SPECIAL EXCEPTION PLAT
GENERALIZED DEVELOPMENT PLAN
AEROSPACE CORPORATION
WESTFIELDS, PARCEL 35
SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

MAY, 2008
REVISED JULY 1, 2008
REVISED SEPTEMBER 4, 2008
REVISED OCTOBER 9, 2008
REVISED NOVEMBER 4, 2008
REVISED DECEMBER 1, 2008
REVISED DECEMBER 17, 2008

ZONING REQUIREMENTS - I-3 DISTRICT

MINIMUM LOT AREA:	REQUIRED: 40,000 SQ. FT. ACTUAL: 1,760,388 SQ. FT.
MINIMUM LOT WIDTH:	REQUIRED: 100 FEET ACTUAL: 1230+ FEET (LEE ROAD) 1460+ FEET (STONECROFT BLVD.)
MAXIMUM BUILDING HEIGHT:	REQUIRED: 75 FEET, SUBJECT TO INCREASE AS MAY BE PERMITTED BY THE BOARD OF SUPERVISORS PURSUANT TO A SPECIAL EXCEPTION IN ACCORDANCE WITH SECTION 9-607 OF THE ZONING ORDINANCE. PROPOSED: 138 FEET (BUILDING 1 TOWER 1A) 165 FEET (BUILDING 1 TOWER 1B) 160 FEET (BUILDING 2 TOWER 2A)) 160 FEET (BUILDING 2 TOWER 2B) (PENTHOUSE ± 22 FEET ABOVE EACH TOWER)
MINIMUM YARD REQUIREMENTS:	REQUIRED FOR FRONT: CONTROLLED BY A 45 DEGREE ANGLE OF BULK PLANE, BUT NOT LESS THAN 40 FEET. PROPOSED: 50 FEET (MIN.-GARAGE #1) 80 FEET (GARAGE #2) REQUIRED FOR SIDE AND REAR: CONTROLLED BY A 45 DEGREE ANGLE OF BULK PLANE. PROPOSED: SIDE: 90 FEET (MIN. - BUILDING ONE) REAR: 200 +/- FEET (GENERATOR BUILDING)
MAXIMUM FLOOR AREA RATIO:	ALLOWED: 0.50 (GRANDFATHERED) PROPOSED: SEE SITE TABULATION
MINIMUM OPEN SPACE:	REQUIRED: 15%, OR 6.08 ACRES PROPOSED: 24.8 ACRES (61% OF SITE AREA) (INCLUDES PLAZA AREAS ASSOCIATED WITH BUILDINGS)
SITE DISTURBANCE:	ASSOCIATED WITH SITE IMPROVEMENTS = APPROXIMATELY 24 ACRES ASSOCIATED WITH STREAM RESTORATION = APPROXIMATELY 2 ACRES

SITE TABULATION:

SITE AREA: 40.41 ACRES, OR 1,760,386 SQ. FT.

PROPOSED R. O. W. DEDICATION: 0.32 ACRES

FAR COMPUTATIONS	
PHASE 1	**GFA (SF)**
Building (Tower 1A and 1B)	452,440
Library	1,900
Visitor Center (Upper Level)	1,625
Signals Lab	27,000
Security Kiosk (2)	400
Switch Gear Building	1,200
Generator Building	11,000
TOTAL PHASE 1	**495,565**
PHASE 2	**GFA (SF)**
Building (Tower 2A and 2B)	477,400
Security Kiosk	200
Switch Gear Building	1,200
TOTAL PHASE 2	**478,800**
TOTAL BUILDING AREA	**974,365**
SITE AREA	1,760,388.00
HALF OF RIGHT-OF-WAY	190,352
TOTAL PROPERTY AREA FOR FAR	**1,950,738**
FAR	**0.50**

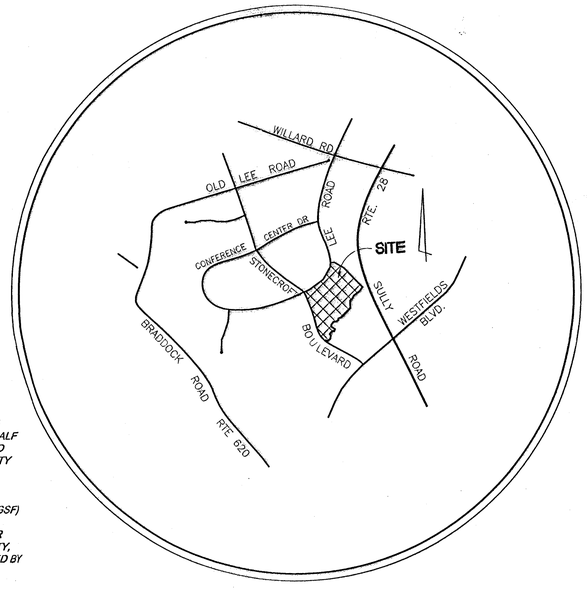
NOTE:
THE TOTAL GROSS FLOOR AREA OF EACH BUILDING MAY VARY WITH FINAL DESIGN, PROVIDED THAT THE OVERAL TOTAL GROSS FLOOR AREA AND THE MAXIMUM BUILDING HEIGHTS DO NOT EXCEED, AND THE DIMENSIONS TO PERIPHERAL PROPERTY LINES ARE NOT LESS THAN, THE VALUES SHOWN ON THIS PLAT.

PARKING TABULATIONS			
PHASE 1	**GFA**	**ZONING**	**PARKING**
Building (Tower 1A and 1B)	452,440	2.6 Spaces / 1000 SF	1177
Library	1,900	1 Space / 1.5 Employees	2
Visitor Center (Upper Level)	1,625	2.6 Spaces / 1000 SF	5
Signals Lab	27,000	1 Space / 1.5 Employees	36
Security Kiosk (2)	400	2 Guards Max	4
Switch Gear Building	1,200	N/A	0
Generator Building	11,000	N/A	0
TOTAL BUILDING	**495,565**		
Cellar			
Labs	27,740	1 Space / 1.5 Employees	37
Conference (800 Seats)	57,382	0.3 Space / Seat	240
Cafeteria with Kitchen	16,000	1 Space / 3000 SF	6
Fitness Center	5,870	N/A	0
Data/Loading/Mechanical	48,450	1 Space / 5000 SF	10
Security Offices	6,355	2.6 Spaces / 1000 SF	17
Visitor Center (Lower Level)	1,625	2.6 Spaces / 1000 SF	5
TOTAL CELLAR	**163,422**		
PHASE 1 - REQUIRED PARKING			**1539**
PARKING PROVIDED			
Surface Parking			151
Garage 1			1,390
PHASE 1 - TOTAL PARKING PROVIDED			**1,541**
PHASE 2	**GFA**	**ZONING**	**PARKING**
Building (Tower 2A and 2B)	477,400	2.6 Spaces / 1000 SF	1242
Security Kiosk	200	2 Guards Max	2
Switch Gear Building	1,200	N/A	0
Cellar	175,000	2.6 Spaces / 1000 SF	455
PHASE 2 - REQUIRED PARKING			**1699**
PHASE 2 - TOTAL PARKING PROVIDED (GARAGE 2)			**1700**

LOADING TABULATION		REQUIRED	PROVIDED
Phase 1 Building (Tower 1A and 1B)	452,440	5	5
Phase 2 Building (Tower 2A and 2B)	477,400	5	5

TABULATION NOTES :

1. *THE TOTAL GROSS FLOOR AREA DOES NOT INCLUDE FLOOR AREA THAT IS CLASSIFIED AS CELLAR SPACE IN ACCORDANCE WITH THE ZONING ORDINANCE.*
2. *THE FLOOR AREA RATIO IS BASED ON THE TOTAL AREA OF THE SITE (1,760,388 SQ. FT.) PLUS THE AREA WITHIN ONE-HALF OF THE RIGHTS-OF-WAY OF STONECROFT BOULEVARD AND LEE ROAD EXTENDED ON THE FRONTAGE OF THE PROPERTY (190,352 SQ. FT.), COMPRISING A TOTAL LAND AREA OF 1,950,738 SQUARE FEET USED TO CALCULATE THE DEVELOPMENT INTENSITY. (MAXIMUM FLOOR AREA: 1,950,738 SQ.FT. X 0.50 = 975,369 GSF)*
3. *CAPACITY OF THE AUDITORIUM SPACES IS 800 SEATS. FOR PURPOSES OF PARKING REQUIREMENTS, AT FULL CAPACITY, 50 PERCENT OF THE SEATS ARE ASSUMED TO BE OCCUPIED BY ON-SITE EMPLOYEES.*
4. *THE TOTAL NUMBER OF PARKING SPACES REQUIRED AND/OR AND/OR PROVIDED MAY VARY WITH FINAL SITE DESIGN AND MIX OF USES, PROVIDED THAT THE NUMBER OF SPACES PROVIDED SHALL NOT BE LESS THAN THE NUMBER REQUIRED BY THE ZONING ORDINANCE BASED ON THE ACTUAL RESULTING USE AREAS. REGARDLESS, IN NO INSTANCE SHALL THE PERCENTAGE OF OPEN SPACE, NOR THE DISTANCES SHOWN TO PERIPHERAL LOT LINES, BE REDUCED BELOW THOSE VALUES SHOWN ON THIS PLAT.*



VICINITY MAP
SCALE: 1" = 2000'

NOTES:

1. *THE PROPERTY DELINEATED ON THIS PLAT IS LOCATED ON FAIRFAX COUNTY ASSESSMENT MAP NO. 44-1 ((4)) 35, AND IS ZONED I-3; WATER SUPPLY PROTECTION OVERLAY DISTRICT.*
2. *EXISTING USE: VACANT*
3. *PROPOSED USE: OFFICE/RESEARCH AND DEVELOPMENT*
4. *OWNER/APPLICANT: THE AEROSPACE CORPORATION 2350 EAST EL SEGUNDO BOULEVARD EL SEGUNDO, CA 90245*
5. *EXISTING FEATURES SHOWN HEREIN PER SURVEY PREPARED BY BURGESS & NIPLE IN JULY, 1997. THE BOUNDARY IS FROM INFORMATION OF RECORD AND TOPOGRAPHY IS AERIAL PHOTOGRAMMETRY DATED MAY, 1997 USING NGVD 1929 DATUM. CONTOUR INTERVAL IS 2 FEET.*
6. *THERE ARE NO BURIAL OR GRAVE SITES KNOWN TO CURRENTLY EXIST ON THIS PROPERTY.*
7. *A 100-YEAR FLOOD PLAIN, RESOURCE PROTECTION AREAS AND ENVIRONMENTAL QUALITY CORRIDOR AREAS EXIST ON THIS PROPERTY, AS SHOWN ON SHEETS 2-6 AND 8-9.*
8. *THE PROPERTY IS SERVED BY PUBLIC WATER AND SANITARY SEWER FACILITIES.*
9. *THERE ARE NO KNOWN UTILITY EASEMENTS WITH A WIDTH OF 25 FEET OR MORE ON THE PROPERTY.*
10. *THERE ARE NO KNOWN HAZARDOUS OR TOXIC SUBSTANCES OR HAZARDOUS WASTES EXISTING, GENERATED, UTILIZED, STORED, TREATED, AND/OR DISPOSED OF ON THIS SITE.*
11. *THE TRAILS PROPOSED ON THE COMPREHENSIVE PLAN/COUNTYWIDE TRAILS PLAN THE LEE ROAD AND STONECROFT BOULEVARD FRONTAGES OF THIS PROPERTY ARE CURRENTLY EXISTING, AS SHOWN ON SHEETS 8 AND 9 THE COMPREHENSIVE PLAN/COUNTYWIDE TRAIL PLAN DOES NOT PROPOSE ANY OTHER TRAILS ON THE PROPERTY. SUBJECT TO COUNTY APPROVAL, APPLICANT RESERVES THE RIGHT TO CONSTRUCT A PRIVATE PEDESTRIAN TRAIL SYSTEM ON THE PROPERTY, INCLUDING POTENTIAL LOCATIONS WITHIN THE FLOOD PLAIN ALONG THE EXISTING SANITARY SEWER EASEMENTS.*
12. *THIS PROPERTY IS SUBJECT TO PROFFERS ACCEPTED PURSUANT TO THE APPROVAL OF RZ 78-S-063 AND PCA 78-S-063-3.*
13. *THE USES PROPOSED ON THIS PLAT WILL CONFORM TO ALL APPLICABLE ORDINANCES, REGULATIONS, ADOPTED STANDARDS AND ANY APPLICABLE CONDITIONS IMPOSED IN CONJUNCTION WITH THE GRANTING OF A SPECIAL EXCEPTION.*
14. *THE APPLICANT RESERVES THE RIGHT TO APPLY THE LAND AREA(S) WITHIN ANY APPLICABLE DEDICATION(S) FOR PUBLIC RIGHT-OF-WAY PURPOSES FOR USE IN DETERMINING THE FLOOR AREA RATIO FOR THE SITE.*
15. *ALL SIGNAGE SHALL BE IN CONFORMANCE WITH ARTICLE 12 OF THE ZONING ORDINANCE.*
16. *MOBILE AND LAND BASED TELECOMMUNICATION FACILITIES SHALL BE PERMITTED AS PROVIDED FOR IN SECTION 2-514 OF THE ZONING ORDINANCE.*
17. *THIS PROJECT WILL BE DESIGNED TO MEET LEED CERTIFICATION.*
18. *MECHANICAL, ELECTRICAL, AND TELECOMMUNICATION EQUIPMENT LOCATED ON TOP OF THE BUILDINGS SHALL NOT BE HIGHER THAN THE PENTHOUSE ROOF ELEVATION AND SHALL BLEND IN ARCHITECTURALLY WITH THE PRIMARY STRUCTURE.*
19. *RPA APPROVED JULY 29, 2008 - PLAN No. 6178-RPA-004-01.*

SHEET INDEX

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2. SPECIAL EXCEPTION / GENERALIZED DEVELOPMENT PLAN OVERVIEW
3-4. SPECIAL EXCEPTION PLAT / GENERALIZED DEVELOPMENT PLAN
5-6. GEOMETRIC PLAN
7. EXISTING VEGETATION MAP (EVM)
7A-7H. STREAM RESTORATION CONCEPT PLAN
8-9. EXISTING CONDITIONS
10-10A. LANDSCAPING
10B. BUILDING #1 PLAZA ENLARGEMENT
10C-10D. TREE PRESERVATION PLAN
11-11A. GARAGE ELEVATIONS AND SECTIONS
12. PLANT IMAGE BOARD - DECIDUOUS
12A. PLANT IMAGE BOARD - EVERGREEN TREES
12B. PLANT IMAGE BOARD - UNDERSTORY TREES
13. STORM WATER INFORMATION AND ADDITIONAL ZONING TABULATIONS
13A. BMP MAP
14. ANGLE OF BULK PLANE DIAGRAMS
15. CONCEPT PERSPECTIVES

COMMONWEALTH OF VIRGINIA
JOHN P. GASTON
Lic.No. 035787
12/17/08
PROFESSIONAL ENGINEER

RECEIVED
Department of Planning & Zoning

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLAT)
See Proffers dated 3/9/09
SE conditions dated ~~12/31/2009~~ 2/23/09 (WOD)
Date of (BOS) (PC) approval 2/23/09
Sheet ____ of 31

BURGESS & NIPLE
4160 PLEASANT VALLEY ROAD, CHANTILLY, VA 20151-1226
PH. (703) 631-9630 FAX (703) 631-6041

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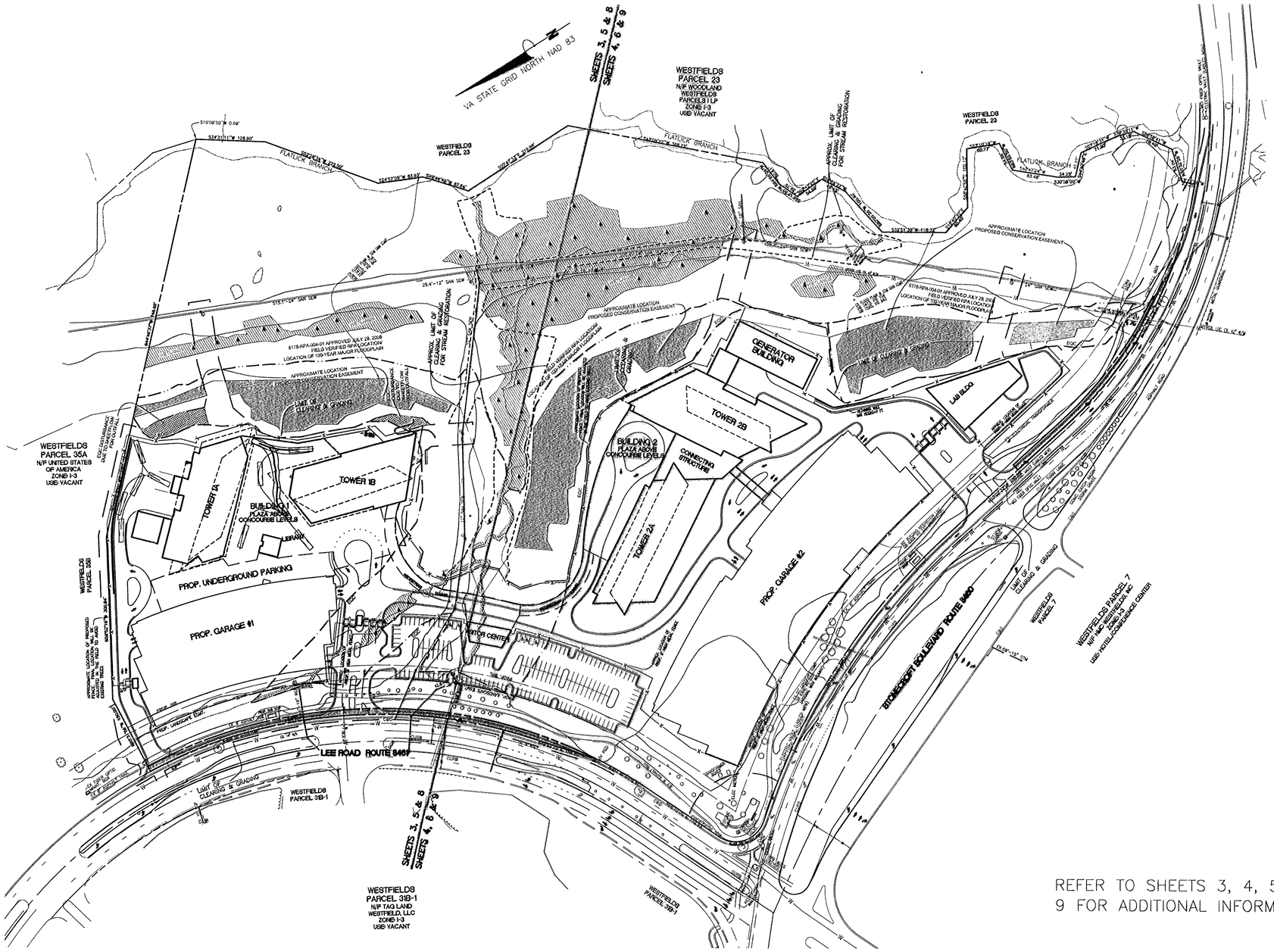

REFER TO SHEETS 3, 4, 5, 6, 8 AND 9 FOR ADDITIONAL INFORMATION/DETAILS

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SCALE: 1" = 100'

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ADDRESS COMMENTS	DEC. 17, 2008
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ADDRESS COMMENTS	OCT. 28, 2008
ADD TRANSPORTATION ITEMS	
ADDRESS PRE-STAFFING COMMENTS	OCT. 9, 2008
REVISED PER COUNTY COMMENTS	SEPT. 4, 2008
	JULY 01, 2008

SPECIAL EXCEPTION AND GENERALIZED DEVELOPMENT PLAN OVERVIEW
AEROSPACE CORPORATION WESTFIELDS, PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN P. GASTON
No. 035787
PROFESSIONAL ENGINEER

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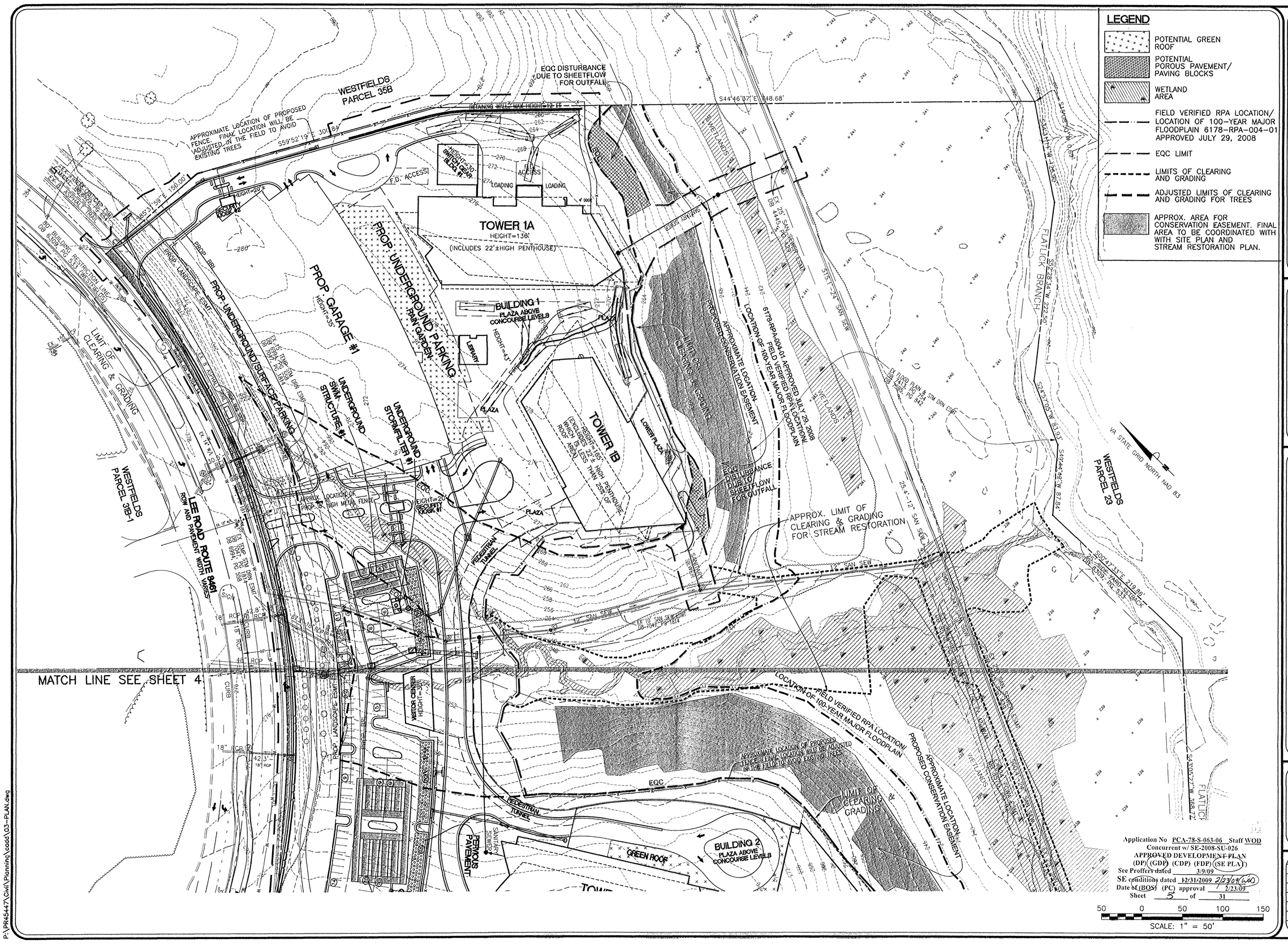

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AEROSPACE CORPORATION
WESTFIELDS, PARCEL 35

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FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN P. GASTON
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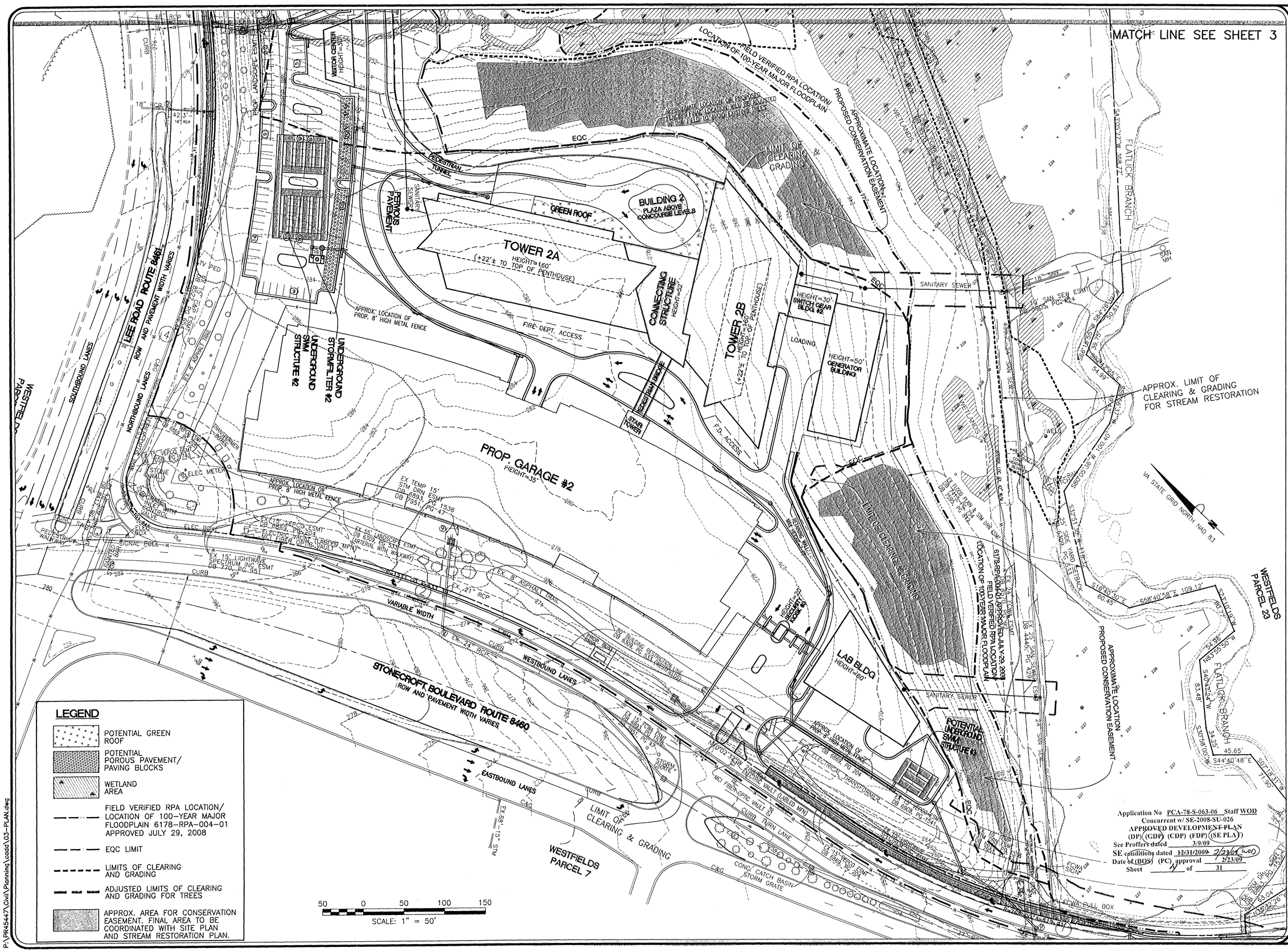

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AEROSPACE CORPORATION WESTFIELDS, PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

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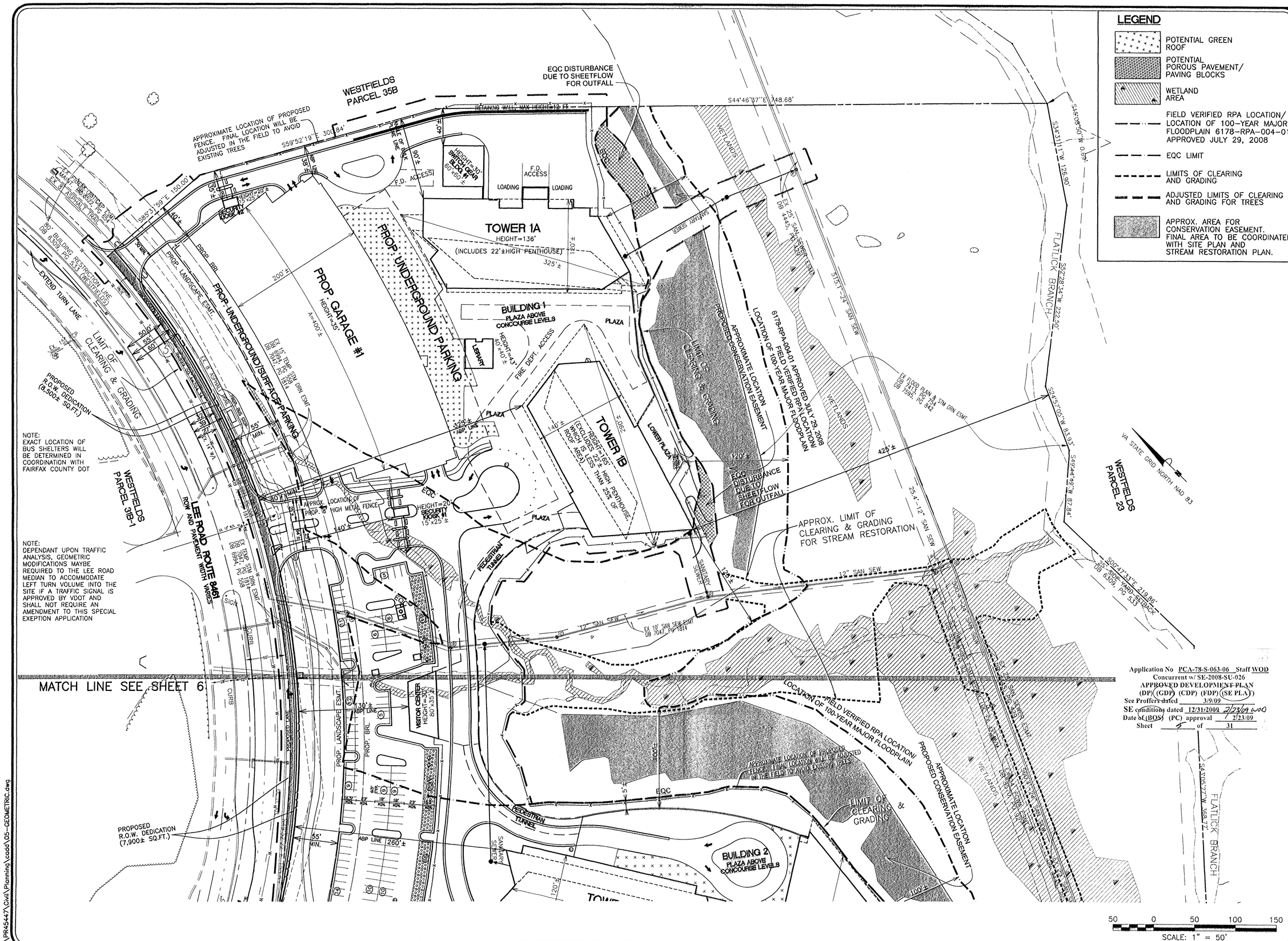

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GEOMETRIC PLAN

AEROSPACE CORPORATION WESTFIELDS, PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN P. GASTON
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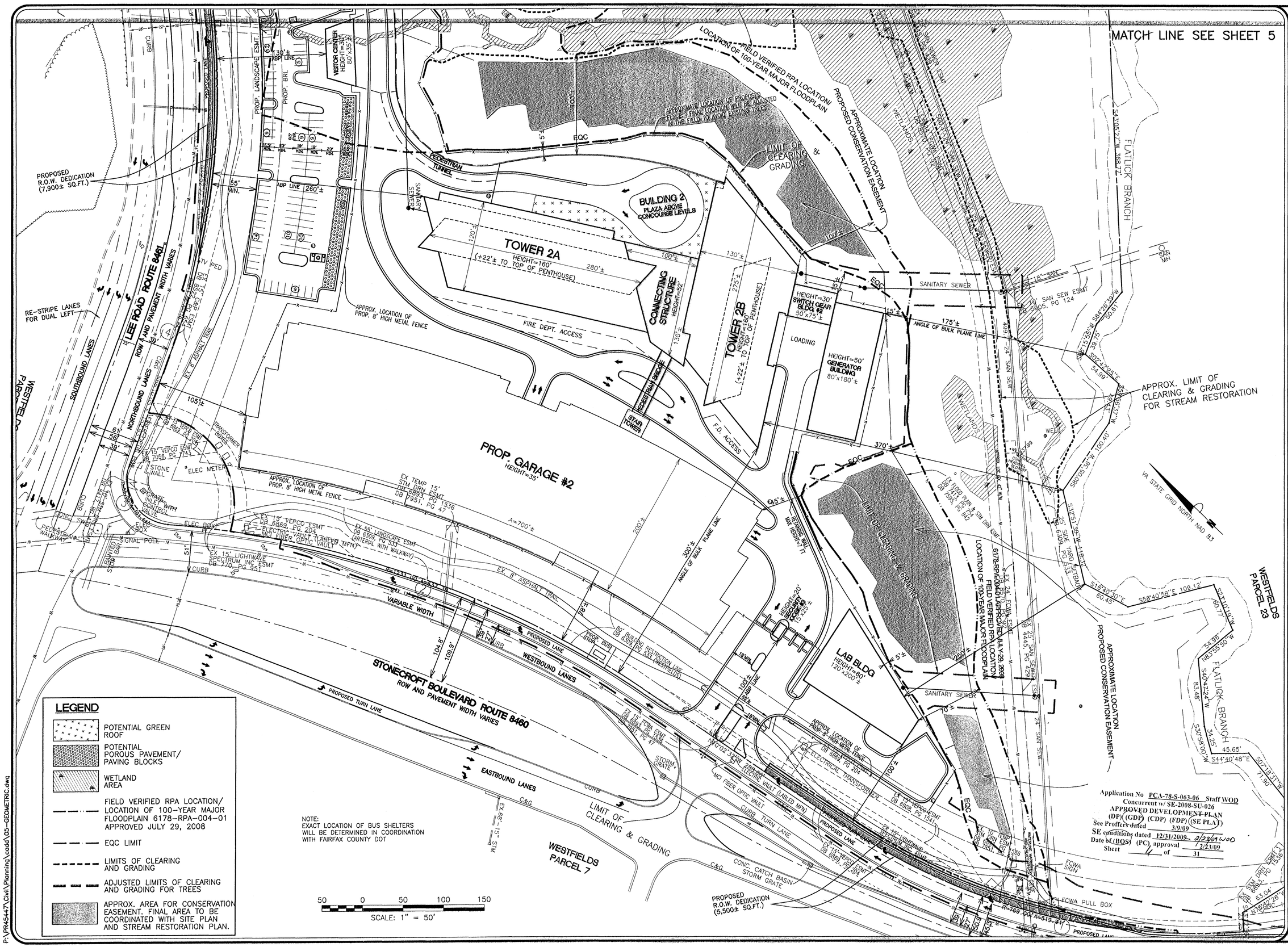

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GEOMETRIC PLAN

AEROSPACE CORPORATION WESTFIELDS, PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

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NOTES:

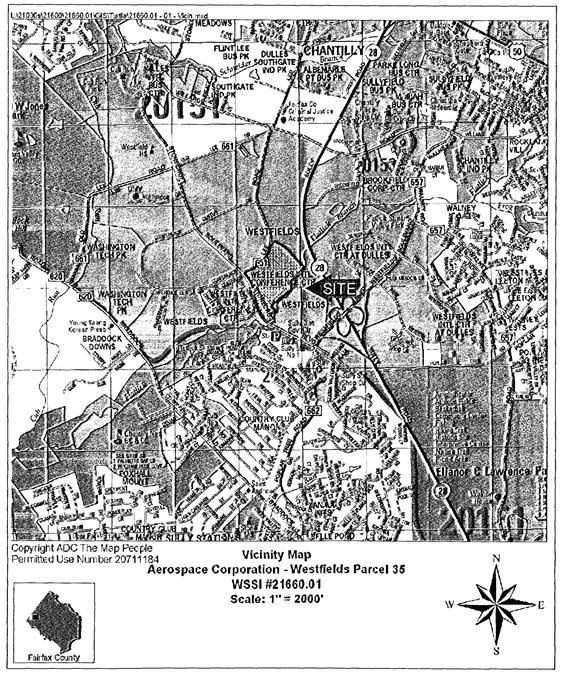
1. This Existing Vegetation Map is based upon examination of background materials, such as the USGS Manassas, VA, 1994 & Herndon, VA 1994 topographic quadrangle, existing topography, the Fairfax County Soils Map, the National Wetlands Inventory Map, and aerial photography, as well as a field verification performed by Jean M. Tufts, WPIT, and Jeffrey A. Browning, WPIT, of Wetland Studies and Solutions, Inc. (WSSI) on January 25, 2008.

2. Topography and boundary information provided by Burgess & Niple, Inc., and a Spring 2004 WSSI Color Infrared Aerial Photograph, were used as the base for this exhibit.

3. Waters of the U.S. delineation information shown hereon, was performed by WSSI as described in a report dated February 13, 2008. A jurisdictional determination from the U.S. Army Corps of Engineers verifying these boundaries is pending.

LEGEND

- SITE BOUNDARY
- VEGETATION COMMUNITY BOUNDARY
- PERENNIAL STREAM (PER WSSI FIELD INVESTIGATION AND FAIRFAX COUNTY CHESAPEAKE BAY MAPPING, SEE NOTE 3)
- INTERMITTENT STREAM (PER WSSI FIELD INVESTIGATION AND FAIRFAX COUNTY CHESAPEAKE BAY MAPPING, SEE NOTE 3)
- WETLAND BOUNDARY (SEE NOTE 3)



Vicinity Map
Aerospace Corporation - Westfields Parcel 35
WSSI #21660.01
Scale: 1" = 2000'

EXISTING VEGETATION MAP SUMMARY TABLE

VEGETATION COMMUNITY	COVER TYPE	PRIMARY SPECIES	SUCCESSIONAL STAGE	CONDITION*	ACREAGE (ac)	COMMENTS
A	Upland Forest	Oak/Hickory	Sub-Climax	Good	21.44	See Condition Description
B	Bottomland Forest	American Sycamore	Long Term Sub-Climax	Good	9.59	See Condition Description
C	Bottomland Forest	Red Maple/Black Gum	Early Successional	Fair-Good	3.66	See Condition Description
D	Upland Forest	Virginia Pine	Early Successional	Fair	0.35	See Condition Description
E	Maintained Grassland	Red Oak/White Oak	N/A	Fair-Good	3.95	See Condition Description
F	Open Field	Eastern Red Cedar	Early Successional	Fair-Good	1.05	See Condition Description
G	Developed	White Pine	N/A	Good	0.37	See Condition Description
Total Approximate Acreage*					40.41	

CONDITION DESCRIPTION:

A. Area A is a mature upland forest in good overall condition and comprises the majority of the site. The canopy is dominated by white oak (*Quercus alba*). Sub-dominants include mockernut hickory (*Carya alba*), pignut hickory (*Carya glabra*), American beech (*Fagus grandifolia*), and red oak (*Quercus rubra*). The understory includes the species found in the canopy. The herbaceous layer is virtually absent due to the time of year the field verification was conducted, and there are only a few sparse colonies of blueberry (*Vaccinium* sp.) in some areas. Few mature dead trees were noted within the stand.

B. Area B is a mature bottomland forest in good overall condition in the southeastern portion of the site and is associated with the floodplain of Flatlick Branch. The canopy is dominated by mature American sycamore (*Platanus occidentalis*), pin oak (*Quercus palustris*), and tulip poplar (*Liriodendron tulipifera*). Other tree species include green ash (*Fraxinus pennsylvanica)*, Amercian elm (*Ulmus americana*), and red maple (*Acer rubrum*). The understory includes pawpaw (*Asimina triloba*) and coralberry (*Symphoricarpos orbiculatus*). Few mature dead standing trees are present within the stand. Younger pioneer species occur along the edge of the utility right-of-way, primarily river birch (*Betula nigra*).

C. Area C consists of a young bottomland forest in the central portion of the site and is associated with unnamed tributaries to Flatlick Branch. A non-maintained sewerline easement is also located in this area. Dominant species include sweet gum (*Liquidambar styraciflua*) and red maple. Other tree species include black gum (*Nyssa sylvatica)* and river birch. Herbaceous dominants include stout wood reedgrass (*Cinna arundinacea*), greenbriar (*Smilax rotundifolia*), and blunt broom sedge (*Carex tribuloides*.)

D. Area D consists solely of a group of young Virginia pines (*Pinus virginiana*) in the northwestern portion of the site. No other species are present within the stand.

E. Area E consists of maintained grassland (that includes a bike path) along the northern and western boundaries of the site. Scattered mature trees include some native and some non-native tree species including white oak, red oak, bird cherry (*Prunus avium*), eastern red cedar (*Juniperus virginiana*), Bradford pear (*Pyrus calleryana*), Virginia pine and red maple. Area E also includes a utility right-of-way in the central portion of the site.

F. Area F consists of an open field dominated by eastern red cedar. Bradford pear is also naturalizing in the field. The trees are young, but well established.

G. Area G consists of a developed area including several volley ball courts. Several mature white pine (*Pinus strobus*) are planted between Stonecroft Boulevard and the courts.

Wetland Studies and Solutions, Inc.
5300 Wellington Branch Drive • Suite 100
Gainesville, Virginia 20155
Phone: 703-679-5600 • Fax: 703-679-5601
www.wetlandstudies.com

EGETATION MAP

Construction Limited Partnership

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLA)
See Proffers dated 3/9/09
SE conditions dated ~~12/31/2009~~ 2/23/09 (PC)
Date of (BOS) (PC) approval 2/23/09
Sheet 7 of 31

Aerospace Corporation - Westfields Parcel 35

Fairfax County, Virginia

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COMMONWEALTH OF VIRGINIA
MICHAEL F. ADAMS
Lic. No. 045587
12/7/08
PROFESSIONAL ENGINEER

REVISIONS

No.	Date	Description	Rev. By	App. By
1	7/1/08	Revised acreage numbers	BNR	MH
1	12/17/08	Revision date added (no changes)	BNR	MH

DATE: February 2008 SCALE: 1" = 100'

Horizontal Datum: VCS NAD 83
Vertical Datum: NGVD 29
Boundary and Topo Source: Burgess & Niple, Inc.

Design	Draft	Approved
JMT	JMT	LABG/MH

Sheet # 7 of

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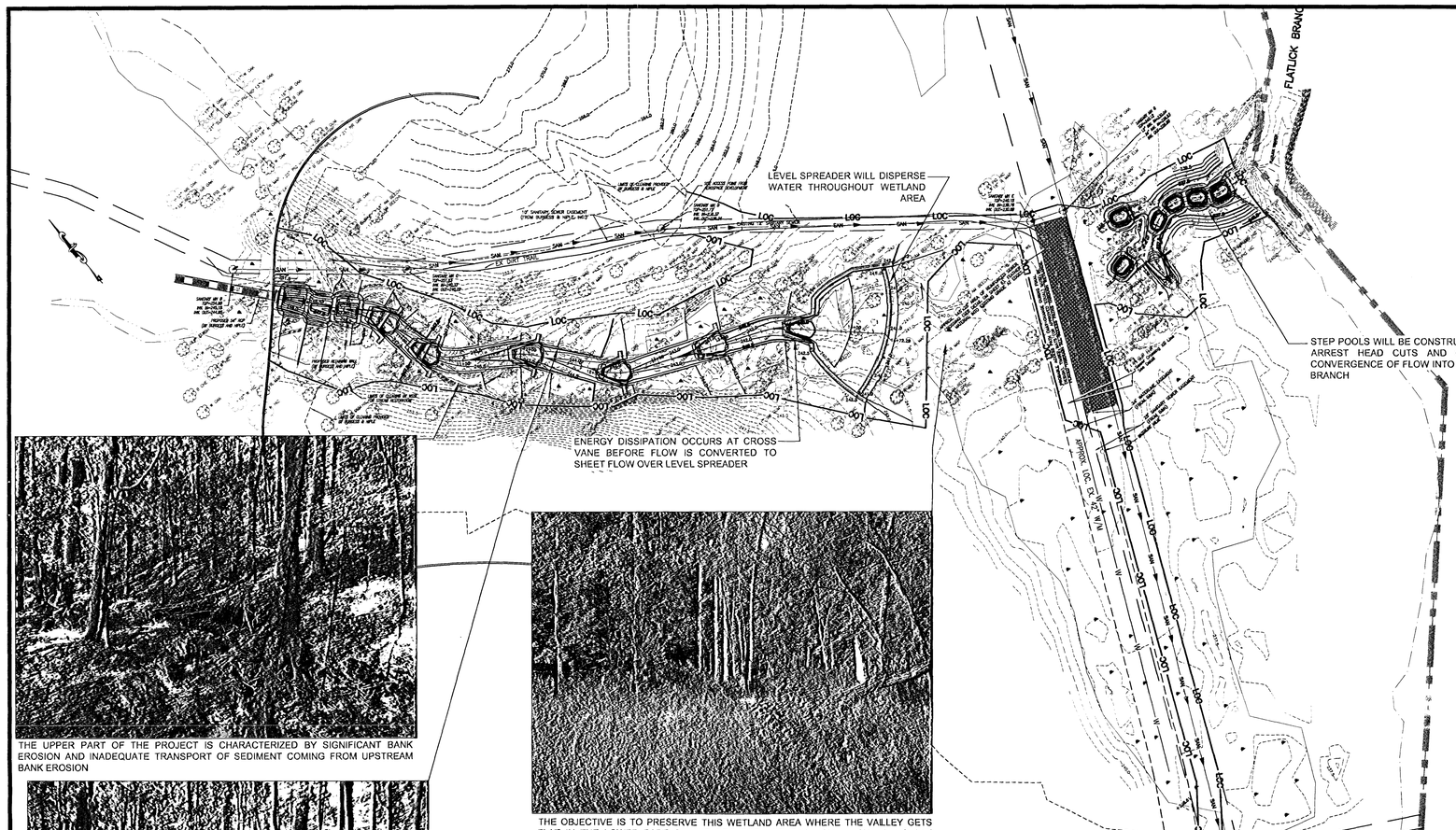


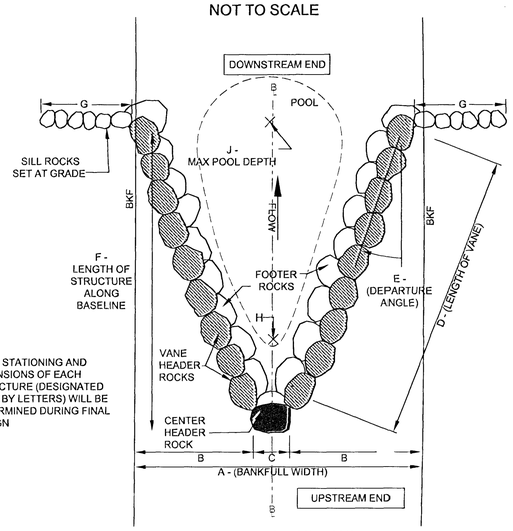
THE UPPER PART OF THE PROJECT IS CHARACTERIZED BY SIGNIFICANT BANK EROSION AND INADEQUATE TRANSPORT OF SEDIMENT COMING FROM UPSTREAM BANK EROSION

THE OBJECTIVE IS TO PRESERVE THIS WETLAND AREA WHERE THE VAILLEY GETS FLAT IN THE LOWER PART OF THE PROJECT. SEVERAL SMALL CHANNELS ARE PRESENT IN THIS AREA THAT FEED WATER THROUGHOUT THE WETLAND.

THE IMAGE SHOWS THE UPPER PORTION OF THE TRANSITION INTO THE WETLAND AREA. A SHORT DISTANCE DOWNSTREAM OF THIS POINT IS WHERE THE CHANNEL FLOW WILL BE TRANSFERRED TO SHEET FLOW.

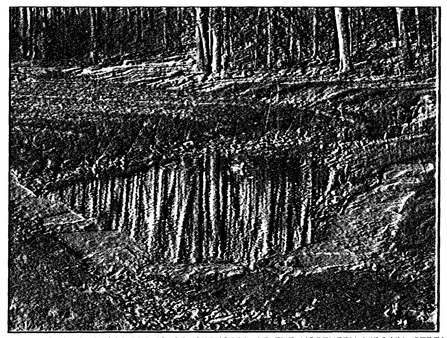
CROSS VANE

NOT TO SCALE



FINAL STATIONING AND DIMENSIONS OF EACH STRUCTURE (DESIGNATED HERE BY LETTERS) WILL BE DETERMINED DURING FINAL DESIGN

CENTER HEADER BOULDER IS KEYED IN UPSTREAM OF ADJACENT SURFACE BOULDERS



THIS VIEW SHOWS CROSS VANES CONSTRUCTED AT THE NORTHERN VIRGINIA STREAM RESTORATION BANK, SNAKEDEN REACH 3. SIMILAR STRUCTURES WILL BE UTILIZED ON THIS PROJECT TO CONTROL GRADE AND PROVIDE IN-STREAM HABITAT AND BANK PROTECTION.

THIS VIEW SHOWS THE NORTHERN VIRGINIA STREAM RESTORATION BANK, SNAKEDEN REACH 1 LOOKING DOWNSTREAM TO ILLUSTRATE THE CONNECTION OF THE CHANNEL WITH A PLANTED RIPARIAN AREA. FOR THIS PROJECT, THE SLOPE OF THE FLOODPLAIN WILL BE VIRTUALLY FLAT TO PROMOTE FREQUENT ACCESS OF HIGH FLOWS TO THE ADJACENT WETLAND AREAS.

DESIGN SUMMARY:

STREAM RESTORATION IS PROPOSED FOR THE UNNAMED TRIBUTARY TO FLATLICK BRANCH AS PART OF THE AEROSPACE CORP WESTFIELDS PARCEL 35 DEVELOPMENT. BASED ON SITE PLANS AND HYDROLOGIC DATA PROVIDED BY BURGESS AND NIPLE, GRADING CHANGES ON THE SITE REDIRECT THE MAJORITY OF STORMWATER THROUGH A PROPOSED 54" RCP INTO THE UNNAMED TRIBUTARY. THIS DISCHARGE IS CONVEYED THROUGH A SECTION OF THE UNNAMED TRIBUTARY THAT WILL BE RESTORED TO A STABLE PATTERN AND PROFILE USING NATURAL CHANNEL DESIGN CONCEPTS. A LEVEL SPREADER IS INCORPORATED IN ORDER TO PRESERVE THE STABLE FORESTED WETLAND LOCATED DOWNSTREAM OF THE PROPOSED 54" RCP. THE LEVEL SPREADER IS DESIGNED TO EVENLY DISTRIBUTE THE FLOW INTO THE EXISTING WETLAND AT NON-EROSIVE VELOCITIES. CHANNEL STABILIZATION IS PROPOSED WHERE THE FLOW CONVERGES AND RETURNS TO FLATLICK BRANCH. CROSS VANES AND STEP POOLS ARE ADDED TO PREVENT CHANNEL EROSION FROM ADVANCING UPSTREAM, WHICH COULD PUT UTILITIES AND WETLAND AREAS AT RISK.

CONCEPTUAL LAYOUT NOTES:

1. THIS PLAN IS FOR CONCEPTUAL PURPOSES ONLY AND SHALL NOT BE USED FOR CONSTRUCTION.
2. PRIOR TO THE DEVELOPMENT OF A FINAL DESIGN PLAN, FURTHER HYDROLOGIC/HYDRAULIC STUDY SHALL BE CONDUCTED TO REFINE THE DIMENSIONS OF THE PROPOSED CHANNEL. THE CURRENT DIMENSIONS ARE BASED ON THE 2-YR OUTFALL DISCHARGE PROVIDED BY BURGESS AND NIPLE AND MAY CHANGE.
3. THE DIMENSIONS OF THE FLOW DISSIPATION STRUCTURE MAY BE ALTERED AFTER H&H MODELING OF THE STRUCTURE.
4. LOCATION AND DETAILS OF STRUCTURES MAY CHANGE DURING FINAL DESIGN.
5. THE DETAIL SHOWN IS FOR ILLUSTRATIVE PURPOSES AND MAY NOT DEPICT FINAL DESIGN DIMENSIONS OR SPECIFICATIONS. OTHER DETAILS WILL ALSO BE DEVELOPED FOR FINAL DESIGN
6. REVEGETATION PLAN WILL CONSIST OF RIPARIAN AND FORESTED WETLAND PLANTINGS AS APPROPRIATE.

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
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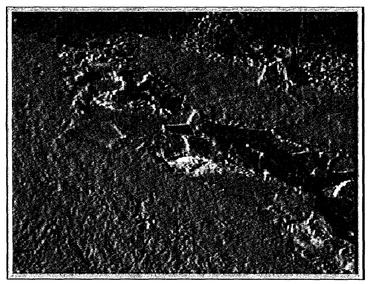
See Proffers dated 3/9/09
SE conditions dated 12/31/2009 2/23/09 WOD
Date of (BOS) (PC) approval 2/23/09
Sheet 6 of 31



THIS VIEW SHOWS STEP POOLS CONSTRUCTED AT THE NORTHERN VIRGINIA SREAM RESTORATION BANK, SNAKEDEN REACH 4. THESE ARE SIMILAR TO WHAT WILL BE CONSTRUCTED AT THE DOWNSTREAM COLLECTION POINTS AND AT THE UPSTREAM END OF THE PROJECT AT THE OUTFALL

GRAPHIC SCALE

50 0 25 50 100 200

(IN FEET) 1 inch = 50 feet

CONCEPTUAL PLAN. NOT FOR CONSTRUCTION

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5300 Wellington Branch Drive, Suite 100 • Gainesville, VA 20155
Phone 703 679 5600 • Fax 703 679 5601
wetlandstudies.com

AEROSPACE CORP WESTFIELDS PARCEL 35
STREAM RESTORATION CONCEPT PLAN

Fairfax County, Virginia

Overall Site Exhibit

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COMMONWEALTH OF VIRGINIA
MICHAEL F. ADAMS JR.
Lic. No. 045587
12/12/
PROFESSIONAL ENGINEER

REVISIONS

No.	Date	Description	Rev. By	App. By

DATE: DECMEBER 17, 2008 SCALE: 1"=50'

Horizontal Datum: VCS NAD 83

Vertical Datum: NGVD 29

Boundary and Topo Source: WSSI

Design	Draft	Approved
MFA	RDD	MFA

Sheet #

7A

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Stream Restoration Success Criteria: The initial success criteria shall be:

(1) With respect to reforested riparian buffer areas:

(a) Plant density of at least 400 living wood stems (including volunteers) per acre of trees and shrubs must be achieved by the end of the first growing season following planting and maintained through the end of the monitoring period or until canopy coverage is greater than 30%, and

(b) Herbaceous plant coverage of at least 60% must be achieved by the end of the first growing season, and at least 80% each monitoring year thereafter.

(c) Woody plant coverage (from live-stakes, tublings, container grown material, and volunteers) along stream banks shall achieve a density of at least 5 l.f./stem by the end of the first growing season and for each monitoring year thereafter.

(2) With respect to the stream and riparian system, the following elements of the restored stream reach shall be assessed using the stated criteria:

(a) Dimension - The analysis of each permanent cross-section specified on the Stream Restoration Site Plan shall indicate that:

(i) The bankfull Cross-Sectional Area did not increase or decrease by an amount greater than 20% of the as-built cross-section.

(b) Pattern - The analysis of the plan-view survey of field measurements shall indicate that:

(i) The Sinuosity of the stream (defined as the stream length along the thalweg divided by the valley length) did not increase or decrease by an amount greater than 0.2 of the as-built pattern.

(c) Profile- The analysis of the longitudinal profile shall indicate that the slope of the longitudinal profile did not increase or decrease by an amount greater than 0.3% of the as-built slope.

(d) Structures - The analysis of each instream structure shall indicate that:

(i) The angle of any rock vane, j-hook, or cross vane did not increase or decrease by an amount greater than 3 degrees from the as-built angle, and remains between 20 and 30 degrees from the tangent to the bankfull at the end of the outside vane arm.

(ii) The slope of any rock vane, j-hook, or cross vane did not increase or decrease by an amount greater than 2% from the as-built slope (i.e. if the design slope was 5%, then any slope from 3% to 7% would be acceptable) and remains between 2% and 7%.

Stream Restoration Monitoring: The monitoring period shall be no more than ten (10) years, unless deficiencies exist at the end of the 10th year, in which case the monitoring period shall be extended (see Section 3c). The Applicant shall perform all necessary work to monitor the restoration in order to demonstrate compliance with the Success Criteria. The Monitoring Program shall follow the guidelines established below:

(1) With respect to reforested riparian buffer areas:

(a) Visual Description. Visual descriptions shall be provided with each monitoring report to Fairfax County. Visual descriptions shall be accomplished by the provision of ground level photographs, taken facing north, south, east, and west, from stations located adjacent to each vegetation plot and hydrology monitoring station [permanent markers shall be established to ensure that the same locations (and view directions) are monitored in each monitoring period].

(b) Vegetation. Sample plots shall be located on a stratified random basis over areas of the site that are reforested riparian buffer areas in order to sample all habitat areas of buffer area at locations adjacent to each photo location marker. A minimum of 3 plots/acre shall be sampled.

Each plot shall be of a size no less than a 30 foot radius for woody plants and a 3 foot diameter for herbaceous plants. Alternative sampling methods may be submitted for DEQ review and approval. The vegetation data shall be collected in the July - November time period and shall include:

(i) Dominant vegetation species identification;

(ii) Coverage assessment;

(iii) Number of woody plant stems (total and #/acre);

(iv) Indicator Status.

(2) With respect to the stream and riparian system:

(a) Woody plant coverage (from live stakes, tublings, container grown material, and volunteers) along stream banks shall be quantified by species and density (5 l.f./stem along the stream bank edge).

(b) Exposure of bank pins (with locations specified on the Stream Restoration Site Plan) shall be measured to provide an assessment of bank erosion in the restored reach.

(c) Scour chains (with locations specified on the Stream Restoration Site Plans) shall be assessed to provide data on sediment movement in the stream bed.

(d) Each Stream Stabilization Structure shall be surveyed, photographed from a permanent monitoring post, or otherwise designated location, established in the first report, visually evaluated for stability, and a narrative statement provided as to whether or not specific Success Criteria have been violated.

(e) To assess channel stability Success Criteria related to cross-sections, four cross sections shall be provided (with permanent markers established the first time in locations specified in the Stream Restoration Site Plan) on a representative mix of riffles and pools at these same time periods.

(f) A surveyed profile of the stream along its thalweg provided as soon as practicable after completion, and in years 1, 3, 5 and 10 and compared to the original design to assess compliance with Success Criteria.

(g) Location of any riparian areas with excessive erosion that needs replanting or protection with rock or coir logs shall be identified.

(h) Within one week after any storm event that exceeds 3.2 inches in 24 hours or 2.0 inches in 2 hours (Fairfax County 2 year storms), the subject stream reach shall be visually inspected for damages. Any damage noted shall be immediately reported to Fairfax County in writing, with supporting photographs, and accompanied by a remediation plan. Photographs and narrative shall be utilized to summarize performance and remediation efforts in the next monitoring report, and shall also be submitted to Fairfax County immediately upon completion of restoration efforts.

(3) Timing of Monitoring Activities: Monitoring activities shall occur during the growing season, and at least:

(a) Prior to restoration activities, as soon as practicable after completion of restoration, and once during the 1st, 2nd, 3rd, 5th, 7th and 10th growing seasons following completion of grading (note that field surveys will be conducted in years 1, 3, 5 and 10);

(b) Monitoring of woody vegetation for the first year or any year following planting shall take place between August and November;

(c) If all Success Criteria have not been met in the 10th year, then a monitoring report (and any necessary corrective actions as noted in the Stream Restoration section's preamble) shall be required for each consecutive year until two annual sequential reports indicate that all criteria have been successfully satisfied (which is an indication that corrective actions were successful).

(d) A final monitoring report (typically prepared the 10th growing season following completion of grading).

Stream Restoration Reports: The Applicant shall submit reports to Fairfax County DPWES describing the conditions of the restoration and relating those conditions to the Success Criteria. Reports shall be submitted by November 30th of each monitoring year and shall contain all data and photos collected in the Monitoring Program, comparison of the data relevant to the Success Criteria with respect to the design plans and previous monitoring reports and as-builts. In the event that the stream restoration fails to meet the success criteria specified herein, the Applicant shall develop the necessary contingency plans and implement appropriate remedial actions until the success criteria are met.

Stream Restoration Maintenance: The stream restoration project shall be placed in a private drainage easement and shall be maintained by the Applicant in perpetuity. The Applicant shall perform all necessary work to maintain the Stream Restoration consistent with the Success Criteria. Corrective actions shall be undertaken to bring deficiencies up to the performance standards described herein, if necessary.

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLAT)
See Proffers dated 3/9/09
SE conditions dated 12/31/2009 3/23/09 WOD
Date of (BOS) (PC) approval 2/23/09
Sheet 9 of 31

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Phone 703 679 5600 • Fax 703 679 5601
wetlandstudies.com

AEROSPACE CORP WESTFIELDS PARCEL 35
STREAM RESTORATION CONCEPT PLAN
Fairfax County, Virginia

Stream Restoration Success Criteria

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COMMONWEALTH OF VIRGINIA
MICHAEL F. ADAMS JR.
Lic. No. 045587
PROFESSIONAL ENGINEER
12/19/08

REVISIONS

No.	Date	Description	Rev. By	App. By

DATE: DECEMBER 17, 2008 SCALE: N/A

Horizontal Datum: VCS NAD 83
Vertical Datum: NGVD 29
Boundary and Topo Source: WSSI

Design	Draft	Approved
MFA	RDD	MFA

Sheet #
7B

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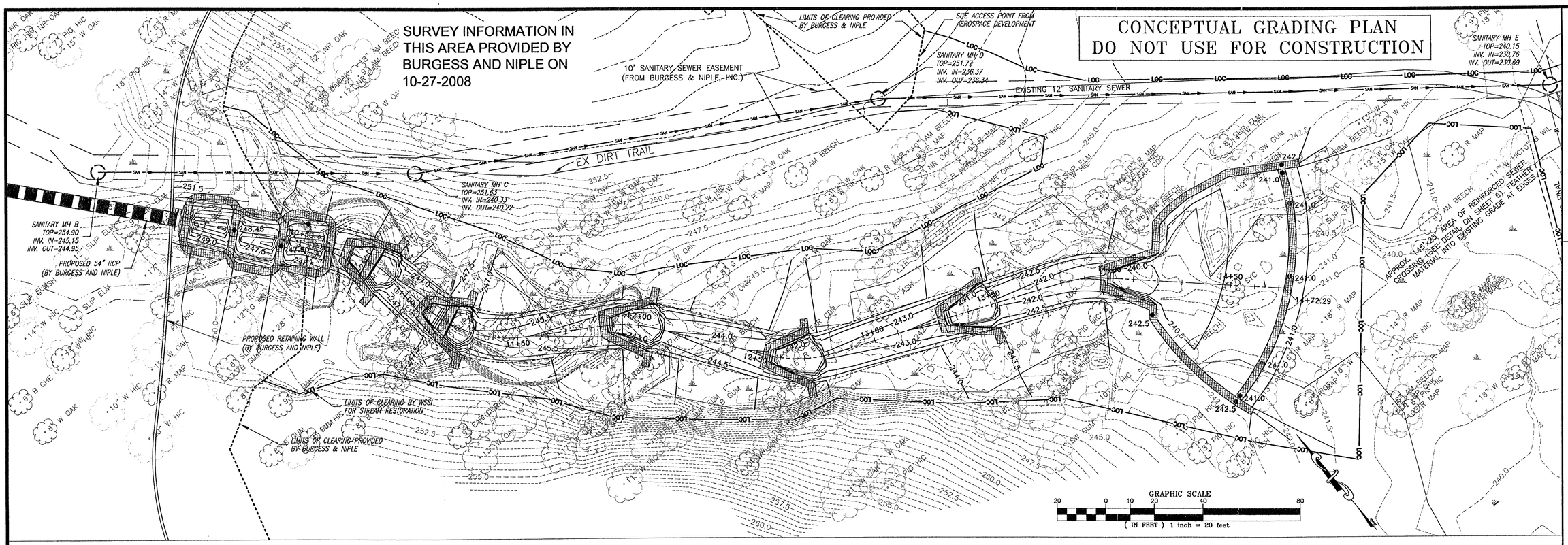

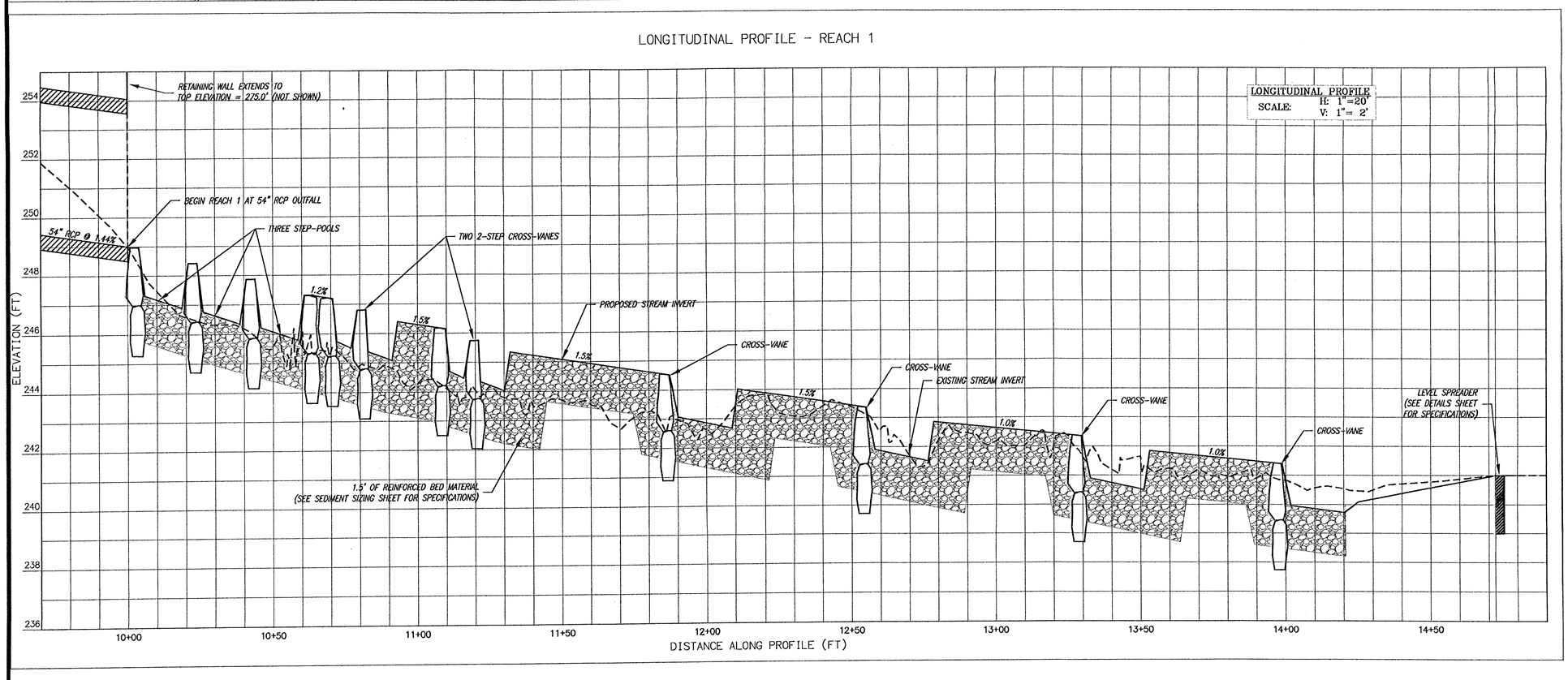

GRADING LEGEND

- BURGESS AND NIPLE 2' CONTOUR
- BURGESS AND NIPLE 10' CONTOUR
- EXISTING CONTOURS (0.5')
- EXISTING INFRASTRUCTURE
- EXISTING EASEMENTS
- PROPOSED CONTOURS (0.5')
- PROPOSED STREAM CENTERLINE
- LIMITS OF CLEARING
- PROPOSED BANKFULL CHANNEL LIMITS
- PROPOSED CROSS VANE
- PROPOSED STEP POOL

PROFILE LEGEND

- EXISTING STREAM INVERT PROJECTED TO PROPOSED CENTERLINE
- PROPOSED STREAM INVERT ALONG PROPOSED CENTERLINE
- STRUCTURE ROCKS
- REINFORCED BED (SEE TYPICAL DETAILS SHEET FOR SPECIFICATIONS)

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AEROSPACE CORP WESTFIELDS PARCEL 35 STREAM RESTORATION CONCEPT PLAN

Fairfax County, Virginia

Grading Plan and Longitudinal Profile - Reach 1

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MICHAEL F. ADAMS JR.
Lic. No. 045587
PROFESSIONAL ENGINEER
12/17/2008

Rev. By	App. By

E: 1" = 20'

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLAT)
See Proffers dated 3/9/09
SE conditions dated 12/31/2009 2/23/09 WOD
Date of (BOS) (PC) approval 2/23/09
Sheet 10 of 31

No.	Date	

DATE: Dece

Horizontal Datum: VCS NAD 83
Vertical Datum: NGVD 29
Boundary and Topo Source: WSSI

Design	Draft	Approved
JTK	JTK	MSR

Sheet # 7C of

Computer File Name:
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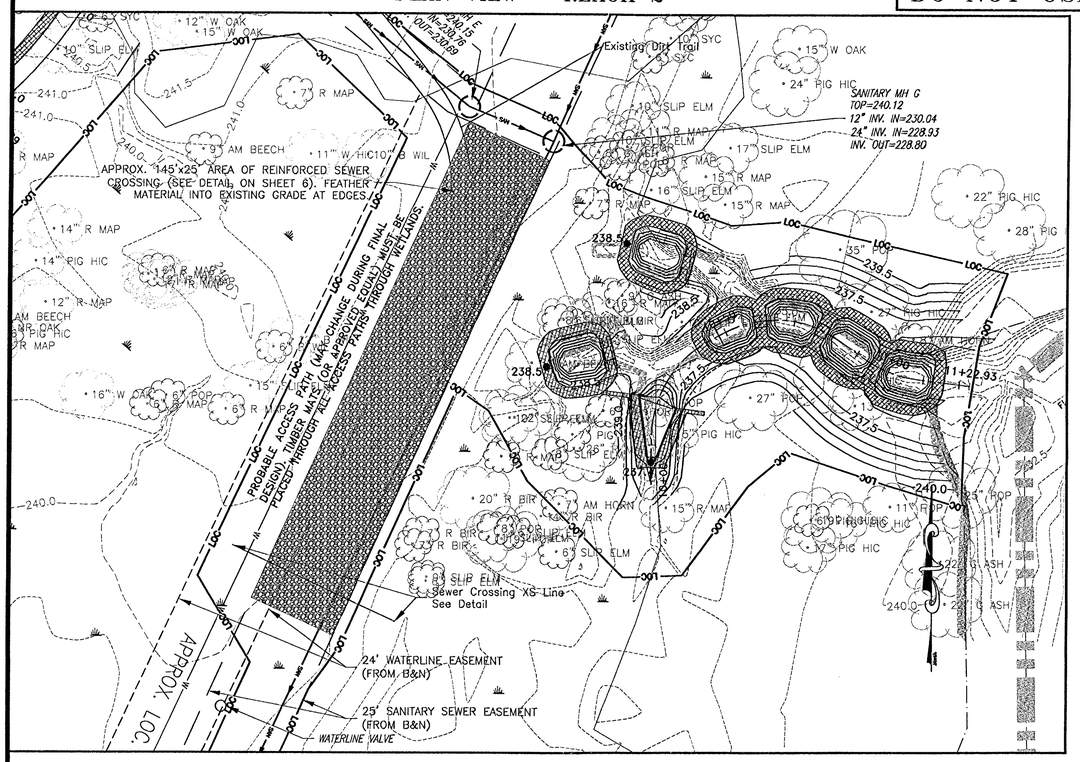
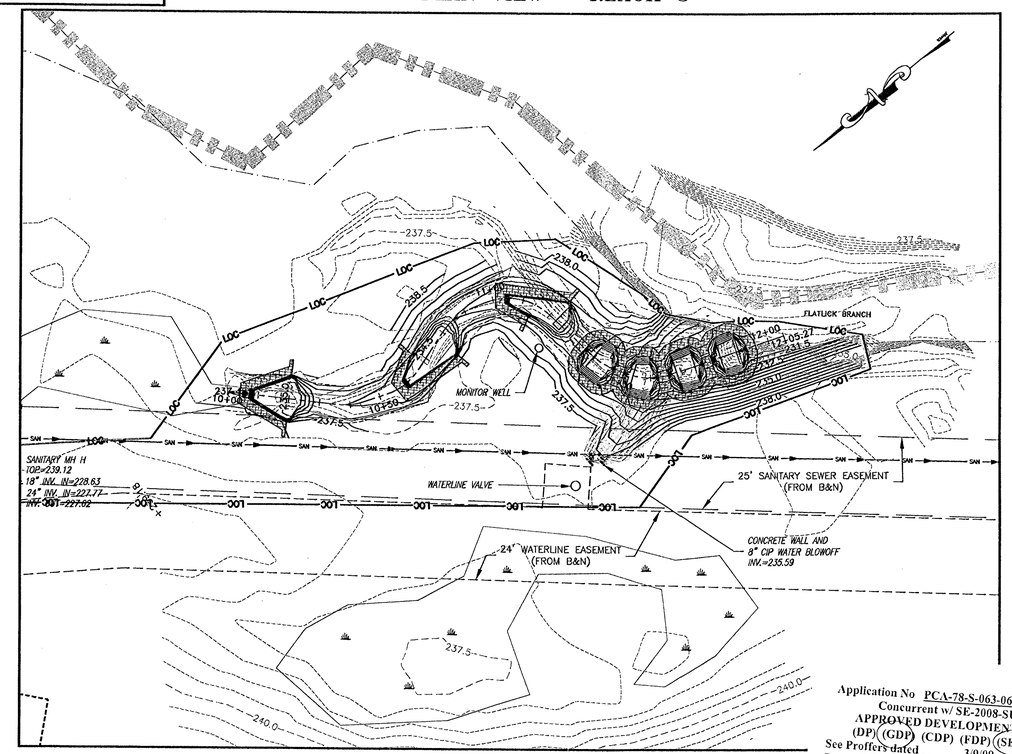
GRADING PLAN & PROFILE 01.dwg

CONCEPTUAL GRADING PLAN
DO NOT USE FOR CONSTRUCTION

PLAN VIEW – REACH 2



PLAN VIEW – REACH 3



Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLAT)
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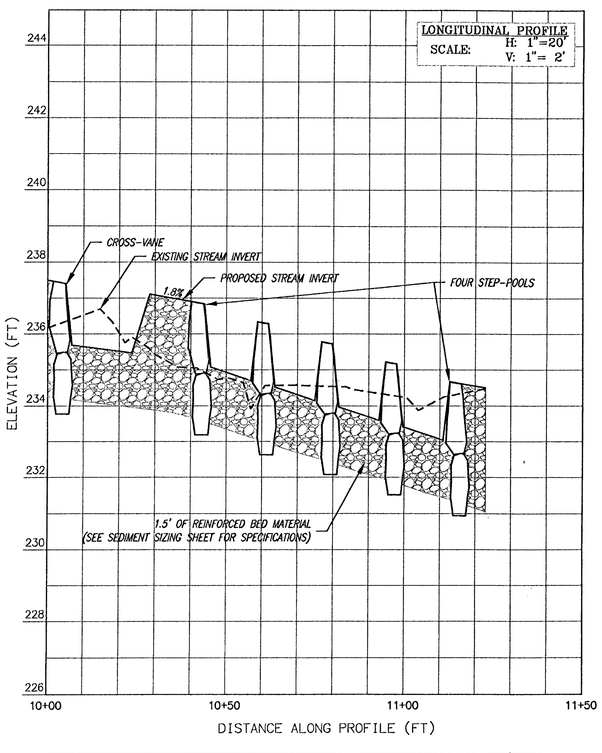
SE conditions dated 12/31/2009 2/23/09 WOD
Date of (BOS) (PC) approval 2/23/09
Sheet 11 of 31

LONGITUDINAL PROFILE – REACH 2



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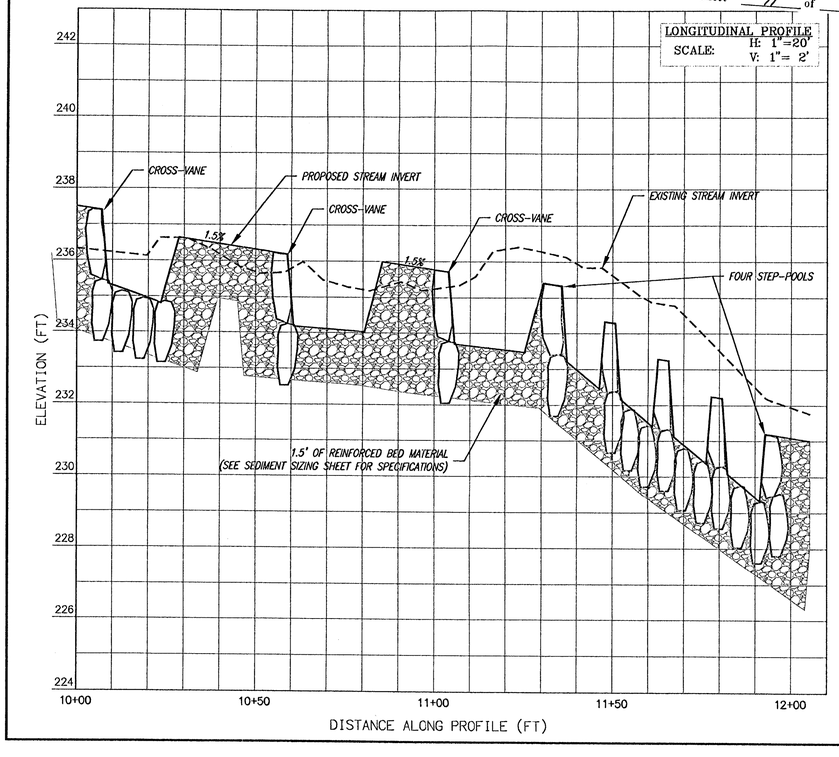

SEE SHEET #3 FOR LEGEND AND NOTES

GRAPHIC SCALE
20 0 10 20 40 80
(IN FEET) 1 inch = 20 feet

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ACE CORP WESTFIELDS PARCEL 35
STREAM RESTORATION CONCEPT PLAN
Fairfax County, Virginia

Grading Plan and Longitudinal Profile - Reach 2 & 3

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MICHAEL F. ADAMS JR.
Lic. No. 045587
PROFESSIONAL ENGINEER

REVISIONS

No.	Date	Description	Rev. By	App. By

SCALE: 1"=20'
DATE: December 17, 2008

Horizontal Datum: VCS NAD 83
Vertical Datum: NGVD 29
Boundary and Topo Source: WSSI

Design	Draft	Approved
JTK	JTK	MSR

Sheet # 7D of

Computer File Name:
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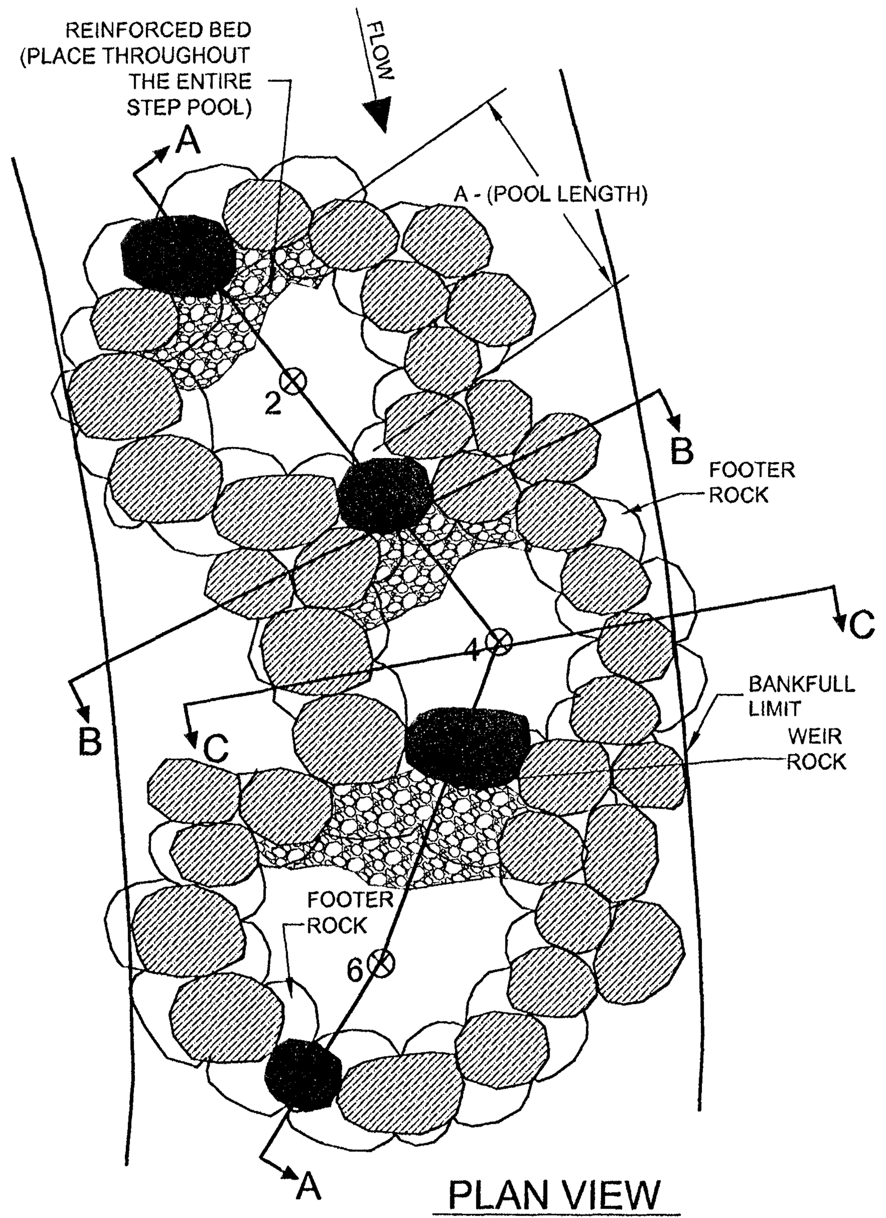
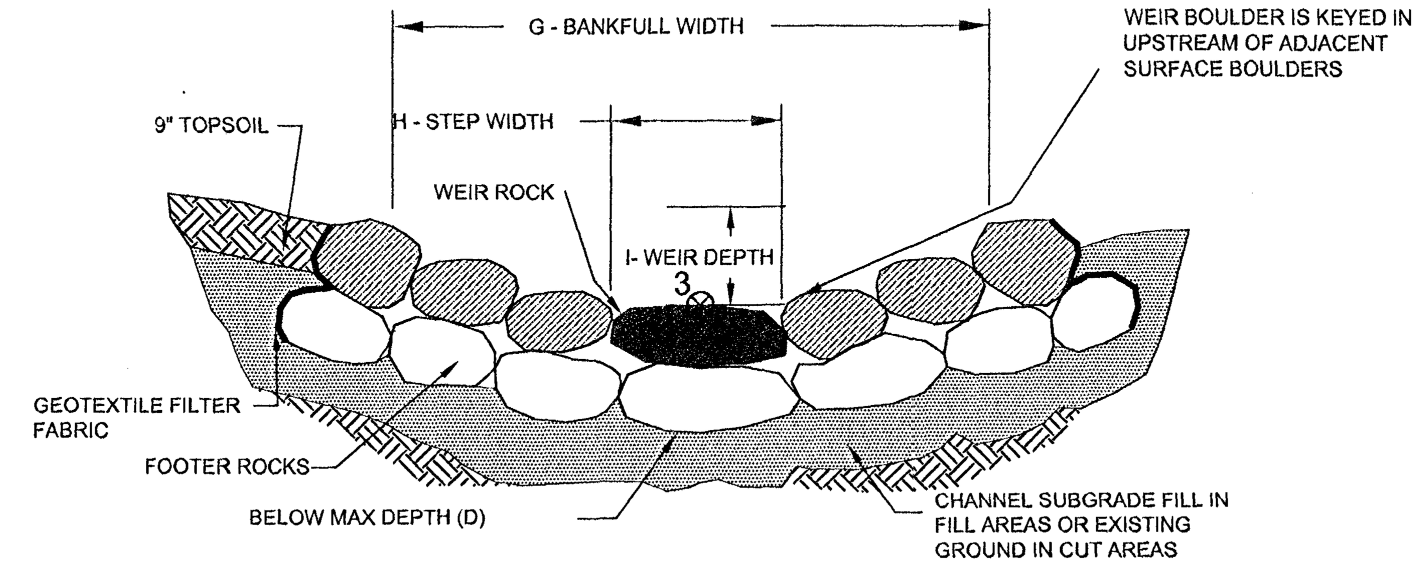
CONCEPTUAL PLAN. NOT FOR CONSTRUCTION

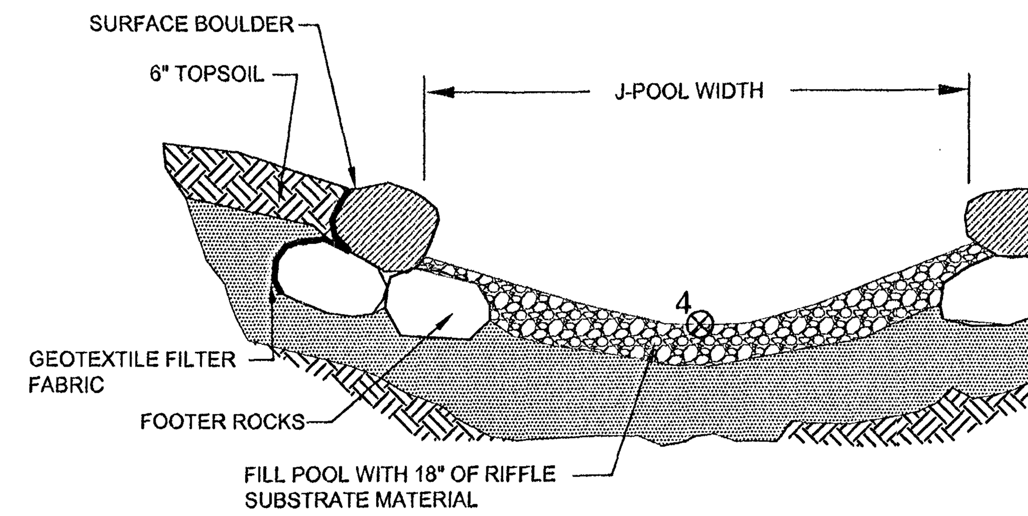


PLAN VIEW
NOT TO SCALE

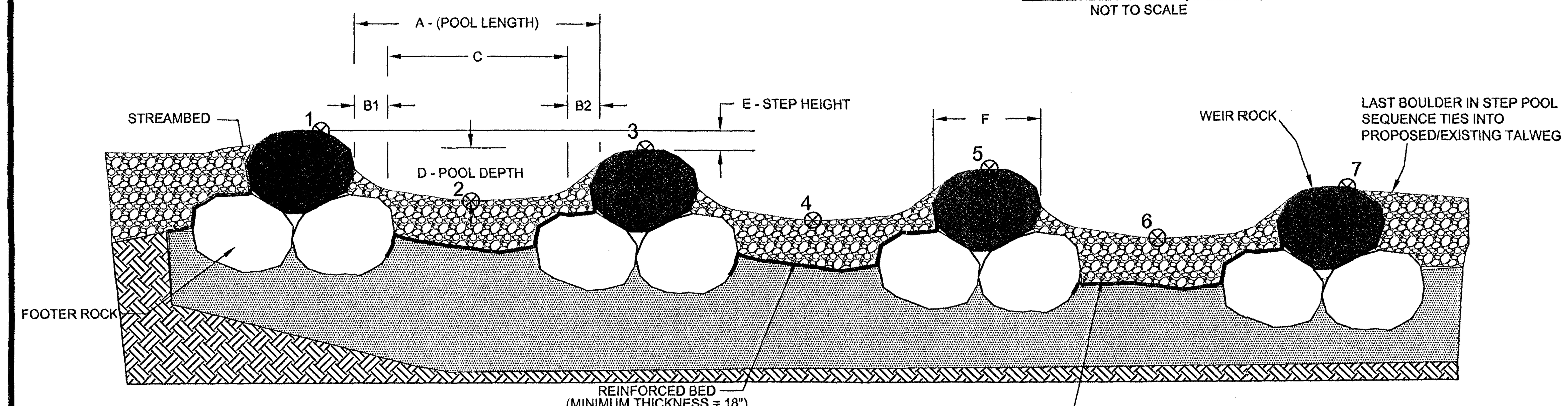
⊗ - STAKEOUT POINT



SECTION B-B (STEP)
NOT TO SCALE

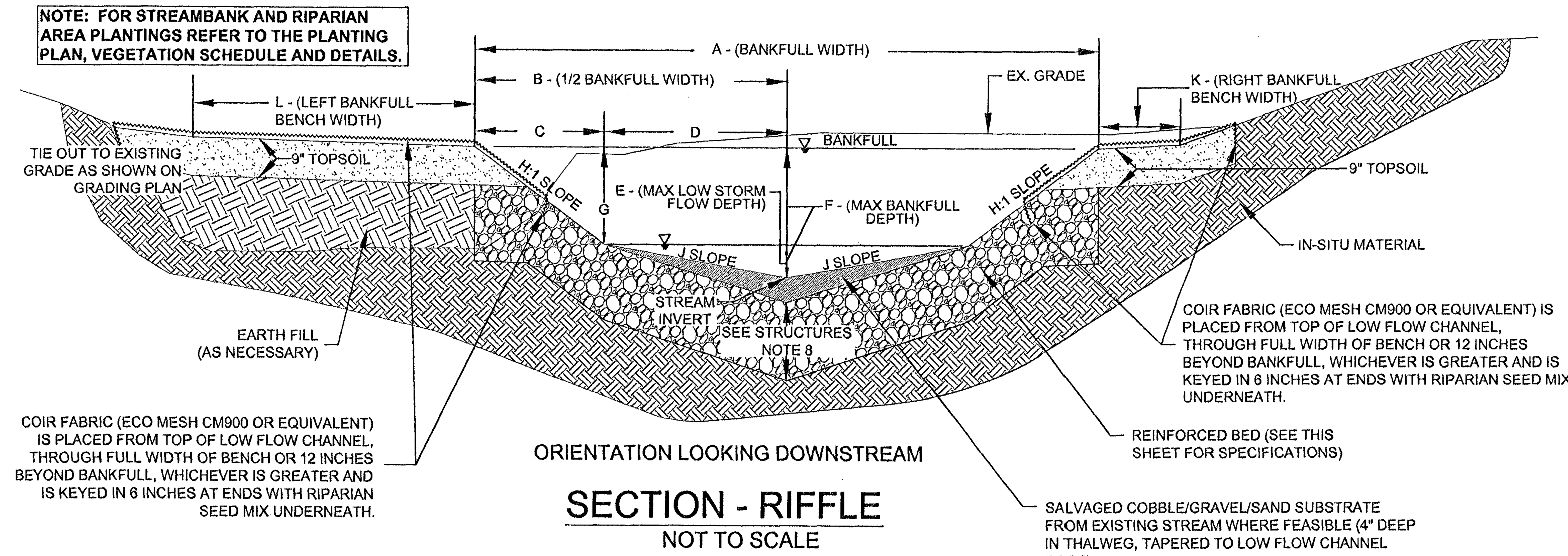


SECTION C-C (POOL)
NOT TO SCALE



SECTION A-A
NOT TO SCALE

STEP POOL
NOT TO SCALE



SECTION - RIFFLE
NOT TO SCALE

SEQUENCE OF CONSTRUCTION

1. PRIOR TO THE START OF ANY EARTH DISTURBANCE THE CONTRACTOR SHALL NOTIFY COE IN ACCORDANCE WITH THE APPROVED PERMIT. IN ADDITION, AN ON-SITE PRE-CONSTRUCTION MEETING SHALL BE HELD TO ENSURE THAT ALL AFFECTED PARTIES (DESIGN ENGINEER, CONTRACTOR, COUNTY STAFF, OWNER, AND PROJECT MANAGER) FULLY UNDERSTAND THE CONSTRUCTION SEQUENCING.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING MISS UTILITY AT 1-800-552-7001 FOR THE LOCATION OF ALL PUBLIC AND PRIVATE UTILITY LINES, PIPES, CABLES, AND ASSOCIATED FEATURES PRIOR TO ANY CONSTRUCTION WORK; ALL UTILITIES SHALL BE CLEARLY IDENTIFIED PRIOR TO CONSTRUCTION BY CONTRACTOR.
3. PRIOR TO ANY EARTH DISTURBING ACTIVITIES ALL NECESSARY EROSION AND SEDIMENT CONTROL MEASURES AND DEVICES SHALL BE INSTALLED AS SPECIFIED ON THE EROSION & SEDMENT CONTROL PLAN.
4. STAKE OUT THE NEW STREAM ALIGNMENT AS SHOWN ON THE GEOMETRY PLAN. PC AND PT POINTS SHALL BE STAKED ALONG THE CENTERLINE AND AT 25-FOOT OFFSETS, IDENTIFIED BY CORRESPONDING CENTERLINE STATION, ON EACH SIDE OF THE PROPOSED CHANNEL. THE CENTER OF EACH CURVE SHALL BE STAKED AND MARKED WITH THE CORRESPONDING RADIUS OF CURVATURE. VERTICAL CONTROL SHALL BE CLEARLY MARKED AT SEVERAL LOCATIONS ALONG THE PROPOSED CHANNEL.
5. CONSTRUCTION SHALL PROCEED FROM UPSTREAM TO DOWNSTREAM, UNLESS AN ALTERNATIVE SEQUENCE IS APPROVED BY THE FIELD ENGINEER.
6. NO WORK SHALL BE STARTED THAT CANNOT BE COMPLETED AND STABILIZED IN ONE DAY.
7. EXCAVATE STREAM CHANNEL TO THE SUBGRADE.
8. PLACE REINFORCED SUBSTRATE MIXTURE IN THE CHANNEL BOTTOM (SEE THIS SHEET FOR MIXTURE SPECIFICATIONS). PRIOR TO PLACING THE ROCK IN THE CHANNEL THE CONTRACTOR SHALL MIX ALL SUBSTRATE COMPONENTS TOGETHER TO ENSURE A UNIFORM MIX IS PLACED THROUGHOUT THE CHANNEL.
9. GRADE THE REMAINING PORTION OF THE CHANNEL AS SHOWN ON THE PLAN. UNLESS SHOWN OTHERWISE, TIE OUT SLOPES SHALL NOT EXCEED 3:1.
10. UPON COMPLETION OF WORK, ALL E&S MEASURES ARE TO REMAIN IN PLACE UNTIL FINAL SITE STABILIZATION IS ACHIEVED, WITH THE EXCEPTION OF THE SANDBAG DIKES AND THE PUMP AROUND DIVERSION.

"REINFORCED BED"[1] MIXTURE SPECIFICATIONS

THE REINFORCED BED MIXTURE SPECIFIED BELOW MUST BE APPROVED BY THE PROJECT ENGINEER PRIOR TO BEING PLACED IN THE STREAM CHANNEL.

MATERIAL	SIZE (D_{50})	BATCH MIX RATIO	PERCENTAGE
ROCK[2]	10.9 in (277 mm)	4 BUCKETS	53-58%
BANK RUN[3] GRAVEL	0.08 - 2.5 in (2 - 64 mm)	2 BUCKETS	25-30%
COARSE SAND[4]	0.04 - 0.08 in (1 - 2 mm)	0.75 BUCKETS	7.5-12.5%
TOPSOIL	LOAM OR SILT LOAM WITH 3-5% ORGANIC CONTENT	0.5 BUCKETS	5-10%

[1] THE REINFORCED BED SHALL BE A MINIMUM OF **18"** IN DEPTH. PORTIONS OF THE STREAM WITH CHANNEL SLOPES GREATER THAN 2.0% SHALL HAVE A MINIMUM REINFORCED BED MATERIAL THICKNESS OF 1.5x THE BED MATERIAL D50. SEE LONGITUDINAL PROFILE FOR LOCATIONS AND THICKNESS.

[2] THE ROCK PORTION OF THE MIXTURE SHALL CONSIST OF CRUSHED STONE (CLASS A1 RIPRAP). THE VOIDS VILLED WITH A MIXTURE OF SAND, GRAVEL, AND TOPSOIL. THE ANGULARITY OF THE CRUSHED ROCK, ALONG WITH THE FILLING OF THE VOIDS, WILL RESULT IN A VERY RESISTANT, ARMORED SUBSTRATE THAT WILL BE CAPABLE OF WITHSTANDING MUCH GREATER SHEAR STRESS THAN THE COMPUTATION OF THE REQUIRED D_{50} WOULD SUGGEST. RIVER WASHED COBBLE (WHITE, TAN, YELLOW, OR BROWN) WITH THE SPECIFIED D_{50} SHALL BE AN ACCEPTABLE ALTERNATE AS LONG AS IT IS WELL GRADED IN SIZE DISTRIBUTION (±6" FROM D_{50}) TO PROVIDE THE ARMOR NEEDED - SUBJECT TO ENGINEERS APPROVAL.

[3] BANK RUN GRAVEL MAY INCLUDE UP TO 5% CLAY, SILT, AND/OR SAND, AND UP TO 25% COBBLE (D_{50} = 3" TO 8"). GRAVEL MUST HAVE NATURAL COLOR (WHITE, TAN, YELLOW, OR BROWN)

[4] THE SAND PORTION OF THE MIXTURE SHALL CONSIST OF A WELL MIXED SAND PREDOMINENTALLY 1.0 MILLIMETERS TO 2.0 MILLIMETERS IN SIZE, SUBJECT TO ENGINEER APPROVAL (I.E. WASHED CONCRETE SAND IS NOT REQUIRED). SAND MUST BE WHITE, TAN, YELLOW, OR BROWN IN COLOR.

SUBSTRATE SIZING CALCULATION FOR THE REINFORCED BED :

SHEAR STRESS:

$$\tau = \gamma * D_{max} * S$$

WHERE

				REACH 1	REACH 2	REACH 3
γ	=	SPECIFIC WEIGHT OF WATER, LB/CF	=	62.4 LB/CF	62.4 LB/CF	62.4 LB/CF
D_{max}	=	MAXIMUM RIFFLE DEPTH, FT	=	1.6 FT	1.3 FT	1.0 FT
S	=	CHANNEL SLOPE, FT/FT	=	0.015 FT/FT	0.018 FT/FT	0.015 FT/FT

THEREFORE:

		REACH 1	REACH 2	REACH 3
SHEAR STRESS (τ)	=	1.49 LBS/SF	1.46 LBS/SF	0.94 LBS/SF

SUBSTRATE PARTICLE SIZE:

$$D_{50} = 3.070 * \tau^{1.042}$$

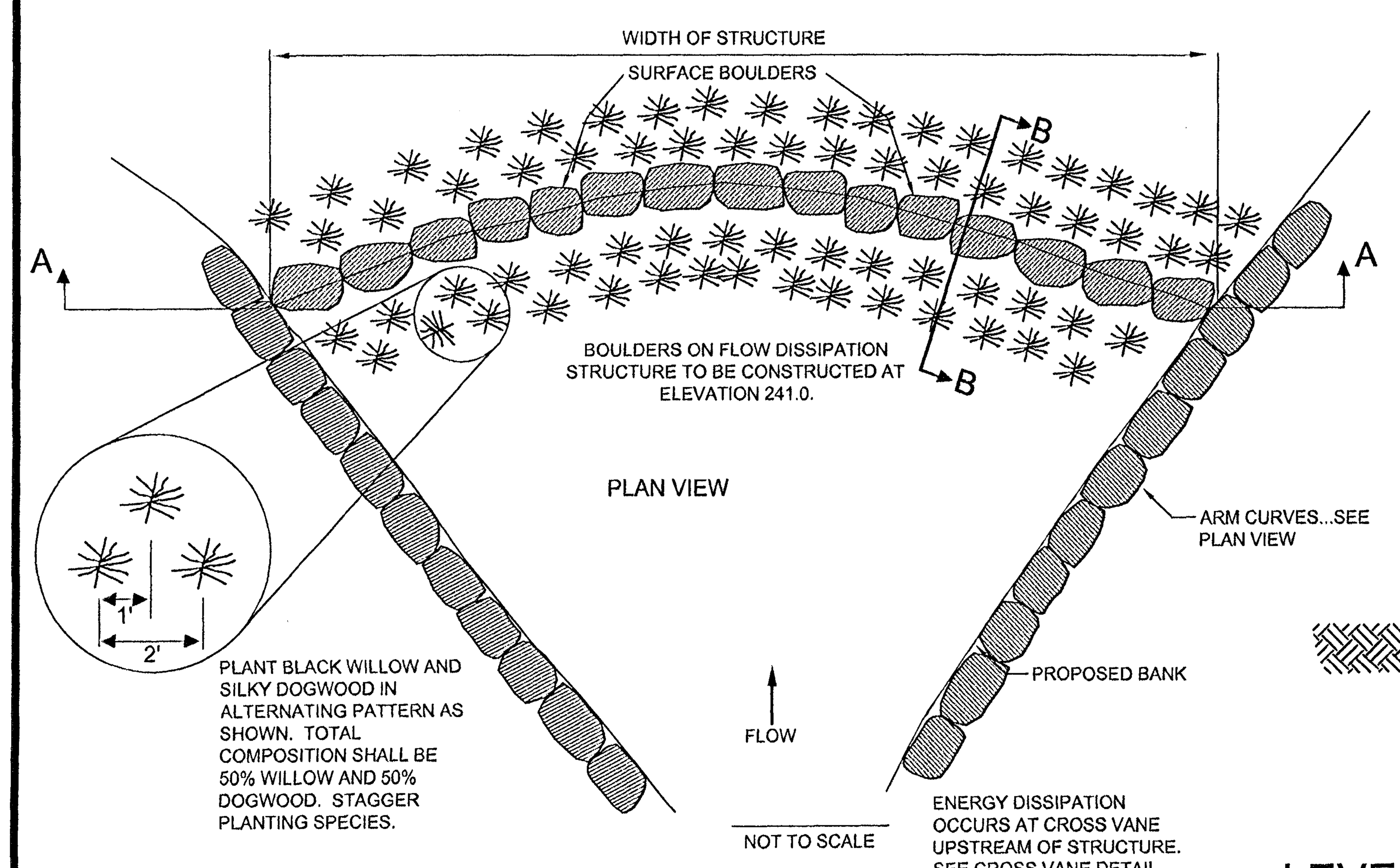
WHERE:

D_{50} = MIN. DIAMETER OF THE MEAN SUBSTRATE PARTICLE SIZE, IN.

THEREFORE:

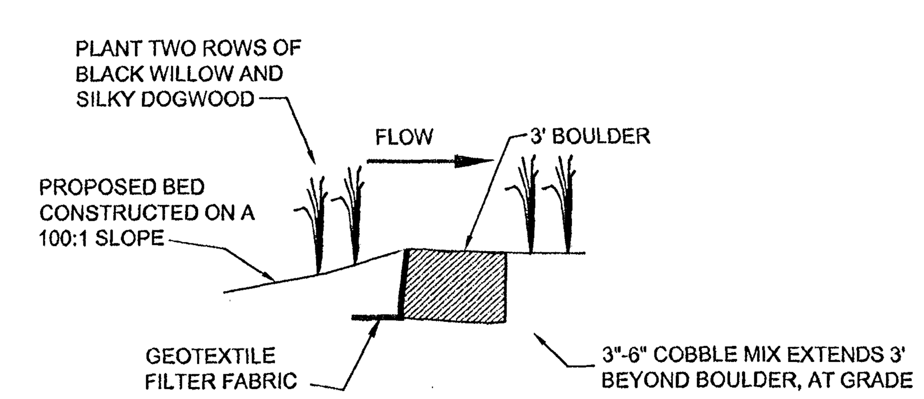
		REACH 1	REACH 2	REACH 3
D_{50}	=	4.7 IN	4.6 IN	2.9 IN

THE VALUES OF D_{50} SHOWN IN THE TABLE ABOVE ARE THE MINIMUM PARTICLE SIZE TO RESIST INCIPIENT MOTION AT BANKFULL FLOWS FOR EACH REACH AND ARE NOT DESIGN VALUES. THE REINFORCED BED IS SIZED FOR THE MAXIMUM SHEAR STRESS COMPUTED FOR THE DEEPEST PORTION OF THE CHANNEL (IN THE RIFFLE) AT BANKFULL ELEVATION IN ORDER TO PROVIDE A FACTOR OF SAFETY (SHEAR STRESS IS TYPICALLY COMPUTED USING THE MEAN RIFFLE DEPTH, WHICH IS LESS THAN MAXIMUM DEPTH). THE SUBSTRATE IS THEN USED TO ARMOR THE ENTIRE CHANNEL BOTTOM, REPRESENTING A SIGNIFICANT FACTOR OF SAFETY. IN ADDITION, SHEAR STRESS COMPUTATIONS GENERALLY REPRESENT THE REQUIRED FORCE TO INITIATE MOVEMENT OF LOOSE, NON-IMBRICATED PARTICLES. THE SUBSTRATE IN THE RESTORED STREAMS WILL BE CONSTRUCTED USING CRUSHED STONE (CAP-ROCK AND OR CLASS AI RIPRAP WITH A D_{50} OF 10.9" - EXCEEDING THESE CALCULATED REQUIREMENTS) WITH THE VOIDS FILLED WITH A SAND, GRAVEL, TOPSOIL MIXTURE. THE ANGULARITY OF THE CRUSHED ROCK, ALONG WITH THE FILLING OF THE VOIDS, WILL RESULT IN A VERY RESISTANT, ARMORED SUBSTRATE THAT WILL BE CAPABLE OF WITHSTANDING MUCH GREATER SHEAR STRESS THAN THE COMPUTATION OF THE REQUIRED D_{50} WOULD SUGGEST.



NOT TO SCALE

CHANNEL BOTTOM UPSTREAM OF STRUCTURE SHALLE BE GRADED ACCORDING TO GRADING PLAN AND SHALL PROVIDE GENTLE SLOPE UP TO CONTROLLING BOUNDER STRUCTURE



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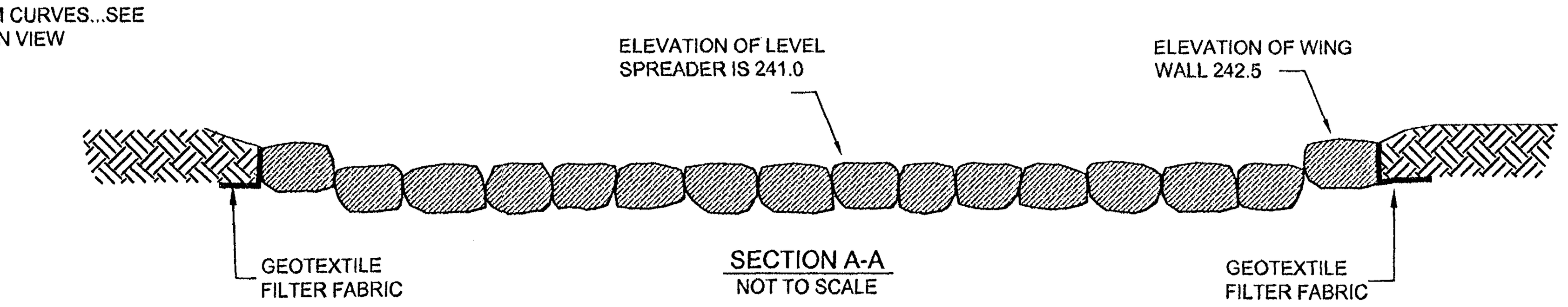

SECTION A-A
NOT TO SCALE

LEVEL SPREADER DETAIL
NOT TO SCALE

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AEROSPACE CORP WESTFIELDS PARCEL 35
STREAM RESTORATION CONCEPT PLAN

Fairfax County, Virginia

Construction Sequence, Sediment Sizing, Typical Cross Sections, & Construction Details

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COMMONWEALTH OF VIRGINIA
MICHAEL F. ADAMS JR.
Lic. No. 045587
PROFESSIONAL ENGINEER

REVISIONS		
Description	Rev. By	App. By

DATE: December 17, 2008
SCALE: N/A

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLAT)
See Proffers dated 3/9/09
SE conditions dated 12/31/2009 2/23/09 WOD
Date of (BOS) (PC) approval 2/23/09
Sheet 12 of 31

/A
/A
Source:
N/A

Design	Draft	Approved
MFA	MFA	MSR

Sheet #
7E of

Computer File Name:
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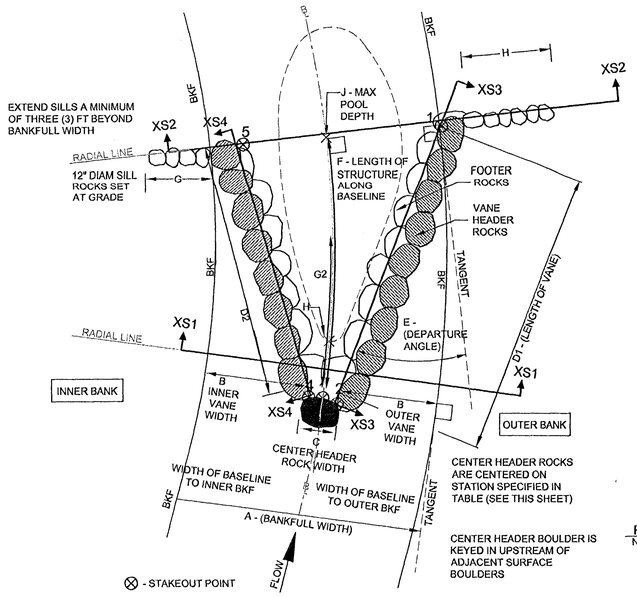
MEANDER CROSS VANE

NOT TO SCALE



STRAIGHT CROSS VANE

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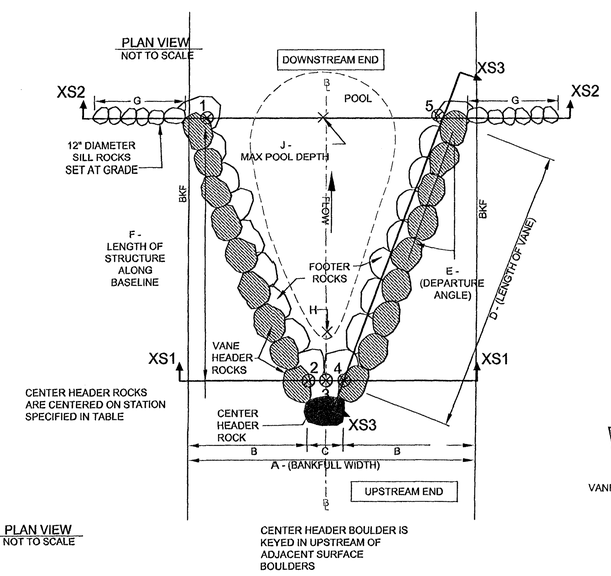

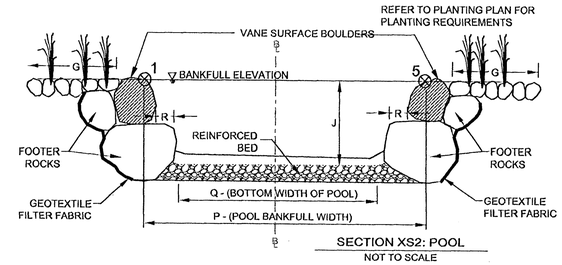

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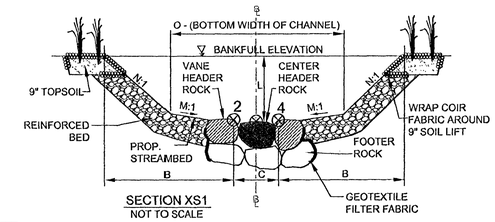

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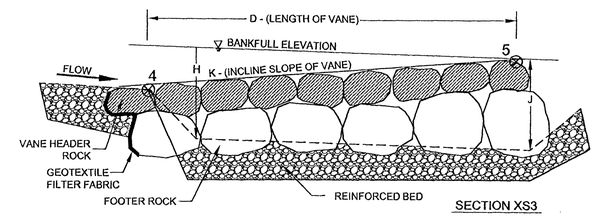

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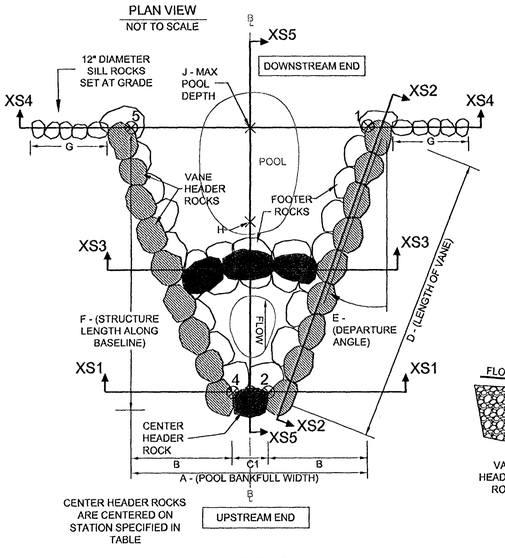

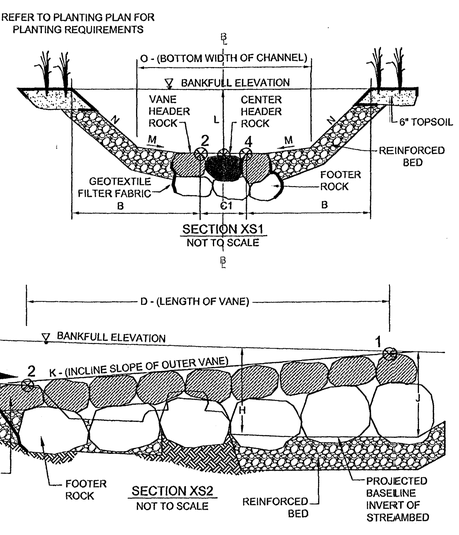

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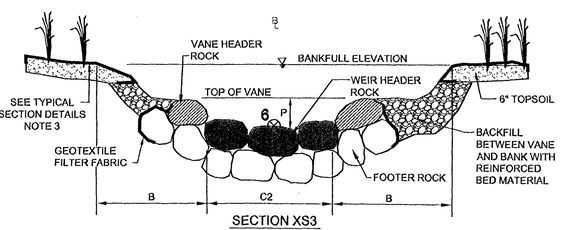
SECTION XS2

NOT TO SCALE



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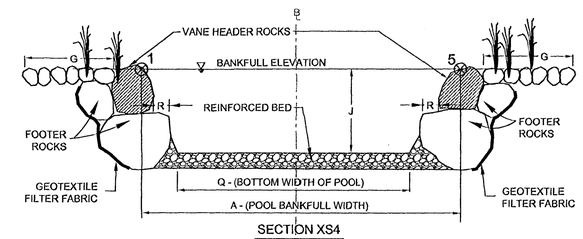

SECTION XS4

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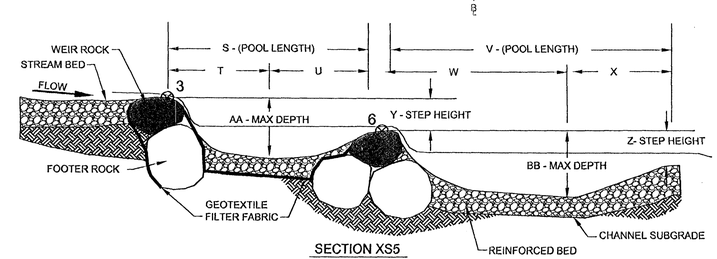
2-STEP CROSS VANE

NOT TO SCALE



SECTION XS5

NOT TO SCALE

"REINFORCED SEWER CROSSING"[1] MIXTURE SPECIFICATIONS

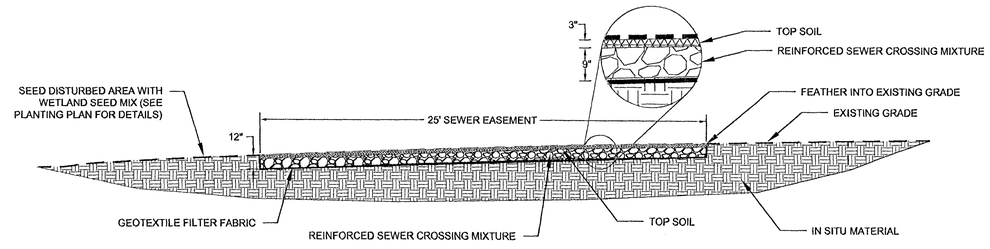
MATERIAL	SIZE (D_{50})	BATCH MIX RATIO	PERCENTAGE
#67 AGGREGATE	0.19 - 1.0 in (4.75 - 25 mm)	2 BUCKETS	60-65%
COARSE SAND[2]	0.04 - 0.08 in (1 - 2 mm)	0.75 BUCKETS	20-25%
TOPSOIL	LOAM OR SILT LOAM WITH 3-5% ORGANIC CONTENT	0.5 BUCKETS	12.5-17.5%

[1] THE REINFORCED SEWER CROSSING SHALL BE 9" IN DEPTH.

[2] SAND DOES NOT NEED TO BE CLEAN SAND.

REINFORCED SEWER CROSSING

NOT TO SCALE



CONCEPTUAL PLAN. NOT FOR CONSTRUCTION

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AEROSPACE CORP WESTFIELDS PARCEL 35
STREAM RESTORATION CONCEPT PLAN
Fairfax County, Virginia

Construction Details

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COMMONWEALTH OF VIRGINIA
MICHAEL F. ADAMS JR.
Lic. No. 045587
12/9/2009
PROFESSIONAL ENGINEER

REVISIONS

Description	Rev. by	App. by

SCALE: As Noted

DATE: December 17, 2008

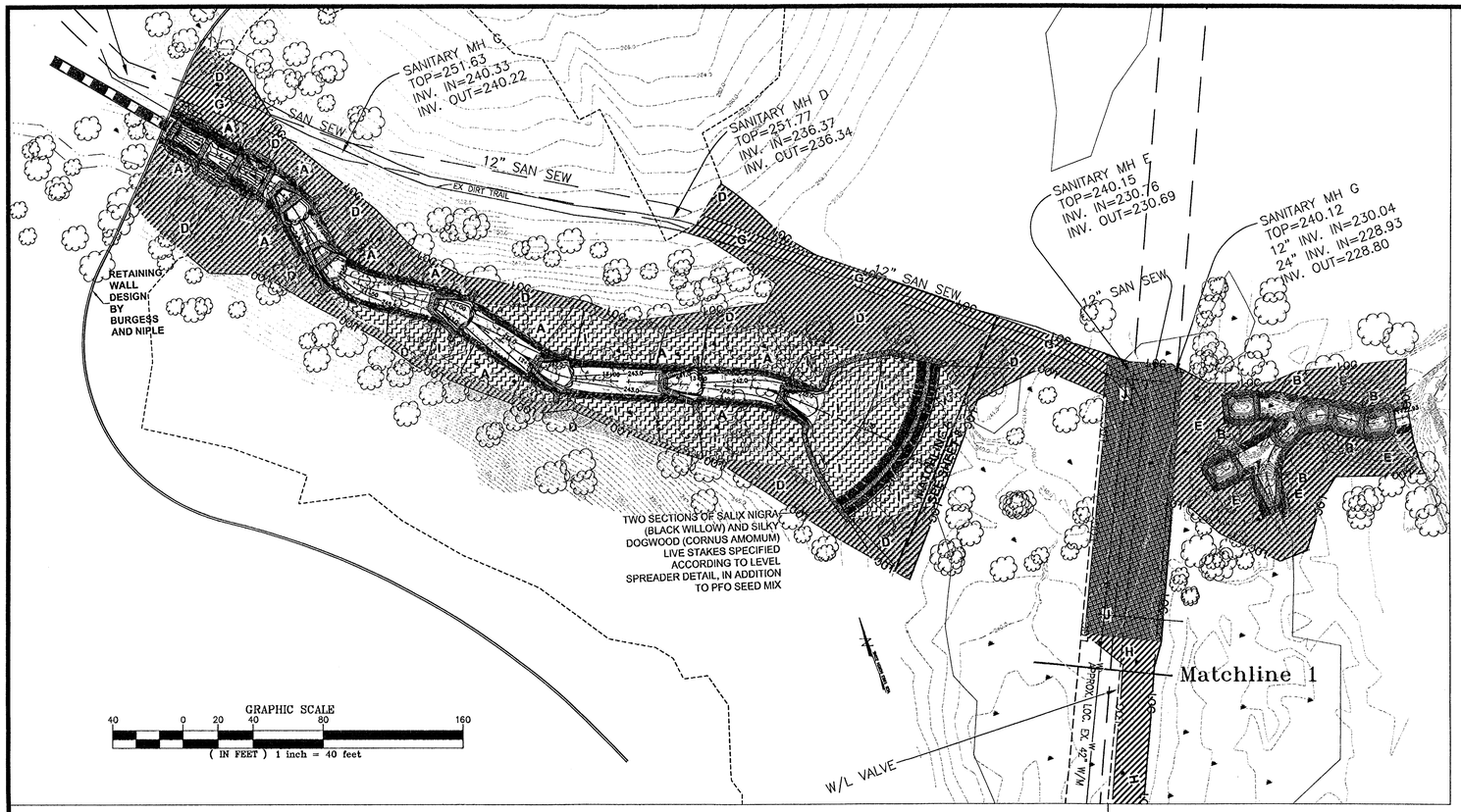
Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLA)
See Proffers dated 3/9/09
SE conditions dated 12/31/2009 2/23/09
Date of (BOS) (PC) approval 2/23/09
Sheet 13 of 31

Boundary and Topo Source: N/A

Design	Draft	Approved
MFA	MFA	MSR

Sheet # 7F of

Computer File Name:

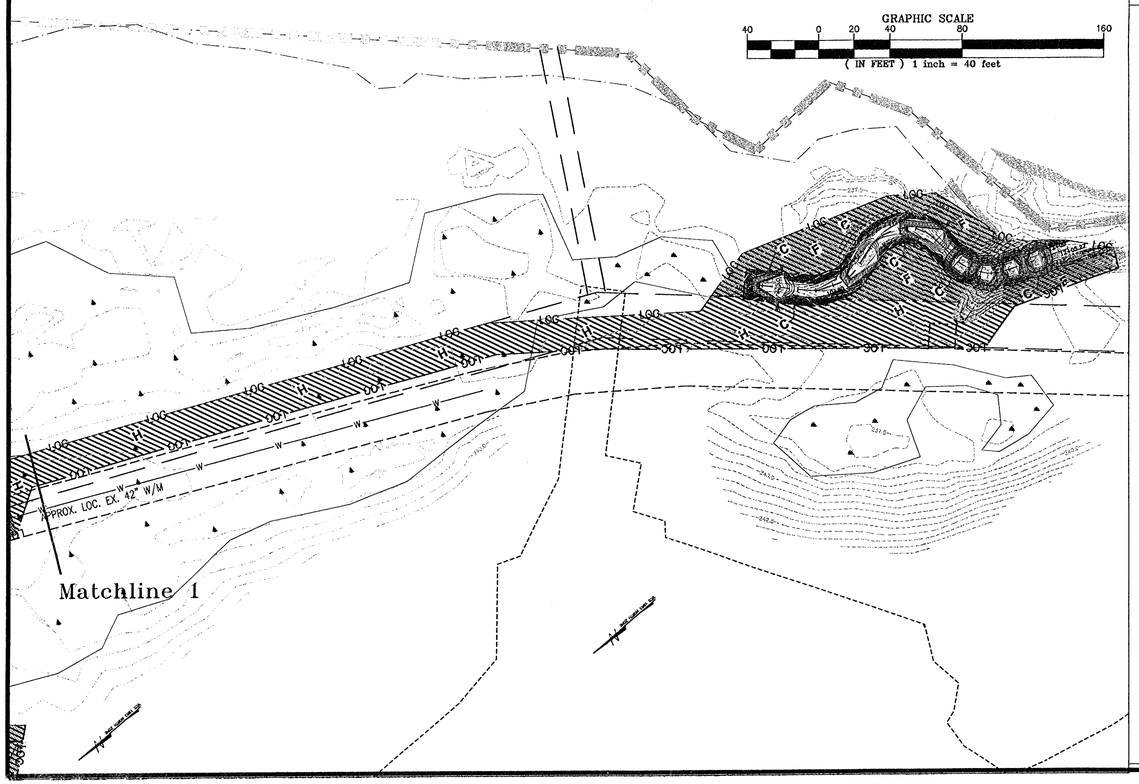


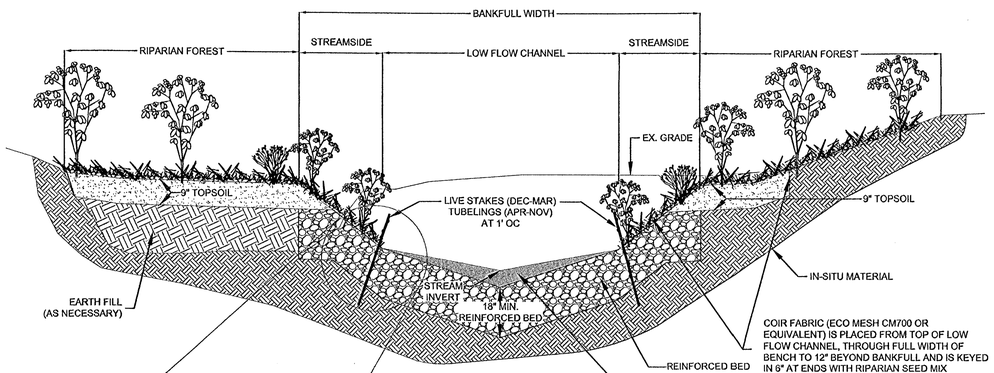
PLANTING AREAS	SYMBOL
STREAMSIDE* 6,251 SF = 0.14 AC 1,691 LF (Alder, Elderberry, Silky Dogwood, Southern Arrowood, typ.)	A, B & C
RIPARIAN FOREST* 32,846 SF = 0.75 AC (Variety of Oak, Hickory, Maple, Birch, Dogwood, Gum, Hornbeam, Elder, etc. species)	D, E & F
RIPARIAN SEED MIX ONLY 14,983 SF = 0.34 AC (Seed mix contains grasses, forbs, shrubs and trees)	G & H
FORESTED WETLAND 16,118 SF = 0.37 AC (Wetland Oaks, Green Ash, Birch, Sweet Gum, Sycamore, Willow, Box Elder, Maple, Alder, Arrowwood, Buttonbush, Inkberry, Winterberry, typ.)	I
WETLAND SEED MIX ONLY 6,786 SF = 0.16 AC (Seed mix contains grasses, sedges, forbs, rushes, shrubs and trees)	J

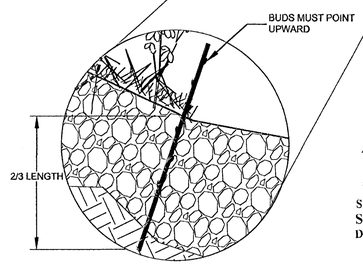
* RIPARIAN SEED MIX SHALL BE DISTRIBUTED EVENLY THROUGHOUT ALL DISTURBED AREAS IN THE AMOUNT SPECIFIED ON THE VEGETATION SCHEDULE.

LEGEND

- EXISTING CONTOURS (0.5')
- PROPOSED CONTOURS (0.5')
- EXISTING SANITARY EASEMENT
- EXISTING WATER LINE EASEMENT
- PROPOSED STREAM CENTERLINE
- PROPOSED LIMITS OF CLEARING
- BURGESS & NIPLE LIMITS OF CLEARING







LIVE STAKE CROSS SECTION THROUGH STREAM BANK

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLAN)
See Proffers dated 3/9/09
SE conditions dated 12/31/2009 - 2/23/09
Date of (BOS) (PC) approval 2/23/09
Sheet 14 of 31

LIVE STAKE PLANTING NOTES

1. A TOOL CALLED A PLANTING BAR MAY BE USED TO PUNCH A HOLE FOR THE CUTTING. IN SOFTER SOILS, LIVE STAKES CAN SOMETIMES BE DIRECTLY PUSHED OR HAMMERED IN.
2. ROOTS SHALL BE TREATED WITH ROOT HORMONE PRIOR TO PLANTING.
3. LIVE STAKES SHOULD BE 18" TO 24" IN LENGTH AND $\frac{3}{8}$" TO $1\frac{1}{2}$" IN DIAMETER.
4. INSTALL THE LIVE STAKE WITH THE CORRECT SIDE UP (SEE DETAIL THIS SHEET). LIVE STAKES SHOULD BE CUT ON AN ANGLE ON THE BOTTOM AND FLAT ON THE TOP. WHEN HELD WITH THE CORRECT END UP, THE BUDS MUST POINT UPWARD.
5. TWO-THIRDS ($\frac{2}{3}$) OF THE LIVE STAKE LENGTH MUST BE PLANTED BELOW GRADE. DEEPER IS FINE, AS LONG AS A FEW BUDS ARE EXPOSED AT THE TOP.
6. TAMP IN AROUND THE CUTTING TO ENSURE THAT THERE ARE NO AIR POCKETS ALONG THE STEM. YOU CAN PUSH THE PLANTING BAR INTO THE SOIL IMMEDIATELY AROUND THE STEM AND PUSH IN THE SOIL TOWARD THE PLANT.

RESTORED STREAM PLANTING DETAIL

NOT TO SCALE

k:\Cadd Files\Stream Restoration\Details\-D-LiveStake.dwg

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Phone: 703 679 5600 - Fax 703 679 5601
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AEROSPACE CORP WESTFIELDS PARCEL 35
STREAM RESTORATION CONCEPT PLAN

Fairfax County, Virginia

Planting Plan

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COMMONWEALTH OF VIRGINIA
MICHAEL F. ADAMS JR.
Lic. No. 045587
PROFESSIONAL ENGINEER

REVISIONS				
No.	Date	Description	Rev. By:	App. By

SCALE: 1" = 40'

DATE: December 17, 2008

Horizontal Datum: VCS NAD 83

Vertical Datum: NGVD 29

Boundary and Topo Source: WSSI

Design	Draft	Approved
RDD	RDD	MSR

Sheet # 7G of

Computer File Name:
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Design Narrative

I. Background

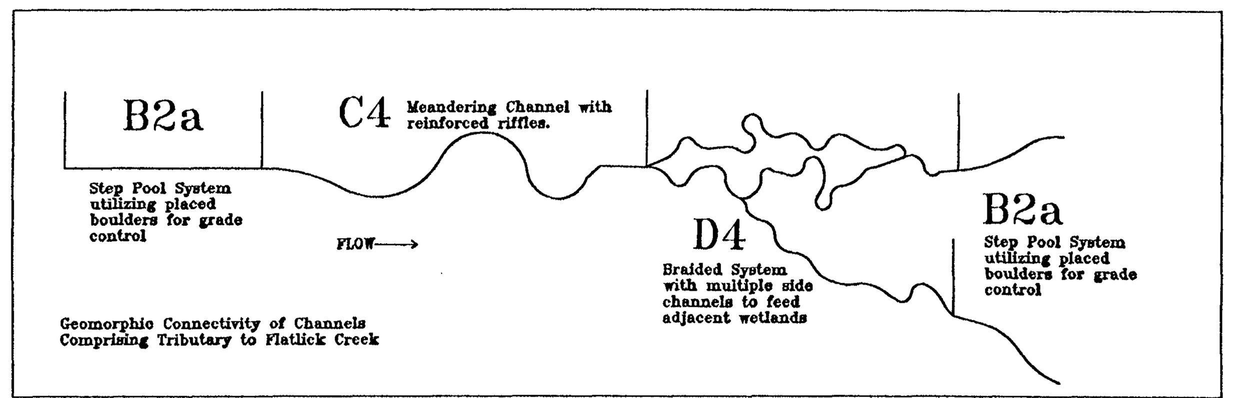
The stream restoration design philosophy for the unnamed tributary of Flatlick Branch is that of Natural Channel Design (NCD). As the name implies, the goal of NCD is to restore a degraded stream by mimicking, as much as possible, the characteristics of a stable, "natural" system. Through the use of geomorphic principles, NCD seeks to achieve long-term stability given current as well as future flow rates.

Prior to developing restoration design protocols applicable to this urban stream, development of a hydrologic/geomorphic basis for these designs was necessary. Though regional curves that predict bankfull discharge as a function of drainage area have been published, the data utilized to produce curves for the Eastern United States do not account for altered hydrology in urban systems. Given the lack of available hydrologic data for small urban systems, there was considerable uncertainty as to the applicability of published regional curve data to the unnamed tributary to Flatlick Branch.

To develop a design on similar stream restoration projects in Fairfax County that will result in environmentally sound, aesthetically pleasing streams with long-term stability, WSSI undertook an analysis that included a review of prior studies and implementation of hydrologic model data (developed by Burgess and Niple) from the proposed development. Information from both of these sources was then considered in order to develop a design that incorporates certain, practicable elements of the NCD philosophy, while also taking into account the significant constraints imposed by the complex urban nature of the project watershed. These constraints include limitations on the location and size of the restored channels which, in turn, determines the type and size of the channel substrate materials that must be used. Details of the development of the design are discussed below, prefaced by a discussion of how restorations employing elements of NCD are in compliance with state law.

II. Regulatory Compliance

NCD is the preferred design methodology for the Virginia Department of Environmental Quality (DEQ) and the U.S. Army Corps of Engineers (COE). The 2005 state legislature revised state law to stipulate that any stream restoration project that is designed in accordance with NCD principles is exempt from the requirements of MS 19 (Code of Virginia, § 10.1-560 and 10.1-561) as well as any related local requirements. Additionally, on March 16, 2007, DEQ published its proposed Section 401 Water Quality Certification Conditions for Nationwide Permit (NWP) #27 (Stream and Wetland Restoration Activities) requiring that natural stream design be used for stream restoration. Therefore, the flow rates used for this project were developed using NCD methodologies and compared to flow rates derived from the traditional modeling techniques.



One of the principal tenets of NCD is the concept of multiple stream types and the unique properties associated with various types of streams. The unnamed tributary to Flatlick Branch is comprised of three different stream types, each with a specific function related to hydraulics and/or ecological function. At the upstream end of the project, a Ba stream (Step Pools with a small floodplain) is used to decrease the channel bed elevation over a relatively short distance. This is accomplished by using boulders placed individually at specific elevations to provide grade control. The step pools transition into a C stream type, which provides a variety of habitat as well as connectivity to the floodplain and wetland areas adjacent to the channel. At the end of the C stream is a cross vane that transitions into a level spreader. The level spreader then diffuses flow into a braided D stream that runs through a wetland area. D stream types are unique braided systems that are flat, wide and often rough; these properties slow down the flow of water through the system and, in this case, feed wetland areas that not only diversify habitat, but provide abundant vegetation to slow down flow. If the D stream type was to be converted into a single-thread channel by ditching, which would have the effect of not only concentrating flow by also steepening the channel, the wetland would likely be drained. Lastly, at the downstream end of the project, a Ba stream type is once again used to drop the grade of the stream bed over a relatively short distance.

III. Published Data

In the process of determining a design protocol, a review of work performed by others was conducted. This included review and consideration of published regional curves as well as reports on urbanization and how it can result in downstream channel enlargement. Specific information reviewed as part of this analysis included the following:

North Carolina Piedmont Regional Curve Data[1]

This data includes bankfull hydraulic geometry relationships for both "urban" and "rural" streams. The streams defined as "urban" averaged 43% impervious area and those classified as "rural" contained "no more than 20%". Impervious cover of up to 20% represents a wide range of land use conditions. For instance, The Chesapeake Bay Local Assistance Manual (CBLAM)[2] assigns a 20% impervious cover to 0.5 acre residential lots (2 houses per acre), which would be considered a rural condition for the North Carolina Piedmont Regional Curve. Land use in the project watershed above the pipe outfall consists of an average impervious cover of 68%. This is much higher than the 43% impervious area that comprises the "urban" condition of the North Carolina Piedmont Regional Curve Data. The effect of this range of imperviousness is detailed in the Discussion section below.

Maryland Piedmont Regional Curve Data[3]

The U.S. Fish and Wildlife Service published a report on Maryland piedmont streams that presents regional curve information. Given that the project watershed is located in close proximity to the study area and in the same physiographic province (piedmont), the MD data is considered to be the most applicable to the unnamed tributary to Flatlick Branch. Note the average impervious area of the contributing watersheds in this study is approximately 8% (and thus is classified as "rural"). This is much lower than the value of imperviousness located within the project watershed.

Eastern United States Regional Curve Data

Regional curve information developed from streams in the eastern portion of the United States is presented in Water in Environmental Planning[4] by Dunne and Leopold (1978).

Dynamics of Urban Stream Channel Enlargement

The Center for Watershed Protection published a report[5] on the impact of watershed development on channel enlargement. From this study, it is estimated that ultimate channel enlargement can take 50-75 yrs from the time the watershed is fully developed. The project watershed is still under development, suggesting the channels have not yet reached their ultimate size (this is supported by the current condition of the channels). Based on an average impervious area in the project watershed up to the pipe outfall of about 68% and assuming no retention of stormwater in the watershed, the resulting enlargement factor would be approximately 8.2.

IV. Hydrologic/Hydraulic Modeling

A hydrologic model of the project watershed was developed by Burgess and Niple to assess stormwater outflows from the project watershed based on the proposed development. The post-development watershed conditions used by Burgess and Niple (including off-site flows from other site plans) were used for the analysis. Flow rates developed from both the NRCS 2- and 10-yr, Type II storm events were compared to results obtained from application of the enlargement factor to the MD regional curve data.

V. Discussion

From the analysis described above, it is clear that there are two distinct methodologies (regional curves and hydrologic modeling) available to size the channel. When considered in relation to one another along with good engineering judgment, a reasonable design methodology has been developed for use in this project. A discussion on each contributing component is provided below, along with the resulting design protocol employed for the unnamed tributary to Flatlick Branch.

Regional Curves

It is evident that use of the regional curves developed for rural MD streams would result in channels that are significantly undersized. The urban nature of the project watershed (for which contributing impervious area averages 68%) results in significantly higher flow rates than the comparably sized watersheds represented by the curves.

In regards to the effects of urbanization, the published regional curves tell a consistent story. Rural curves (MD and NC only - no data representing the character of the "Eastern" curve is available) fall well below the urban NC curve. Since the NC rural curve represents a wide range of development conditions with up to 20% imperviousness in watersheds, it is not surprising that it plots above the MD rural curve with an impervious area of 8%. Because of the uncertainty in the conditions of the watersheds used to develop the NC rural curve along with the significant difference between the average impervious area of the regional curve data and the project watershed, the NC regional curves are not an appropriate method to size the restored channel. The rural MD data has been determined, however, to be representative of VA piedmont streams through comparison with reference stream data collected by WSSI. Thus, the published rural MD data is applicable, yet requires adjustment to account for the effects of urbanization (i.e. increased flow rates).

Through application of the enlargement factors to the cross-sectional areas represented by the MD rural curve for each design reach in the project watershed, a modified regional curve was developed that is specific to the percentage of imperviousness within the project watershed. The cross-sectional area calculated using the enlargement factor was converted to a flowrate using the bankfull discharge relationships developed as part of the published MD data. This data was compared to the hydrologic modeling data to develop a set of design flowrates for the unnamed tributary to Flatlick Branch.

Hydrologic Modeling

Tthe 2-yr modeled flow data plots below the modified MD curve data. As impervious area increases, stormflow hydrographs have larger peaks for shorter durations. To account for the increase in peak flows that occurs with the increase in impervious area due to the proposed development, Stormwater Management (SWM) facilities have been included on the site and are also present upstream of the site. These SWMs include underground storage, rain gardens, green roofs and others which are designed to reduce peak flows leaving the site. These SWM facilities are included in the hydrologic modeling analysis but are unable to be included in the regional curve analysis.

Enlargement Factor

Studies have shown and experience confirms that channels enlarge in response to increased runoff volumes, peak rates, and increased frequencies resulting from development of the watershed. Enlargement curves provide a measure of the potential enlargement factor based on impervious area. The enlargement factor was applied to the MD rural curve in order to replicate the NC urban curve. The NC urban curve was developed from watersheds with 43% impervious area, which results in an enlargement factor of 4.25. This factor of 4.25 was applied to the MD rural curve, which compares well with the NC urban curve and establishes the validity of using the enlargement factor to account for differences in impervious area between the MD rural curve and the project watershed.

VI. Design Protocol

Ultimate Channel Size

The ultimate size of the restored channel in the project watershed is determined by use of the hydrologic model data for the 2-yr storm provided by Burgess and Niple. Although the MD regional curve with enlargement factor is used in other urbanized restorations completed by WSSI, none of those projects included as much impervious area or as many SWM facilities as are included in this project watershed. There is also a large difference between the impervious area in the upper, urbanized portion of the watershed and the lower, forested portion of the watershed. This dichotomy of land use causes flowrates to decrease moving downstream in the project watershed, according to the regional curve analysis.

In addition, the regional curve analysis does not give any consideration to stormwater management facilities, it represents a worst-case scenario for the determination of flows in a developing watershed. This type of conservative approach is often desired in order to ensure stability of the restored reach under changing flow conditions. However, oversizing the unnamed tributary to Flatlick Branch could result in loss of wetland function at the downstream portion of the watershed.

Because of the uncertainty in the application of the regional curve analysis to this project along with the desire to keep the unnamed tributary hydrologically connected to the surrounding wetland area, the 2-yr hydrologic model value of 113 cfs will be used as the target flowrate used to begin the iterative channel design process - a process that must consider all relevant contraints (tree impacts, overbank flooding, sewer laterals, access, etc.) to arrive at the optimum channel design.

Velocity over Level Spreader

To maintain stability of the untouched wetland area, a level spreader was designed to keep velocities below the maximum allowable velocity to prevent soil erosion for the Rowland Series silt loam soils found in the stream valley during the 2-year design discharge of 113 cfs. Although the permissible velocity for silt loam soils is 3.0 fps (obtained from Table 5-22 in the Virginia Erosion and Sediment Control Handbook, as referenced in Section 6-1009 of the Fairfax County Public Facilities Manual), a permissible velocity of 2.5 fps (for sandy loam soils) was used for this analysis. According to the Fairfax County Soil Survey, sandy loam textures are common near creek banks and sandbars with Rowland Series soils. Because sandy loam textures could be present on site, 2.5 fps is used as the maximum permissible velocity. Velocity over the level spreader was calculated using continuity with Manning's equation. It is assumed that the full length of the level spreader is utilized for the cross-sectional area. Due to the large length of the level spreader relative to the depth, the cross-section is approximated as rectangular. Although it is expected that the wetland area will be heavily vegetated, which will slow down flow, a Manning's n of 0.035 (a typical value for unvegetated channels) is used as a conservative velocity approach. Sample calculations are shown below.

$$Q = VA \qquad V = \frac{1.49}{n} R^{\frac{2}{3}} S^{\frac{1}{2}}$$

$$Q = \left(\frac{1.49}{n} R^{\frac{2}{3}} S^{\frac{1}{2}}\right)(A)$$

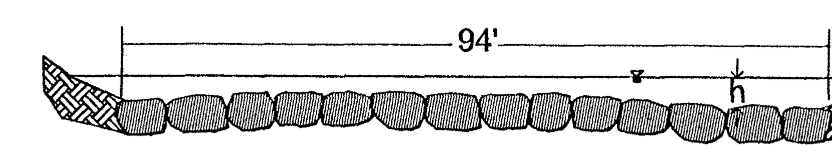
$$n = 0.035 \quad L = 94\,[ft] \quad S = 0.005\,[ft/ft]$$

$$A = Lh\,[ft^2] \qquad R = \frac{A}{P} = \frac{Lh}{L+2h}\,[ft]$$

where L = *length of level spreader*
n = *Manning's number*
S = *channel slope*
h = *height of water above level spreader*
A = *flow area*
P = *wetted perimeter*
Q = *design flow*
V = *velocity over the level spreader*

$$113 = \frac{1.49}{0.035}\left(\frac{94h}{94+2h}\right)^{\frac{2}{3}}(0.005)^{\frac{1}{2}}(94h)$$

$$h = 0.57\,[ft] \qquad V = 2.09\,[ft/s]$$



The depth of flow, h, is calculated from continuity and Manning's to be 0.57 ft. This depth results in a velocity of 2.09 ft/s, which is below the design permissible velocity of 2.5 ft/s. In addition, the permissible velocity is for unlined earthen channels. In this case, flow from over the level spreader enters a densely vegetated wetland area, which provides flow resistance (reducing the velocity) and reinforcement of the soils, so the actual velocity is expected to be lower than the 2.09 ft/s computed here.

Wingwalls, which have a top elevation of 1.5 ft above the level spreader, will be constructed to confine the flow to the level spreader area. The velocity analysis above provides a conservative value of velocity but most likely underestimates flow depth. To ensure the wingwalls will not be overtopped, a second continuity analysis was performed that uses a Manning's number of 0.1, which is a typical value for flow through vegetation. Sample calculations for this analysis are shown below.

$$Q = VA \qquad V = \frac{1.49}{n} R^{\frac{2}{3}} S^{\frac{1}{2}}$$

$$Q = \left(\frac{1.49}{n} R^{\frac{2}{3}} S^{\frac{1}{2}}\right)(A)$$

$$n = 0.1 \quad L = 94\,[ft] \quad S = 0.005\,[ft/ft]$$

$$A = Lh\,[ft^2] \qquad R = \frac{A}{P} = \frac{Lh}{L+2h}\,[ft]$$

$$113 = \frac{1.49}{0.1}\left(\frac{94h}{94+2h}\right)^{\frac{2}{3}}(0.005)^{\frac{1}{2}}(94h)$$

$$h = 1.09\,[ft] \qquad V = 1.10\,[ft/s]$$

The higher Manning's n value results in a water depth of 1.09 ft which is less than the 1.5 ft difference between the top elevation of the wingwalls and the elevation of the level spreader.

Based on this analysis, velocities are below the permissible velocity for the given soil type and the design flows do not top the wing wall. The densely vegetated wetland area along the profile of the level spreader and the low velocity combine to create a stable system to meet the objective of preserving the wetland in the lower portion of the project while still conveying the design discharge.

Channel Substrate and Sediment Transport

In a stream system where there is an ample supply of sediment, the restored reach must be designed to provide adequate sediment transport. If this is not considered, sediment will aggrade in the channel and can result in redirection and erosion of a new channel. In the project watershed, however, the vast majority of channel sediments are supplied through incision of the channel bed and subsequent erosion of the channel banks. The urban nature of the contributing watersheds is such that very little sediment is contributed through overland runoff. The sediments that are supplied are also very small - thus providing adequate sediment transport is not a concern in the project watershed. In fact, since stabilization of the bed and banks will drastically reduce the available in-stream sediment supply, preventing mobilization of the substrate material is necessary because little replenishment is available.

Therefore, it will be necessary to provide a reinforced bed throughout the upper portion of the unnamed tributary to Flatlick Branch to prevent the entrainment of sediment that will eventually be deposited in the wetland area located in the lower portion of the project watershed.

Sizing of the bed material is determined through analysis of the shear stresses the channel lining will experience, based on the flow depth and channel slope in each reach:

t = Y*D*S

Where:

t	=	maximum shear stress, lb/ft^2
Y	=	specific weight of water, 62.4 lb/ft^3
D	=	maximum depth, ft
S	=	channel slope, ft/ft

The minimum required diameter of the mean size of the substrate material (D_{50}) is then computed by the equation relating shear stress to particle size[3]:

D_{50} = $3.070*t^{1.042}$

Where:

D_{50} = min. diameter of the mean substrate particle size, in.

Note that the substrate material is sized for the maximum shear stress experienced in the deepest portion of the channel (in the riffle) at the bankfull elevation in order to provide a larger factor of safety (shear stress is typically computed using the mean riffle depth). This computed substrate size is then used to armor the entire channel bottom, representing a significant factor of safety. In addition, shear stress computations generally represent the required force to initiate movement of loose, non-imbricated particles. The substrate in the unnamed tributary to Flatlick Branch will be constructed using crushed stone (cap-rock and or class AI riprap) with the voids filled with a sand, gravel and topsoil mixture. The angularity of the crushed rock, along with the filling of the voids, will result in a very resistant, armored substrate that will be capable of withstanding much greater shear stress than the computation of the required D_{50} would suggest. Specific computations to determine the substrate size for this reach are presented in this plan set.

Overbank flooding is also considered, especially in relation to flow through the wetland areas in the lower portion of the watershed. Overbank design velocities are limited to the specified allowable velocity contained in the Virginia Erosion and Sediment Control Handbook for "sandy loam (noncolloidal)". This allowable velocity, 2.5 fps, is used as a basis for sizing the step pool leading into the wetland system in the lower portion of the watershed. Coupled with the fact that the significant benefit provided by the wetland vegetation was not considered, the wetland areas will remain stable.

Reference Data

Layout of the channel pattern is governed by several factors, including the pattern of the existing stream channel, site constraints (trees, utilities, paths, etc.), and reference reach information. Wherever site constraints do not pose a limitation, parameters of the stream pattern suggested by WSSI-compiled reference data will be utilized.

Future Watershed Conditions

Hydrologic modeling in the project watershed considered post-development conditions, which is considered a fully developed condition. Although post-development conditions include an increase in impervious area, Best Management Practices are also included which reduce peak flow rates to a degree, particularly in smaller storms. In the event a redevelopment project does propose to increase the amount of impervious area in the watershed, state and county regulations are in-place to require that stormwater management be provided to offset any increases in stormwater runoff. In addition, adequate outfall regulations require that the downstream receiving water be able to withstand any increase in runoff rate or volume. Thus, any redevelopment that proposes to increase stormwater runoff from the site will be required to abide by these regulations, although it is unlikely that any redevelopment within the watershed will increase the amount of impervious area.

VII. Conclusion

Natural Channel Design theories, techniques, and practices are employed as described in this plan set, and are modified as necessary to ensure long term stability will be achieved in these urbanized hydrologic conditions. Through careful review and study of previous analyses and modeling of the watershed, a design protocol has been developed that considers all sources without undue reliance on any one. The design protocol employed for the unnamed tributary to Flatlick Branch will provide an environmentally sound, aesthetically pleasing, and structurally stable stream restoration project.

[1] Harman, W.H. et al. 1999. Bankfull Hydraulic Geometry Relationships for North Carolina Streams. AWRA Wildland Hydrology Symposium Proceedings. Edited By: D.S. Olsen and J.P. Potyondy. AWRA Summer Symposium. Bozeman, MT.

[2] Chesapeake Bay Local Assistance Department. 1989. Chesapeake Bay Local Assistance Manual.

[3] McCandless, T.L. and Everett, R.A. 2002. Bankfull Discharge and Channel Characteristics of Streams in the Piedmont Hydrologic Region. U.S. Fish and Wildlife Service, Report CBFO-SO2-01.

[4] Dunne, T., and L.B. Leopold, 1978. Water in Environmental Planning. W.H. Freeman Co. San Francisco, CA.

[5] Caraco, D. 2000. The Dynamics of Urban Stream Channel Enlargement. Watershed Protection Techniques 3(3):729-734. The Center for Watershed Protection. Elliot City, MD.

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLAT)
See Proffers dated 3/9/09
SE conditions dated ~~12/31/2009~~ 7/23/09 WOD
Date of (BOS) (PC) approval 2/23/09
Sheet 15 of 31

Wetland Studies and Solutions, Inc.
5300 Wellington Branch Drive, Suite 100 • Gainesville, VA 20155
Phone 703 679 5600 • Fax 703 679 5601
wetlandstudies.com

AEROSPACE CORP WESTFIELDS PARCEL 35
STREAM RESTORATION CONCEPT PLAN
Fairfax County, Virginia

Design Narrative

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COMMONWEALTH OF VIRGINIA
MICHAEL F ADAMS JR.
Lic. No. 045587
12/17/2008
PROFESSIONAL ENGINEER

REVISIONS

No.	Date	Description	Rev. By	App. By

DATE: December 17, 2008
SCALE: N/A

Horizontal Datum: N/A
Vertical Datum: N/A
Boundary and Topo Source: N/A

Design	Draft	Approved
RDD	RDD	MSR

Sheet #
7H of

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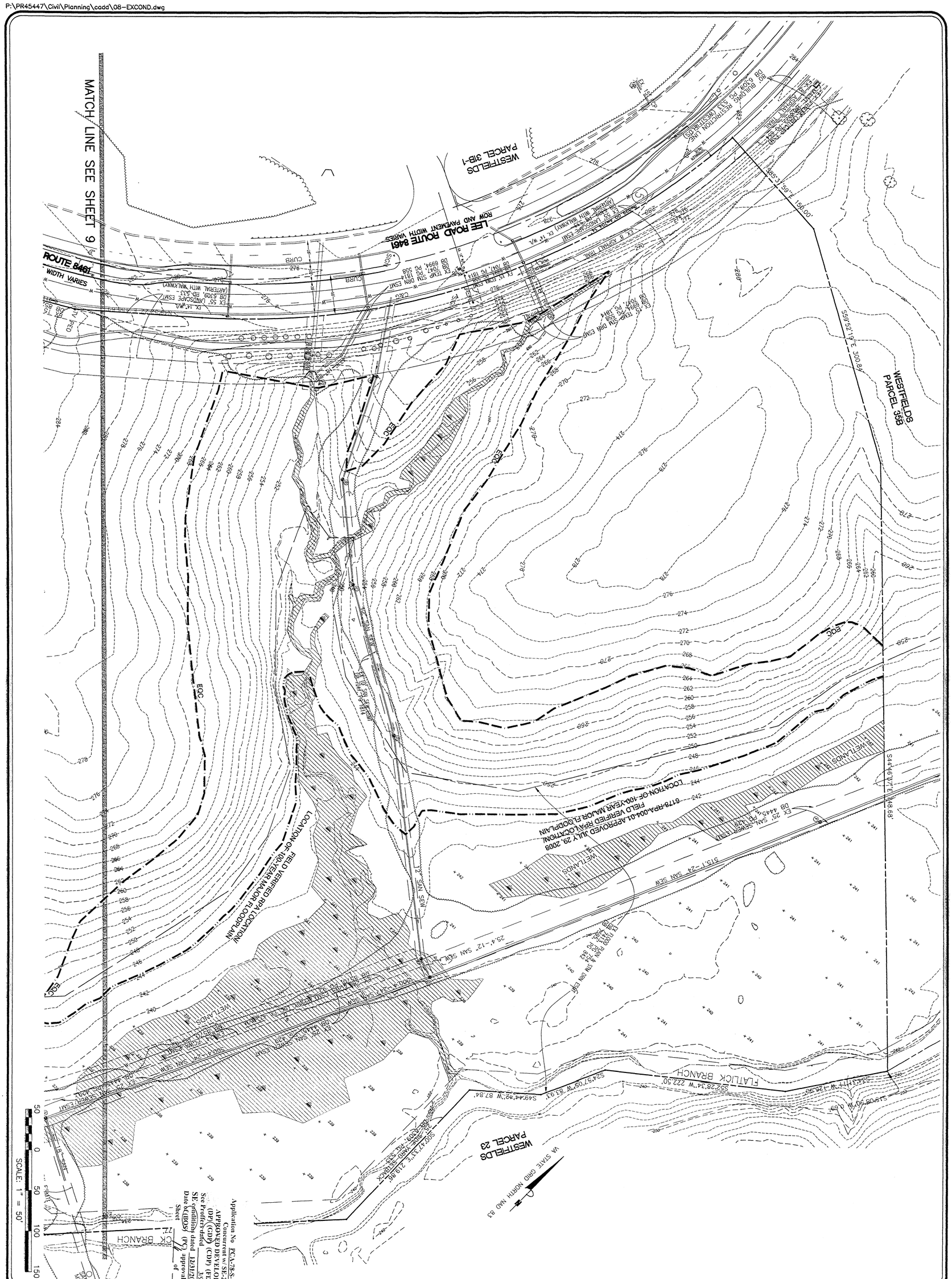

Application No. PCA-78-S-063-06, Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DPA) (CDP) (CDP) (FDP) (SE PL.)
Site Plan Number: 3.9.09
SE conditions dated 12/31/2009 2/12/2009
Date 8/18/09 (PC) Approval 2/12/2009
Sheet 1 of 1

COMMONWEALTH OF VIRGINIA
JOHN P. GOSTON
No. 035787
PROFESSIONAL ENGINEER

EXISTING CONDITIONS

ROSPACE CORPORATION
WESTFIELDS, PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

ADDRESS COMMENTS	DEC. 17, 2008
ADDRESS COMMENTS	DEC. 1, 2008
ADDRESS COMMENTS	NOV. 4, 2008
ADDRESS COMMENTS	OCT. 28, 2008
ADD TRANSPORTATION ITEMS	OCT. 9, 2008
ADDRESS PRE-STAFFING COMMENTS	SEPT. 4, 2008
REVISED PER COUNTY COMMENTS	JULY 01, 2008
REVISIONS	DATE

BURGESS & NIPLE
4160 PLEASANT VALLEY ROAD, CHANTILLY, VA 20151-1226
PH. (703) 631-9630 FAX (703) 631-6041

DATE: MAY, 2008	
SCALE: 1" = 50'	
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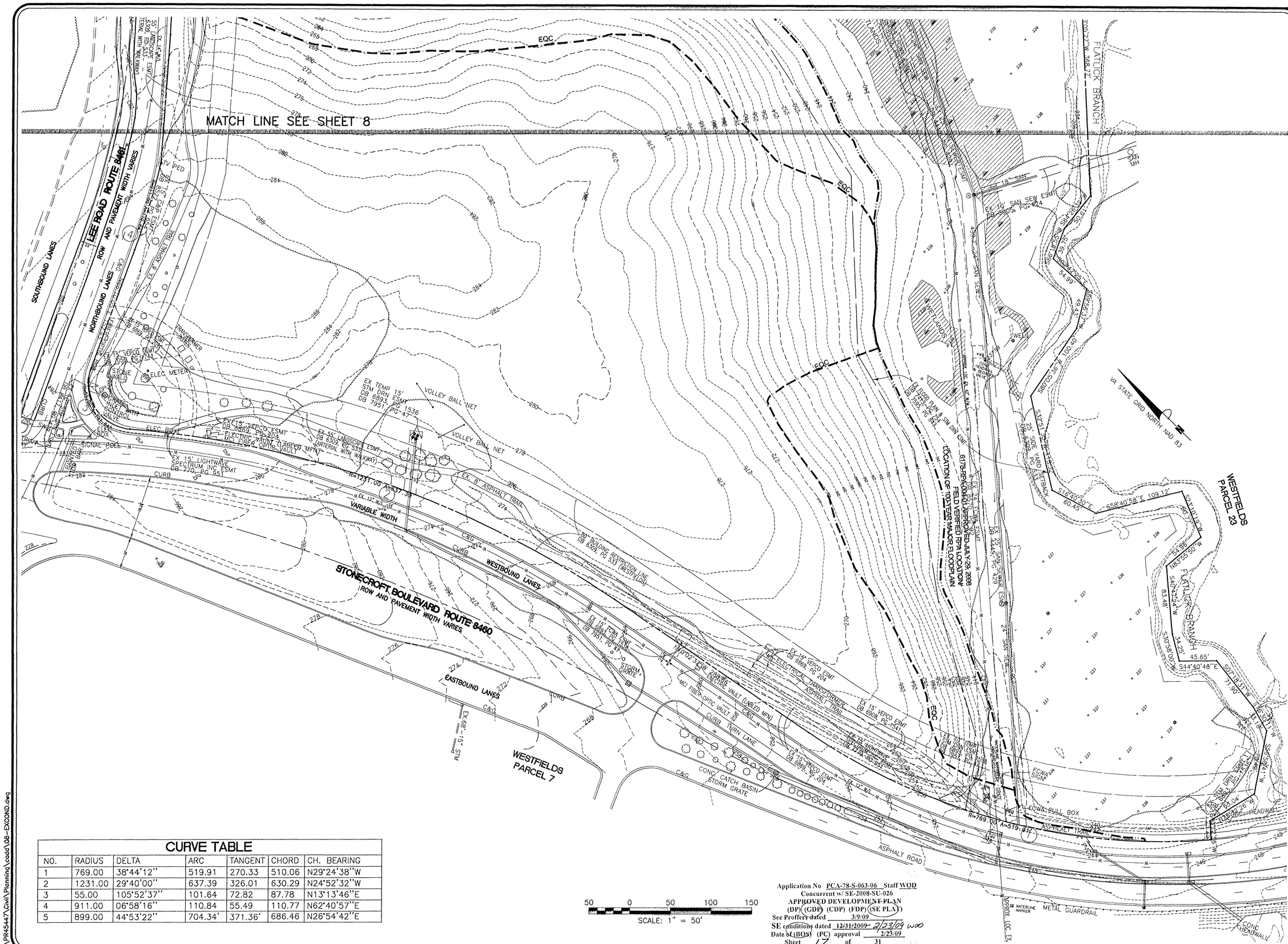
FILE NO.: C-4702	



CURVE TABLE

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3	55.00	105°52'37"	101.64	72.82	87.78	N13°13'46"E
4	911.00	06°58'16"	110.84	55.49	110.77	N62°40'57"E
5	899.00	44°53'22"	704.34'	371.36'	686.46	N26°54'42"E

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLAT)
See Proffers dated 3/9/09
SE conditions dated ~~12/31/2009~~ 2/23/09 WOD
Date of (BOS) (PC) approval 2/23/09
Sheet 17 of 31

BURGESS & NIPLE
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PH. (703) 631-9630 FAX (703) 631-6041

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EXISTING CONDITIONS
AEROSPACE CORPORATION WESTFIELDS, PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN P. GASTON
No. 035787
PROFESSIONAL ENGINEER

DATE: MAY, 2008	
SCALE: 1" = 50'	
DESIGN: JPG	DRAWN: MPC
CHECK: DMT	CHECK: JPG
JOB NO.: PR45447	
P.R. NO.: 45447	
SHEET 9 OF	
FILE NO.: C-4702	

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LEGEND

- CANOPY TREE — Species may include: oak, hickory, maple, beech, birch, and gum.
- EVERGREEN TREE — Species may include: pine, cedar, holly, spruce, and magnolia.
- UNDERSTORY TREE — Species may include: serviceberry, redbud, fringetree, and hornbeam.
- LAWN
- MEADOW SEED MIX
- SHRUBS — Species may include: witchhazel, beautyberry, and native azaleas.
- RAIN GARDEN
- FOREST SAVE

NOTES:

1. The landscape plan will not use invasive plants and will emphasize the use of native species. The overall landscape design for the project site will form a link between the contemporary nature of the proposed architecture and the existing natural conditions of the site. Planting design in plazas will respond to the architecture of the buildings and create pedestrian friendly environments. Plantings closer to the edge of the disturbed area of the site will respond more to the surrounding forest and be more naturalistic in their design.

2. The tree planting plan for the perimeter of the site will primarily use native tree species. A mixture of hardwood deciduous, evergreen, and understory trees will provide a varied treatment to the edge and year-round interest.

3. Irrigation will be provided to the landscaping on the interior of the site for plantings that are location on top of underground building structures. Irrigation and maintenance of the streetscape edge within the Westfields easement will be maintained by the Westfields Business Owners Association per the Westfields Development Guidelines.

4. Selective removal of trees located outside the limits of clearing will be required where there is significant impact to tree roots resulting from construction operations. Critical root zone for forest grown trees was determined according to the guidelines set forth in the Fairfax County Public Facilities Manual. Any tree to be removed outside the limits of clearing will be verified with the County Arborist prior to removal.

5. An eight foot high black metal picket fence with top and bottom rails will be installed along the frontage of the property adjacent to Stonecroft Blvd. and Lee Road. An eight foot high black coated chain link fence will be installed along the RPA and adjacent properties.

examples of picket fence styles

OCULUS

2410 17th STREET NW SUITE 201 WASHINGTON DC 20009
P 202 588 5454 F 202 588 5449 E OCULUS@OCULUS-DC.COM

AEROSPACE CORPORATION WESTFIELDS PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

Application No PCA-78-S-063-06 Staff WOD
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Sheet 16 of 31

COMMONWEALTH OF VIRGINIA
DONALD RAY HOOVER
No. 000730
LANDSCAPE ARCHITECT

SUBMISSIONS/ REVISIONS	
7-1-08	REVISED PER COUNTY COMMENTS
9-10-08	REVISED PER COUNTY COMMENTS
10-9-08	REVISED PER COUNTY COMMENTS
11-4-08	REVISED PER COUNTY COMMENTS
12-1-08	REVISED PER COUNTY COMMENTS
12-17-08	REVISED PER COUNTY COMMENTS

KEY MAP

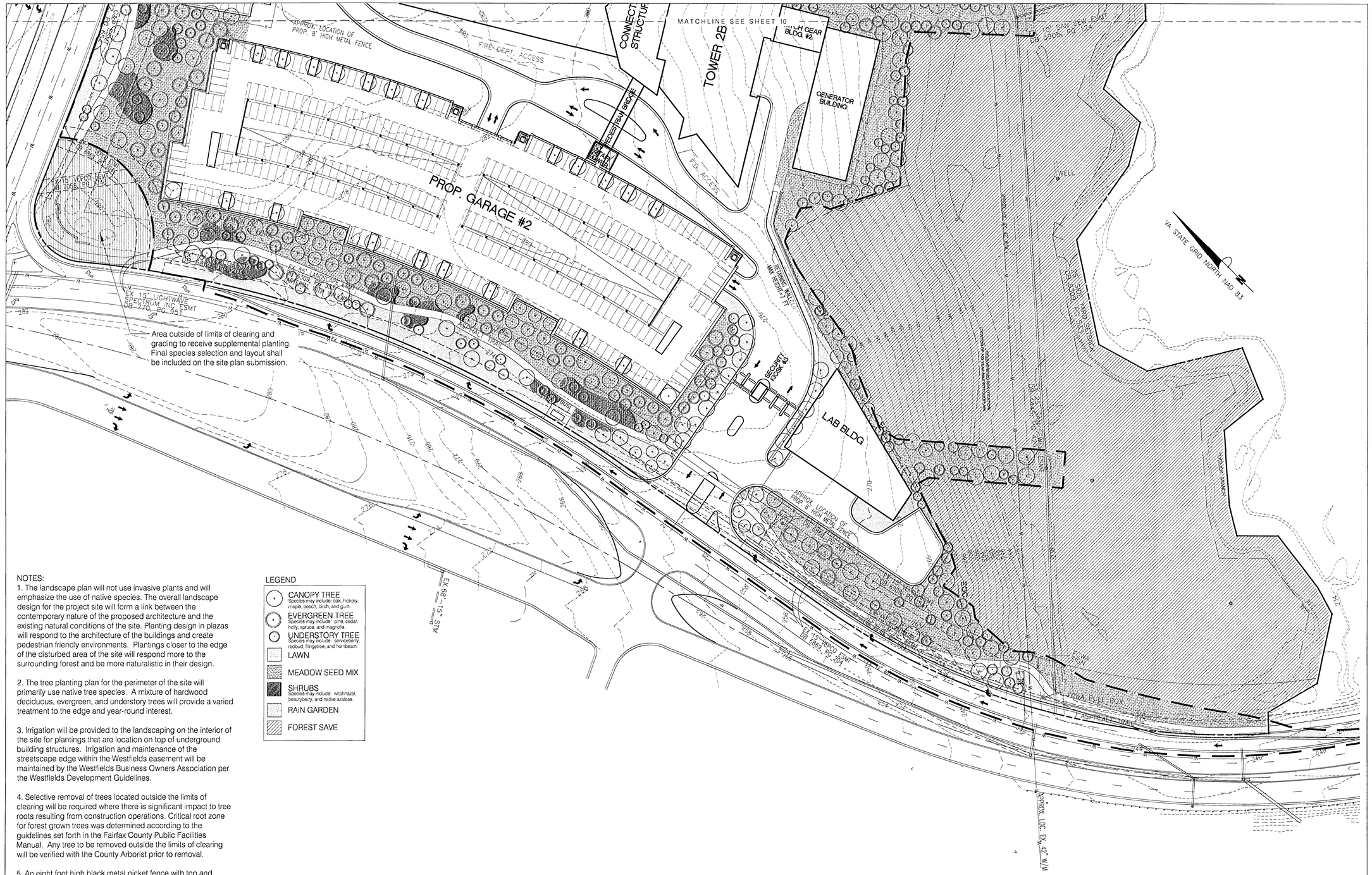
DATE: MAY, 2008

PROJECT NUMBER: W801

SCALE: 1" = 50'

DRAWING TITLE: LANDSCAPE PLAN

SHEET NUMBER: 10



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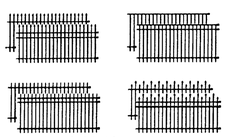
- FOREST SAVE



examples of picket fence styles

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLA)
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SE conditions dated 12/31/2009- 2/23/09 WOD
Date of (BOS) (PC) approval 2/23/09
Sheet 29 of 31

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P 202 588 5454 F 202 588 5449 E OCULUS@OCULUS-DC.COM

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SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DONALD RAY HOOVER
No. 000790
LANDSCAPE ARCHITECT

SUBMISSIONS/ REVISIONS	
7-1-08	REVISED PER COUNTY COMMENTS
9-10-08	REVISED PER COUNTY COMMENTS
10-9-08	REVISED PER COUNTY COMMENTS
11-4-08	REVISED PER COUNTY COMMENTS
12-1-08	REVISED PER COUNTY COMMENTS
12-17-08	REVISED PER COUNTY COMMENTS

KEY MAP

DATE: MAY, 2008

PROJECT NUMBER: W801

SCALE: 1" = 50'

DRAWING TITLE: LANDSCAPE PLAN

SHEET NUMBER: 10A

NOTE: PLAZA DRAWING IS FOR CONCEPT DESIGN ONLY AND IS SUBJECT TO CHANGE.

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SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DONALD RAY HOOVER
No. 002730
LANDSCAPE ARCHITECT

SUBMISSIONS/ REVISIONS	
11-4-08	REVISED PER COUNTY COMMENTS
12-1-08	REVISED PER COUNTY COMMENTS
12-17-08	REVISED PER COUNTY COMMENTS

KEY MAP

DATE: MAY, 2008

PROJECT NUMBER: W801

SCALE: 1" = 16'

DRAWING TITLE: BUILDING 1 PLAZA ENLARGEMENT

SHEET NUMBER: 10B

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
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See Proffers dated 3/9/09
SE conditions dated 12/31/2009 2/23/09 WOD
Date of (BOS) (PC) approval 2/23/09
Sheet 10 of 31

Tree Number	Diameter (in.)	Action	Notes
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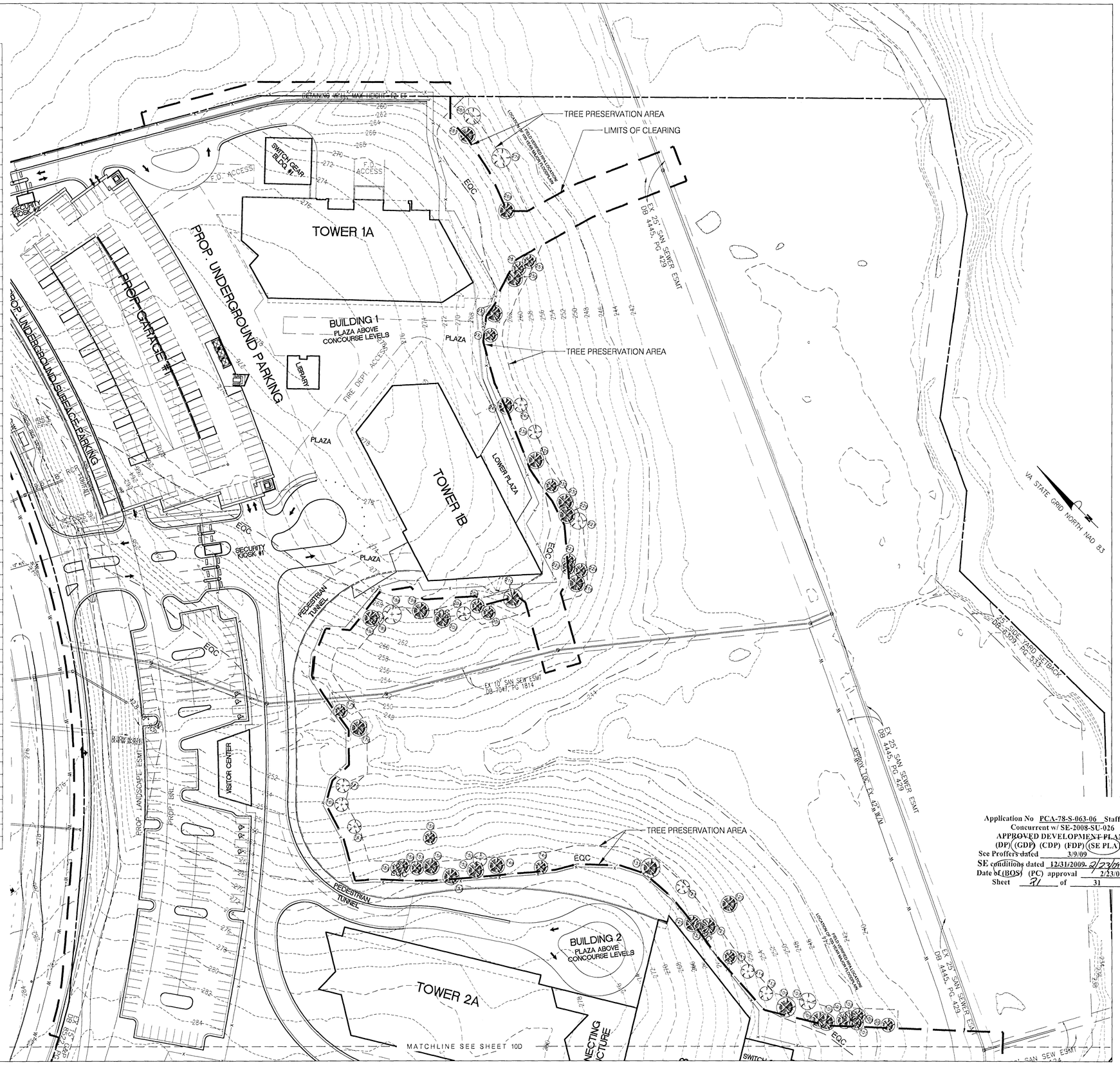
100	10	remove	will sustain significant root damage
101	12	remove	will sustain significant root damage
102	14	remove	will sustain significant root damage
103	14	remove	will sustain significant root damage
105	18	remove	will sustain significant root damage
106	16	remove	will sustain significant root damage
107	16	save	
109	28 twin	remove	will sustain significant root damage
112	10	save	
114	12	save	
115	12	remove	will sustain significant root damage
120	18	remove	dead
121	16	remove	will sustain significant root damage
123	12	remove	will sustain significant root damage
125	174	remove	will sustain significant root damage
127	10	save	
133	22	remove	will sustain significant root damage
145	12	remove	will sustain significant root damage
148	14	remove	will sustain significant root damage
150	10	save	
152	18	remove	will sustain significant root damage
153	18	remove	will sustain significant root damage
155	10	remove	dead
156	18	remove	will sustain significant root damage
157	12	remove	will sustain significant root damage
158	12	remove	will sustain significant root damage
159	10	remove	will sustain significant root damage
163	10	save	
169	10	save	
171	10	save	
176	16	remove	will sustain significant root damage
179	10	remove	will sustain significant root damage
188	22	save	
189	12	save	
190	14	remove	will sustain significant root damage
198	18	remove	will sustain significant root damage
202	18	remove	dead
204	10	save	
208	12	remove	will sustain significant root damage
209	10	remove	will sustain significant root damage
210	24 twin	remove	will sustain significant root damage
218	14	remove	will sustain significant root damage
222	12	remove	will sustain significant root damage
223	12	remove	will sustain significant root damage
224	12	remove	will sustain significant root damage
227	14	save	
229	14	remove	will sustain significant root damage
230	14	remove	will sustain significant root damage
232	12	remove	will sustain significant root damage
235	18	remove	will sustain significant root damage
238	10	save	
240	10	save	
241	16	remove	will sustain significant root damage
255	14	remove	will sustain significant root damage
257	12	remove	will sustain significant root damage
261	12	remove	will sustain significant root damage
268	16	remove	will sustain significant root damage
272	16	remove	will sustain significant root damage
273	10	remove	will sustain significant root damage
276	22	save	
280	14	save	
281	14	remove	will sustain significant root damage

LEGEND

TREE OUTSIDE THE LIMITS OF CLEARING TO BE REMOVED



Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLA)
See Proffers dated 3/9/09
SE conditions dated 12/31/2009 2/23/09 WOD
Date of (BOS) (PC) approval 2/23/09
Sheet 31 of 31

OCULUS

2410 17th STREET NW SUITE 201 WASHINGTON DC 20009
P 202 588 5454 F 202 588 5449 E OCULUS@OCULUS-DC.COM

AEROSPACE CORPORATION WESTFIELDS PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DONALD RAY HOOVER
No. 000750
LANDSCAPE ARCHITECT

SUBMISSIONS/ REVISIONS	
12-1-08	REVISED PER COUNTY COMMENTS
12-17-08	REVISED PER COUNTY COMMENTS

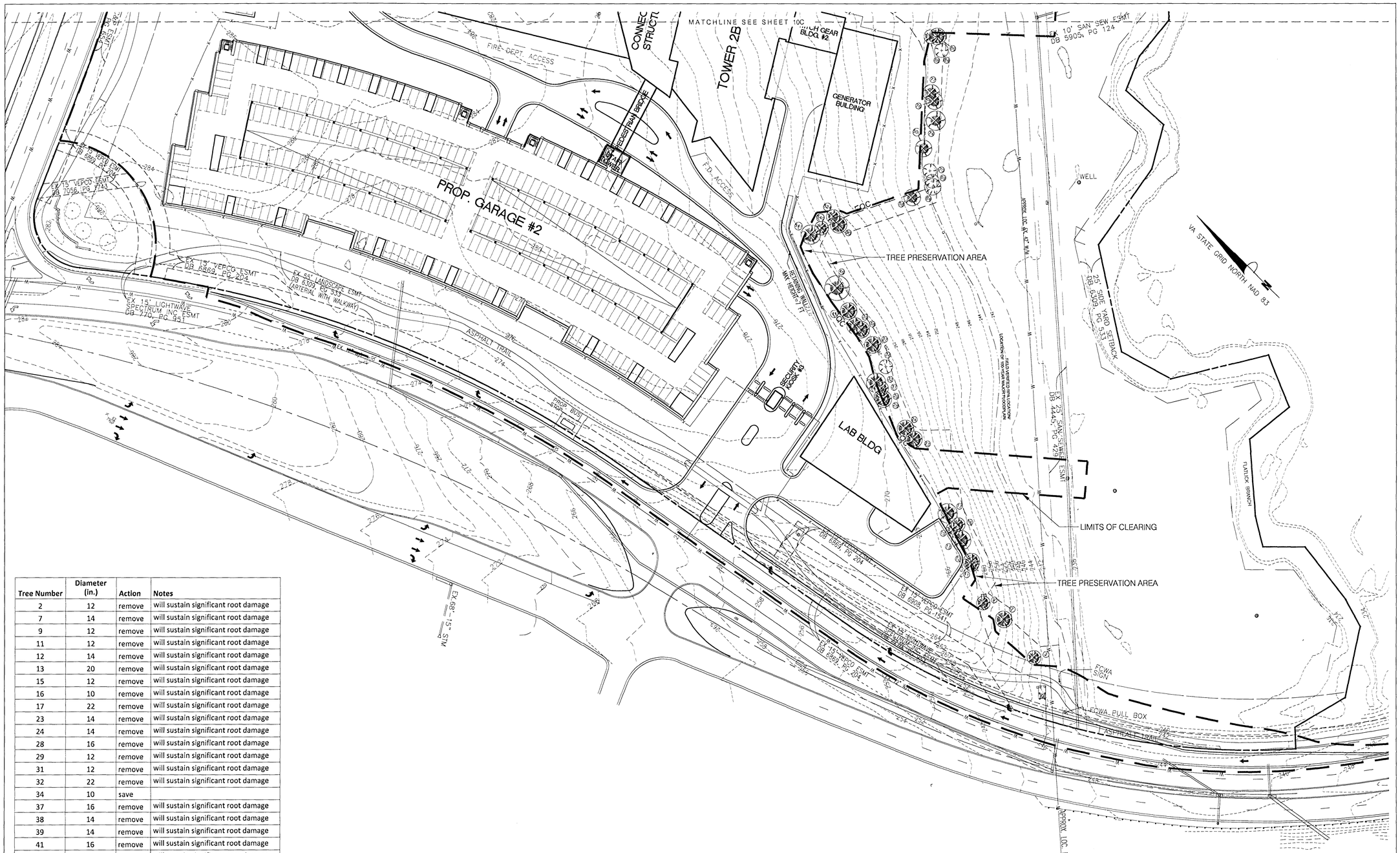
DATE: MAY, 2008

PROJECT NUMBER: W801

SCALE: 1" = 50'

DRAWING TITLE: TREE PRESERVATION PLAN

SHEET NUMBER: 10C



Tree Number	Diameter (in.)	Action	Notes
2	12	remove	will sustain significant root damage
7	14	remove	will sustain significant root damage
9	12	remove	will sustain significant root damage
11	12	remove	will sustain significant root damage
12	14	remove	will sustain significant root damage
13	20	remove	will sustain significant root damage
15	12	remove	will sustain significant root damage
16	10	remove	will sustain significant root damage
17	22	remove	will sustain significant root damage
23	14	remove	will sustain significant root damage
24	14	remove	will sustain significant root damage
28	16	remove	will sustain significant root damage
29	12	remove	will sustain significant root damage
31	12	remove	will sustain significant root damage
32	22	remove	will sustain significant root damage
34	10	save	
37	16	remove	will sustain significant root damage
38	14	remove	will sustain significant root damage
39	14	remove	will sustain significant root damage
41	16	remove	will sustain significant root damage
46	40 twin	remove	will sustain significant root damage
50	18	remove	will sustain significant root damage
58	14	remove	will sustain significant root damage
64	14	save	
69	12	save	
70	10	save	
74	20	remove	will sustain significant root damage
76	14	remove	will sustain significant root damage
77	14	remove	will sustain significant root damage
500	18	remove	will sustain significant root damage
524	10	remove	will sustain significant root damage
540	12	remove	will sustain significant root damage
541	24	remove	will sustain significant root damage
84	12	save	
86	14	remove	will sustain significant root damage
88	10	remove	will sustain significant root damage

LEGEND

TREE OUTSIDE THE LIMITS OF CLEARING TO BE REMOVED

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Sheet 32 of 31

OCULUS

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AEROSPACE CORPORATION WESTFIELDS PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DONALD RAY HOOVER
No. 000790
LANDSCAPE ARCHITECT

SUBMISSIONS/ REVISIONS	
12-1-08	REVISED PER COUNTY COMMENTS
12-17-08	REVISED PER COUNTY COMMENTS

KEY MAP

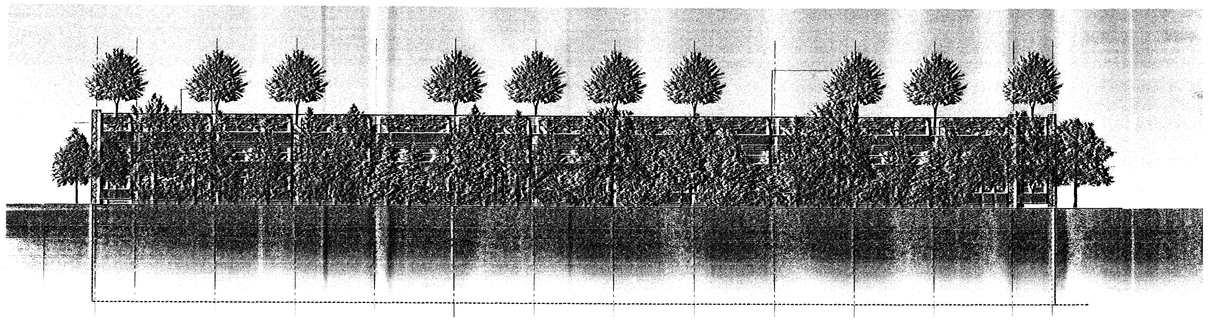
DATE: MAY, 2008

PROJECT NUMBER: W801

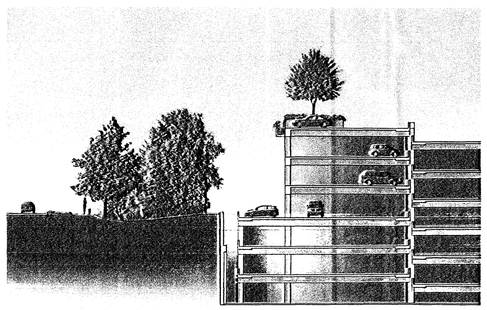
SCALE: 1" = 50'

DRAWING TITLE: TREE PRESERVATION PLAN

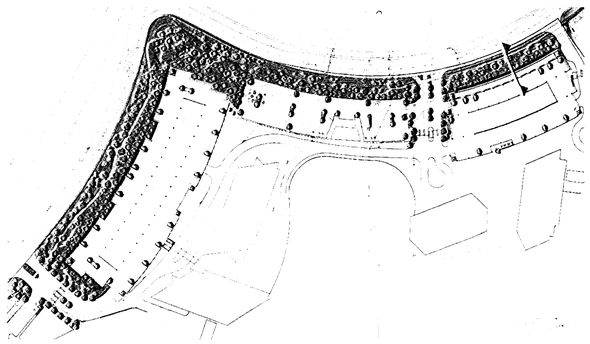
SHEET NUMBER: 10D



1 GARAGE 1 ELEVATION - (note garage facade is diagramatic and subject to change) 1"=25'



2 GARAGE 1 SECTION 1"=25'



3 SECTION KEY PLAN NTS

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLAT)
See Proffers dated 3/9/09
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Sheet 22 of 31

OCULUS

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AEROSPACE CORPORATION WESTFIELDS PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
DONALD RAY HOOVER
No. 002790
LANDSCAPE ARCHITECT

SUBMISSIONS/ REVISIONS	
7-1-08	REVISED PER COUNTY COMMENTS
9-10-08	REVISED PER COUNTY COMMENTS
10-9-08	REVISED PER COUNTY COMMENTS
12-1-08	REVISED PER COUNTY COMMENTS
12-17-08	REVISED PER COUNTY COMMENTS

KEY MAP

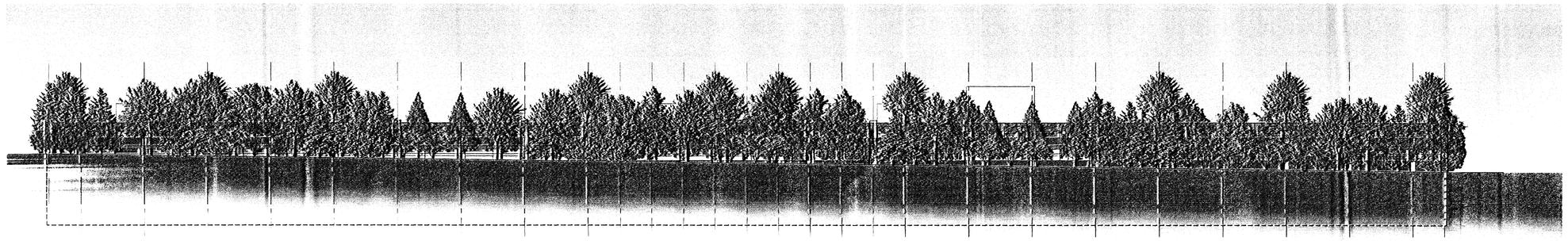
DATE: MAY, 2008

PROJECT NUMBER: W801

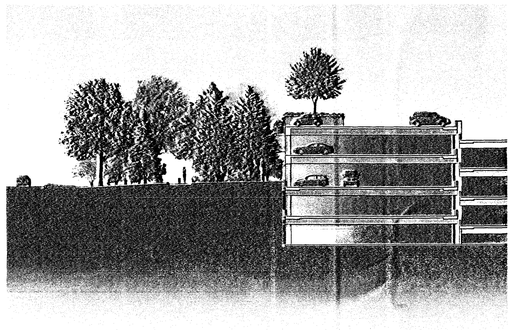
SCALE: 1" = 25'

DRAWING TITLE: GARAGE 1 ELEVATION & SECTION

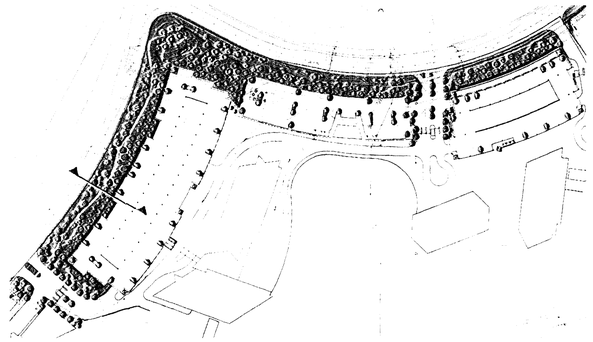
SHEET NUMBER: 11



1 GARAGE 2 ELEVATION - (note garage facade is diagramatic and subject to change) 1"=25'



2 GARAGE 2 SECTION 1"=25'



3 SECTION KEY PLAN NTS

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AEROSPACE CORPORATION WESTFIELDS PARCEL 35

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10-9-08	REVISED PER COUNTY COMMENTS
12-1-08	REVISED PER COUNTY COMMENTS
12-17-08	REVISED PER COUNTY COMMENTS

KEY MAP

DATE: MAY, 2008

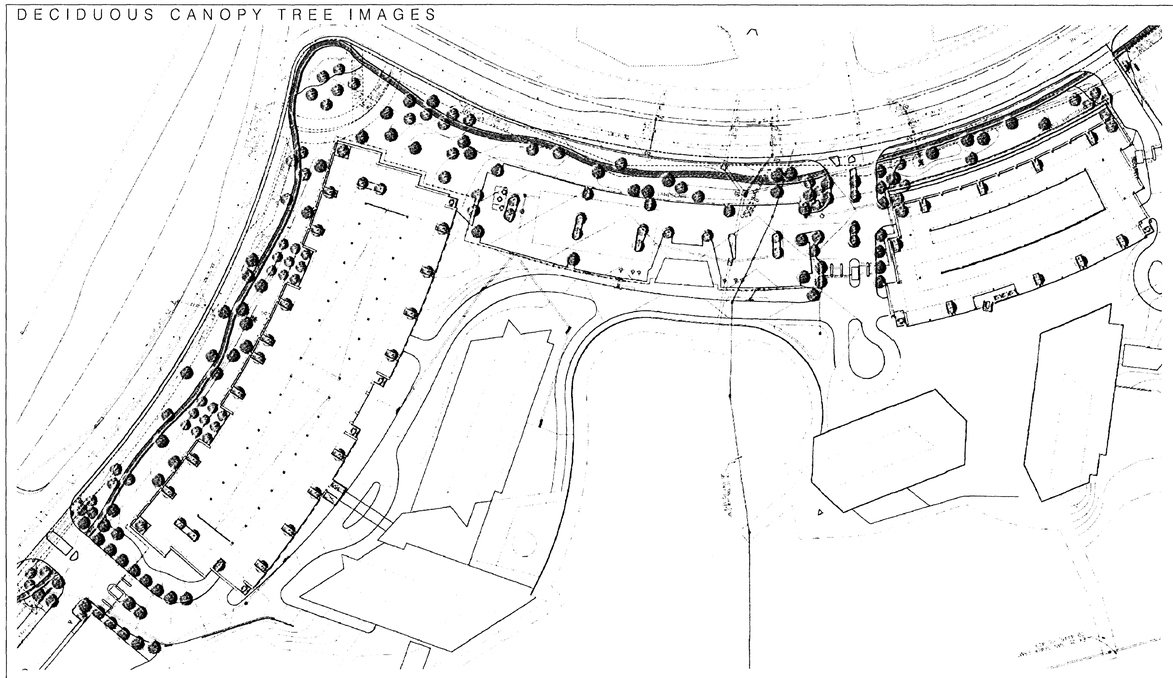
PROJECT NUMBER: W801

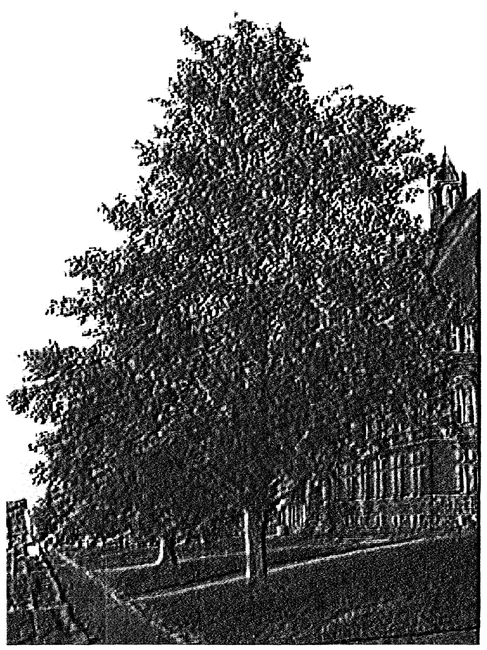
SCALE: 1" = 25'

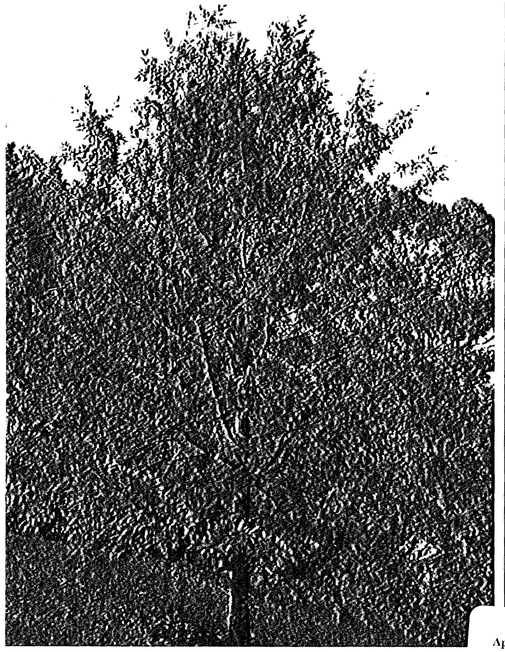
DRAWING TITLE: GARAGE 2 ELEVATION & SECTION

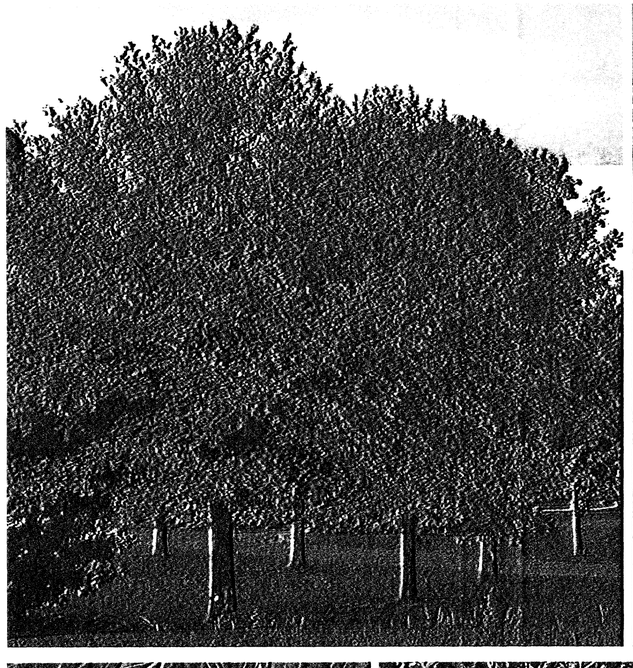
SHEET NUMBER: 11A

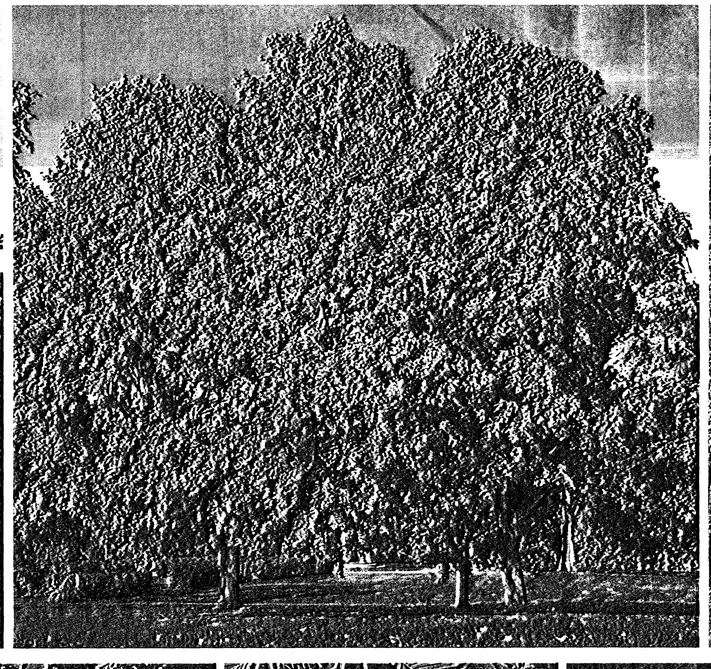
DECIDUOUS CANOPY TREE IMAGES

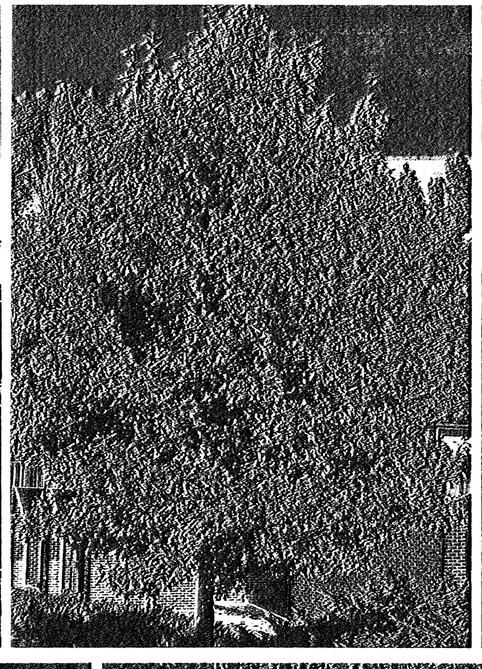


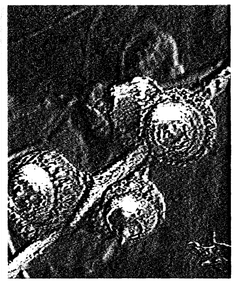


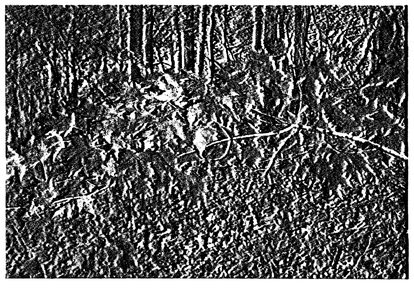












OCULUS

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AEROSPACE CORPORATION WESTFIELDS PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

Application No PCA-78-S-063-06 Staff WOD
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Date of (BOS) (PC) approval 2/23/09
Sheet 32 of 31

COMMONWEALTH OF VIRGINIA
DONALD RAY HOOVER
No. 000790
LANDSCAPE ARCHITECT

SUBMISSIONS/REVISIONS	
7-1-08	REVISED PER COUNTY COMMENTS
9-10-08	REVISED PER COUNTY COMMENTS
10-9-08	REVISED PER COUNTY COMMENTS
12-1-08	REVISED PER COUNTY COMMENTS
12-17-08	REVISED PER COUNTY COMMENTS

KEY MAP

DATE: MAY, 2008

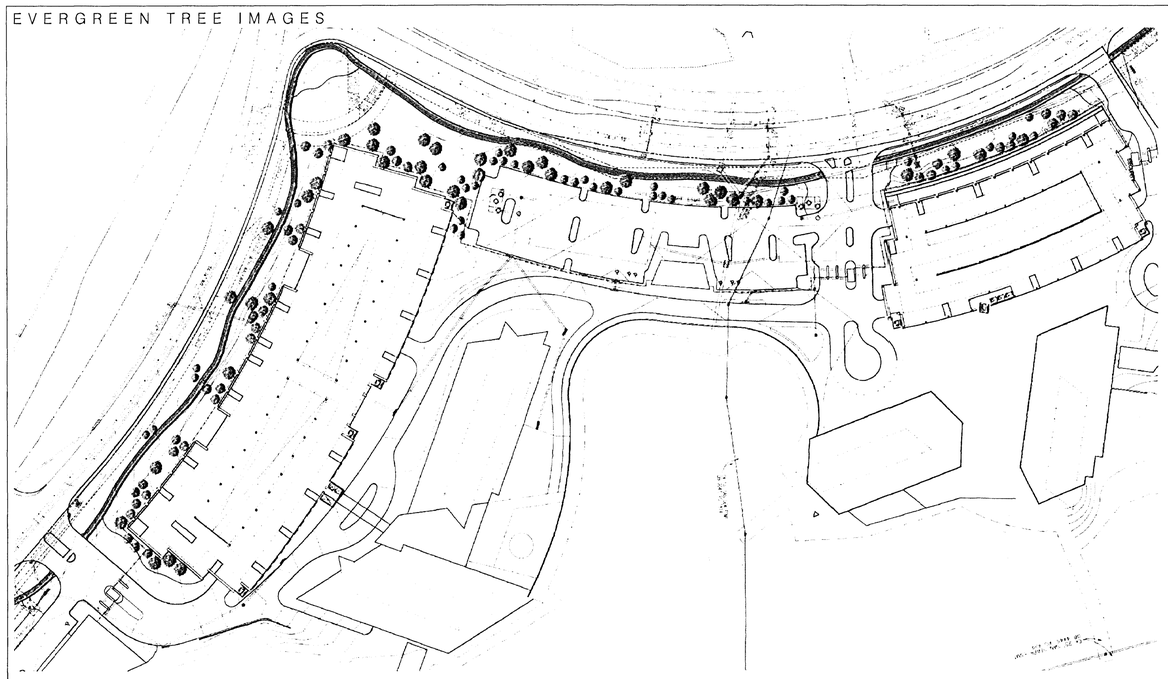
PROJECT NUMBER: W801

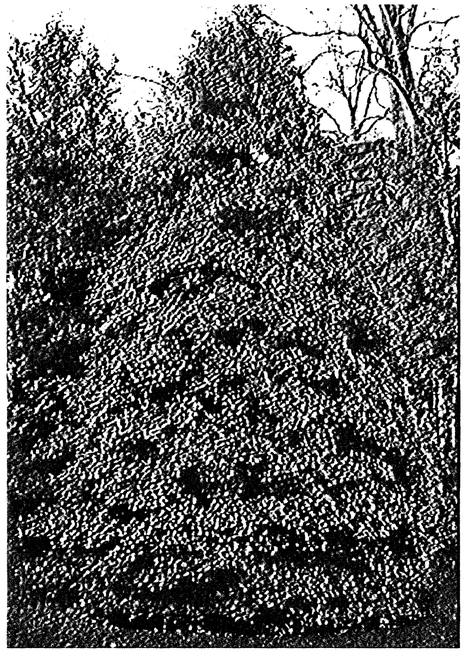
SCALE:

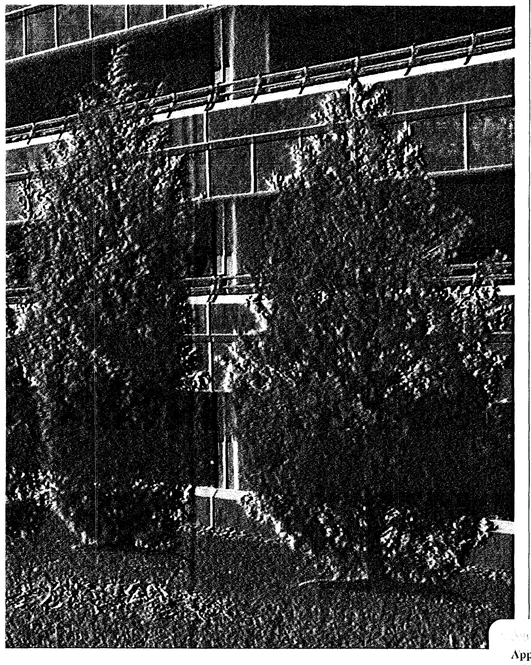
DRAWING TITLE: PLANT IMAGE BOARD - DECIDUOUS CANOPY TREES ALONG STREETSCAPE SIDE

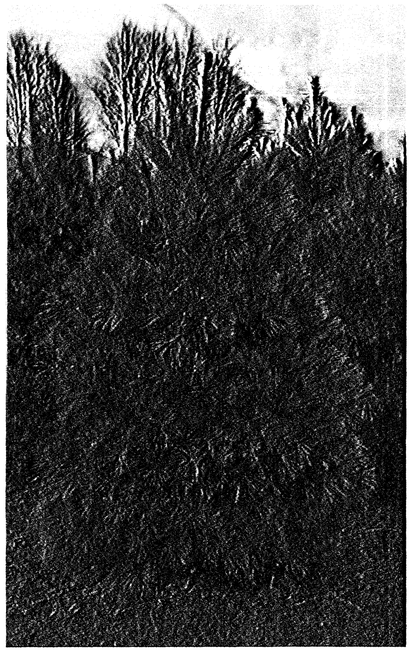
SHEET NUMBER: 12

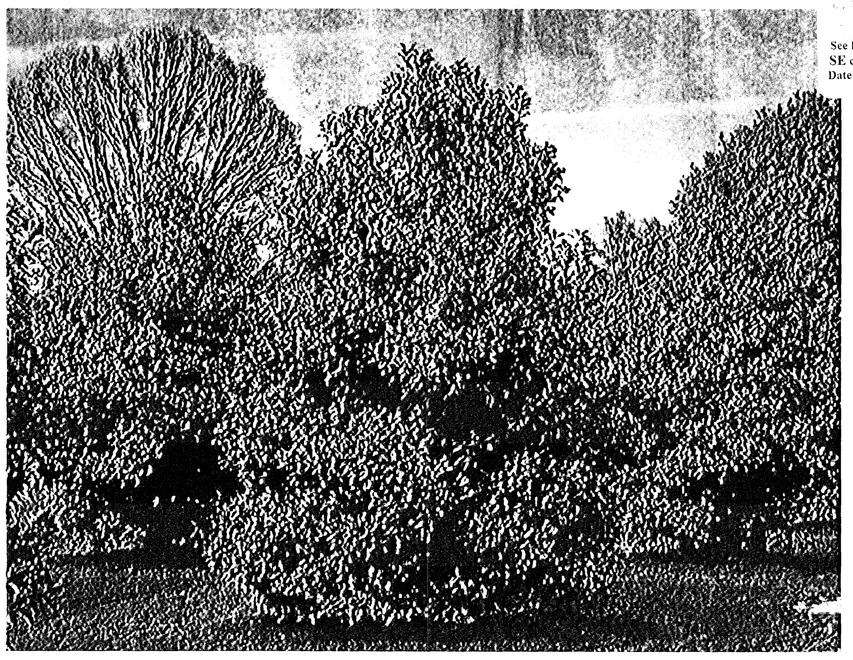
EVERGREEN TREE IMAGES

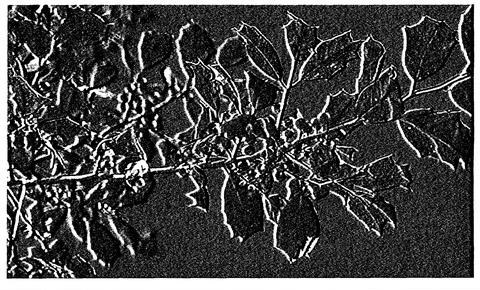


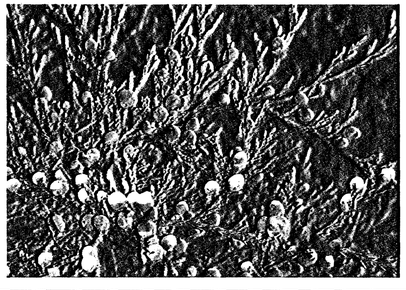












OCULUS

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AEROSPACE CORPORATION WESTFIELDS PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
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See Proffers dated 3/9/09
SE conditions dated ~~12/31/2009~~ 2/23/09 WOD
Date of (BOS) (PC) approval 2/23/09
Sheet 24 of 31

COMMONWEALTH OF VIRGINIA
DONALD RAY HOOVER
No. 002750
LANDSCAPE ARCHITECT

SUBMISSIONS/ REVISIONS	
7-1-08	REVISED PER COUNTY COMMENTS
9-10-08	REVISED PER COUNTY COMMENTS
10-9-08	REVISED PER COUNTY COMMENTS
12-1-08	REVISED PER COUNTY COMMENTS
12-17-08	REVISED PER COUNTY COMMENTS

KEY MAP

DATE: MAY, 2008

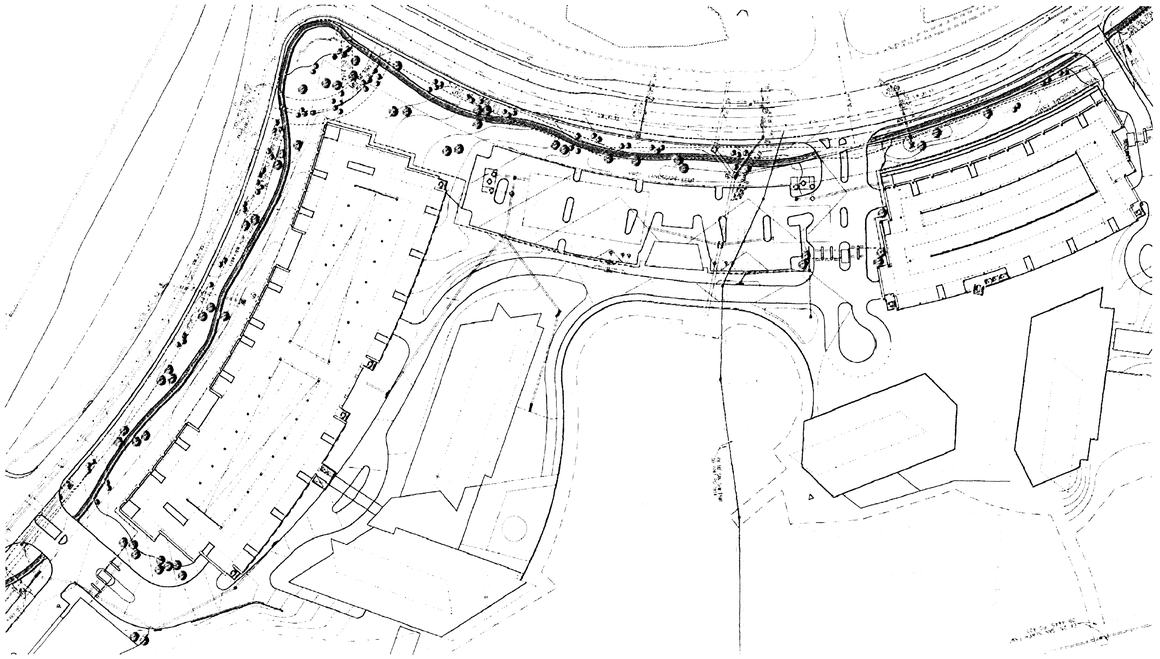
PROJECT NUMBER: W801

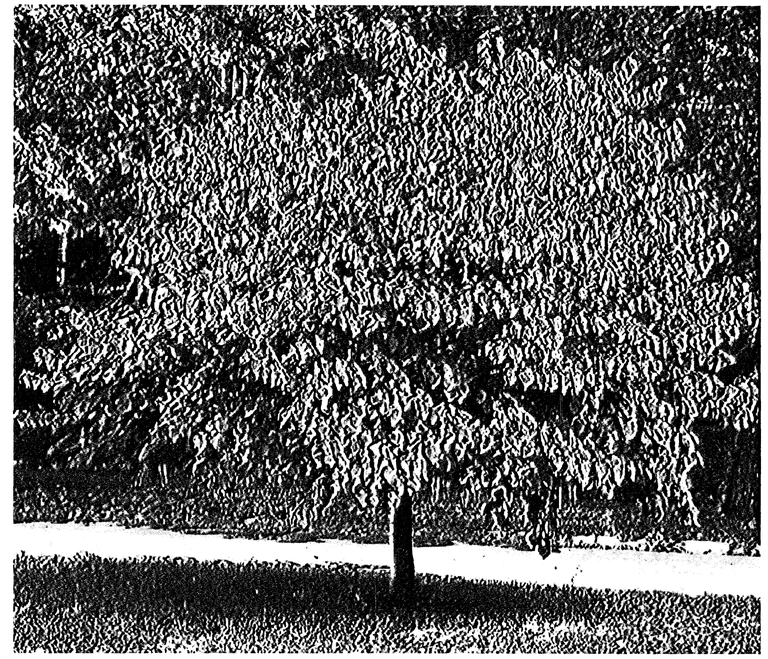
SCALE:

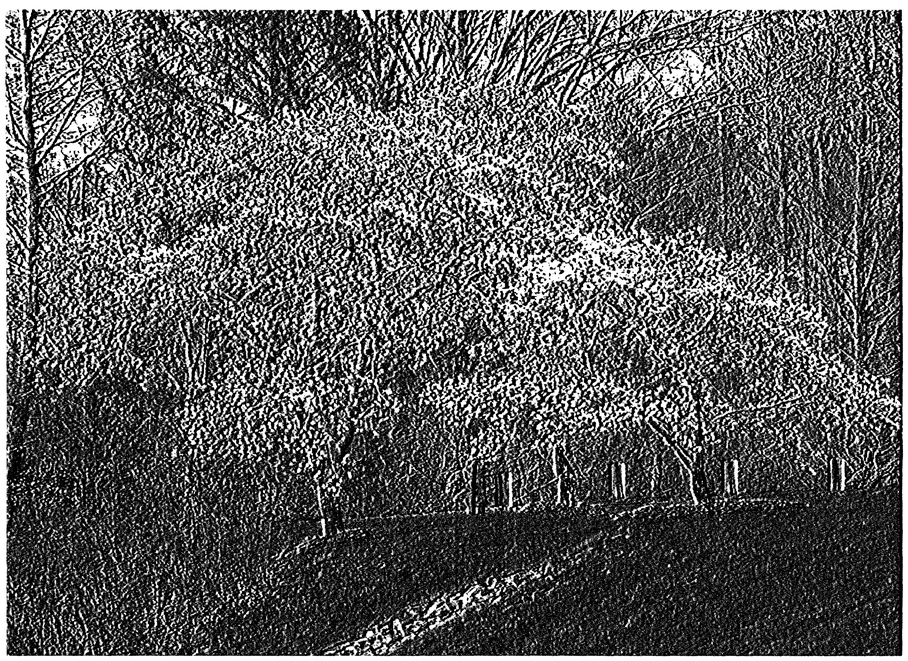
DRAWING TITLE: PLANT IMAGE BOARD - EVERGREEN TREES ALONG STREETSCAPE SIDE

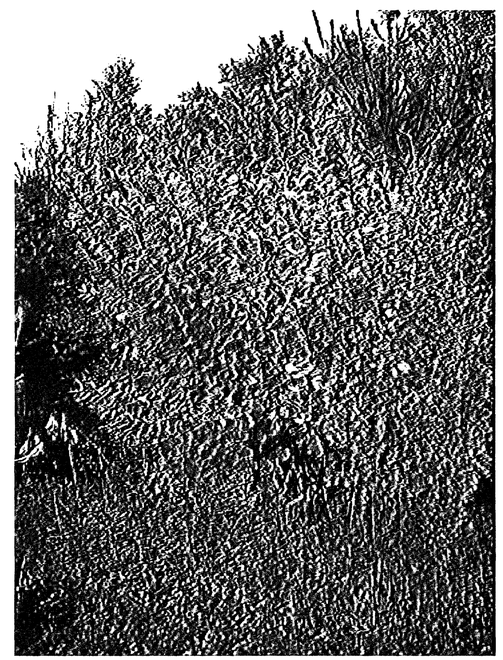
SHEET NUMBER: 12A

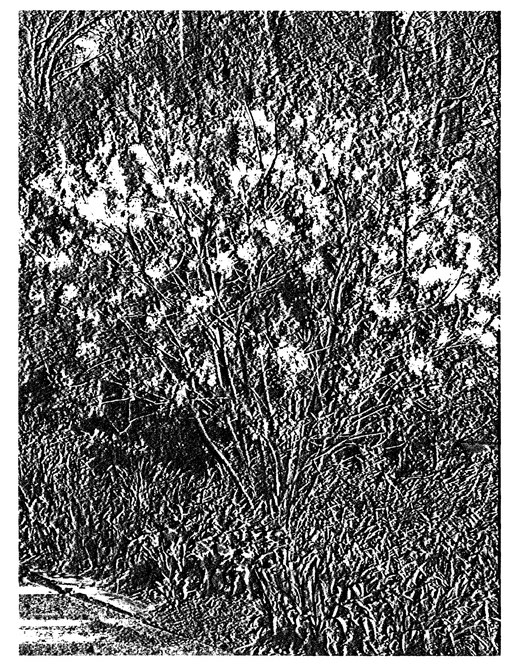
UNDERSTORY TREE IMAGES

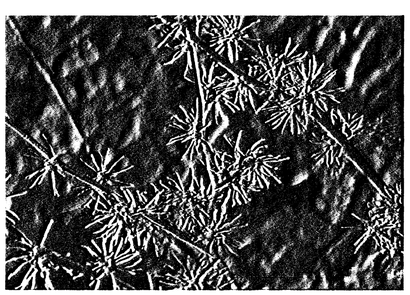


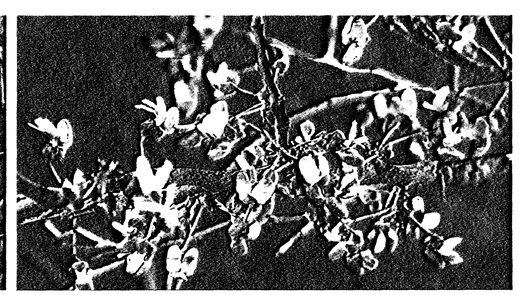


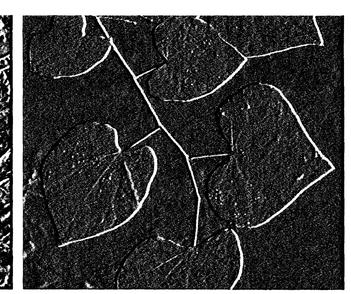












OCULUS

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AEROSPACE CORPORATION
WESTFIELDS PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

Application No PCA-78-S-063-06 Staff WOD
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Sheet 27 of 31

COMMONWEALTH OF VIRGINIA
DONALD RAY HOOVER
No. 002750
LANDSCAPE ARCHITECT

SUBMISSIONS: REVISIONS	
7-1-08	REVISED PER COUNTY COMMENTS
9-10-08	REVISED PER COUNTY COMMENTS
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12-17-08	REVISED PER COUNTY COMMENTS

KEY MAP:

DATE: MAY, 2008

PROJECT NUMBER: W801

SCALE:

DRAWING TITLE: PLANT IMAGE BOARD - UNDERSTORY TREES ALONG STREETSCAPE SIDE

SHEET NUMBER: 12B

FLOOR AREA TABULATIONS FOR LAND AREAS WITHIN
ZONING PARCELS A AND A-2
JUNE 30, 2008

THE LAND AREAS THAT ARE WITHIN THE TWO ZONING PARCELS THAT WERE DESIGNATED AS ZONING PARCELS A AND A-2 WITH THE REZONING OF THE WESTFIELDS SITE (CASE NUMBER RZ 78-S-083) ARE SUBJECT TO A ZONING PROFFER THAT LIMITS THE TOTAL ALLOWABLE BUILDING FLOOR AREA THAT MAY BE DEVELOPED ON THESE PARCELS. THE FOLLOWING TABULATIONS ARE PROVIDED IN COMPLIANCE WITH PROFFER #8 TO PROVIDE AN ACCOUNTING OF THE BUILDING FLOOR AREA ALLOCATIONS APPLICABLE TO ZONING PARCELS A AND A-2. IT SHOULD BE NOTED THAT THE PERMITTED DEVELOPMENT ON A NUMBER OF THESE PARCELS HAS BEEN ESTABLISHED THROUGH RECORDED DEEDS AND AGREEMENTS THAT LIMIT OR ALLOCATE DEVELOPMENT RIGHTS.

1. CALCULATION OF GROSS ALLOWABLE FLOOR AREA, ZONING PARCELS A AND A-2:

ZONING PARCEL	AREA	F.A.R CREDIT PER PROFFER	POTENTIAL FLOOR AREA
A	274.12591 AC. (11,9490,924 SQ. FT.)	0.50	5,970,462 SQ. FT.
A-2	59.66678 AC. (2, 599,084 SQ. FT.)	0.00	0 SQ. FT.
TOTALS	333.79269 AC. (14,540,008 SQ. FT.	0.41 (AVERAGE)	5,970,462 SQ. FT.

2. FLOOR AREA CHARGED AGAINST THE TOTAL POTENTIAL FLOOR AREA FOR LAND AREAS WITHIN ZONING PARCELS A AND A-2 THAT HAVE BEEN PREVIOUSLY DEVELOPED OR ARE SUBJECT TO POTENTIAL FUTURE DEVELOPMENT (EXCLUDING PARCEL 35A):

PARCEL	AREA OF PARCEL WITHIN ZONING PARCEL A OR A-2 (ACRES / SQ. FT.)	FLOOR AREA CHARGED AGAINST TOTAL (GROSS SQ. FT.)
3A	32.72 / 1,425,347	709,282 (1)
7	12.52 / 545,371	223,602 (2)
9A-1	34.89 / 1,519,694	659,368 (1)
9A-2	17.02 / 741,315	321,653 (1)
9B-1	41.08 /1,789,595	252,855 (3)
9B-2	7.57 / 329,750	135,360 (2)
11	2.08 / 90.683	400 (1)
15A	0.14 / 5,823	2,387 (2)
15B-1	4.23 / 184,250	63,940 (2)
25A	3.58 / 155,953	34,217 (1)
27C	2.01 / 87,520	33,933 (2)
29D	1.90 / 82,764	700 (1)
29E-1	0.08 / 3,600	1,476 (2)
31A-1	8.71 / 379,250	149,472 (1)
31A-2	9.88 /430,598	150,077 (1)
31A-3	6.35 / 276,469	85,451 (1)
31-B1	18.74 / 816,489	300,000 (1)
31B-2	6.18 / 269,110	85,000 (1)
35B	9.00 / 392,050	160,737 (1)
39	31.56 / 1,374,754	563,643 (1)
41	7.41 / 322,900	0 (1)
TOTALS	259.03 / 11,282,708	4,106,356

NOTES:
(1) FLOOR AREA CHARGED BASED ON A FLOOR AREA ALLOCATION ASSIGNED TO THE DEVELOPMENT PARCEL BY A RECORDED DEED/AGREEMENT.
(2) FLOOR AREA CHARGED BASED ON THE POTENTIAL DEVELOPMENT OF THE DEVELOPMENT PARCEL TO A FLOOR AREA RATIO OF 0.41 CALCULATED ON THE AREA OF THE PARCEL WITHIN ZONING PARCELS A AND A-2.
(3) FLOOR AREA CHARGED BASED ON THE POTENTIAL DEVELOPMENT OF REMAINDER PARCEL 9B-1A (14.81 AC.) TO A MAXIMUM F.A. R. OF 0.50.

3. REMAINING FLOOR AREA TO BE ALLOCATED:

A. GROSS BUILDING FLOOR AREA ALLOCATED TO ZONING PARCELS A AND A-2: 5,970,462 GROSS SQ. FT.

B. LESS, GROSS BUILDING FLOOR AREAS PREVIOUSLY ALLOCATED AS SHOWN ABOVE: 4,106,356 GROSS SQ. FT.

C. FLOOR AREA REMAINING TO BE ALLOCATED: 1,864,106 GROSS SQ. FT.

4. FLOOR AREA ALLOCATION FOR PARCEL 35A:

A. FLOOR AREA REMAINING TO BE ALLOCATED: 1,864,106 GROSS SQ. FT.

B. LESS, GROSS BUILDING FLOOR AREA PROPOSED ON PARCEL 35A: - 975,350 GROSS SQ. FT.

C. REMAINING FLOOR AREA: 888,756 GROSS SQ. FT.

SPECIAL EXCEPTION
AEROSPACE CORPORATION
WESTFIELDS, PARCEL 35

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)	Speciall 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 3&4.

☒ 3. Provide:

Facility Name/ Type & No. (e.g. dry pond A, infil. trench, underground vault, etc.)	On-site area served (acres)	Off-site area served (acres)	Drainage area (acres)	Footprint area (sf)	Storage Volume (cf)	If pond, dam height (ft)
STORM FILTER #1	4.0 AC	N/A	4.0 AC	+200 SF	N/A	N/A
STORM FILTER #2	4.0 AC	N/A	4.0 AC	+200 SF	N/A	N/A
SWM DETENTION STR. #1	5.49 AC	N/A	5.49 AC	+2,432 SF	+12,265 CF	N/A
SWM DETENTION STR. #2	7.6 AC	N/A	7.6 AC	+8,640 SF	+38,302 CF	N/A
SWM DETENTION STR. #3	2.29 AC	N/A	2.29 AC	+1,472 SF	+7,741 CF	N/A
RAIN GARDEN	1.78 AC	N/A	1.78 AC	+15,668 SF	N/A	N/A
GREEN ROOF AREA	0.54 AC	N/A	0.54 AC	+10,782 SF	N/A	N/A
PERVOUS PVMT. AREA	0.47 AC	N/A	0.47 AC	+4,802 SF	N/A	N/A
Totals	26.2 AC	N/A	26.2 AC	+44,194 SF	+58,308 CF	N/A

☒ 4. Onsite drainage channels, outfalls and pipe systems are shown on Sheet s 3&4
Pond inlet and oulet pipe systems are shown on Sheet N/A.

☐ 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 N/A.

☒ 7. A 'stormwater management narrative' which contains a description of how detention and best management practices requirements will be met is provided on Sheet 12.

☒ 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 12.

☒ 9. A description of how the outfall requirements, including contributing drainage areas of the Public Facilities Manual will be satisfied is provided on Sheet 12.

☒ 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 8&9; NOTE ON SHEET 1

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

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

NOTES:

(1) IF AN INADEQUATE SECTION IS ENCOUNTERED DURING THE FINAL ENGINEERING DESIGN STAGE, A PROPORTIONAL IMPROVEMENT AND NO ADVERSE IMPACT TO THE DOWNSTREAM DRAINAGE SYSTEM WILL BE SHOWN BY USING ACCEPTABLE METHODS DESCRIBED IN SECTION 6-0203.4 OF THE PFM, WHICH INCLUDES THE CRITICAL SHEAR STRESS METHOD, CHANNEL CAPACITY METHOD, AND 1-YEAR DETENTION METHOD.

(2) THE STORM WATER MANAGEMENT/BMP FACILITIES SHOWN ON THIS PLAT ARE BASED ON PRELIMINARY EVALUATIONS AND DESIGNS. THE TYPE, LOCATION, SIZE AND ASSOCIATED COMPUTATIONS OF SWM/BMP FACILITIES UTILIZED ON THIS SITE MAY VARY WITH FINAL ENGINEERING DESIGN PROVIDED THAT ALL FACILITIES SHALL BE WITHIN THE LIMITS OF CLEARING PROPOSED ON THIS PLAT.

COMPUTATIONS FOR OUTFALL #1 AND #3
SHEET FLOW CONDITION

TIME OF CONCENTRATION Tc= 5 MIN
RAINFALL INTENSITY I(2YR)= 5.45 IN/HR
I(10YR)= 7.27 IN/HR

OUTFALL #1
PRE-DEVELOPMENT RUNOFF
A= 3.78 AC, C= 0.30
Q(2YR) = 6.18 CFS
Q(10YR)= 8.24 CFS

POST-DEVELOPMENT RUNOFF
A= 2.50 AC, C= 0.43
Q(2YR) = 5.86 CFS
Q(10YR)= 7.82 CFS

OUTFALL #3
PRE-DEVELOPMENT RUNOFF
A= 2.02 AC, C= 0.30
Q(2YR) = 3.30 CFS
Q(10YR)= 4.41 CFS

POST-DEVELOPMENT RUNOFF
A= 0.66 AC, C= 0.54
Q(2YR) = 1.94 CFS
Q(10YR)= 2.59 CFS

BMP FACILITY DESIGN CALCULATIONS:

Part 1: LIST OF SUBAREAS AND "C" FACTORS USED

SUBAREA DESIGNATION AND DESCR.	C	AREA ACRES
(1) QUALIFYING OPEN SPACE	0.30	12.55
(2) STORM FILTER #1	0.80	4.00
(3) STORM FILTER #2	0.80	4.00
(4) RAIN GARDEN	0.75	1.78
(5) GREEN ROOF AREA	0.45	0.54
(6) PERVIOUS PAVEMENT AREA #1	0.90	0.15
(7) PERVIOUS PAVEMENT AREA #2	0.90	0.14
(8) PERVIOUS PAVEMENT AREA #3	0.90	0.18
(9) ON-SITE UNCONTROLLED	0.55	17.07
		40.41 SITE AREA

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

(A) SITE AREA 40.41 AC

(B) SUBAREA DESIGNATION	C	X	ACRES	= PRODUCT
(1) QUALIFYING OPEN SPACE	0.30		12.55	3.77
(2) STORM FILTER #1	0.80		4.00	3.20
(3) STORM FILTER #2	0.80		4.00	3.20
(4) RAIN GARDEN	0.75		1.78	1.34
(5) GREEN ROOF AREA	0.45		0.54	0.24
(6) PERVIOUS PAVEMENT AREA #1	0.90		0.15	0.14
(7) PERVIOUS PAVEMENT AREA #2	0.90		0.14	0.13
(8) PERVIOUS PAVEMENT AREA #3	0.90		0.18	0.16
(9) ON-SITE UNCONTROLLED	0.55		17.07	9.39
		TOTAL=	40.41	TOTAL= 21.55

WEIGHTED AVERAGE "C" FACTOR FOR THE SITE= 21.55 / 40.4 = 0.53

Part 3: COMPUTE THE TOTAL PHOSPHORUS REMOVAL FOR THE SITE

SUB-AREA	BMP TYPE	EFF.	OFF SITE	AREA RATIO	"C" FACTOR RATIO	PRO-DUCT
(1)	QUALIFYING OPEN SPACE	100		12.55 / 40.4 = 0.31	1.00	31.06
(2)	STORM FILTER #1	50		4.00 / 40.4 = 0.10	0.80 / 0.53 = 1.50	7.42
(3)	STORM FILTER #2	50		4.00 / 40.4 = 0.10	0.80 / 0.53 = 1.50	7.42
(4)	RAIN GARDEN	50		1.78 / 40.4 = 0.04	0.75 / 0.53 = 1.41	3.10
(5)	GREEN ROOF AREA	40		0.54 / 40.4 = 0.01	0.45 / 0.53 = 0.84	0.45
(6)	PERVIOUS PAVEMENT AREA #1	35		0.15 / 40.4 = 0.00	0.90 / 0.53 = 1.69	0.22
(7)	PERVIOUS PAVEMENT AREA #2	35		0.14 / 40.4 = 0.00	0.90 / 0.53 = 1.69	0.20
(8)	PERVIOUS PAVEMENT AREA #3	35		0.18 / 40.4 = 0.00	0.90 / 0.53 = 1.69	0.26
(9)	ON-SITE UNCONTROLLED	0		17.07 / 40.4 = 0.42	0.55 / 0.53 = 1.03	0.00
					TOTAL SITE PHOSPHORUS REMOVAL =	50.14

Part 4: DETERMINE COMPLIANCE WITH PHOSPHORUS REMOVAL REQUIREMENT

REQUIREMENT: 50% FOR THE ENTIRE SITE
SITE PHOSPHORUS REMOVAL = 50.14 % > 50.00 %

NOTE: BMP CALCULATIONS ARE BASED ON THE NORHTERN VIRGINIA BMP HANDBOOK (OCCOQUAN METHOD)

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLAT)
See Proffers dated 3/9/09
SE conditions dated 12/31/2009 2/23/09
Date of (BOS) (PC) approval 2/23/09
Sheet 26 of 31

STORM WATER MANAGEMENT (SWM), BEST MANAGEMENT PRACTICES (BMP)

THE PROPERTY ASSOCIATED WITH THIS SITE PLAN IS LOCATED IN THE WESTFIELDS INTERNATIONAL CORPORATE CENTER IN CHANTILLY AND IS DESIGNATED AS WESTFIELDS PARCEL 35. THE SITE IS BORDERED BY LEE ROAD ROUTE 8461 TO THE NORTH, STONECROFT BOULEVARD ROUTE 8460 TO THE WEST, WESTFIELDS PARCEL 35A TO THE EAST AND WESTFIELDS PARCEL 23 TO THE SOUTH. THE TOTAL SITE AREA FOR THE SUBJECT PROPERTY IS 40.41 ACRES, OF WHICH, ONLY ABOUT 23.2 ACRES WILL BE DISTURBED WITH THIS DEVELOPMENT. THE MAJORITY OF THE SITE CONSISTS OF MATURE UPLAND FOREST IN GOOD OVERALL CONDITION. THE REMAINDER OF THE SITE CONSISTS OF MATURE/YOUNG BOTTOMLAND FOREST, MAINTAINED GRASSLAND, AND OPEN FIELD. THE EXISTING TERRAIN GENERALLY SLOPES TOWARDS FLATLICK BRANCH.

FLATLICK BRANCH TRAVERSES THE SOUTHERN PROPERTY LINE. APPROXIMATELY 13.8 ACRES OF THE PROPERTY IS WITHIN THE 100-YEAR FLOOD PLAIN LIMIT OF FLATLICK BRANCH, WHICH IS ALSO CONSIDERED TO BE THE LIMIT OF THE RESOURCE PROTECTION AREA (RPA). UP TO 21.15 ACRES OF THE PROPERTY IS CONSIDERED TO BE AN ENVIRONMENTAL QUALITY CORRIDOR (EQC). THERE IS AN EXISTING DEFINED CHANNEL THAT BISECTS THE MIDDLE PORTION OF THE SITE (FLOWING SOUTHWARD) THAT RECEIVES STORM WATER RUNOFF FROM LEE ROAD AND UPSTREAM PROPERTIES FROM THE NORTH AND CONVEYS THE WATER TO THE MAIN STREAM BED OF FLATLICK BRANCH. STORM WATER RUNOFF FROM THE EXISTING UN-DEVELOPED SITE DRAINS TOWARDS FLATLICK BRANCH.

THE SITE IS WITHIN THE CUB RUN WATERSHED, WHICH ULTIMATELY DRAINS TO THE OCCOQUAN. THEREFORE, THE PHOSPHOROUS REMOVAL REQUIREMENT FOR THIS DEVELOPMENT IS 50%. WATER QUALITY IMPROVEMENT [BEST MANAGEMENT PRACTICES (BMP)] WILL BE PRIMARILY MET THROUGH A COMBINATION OF QUALIFYING OPEN SPACE AND THE USE OF UNDERGROUND MANUFACTURED BMP DEVICES, RAIN GARDEN, GREEN ROOF, AND PERVIOUS PAVEMENT (APPRXIMATE LOCATION SHOWN ON THE PLAT). DEDICATED OPEN SPACE AREAS USED FOR BMP CREDIT WILL BE PLACED IN A CONSERVATION EASEMENT AS A WATER QUALITY MANAGEMENT AREA, WHICH PROVIDES APPROXIMATELY 34% OF THE OVERALL PHOSPHOROUS REMOVAL CREDIT FOR THIS DEVELOPMENT. BMP CREDIT ALLOCATION FOR EACH OF THE FACILITY IS SHOWN ON THE BMP COMPUTATIONS ON THIS SHEET. BMP CALCULATION IS BASED ON THE NORTHERN VIRGINIA BMP HANDBOOK (OCCOQUAN METHOD). SEE BMP MAP ON SHEET 13A.

STORMWATER MANAGEMENT (SWM) WILL BE PRIMARILY ACCOMPLISHED USING THREE UNDERGROUND SWM FACILITIES WITH INDEPENDENT CONTROL STRUCTURES. THE 2-YEAR AND 10-YEAR FLOWS WILL BE ATTENUATED TO PRE-DEVELOPMENT CONDITIONS. THE PROPERTY OWNER WILL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL SWM/BMP FACILITIES. WITH THE PROPOSED DEVELOPMENT, THE EXISTING DRAINAGE PATTERN WILL BE ESSENTIALLY MAINTAINED AND THE RATE OF DRAINAGE FLOW WILL NOT BE INCREASED ABOVE THE PRE-DEVELOPMENT LEVEL. THIS PLAN COMPLIES FULLY WITH THE AMENDED CHESAPEAKE BAY PRESERVATION ORDINANCE (CBPO).

ADEQUATE OUTFALL ANALYSIS

THE PRIMARY OUTFALL FOR THIS SITE IS PROVIDED BY FLATLICK BRANCH, WHICH FLOWS WESTWARD ALONG THE SOUTHERN PROPERTY LINE. A SECONDARY OUTFALL FOR THIS DEVELOPMENT IS PROVIDED BY THE EXISTING STORM SEWER SYSTEM ALONG STONECROFT BOULEVARD.

THERE ARE FOUR OUTFALLS FOR THIS DEVELOPMENT. THREE OF THE FOUR ARE DRAINING DIRECTLY TO FLATLICK BRANCH AND ONE IS DRAINING TO THE EXISTING STORM DRAIN SYSTEM IN STONECROFT BOULEVARD. AS EXPLAINED BELOW, TWO OF THE OUTFALLS (OUTFALL #1 AND OUTFALL #3) ARE SHEET FLOW CONDITION AND THE OTHER TWO OUTFALLS (OUTFALL #2 AND OUTFALL #4) ARE CONCENTRATED FLOWS:

OUTFALL #1 – LOCATED IN THE FLOOD PLAIN/RPA AREA, AT THE SOUTH EAST CORNER OF THE PROPOSED DEVELOPMENT, REAR OF TOWER 1A, RECEIVES RUNOFF VIA SHEET FLOW CONDITION FROM THE LOWER SECTION OF THE DRIVEWAY SERVING THE LOADING DOCK AREA OF TOWER 1A AND OUTFALLS DIRECTLY VIA OVERLAND TO THE FLOOD PLAIN/RPA. THE PRE-DEVELOPMENT 10-YEAR SHEET FLOW TO THIS OUTFALL IS ±8.24 CFS. THE POST-DEVELOPMENT 10-YEAR FLOW TO THIS OUTFALL IS ±7.82 CFS. BASED ON THE ADEQUATE OUTFALL REQUIREMENTS PERTAINING TO SHEET FLOW CONDITIONS, IF SHEET FLOW IS MAINTAINED IN THE POST-DEVELOPMENT CONDITION AND THE FLOW/VOLUME IS LESS THAN THE PRE-DEVELOPMENT LEVELS, ADEQUATE OUTFALL REQUIREMENT IS MET. BASED ON THE SHEET FLOW COMPUTATIONS SHOWN ON THIS SHEET, IT IS MY PROFESSIONAL OPINION THAT ADEQUATE EXIST FOR OUTFALL #1.

OUTFALL #2 – LOCATED AT THE END OF PROPOSED STORM STRUCTURE #1 IS AN EXISTING DEFINED CHANNEL THAT BISECTS THE MIDDLE PORTION OF THE SITE (FLOWING SOUTHWARD) TOWARDS FLATLICK BRANCH. CURRENTLY, THIS CHANNEL RECEIVES OFFSITE FLOW FROM LEE ROAD AND UPSTREAM PROPERTIES FROM THE NORTH VIA COMBINATION OF CLOSED SYSTEM AND OPEN CHANNEL FLOW. IT ALSO RECEIVES ONSITE FLOW FROM THE SUBJECT PROPERTY. OFFSITE FLOW WILL BE INTERCEPTED AND DIVERTED THROUGH THE DEVELOPMENT BY A PROPOSED CLOSED STORM SEWER SYSTEM AND RELEASED AT THE SAME POINT WITHIN THE EXISTING NATURAL CHANNEL AT PROPOSED STRUCTURE #1. ONSITE FLOW WILL ALSO BE COLLECTED BY A PROPOSED CLOSED STORM SEWER SYSTEM AND DETAINED IN TWO UNDERGROUND SWM STRUCTURES. OUTFALL PIPES FROM TWO OF THE UNDERGROUND SWM SYSTEMS (SWM FACILITY #1 AND #2), WHICH PROVIDES SWM FOR ±13.1 ACRES OF THE PROPOSED DEVELOPMENT, CONNECT TO THE SAME STORM SYSTEM THAT OUTFALLS TO THE EXISTING CHANNEL AT PROPOSED STR. #1. THE EXISTING STREAM CHANNEL CONVEYS RUNOFF TO FLATLICK BRANCH.

THE EXTENT OF REVIEW FOR THIS OUTFALL WILL BASED ON PFM 6-0203.2C, WHICH STATES THAT THE EXTENT OF REVIEW SHALL BE TO A POINT THAT IS AT LEAST 150 FT DOWNSTREAM OF A POINT WHERE THE DRAINAGE AREA IS 360 ACRES OR GREATER. STRUCTURE #1 OUTFALLS DIRECTLY INTO THE FLOOD PLAIN LIMIT OF FLATLICK BRANCH, WHICH HAS AN AREA GREATER THAN 360 ACRES. THE POST-DEVELOPMENT 2-YR FLOW TO THIS OUTFALL IS ±110 CFS AND 2-YR VELOCITY IS 14.9 FPS. THE POST-DEVELOPMENT 10-YR FLOW TO THIS OUTFALL IS ± 218 CFS AND THE 10-YR VELOCITY IS 17.3 FPS. AEROSPACE CORPORATION COMMITTED TO RESTORE THE EXISTING STREAM CHANNEL. THIS WILL BE DONE AS SEPARATE PROJECT INDEPENDENT OF THE SPECIAL EXCEPTION AND SITE PLAN. AEROSPACE HIRED AND ENVIRONMENTAL CONSULTANT TO DESIGN AND CONDUCT THE STREAM RESTORATION PROJECT. THE ENVIRONMENTAL ENGINEERS WILL INCORPORATE DEVICES THAT WILL REDUCE VELOCITY AND NATURALLY RESTORE THE STREAM TO ADEQUATELY RECEIVED THE POST-DEVELOPMENT FLOW FROM OUR OUTFALL AND CONVEY IT TO FLATLICK BRANCH IN A NON-EROSIVE LEVEL. DEVICES THAT MAY BE USED INCLUDE PLUNGE POOLS AND OTHER FEATURES THAT DISSIPATES ENERGY AND REDUCE VELOCITY. THE MODIFIED STREAM SECTION WILL BE ANALYZED BY THE USE OF A 10-YEAR FREQUENCY STORM TO VERIFY THAT STORM WATER WILL NOT OVERTOP CHANNEL BANKS NOR CAUSE EROSION OF CHANNEL BED AND BANKS FOR THE 2-YEAR VELOCITY. IT IS MY PROFESSIONAL OPINION THAT THE STREAM RESTORATION PROJECT WILL PROVIDE ADEQUATE OUTFALL FOR OUTFALL #2.

OUTFALL #3 – LOCATED ADJACENT TO THE FLOOD PLAIN/RPA AREA, REAR OF TOWER 2A, RECEIVES RUNOFF VIA SHEET FLOW CONDITION FROM THE SECTION OF THE DRIVEWAY SERVING THE LOADING DOCK AREA AND OUTFALLS DIRECTLY VIA OVERLAND TO THE FLOOD PLAIN/RPA. THE PRE-DEVELOPMENT 10-YEAR SHEET FLOW TO THIS OUTFALL IS ±4.41 CFS. THE POST-DEVELOPMENT 10-YEAR FLOW TO THIS OUTFALL IS ±2.59 CFS. BASED ON THE ADEQUATE OUTFALL REQUIREMENTS PERTAINING TO SHEET FLOW CONDITIONS, IF SHEET FLOW IS MAINTAINED IN THE POST-DEVELOPMENT CONDITION AND THE FLOW/VOLUME IS LESS THAN THE PRE-DEVELOPMENT LEVELS, ADEQUATE OUTFALL REQUIREMENT IS MET. BASED ON THE SHEET FLOW COMPUTATIONS SHOWN ON THIS SHEET, IT IS MY PROFESSIONAL OPINION THAT ADEQUATE EXIST FOR OUTFALL #3.

OUTFALL #4 – LOCATED AT THE SOUTHWEST CORNER OF THE DEVELOPMENT ADJACENT TO STONECROFT BOULEVARD. THIS OUTFALL IS TO THE EXISTING STORM DRAINAGE SYSTEM ON STONECROFT BOULEVARD. THE PROPOSED UNDERGROUND SWM FACILITY (SWM FACILITY #3) OUTFALLS TO THIS SYSTEM AT EXISTING STRUCTURE #1, WHICH IS CONSIDERED AS THE POINT OF CONFLUENCE. THE EXISTING STORM DRAINAGE SYSTEM AT STONECROFT BOULEVARD WAS DESIGNED TO RECEIVE FLOW FROM A PORTION OF THE SUBJECT PROPERTY.

THE EXTENT OF REVIEW FOR THIS OUTFALL WILL BASED ON PFM 6-0203.2A, WHICH STATES THAT THE EXTENT OF REVIEW SHALL BE TO A POINT THAT IS AT LEAST 150 FT DOWNSTREAM OF A POINT WHERE THE RECEIVING PIPE OR CHANNEL IS JOINED BY ANOTHER THAT HAS A DRAINAGE AREA THAT IS AT LEAST 90% OF THE SIZE OF THE FIRST DRAINAGE AREA AT THE POINT OF CONFLUENCE.

THE CONTRIBUTING DRAINAGE AREA ASSOCIATED WITH THE PROPOSED DEVELOPMENT TO THE EXISTING STORM SEWER SYSTEM ON STONECROFT BOULEVARD IS ±2.7 ACRES. THE POINT OF CONFLUENCE IS AT EXISTING STRUCTURE #1, WHICH IS THE POINT WHERE THE OUTFALL PIPE FROM PROPOSED SWM FACILITY 3 CONNECTS TO THE EXISTING STORM SEWER SYSTEM. THE TOTAL CONTRIBUTING OFFSITE AREA TO EXISTING STRUCTURE #2 IS ±3.3 ACRES, WHICH IS MORE THAN 90% OF THE CONTRIBUTING AREA ASSOCIATED WITH THE DEVELOPMENT. THEREFORE, PER PFM 6-0203.2A, THE EXTENT OF REVIEW ON THE EXISTING SYSTEM WILL BE 150 DOWNSTREAM OF EXISTING STRUCTURE #2. BASED ON OUR PRELIMINARY ANALYSIS OF THE EXISTING STORM SEWER SYSTEM ALONG STONECROFT BOULEVARD, IT IS MY PROFESSIONAL OPINION THAT ADEQUATE OUTFALL EXIST FOR OUTFALL #4.

BURGESS & NIPLE
4160 PLEASANT VALLEY ROAD, CHANTILLY, VA 20151-1226
PH. (703) 631-9630 FAX (703) 631-6041

ADDRESS COMMENTS	DEC. 17, 2008
ADDRESS COMMENTS	DEC. 1, 2008
ADDRESS COMMENTS	NOV. 4, 2008
ADDRESS COMMENTS	OCT. 28, 2008
ADD TRANSPORTATION ITEMS	OCT. 9, 2008
ADDRESS PRE-STAFFING COMMENTS	SEPT. 4, 2008
REVISED PER COUNTY COMMENTS	JULY 01, 2008
REVISIONS	DATE

STORM WATER INFORMATION SHEET
AND ADDITIONAL ZONING TABULATIONS
AEROSPACE CORPORATION
WESTFIELDS, PARCEL 35
SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN P. GASTON
Lic.No. 035787
12/1/08
PROFESSIONAL ENGINEER

DATE: MAY, 2008	
SCALE: NONE	
DESIGN: JPG	DRAWN: VK
CHECK: DMT	CHECK: JPG
JOB NO.: PR45447	
P.R. NO.: 45447	
SHEET 13 OF	
FILE NO.: C-4702	

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BURGESS & NIPLE
4160 PLEASANT VALLEY ROAD, CHANTILLY, VA 20151-1226
PH. (703) 631-9630 FAX (703) 631-6041

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STORM WATER AND BEST MANAGEMENT PRACTICES MAP
AEROSPACE CORPORATION WESTFIELDS, PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN P. GASTON
Lic.No. 035787
PROFESSIONAL ENGINEER

DATE: MAY, 2008	
SCALE: 1"=70'	
DESIGN: JPG	DRAWN: VK
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P.R. NO.: 45447	
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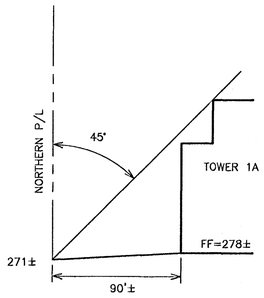
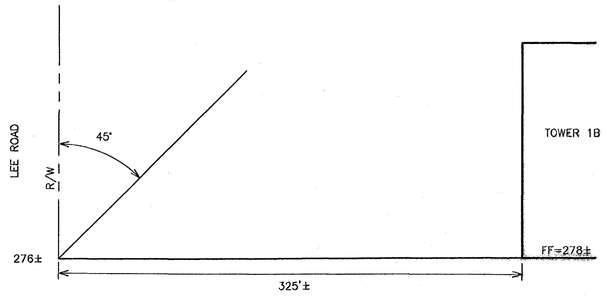
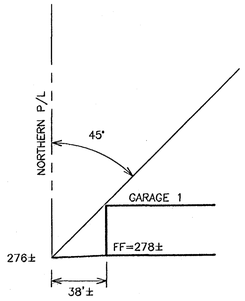
FILE NO.: C-4702	



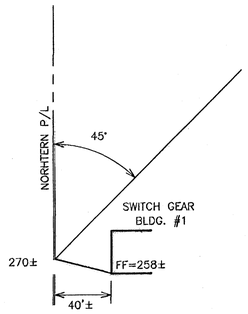
TOWER 1A
ANGLE OF BULK PLANE



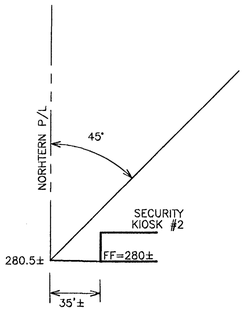
TOWER 1B
ANGLE OF BULK PLANE



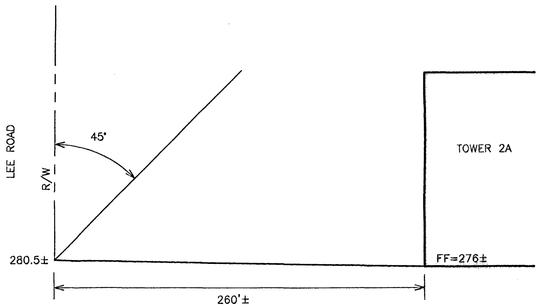
GARAGE 1
ANGLE OF BULK PLANE



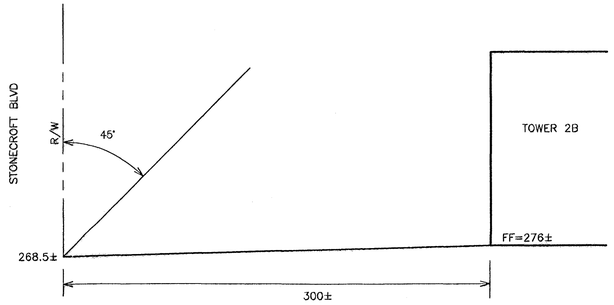
SWITCH GEAR BLDG. #1
ANGLE OF BULK PLANE



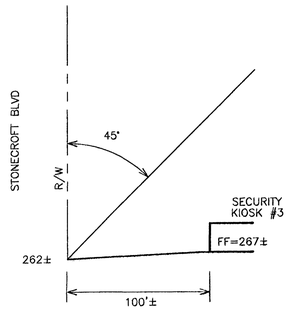
SECURITY KIOSK #2
ANGLE OF BULK PLANE



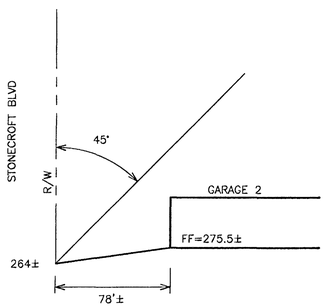
TOWER 2A
ANGLE OF BULK PLANE



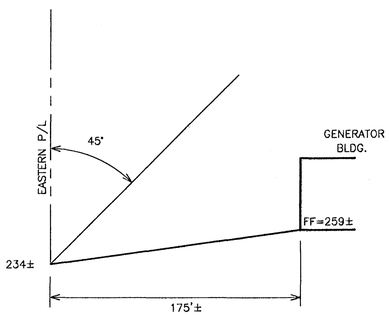
TOWER 2B
ANGLE OF BULK PLANE



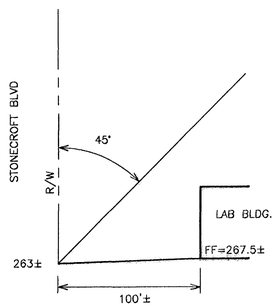
SECURITY KIOSK #3
ANGLE OF BULK PLANE



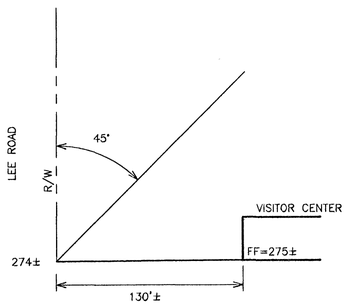
GARAGE 2
ANGLE OF BULK PLANE



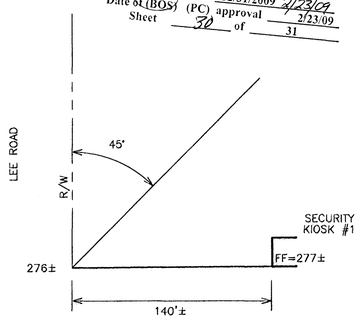
GENERATOR BUILDING
ANGLE OF BULK PLANE



LAB BUILDING
ANGLE OF BULK PLANE



VISITOR CENTER
ANGLE OF BULK PLANE



SECURITY KIOSK #1
ANGLE OF BULK PLANE

Application No PCA-78-S-063-06 Staff WOD
Concurrent w/ SE-2008-SU-026
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLA)
See Proffers dated 3/9/09
SE conditions dated 12/31/2009 2/23/09
Date of (BOS) (PC) approval 2/23/09
Sheet 30 of 31

50 0 50 100 150
SCALE: 1" = 50'

BURGESS & NIPLE
4160 PLEASANT VALLEY ROAD, CHANTILLY, VA 20151-1226
PH. (703) 631-9630 FAX (703) 631-6041

REVISIONS	DATE
ADDRESS COMMENTS	DEC. 17, 2008
ADDRESS COMMENTS	DEC. 1, 2008
ADDRESS COMMENTS	NOV. 4, 2008
ADDRESS COMMENTS	OCT. 28, 2008
ADD TRANSPORTATION ITEMS	OCT. 9, 2008
ADDRESS PRE-STAFFING COMMENTS	SEPT. 4, 2008
REVISED PER COUNTY COMMENTS	JULY 01, 2008

ANGLE OF BULK PLANE DIAGRAMS

AEROSPACE CORPORATION WESTFIELDS, PARCEL 35

SULLY DISTRICT
FAIRFAX COUNTY, VIRGINIA

COMMONWEALTH OF VIRGINIA
JOHN P. GASTON
No 035787
PROFESSIONAL ENGINEER
2/10/09

DATE: MAY, 2008	
SCALE: 1" = 50'	
DESIGN: JPG	DRAWN: MPC
CHECK: DMT	CHECK: JPG
JOB NO.: PR45447	
P.R. NO.: 45447	
SHEET 14 OF	
FILE NO.: C-4702	

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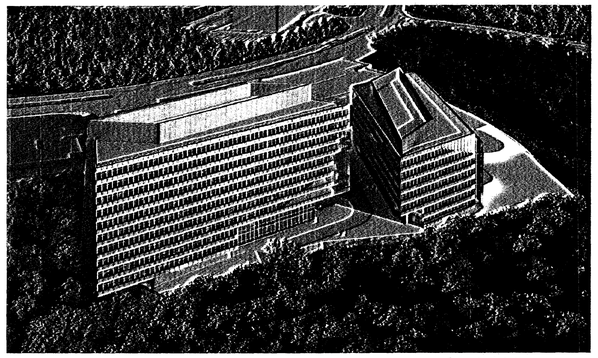
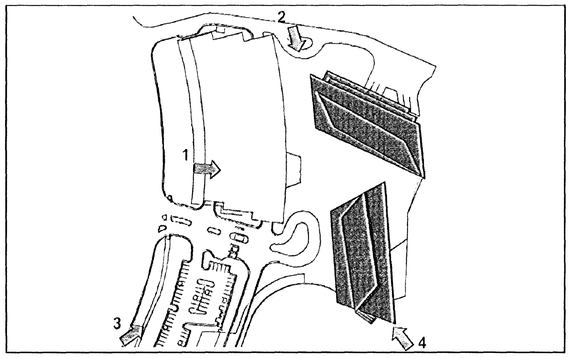
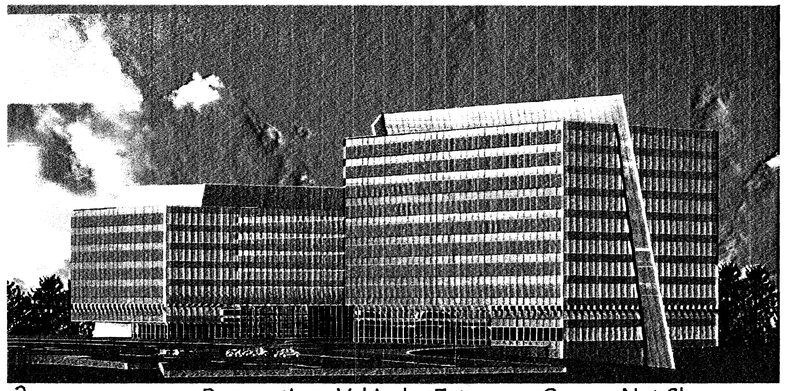


Aerial View

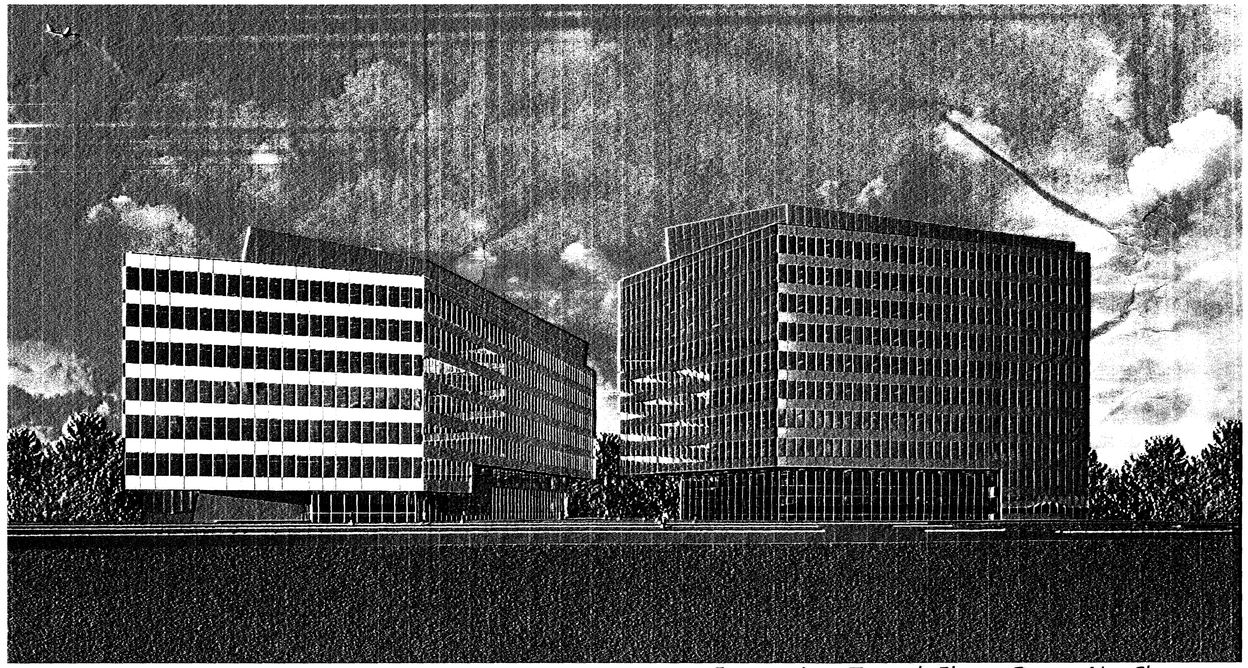


Floor Plan Diagram

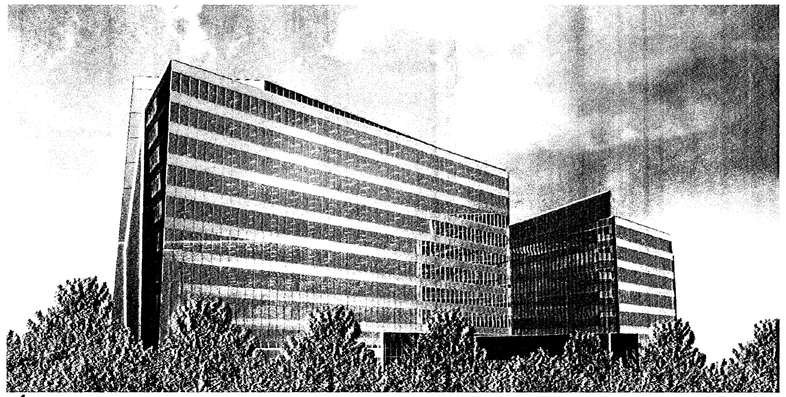
2 Perspective - From NRO - Garage Not Shown



3 Perspective - Vehicular Entrance - Garage Not Shown

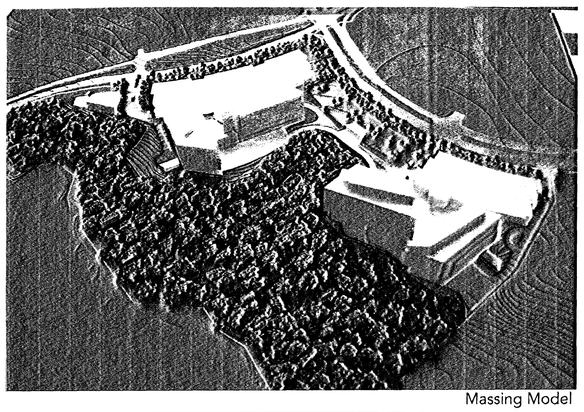


1 Perspective - Towards Plaza - Garage Not Shown

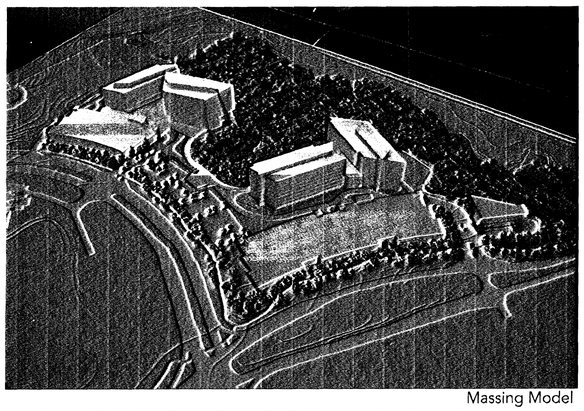


4 Perspective - From Route 28

NOTE: GARAGE AND LANDSCAPING NOT SHOWN



Massing Model



Massing Model

Application No PCA-78-S-063-06 Staff WOD
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APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SE PLAT)
See Proffers dated 3/9/09
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Sheet 31 of 31

KGD

KISHIMOTO | GORDON | DALAYA PC

1300 Wilson Boulevard
Suite 250
Rosslyn, Virginia 22209
703 749 9042
www.kgdarchitecture.com

CONSULTANT

SEAL & SIGNATURE

THE AEROSPACE CORPORATION
CHANTILLY CAMPUS
CHANTILLY, VA.

SCHEMATIC DESIGN
THE AEROSPACE CORPORATION

KEY PLAN

REVISIONS
NO. DATE DESCRIPTION

ISSUE
DATE DESCRIPTION

PROJECT NUMBER 07063.00

DATE 12/17/08

SCALE NONE

DRAWING TITLE
CONCEPT PERSPECTIVES

DRAWING NUMBER 15

AERO_SE_15.dwg December 16, 2008, 6:22 pm