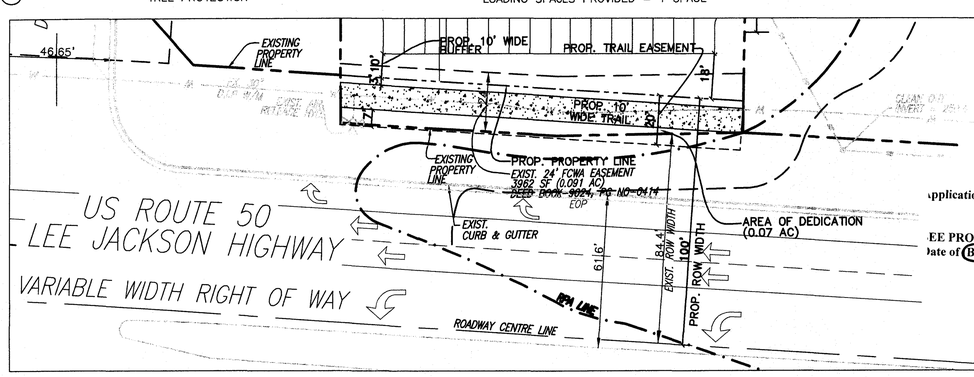
NOTES

1) EXISTING ZONING: LIGHT INTENSITY INDUSTRIAL DISTRICT (I-3)
PROPOSED ZONING: GENERAL INDUSTRIAL DISTRICT (I-5)
2) SERVICE DRIVE REQUIREMENT ALONG ROUTE 50 IS WAIVED AS REQUESTED.
3) THE OUTLINED PROPERTY SHOWN HEREON ARE DELINEATED AS FAIRFAX COUNTY TAX ASSESSMENT PARCEL NUMBER 033-2-01-0003.
4) THE EXISTING TOPOGRAPHY DELINEATED HEREON IS PER A CURRENT FIELD RUN TOPOGRAPHIC SURVEY PERFORMED BY HIGHLANDS SURVEYING DONE ON OCTOBER 24, 2005.
5) ALL STANDARD PARKING SPACES DEPICTED HEREON ARE 8.5' X 18' IN SIZE
ALL HANDICAP PARKING SPACES DEPICTED HEREON ARE 8.5' X 18' IN SIZE.
6) THE PROPERTIES SHOWN HEREON LIES IN ZONE AE(BASEFLOOD ELEVATION 253.8) AS SHOWN ON USGS FLOOD PLAIN MAP.
7) THE PROPERTY DELINEATED HEREON IS CURRENTLY OWNED BY VAHID K. AMIN AND WAS ACQUIRED BY HIM IN DEED BOOK 17477 PAGE 920.
8) THE SUBJECT PROPERTY IS TO BE SERVED BY PUBLIC SEWER AND WATER.
9) THE PROPERTY SHOWN HEREON IS LOCATED WITHIN AREA A-3 OF THE FAIRFAX COUNTY COMPREHENSIVE PLAN AND AT AN F.A.R. OF 0.171.
10) CONSTRUCTION OF PROJECT TO BE INITIATED UPON OBTAINING ALL APPROVALS AND PERMITS.
11) NO CEMETERIES OR BURIAL GROUNDS HAVE BEEN DISCOVERED ON THE PROPERTY.
12) 30' WIDE ACCESS EASEMENT IS PROFFERED IN REZONING CASE # RZ 84-C-070.
13) THE MAXIMUM HEIGHT OF THE PROPOSED BUILDING IS TWENTY FOUR FEET (24').
14) THE LOCATION OF ALL EXISTING AND PROPOSED UTILITY EASEMENTS HAVING A WIDTH OF TWENTY-FIVE (25) FEET OR MORE, AND ALL MAJOR UTILITIES UNDERGROUND UTILITY EASEMENTS REGARDLESS OF WIDTH ARE SHOWN ON THE PLAT. TO THE BEST OF MY KNOWLEDGE, THERE ARE NO OTHER EXISTING UTILITY EASEMENTS ON THE PROPERTY.
15) THE PROPOSED USE SHALL NOT GENERATE, UTILIZE, STORE, TREAT, AND/OR DISPOSE OF ANY HAZARDOUS OR TOXIC SUBSTANCES AS SET FORTH IN TITLE 40, CODE OF FEDERAL REGULATIONS, PARTS 116.4, 302.4 AND 335; AND ANY HAZARDOUS WASTE AS SET FORTH IN COOMONWEALTH OF VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY HAZARDOUS WASTE MANAGEMENT REGULATIONS VR 672-10-1; AND/OR ANY PETROLEUM PRODUCTS AS DEFINED IN TITLE 40, CODE OF FEDERAL REGULATIONS PART 280. TO THE BEST OF MY KNOWLEDGE, THERE IS NO EXISTING STORAGE TANK OR CONTAINER ON THE PROPERTY AND THERE SHALL BE NONE IN CONNECTION WITH THE PROPOSED USE. THE PROPOSED USE SHALL NOT BE PROCESSING, ASSEMBLY, MANUFACTURE, COMPOUNDING, PREPARATION, CLEANING, SERVICING, TESTING, OR REPAIR OF MATERIALS, GOODS OR PRODUCTS WHICH GENERATES, UTILIZES, STORES, TREATS, AND/OR DISPOSES OF A HAZARDOUS OR TOXIC MATERIAL OR WASTE, ON THE PROPERTY.
16) ALL EXISTING PAVEMENT AS SHOWN ON SHEET 1 SHALL BE REMOVED AND RESEEDED.
17) OWNER SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF THE BIO RETENTION FACILITY.

PARKING REQUIREMENT

USE	PARKING PROVIDED
WAREHOUSE	6,557 / 1000 = 6.56 PARKING SPACES (USED - 7 SP)
NUMBER OF EMPLOYEES:	= 2 X 1 = 2 SPACES
ASSOCIATED RETAIL-FURNITURE & CARPET STORE:	4,372 X 0.7 = 3,060.40 SF NET FLOOR AREA 3,061 / 500 = 6.12 SPACES (USED - 7 SP)
NUMBER OF EMPLOYEES:	= 2 X 1 = 2 SPACES

TOTAL PARKING SPACES REQUIRED = 18 SPACES
PARKING PROVIDED = 18 SPACES (INCLUDES ONE HD VAN ACCESSIBLE SPACE)
LOADING SPACES PROVIDED = 1 SPACE



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SCALE: 1": 30'

GENERALIZED DEVELOPMENT PLAN
RED FOX PLAZA
RZ#2007-SU-006

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

Application No. RZ-2007-SU-006 Staff S.McKnight
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP)
PROFFERS DATED 8-13-2007
Date of (BOS) (PC) approval 9-10-2007

Sheet 2 of 5

SHEET NO. 2 OF 5
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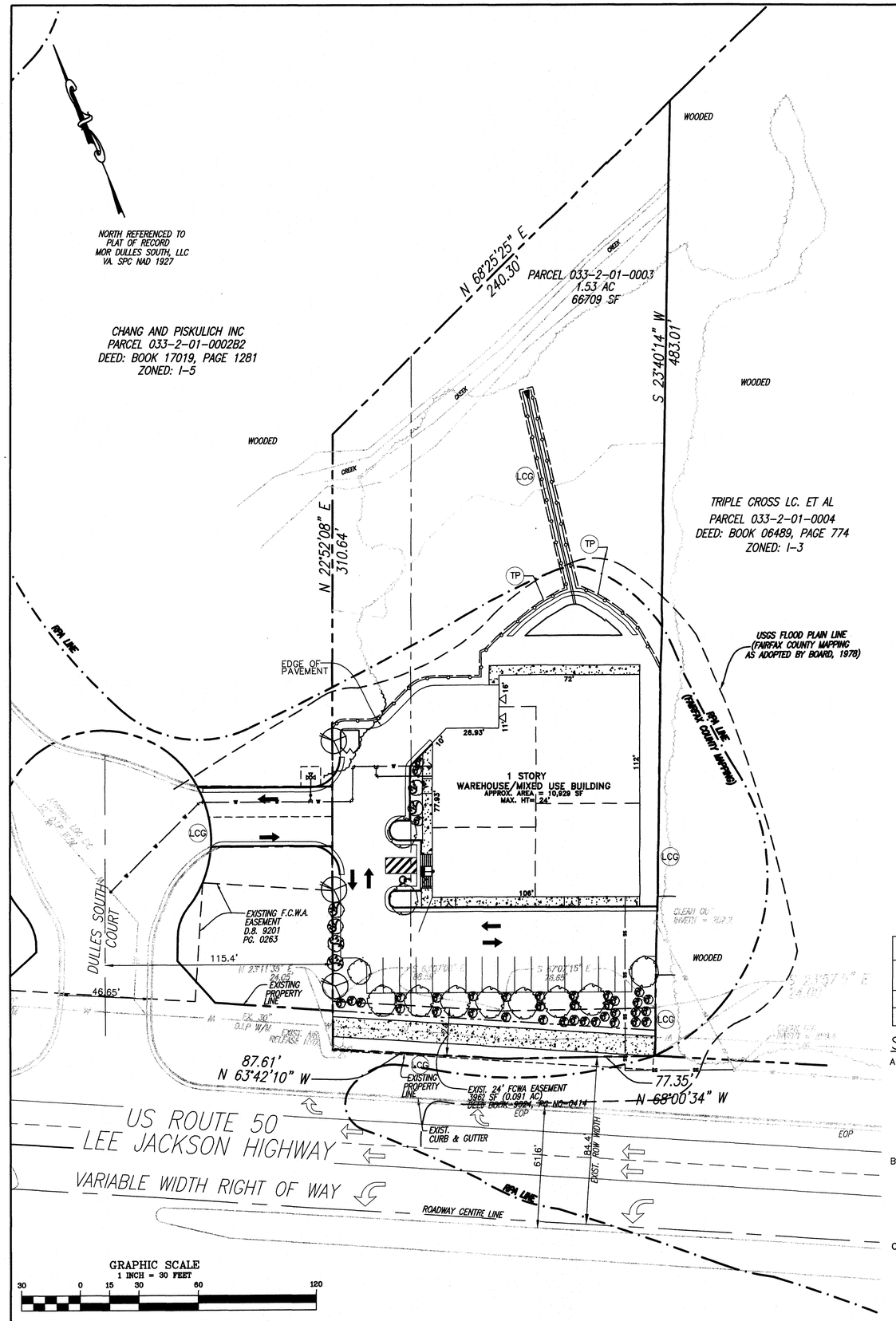


NOTE:

THE REQUIRED 5% INTERIOR PARKING LANDSCAPING AND 10% TREE COVER REQUIREMENT WOULD BE PROVIDED DURING THE FINAL SITE PLAN SUBMISSION.

LANDSCAPE SCHEDULE – TREES

SYMBOL	PLANTING TYPE
	EVERGREEN TREES
	DECIDUOUS TREES
	SHRUBS

BIORETENTION FILTER PLANT SCHEDULE

TREES

SYMBOL	QTY	SIZE	BOTANICAL NAME
CP	4	BB	CRATAEGUS PRU1NOSA–FROST HAWTHORN
AS	5	BB	ARABIA SPIROSA–HERCULES CLUB

SHRUBS

SYMBOL	QTY	SIZE	BOTANICAL NAME
LR	12	BB	LEUCOTHOE RECEMOSA–FETTERBUSH

BIORETENTION FILTER LANDSCAPE NOTES:

1. The owner and/or his landscape contractor shall furnish and install the plants shown on the landscape plan and as listed in the Plant Schedule
2. All plants should be nursery grown and containerized
3. Trees should have caliper of 1.25" with approximate height of 8 feet for upright species
4. lants should be prepared in accordance with the American Standards for Nursery Stock (ASPS). Balled and Burlapped (BB) plants should be pruned, dug, and stored in accordance with ASPS standards.
5. All plants should be of normal shape, free of disease/pests, and healthy at the time of planting. Plants should be protected from wind and mechanical damage during transport.
6. Plant locations should be staked prior to excavation of plant pits to allow identification of conflicting uses such as underground utilities and pipes, affirmation of the owner or his landscape architect that the design intent is preserved by the proposed locations and identification of potential adverse soil or moisture conditions. Refer to STDS & SPECS 3.37 and 3.38 of the Erosion and Sediment Control Handbook and Section 3.11 of the Virginia Stormwater management and book for additional guidance.
7. Plant pits should be dug in an area of previously loosened soil approximately 3 to 4 times the size of the root ball or pot. The pit should be such that the plant ball sits on firm soil with the surface of the root ball at or slightly above the position that the plant was previously grown.
8. Sit the plant in the pit carefully to avoid breaking the ball. Pots shall be removed. Fabric wraps and ropes must be cut and removed as much as possible without undue disturbance of the roots. After checking plant depth, fill the hole with soil halfway, tamp around root ball, and add water to settle soil. After water drains, finish filling soil to ground level. Use excess soil to form shallow basin to contain water.
9. Each plant should be mulched after planting to control competing vegetation and reduce moisture loss. Mulch should be good quality hardwood shred or shredded wood waste free of debris/ contaminates. Mulch material shall be composted to produce a dark brown colored material resistant to flotation and wind transport.
10. Plant stock should be watered at a rate of 1 inch/week during the growing season if natural rainfall is < than this amount or temperatures are excessive. Plants may be fertilized with a slow release nutrient mix. Mulch surrounds should be maintained for all plants for a minimum of 2 years or until plants are well established.
11. All plantings should carry a survival warranty for at least one year. All non–surviving plants should be replaced promptly.
12. Substitution of different plants than shown on the plan may be made, consistent with the design intent, if the specified plants are not readily available in the marketplace at time of implementation

SOILS DATA

LOT NO.	SOIL I.D. NAME	SERIES NAME	FOUNDATION SUPPORT	SUBSURFACE DRAINAGE	SLOPE STABILITY	ERODABILITY	PROBLEM CLASS	GEOTECHNICAL REPORT REQ'D.
3	273B1	READINGTON	GOOD	MARGINAL–P,R	2–7 %	LOW	B	NO
3	13A+	BOWMANSVILLE	POOR–F,B,W	POOR–F,W	0–2 %	LOW	A	YES

SOILS CLASSIFICATION:

A) READINGTON:

THIS SILTY AND CLAYEY SOIL OCCURS ON NEARLY LEVEL UPLANDS UNDERLAIN BY RED SHALE AND SANDSTONE. THE SEASONAL HIGH WATER TABLE, PERCHED ABOVE BEDROCK, IS 0.5 TO 2 FEET BELOW THE SURFACE. THE DEPTH TO BEDROCK IS FROM TWO TO THREE FEET. SOIL PERMEABILITY IS MODERATE, BUT THE SHALLOW BEDROCK HAS FEW FRACTURES TO ALLOW WATER TO PASS THROUGH. FOUNDATIONS TYPICALLY EXTEND TO SHALLOW ROCK. FOUNDATION DRAINS AND WATERPROOFING ARE NECESSARY TO PREVENT WET BASEMENTS. GRADING AND SUBSURFACE DRAINAGE ARE OFTEN REQUIRED TO ELIMINATE WET YARDS. SUITABILITY FOR SEPTIC DRAINFIELDS AND INFILTRATION TRENCHES IS POOR BECAUSE OF SHALLOW BEDROCK AND THE PERCHED WATER TABLE. USE OF THIS BEDROCK AS ENGINEERED FILL, ROAD EMBANKMENT, AND/OR TRENCH BACKFILL IS LIMITED DUE TO RAPID DISINTEGRATION. ADDED TOPSOIL MAY BE NEEDED TO PROVIDE ADEQUATE ROOTING DEPTHS FOR LAWNS, TREES, AND LANDSCAPE PLANTS.

B) BOWMANSVILLE:

SOILS CONSIST OF ORGANIC SILT AND CLAY ALLUVIUM ERODED FROM SANDSTONES, SILTSTONES, AND SHALES. THIS SOIL OCCURS IN THE FLOODPLAIN AT THE BASE OF ADJOINING UPLAND SLOPES, AND IS SUBJECT TO FLOODING1. THE SEASONAL HIGH WATER TABLES IS ZERO TO ONE FOOT BELOW THE SURFACE. DEPTH TO HARD BEDROCK RANGES FROM 4 TO 12 FEET. PERMEABILITY IS SLOW. FOUNDATION SUPPORT MAY BE POOR BECAUSE OF SOFT SOIL AND SEASONAL SATURATION. BASEMENTS BELOW EXISTING GRADE ARE NOT RECOMMENDED BECAUSE OF POTENTIAL SEVERE WETNESS PROBLEMS. SUITABILITY FOR SEPTIC DRAINFIELDS AND INFILTRATION TRENCHES IS POOR BECAUSE OF WETNESS, SLOW PERMEABILITY AND FLOODING POTENTIAL. BOWMANSVILLE IS PREDOMINANTLY HYDRIC AND MAY CONTAIN POTENTIAL NONTIDAL WETLANDS2.

C) PROBLEM CLASS 'A' SOILS:

LETTER DESIGNATED A,B, OR C ARE ASSIGNED TO EACH SOIL TYPE ACCORDING TO THE SEVERITY OF SOIL PROBLEMS AND THE POTENTIAL DIFFICULTY OF ANALYZING AND CORRECTING THESE DESIGNATIONS SERVE AS A GUIDE TO DETERMINE IF A GEOTECHNICAL ENGINEERING STUDY IS REQUIRED FOR THE SITE DEVELOPMENT.

a) ALL CONSTRUCTION INVOLVING PROBLEM SOILS MUST BE PERFORMED UNDER THE FULL–TIME INSPECTION OF THE GEOTECHNICAL ENGINEER.

b) THE GEOTECHNICAL ENGINEER SHALL FURNISH A WRITTEN OPINION TO THE COUNTY AS TO WHETHER OR NOT WORK HAS BEEN PERFORMED IN ACCORDANCE WITH THE APPROVED PLANS, AND HIS RECOMMENDATIONS FOR WORK IN THE VICINITY OF THE UNITS TO BE OCCUPIED PRIORTO THE ISSUANCE OF RESIDENTIAL OR NONRESIDENTIAL USE PERMITS.

MINIMUM STORMWATER INFORMATION FOR REZONING, SPECIAL EXCEPTION, SPECIAL PERMIT AND DEVELOPMENT PLAN APPLICATIONS

The following information is required to be shown or provided in all zoning applications, or a waiver request of the submission requirement with justification shall be attached. Note: Waivers will be acted upon separately. Failure to adequately address the required submission information may result in a delay in processing this application.

This information is required under the following Zoning Ordinance paragraphs:

Special Permits (8-011 2J & 2L)	Special Exceptions (9-011 2J & 2L)
Cluster Subdivision (9-615 1G & 1N)	Commercial Revitalization Districts (9-622 2A (12) & (14))
Development Plans PRC District (16-302 3 & 4L)	PRC Plan (16-303 1E & 1O)
FDP P Districts (except PRC) (16-502 1F & 1Q)	Amendments (18-202 10F & 10I)

☑ 1. Plat is at a minimum scale of 1"=50' (unless it is depicted on one sheet with a minimum scale of 1"=100').

☑ 2. A graphic depicting the stormwater management facility(ies) and limits of clearing and grading accommodate the stormwater management facility(ies), storm drainage pipe systems and outlet protection, pond spillways, access roads, site outfalls, energy dissipation devices, and stream stabilization measures as shown on Sheet 2.

☐ 3. Provide:

Facility Name/ Type & No.	On-site area served (acres)	Off-site area served (acres)	Drainage area (acres)	Footprint area (sf)	Storage Volume (cf)	If pond, dam height (ft)
BIO RETENTION (e.g. dry pond, wet pond, infiltration, underground vault, etc.)	0.33 AC	----	0.33 AC	10,929 SF	567 CF	----
FILTER						
Totals						

☑ 4. Onsite drainage channels, outfalls and pipe systems are shown on Sheet 2. Pond inlet and outlet pipe systems are shown on Sheet ____.

☐ 5. Maintenance access (road) to stormwater management facility(ies) are shown on Sheet N/A. Type of maintenance access road surface noted on the plat is N/A (asphalt, geoblock, gravel, etc.).

☑ 6. Landscaping and tree preservation shown in and near the stormwater management facility is shown on Sheet 3.

☑ 7. A 'stormwater management narrative' which contains a description of how detention and best management practices requirements will be met is provided on Sheet 4.

☑ 8. A description of the existing conditions of each numbered site outfall extended downstream from the site to a point which is at least 100 times the site area or which has a drainage area of at least one square mile (640 acres) is provided on Sheet 4.

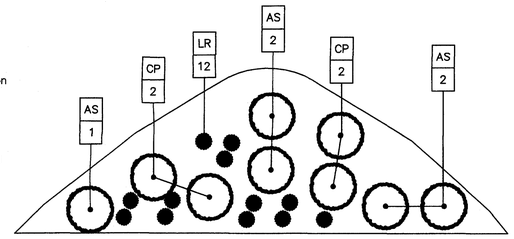
☑ 9. A description of how the outfall requirements, including known changes to contributing drainage areas (i.e. drainage diversions), of the Public Facilities Manual will be satisfied is provided on Sheet 4.

☑ 10. Existing topography with maximum contour intervals of two (2) feet and a note as to whether it is an air survey or field run is provided on Sheets 1.

☐ 11. A submission waiver is requested for N/A.

☐ 12. Stormwater management is not required because N/A.

Revised 2-21-2006



BIORETENTION FILTER PLANTING PLAN

LEGEND

- PROPOSED CURB & GUTTER
- PROPOSED EDGE OF PAVEMENT
- BUILDING RESTRICTION LINE
- PROPERTY LINE
- DIRECTION OF TRAFFIC
- PROPOSED TREES & SHRUBS
- EXISTING SANITARY
- EXISTING WATER LINE
- PROPOSED SANITARY
- PROPOSED WATER LINE
- PROPOSED BIO RETENTION PLANTS

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SCALE: 1": 30'

LANDSCAPE PLAN
RED FOX PLAZA
RZ#2007-SU-006

SULLY DISTRICT
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Sheet 3 of 5

SHEET NO. 3 OF 5

FILE. NO. 05–32

STORM WATER MANAGEMENT CALCULATIONS

IMPERVIOUS ACREAGE ANALYSIS
(ENGINEER'S USE)

	DEVELOPMENT LEVEL		IMPERVIOUS ACREAGE COMPUTATIONS	
	PRE	POST	PRE	POST
SITE AREA IN ACRES	A'	A	1.53	1.53
COMPOSITE RATIONAL 'C' FACTOR	C1	C2	0.31	0.50
FRACTIONAL IMPERVIOUSNESS	B1	B2	0.08	0.377
TOTAL IMPERVIOUSNESS AREA	A'xB1	AxB2	0.13	0.57
INCREASE IN IMPERVIOUS ACRES (AxB2)–(A'xB1) = 0.44 Ac.				

IMPERVIOUS AREA SUMMARY

LOT AREA = 66,709 SF (1.53 AC)

EXISTING CONDITIONS
EXIST DRIVEWAY 5,815 SF
EXIST HOUSE/STOOP 0 SF
EXIST TOTAL 5,815 SF (0.13 AC)

PROPOSED CONDITIONS
PROP DRIVEWAY 12,889 SF
LEAD WALK 1,344 SF
BUILDING 10,929 SF
PROP TOTAL 25,162 SF
= 37.72% OF SITE

INCREASE = 19,347 SF (0.44 Acres)

'C' RUNOFF COEFFICIENT

PRE–DEVELOPMENT

$C_{PRE} = \frac{(0.90)(0.13) + (0.25)(1.40)}{1.53}$

= 0.31

POST–DEVELOPMENT

$C_{POST} = \frac{(0.90)(0.58) + (0.25)(0.95)}{1.53}$

= 0.50

TOTAL SITE AREA

A=1.53 AC

IMPERVIOUS "C" FACTOR = 0.90
PERVIOUS "C" FACTOR = 0.25

PRE DEVELOPMENT SITE DISCHARGE
Cw=0.31
Q2=0.31 x5.45 x1.53 =2.58 CFS
Q10=0.31 x7.27 x1.53 =3.45 CFS

POST DEVELOPMENT SITE DISCHARGE
Cw=0.50
Q2=(0.50)(5.45)(1.53) = 4.17 CFS
Q10=(0.50)(7.27)(1.53) = 5.56 CFS

INDIVIDUAL AREA ANALYSIS

PRE DEVELOPED
A'1=1.13 AC
C=0.26

Q2=0.26 x5.45 x1.13=1.60 CFS
Q10=0.26 x7.27 x1.13=2.14 CFS

A'2=0.40 AC
C=0.45

Q2=0.45x5.45 x0.40=0.98 CFS
Q10=0.45x7.27 x0.40=1.31 CFS

PHASE 1
A–1=0.395 AC
C=0.60

Q2=0.60 x5.45 x0.395 =1.29 CFS
Q10=0.60 x7.27 x0.395=1.72 CFS

A–2=0.40 AC
C=0.60

Q2=0.60 x5.45 x0.40=1.31 CFS
Q10=0.60 x7.27 x0.40=1.74 CFS

POST DEVELOPED
A1=1.25 AC
C=0.44

Q2=(0.44)(5.45)(1.25) = 3.00 CFS
Q10=(0.44)(7.27)(1.25) = 4.00 CFS

A2=0.28 AC
C=0.67

Q2=(0.67)(5.45)(0.28) = 1.02 CFS
Q10=(0.67)(7.27)(0.28) = 1.36 CFS

SUMMARY OF DISCHARGE WITHOUT DETENTION
A1 – A'1
Q2=3.00–1.60=1.40 CFS
Q10=4.00–2.14=1.86 CFS

A2 – A'2
Q2=1.02–0.98= 0.04 CFS
Q10=1.36–1.31=0.05 CFS

SUMMARY OF DISCHARGE WITH DETENTION
A1 – A'1
Q2=3.00–1.60–1.40 =0.00 CFS
Q10=4.00–2.14–1.86 =0.00 CFS

PRE–DEVELOPED CONDITION:
IN THE PRE DEVELOPED CONDITION, AREA A'1 OF 1.13 AC SHEET FLOWS TOWARDS THE EXISTING CREEK TO THE NORTH. THE AREA A'2 OF 0.40 AC SHEET FLOWS TOWARDS THE ROAD SIDE DITCH ALONG THE LEE JACKSON HIGHWAY TO THE SOUTH. THIS RUNOFF EVENTUALLY JOINS THE CREEK AT THE NORTH.

EROSION AND SEDIMENT CONTROL MEASURES ARE PROVIDED TO PROTECT PUBLIC RIGHT OF WAY AND THE CREEK FROM SEDIMENTATION.

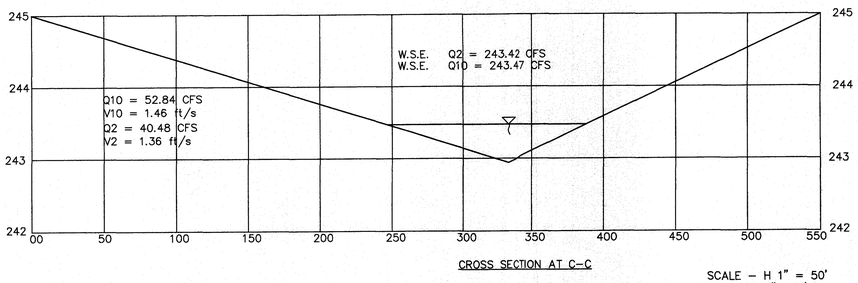
POST–DEVELOPED CONDITION:
IN THE POST DEVELOPED CONDITION, THE AREA A1 (1.25 AC) SHEET FLOWS TO THE EXISTING CREEK TOWARDS THE NORTH. THE 10 YEAR RUNOFF VOLUME IS INCREASED BY 1.86 CFS. HOWEVER, THIS VOLUME WILL BE DETAINED BY THE PROPOSED BIO–RETENTION FILTER. THUS THE 10 YEAR VOLUME TO THE NORTH IS AT THE PRE DEVELOPED RATE.
THE AREA A2 (0.28 AC) SHEET FLOWS TOWARDS THE ROAD SIDE DITCH ALONG THE LEE JACKSON HIGHWAY TO THE SOUTH.

BMP NARRATIVE:
THIS PROJECT CONSISTS OF CONSTRUCTION OF A WAREHOUSE MIXED USE BUILDING ON AN I–5 ZONED LOT IN CHANTILLY AREA. THE IMPERVIOUS AREA ON THE LOT IS 25,162 SF. AS SUCH, IT DOES NOT QUALIFY AS "REDEVELOPMENT" AND MUST MEET THE 40 % PHOSPHORUS REMOVAL REQUIREMENT. TREATMENT IS PROVIDED BY PRIVATE, ON–LOT BIORETENTION FILTER.

OUTFALL NARRATIVE:
THE SITE OUTFALLS TO TWO LOCATIONS. AREA A1 (1.13 AC) FLOWS TO THE NORTH TOWARDS THE EXISTING CREEK AND AREA A2 (0.28 AC) SHEET FLOWS TO THE SOUTH TOWARDS THE LEE JACKSON HIGHWAY.
BASED ON FAIRFAX COUNTY TOPO MAP THE DRAINAGE AREA AT C/S D–D IS COMPUTED TO BE 0.4 AC. THE INCREASE IN 10 YEAR RUNOFF VOLUME IS 0.05 CFS. THEREFORE THE TOTAL 10 YEAR RUNOFF VOLUME AT C/S D–D IS 1.36 CFS. AN OPEN CHANNEL ANALYSIS SHOWS A WATER DEPTH OF 0.15 FEET AT 0.83 FT/SEC. THIS IS A LOW DEPTH NON EROSIVE FLOW AND WILL NOT HAVE ANY ADVERSE IMPACT ON THE DOWNSTREAM PROPERTIES.

THE AREA A1 OUTFALLS TO POINT P AT C/S A–A. BASED ON FAIRFAX COUNTY TOPO MAP, THE TOTAL DRAINAGE AREA AT C/S A–A TO THE NORTH IS COMPUTED TO BE 9.74 AC. THE INCREASE IN 10 YEAR RUNOFF VOLUME IS 1.86 CFS. HOWEVER THIS VOLUME WILL BE DETAINED BY THE PROPOSED BIORETENTION FILTER. THEREFORE THE TOTAL 10 YEAR VOLUME AT C/S A–A IS 24.78 CFS. AN OPEN CHANNEL ANALYSIS AT C/S A–A SHOWS A WATER DEPTH OF 0.69 FEET AT A VELOCITY 1.74 FT/SEC. THIS IS A LOW DEPTH NON EROSIVE FLOW.
WE GO DOWNSTREAM WITH OUR ANALYSIS AND AT A POINT Q (C/S B–B) THE DRAINAGE AREA IS 9.76 AC WHICH IS GREATER THAN 90% OF THE DRAINAGE AREA AT POINT P. THEREFORE THE CONFLUENCE AT POINT Q MEETS THE CRITERIA. THE 10 YEAR VOLUME AT POINT Q (C/S B–B) IS COMPUTED TO BE 46.12 CFS. AN OPEN CHANNEL ANALYSIS AT POINT Q (C/S B–B) SHOW WATER DEPTH OF 0.95 FEET AT 1.60 FT/SEC. THIS IS A LOW DEPTH NON EROSIVE FLOW.
WE GO ANOTHER 150' TO POINT R (C/S C–C) WITH OUR OUTFALL ANALYSIS. THE 10 YEAR VOLUME AT POINT R (C/S C–C) IS COMPUTED TO BE 52.84 CFS. AN OPEN CHANNEL ANALYSIS SHOW WATER DEPTH OF 0.53 FEET AT 1.46 FT/SEC. THIS IS A LOW DEPTH NON EROSIVE FLOW.

THE WATER DEPTH AT C/S A–A, B–B & C–C IS LOW AND THE VELOCITY IS NON EROSIVE. THEREFORE IT IS OUR OPINION THAT THE OUTFALL TO THE NORTH AND SOUTH WILL NOT HAVE ANY ADVERSE EFFECT ON TO THE DOWNSTREAM PROPERTIES.



CROSS SECTION AT C–C

SCALE – H 1" = 50'
V 1" = 1'

OUTFALL ANALYSIS:

CATCHMENT AREA AT CROSS SECTION 'B–B'

NOTE: REFER TO TOPO MAP FOR C/S 'B–B'

AREA = 9.76 AC
PERVIOUS AREA = 9.063 AC
IMPERVIOUS AREA = 0.697 AC

$Cw = \frac{(0.9)(0.697) + (0.25)(9.063)}{9.76}$

= 0.30

Q2=(0.30)(5.45)(9.76) = 15.96 CFS
Q10=(0.30)(7.27)(9.76) = 21.29 CFS

FROM UPSTREAM, THE DRAINAGE AREA 1 WILL FLOW TO C/S B–B. ALSO DUE TO THE PROPOSED DEVELOPMENT THE INCREASE IN RUNOFF FROM SOUTH EAST (C/S D–D) IS 0.05 CFS.

TOTAL VOLUME DRAINING TO CROSS SECTION 'B–B' = 21.29 + 24.78 + 0.05 = 46.12 CFS

OPEN CHANNEL ANALYSIS AT CROSS SECTION B–B

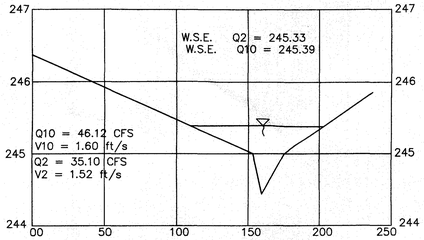
Input Data
Channel Slope 0.00998 ft/ft
Elevation range: 244.44 ft to 246.37 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	246.37	0.00	237.87	0.042
153.00	245.00			
159.33	244.44			
174.87	245.00			
237.87	245.86			

Discharge 46.12 cfs

Results

Wtd. Mannings Coefficient	0.042
Water Surface Elevation	254.39 ft
Flow Area	28.76 sf
Wetted Perimeter	94.12 ft
Top Width	94.08 ft
Depth	0.95 ft
Critical Water Elev.	245.23 ft
Critical Slope	0.040833 ft/ft
Velocity	1.60 ft/s
Velocity Head	0.04 ft
Specific Energy	245.43 ft
Froude Number	0.51
Full Flow Capacity	629.30 cfs
Flow is subcritical.	



CROSS SECTION AT B–B

SCALE – H 1" = 50'
V 1" = 1'

CATCHMENT AREA AT CROSS SECTION 'C–C'

NOTE: REFER TO TOPO MAP FOR C/S 'C–C'

AREA = 3.70 AC
PERVIOUS AREA = 3.70 AC
IMPERVIOUS AREA = 0.0 AC

$Cw = \frac{(0.9)(0.0) + (0.25)(3.70)}{3.70}$

= 0.25

Q2=(0.25)(5.45)(3.70) = 5.04 CFS
Q10=(0.25)(7.27)(3.70) = 6.72 CFS

FROM UPSTREAM, THE DRAINAGE AREA 1 AND 2 WILL FLOW TO C/S C–C. ALSO DUE TO THE PROPOSED DEVELOPMENT THE INCREASE IN RUNOFF FROM SOUTHEAST (C/S D–D) IS 0.05 CFS.

TOTAL VOLUME DRAINING TO CROSS SECTION 'C–C' = 6.72 + 24.78 + 21.29 + 0.05 = 52.84 CFS

OPEN CHANNEL ANALYSIS AT CROSS SECTION C–C

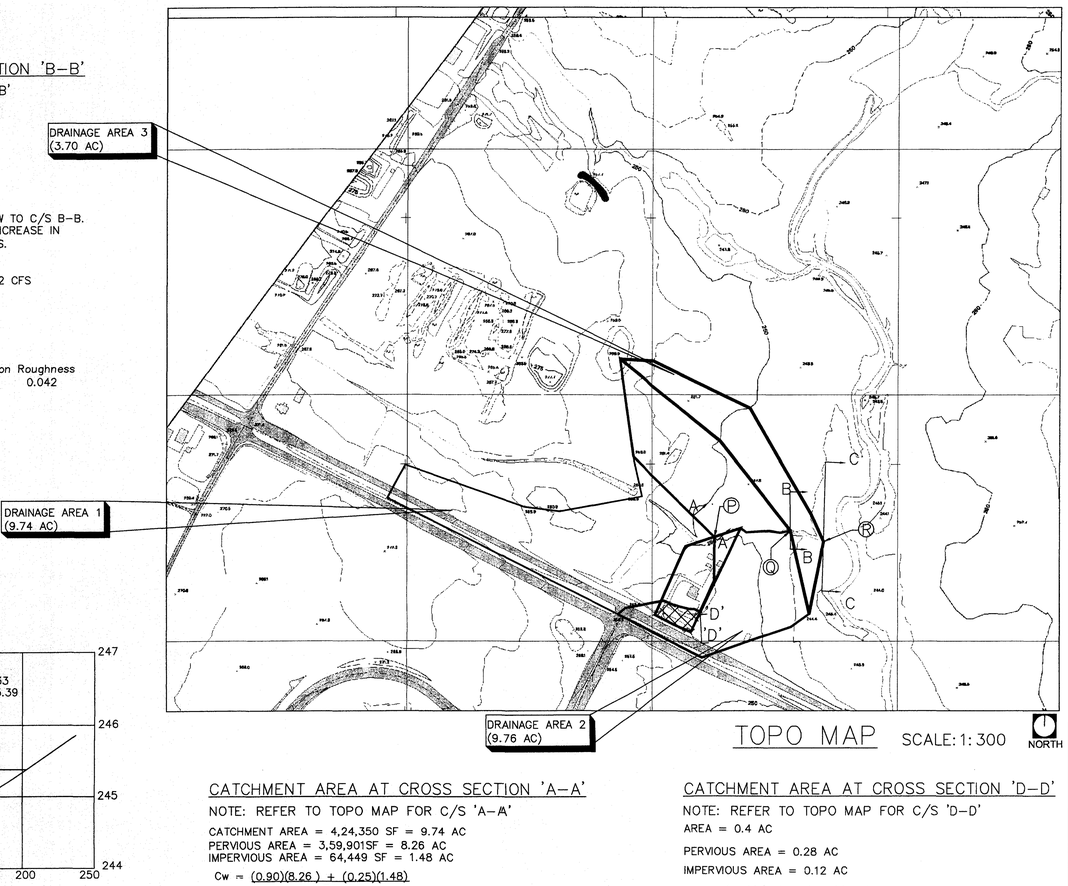
Input Data
Channel Slope 0.00998 ft/ft
Elevation range: 242.94 ft to 245.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	245.00	0.00	536.00	0.042
332.00	242.94			
536.00	245.00			

Discharge 52.84 cfs

Results

Wtd. Mannings Coefficient	0.042
Water Surface Elevation	243.47 ft
Flow Area	36.31 sf
Wetted Perimeter	137.47 ft
Top Width	137.47 ft
Depth	0.53 ft
Critical Water Elev.	243.34 ft
Critical Slope	0.043947 ft/ft
Velocity	1.46 ft/s
Velocity Head	0.03 ft
Specific Energy	243.50 ft
Froude Number	0.50
Full Flow Capacity	1990.04 cfs
Flow is subcritical.	



TOPO MAP SCALE: 1: 300 NORTH

CATCHMENT AREA AT CROSS SECTION 'A–A'

NOTE: REFER TO TOPO MAP FOR C/S 'A–A'

CATCHMENT AREA = 4,24,350 SF = 9.74 AC
PERVIOUS AREA = 3,59,901SF = 8.26 AC
IMPERVIOUS AREA = 64,449 SF = 1.48 AC

$Cw = \frac{(0.90)(8.26) + (0.25)(1.48)}{9.74}$

= 0.35

Q2= 0.35 x5.45 x 9.74 = 18.85 CFS
Q10=0.35 x7.27 x 9.74 = 24.78 CFS

DUE TO THE PROPOSED DEVELOPMENT, THE INCREASE IN 10 YEAR VOLUME IS 2.13 CFS. HOWEVER, THIS VOLUME WILL BE DETAINED BY THE PROPOSED BIO RETENTION FILTER.

THUS THE 10 YEAR VOLUME DRAINING TO CROSS SECTION 'A–A' = 24.78 CFS

OPEN CHANNEL ANALYSIS AT CROSS SECTION A–A

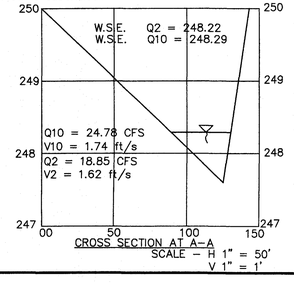
Input Data
Channel Slope 0.00998 ft/ft
Elevation range: 247.60 ft to 250.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	250.00	0.00	143.00	0.042
125.00	247.60			
143.00	250.00			

Discharge 24.78 cfs

Results

Wtd. Mannings Coefficient	0.042
Water Surface Elevation	248.29 ft
Flow Area	14.24 sf
Wetted Perimeter	41.25 ft
Top Width	41.20 ft
Depth	0.69 ft
Critical Water Elev.	248.13 ft
Critical Slope	0.040010 ft/ft
Velocity	1.74 ft/s
Velocity Head	0.05 ft
Specific Energy	248.34 ft
Froude Number	0.52
Full Flow Capacity	684.30 cfs
Flow is subcritical.	



CROSS SECTION AT A–A

SCALE – H 1" = 50'
V 1" = 1'

CATCHMENT AREA AT CROSS SECTION 'D–D'

NOTE: REFER TO TOPO MAP FOR C/S 'D–D'

AREA = 0.4 AC

PERVIOUS AREA = 0.28 AC

IMPERVIOUS AREA = 0.12 AC

$Cw = \frac{(0.9)(0.12) + (0.25)(0.28)}{0.4}$

= 0.45

Q2 =(0.45)(5.45)(0.4) = 0.98 CFS
Q10= (0.45)(7.27)(0.4) = 1.31 CFS

DUE TO THE PROPOSED DEVELOPMENT, THERE IS AN INCREASE OF 0.05 CFS IN THE 10 YEAR RUNOFF DRAINING TO THIS POINT.

TOTAL VOLUME DRAINING TO CROSS SECTION 'D–D' = 1.31 + 0.05 = 1.36 CFS

OPEN CHANNEL ANALYSIS AT CROSS SECTION D–D

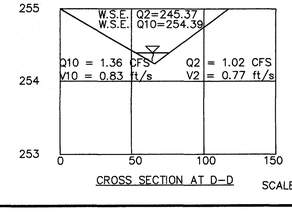
Input Data
Channel Slope 0.056500 ft/ft
Elevation range: 395.27 ft to 396.00 ft.

Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
0.00	255.00	0.00	117.00	0.042
66.00	254.24			
117.00	255.00			

Discharge 1.36 cfs

Results

Wtd. Mannings Coefficient	0.042
Water Surface Elevation	254.39 ft
Flow Area	1.64 sf
Wetted Perimeter	22.48 ft
Top Width	22.47 ft
Depth	0.15 ft
Critical Water Elev.	254.35 ft
Critical Slope	0.066759 ft/ft
Velocity	0.83 ft/s
Velocity Head	0.01 ft
Specific Energy	254.40 ft
Froude Number	0.54
Full Flow Capacity	110.71 cfs
Flow is subcritical.	



CROSS SECTION AT D–D

SCALE – H 1" = 50'
V 1" = 1'

NO.	DATE	REVISION
1.	MAY–07–2007	LOADING DOCK
2.	MAY–16–2007	COUNTY REVIEW COMMENTS
3.	JUNE–05–2007	PER COUNTY REVIEW COMMENTS
4.	JUNE–11–2007	SITE TABULATION AND FAR

CIVILAND, LLC
P.O. BOX 650206 STERLING, VIRGINIA 20165
(703) 404–0363 Fax (703) 404–0443
fmojgani@earthlink.net

DESIGN BY: FM
DRWN BY: FM
DATE OCT–2006

COMMONWEALTH OF VIRGINIA
FARHANG MOJGANI
Lic. No. 016844
6/11/07
PROFESSIONAL ENGINEER

SCALE: AS SHOWN

SWM PLAN
RED FOX PLAZA
RZ#2007–SU–006
SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

Application No. RZ–2007–SU–006 Staff S.McKnight
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP)
EE PROFFERS DATED 8–13–2007
Date of (BOS) (PC) approval 9–10–2007

Sheet 4 of 5

SHEET NO. 4 OF 5
FILE. NO. 05–32

BMP FACILITY DESIGN CALCULATIONS

PLAN NAME: LEE JACKSON HWY
PLAN NUMBER: (TO BE ASSIGNED)
DATE: OCT-06
ENGINEER: CIVILAND, LLC

I. WATER QUALITY NARRATIVE

THE SITE CONSISTS OF 1.53 AC OF INDUSTRIAL DEVELOPMENT. THE AREA TO BE TO DISTURBED IS 0.795 AC. THE AREA A1 (0.735 AC) IS AN OPEN SPACE AND SHEET FLOWS TO THE EXISTING CREEK TO THE NORTH. THE AREA A2 (0.33 AC) IS CONTROLED BY THE PROPOSED BIO RETENTION FILTER. THE AREA A3 (0.465 AC) IS UNCONTROLLED DISTURBED. THROUGH TREATING THE ONSITE CONTROLLED RUNOFF AND CREDIT FROM OPEN SPACE, THE PROPOSED PHOSPHOROUS REMOVAL ACHIEVED FOR THE SUBJECT PROPERTY IS APPROXIMATELY 64.54%.

II. WATERSHED INFORMATION

PART 1: LIST ALL THE SUBAREAS AND "C" FACTORS USED IN THE BMP COMPUTATIONS

SUBAREA DESIGNATION AND DESCRIPTION (1)	C (2)	AREAS (3)
A1-OPEN SPACE	0.25	0.735
A2-ONSITE CONTROLLED DISTURBED	0.76	0.33
A3-ONSITE UNCONTROLLED DISTURBED	0.70	0.465

- Extended Detention Dry Pond
  - Design (i) (Chart "A") 40%*
  - Regional 50%
- Wet Pond
  - Design (i) (4.0xVr) 50%
  - Design (ii) (2.5xVr+Extended Detention) 45%
  - Regional (4.0xVr) 65%
- Infiltration Trench
  - Design (i) (0.5 in/imp Ac) 50%
  - Design (ii) (1.0 in/imp Ac) 65 %*
  - Design (iii) (2-year 2-hour storm) 70%

III a. PHOSPHORUS REMOVAL - " OCCOQUAN METHOD "

THIS SECTION IS FOR THE JURISDICTIONS WHICH DO NOT UTILIZE CBLAD'S "CHESAPEAKE BAY METHOD" FOR PHOSPHORUS REMOVAL CALCULATIONS. THE "CHESAPEAKE BAY METHOD" IS ADDRESSED IN SECTION IIIB OF THIS WORKSHEET. PLEASE CHECK WITH YOUR LOCAL JURISDICTION TO DETERMINE WHICH METHOD TO USE.

PART 2: COMPUTE THE WEIGHTED AVERAGE "C" FACTOR FOR THE SITE

(A) AREA OF THE SITE (a) 1.53 ACRES

(B) SUBAREA DESIGNATION (1)	"C" (2)	ACRES (3)	PRODUCT (4)
A1-OPEN SPACE	0.25	0.735	0.184
A2-ONSITE CONTROLLED DISTURBED	0.76	0.33	0.251
A3-ONSITE UNCONTROLLED DISTURBED	0.70	0.465	0.326

(b) TOTAL = 0.760

(C) WEIGHTED AVERAGE "C" FACTOR (b)/ (a) = c = 0.50

PART 3: COMPUTE THE TOTAL PHOSPHORUS REMOVAL FOR THE SITE

(B) SUBAREA DESIGNATION (1)	BMP TYPE (2)	REMOVAL EFF. (%) (3)	AREA RATIO (4)	C FACTOR RATIO (5)	PRODUCT (6)
A1	OPEN SPACE	100	0.480	1.00	48.04
A2	BIO RETENTION FILTER	50	0.216	1.53	16.50
A2	UNCONTROLLED	0	0.304	1.41	00.00

(a) TOTAL = 64.54%

PART 4: DETERMINE COMPLIANCE WITH PHOSPHORUS REMOVAL REQUIREMENT

(A) SELECT REQUIREMENT (a) 50%

WATER SUPPLY OVERLAY DISTRICT (OCCOQUAN WATERSHED) = 50% (FAIRFAX COUNTY AND PRINCE WILLIAM COUNTY)

CHESAPEAKE BAY PRESERVATION AREA (NEW DEVELOPMENT) = 40% (FAIRFAX COUNTY) 50% (PRINCE WILLIAM COUNTY)

CHESAPEAKE BAY PRESERVATION AREA (REDEVELOPMENT) = [1-0.9 x ("I" PRE / "I" POST)] x 100 = % GREATER THAN OR EQUAL TO LINE 4(a)

(B) IF LINE 3(a) 64.54% IS GREATER THAN OR EQUAL TO LINE 4(a) 50% THEN PHOSPHORUS REMOVAL REQUIREMENT IS SATISFIED.

BIO-RETENTION FILTER

DESIGN:

DRAINAGE AREA TO THE FACILITY = 14,215 SF
IMPERVIOUS AREA = 11,284 SF
DEPTH OF FILTER = 2.5 FT
MAXIMUM PONDING DEPTH = 1 FEET (PFM 6-1307.4E)
COEFFICIENT OF PERMEABILITY OF FILTER BED = (Kf) = 1.5 IN/HR (PFM 6-1307.5C)
POROSITY OF GRAVEL = 0.40
ASSUMING TIME OF CONCENTRATION = Tc = 5 MIN.
INTENSITY OF RAINFALL: I2 = 5.45 IN/HR
I10 = 7.27 IN/HR.
I100 = 9.84 IN/HR
TARGET REMOVAL EFFICIENCY = 50%

FOR CAPTURING AND TREATING FIRST 0.5" OF RUNOFF VOLUME
THE WATER QUALITY VOLUME IS
WQv = 1,815 (11,284 /43,560) CF
= 470 CF

AREA OF THE FILTER BED IS
= Af = WQv/Hf
= 470/1 SF
= 470 SF

THEREFORE AREA PROVIDED = 470.00 SF

DRAINAGE TIME THROUGH THE FILTER AREA
Tf = (WQv)(Df)/[(Kf/12)(0.5Hr + Df)Af]
= (470)(2.5)/[(1.5 / 12)(0.5 x 1 + 2.5) x 470]
= 6.67 HRS < 24 HRS [PFM 6-1307.5B, 6-1307.5C]

MATERIAL SPECIFICATIONS:

THE BIO RETENTION SOIL MEDIA SHALL BE COMPOSED OF A MIXTURE OF 60-75% WASHED SAND, 5-15% ORGANIC COMPOST MEETING THE REQUIREMENTS OF TABLE 6.32 AND 10-35% TOPSOIL. TOP SOIL SHALL BE A SANDY LOAM, LOAMY SAND, SILT LOAM OR LOAM PER USDA TEXTURAL CLASSIFICATION. THE TEXTURAL CLASS OF THE TOP SOIL SHALL BE VERIFIED BY A LABORATORY ANALYSIS. TOP SOIL SHALL BE OF UNIFORM COMPOSITION, CONTAINING NO MORE THAN 8% CLAY, FREE OF STONES, STUMPS, BRUSH, ROOTS OR SIMILAR OBJECTS LARGER THAN 2 INCHES. TOP SOIL SHALL BE FREE OF BERMUDA GRASS, QUACKGRASS, JOHNSON GRASS, MUGWORT, NUTSEDGE, POISON IVY, CANADIAN THISTLE, TEARTHUMB OR OTHER NOXIOUS WEEDS. SAND SHALL MEET AASHTO M-6, ASTM C-33 OR VDOT SECTION 202 GRADE 'A' FINE AGGREGATE SPECIFICATIONS. SAND SHALL BE CLEAN AND FREE OF DELETERIOUS MATERIALS. THE FINAL SOIL MIXTURE SHALL NOT CONTAINING MATERIAL OR SUBSTANCE THAT MAY BE HARMFUL TO THE PLANT GROWTH OR HINDRANCE TO PLANT GROWTH OR MAINTAINANCE. THE FINAL SOIL MIXTURE SHALL MEET THE REQUIREMENTS IN TABLE 6.33. EACH BIO RETENTION AREA SHALL HAVE A MINIMUM OF ONE SOIL TEST PERFORMED ON THE FINAL SOIL MIXTURE. TEST RESULTS AND MATERIALS CERTIFICATIONS SHALL BE SUBMITTED TO DPWES PRIOR TO BOND RELEASE.

MULCH SHALL BE MADE DOUBLE SHREDDED AGED HARDWOOD BARK WITH A PARTICLE SIZE GREATER THAN 0.5 INCHES (1.27 CM). MULCH SHALL BE WELL AGED, UNIFORM IN COLOR AND FREE OF SALTS, HARMFUL CHEMICALS AND EXTRANEOUS MATERIALS INCLUDING SOIL, STONES AND PLANT MATERIAL. WELL AGED MULCH IS MULCH THAT HAS BEEN STOCKPILED OR STORED FOR 6-12 MONTHS.

UNDERDRAINS SHALL BE PVC PIPE CONFORMING TO THE REQUIREMENTS OF ASTM F 758, TYPE PS 28 OR ASTM F 949; HDPE PIPE CONFORMING TO THE REQUIREMENTS AASHTO M 252 OR M 294, TYPW S; OR APPROVED EQUIVALENT PIPE. UNDERDRAINS SHALL BE PERFORATED WITH 4 ROWS OF 3/8 INCH (9.5 mm) HOLES WITH A SPACING OF 3.25 ± 0.25 INCHES (82.5 ± 6.4 mm) OR A COMBINATION OF THE HOLE SIZE AND SPACING THAT PROVIDES A MINIMUM INLET AREA ≥ 1.76 SQUARE INCHES PER LINEAR FOOT (37.2 sq. cm/m) OF PIPE OR BE PERFORATED WITH SLOTS 0.125 INCHES (3.2 mm) IN WIDTH THAT PROVIDES A MINIMUM INLET AREA ≥ 1.5 SQUARE INCHES PER LINEAR FOOT (31.8 sq. cm/m) OF PIPE.

FILTER FABRIC SHALL BE A NEEDLED, NON-WOVEN, POLYPROPYLENE GEOTEXTILE MEETING THE REQUIREMENTS IN TABLE 6.34. HEAT-SET OR HEAT-CALENDARED FABRICS ARE NOT PERMITTED.

CONSTRUCTION SPECIFICATION:

The owner shall provide for inspection during construction of the facility by a licenced design professional (in accordance with standard practise, the actual inspections may be performed by an individual under responsible charge of the licensed professional). The licensed professional shall certify that the facility was constructed in accordance with the approved plans. The licensed professional 's certification along with any material delivery tickets and certifications from the material suppliers and results of the tests and inspections required shall be submitted to the county prior to bond release. For projects requiring as built plans, the required certification and supporting documents shall be submitted with or incorporated in the as built plans. For projects that donot require as built plans, the required certifiacation and supporting documents shall be submitted with the RUP or non RUP request.

Bioretension facilities shall be constructed after the drainage area to the facility is completely stabilized. Erosion and sediment controls for the construction of the facility shall be installed as specified in the erosion and sediment control plan.

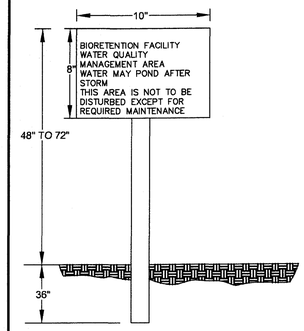
The components of the soil media shall be thoroughly mixed until a homogeneous mixture is obtained. It is preferable that the components of the soil media be mixed at a batch facility prior to the delivery to the site. The soil media shall be moistened, as necessary, to prevent seperation during installation.

The soil media shall be tested for pH, organic matter, and soluble salts prior to installation. If the results of the tests indicate that the required specifications are not met, the soil represented by such tests shall be amended or corrected as required and retested until the soil meets the required specifications. If the pH is too high, it may be lowered by adding iron sulphate plus sulphur.

For bioretension basins, the floor of the facility shall be scarified or tilled to reduce soil compction and raked to level it before the filter fabric, stone, and soil media are

The soil media may be placed by mechanical methods with minimal compaction in order to maintain the porosity of the media. Spreading shall be by hand. The soil media shall be placed in 8-12 inch (203-305 mm) lifts with no machinery allowed over the soil media during or after construction. The soil media should be overfilled above the proposed surface elevation as needed to allow for natural settlement. Lifts may be lightly watered to encourage settlement. Ater the final lift is placed, the soil media shall be raked to level before it is, saturated, and allowed to settle for atleast one week prior to the installation of the plant materials.

Fill for the berm and overflow weir shall consist of clean material free of organic matter, rubbish, frozen soil, snow, ice, particles with sizes larger than 3 inches (76 mm), or other deleterious material. Fill shall be placed in 8-12 inch (203-305 mm) lifts and compacted to prevent settlement. Compaction equipment shall not be allowed within the facility on the soil bed. The top of the berm and the invert of the overflow weir shall be constructed at the design elevation.



GENERAL REQUIREMENTS: -

1) THE SIGN IS TO BE PLACED ON A 3" "U" CHANNEL POST 8' LONG.

2) THE SIGN IS TO BE PLACED AT APPROXIMATELY 100-FOOT INTERVALS ALONG THE PERIMETER OF THE REFORESTED AREA OR THE BIORETENTION FACILITY. THE SIGN IS TO BE PLACED AT APPROXIMATELY 100-FOOT INTERVALS ALONG THE LENGTH OF VERETATED SWALES ON ALTERNATING SIDES. EACH REFORESTED AREA, BIORETENTION FACILITY, AND VEGETATED SWALE SHALL HAVE A MINIMUM OF ONE SIGN.

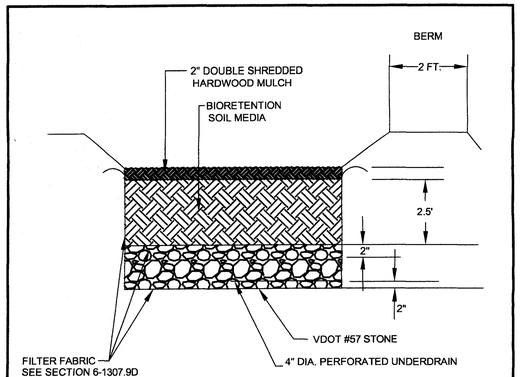
3) THE SIGN SHALL BE MADE WITH REFLECTIVE MATERIALS AND BE GREEN WITH WHITE BORDER AND STANDARD 1/2" LETTERING.

4) ALTERNATE DESIGN MAY BE APPROVED BY THE DIRECTOR.

5) SIGN IS NOT TO BE PLACED IN EXISTING OR PROPOSED VDOT RIGHT-OF-WAY.

6) SIGNS FOR BIORETENTION FACILITIES ON INDIVIDUAL SINGLE FAMILY LOTS MAY BE PLACED ON WOOD OR METAL POSTS AT HEIGHTS AS LOW AS 30" ABOVE GROUND AND BE MADE OF NON-REFLECTIVE MATERIALS IN COLORS OTHER THAN GREEN AND WHITE.

81-6



SOIL MEDIA
20-30% TOPSOIL
20-30% ORGANIC COMPOST
50-60% SAND, ASTM C-33

NOTES:
1) SIDE SLOPES OF THE FACILITY EXCAVATED BELOW GROUND MAY BE AS STEEP AS THE IN SITU SOILS WILL PERMIT. ALL EXCAVATION MUST BE PERFORMED IN ACCORDANCE WITH VOSH REQUIREMENTS.
2) ALL PIPE SHALL BE IN ACCORDANCE WITH SECTION 6-1307.9C

CROSS SECTION VIEW (NTS)

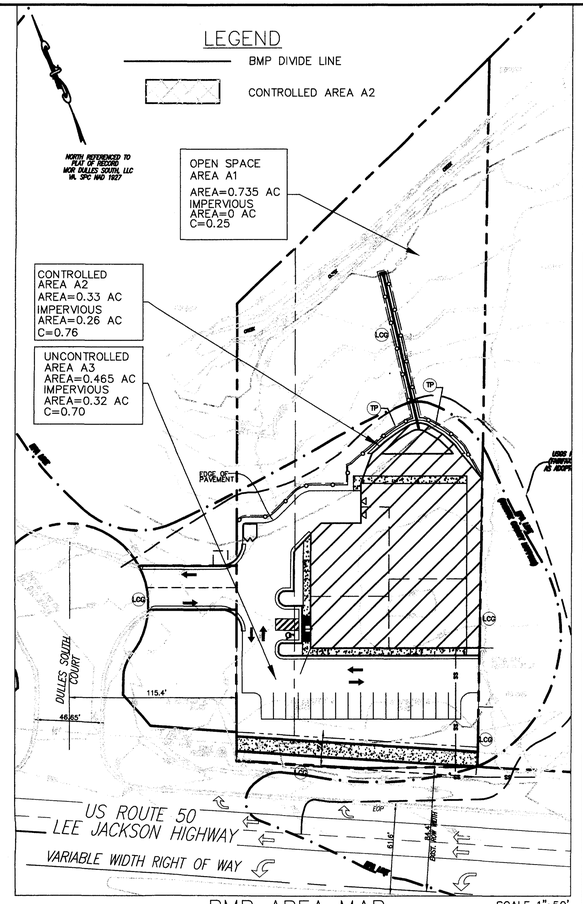
82-6

Plant material shall be installed per g 12-0805.

Planting shall take place after construction is completed and during the following periods : March 15 through June 15 and September 15 through November 15 unless otherwise approved by the director.

All areas surrounding the facility that are graded or denuded during construction of the facility and are to be planted with turf grass shall be sodded.

The facility shall be inspected at 12-24 and 36-48 hours after a significant rainfall (0.5-1.0 inch) or artificial flooding to determine that the facility is draining properly. Results of the inspection shall be provided to DPWES prior to bond release.



BMP AREA MAP SCALE 1": 50'

PLANTING SPECIFICATIONS:

DEPENDING ON THE BIORETENTION PLANTING PLAN TYPE AND APPLICATION AS DETAILED IN 6-1307.10G, A MIXTURE OF TREES, SHRUBS, AND PERENNIAL HERBACEOUS PLANTS WITH A HIGH DENSITY OF FIBROUS ROOTS IS REQUIRED. SELECTED PLANTS MUST BE ABLE TO TOLERATE HIGHLY VARIABLE MOISTURE CONDITIONS, GENERALLY DRY WITH BRIEF PERIODS OF INUNDATION. DEPENDING ON SITE CONDITIONS, SELECTED PLANTS ALSO MUST BE ABLE TO TOLERATE EXPOSURE TO WIND AND SUN, AS WELL AS SALT AND TOXINS IN RUNOFF FROM ROADS, PARKING LOTS, AND DRIVEWAYS. THE USE OF NATIVE PLANT SPECIES IS PREFERRED. THE ACCEPTABILITY OF PROPOSED PLANT MATERIALS WILL BE DETERMINED BY THE DIRECTOR. GUIDANCE ON THE USE AND SELECTION OF PLANTS FOR BIORETENTION FACILITIES IS AVAILABLE FROM THE URBAN FOREST MANAGEMENT DIVISION.

2. ALL PLANTS SHALL CONFORM TO THE LATEST VERSION OF AMERICAN STANDARD FOR NURSERY STOCK PUBLISHED BY THE AMERICAN NURSERY AND LANDSCAPE ASSOCIATION (ANSI Z60.1) FOR QUALITY AND SIZING. TREES AND SHRUBS SHALL BE NURSERY GROWN UNLESS OTHERWISE APPROVED AND SHALL BE HEALTHY AND VIGOROUS, FREE FROM DEFECTS, DECAY, DISFIGURING ROOTS, SUN-SCALD, INJURIES, ABRASIONS, DISEASES, INSECT PESTS, AND ALL FORMS OF INFESTATIONS OR OBJECTIONABLE DISFIGUREMENTS AS DETERMINED BY THE DIRECTOR.

3. TREES SHALL BE A MINIMUM OF 1 INCH (25.4 MM) CALIPER. SHRUBS SHALL BE A MINIMUM OF 2 GALLONS (7.57 L) CONTAINER SIZE AND HERBACEOUS PLANTS SHALL BE A MINIMUM OF 6 INCH (152 MM) DIAMETER CONTAINER SIZE. VARIATION IN SI- MAY BE APPROVED BY THE DIRECTOR, BASED ON THE REQUIREMENTS OF THE SPECIFIC PLANTS LISTED IN THE SCHEDULE.

4. THE PLANTING PLAN SHALL PROVIDE FOR PLANT COMMUNITY DIVERSITY AND SHOULD CONSIDER AESTHETICS FROM PLANT FORM, COLOR, AND TEXTURE YEAR-ROUND. THE BIORETENTION FACILITY DESIGN AND SELECTION OF PLANT MATERIAL SHALL SERVE TO VISUALLY LINK THE FACILITY INTO THE SURROUNDING LANDSCAPE. IF TREES AND SHRUBS ARE PART OF THE DESIGN, WOODY PLANTS SPECIES SHALL NOT BE PLACED DIRECTLY WITHIN THE INFLOW SECTION OF THE

5. ALL PLANTINGS MUST BE WELL ESTABLISHED PRIOR TO RELEASE OF THE CONSERVATION DEPOSIT. NURSERY STOCK TREES AND SHRUBS REQUIRED BY THE APPROVED PLAN SHALL BE VIABLE (HEALTHY AND CAPABLE OF DEVELOPING A TRUNK AND BRANCH STRUCTURE TYPICAL FOR THEIR SPECIES) AT THE TIME THE CONSERVATION DEPOSIT IS RELEASED.

NO.	DATE	REVISION
1.	MAY-07-2007	LOADING DOCK
2.	MAY-16-2007	COUNTY REVIEW COMMENTS
3.	JUNE-05-2007	PER COUNTY REVIEW COMMENTS
4.	JUNE-11-2007	SITE TABULATION AND FAR

CIVILAND, LLC
P.O. BOX 650206 STERLING, VIRGINIA 20165
(703) 404-0363 @ Fax (703) 404-0443
fmojgani@earthlink.net

DESIGN BY: FM
CHKD BY: FM
DATE OCT-2006

COMMONWEALTH OF VIRGINIA
FARHANG MOJGANI
Lic. No. 016844
6/11/07
PROFESSIONAL ENGINEER

SCALE: AS SHOWN

BMP PLAN
RED FOX PLAZA
RZ#2007-SU-006
SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

Application No. RZ-2007-SU-006 Staff S.McKnight
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP)
SEE PROFFERS DATED 8-13-2007
Date of (BOS) (PC) approval 9-10-2007

Sheet 2 of 5

SHEET NO. 5 OF 5
FILE. NO. 05-32