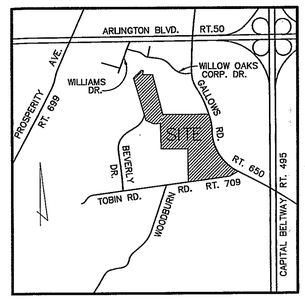
# INOVA FAIRFAX HOSPITAL CAMPUS

Providence District  Fairfax County, Virginia

## Generalized Development Plan / Special Exception Amendment Plat PCA 2008-PR-009 / SEA 80-P-078-16




VICINITY MAP
SCALE : 1"= 2,000'

## Applicant:

Inova Health Care Services
3300 Gallows Road
Falls Church, VA 22042

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Inova Fairfax Hospital Campus
Generalized Development Plan/
Special Exception Amendment Plat
PCA 2008-PR-009
SEA 80-P-078-16


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Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012
Sheet 1 of 29

SEAL

COMMONWEALTH OF VIRGINIA
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Revised December 5, 2011
Revised November 1, 2011
Revised October 5, 2011
Revised August 26, 2011
Revised July 15, 2011
April 18, 2011


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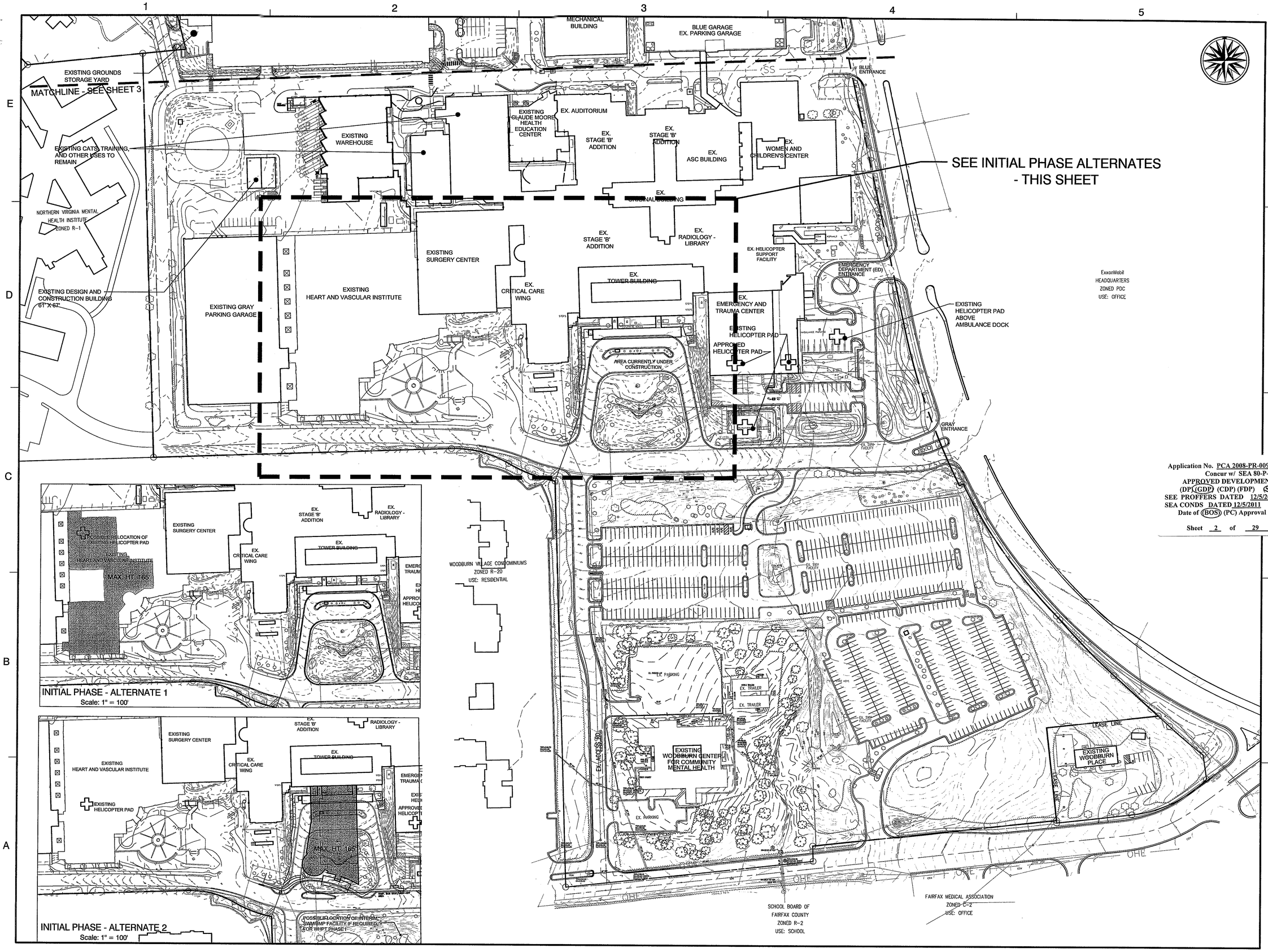
Zoning Evaluation Division


M-10792

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# INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
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Sheet 2 of 29

SCALE

0' 80' 160'

| No. | DATE | BY | Description |
|---|---|---|---|
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

TITLE

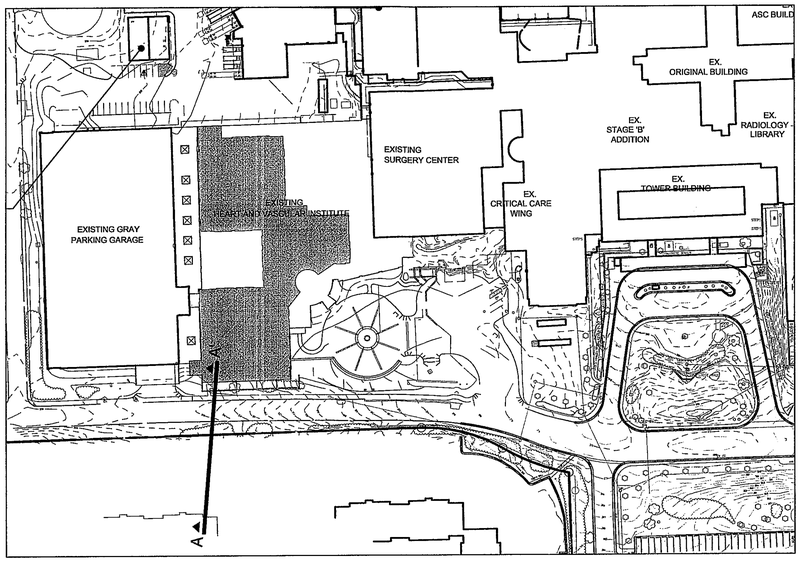
INOVA
Fairfax Hospital Campus
Development Plan
Existing Conditions Plan

PROJECT NO.

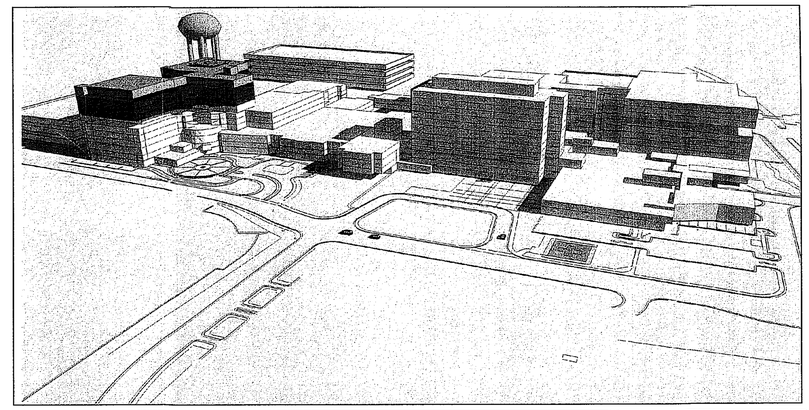
2

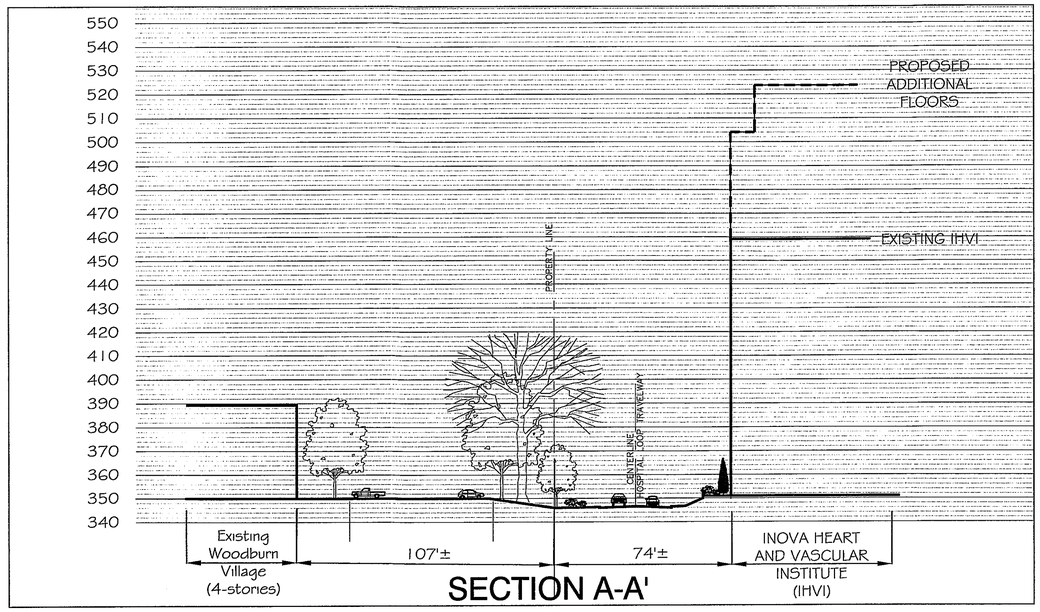
SHEET NO. 2 OF 28

M-10792

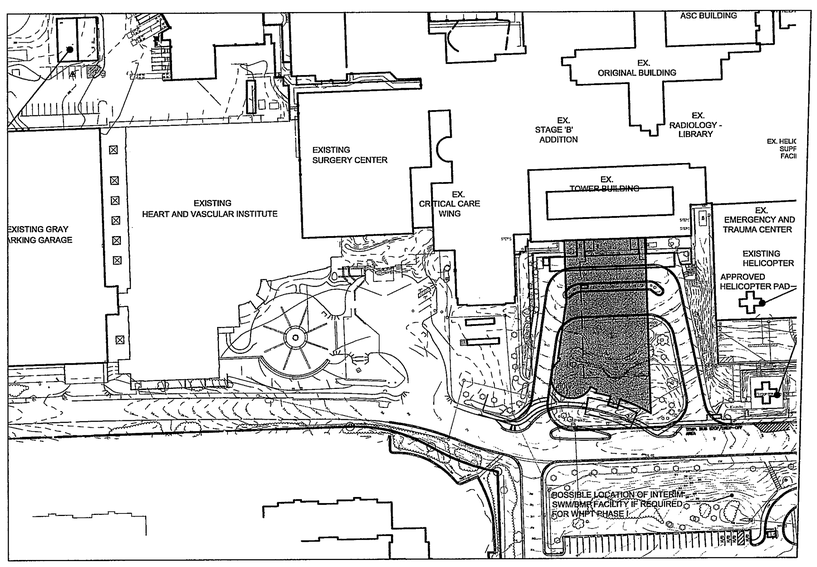



INITIAL PHASE - ALTERNATE 1

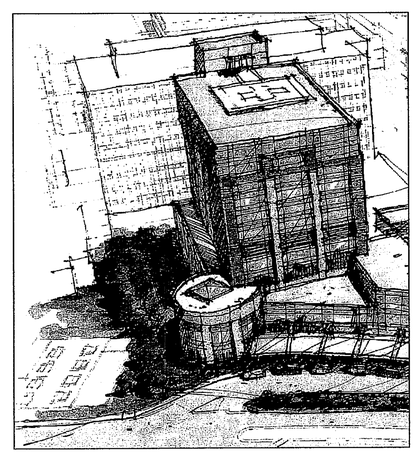





SECTION A-A'




INITIAL PHASE - ALTERNATE 2



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SEE PROFFERS DATED 12/5/2011
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Sheet 3 of 29

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INOVA
FAIRFAX HOSPITAL
CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

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KEY PLAN

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DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

TITLE

INOVA
Fairfax Hospital Campus
Development Plan
Initial Phase Alternatives

PROJECT NO.

2A

SHEET NO. 2A OF 28

M-10792

1 2 3 4 5

E D C B A

NOTES:

1. THE PROPERTY THAT IS THE SUBJECT OF THE RELATED PROFFERED CONDITION AMENDMENT (PCA) AND SPECIAL EXCEPTION AMENDMENT (SEA) APPLICATIONS IS IDENTIFIED ON THE FAIRFAX COUNTY ZONING MAP AS 59-2 ((1)) 1A1, 1B1 AND 1C1. THESE PARCELS WERE PREVIOUSLY IDENTIFIED AS 59-2 ((1)) 1A (PART), 1B, 1C, 1D AND 1E. PARCELS 49-3((1)) 136C AND 136C1 ARE ALSO INCLUDED IN THE SUBJECT PROPERTY.

2. THE COMBINED GENERALIZED DEVELOPMENT PLAN (GDP)/SPECIAL EXCEPTION AMENDMENT (SEA) PLAT ACCOMPANIES A PROFFERED CONDITION AMENDMENT (PCA) APPLICATION AND A SEA APPLICATION THAT HAVE BEEN FILED TO AMEND A PORTION OF THE CURRENT DEVELOPMENT PROGRAM ON THE INOVA FAIRFAX HOSPITAL CAMPUS THAT WAS APPROVED FOR SEA 80-P-078-15 BY THE BOARD OF SUPERVISORS ON JULY 13, 2009. THE RELATED PCA AND SEA APPLICATIONS HAVE BEEN FILED FOR THE FOLLOWING PURPOSES:

   A. TO REPRESENT A PROPOSED PARKING GARAGE THAT WILL BE CONSTRUCTED TO SERVE THE HOSPITAL CAMPUS. IT IS ANTICIPATED THAT THE PARKING GARAGE SHOWN ON THE GRAPHIC WILL BE THE FIRST OF TWO PARKING GARAGES CONSTRUCTED ON THE WEST SIDE OF CENTERS OF EXCELLENCE BOULEVARD. A SECOND PHASE EXTENSION TO THE PARKING GARAGE SHOWN ON THE GRAPHIC IS ANTICIPATED TO BE CONSTRUCTED TO THE SOUTH IN THE FUTURE TO SERVE FUTURE DEVELOPMENT ON THE HOSPITAL CAMPUS. THE FIRST PHASE OF THE GARAGE WILL BE REFERENCED AS THE GREEN GARAGE. IT WILL BE A 3 BAY DESIGN AND WILL CONTAIN A MAXIMUM OF 8 LEVELS, 3 OF WHICH WILL BE BELOW GRADE. IT WILL HAVE A MAXIMUM HEIGHT OF 70 FEET AND IT WILL CONTAIN A MAXIMUM OF 1300 PARKING SPACES. THE APPLICANT RESERVES THE RIGHT TO CONSTRUCT A PEDESTRIAN ENCLOSURE WITHIN THE GARAGE THAT WILL CONNECT TO A POSSIBLE ENCLOSED PEDESTRIAN BRIDGE AT THE SIXTH LEVEL ON THE NORTH FACE OF THE GARAGE THAT WILL CONNECT TO THE SECOND LEVEL OF THE WOMEN'S HOSPITAL.

      THERE IS AN ELEVATION OF THE WESTERN FACE OF THE PROPOSED GARAGE REPRESENTED ON SHEET 5. IT IS PRESENTED TO ILLUSTRATE THE GENERAL CHARACTER AND ARCHITECTURAL THEME OF THE WESTERN FACE OF THE PROPOSED GARAGE. IT IS TO BE UNDERSTOOD THIS IS A PRELIMINARY DESIGN THAT WILL BE SUBJECT TO REFINEMENT AND MINOR MODIFICATION WITH FINAL ARCHITECTURAL AND ENGINEERING DESIGN.

   B. TO REPRESENT THE ADDITION OF APPROXIMATELY 15 SURFACE PARKING SPACES NEEDED ON AN INTERIM BASIS TO SERVE THE USERS OF THE WOODBURN CENTER FOR COMMUNITY MENTAL HEALTH WHILE THE CENTER IS STILL AT THIS LOCATION.

   C. TO REPRESENT A TEMPORARY ACCESS TRAVELWAY BETWEEN THE CENTERS OF EXCELLENCE BOULEVARD AND THE EXISTING ACCESS ROAD TO THE WEST TO SERVE THE USERS OF THE WOODBURN CENTER FOR COMMUNITY MENTAL HEALTH WHILE THE CENTER IS STILL AT THIS LOCATION.

   D. TO REPRESENT AN ADJUSTMENT TO THE LOCATION AND THE LENGTH OF THE 6 FOOT HIGH SOLID WALL IN THE VICINITY OF THE BUS BAYS FOR THE PURPOSES OF SAVING AS MANY EXISTING TREES AS POSSIBLE IN THE BUFFER AREA AND IMPROVING SIGHT DISTANCE AT THE INTERSECTION.

   E. TO REPRESENT AN ADJUSTMENT TO THE ALIGNMENT OF THE 8 FOOT TRAIL AND THE ASSOCIATED LIMITS OF CLEARING AND GRADING ALONG GALLOWS ROAD IN THE VICINITY OF THE WOODBURN ROAD INTERSECTION TO RELOCATE THE TRAIL TO THE EXTENT FEASIBLE ONTO THE SUBJECT PROPERTY AND OUTSIDE OF THE RIGHT-OF-WAY AS IS CURRENTLY REPRESENTED.

   F. TO REPRESENT A REVISED DETAIL FOR THE BUS FACILITY.

   G. TO REPRESENT A NEW FREESTANDING IDENTIFICATION SIGN AT THE INTERSECTION OF THE CENTERS OF EXCELLENCE BOULEVARD AND WOODBURN ROAD.

   H. IT IS NOTED THAT THE WOMEN'S HOSPITAL AND PATIENT TOWER, REFERRED TO IN SEA-15 AS THE "WHPT" IS BEING DESIGNED AND CONSTRUCTED IN TWO PHASES KNOWN AS THE SOUTH PATIENT TOWER ("SPT") AND THE WOMEN'S HOSPITAL ("WH").

   I. TO REPRESENT MINOR MODIFICATIONS TO THE GDP/SEA PLAT APPROVED BY ZONING INTERPRETATIONS SUBSEQUENT TO THE JULY 2009 APPROVAL OF SEA 80-P-078-15.

3. IT IS NOTED THAT WITH THE APPROVAL OF SEA-15, THE LAND AREA OF THE CAMPUS WAS EXPANDED FROM ITS ORIGINAL 58.90 ACRES TO A TOTAL OF 65.46 ACRES WHICH INCLUDED THE ADDED LAND AREAS OF THE WOODBURN MENTAL HEALTH CENTER AND THE FAIRFAX HOUSE AKA WOODBURN PLACE. IN ADDITION, TWO DEVELOPMENT PROGRAMS WERE APPROVED WITH SEA-15, IDENTIFIED AS OPTION 1 AND OPTION 2. IT IS NOTED THAT BY DEED RECORDED ON JULY 28, 2011 IN DEED BOOK 21773 AT PAGE 1743, 10,157 SF OF THE LAND AREA OF THE CAMPUS WAS DEDICATED TO FAIRFAX COUNTY FOR PUBLIC STREET PURPOSES WITH DENSITY CREDIT RESERVED THEREFOR.

   THE OPTION 1 DEVELOPMENT PROGRAM THAT WAS APPROVED FOR THE TOTAL NEW CAMPUS LAND AREA IS BASED ON THE PREMISE THAT THE EXISTING WOODBURN MENTAL HEALTH CENTER USE WILL REMAIN IN ITS CURRENT LOCATION AT ITS CURRENT SIZE, AND WILL MOVE TO WILLOW OAKS UPON COMPLETION OF THE NEW MID-COUNTY COMMUNITY SERVICES BUILDING AT WILLOW OAKS.

   THE OPTION 2 DEVELOPMENT PROGRAM THAT WAS APPROVED IS BASED ON THE PREMISE THAT THE EXISTING WOODBURN MENTAL HEALTH CENTER BUILDING WILL BE RAZED, THE USE WILL BE TEMPORARILY RELOCATED TO A NEARBY LOCATION OFFSITE, AND THAT A NEW FACILITY WOULD BE CONSTRUCTED ON THE 5.41 ACRE SITE AT A 0.8 FAR (188,500± SF GFA).

   BOTH DEVELOPMENT PROGRAMS DEPICT THE EXISTING WOODBURN PLACE BUILDING (AKA FAIRFAX HOUSE) TO REMAIN. BOTH THE OPTION 1 AND 2 DEVELOPMENT PROGRAMS ALLOCATE A TOTAL OF 15,000 SQUARE FEET OF GROSS FLOOR AREA (GFA) TO ACCOMMODATE FUTURE EXPANSION OF THIS USE.

   IN THE APPROVED OPTION 1 DEVELOPMENT PROGRAM, THE WOMEN'S HOSPITAL AND PATIENT TOWER (WHPT) BUILDING WAS APPROVED UP TO 821,661 SQUARE FEET OF GROSS FLOOR AREA. IN THE OPTION 2 DEVELOPMENT PROGRAM, THE WOMEN'S HOSPITAL AND PATIENT TOWER (WHPT) BUILDING WAS APPROVED UP TO 642,686 SQUARE FEET OF GROSS FLOOR AREA.

   IN ITS APPROVAL OF RZ 2008-PR-009 AND SEA 80-P-078-15, IN ADDITION TO ITS APPROVAL OF OPTION 1 AND OPTION 2, THE BOARD APPROVED TWO ALTERNATIVE DEVELOPMENT PROGRAMS FOR THE INITIAL PHASE OF THE HOSPITAL EXPANSION. ONE ALTERNATIVE IS A VERTICAL EXPANSION TO THE EXISTING INOVA HEART AND VASCULAR INSTITUTE BUILDING AND THE SECOND ALTERNATIVE IS AN ADDITION TO THE EXISTING TOWER BUILDING, BOTH OF WHICH ARE SHOWN ON THE APPROVED GDP/SEA PLAT.

   WHEREAS THE SECOND ALTERNATIVE IS CURRENTLY UNDER CONSTRUCTION, THE FIRST ALTERNATIVE IS MAINTAINED ON THE GDP/SEA PLAT FOR POSSIBLE FUTURE CONSIDERATION.

   AS APPROVED, IT WAS NOTED EVEN IF THE APPLICATION PROPERTY IS OR PROCEEDS ON AN INTERIM BASIS TO BE DEVELOPED PURSUANT TO OPTION 2, INOVA MAY CONSTRUCT THE WOMEN'S HOSPITAL AND PATIENT TOWER ("WHPT") UP TO THE MAXIMUM GFA AND HEIGHT OF THE WHPT AS SHOWN IN OPTION 1 WITHOUT REQUIRING A PROFFERED CONDITION AMENDMENT ("PCA") OR SPECIAL EXCEPTION AMENDMENT ("SEA") IF SUFFICIENT ADDITIONAL GFA BECOMES AVAILABLE TO SUPPORT THE DEVELOPMENT PROGRAM, THROUGH DEMOLITION OF EXISTING GFA ON THE APPLICATION PROPERTY, BY AGREEMENT WITH FAIRFAX COUNTY IN ITS PROPRIETARY CAPACITY TO UTILIZE UNUSED DENSITY ON THE WOODBURN SITE AND/OR THE WOODBURN PLACE SITE AND/OR BY WAY OF AN AMENDMENT TO THE COMPREHENSIVE PLAN.

   THE PURPOSE OF THE ABOVE PARAGRAPH IS TO ALLOW INOVA TO CONSTRUCT ONLY THE WHPT UP TO THE MAXIMUM GFA AND HEIGHT OF THE WHPT AS IT IS SHOWN ON THE GDP/SEA PLAT UNDER OPTION 1 IN THE EVENT ADDITIONAL GFA BECOMES AVAILABLE IN THE FUTURE, AND THIS IS ALLOWABLE ONLY BECAUSE THE OPTION 1 WHPT HAS BEEN APPROVED AS PART OF RZ 2008-PR-009. AS SHOWN ON THE GRAPHIC, THE OPTION 1 WHPT AND THE OPTION 2 WHPT HAVE THE SAME BUILDING FOOTPRINT, AND THIS PARAGRAPH WOULD ONLY ALLOW THE CONSTRUCTION OF ADDITIONAL FLOORS WITHIN THE OPTION 2 WHPT NOT TO EXCEED THE MAXIMUM HEIGHT LIMIT OF THE OPTION 1 WHPT (165 FEET). ANY SUCH ADDITIONAL GFA INCORPORATED INTO THE OPTION 2 WHPT WILL COUNT TOWARD THE TOTAL ALLOWABLE FAR FOR THE APPLICATION PROPERTY. A PCA AND/OR SEA SHALL BE REQUIRED TO UTILIZE ANY SUCH ADDITIONAL GFA ANYWHERE OTHER THAN IN THE WHPT.

4. THE BOUNDARY INFORMATION SHOWN ON THE GRAPHIC IS FROM EXISTING RECORDS. THE TOPOGRAPHY SHOWN ON THE GRAPHIC IS AT A CONTOUR INTERVAL OF TWO (2) FEET FROM AN AIR SURVEY THAT HAS BEEN FIELD VERIFIED.

5. THE EXISTING BUILDING DIMENSIONS, LOCATIONS, PARKING LOT LAYOUT AND INTERNAL CIRCULATION INFORMATION ARE TAKEN FROM AN AIR SURVEY IN PART AND IN PART FROM AS_BUILT SURVEY RECORDS PERFORMED BY DEWBERRY AND BY OTHERS.

6. THE PROPERTY IS SERVED BY PUBLIC WATER AND SEWER.

7. THE MINIMUM YARD REQUIREMENTS SET FORTH IN THE ZONING ORDINANCE FOR THE C-3 DISTRICT ARE AS FOLLOWS. IT IS TO BE NOTED THAT THE MINIMUM YARDS ARE APPLICABLE ONLY TO THE PERIPHERY OF THE SUBJECT PROPERTY.

   FRONT YARD: CONTROLLED BY A 25° ANGLE OF BULK PLANE, BUT NOT LESS THAN 40 FEET.

   SIDE YARD: NO REQUIREMENT

   REAR YARD: CONTROLLED BY A 20° ANGLE OF BULK PLANE, BUT NOT LESS THAN 25 FEET.

   IN ADDITION, IT IS NOTED THAT PAR. 5 OF SECT. 9-308 OF THE ZONING ORDINANCE REQUIRES ALL MEDICAL CARE FACILITY BUILDINGS TO BE LOCATED NO CLOSER THAN 45 FEET TO ANY PUBLIC STREET LINE OR CLOSER THAN 100 FEET TO ANY LOT LINE WHICH ABUTS AN R-A THROUGH R-4 DISTRICT.

8. LANDSCAPING AND SCREENING AND TREE CANOPY HAVE BEEN/WILL BE PROVIDED IN ACCORDANCE WITH THAT REPRESENTED ON THE GRAPHICS; IN ACCORDANCE WITH THE APPLICABLE PROVISIONS OF ARTICLE 13 OF THE ZONING ORDINANCE; IN ACCORDANCE WITH CHAPTER 122, TREE CONSERVATION ORDINANCE; AND IN ACCORDANCE WITH PREVIOUSLY APPROVED DEVELOPMENT CONDITIONS. IN ITS APPROVAL OF SEA 80-P-078-15, THE BOARD MODIFIED THE TRANSITIONAL SCREENING AND WAIVED THE BARRIER REQUIREMENTS AS HAD BEEN PREVIOUSLY APPROVED WITH ITS APPROVAL OF SE 80-P-078 THROUGH SEA 80-P-078-14 IN FAVOR OF THAT SHOWN ON THE SEA PLAT. A REQUEST IS HEREBY MADE FOR A RENEWED BOARD MODIFICATION/WAIVER OF SAID REQUIREMENTS IN CONJUNCTION WITH ITS APPROVAL OF THIS SEA-16.

   THE TREES AND LANDSCAPING PROGRAM ALONG GALLOWS ROAD SOUTH OF THE SOUTHERNMOST ENTRANCE TO THE CAMPUS ARE IN COMPLIANCE WITH THE STREETSCAPE GUIDELINES SET FORTH IN THE MERRIFIELD SUBURBAN CENTER. IN ADDITION THE LANDSCAPE PROGRAM IS DESIGNED TO SCREEN THE APPROVED COOLING TOWERS/GENERATORS. SAID LANDSCAPE PROGRAM WILL BE INSTALLED AS REPRESENTED ON THE GRAPHIC SUBJECT TO ANY QUALIFICATION THAT MAY BE REQUIRED BASED ON THE HELICOPTER FLIGHT PATH /APPROACH GUIDELINES.

   THERE ARE EXISTING LANDSCAPE TREES AND SHRUBS IN THE VICINITY OF THE APPROVED AND PROPOSED IMPROVEMENTS THAT ARE THE SUBJECT OF THIS SPECIAL EXCEPTION AMENDMENT THAT MAY OR WILL BE REMOVED DUE TO CONSTRUCTION. ALL SUCH LANDSCAPE TREES AND SHRUBS THAT WILL BE REMOVED WILL BE REPLACED WITH DESIRABLE TREES AND SHRUBS THAT ARE SUITABLE FOR THE PARTICULAR ENVIRONMENT AS APPROVED BY THE URBAN FOREST MANAGEMENT DIVISION, DPWES.

   THE INTERIOR PARKING LOT LANDSCAPING, PERIPHERAL PARKING LOT LANDSCAPING, AND TREE CANOPY CALCULATIONS THAT ARE PRESCRIBED BY THE PROVISIONS OF ARTICLE 13 OF THE ZONING ORDINANCE AND CHAPTER 122 OF THE CODE WILL BE PROVIDED WITH THE SUBMISSION OF THE SITE PLAN(S) FOR THE SUBJECT DEVELOPMENT PROGRAM.

9. IN COMPLIANCE WITH DEVELOPMENT CONDITION #17 APPROVED WITH SEA 80-P-078-8 AND DEVELOPMENT CONDITION #7 APPROVED WITH SEA 80-P-078-9, A PARKING STUDY UPDATE FOR THE FAIRFAX HOSPITAL CAMPUS WAS COMPLETED AND FILED WITH THE COUNTY ON SEPTEMBER 12, 2003. A MORE RECENT PARKING STUDY UPDATE WAS FILED ON JULY 31, 2008. THAT STUDY CONCLUDED THAT THERE WILL BE A FUTURE CAMPUS DEMAND FOR 4,866 PARKING SPACES WITH THE COMPLETION OF THE APPROVED DEVELOPMENT PROGRAM. AS NOTED IN THE TABULATION, UNDER THE OPTION 1 PROPOSED DEVELOPMENT PROGRAM, THERE WILL BE 5776 PARKING SPACES ON THE CAMPUS.

   THE HOSPITAL RESERVES THE RIGHT TO INCREASE OR DECREASE THE NUMBER OF PARKING SPACES ON THE CAMPUS WITHOUT A PCA, AN SEA OR ADMINISTRATIVE INTERPRETATION TO ALLOW FOR MINOR ENGINEERING ISSUES SUCH AS, BUT NOT LIMITED TO, RESTRIPING PARKING LOTS, STORAGE, CONSTRUCTION EQUIPMENT/TRAILERS, STORMWATER MANAGEMENT PONDS, ETC. PROVIDED THAT AT NO TIME WILL THE TOTAL NUMBER OF PARKING SPACES BE REDUCED BELOW THAT REQUIRED BY THE PROVISIONS OF THE ZONING ORDINANCE. FURTHERMORE, IT IS TO BE UNDERSTOOD THAT THE EXISTING PARKING SPACES MAY BE REDUCED IN NUMBER TO ACCOMMODATE FUTURE EXPANSION/ADDITIONS TO THE HOSPITAL, AS MAY BE APPROVED WITH THIS OR FUTURE PCA/SEA APPLICATIONS, AS LONG AS IT CAN BE DEMONSTRATED THAT ADEQUATE PARKING IS PROVIDED.

   PARKING SPACES AND LOADING SPACES WILL BE PROVIDED ON THE CAMPUS IN ACCORDANCE WITH THE ABOVE REPRESENTATIONS AND WITH THE PROVISIONS SET FORTH IN ARTICLE 11 OF THE ZONING ORDINANCE.

10. TO THE BEST OF OUR KNOWLEDGE, THERE ARE NO GRAVES LOCATED ON THE SUBJECT PROPERTY.

11. THE EXISTING AND APPROVED HOSPITAL AND RELATED USES ON SITE DO UTILIZE, STORE, TREAT AND DISPOSE OF HAZARDOUS AND TOXIC SUBSTANCES AS SET FORTH IN TITLE 40, CODE OF FEDERAL REGULATIONS PARTS 116.4, 302.4 AND 355; HAZARDOUS WASTE AS SET FORTH IN VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY HAZARDOUS WASTE MANAGEMENT REGULATIONS; AND/OR PETROLEUM PRODUCTS AS DEFINED IN TITLE 40, CODE OF FEDERAL REGULATIONS PART 280. TO THE BEST OF OUR KNOWLEDGE AND UNDERSTANDING, ALL SUCH SUBSTANCES THAT ARE UTILIZED, STORED AND/OR DISPOSED OF IN CONJUNCTION WITH THE HOSPITAL AND RELATED USES WILL BE IN ACCORDANCE WITH SAID REGULATIONS.

12. THE ORIGINAL HOSPITAL BUILDING WAS CONSTRUCTED IN 1958. NUMEROUS ADDITIONS AND ACCESSORY BUILDINGS HAVE BEEN CONSTRUCTED OVER THE SUBSEQUENT YEARS. WITH THE EXCEPTION OF SOME NOMINAL DEMOLITION THAT WILL OCCUR WITH THE CONTINUED EXPANSION OF THE APPROVED DEVELOPMENT PROGRAM, ALL OF THE BUILDINGS ON THE CAMPUS WILL BE RETAINED FOR THE NEAR TERM, HOWEVER, THE APPLICANT RESERVES THE RIGHT TO DEMOLISH EXISTING STRUCTURES AT ANY TIME.

    THE WOODBURN MENTAL HEALTH CENTER BUILDING WAS BUILT IN 1973. IN BOTH OPTIONS 1 AND 2 DEVELOPMENT PROGRAMS, THE EXISTING BUILDING WILL BE RAZED. THE FAIRFAX HOUSE, AKA WOODBURN PLACE, WAS BUILT IN 1967. UNDER BOTH OPTIONAL DEVELOPMENT PROGRAMS, IT IS PROPOSED THAT THE EXISTING BUILDING WILL REMAIN AND AN ADDITION WILL BE CONSTRUCTED ON THE SITE FOR A TOTAL OF 15,000 SQUARE FEET OF GROSS FLOOR AREA.

13. THERE IS NO FLOODPLAIN DESIGNATED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY OR UNITED STATES GEOLOGICAL SURVEY LOCATED ON THE SUBJECT PROPERTY. FAIRFAX COUNTY DOES DESIGNATE A MINOR FLOODPLAIN AND RESOURCE PROTECTION AREA (RPA) IN THE NORTHERN AREA OF THE SUBJECT PROPERTY IN THE LOCATION OF THE APPROVED SWM/BMP POND (SEE NOTE 18). A WATER QUALITY IMPACT ASSESSMENT HAS BEEN APPROVED TO ADDRESS APPROVED IMPROVEMENTS IN THE RPA. IN ADDITION, A FLOODPLAIN STUDY HAS BEEN APPROVED TO ADDRESS THE APPROVED IMPROVEMENTS IN THE MINOR FLOODPLAIN.

    IT IS TO BE NOTED THAT THE RPA REPRESENTED ON THE GRAPHIC IS THE FIELD VERIFIED RPA. IT IS BASED ON AN RPA DELINEATION STUDY THAT HAS BEEN APPROVED.

14. OTHER THAN THE EXISTING VEGETATION, THERE ARE NO SCENIC ASSETS OR NATURAL FEATURES ON THE SUBJECT PROPERTY THAT ARE DESERVING OF PROTECTION AND PRESERVATION.

15. THERE ARE NO EXISTING UTILITY EASEMENTS HAVING A WIDTH OF TWENTY-FIVE (25) FEET OR MORE LOCATED ON THE MAIN CAMPUS PORTION OF THE SUBJECT PROPERTY. PARCEL 136C HAS AN EXISTING VIRGINIA POWER EASEMENT WITH A WIDTH OF THIRTY (30) FEET FOR AN AERIAL POWER LINE RUNNING ACROSS THE PROPERTY THAT IS BEING RELOCATED OFFSITE AS A PART OF SITE PLAN 5544-SP-010 FOR THE WILLOW OAKS STORM WATER MANAGEMENT POND. OTHER THAN EXISTING MAJOR UNDERGROUND UTILITIES THAT SERVE THE CAMPUS DEVELOPMENT PROGRAM, THERE ARE NO OTHER MAJOR UNDERGROUND UTILITIES LOCATED ON THE SUBJECT PROPERTY.

    IT IS TO BE NOTED THERE ARE SEVERAL CONSERVATION EASEMENTS THAT HAVE BEEN RECORDED ON PARCEL 136C FOR THE PURPOSE OF PROVIDING AN INTERIM BEST MANAGEMENT PRACTICE (BMP) FOR THE ADJACENT DEVELOPMENT PROGRAM ON PARCEL 136C. THESE CONSERVATION EASEMENTS MAY BE VACATED WITH THE APPROVAL OF THE COUNTY WHEN IT CAN BE DEMONSTRATED THAT THE BMP REQUIREMENT IS OTHERWISE ACCOMMODATED.

16. A STATEMENT CONFIRMING THE OWNERSHIP OF THE PROPERTY AND THE APPLICANT'S INTEREST IS PROVIDED SEPARATELY AS ARE THE STATEMENTS REQUIRED BY THE PROVISION SET FORTH IN PAR. 7 OF SECT. 9-011 OF THE ZONING ORDINANCE.

17. THE FAIRFAX COUNTY COMPREHENSIVE PLAN RECOMMENDS A MAJOR PAVED TRAIL ALONG BOTH SIDES OF GALLOWS ROAD AND A MINOR PAVED TRAIL ALONG THE NORTH SIDE OF WOODBURN ROAD IN THE VICINITY OF THE SUBJECT PROPERTY.

    THERE IS AN EXISTING SIDEWALK ALONG THE WESTERN SIDE OF GALLOWS ROAD WHICH HAS BEEN REPLACED IN PART BY A MEANDERING EIGHT (8) FOOT WIDE TRAIL/SIDEWALK. THE EIGHT (8) FOOT WIDE TRAIL/SIDEWALK WILL BE EXTENDED ALONG THE BALANCE OF THE GALLOWS ROAD FRONTAGE IN CONJUNCTION WITH THE PROFFERED IMPROVEMENT OF GALLOWS ROAD BY THE APPLICANT.

18. THE PROPOSED STORMWATER DETENTION AND BEST MANAGEMENT PRACTICE COMPONENTS OF THIS APPLICATION ARE SUBSTANTIALLY THE SAME AS THOSE APPROVED WITH SEA-15. MINOR CHANGES TO SHEETS 19, 23 AND 24 APPROVED WITH SEA-15 HAVE BEEN MADE TO REFLECT THE FINAL STORMWATER VAULT DESIGN AS REFLECTED ON SP 6157-SP-019.

    STORMWATER 2- YEAR AND 10-YEAR DETENTION WILL BE PROVIDED IN UNDERGROUND VAULTS FOR THE SPT, THE WH, THE PROPOSED PARKING GARAGE AND, IN THE EVENT OF DEVELOPMENT OF OPTION 2, THE COUNTY BUILDING. THE APPROVED VAULT LOCATIONS ARE SHOWN ON THE GRAPHIC. THE WILLOW OAKS SWM/BMP POND, AS REPRESENTED ON SHEETS 17 AND 18, HAS BEEN DESIGNED UNDER 5544-SP-010 TO PROVIDE BEST MANAGEMENT PRACTICES (BMPS) FOR THE SPT, THE WH AND THE PROPOSED PARKING GARAGE AND A DEFERRAL OF PROVIDING THESE BMP'S HAS BEEN GRANTED UNTIL THE POND IS CONSTRUCTED (IT IS NOTED THAT THE POND IS UNDER CONSTRUCTION AT THIS TIME).

    CONSTRUCTION OF THE WILLOW OAKS SWM/BMP POND IS A REQUIREMENT OF DEVELOPMENT ON THE WILLOW OAKS PROPERTY (PCA 87-P-038-04) AND IS NOT A REQUIREMENT OF THE APPLICATION PROPERTY. ALTERNATIVELY, AT THE APPLICANT'S OPTION, AN ON-SITE SAND FILTER OR OTHER ALLOWABLE MEASURES MAY BE CONSTRUCTED TO PROVIDE BMPS FOR THE SPT, THE WH, THE COUNTY BUILDING, AND/OR THE PROPOSED PARKING GARAGE, AS MAY BE APPROVED BY DPWES.

    THE APPLICANT WILL INSTALL FAIRFAX COUNTY ACCEPTED LOW IMPACT DEVELOPMENT (LID) FACILITIES, ON THE APPLICATION PROPERTY IN AT LEAST ONE OF THE POSSIBLE LOCATIONS AS REPRESENTED ON THE GRAPHIC. THE LID FACILITIES (PERVIOUS PAVEMENT OR OTHER) WILL TREAT A TOTAL OF 20,000 SQUARE FEET OF IMPERVIOUS SURFACE AND WILL HAVE A MINIMUM PHOSPHOROUS REMOVAL EFFICIENCY OF 40 PERCENT. THE LID FACILITIES WILL BE DESIGNED IN ACCORDANCE WITH THE PFM. THESE LID FACILITIES ARE INTENDED AS DEMONSTRATION FACILITIES AND WILL NOT FACTOR INTO THE REQUISITE CALCULATIONS FOR STORMWATER MANAGEMENT AND BMPS

19. IN ACCORDANCE WITH PRIOR APPROVALS, THE FLOOR AREA RATIO (FAR) CALCULATIONS ARE BASED ON THE ORIGINAL LAND AREA OF 59.73 ACRES FOR THE CAMPUS AND THE 6.56 ACRES FOR THE ADDITIONAL LAND AREAS OF THE WOODBURN MENTAL HEALTH CENTER (5.41 ACRES) AND THE FAIRFAX HOUSE AKA WOODBURN PLACE (1.15 ACRES) FOR A TOTAL LAND AREA OF 66.29 ACRES. THE FLOOR AREA RATIO RELATED TO ALL FUTURE DEDICATIONS IS RESERVED FOR DEVELOPMENT OF THE SUBJECT PROPERTY IN ACCORDANCE WITH THE PROVISIONS SET FORTH IN PAR. 4 OF SECT. 2-308 OF THE ZONING ORDINANCE.

    IN ACCORDANCE WITH THE RECOMMENDATIONS SET FORTH IN THE COMPREHENSIVE PLAN, THE FAR FOR PARCEL 136C WILL BE LIMITED TO 0.25 WITH THE GROSS FLOOR AREA FROM THE REMAINING FLOOR AREA RATIO BETWEEN 0.25 AND 0.80 ON THE PARCEL 136C BEING TRANSFERRED TO THE MAIN CAMPUS.

20. DEVELOPMENT OF THE PREVIOUSLY APPROVED AND PROPOSED IMPROVEMENTS ON THE CAMPUS WILL CONTINUE TO OCCUR IN PHASES. IT IS TO BE UNDERSTOOD THAT THE FIRST PHASE(S) OF THE PROPOSED IMPROVEMENTS IS CURRENTLY PLANNED TO COMMENCE WITHIN THIRTY (30) MONTHS FROM THE DATE OF APPROVAL OF THE SPECIAL EXCEPTION AMENDMENT IN ACCORDANCE WITH THE PROVISION SET FORTH IN SECT. 9-015 OF THE ZONING ORDINANCE. IT IS TO BE FURTHER UNDERSTOOD THAT ALL PHASES OF THE APPROVED AND PROPOSED CONSTRUCTION MIGHT NOT COMMENCE WITHIN SAID THIRTY (30) MONTH PERIOD.

    IT IS TO BE NOTED THAT AS PART OF THE PHASING OF DEVELOPMENT, EXISTING PARKING AREAS MAY BE USED FOR CONSTRUCTION STAGING AREAS, AND ADDITIONAL PARKING AREAS MAY BE PROVIDED WHICH MAY NOT BE LOCATED AND/OR DESIGNED IN STRICT ACCORDANCE WITH THE FINAL DEVELOPMENT PROGRAM REPRESENTED ON THE GRAPHIC AS LONG AS THE DISTANCES TO THE PERIPHERAL LOT LINES AS REPRESENTED ON THE GRAPHIC ARE NOT REDUCED IN A MATERIAL WAY.

21. THE FOOTPRINTS OF THE BUILDINGS SHOWN ON THE GRAPHIC MAY BE INCREASED UP TO FIVE (5) PERCENT AS LONG AS THE OPEN SPACE PRESENTED IN THE TABULATION AND THE MINIMUM DISTANCES TO THE PERIPHERAL LOT LINES AS PRESENTED ON THE GRAPHIC ARE NOT DIMINISHED IN A MATERIAL WAY AND AS LONG AS THE RESULTANT PROPOSED DEVELOPMENT IS IN SUBSTANTIAL CONFORMANCE WITH THAT REPRESENTED ON THE GRAPHIC. THE SIZES AND SHAPES AND LOCATIONS OF THE APPROVED AND PROPOSED BUILDINGS, STRUCTURES AND IMPROVEMENTS ARE PRELIMINARY AND SUBJECT TO MINOR MODIFICATION WITH FINAL ENGINEERING AND ARCHITECTURAL DESIGN IN ACCORDANCE WITH THE PROVISIONS SET FORTH IN SECTS. 9-004 AND 18-204 OF THE ZONING ORDINANCE.

THE TOTAL GROSS FLOOR AREA AND MAXIMUM BUILDING HEIGHTS PRESENTED IN THE TABULATION ARE TO BE CONSIDERED MAXIMUMS AND THE DIMENSIONS TO THE PERIPHERAL LOT LINES PRESENTED ON THE GRAPHIC ARE TO BE DEEMED MINIMUMS WITH THE UNDERSTANDING THAT ALL DIMENSIONS SHOWN ON THE GRAPHIC AND IN THE TABULATION ARE SUBJECT TO MINOR MODIFICATION IN ACCORDANCE WITH THE PROVISIONS SET FORTH IN SECTS. 9-004 AND 18-204 OF THE ZONING ORDINANCE. THE FLOOR AREAS OF THE INDIVIDUAL BUILDINGS AS PRESENTED IN THE TABULATION MAY VARY WITH FINAL ARCHITECTURAL DESIGN; HOWEVER, THE TOTAL COMBINED GROSS FLOOR AREA AS PRESENTED IN THE TABULATION WILL NOT BE EXCEEDED.

THE GROSS FLOOR AREAS THAT ARE REPRESENTED ARE GROSS FLOOR AREAS CALCULATED IN ACCORDANCE WITH THE DEFINITION OF GROSS FLOOR AREA AS SET FORTH IN ARTICLE 20 OF THE ZONING ORDINANCE. THE MAXIMUM BUILDING HEIGHTS THAT ARE REPRESENTED WILL BE CALCULATED IN ACCORDANCE WITH THE APPLICABLE PROVISIONS IN THE ZONING ORDINANCE. IN ADDITION, IT IS TO BE UNDERSTOOD THAT BOTH THE EXISTING, APPROVED AND PROPOSED BUILDINGS MAY HAVE CELLARS AS DEFINED IN ARTICLE 20.

LASTLY, THE APPLICANT RESERVES THE RIGHT TO SHIFT GROSS FLOOR AREA THAT IS REPRESENTED ON THE TABULATION FROM ONE BUILDING TO ANOTHER WITH THE UNDERSTANDING THAT THE RESULTANT BUILDING FOOTPRINTS WILL BE IN SUBSTANTIAL CONFORMANCE WITH THE FOOTPRINTS REPRESENTED ON THE GRAPHIC AND THE MAXIMUM TOTAL GROSS FLOOR AREA REPRESENTED IN THE TABULATION WILL NOT BE EXCEEDED.

22. AS NOTED ABOVE, THE PRINCIPAL USE OF ALL OF THE BUILDINGS ON THE EXISTING HOSPITAL CAMPUS IS HOSPITAL (MEDICAL CARE FACILITY) AND RELATED ACCESSORY USES. IT IS TO BE UNDERSTOOD THAT ADDITIONAL ACCESSORY SERVICES USES AS PRESCRIBED BY THE PROVISIONS SET FORTH IN PART 2 OF ARTICLE 10 OF THE ZONING ORDINANCE MAY ALSO BE ESTABLISHED IN THE EXISTING, APPROVED AND PROPOSED BUILDINGS, AND THAT ADDITIONAL SPECIAL EXCEPTION AND SPECIAL PERMIT USES ALLOWED IN THE C-3 DISTRICT MAY ALSO BE ESTABLISHED SUBJECT TO APPROPRIATE APPROVALS.

    THE PRINCIPAL USE IN THE COUNTY FACILITIES IS PUBLIC USE AND RELATED ACCESSORY SERVICE USES AS DESCRIBED IN THE PROFFERS.

23. IT IS TO BE UNDERSTOOD THAT ADDITIONAL SITE FEATURES SUCH AS GAZEBOS, TRELLISES, SIGNS, FLAGPOLES, SIDEWALKS/TRAILS, LIGHT STANDARDS, PASSIVE AND ACTIVE RECREATION FACILITIES, WALLS, FENCES, AND/OR UTILITY AND MAINTENANCE STRUCTURES NOT REPRESENTED ON THE GRAPHIC MAY BE PROVIDED AS LONG AS THE RESULTANT PROPOSED DEVELOPMENT IS IN SUBSTANTIAL CONFORMANCE WITH THAT REPRESENTED ON THE GRAPHIC.

    ALL SIGNS WILL BE PROVIDED IN ACCORDANCE WITH THE PROVISIONS SET FORTH IN ARTICLE 12 OF THE ZONING ORDINANCE AND IN ACCORDANCE WITH PRIOR APPROVALS. THE LOCATIONS OF THE FREESTANDING IDENTIFICATION SIGNS AT THE SITE ENTRANCES ARE APPROXIMATE AND SUBJECT TO ADJUSTMENT WITH FINAL ENGINEERING. IT IS ALSO UNDERSTOOD THAT MOBILE AND LAND BASED TELECOMMUNICATION FACILITIES MAY BE PROVIDED ON SITE IN ACCORDANCE WITH THE PROVISIONS SET FORTH IN SECT. 2-514 OF THE ZONING ORDINANCE.

24. NOTWITHSTANDING THE GDP/SEA PLAT IS PRESENTED AS ONE SET OF PLANS, THE APPLICANT RESERVES THE RIGHT TO FILE FOR ONLY SPECIAL EXCEPTION AMENDMENT(S) FROM THE BOARD OF SUPERVISORS IN THE FUTURE IN ACCORDANCE WITH SECT 9-014 OF THE ZONING ORDINANCE, WITHOUT FILING FOR AN AMENDMENT TO THE GENERALIZED DEVELOPMENT PLAN AMENDMENT (GDP) SO LONG AS THE FLOOR AREA RATIO IS NOT INCREASED AND THERE IS NO PROPOSED CHANGE TO THE PROFFERED CONDITIONS.

    IT IS ALSO TO BE UNDERSTOOD THAT PARTIAL SPECIAL EXCEPTION AMENDMENT AND/OR PROFFERED CONDITION AMENDMENT APPLICATIONS MAY BE FILED IN THE FUTURE IN ACCORDANCE WITH THE APPLICABLE PROVISIONS OF THE ZONING ORDINANCE.

25. THE SUBJECT PROPERTY IS LOCATED IN SUB-UNIT M1 OF THE MERRIFIELD SUBURBAN CENTER COMPONENT OF THE FAIRFAX COUNTY COMPREHENSIVE PLAN. BOTH OF THE ALTERNATE DEVELOPMENT PROGRAMS ARE IN ACCORDANCE WITH THE LAND USE OPTION RECOMMENDATION SET FORTH FOR SUB-UNIT M1. AS SUCH, THERE SHOULD BE NO ADVERSE EFFECTS ON ADJACENT OR NEIGHBORING PROPERTIES FROM EITHER OF THE DEVELOPMENT PROGRAMS. IT IS NOTED THAT THESE APPLICATIONS ARE NOT PROPOSING TO IMPLEMENT THE APPROVED OPTION IN THE COMPREHENSIVE PLAN ALLOWING FOR UP TO 1.0 FAR.

26. TO THE BEST OF OUR KNOWLEDGE, EXCEPT AS QUALIFIED ABOVE, THE PROPOSED DEVELOPMENT OF THE SUBJECT PROPERTY CONFORMS TO ALL CURRENT APPLICABLE LAND DEVELOPMENT ORDINANCES, REGULATIONS AND ADOPTED STANDARDS.

TABULATION FOR OPTION 1 PLAN:

| | |
|---|---|
| EXISTING/PROPOSED ZONING | C-3 |
| LAND AREA | 65.23 AC[1] |
| EXISTING/PROPOSED USE | 924 BED HOSPITAL AND ACCESSORY USES (MEDICAL CARE FACILITY) |
| FLOOR AREA RATIO (FAR) | |
| CURRENTLY APPROVED/PROPOSED | 0.80 |
| GROSS FLOOR AREA | |
| TOTAL EXISTING | 1,476,482± SF |
| HOSPITAL | 1,426,882± SF |
| WOODBURN MENTAL HEALTH CENTER | 34,600± SF |
| WOODBURN PLACE + EXPANSION | 15,000± SF |
| PREVIOUSLY APPROVED ADDITIONAL | 833,592± SF |
| HOSPITAL – WOMEN'S CENTER | 821,661± SF |
| CHILD CARE CENTER EXPANSION | 7,311± SF |
| TEMPORARY ADMINISTRATIVE OFFICE FACILITY | 4,620± SF |
| TOTAL EXISTING & PREVIOUSLYAPPROVED | 2,310,074± SF |
| EXISTING | 1,476,482± SF |
| PREVIOUSLY APPROVED | 833,592± SF |
| OPEN SPACE | |
| REQUIRED (15% OF 65.23 ACRES) | 9.78AC |
| PROPOSED (35 % OF 65.23 ACRES) | 22.83 AC |
| PARKING SPACES REQUIRED | 3,007[2] |
| HOSPITAL: 924 LICENSED BEDS @ 2.9 SPACES/BED | 2,680 |
| CHILD CARE CENTER: 200 CHILDREN @ 0.16 SPACES/CHILD | 32 |
| RONALD MCDONALD HOUSE: 8 UNITS @ 1 SPACE/UNIT PLUS 1 SPACE/STAFF MEMBER (7) | 15 |
| EDUCATION CENTER: 70 FACULTY/EMPLOYEES PLUS 74 STUDENTS/VISITORS @ 1 SPACE PER | 144 |
| WOODBURN MENTAL HEALTH CENTER: 3.6 SPACES/1000 SF GFA | 125 |
| WOODBURN PLACE: 1 SPACE/3 RESIDENTS (15) PLUS 1 PACE/EMPLOYEE (6) | 11 |
| PARKING SPACES EXISTING | 5,085 |
| BLUE GARAGE | 587 |
| GRAY GARAGE | 1,093 |
| EMPLOYEE GARAGE | 2,246 |
| LOT #9 | 182 |
| LOT # 9A | 211 |
| LOT #10 | 258 |
| EMERGENCY CENTER | 28 |
| CHILD CARE | 25 |
| RONALD MCDONALD HOUSE | 14 |
| PARCEL 136 C | 280 |
| RANDOM INTERNAL SITE | 56 |
| WOODBURN MENTAL HEALTH CENTER | 94 |
| WOODBURN PLACE | 11 |
| PARKING SPACES TO BE REMOVED WITH PROPOSED DEVELOPMENT PROGRAM | 629 |
| LOT #9 | (182) |
| LOT #9A & 10 | (197) |
| PARCEL 136 C ADJUSTMENT | (176) |
| WOODBURN MENTAL HEALTH CENTER | (74) |
| ADDITIONAL PARKING SPACES PROPOSED WITH PROPOSED DEVELOPMENT PROGRAM | 1320 |
| GREEN GARAGE | 1300 |
| WOODBURN PLACE | 5 |
| WOODBURN MENTAL HEALTH CENTER TEMPORARY | 15 |
| GRAND TOTAL OF PROPOSED PARKING SPACES: 5,085 (EXISTING) – 629 (REMOVED) + 1320 (PROPOSED ADDITIONAL) | 5776 |

[1] SEE NOTE 19

[2] SEE NOTE 9

TABULATION FOR OPTION 2 PLAN:

| | |
|---|---|
| EXISTING/PROPOSED ZONING | C-3 |
| LAND AREA | 65.23 AC[1] |
| EXISTING/PROPOSED USES | 924 BED HOSPITAL AND ACCESSORY USES (MEDICAL CARE FACILITY) AND PUBLIC USE |
| FLOOR AREA RATIO (FAR) | |
| CURRENTLY APPROVED/PROPOSED | 0.80 |
| GROSS FLOOR AREA | |
| TOTAL EXISTING | 1,476,482± SF |
| HOSPITAL | 1,426,882± SF |
| WOODBURN MENTAL HEALTH CENTER | 34,600± SF |
| WOODBURN PLACE + EXPANSION | 15,000± SF |
| PROPOSED DEMOLITION | |
| WOODBURN MENTAL HEALTH CENTER | (34,600± SF) |
| PREVIOUSLY APPROVED ADDITIONAL | 843,117± SF |
| HOSPITAL–WOMEN'S CENTER | 667,761± SF |
| MID-COUNTY COMMUNITY SERVICES CENTER | 188,500± SF |
| CHILD CARE CENTER EXPANSION | 7,311± SF |
| TEMPORARY ADMINISTRATIVE OFFICE FACILITY | 4,620± SF |
| TOTAL EXISTING, DEMOLITION & PREVIOUSLY APPROVED | 2,310,074± SF |
| EXISTING | 1,501,557± SF |
| DEMOLITION | (34,600± SF) |
| PREVIOUSLY APPROVED | 843,117± SF |
| OPEN SPACE | |
| REQUIRED (15% OF 65.23 ACRES) | 9.78AC |
| PROPOSED (32% OF 65.23 ACRES) | 20.87 AC |
| PARKING SPACES REQUIRED | 3,373[2] |
| HOSPITAL: 924 LICENSED BEDS @ 2.9 SPACES/BED | 2680 |
| CHILD CARE CENTER: 200 CHILDREN @ 0.16 SPACES/CHILD | 32 |
| RONALD MCDONALD HOUSE: 8 UNITS @ 1 SPACE/UNIT PLUS 1 SPACE/STAFF MEMBER (7) | 15 |
| EDUCATION CENTER: 70 FACULTY/EMPLOYEES PLUS 74 STUDENTS/VISITORS @ 1 SPACE PER | 144 |
| COUNTY FACILITY: 2.6 SPACES/1000 SF GFA | 491 |
| WOODBURN PLACE: 1 SPACE/3 RESIDENTS (15) PLUS 1 PACE/EMPLOYEE (6) | 11 |
| PARKING SPACES EXISTING | 5,085 |
| BLUE GARAGE | 587 |
| GRAY GARAGE | 1,093 |
| EMPLOYEE GARAGE | 2,246 |
| LOT #9 | 182 |
| LOT # 9A | 211 |
| LOT #10 | 258 |
| EMERGENCY CENTER | 28 |
| CHILD CARE | 25 |
| RONALD MCDONALD HOUSE | 14 |
| PARCEL 136 C | 280 |
| RANDOM INTERNAL SITE | 56 |
| WOODBURN MENTAL HEALTH CENTER | 94 |
| WOODBURN PLACE | 11 |
| PARKING SPACES TO BE REMOVED WITH PROPOSED DEVELOPMENT PROGRAM | (477) |
| LOT #9 | (98) |
| LOT #9A | (76) |
| LOT #10 | (33) |
| WOODBURN MENTAL HEALTH CENTER | (94) |
| PARCEL 136 C ADJUSTMENT | (176) |
| ADDITIONAL PARKING SPACES PROPOSED WITH PROPOSED DEVELOPMENT PROGRAM | 830 |
| MID-COUNTY COMMUNITY SERVICES CENTER GARAGE | 825 |
| WOODBURN PLACE | 5 |
| GRAND TOTAL OF PROPOSED PARKING SPACES: 5,085 (EXISTING) – 477 (REMOVED) +830 (PROPOSED ADDITIONAL) | 5,438 |

[1] SEE NOTE 19

[2] SEE NOTE 9

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 4 of 29


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INOVA
FAIRFAX HOSPITAL
CAMPUS

GENERALIZED DEVELOPMENT PLAN /
SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

KEY PLAN

SCALE

| No. | DATE | BY | Description |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY JMC

APPROVED BY

CHECKED BY PGY

DATE April 18, 2011

TITLE

Inova
Fairfax Hospital Campus
Development Plan
Notes and Tabulation

PROJECT NO.

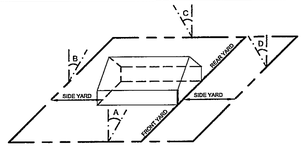
3

SHEET NO. 3 OF 28

M-10792

## CURVE TABLE

| NO. | RADIUS | DELTA | ARC | TANGENT | CHORD | BEARING |
|---|---|---|---|---|---|---|
| 1 | 1832.00' | 02°16'33" | 72.77' | 36.39' | 72.76' | S13°14'28"E |
| 2 | 1318.00' | 14°35'01" | 335.48' | 168.65' | 334.57' | S19°23'44"E |
| 3 | 1049.44' | 17°49'00" | 326.33' | 164.49' | 325.02' | S35°35'45"E |
| 4 | 1300.00' | 06°55'30" | 157.12' | 78.66' | 157.03' | S44°10'05"E |
| 5 | 1201.55' | 04°11'16" | 87.82' | 43.93' | 87.80' | S49°36'26"E |
| 6 | 246.48' | 38°51'35" | 167.17' | 86.94' | 163.98' | S64°15'59"W |
| 7 | 290.00' | 19°36'32" | 99.25' | 50.11' | 98.77' | N69°20'05"W |
| 8 | 210.00' | 32°17'49" | 118.37' | 60.81' | 116.81' | N75°40'45"W |




FRONT YARD : 1:1 A 25' WITH A BUILDING HEIGHT OF 165', THE FRONT YARD = 77' BUT NOT LESS THAN 40'

SIDE YARD : 1:1 B NO REQUIREMENT

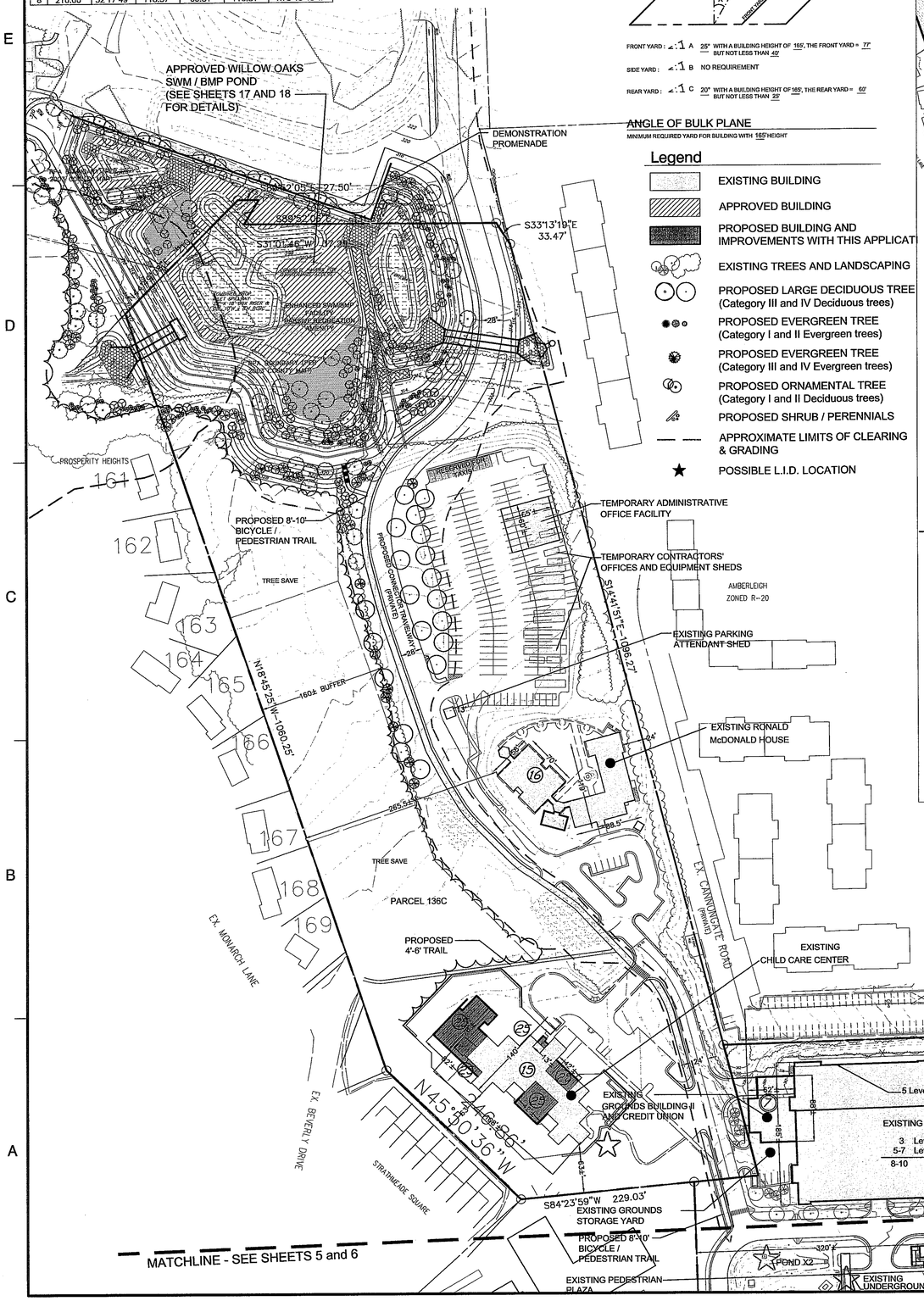
REAR YARD : 1:1 C 20' WITH A BUILDING HEIGHT OF 165', THE REAR YARD = 60' BUT NOT LESS THAN 20'

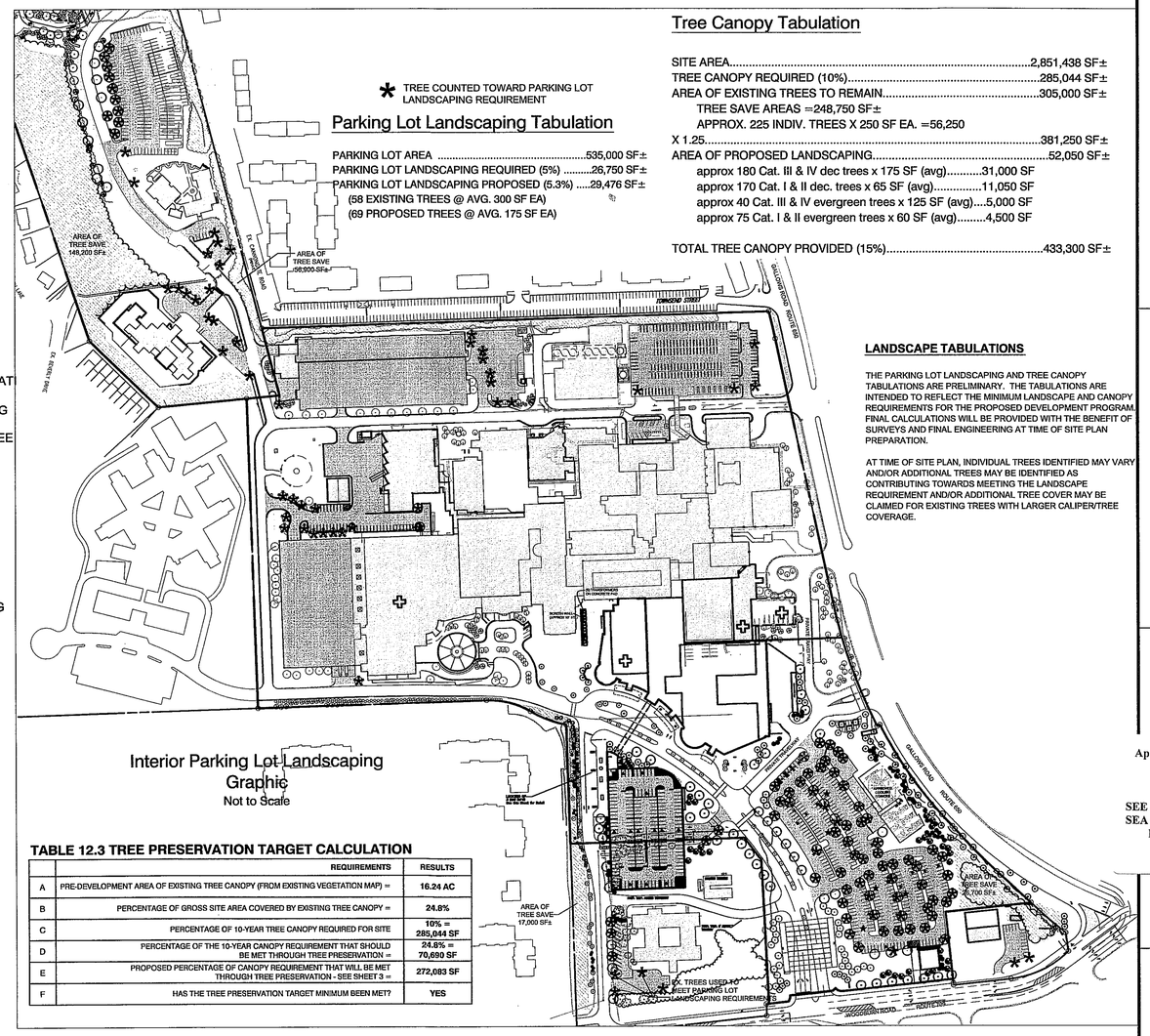
### ANGLE OF BULK PLANE

MINIMUM REQUIRED YARD FOR BUILDING WITH 165' HEIGHT

### Legend

- EXISTING BUILDING
- APPROVED BUILDING
- PROPOSED BUILDING AND IMPROVEMENTS WITH THIS APPLICATI
- EXISTING TREES AND LANDSCAPING
- PROPOSED LARGE DECIDUOUS TREE (Category III and IV Deciduous trees)
- PROPOSED EVERGREEN TREE (Category I and II Evergreen trees)
- PROPOSED EVERGREEN TREE (Category III and IV Evergreen trees)
- PROPOSED ORNAMENTAL TREE (Category I and II Deciduous trees)
- PROPOSED SHRUB / PERENNIALS
- APPROXIMATE LIMITS OF CLEARING & GRADING
- POSSIBLE L.I.D. LOCATION




Interior Parking Lot Landscaping Graphic
Not to Scale

### TABLE 12.3 TREE PRESERVATION TARGET CALCULATION

| | | REQUIREMENTS | RESULTS |
|---|---|---|---|
| A | PRE-DEVELOPMENT AREA OF EXISTING TREE CANOPY (FROM EXISTING VEGETATION MAP) = | | 16.24 AC |
| B | PERCENTAGE OF GROSS SITE AREA COVERED BY EXISTING TREE CANOPY = | | 24.8% |
| C | PERCENTAGE OF 10-YEAR TREE CANOPY REQUIRED FOR SITE | | 10% = 285,044 SF |
| D | PERCENTAGE OF THE 10-YEAR CANOPY REQUIREMENT THAT SHOULD BE MET THROUGH TREE PRESERVATION = | | 24.8% = 70,690 SF |
| E | PROPOSED PERCENTAGE OF CANOPY REQUIREMENT THAT WILL BE MET THROUGH TREE PRESERVATION - SEE SHEET 3 = | | 272,083 SF |
| F | HAS THE TREE PRESERVATION TARGET MINIMUM BEEN MET? | | YES |

* TREE COUNTED TOWARD PARKING LOT LANDSCAPING REQUIREMENT

### Parking Lot Landscaping Tabulation

PARKING LOT AREA .....535,000 SF±
PARKING LOT LANDSCAPING REQUIRED (5%) .....26,750 SF±
PARKING LOT LANDSCAPING PROPOSED (5.3%) .....29,476 SF±
(58 EXISTING TREES @ AVG. 300 SF EA)
(69 PROPOSED TREES @ AVG. 175 SF EA)

### Tree Canopy Tabulation

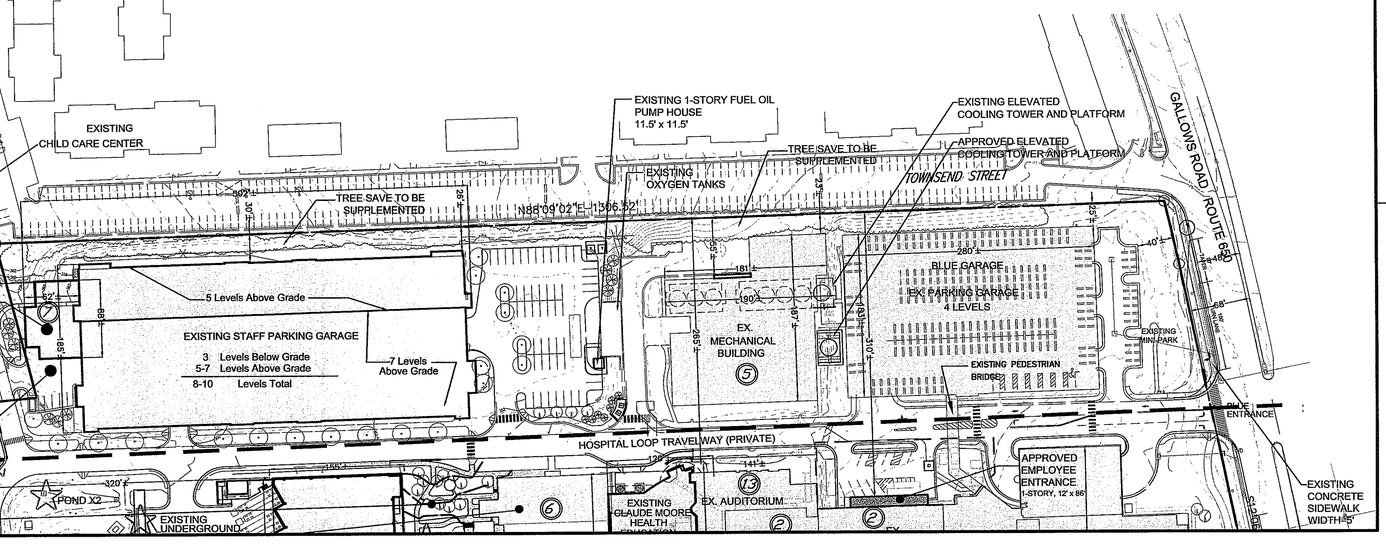
SITE AREA.....2,851,438 SF±
TREE CANOPY REQUIRED (10%).....285,044 SF±
AREA OF EXISTING TREES TO REMAIN.....305,000 SF±
TREE SAVE AREAS =248,750 SF±
APPROX. 225 INDIV. TREES X 250 SF EA. =56,250
X 1.25.....381,250 SF±
AREA OF PROPOSED LANDSCAPING.....52,050 SF±
approx 180 Cat. III & IV dec trees x 175 SF (avg).....31,000 SF
approx 170 Cat. I & II dec. trees x 65 SF (avg).....11,050 SF
approx 40 Cat. III & IV evergreen trees x 125 SF (avg)....5,000 SF
approx 75 Cat. I & II evergreen trees x 60 SF (avg).....4,500 SF

TOTAL TREE CANOPY PROVIDED (15%).....433,300 SF±

### LANDSCAPE TABULATIONS

THE PARKING LOT LANDSCAPING AND TREE CANOPY TABULATIONS ARE PRELIMINARY. THE TABULATIONS ARE INTENDED TO REFLECT THE MINIMUM LANDSCAPE AND CANOPY REQUIREMENTS FOR THE PROPOSED DEVELOPMENT PROGRAM. FINAL CALCULATIONS WILL BE PROVIDED WITH THE BENEFIT OF SURVEYS AND FINAL ENGINEERING AT TIME OF SITE PLAN PREPARATION.

AT TIME OF SITE PLAN, INDIVIDUAL TREES IDENTIFIED MAY VARY AND/OR ADDITIONAL TREES MAY BE IDENTIFIED AS CONTRIBUTING TOWARDS MEETING THE LANDSCAPE REQUIREMENT AND/OR ADDITIONAL TREE COVER MAY BE CLAIMED FOR EXISTING TREES WITH LARGER CALIPER/TREE COVERAGE.

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INOVA
FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 5 of 29

SCALE

0' 80' 160'

| No. | DATE | BY | Description |
|---|---|---|---|
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
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| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

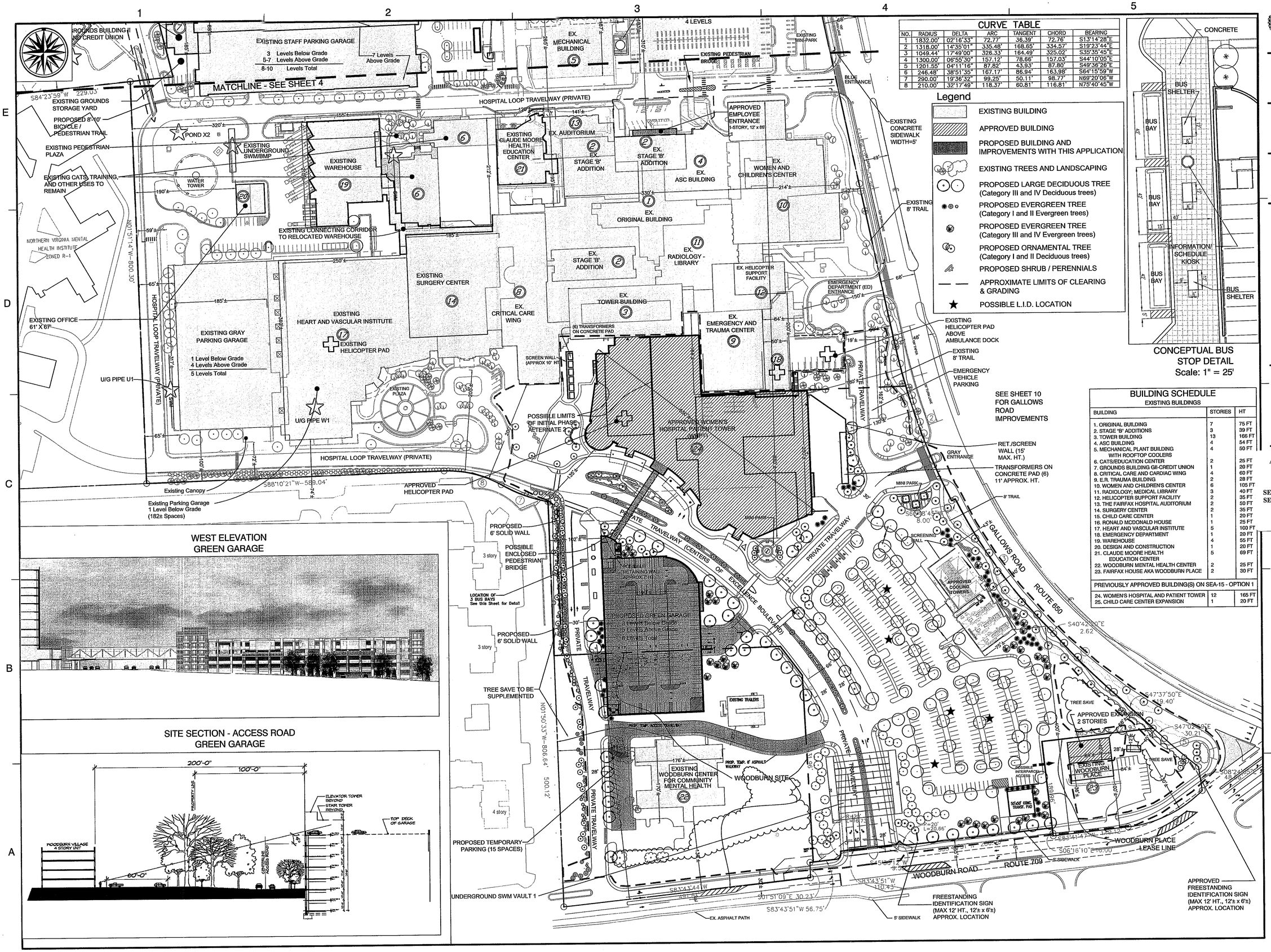
TITLE
INOVA
Fairfax Hospital Campus
Development Plan
GDP / SEA Plat

PROJECT NO.

4

SHEET NO. 4 OF 28

M-10792




## CURVE TABLE

| NO. | RADIUS | DELTA | ARC | TANGENT | CHORD | BEARING |
|---|---|---|---|---|---|---|
| 1 | 1832.00' | 02°16'33" | 72.77' | 36.39' | 72.76' | S13°14'28"E |
| 2 | 1318.00' | 14°35'01" | 335.48' | 168.65' | 334.57' | S19°23'44"E |
| 3 | 1049.44' | 17°49'00" | 326.33' | 164.49' | 325.02' | S35°35'45"E |
| 4 | 1300.00' | 06°55'30" | 157.12' | 78.66' | 157.03' | S44°10'05"E |
| 5 | 1201.55' | 04°11'16" | 87.82' | 43.93' | 87.80' | S49°36'26"E |
| 6 | 246.48' | 38°51'35" | 167.17' | 86.94' | 163.98' | S64°15'59"W |
| 7 | 290.00' | 19°36'32" | 99.25' | 50.11' | 98.77' | N69°20'06"W |
| 8 | 210.00' | 32°17'49" | 118.37' | 60.81' | 116.81' | N75°40'45"W |

## Legend

- EXISTING BUILDING
- APPROVED BUILDING
- PROPOSED BUILDING AND IMPROVEMENTS WITH THIS APPLICATION
- EXISTING TREES AND LANDSCAPING
- PROPOSED LARGE DECIDUOUS TREE (Category III and IV Deciduous trees)
- PROPOSED EVERGREEN TREE (Category I and II Evergreen trees)
- PROPOSED EVERGREEN TREE (Category III and IV Evergreen trees)
- PROPOSED ORNAMENTAL TREE (Category I and II Deciduous trees)
- PROPOSED SHRUB / PERENNIALS
- APPROXIMATE LIMITS OF CLEARING & GRADING
- POSSIBLE L.I.D. LOCATION




CONCEPTUAL BUS STOP DETAIL
Scale: 1" = 25'

## BUILDING SCHEDULE

EXISTING BUILDINGS

| BUILDING | STORIES | HT |
|---|---|---|
| 1. ORIGINAL BUILDING | 7 | 75 FT |
| 2. STAGE "B" ADDITIONS | 3 | 39 FT |
| 3. TOWER BUILDING | 13 | 166 FT |
| 4. ASC BUILDING | 4 | 54 FT |
| 5. MECHANICAL PLANT BUILDING WITH ROOFTOP COOLERS | 4 | 50 FT |
| 6. CATS/EDUCATION CENTER | 2 | 25 FT |
| 7. GROUNDS BUILDING GII-CREDIT UNION | 1 | 20 FT |
| 8. CRITICAL CARE AND CARDIAC WING | 4 | 60 FT |
| 9. E.R. TRAUMA BUILDING | 2 | 28 FT |
| 10. WOMEN AND CHILDREN'S CENTER | 6 | 105 FT |
| 11. RADIOLOGY; MEDICAL LIBRARY | 3 | 40 FT |
| 12. HELICOPTER SUPPORT FACILITY | 2 | 35 FT |
| 13. THE FAIRFAX HOSPITAL AUDITORIUM | 2 | 50 FT |
| 14. SURGERY CENTER | 2 | 35 FT |
| 15. CHILD CARE CENTER | 1 | 20 FT |
| 16. RONALD MCDONALD HOUSE | 1 | 25 FT |
| 17. HEART AND VASCULAR INSTITUTE | 5 | 100 FT |
| 18. EMERGENCY DEPARTMENT | 1 | 20 FT |
| 19. WAREHOUSE | 4 | 55 FT |
| 20. DESIGN AND CONSTRUCTION | 1 | 20 FT |
| 21. CLAUDE MOORE HEALTH EDUCATION CENTER | 5 | 69 FT |
| 22. WOODBURN MENTAL HEALTH CENTER | 2 | 25 FT |
| 23. FAIRFAX HOUSE AKA WOODBURN PLACE | 2 | 30 FT |
| PREVIOUSLY APPROVED BUILDING(S) ON SEA-15 - OPTION 1 | | |
| 24. WOMEN'S HOSPITAL AND PATIENT TOWER | 12 | 165 FT |
| 25. CHILD CARE CENTER EXPANSION | 1 | 20 FT |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# INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
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(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 6 of 29

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0' 80' 160'

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REVISIONS

DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

TITLE

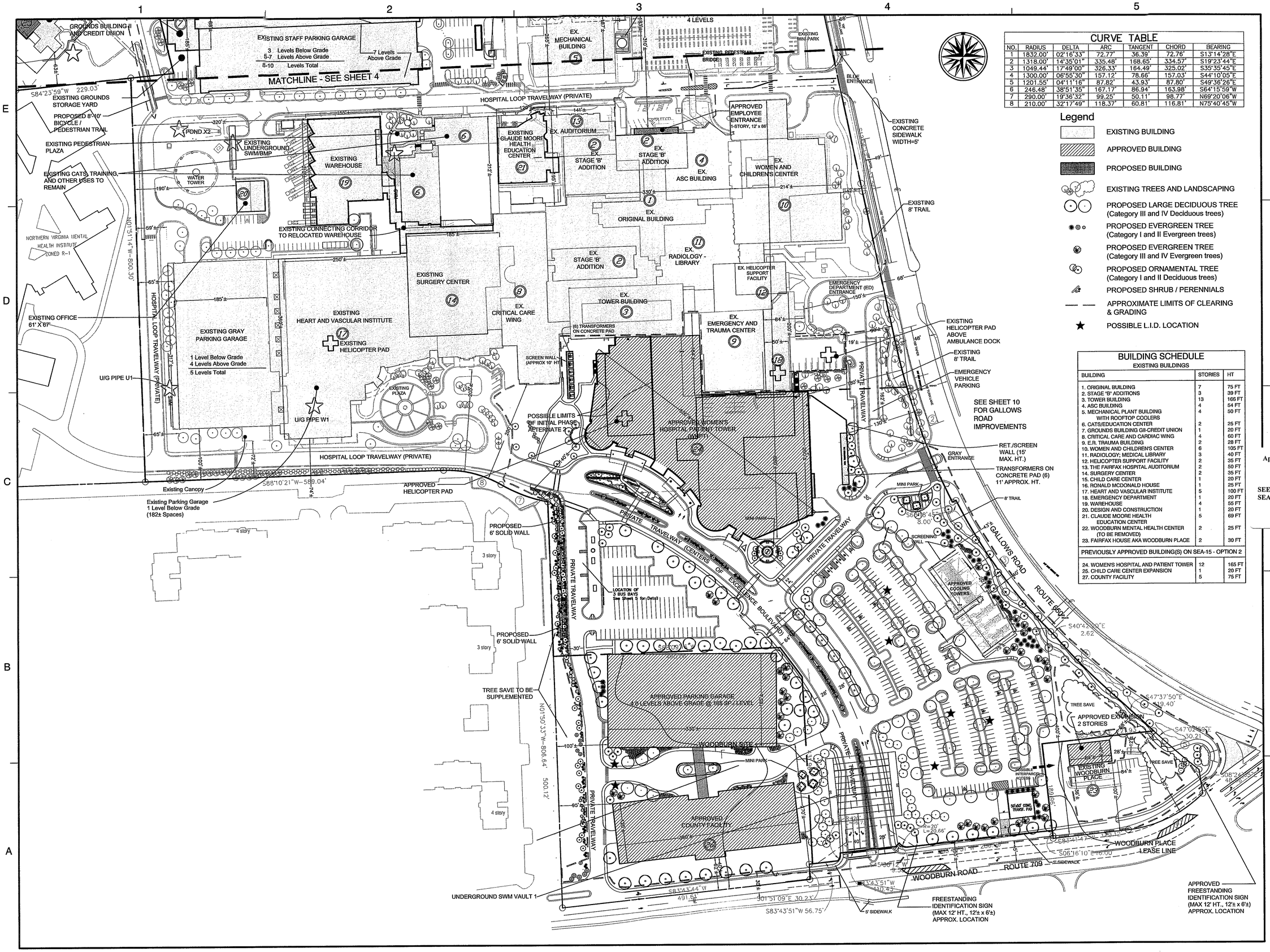
INOVA
Fairfax Hospital Campus
Development Plan
GDP / SEA Plat
Option 1

PROJECT NO.

5

SHEET NO. 5 OF 28

M-10792

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| 21. CLAUDE MOORE HEALTH EDUCATION CENTER | 5 | 69 FT |
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| 23. FAIRFAX HOUSE AKA WOODBURN PLACE | 2 | 30 FT |
| PREVIOUSLY APPROVED BUILDING(S) ON SEA-15 - OPTION 2 | | |
| 24. WOMEN'S HOSPITAL AND PATIENT TOWER | 12 | 165 FT |
| 25. CHILD CARE CENTER EXPANSION | 1 | 20 FT |
| 27. COUNTY FACILITY | 5 | 75 FT |


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INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES COLLETON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

Application No. PCA 2008-PR-009 Staff WOD
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APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 7 of 29

SCALE

0' 80' 160'

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REVISIONS

DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

TITLE

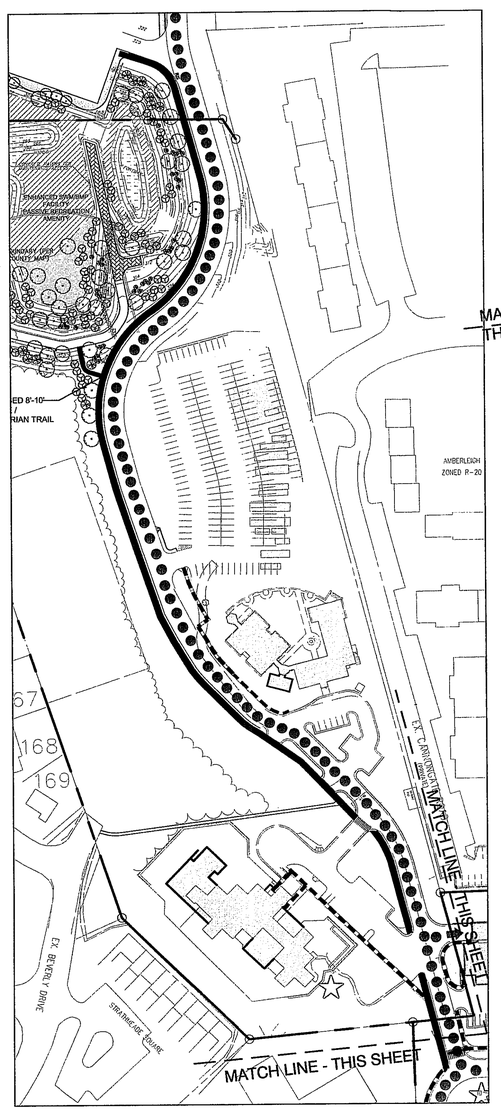
INOVA
Fairfax Hospital Campus
Development Plan
GDP / SEA Plat
Option 2

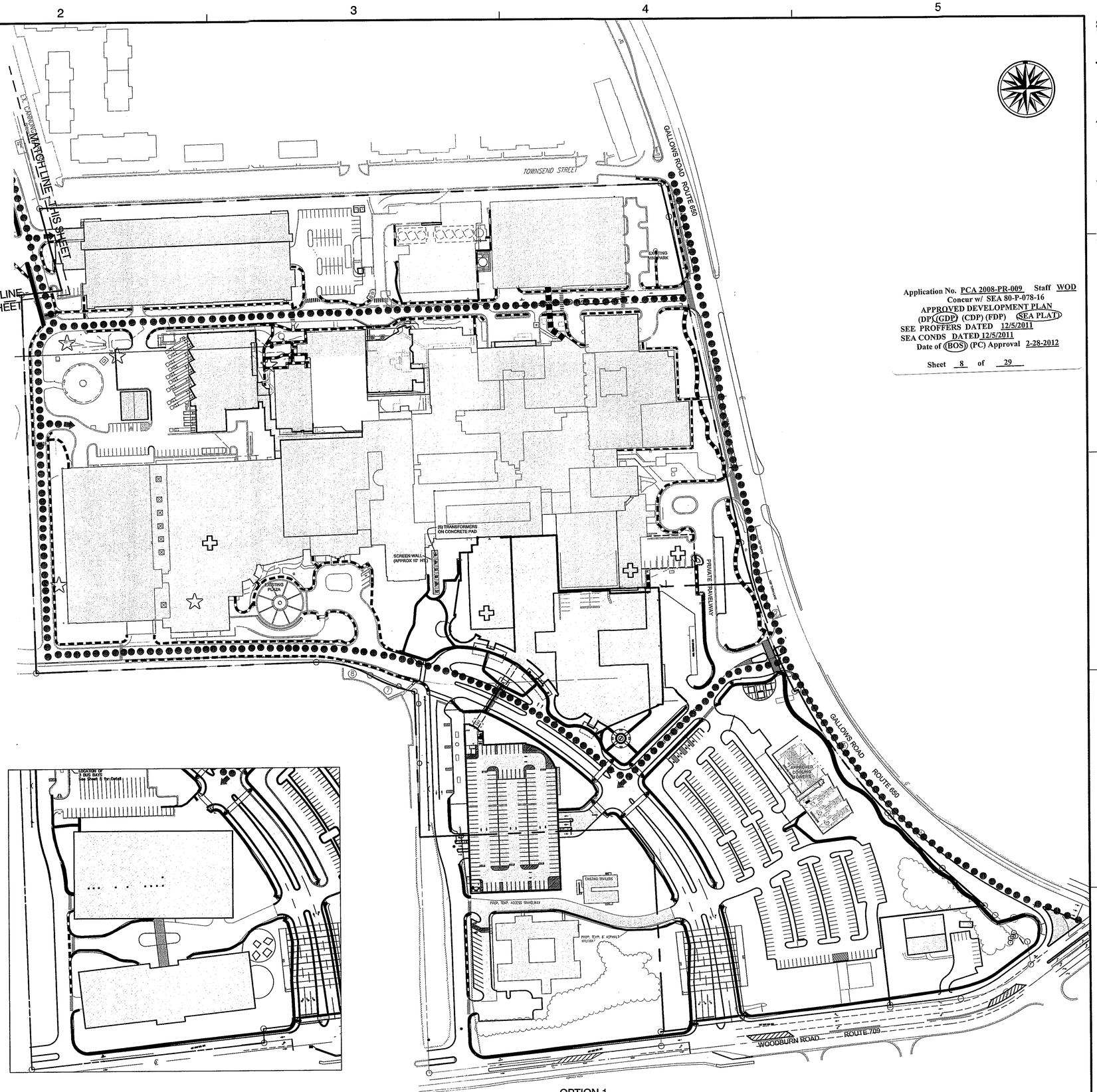
PROJECT NO.

6

SHEET NO. 6 OF 28

M-10792







OPTION 2

OPTION 1

Legend

- EXISTING SIDEWALK / TRAIL
- PROPOSED SIDEWALK / TRAIL
- PROPOSED BICYCLE CIRCULATION

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DPA) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
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Sheet 8 of 29

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INOVA
FAIRFAX HOSPITAL
CAMPUS

GENERALIZED DEVELOPMENT PLAN /
SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

KEY PLAN

SCALE

0' 80' 160'

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| 3 | 10.05.11 | JMC | |
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REVISIONS

DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

TITLE

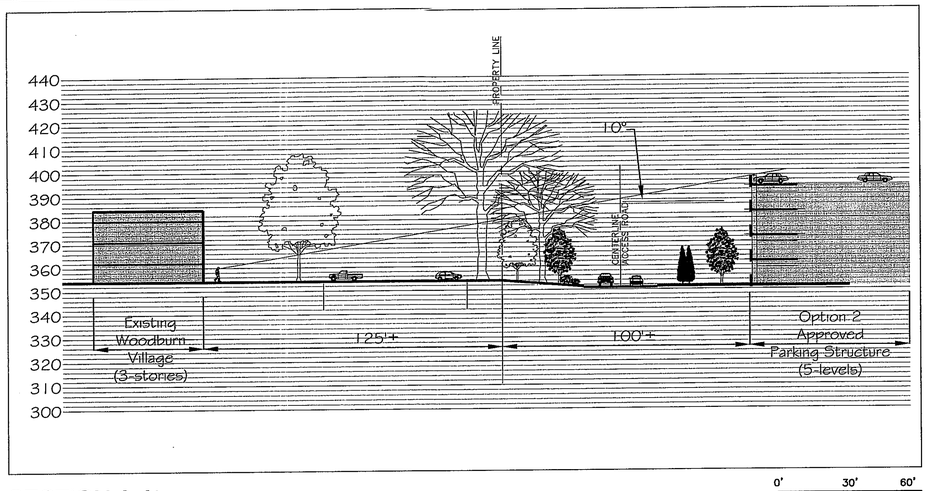
INOVA
Fairfax Hospital Campus
Development Plan
Pedestrian Circulation

PROJECT NO.

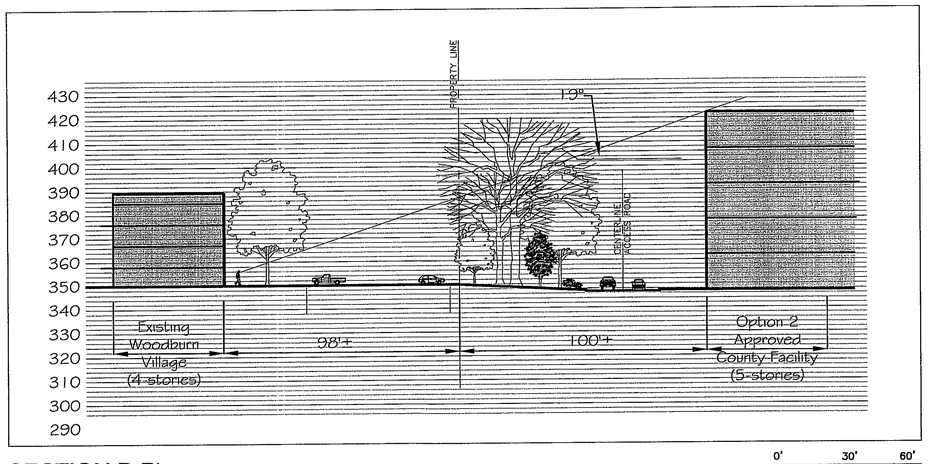
7

SHEET NO. 7 OF 28

M-10792




SECTION A-A'

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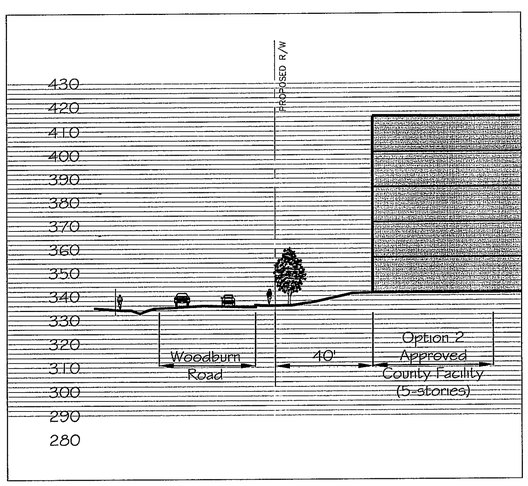


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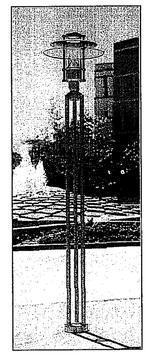
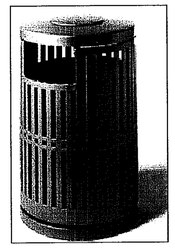
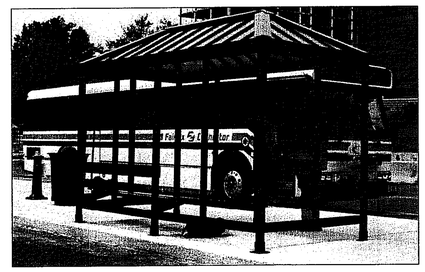


TYPICAL DECORATIVE LIGHT

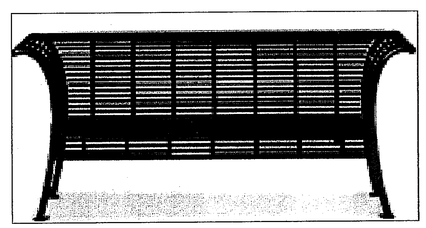


TYPICAL TRASH RECEPTACLE

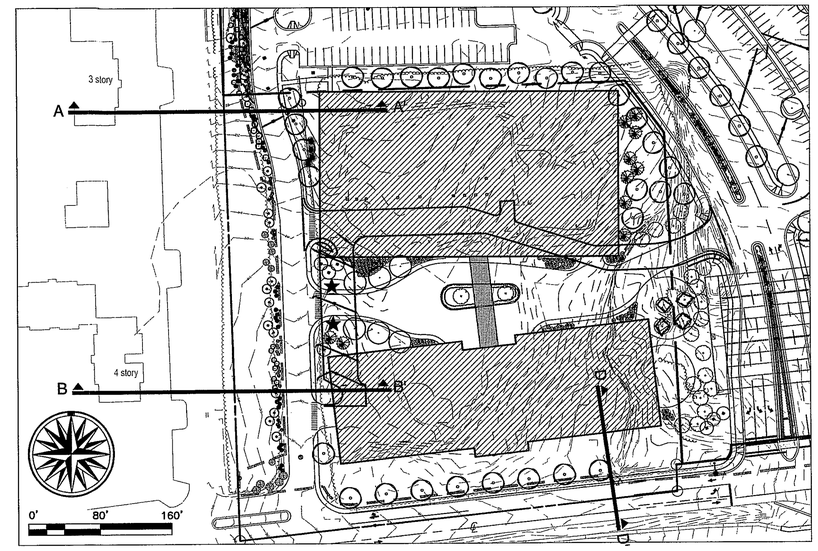
NOTE: THE TYPICAL SITE FURNITURE PRESENTED ON THIS SHEET ARE SHOWN TO ILLUSTRATE THE GENERAL CHARACTER OF THE PROPOSED FACILITIES. THEY ARE SUBJECT TO MINOR MODIFICATION WITH FINAL ARCHITECTURAL DESIGN.



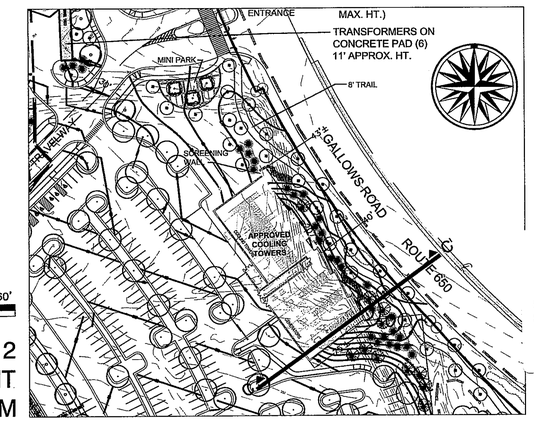
TYPICAL BUS SHELTER



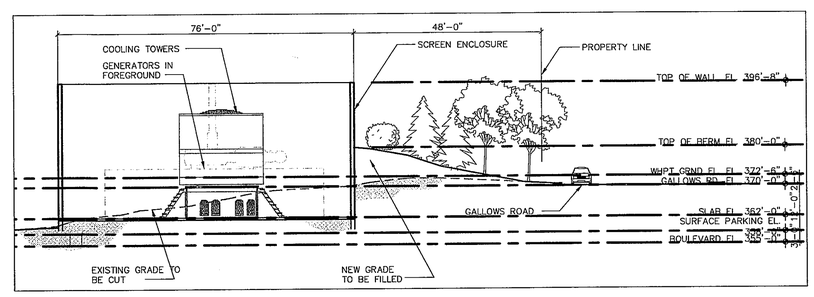
TYPICAL BENCH



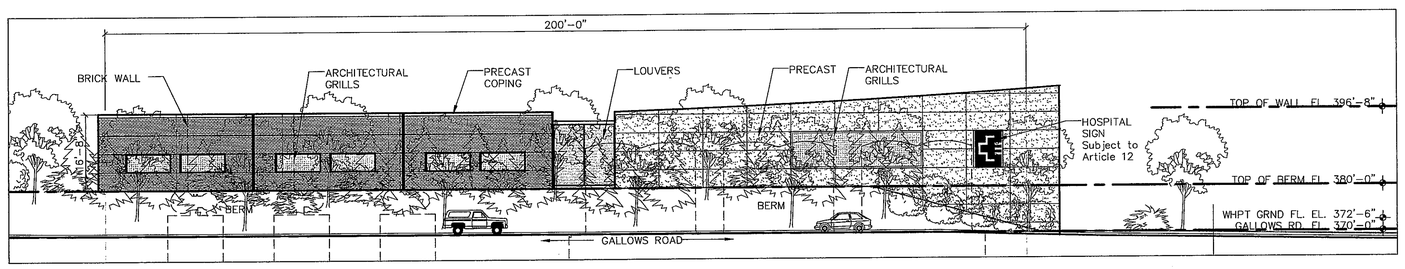

OPTION 2 DEVELOPMENT PROGRAM




OPTIONS 1 & 2 DEVELOPMENT PROGRAM




SECTION C-C' (NOT TO SCALE)

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TITLE
INOVA
Fairfax Hospital Campus
Development Plan

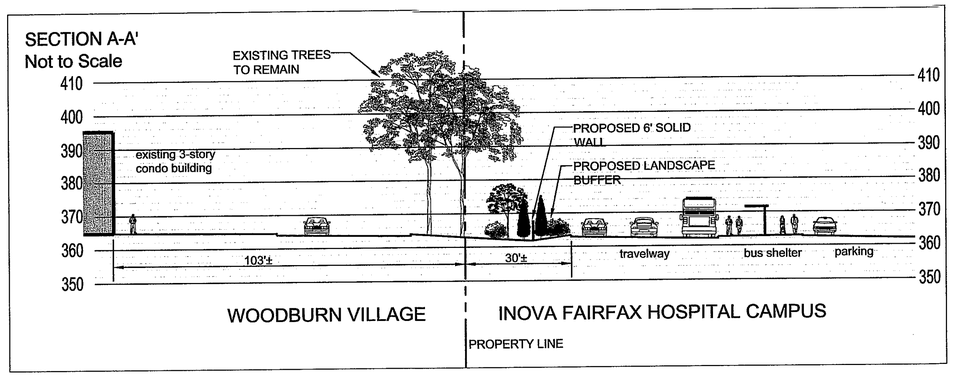
Cross Sections / Site Furniture

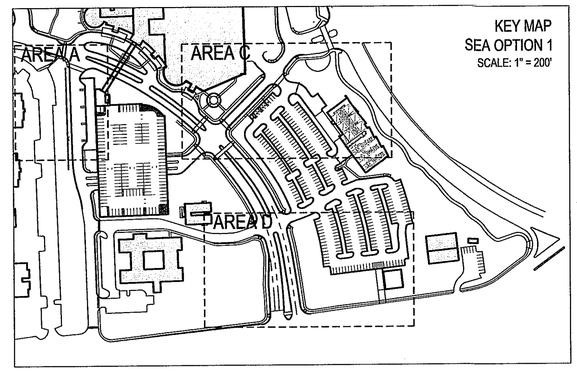
PROJECT NO.

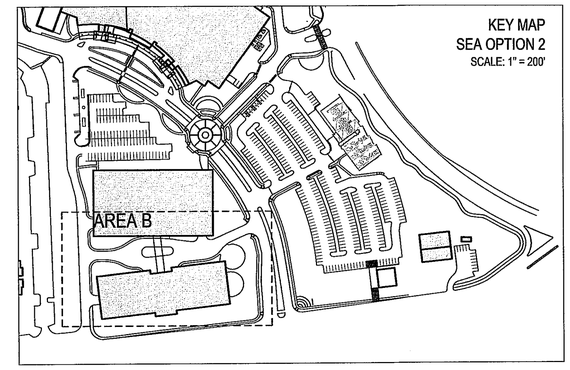
8

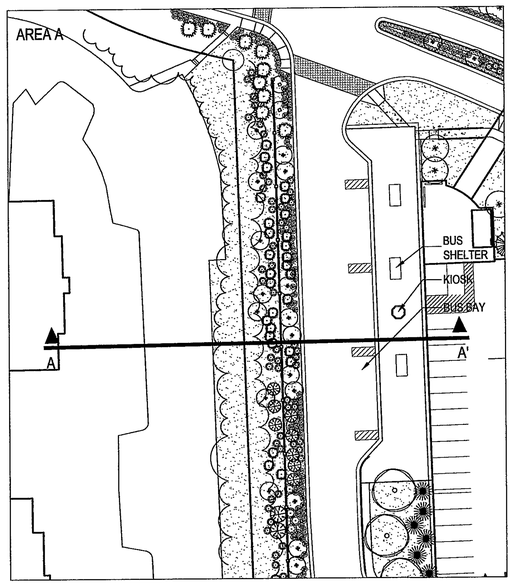
SHEET NO. 8 OF 28

M-10792

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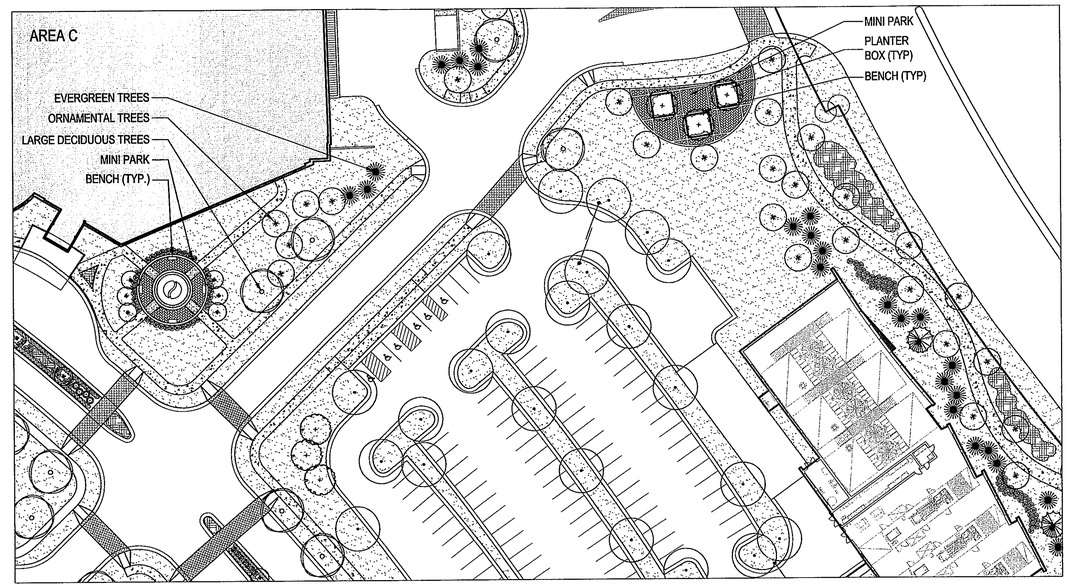
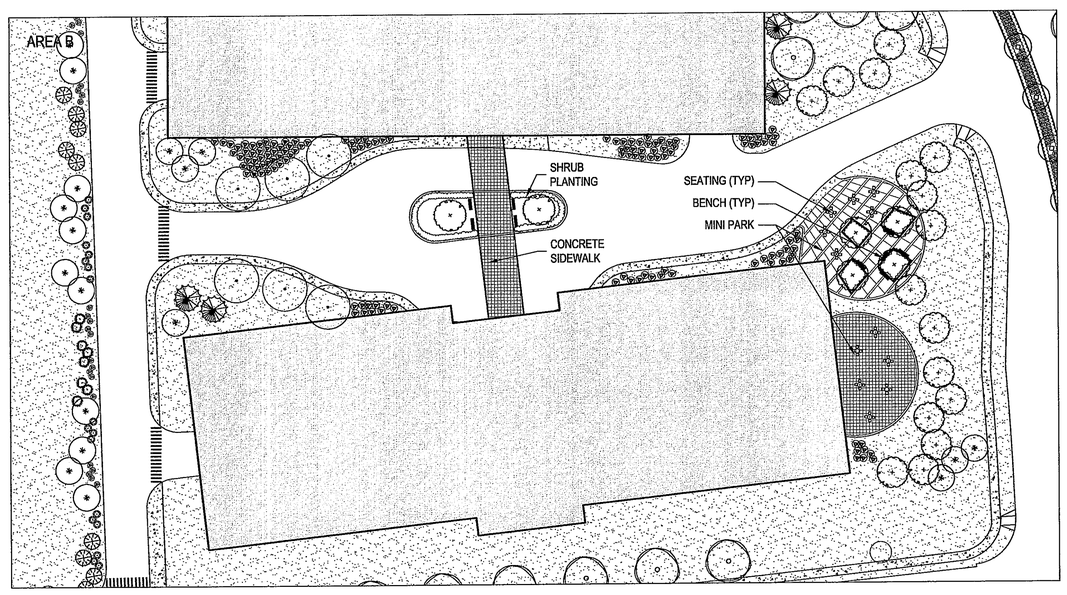
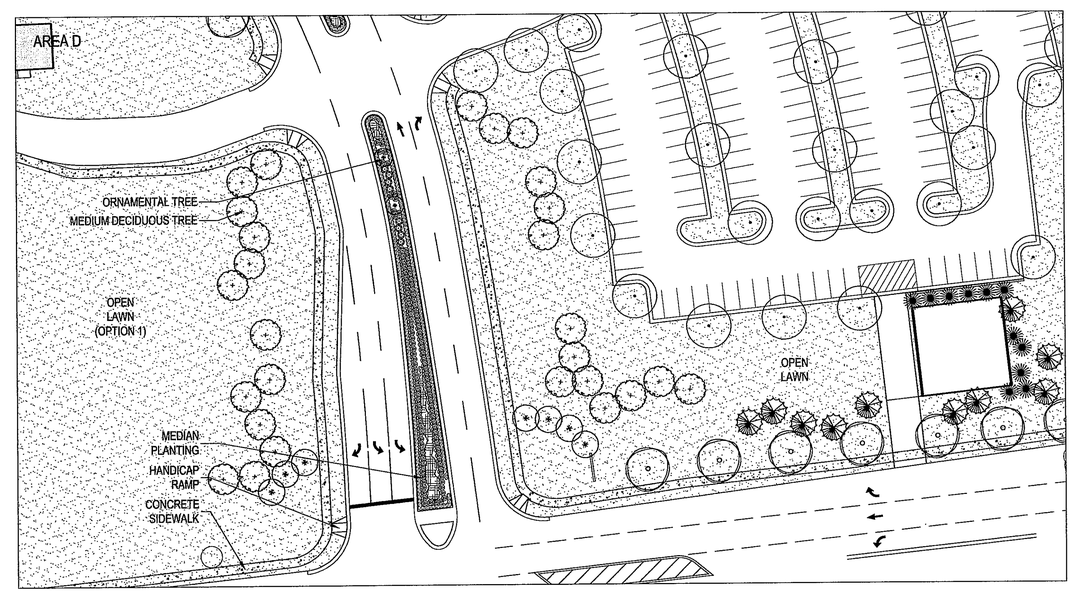
- PROPOSED SITE FURNITURE
- PROPOSED LAWN/SOD
- PROPOSED SPECIAL PAVING

NOTE:
THE DETAILS PROVIDED HEREON REPRESENT THE PROPOSED HARDSCAPE AND LANDSCAPE PLANS FOR THE INDIVIDUAL OPEN SPACE AREAS. MINOR DESIGN CHANGES MAY BE MADE WITH FINAL DESIGN AND ENGINEERING.





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INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLEITON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
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(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 10 of 29

SCALE

0' 40' 80'

| No. | DATE | BY | Description |
|---|---|---|---|
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

TITLE

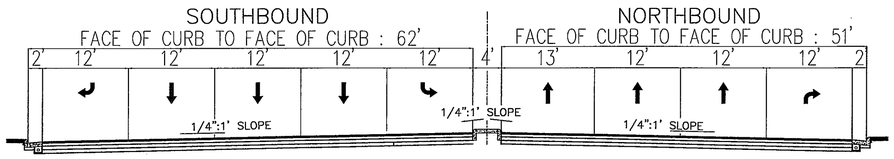
INOVA
Fairfax Hospital Campus
Development Plan
Detail Enlargements

PROJECT NO.

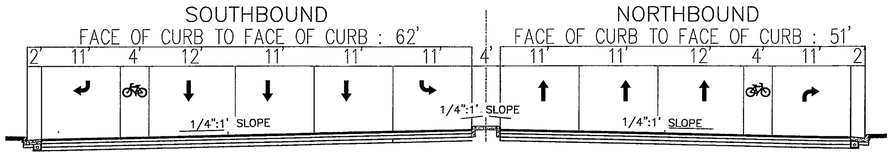
9

SHEET NO. 9 OF 28

M-10792




EXISTING GALLOWS RD. (RTE. 650)
TYPICAL SECTION A–A'




PROPOSED GALLOWS RD. (RTE. 650)
TYPICAL SECTION A–A'

## GENERAL NOTES

SHEET 11
THE IMPROVEMENTS SHOWN ON THIS SHEET INCLUDE:

ADDITION OF THIRD SOUTHBOUND LANE FROM JUST NORTH OF WILLOW OAKS CORP. DRIVE

INTERSECTION OF WILLOW OAKS CORPORATE DRIVE AND GALLOWS ROAD, SIGNAL TIMING AND CYCLE LENGTH IMPROVEMENTS. ADDITION OF SECOND LEFT TURN LANE FROM NORTHBOUND GALLOWS TO WILLOW OAKS CORPORATE DRIVE.

INTERSECTION OF ANDERSON DRIVE AND GALLOWS ROAD, SIGNAL TIMING AND CYCLE LENGTH IMPROVEMENTS.

SHEET 12 AND 13
THE IMPROVEMENTS SHOWN ON THESE SHEETS INCLUDE:

CONTINUATION OF THIRD SOUTHBOUND LANE TO JUST SOUTH OF THE EMERGENCY DEPARTMENT ENTRANCE

INTERSECTION OF HOSPITAL BLUE ENTRANCE AND GALLOWS ROAD, SIGNAL TIMING AND CYCLE LENGTH IMPROVEMENTS ALONG WITH RE–STRIPING OF THE EASTBOUND APPROACH.

BEGIN BIKE LANE IMPROVEMENTS SOUTH OF WILLOW OAKS CORPORATE DRIVE (AS NOTED IN THE INOVA FAIRFAX HOSPITAL PROFFERS RZ 2008–PR–009)

SHEET 14
THE IMPROVEMENTS SHOWN ON THIS SHEET INCLUDE:

INTERSECTION OF WOODBURN ROAD AND FUTURE CENTER OF EXCELLENCE BOULEVARD, POSSIBLE INSTALLATION OF SIGNAL CONTROL ARM. EXTENSION OF RIGHT–TURN LANE FROM GALLOWS ROAD SOUTHBOUND ALONG THE LENGTH OF WOODBURN ROAD EASTBOUND TERMINATING AT FUTURE CENTER OF EXCELLENCE BOULEVARD.

SHEET 15
THE IMPROVEMENTS SHOWN ON THIS SHEET INCLUDE:

AT THE INTERSECTION OF WOODBURN ROAD AND GALLOWS ROAD, ADDITION OF THIRD WESTBOUND LANE FROM EXIT RAMP, (MAKING LANE USE THROUGH–LEFT–LEFT) AND SIGNAL TIMING IMPROVEMENTS. ADDITION OF SECOND THROUGH LANE ALONG WOODBURN ROAD WESTBOUND. EXTENSION OF RIGHT–TURN LANE FROM GALLOWS ROAD SOUTHBOUND ALONG THE LENGTH OF WOODBURN ROAD WESTBOUND, TERMINATING AT FUTURE CENTER OF EXCELLENCE BOULEVARD (AS SHOWN ON SHEET 14).

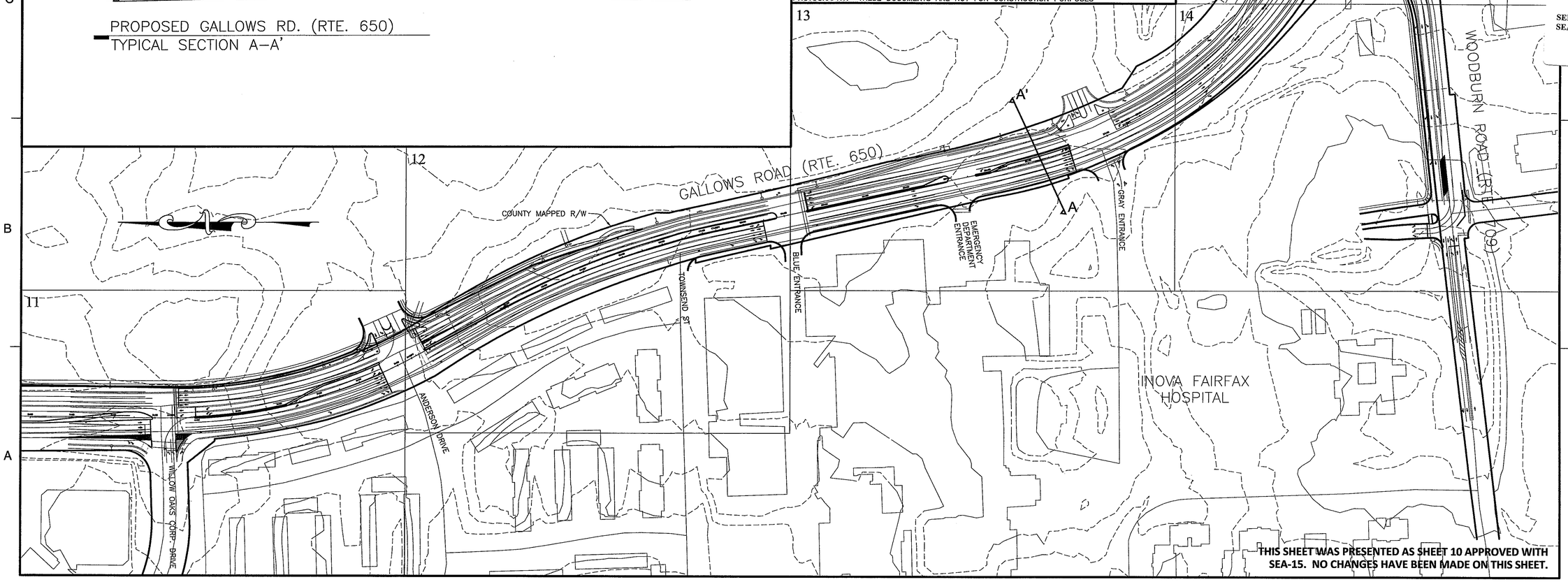
ADDITION OF SECOND EASTBOUND RIGHT–TURN LANE ON WOODBURN ROAD (MAKING USE LEFT–LEFT–RIGHT–RIGHT) AND SIGNAL TIMING IMPROVEMENTS. ADDITION OF SECOND LEFT–TURN LANE ALONG NORTHBOUND GALLOWS ROAD (MAKING USE THROUGH–THROUGH–LEFT–LEFT).

TERMINATION OF BIKE LANE IMPROVEMENTS ON NORTH SIDE OF WOODBURN ROAD INTERSECTION

SHEET 16
THIS SHEET IS INTENDED TO DEMONSTRATE THE ABILITY FOR THE PROPOSED RT. 495 HOT–LANE IMPROVEMENTS TO CONNECT TO THE PROPOSED GALLOWS ROAD IMPROVEMENTS. THE ALIGNMENTS SHOWN ON THIS SHEET WERE TAKEN FROM PRESENTATION GRAPHICS PROVIDED BY VDOT AND DO NOT NECESSARILY REPRESENT THE FINAL HOT–LANE IMPROVEMENT DESIGN.

NOTE:

SHEETS 10–16 WERE CREATED FOR VISUALIZING THE PROPOSED TRAFFIC IMPROVEMENTS SET FORTH IN THE PROFFERS. THE STORM SEWER SYSTEMS SHOWN WITH THE ROADWAY IMPROVEMENTS ARE APPROXIMATE AND ARE SUBJECT TO CHANGE UPON FINAL ENGINEERING. THE "EXISTING CONDITIONS" ARE SHOWN WITH TWO–FOOT CONTOURS AND WERE COMPILED THROUGH MULTIPLE SOURCES, INCLUDING FIELD SURVEYS, AIR FLOWN SURVEYS, COUNTY GIS, PROPOSED ROAD IMPROVEMENT PLANS BY OTHERS, AND DRAFTED LAYOUTS BASED ON AERIAL PHOTOGRAPHY. THESE DOCUMENTS ARE NOT FOR CONSTRUCTION PURPOSES

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# INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT
PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL
COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
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Date of (BOS) (PC) Approval 2-28-2012

Sheet 11 of 29

SCALE
0' 120' 240'

| No. | DATE | BY | Description |
|---|---|---|---|
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
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| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

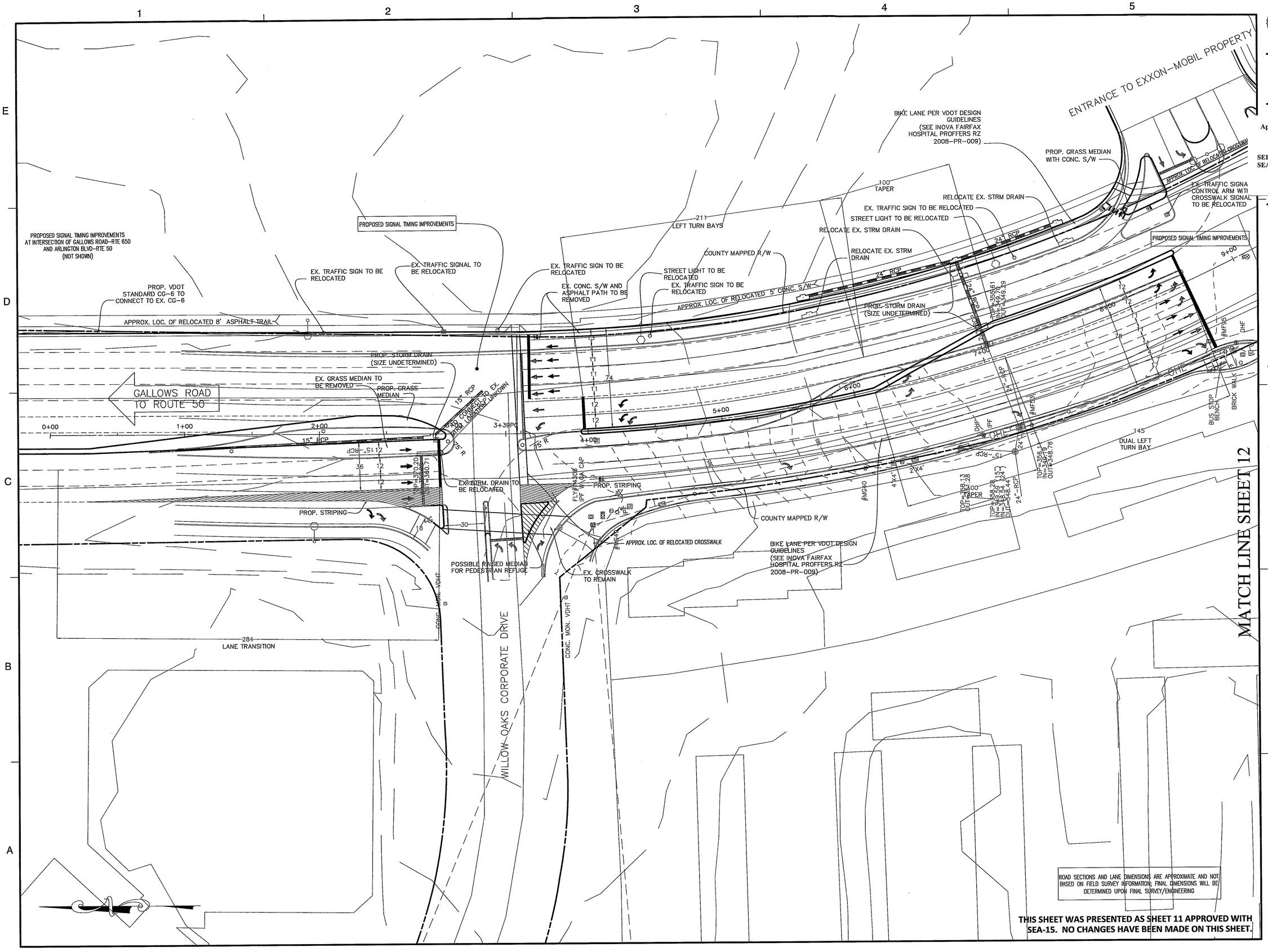
TITLE
INOVA
Fairfax Hospital Campus
Development Plan
Road Improvement Plan

PROJECT NO.

10

SHEET NO. 10 OF 28

M-10792




ROAD SECTIONS AND LANE DIMENSIONS ARE APPROXIMATE AND NOT BASED ON FIELD SURVEY INFORMATION; FINAL DIMENSIONS WILL BE DETERMINED UPON FINAL SURVEY/ENGINEERING

**THIS SHEET WAS PRESENTED AS SHEET 11 APPROVED WITH SEA-15. NO CHANGES HAVE BEEN MADE ON THIS SHEET.**

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Sheet 12 of 29

INOVA FAIRFAX HOSPITAL CAMPUS
GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT
PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL
COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

KEY PLAN

SCALE
0' 30' 60'

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INOVA
Fairfax Hospital Campus
Development Plan
Road Improvement Plan

PROJECT NO.

11

SHEET NO. 11 OF 28

M-10792

MATCH LINE SHEET 11

GALLOWS ROAD

TOWNSEND STREET

BLUE ENTRANCE

ANDERSON DRIVE

MATCH LINE SHEET 13

BIKE LANE PER VDOT DESIGN GUIDELINES (SEE INOVA FAIRFAX HOSPITAL PROFFERS RZ 2008-PR-009)

END NORTHBOUND REALIGNMENT FOR ADDITIONAL SOUTHBOUND GALLOWS ROAD LANE TIE IMPROVEMENTS INTO EXISTING ROAD ALIGNMENT

APPROX. AREA OF RELOCATED. BUS STOP

144 TAPER

281 RIGHT TURN BAY

COUNTY MAPPED R/W

PROP. GRASS OR CONC. MEDIAN

STREET LIGHT TO BE RELOCATED

RELOCATE EX. STRM DRAIN INLET

PROP. GRASS MEDIAN WITH CONC. S/W

EX. TRAFFIC SIGN TO BE RELOCATED

EX. TRAFFIC SIGNAL CONTROL ARM TO BE RELOCATED

PROP. 5' CONC. S/W

CONCRETE DITCH

PROPOSED SIGNAL TIMING IMPROVEMENTS

100 TAPER

156 LEFT TURN BAY

FIELD SURVEYED PROPERTY LINE

Application No. PCA 2008-PR-009 Staff WOD
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Sheet 13 of 29

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**THIS SHEET WAS PRESENTED AS SHEET 12 APPROVED WITH SEA-15. NO CHANGES HAVE BEEN MADE ON THIS SHEET.**

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TIMOTHY CHARLES GULLSTONE
Lic. No. 20112
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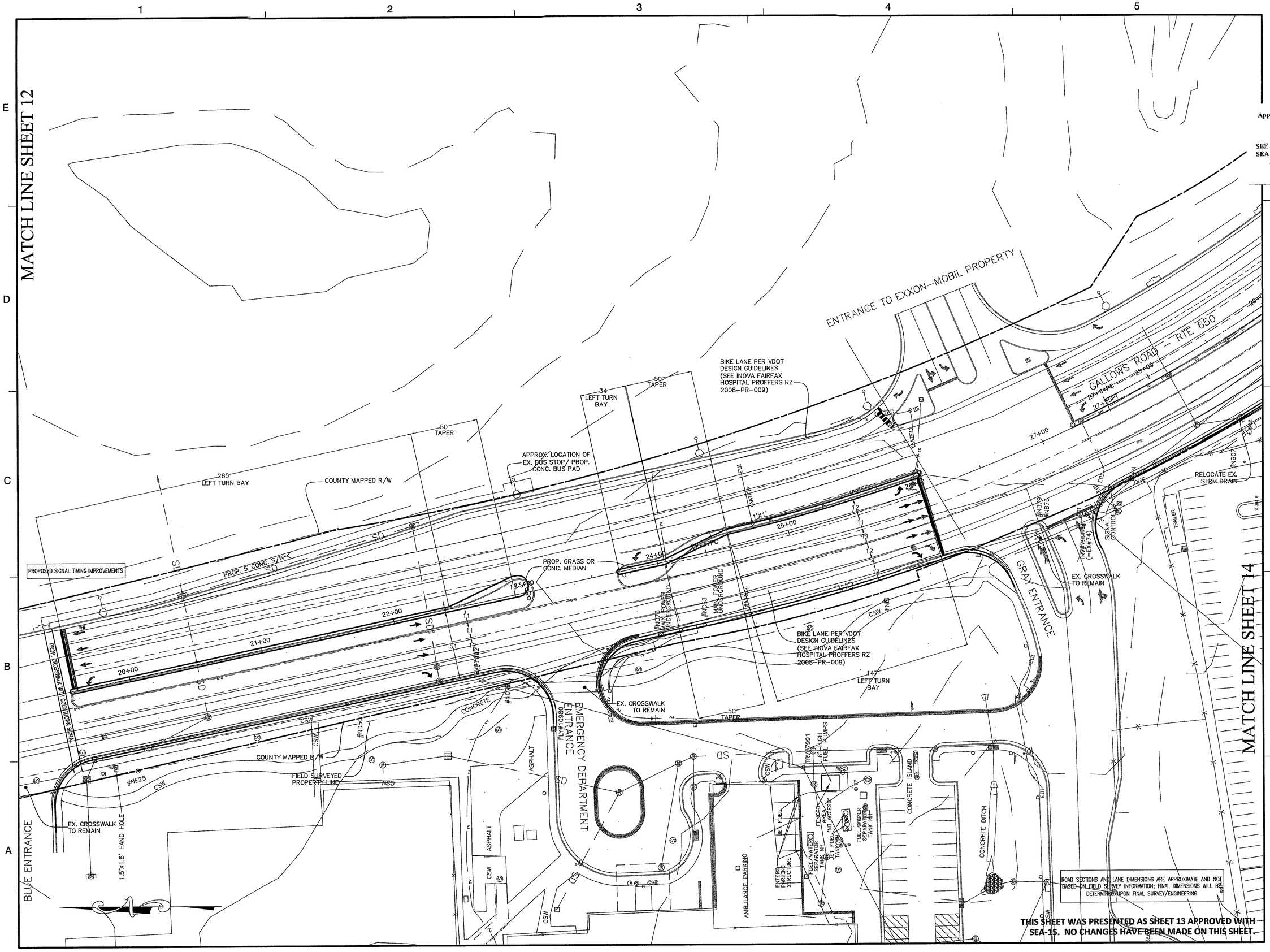
INOVA
Fairfax Hospital Campus
Development Plan
Road Improvement Plan

PROJECT NO.

12

SHEET NO. 12 OF 28

M-10792

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# INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
Lic. No. 20112
12.5.2011
PROFESSIONAL ENGINEER

KEY PLAN

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TITLE
INOVA
Fairfax Hospital Campus
Development Plan
Road Improvement Plan

PROJECT NO.

13

SHEET NO. 13 OF 28

M-10792

MATCH LINE SHEET 13

MATCH LINE THIS SHEET

BIKE LANE PER VDOT DESIGN GUIDELINES (SEE INOVA FAIRFAX HOSPITAL PROFFERS RZ 2008-PR-009)

COUNTY MAPPED R/W

GALLOWS ROAD-RTE. 650

PROP. VDOT STANDARD CG-6

TRAFFIC MODIFICATIONS PROPOSED TO PREVENT WEAVING MOTION OF MOTORISTS FROM 495 RAMP TO GRAY ENTRANCE (SEE INOVA FAIRFAX HOSPITAL PROFFERS RZ 2008-PR-009)

COUNTY MAPPED R/W

FIELD SURVEYED PROPERTY LINE

BIKE LANE PER VDOT DESIGN GUIDELINES (SEE INOVA FAIRFAX HOSPITAL PROFFERS RZ 2008-PR-009)

ROAD MARKING TO BE DOUBLE YELLOW WITH OPENINGS FOR STREET ENTRANCES

FIELD SURVEYED PROPERTY LINE

COUNTY MAPPED R/W

WOODBURN ROAD - ROUTE 709

PAINTED MEDIAN

PROPOSED SIGNAL IF NEEDED (SEE INOVA FAIRFAX HOSPITAL PROFFERS RZ 2008-PR-009)

PROP. VDOT STANDARD CG-6 TO CONNECT TO EX. CG-6

COUNTY MAPPED R/W

FUTURE CENTER OF EXCELLENCE BOULEVARD

STORAGE SHED

ENTERS STORAGE SHED

ASPH PARKING

JERSEY BARRIER

PROPOSED INTERSECTION WILL BE DESIGNED FOR PEDESTRIAN MOVEMENTS PER VDOT. THE RESTRIPING PLAN SHOWN WEST OF THIS INTERSECTION IS SUBJECT TO VDOT APPROVAL.

ROAD SECTIONS AND LANE DIMENSIONS ARE APPROXIMATE AND NOT BASED ON FIELD SURVEY INFORMATION; FINAL DIMENSIONS WILL BE DETERMINED UPON FINAL SURVEY/ENGINEERING

PROP. VDOT STANDARD CG-6 TO CONNECT TO EX. CG-6

COUNTY MAPPED R/W

STRIPING TO MATCH EXISTING ROAD SECTION. THE RESTRIPING PLAN SHOWN HERE IS SUBJECT TO VDOT APPROVAL.

ASPHALT PATH

THIS SHEET WAS PRESENTED AS SHEET 14 APPROVED WITH SEA-15


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Sheet 15 of 29

# INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES COLLETTON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

KEY PLAN

SCALE

0' 30' 60'

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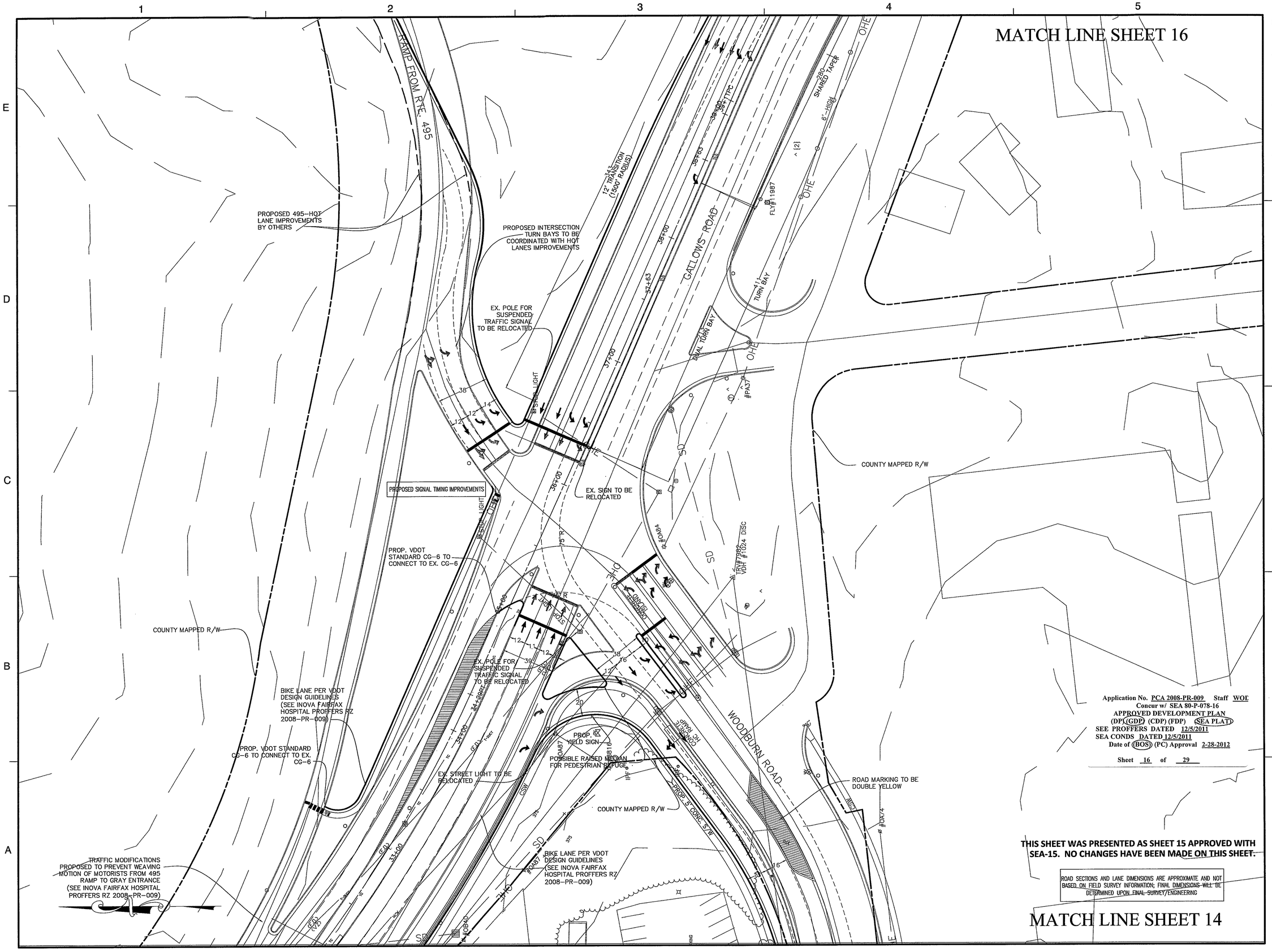
INOVA
Fairfax Hospital Campus
Development Plan
Road Improvement Plan

PROJECT NO.

14

SHEET NO. 14 OF 28

M-10792

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Sheet 16 of 29

**THIS SHEET WAS PRESENTED AS SHEET 15 APPROVED WITH SEA-15. NO CHANGES HAVE BEEN MADE ON THIS SHEET.**

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PROVIDENCE DISTRICT
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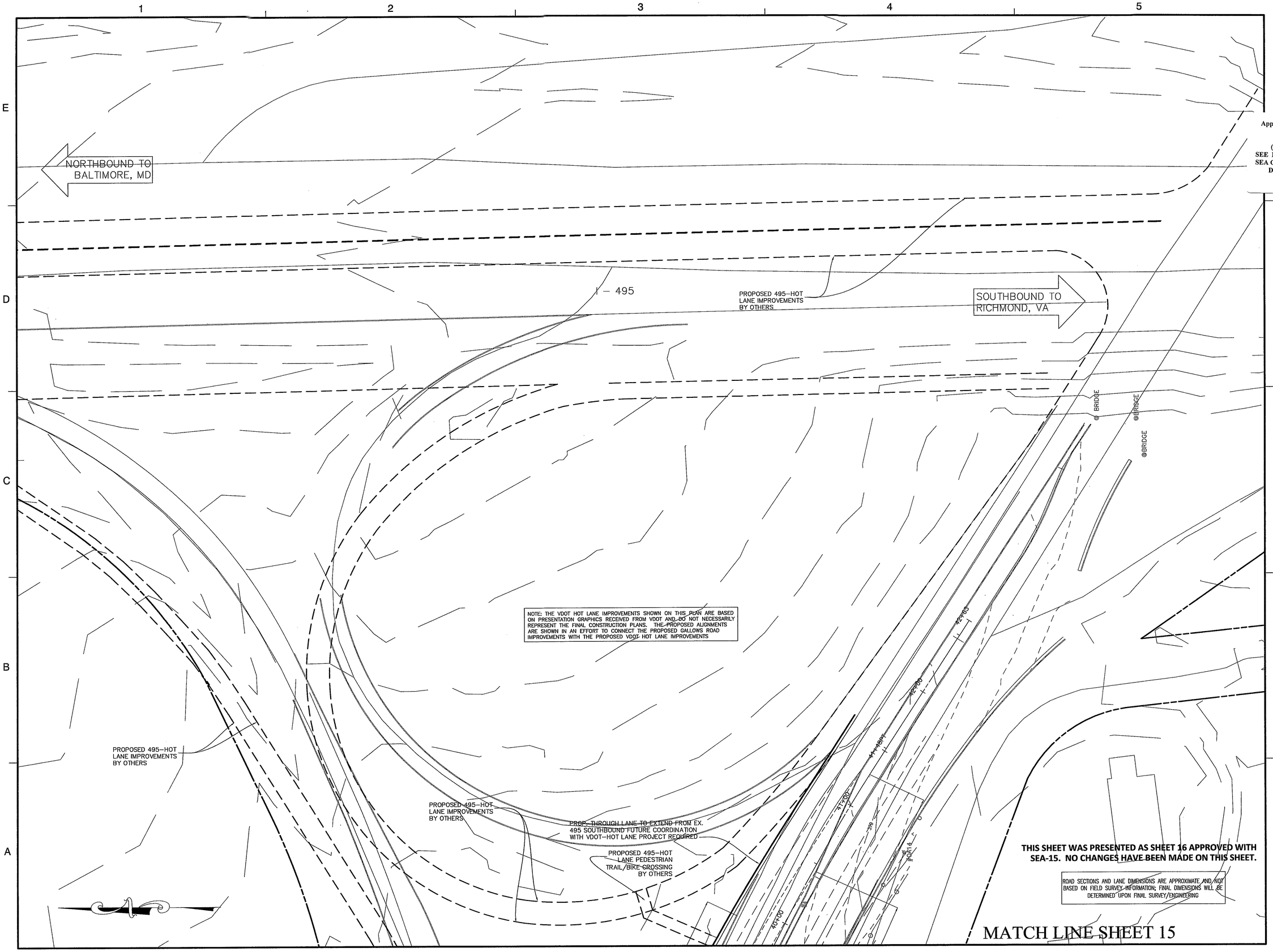
INOVA
Fairfax Hospital Campus
Development Plan
Road Improvement Plan

PROJECT NO.

15

SHEET NO. 15 OF 28

M-10792

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Sheet 17 of 29

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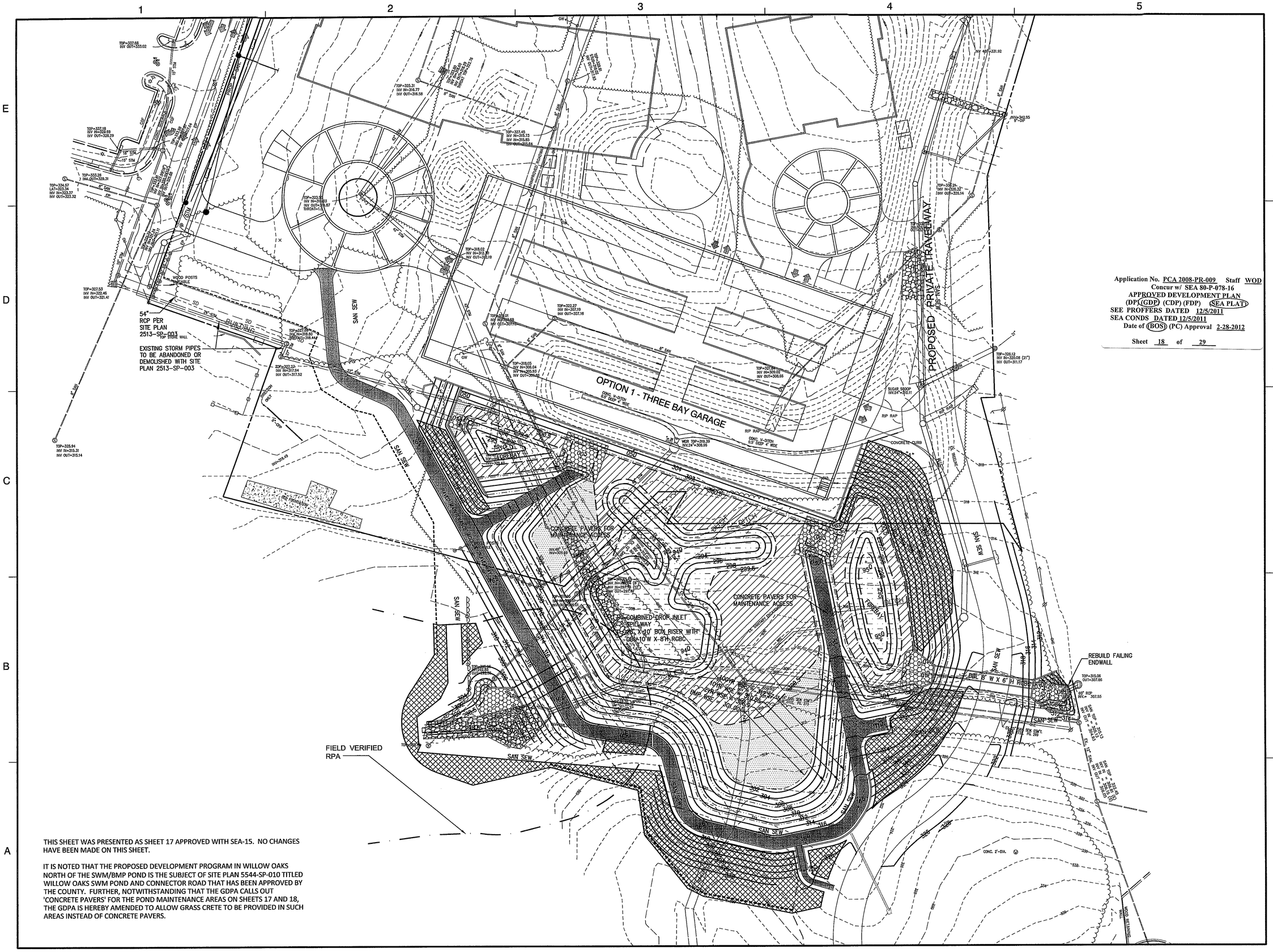
Road Improvement Plan

PROJECT NO.

16

SHEET NO. 16 OF 28

M-10792

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Sheet 18 of 29

THIS SHEET WAS PRESENTED AS SHEET 17 APPROVED WITH SEA-15. NO CHANGES HAVE BEEN MADE ON THIS SHEET.

IT IS NOTED THAT THE PROPOSED DEVELOPMENT PROGRAM IN WILLOW OAKS NORTH OF THE SWM/BMP POND IS THE SUBJECT OF SITE PLAN 5544-SP-010 TITLED WILLOW OAKS SWM POND AND CONNECTOR ROAD THAT HAS BEEN APPROVED BY THE COUNTY. FURTHER, NOTWITHSTANDING THAT THE GDPA CALLS OUT 'CONCRETE PAVERS' FOR THE POND MAINTENANCE AREAS ON SHEETS 17 AND 18, THE GDPA IS HEREBY AMENDED TO ALLOW GRASS CRETE TO BE PROVIDED IN SUCH AREAS INSTEAD OF CONCRETE PAVERS.

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| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY SCC
APPROVED BY PGY
CHECKED BY TCC
DATE April 18, 2011

TITLE

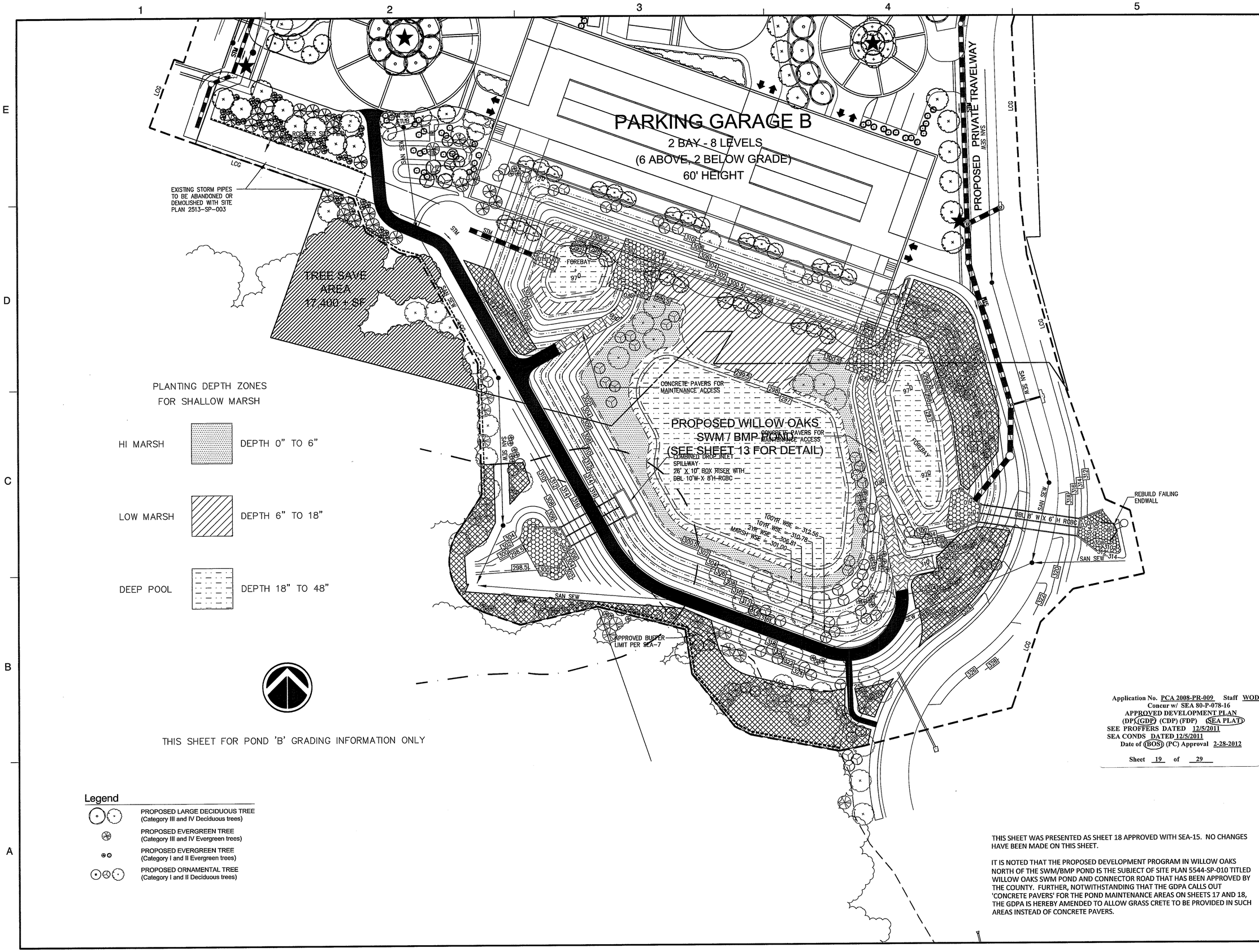
INOVA
Fairfax Hospital Campus
SWM Grading Plan
GDP / SEA

PROJECT NO.

17

SHEET NO. 17 OF 28

M-10792




Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 19 of 29

## Legend

- PROPOSED LARGE DECIDUOUS TREE (Category III and IV Deciduous trees)
- PROPOSED EVERGREEN TREE (Category III and IV Evergreen trees)
- PROPOSED EVERGREEN TREE (Category I and II Evergreen trees)
- PROPOSED ORNAMENTAL TREE (Category I and II Deciduous trees)

THIS SHEET WAS PRESENTED AS SHEET 18 APPROVED WITH SEA-15. NO CHANGES HAVE BEEN MADE ON THIS SHEET.

IT IS NOTED THAT THE PROPOSED DEVELOPMENT PROGRAM IN WILLOW OAKS NORTH OF THE SWM/BMP POND IS THE SUBJECT OF SITE PLAN 5544-SP-010 TITLED WILLOW OAKS SWM POND AND CONNECTOR ROAD THAT HAS BEEN APPROVED BY THE COUNTY. FURTHER, NOTWITHSTANDING THAT THE GDPA CALLS OUT 'CONCRETE PAVERS' FOR THE POND MAINTENANCE AREAS ON SHEETS 17 AND 18, THE GDPA IS HEREBY AMENDED TO ALLOW GRASS CRETE TO BE PROVIDED IN SUCH AREAS INSTEAD OF CONCRETE PAVERS.

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INOVA FAIRFAX HOSPITAL CAMPUS
GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT
PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL
COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLEITON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

KEY PLAN

SCALE
0' 40' 80'

| No. | DATE | BY | Description |
|---|---|---|---|
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY SCC
APPROVED BY PGY
CHECKED BY TCC
DATE April 18, 2011

TITLE
INOVA
Fairfax Hospital Campus
SWM Landscape Plan
GDP / SEA

PROJECT NO.

18

SHEET NO. 18 OF 28

M-10792

## INOVA FAIRFAX HOSPITAL STORMWATER MANAGEMENT NARRATIVE

This plan proposes the expansion of the INOVA hospital facilities and related infrastructure. SWM and BMP will be provided for the proposed improvements. Runoff from the northern portion of the site will be conveyed to the proposed Willow Oaks SWM/BMP Pond (See Inova Willow Oaks SWM Narrative provided herein) and runoff from the southern portion of the site will be conveyed to a maximum of 2 proposed underground (detention only) vaults, identified as SWM Vault 1 and SWM Vault 2. As detailed in this Application, there are 2 development program options for the southern portion of the site. If Option 1 is selected, then it is anticipated that only SWM Vault 1 will be required. If Option 2 is selected, then both SWM Vault 1 and possible SWM Vault 2 will be required. For the purpose of SWM calculations, it is assumed that both SWM Vault 1 and SWM Vault 2 are required as described under Option 2. This is the most conservative scenario for design.

### Detention and BMP

#### Option 1 (WHPT + Redevelopment of Existing Woodburn Place + Willow Oaks Road Improvements)

Under this option, SWM Vault 1, approximately 139' wide x 129' long x 10' high (avg.), will be located beneath the proposed boulevard near the entrance to Woodburn Drive. SWM Vault 1 will provide detention for the WHPT and Redevelopment of Woodburn Place (21.77 acres). The proposed Willow Oaks SWM/BMP Pond will provide detention and BMP for the Willow Oaks Road Improvements to the north of the hospital. The Willow Oaks SWM/BMP Pond is currently in final design under plan # 5544-SP-010-2. As demonstrated by the BMP computations on Sheet 24,BMP for Option 1 improvements can be provided by the proposed Willow Oaks SWM/BMP Pond plus temporary water quality management areas that exist along connector road between Willow Oaks and the hospital campus. This is the preferred approach for BMP and a request would be made to DPWES at Site Plan to defer BMP for Option 1 improvements until the proposed Willow Oaks SWM/BMP Pond is designed and constructed. Alternately, at the Applicant's discretion, BMP could be provided by a sand filter or alternate BMP(s) as allowed by the PFM.

#### Option 2 (WHPT + Redevelopment of Existing Woodburn Place + Willow Oaks Road Improvements + Redevelopment of Existing Woodburn Mental Health Facility

Under this option, SWM Vault 1, approximately 139' wide x 129' long x 10' high (avg.), and possibly SWM Vault 2, approximately 32' wide x 127' long x 11' high (avg.) would need to be constructed. SWM Vault 1 will be located beneath the proposed boulevard near the entrance to Woodburn Drive, and SWM Vault 2 will be located on the existing Mental Health Facility property. These facilities will provide detention for the WHPT, Redevelopment of Woodburn Place, and Redevelopment of Woodburn Mental Health Facility (27.18 acres). The proposed Willow Oaks SWM/BMP Pond will provide detention and BMP for the Willow Oaks Road Improvements to the north of the hospital. The Willow Oaks SWM/BMP Pond is currently in final design under plan # 5544-SP-010-2. As demonstrated by the BMP computations on Sheet 24, BMP for Option 2 improvements can be provided by the proposed Willow Oaks SWM/BMP Pond plus temporary water quality management areas that exist along connector road between Willow Oaks and the hospital campus. This is the preferred approach for BMP and a request would be made to DPWES at Site Plan to defer BMP for Option 2 improvements until the proposed Willow Oaks SWM/BMP Pond is designed and constructed. Alternately, at the Applicant's discretion, BMP could be provided by a sand filter or alternate BMP(s) as allowed by the PFM.

### FLOODPLAIN

There is a regulated minor floodplain on the northern portion of the site at the proposed Willow Oaks SWM Pond (See Willow Oaks SWM Narrative provided in this Application for details on this floodplain).

There is no regulated floodplain on the southern portion of the site.

### LOW IMPACT DEVELOPMENT

The Applicant shall install Fairfax County accepted Low Impact Development (LID) facilities, on the Application Property in at least one of the potential locations shown on this development plan. The LID facilities (pervious pavement or other) shall treat a combined total of 20,000 square feet of impervious surface and shall have a minimum phosphorous removal efficiency of 40 percent. The LID facilities will be designed in accordance with the PFM. These LID facilities are intended as demonstration facilities and shall not factor into the requisite calculations for stormwater management and BMPs.

### PRE-DEV RUNOFF FROM SOUTHERN 27.18 SITE AREA

AREA OF SITE = 27.17 ACRES
RUNOFF COEFFICIENT = 0.30
TIME OF CONCENTRATION (TC) = 15 MIN

### ULTIMATE CONDITION RUNOFF FROM SOUTHERN 27.18 SITE AREA

| ULTIMATE LANDUSE | C | AREA (A) (ACRES) | PRODUCT OF C X A | WEIGHTED C | TC (MIN) |
|---|---|---|---|---|---|
| COMMERCIAL | 0.85 | 23.58 | 20.04 | | |
| EX. PUBLIC ROADS | 0.90 | 1.32 | 1.19 | | |
| PUBLIC ROAD IMPROVEMENTS | 0.90 | 0.34 | 0.31 | | |
| OPEN SPACE | 0.35 | 0.50 | 0.18 | | |
| WOODS TO REMAIN | 0.20 | 1.44 | 0.29 | | |
| | TOTALS = | 27.17 | 22.01 | 0.81 | 5.0 |

### ULTIMATE CONDITION RUNOFF TO PROPOSED UNDERGOUND FACILITIES

| ULTIMATE LANDUSE | C | AREA (A) (ACRES) | PRODUCT OF C X A | TC (MIN) |
|---|---|---|---|---|
| COMMERCIAL TO VAULT 1 | 0.85 | 17.00 | 14.45 | 5.0 |
| COMMERCIAL TO VAULT 2 | 0.85 | 3.80 | 3.23 | 5.0 |

### REQUIRED RUNOFF TO DETAIN FROM ULTIMATE CONDITION SITE AREA

| CONDITION | C | A | I (INCHES/HR) 2-YR | I (INCHES/HR) 10-YR | PEAK FLOW (CFS) 2-YR | PEAK FLOW (CFS) 10-YR | |
|---|---|---|---|---|---|---|---|
| ULTIMATE | 0.81 | 27.18 | 5.45 | 7.27 | 120 | 160 | |
| PRE-DEVELOPMENT | 0.30 | 27.18 | 3.90 | 5.10 | 32 | 42 | |
| | | | | | 88 | 118 | DETENTION REQUIRED |
| FLOW INTO SWM VAULT 1 | 0.85 | 17.00 | 5.45 | 7.27 | 79 | 105 | |
| FLOW OUT OF SWM VAULT 1 (SEE HEC-1 MODEL) | | | | | 5 | 5 | |
| DETENTION PROVIDED IN SWM VAULT 1 → | | | | | 74 | 100 | |
| FLOW INTO SWM VAULT 2 | 0.85 | 3.80 | 5.45 | 7.27 | 18 | 23 | |
| FLOW OUT OF SWM VAULT 2 (SEE HEC-1 MODEL) | | | | | 3 | 4 | |
| DETENTION PROVIDED IN SWM VAULT 1 → | | | | | 15 | 19 | |
| TOTAL DETENTION PROVIDED BY SWM VAULT 1 AND SWM VAULT 2 → | | | | | 89 | 119 | DETENTION PROVIDED |

## INOVA FAIRFAX HOSPITAL STORMWATER OUTFALL NARRATIVE

There are 2 outfall points associated with this development program. One is the outfall downstream of the proposed Willow Oaks SWM/BMP Pond and the second is the outfall downstream of Woodburn Road (See Outfall Maps provided in this Application).

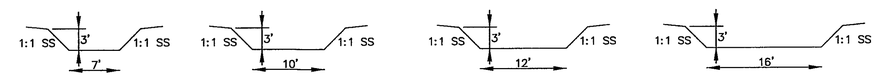
### WILLOW OAKS SWM/BMP POND OUTFALL

(See Inova Willow Oaks SWM Outfall Narrative provided in this Application)

### WOODBURN ROAD OUTFALL

This outfall drains to an existing 48" RCP storm sewer at Woodburn Road. This 48" sewer serves as the receiving pipe for the outfall and has a drainage area of 31.3 acres. The 48" RCP storm sewer flows in a southerly direction for approximately 690 ft beneath the Fairfax County School Board property and outfalls into an existing channel. The existing channel slightly meanders in a southerly direction until it reaches the inlet of an existing 72" RCP storm sewer. Based on field observations, the channel bottom varies between 7-10 ft wide and is approximately 3 ft deep on average. The channel bottom consists mainly of large cobbles, Riprap (Class I), and gravel. The channel banks are steep (1:1 or greater) and lined by a combination of grass and exposed tree roots. The 72" RCP storm sewer is in good shape, has a clean bottom, and there is no evidence of deterioration. Just upstream of the 72" storm sewer an incoming tributary confluences with the outfall. This tributary has a drainage area of 41.0 acres and is greater than 90 % of the area of the receiving pipe. Given this, the downstream extent of review based on PFM 6-0203.2A is 150 ft downstream of this confluence. However, because the Zoning Ordinance is more conservative for determining the downstream extent of review, the downstream extent of review for this development application has been extended and anlayzed down to Accotink Creek where the drainage area is greater than 15 square miles. Downstream of the existing 72" RCP storm sewer the existing channel slightly meanders and has the same channel characteristics as the channel described upstream of the 72" RCP storm sewer with a channel bottom width varying between 10 - 15 ft wide and a depth of 3 ft on average.

Capacity and velocity computations for this outfall are summarized and provided below. A 100-year backwater elevation was determined at the inlet to the existing 72" RCP storm sewer, which is determined to be in inlet control. This backwater does not flood any buildings. Based on these computations and field observations of the outfall, it is the opinion of the engineer that; (1) adequacy of the downstream drainage system is met within the extent of review; (2) that the cross sections shown are reflective of the stream reach analyzed; and (3) that there will be no flooding of existing downstream dwellings, or buildings constructed under an approved building permit, by the 100-year storm event.




SECTION A-A SCALE: 1"=10' | SECTION B-B SCALE: 1"=10' | SECTION C-C SCALE: 1"=10' | SECTION D-D SCALE: 1"=10'

### EX. CHANNEL CAPACITY/VELOCITY SUMMARY – WOODBURN ROAD OUTFALL

| SECTION | CHARACTERISTICS SLOPE (FT/FT) | n-VALUE | WIDTH (FT) | SIDE SLOPE (V:H) | DEPTH (FT) | NORMAL DEPTH (FT) | 2-YR FLOW * (CFS) | VELOCITY ACTUAL (FPS) | VELOCITY PERMISSIBLE ** (FPS) | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|
| A-A | 0.015 | 0.058 | 7.0 | 1:1 | 3.0 | 1.98 | 70 | 3.94 | 5.50 | ADEQUATE FOR CAPACITY AND VELOCITY |
| B-B | 0.015 | 0.058 | 10.0 | 1:1 | 3.0 | 2.39 | 136 | 4.59 | 5.50 | ADEQUATE FOR CAPACITY AND VELOCITY |
| C-C | 0.014 | 0.058 | 12.0 | 1:1 | 3.0 | 3.00 | 231 | 5.13 | 5.50 | ADEQUATE FOR CAPACITY AND VELOCITY |
| D-D | 0.014 | 0.058 | 16.0 | 1:1 | 3.0 | 2.98 | 300 | 5.30 | 5.50 | ADEQUATE FOR CAPACITY AND VELOCITY |

* SEE OUTFALL HEC-1 MODEL NODES "A-A", "4", "5" AND "6" FOR SECTIONS A-A, B-B, C-C, AND D-D, RESPECTIVELY
** PER TABLE 5-22 "PERMISSIBLE VELOCITIES FOR UNLINED EARTHEN CHANNELS" OF THE VIRGINIA EROSION AND SEDIMENT CONTROL HANDBOOK

### EX. STORM SEWER CAPACITY SUMMARY – WOODBURN ROAD OUTFALL

| SEWER | SLOPE (FT/FT) | n-VALUE | DIA. (FT) | NORMAL DEPTH (FT) | 10-YR FLOW * (CFS) | COMMENTS |
|---|---|---|---|---|---|---|
| EX 48" (1) – (2) | 0.0020 | 0.013 | 4.0 | 2.39 | 43 | ADEQUATE FOR CAPACITY |
| EX 48" (2) – (3) | 0.0148 | 0.013 | 4.0 | 1.70 | 66 | ADEQUATE FOR CAPACITY |
| EX 72" STORM | 0.0100 | 0.013 | 6.0 | 2.71 | 178 | ADEQUATE FOR CAPACITY |

* SEE OUTFALL HEC-1 MODEL NODES "1", "2" AND "4" FOR SEWERS EX 48 STORM (1)-(2), EX 48 STORM (2)-(3) AND EX 72 STORM, RESPECTIVELY.

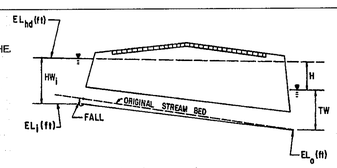
### 100-YR FLOODING ELEVATION AT EX 72" RCP

STRUCTURE: EX 72" STORM

DESIGN FLOWS / TAILWATER

| R.I. (YEARS) | FLOW (CFS) | TW Elev. |
|---|---|---|
| 100-YR | 302 | 295 |

CULVERT TYPE: RCP
ENT. TYPE: SQ. EDGE WITH HE.
NO. OF PIPES = 1
DIAMETER = 6
MANNING'S "N" = 0.013
Ke = 0.5
ELi = 290
ELo = 289
ELtr =
ELsh =
L = 95




| CULVERT DESCRIPTION: MATERIAL-SHAPE-SIZE-ENTRANCE | TOTAL FLOW Q (CFS) | FLOW PER BARREL Q/N | HEADWATER CALCULATIONS – INLET CONTROL HWi/D | HWi | EL(hi) | OUTLET CONTROL TW Depth | dc | (dc+D)/2 | ho | Ke | H | EL(ho) | CONTROL HW ELEV. | APPROX OUTLET VEL. | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 72" dia. RCP | 302 | 302 | 1.42 | 8.54 | 298.54 | 6.00 | 4.78 | 5.39 | 6.00 | 0.5 | 3.14 | 298.14 | 298.54 | 10.68 | I.C. |

TECHNICAL FOOTNOTES :

1) HWi BASED ON POLYNOMIAL BEST-FIT EQUATIONS FROM THE FHA PUBLICATION ENTITLED CALCULATOR DESIGN SERIES #3

2) HWi MAY NOT BE ACCURATE FOR VALUES < 0.5D AND > 4.5D

3) EL(hi) = HWi + ELi (INVERT OF INLET CONTROL SECTION)

4) TW BASED ON DOWNSTREAM CONTROL OR FLOW DEPTH IN CHANNEL

5) ho = TW OR (dc+D)/2 WHICHEVER IS GREATER

6) H = (1 + Ke + (29 n^2 L) / R^1.33) V^2 / 2g

7) EL(ho) = ELo + H + ho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INOVA FAIRFAX HOSPITAL CAMPUS
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Sheet 20 of 29

SCALE

| No. | DATE | BY | Description |
|---|---|---|---|
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
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| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

TITLE
INOVA
Fairfax Hospital Campus
SWM and Outfall Narratives
GDP / SEA

PROJECT NO.

19

SHEET NO. 19 OF 28

M-10792

## INOVA WILLOW OAKS

## STORMWATER MANAGEMENT NARRATIVE

The INOVA Willow Oaks site is located in the Accotink Creek watershed. The existing site is mostly undeveloped woods. There are two existing dry ponds on the site: Pond A and Pond B, a quasi-regional pond. This plan proposes the development of the Willow Oaks. SWM is required for the proposed improvements in the form of quality and quantity control. Runoff from the site will be conveyed to an enhanced extended detention dry pond hereinafter referred to as the Willow Oaks SWM/BMP Pond.

**Existing Conditions – Pond A and Pond B**

Existing Pond B is located on the site east of Williams Drive and south of Willow Oaks Corporate Center Drive. This pond was designed by Rinker-Detwiler and Associates, P.C. in 1986 (Plan #6295-SP-01-2) and is one of the first "regional" facilities constructed in the County. It was designed as a detention only dry pond and currently does not provide BMP. New development in the watershed of Pond B is currently covered for detention, but BMP must be provided by other means (i.e. sand filters, dedicated conservation easements, etc.). In comparison to today's PFM requirements for pond facilities, criteria used in designing Pond B are outdated. For example, the hydrology used to size the outlet works, emergency spillway and set the top of dam are all based on 2-hour storm durations. Under current PFM criteria this is acceptable for drainage areas less than 20 acres but Pond B has a drainage area of approximately 130.1 acres. The outlet works of Pond B consists of a riser with outlet conduit and an emergency spillway placed in the fill section of the dam, which is armored by riprap covered by approximately 1'-2' of earth.

Immediately north and adjacent to existing Pond B is Pond A. Pond A, which drains into Pond B, is also a detention only dry pond. Pond A was designed in accordance with current PFM criteria by Dewberry in 1993 (Plan # 5544-SP-04). The outlet works of Pond A consists of a combined drop inlet principle/emergency spillway including a riser and outlet conduit. Willow Oaks, Bedford Village, north end of INOVA Fairfax Hospital Campus, and some businesses along Williams Drive as well as parts of VA Route 50 all drain to existing Pond A and/or Regional Pond B.

**Proposed Willow Oaks SWM/BMP Pond**

As part of this development application, it is proposed that existing Pond A and Pond B be combined into one SWM/BMP facility that consists of an enhanced extended detention dry pond that meets current PFM design criteria. The proposed facility will be privately owned and maintained. The proposed facility will include sediment forebays at major inflow points and a shallow marsh area consisting of a micro pool as well as high and low marshes. The outlet works will consist of a combined drop inlet principle/emergency spillway in the form of a riser and outlet conduit. The proposed dam embankment will be approximately 18' high with less than 50 ac-ft of storage to the top of the dam and will not be State regulated. Concept grading plans of the proposed facility are provided in this application.

The proposed facility is designed to provide peak flow reduction for the 2- and 10-year storms from developed conditions to good forested conditions for the entire 130.1 acre watershed it serves. Further, the proposed facility is designed to exceed the minimum phosphorous removal requirement for the 130.1 acre watershed it serves by providing 50 % phosphorous removal efficiency - the minimum required is 40 % for this particular location in the County. As demonstrated by the phosphorous removal computations provided, the proposed facility provides enough BMP to cover the entire 130.1 acre watershed it serves (including the INOVA Willow Oaks site) plus the INOVA Fairfax Hospital site. Though the southern portion of the INOVA Fairfax Hospital site along Woodburn Road does not drain to the proposed facility, BMP credit is requested as part of the INOVA Fairfax Hospital development application in lieu of having to design, build and maintain large sand filter systems.

Willow Oaks SWM/BMP Detention Summary

| | Drainage Area (acres) | Peak Flow (cfs) 2-year | Peak Flow (cfs) 10-year |
|---|---|---|---|
| Good Forested Conditions | 130.1 | 39 | 173 |
| Ultimate Conditions | 130.1 | | |
| • Into proposed facility | | 345 | 636 |
| • Out of proposed facility | | 34 | 106 |
| Over-detention provided | | 5 | 67 |

Willow Oaks SWM/BMP Water-Surface Elevation Summary

| | Combined PSW/ESW PSW Top | ESW Top | Dam Top | WSE | Freeboard |
|---|---|---|---|---|---|
| Marsh pool | 307.00 ft | 310.75 ft | 316.62 ft | 301.00 ft | 15.62 ft |
| BMP pool | 307.00 ft | 310.75 ft | 316.62 ft | 304.50 ft | 12.12 ft |
| 2-year pool | 307.00 ft | 310.75 ft | 316.62 ft | 306.81 ft | 9.81 ft |
| 10-year pool | 307.00 ft | 310.75 ft | 316.62 ft | 310.78 ft | 5.84 ft |
| 100-year pool | 307.00 ft | 310.75 ft | 316.62 ft | 312.56 ft | 4.06 ft |
| 1.5 x 100-year pool (S.D.F.) | 307.00 ft | 310.75 ft | 316.62 ft | 314.60 ft | 2.02 ft |
| 2.5 x 100-year pool (F.B.H) | 307.00 ft | 310.75 ft | 316.62 ft | 316.19 ft | 0.43 ft |

Where: PSW = Principal Spillway ESW = Emergency Spillway WSE = Water-surface elevation

**Floodplain**

There is a regulated minor floodplain onsite at the proposed Willow Oaks SWM/BMP Pond. Accordingly, a Floodplain Study will be prepared and submitted at Site Plan. The proposed Willow Oaks SWM/BMP Pond will reflect a decrease in its 100-year flood elevation when compared to existing conditions and will not impact adjacent properties. This decrease is a result of increased storage and spillway capacity associated with the proposed facility. A summary of the 100-year water-surface elevations is provided as follows:

100-Year Water-Surface Elevation Summary

| | | |
|---|---|---|
| Existing Pond A | 316.28 ft | See Existing Conditions HEC-1 Model |
| Existing Regional Pond B | 313.69 ft | See Existing Conditions HEC-1 Model |
| Proposed Willow Oaks SWM/BMP Pond | 312.56 ft | See Ultimate Conditions HEC-1 Model |

## INOVA WILLOW OAKS

## STORMWATER OUTFALL NARRATIVE

**Description of Existing Outfall**

The Willow Oaks development has one outfall The outfall channel begins at the proposed Willow Oaks SWM/BMP pond and proceeds in a southerly direction approximately 4,500 feet where it confluences with Accotink Creek. At Accotink Creek the drainage area is approximately 15 square miles. Based on field observations, the channel is predominantly natural channel, lightly meandering, 10'-15' wide bottom width, varying 3'-4' deep, and steep side slopes (1:1) Approximately 1500' of the outfall channel located just upstream of the Highland Lane culvert crossing was improved to reflect riprap and gabions to create an engineered rectangular channel. In addition, the Highland Lane culvert was upgraded to a triple 6' x 6' box culvert as part of that project. There are no signs of erosion at either the inlet or outlet of this culvert. These channel and culvert improvements were implemented by the County as recommended in the Parsons Brinckerhoff, Quade & Douglas report entitled, "Accotink Creek Watershed Immediate Action Plan", dated April 1978. Downstream of Highland Lane, the channel is natural and ends at Accotink Creek.

**Description of Outfall Adequacy Requirements**

In an effort to exceed minimum PFM requirements, NRCS Hydrology was used with a 24-hour duration storm for the 2-, 10- and 100-year events. This exceeds the minimum 2-hour duration storm as given under PFM section 6-1301.5. Using NRCS Hydrology, a rainfall-runoff model was developed using HEC-1 to determine 2-, 10- and 100-year peak flows at multiple points along the site outfall. Cross section computations for permissible velocity and channel capacity assuming normal depth were performed and the Highland Road culvert was checked for capacity and freeboard. In addition, the 100-year flood elevation was determined for each cross section and the resulting 100-year floodplain was mapped. The limits of the site outfall studied, cross section locations, and developed 100-year floodplain limits are provided in this Application. Under developed conditions (i.e. proposed Willow Oaks SWM/BMP facility with fully developed watershed), the outfall analysis reflects 5 key points:

1. All representative cross sections are adequate in terms of permissible velocity for the 2-yr storm.
2. All representative cross sections are adequate in terms of channel capacity with the exception of cross section 4 that represents the existing gabion-lined channel located just upstream of Highland Road. Here the 10-year storm is determined to be out of bank while the 2-year storm is contained.
3. All representative cross sections are adequate in terms of 100-year flooding with the exception of cross section 4 that represents the existing gabion-lined channel located just upstream of Highland Road. Here the 100-year floodplain encroaches on a single home.
4. The Highland Road culvert crossing is adequate for 10-year capacity and freeboard.
5. Even if the proposed Willow Oaks SWM/BMP facility could be designed to have infinite capacity, analysis confirms that the 10-year storm would still remain out of bank as described under point 2, and the home identified under point 3 would still flood at cross section 4. The analysis shows that this condition exists because the drainage that accumulates downstream of the Willow Oaks SWM/BMP facility is sufficient enough for the 10-year storm to exceed the capacity of the gabion-lined channel and also cause 100-year flooding of the home.

Given point 5 above, it can be concluded that increasing storage capacity at the proposed Willow Oaks SWM/BMP facility will not solve the existing 10-year capacity and 100-year flooding issues at the gabion-lined channel reflected by cross section 4. For these reasons it is appropriate to apply the concept of "no adverse impact and proportional improvement". That said the channel capacity method (PFM section 6-0203.4B) and 100-year flooding method (PFM section 6-0203.5) were used to evaluate proportional improvements. The proportional improvement computations for cross section 4 are found on this sheet.

The outfall analysis demonstrates that the proposed Willow Oaks SWM/BMP facility provides the required detention to demonstrate no adverse impact and proportional improvement for channel capacity and 100-year flooding at cross section 4. For these reasons, it is our judgment that the site outfall downstream of the development site together with the proposed Willow Oaks SWM/BMP facility function as an acceptable drainage system in accordance with criteria set forth in the PFM.

A summary of the natural and manmade channel adequacy along the study reach is given in Tables 1, 2 and 3 below.

Table 1 – Channel Capacity Check (Developed Conditions)

| Section | Channel n-value | Max Capacity (cfs) | Flow (cfs) | Comments |
|---|---|---|---|---|
| 1 (natural) | 0.045 [A] | 662 | 49 (2-yr) | capacity is adequate |
| 2 (natural) | 0.045 [A] | 374 | 98 (2-yr) | capacity is adequate |
| 3 (natural) | 0.045 [A] | 226 | 187 (2-yr) | capacity is adequate |
| **4 (gabions)** | **0.037 [B]** | **307** | **499 (10-yr)** | **capacity not adequate [D]** |
| 5 (natural) | 0.058 [C] | 246 | 216 (2-yr) | capacity is adequate |
| 6 (natural) | 0.058 [C] | 269 | 216 (2-yr) | capacity is adequate |

Table 2 – Channel Velocity Check (Developed Conditions)

| Section | Permissible Velocity (fps) | Velocity (fps) | Comments |
|---|---|---|---|
| 1 (natural) | 5.5 [E] | 2.8 (2-yr) | velocity is adequate |
| 2 (natural) | 5.5 [E] | 3.6 (2-yr) | velocity is adequate |
| 3 (natural) | 5.5 [E] | 4.0 (2-yr) | velocity is adequate |
| 4 (gabions) | >8.0 | 6.2 (2-yr) | velocity is adequate |
| 5 (natural) | 5.5 [E] | 4.0 (2-yr) | velocity is adequate |
| 6 (natural) | 5.5 [E] | 3.7 (2-yr) | velocity is adequate |

Table 3 – 100-Year Water-Surface Elevation at Outfall Sections

| Section | WSEL (ft) | Section | WSEL (ft) |
|---|---|---|---|
| 1 | 299.36 | **4** | **284.92 [F] (100-year floods single home at Sec. 4)** |
| 2 | 293.49 | 5 | 274.86 |
| 3 | 289.54 | 6 | 269.08 |

Where:

A : n = n1 + n2 + n3 + n4 + n5 + n6 = 0.02 + 0.010 + 0.00 + 0.01 + 0.005 + 0.00 = 0.045 (per Tables 5-16 - 5-21 of VA E&S Control Handbook)
B : n = 0.037 = weighted average of gabion sides (n=0.030) and stone bottom (n=0.045)
C : n = n1 + n2 + n3 + n4 + n5 + n6 = 0.02 + 0.010 + 0.005 + 0.01 + 0.005 + 0.0075 = 0.058 (per Tables 5-16 - 5-21 of VA E&S Control Handbook)
D : See computations for demonstration of no adverse impact and proportional improvement for channel capacity.
E : Per Table 5-22 of VA E&S Control Handbook for field verified soil type of Graded, Silt to Cobbles (noncolloidal).
F : See computations for demonstration of no adverse impact and proportional improvement for 100-year flooding.

**Opinion of Outfall Adequacy**

Based on these computation and field observations of the outfall, it is the opinion of the engineer that:

1. Cross sections shown are reflective of the stream reach analyzed.
2. Adequacy of the downstream drainage system is met within the extent of review and the proposed Willow Oaks SWM/BMP facility provides the required detention to demonstrate no adverse impact and proportional improvement for 10-year channel capacity and 100-year flooding at cross section 4 where the 10-year storm is out of bank and a single home is flooded by the 100-year storm.
3. There will be no flooding of existing downstream dwellings, or buildings constructed under an approved building permit by the 100-year storm event with the exception of the home described under point 2 above.

**WILLOW OAKS OUTFALL ANALYSIS FOR PROPOSED SWM/BMP POND**
**PROPORTIONAL IMPROVEMENT**
**CHANNEL CAPACITY METHOD**

**INADEQUATE CAPACITY SECTION 4**

**GIVEN:**

| | | | | |
|---|---|---|---|---|
| Ad | = | Contributing drainage area of site | = | 21.55 acres |
| Acs | = | Contributing drainage area to section | = | 267.4 acres |
| CNd | = | Post run-off curve number for site | = | 89 |
| CNcs | = | Existing runoff curve number to section | = | 83 |

**THE CORRESPONDING PROPORTIONAL IMPROVEMENT IS CALCULATED AS:**

$$Pi = \frac{Cd\ Ad}{Ccs\ Acs} \times 100$$

Johnson and Meadows (1980) had developed and equation for converting CN values to C value:

$$C = 1 - \frac{S\,[1.2 - S/(P+0.8S)]}{P}$$

where: $S = (1000/CN) - 10$

| STORM EVENT | 2-YR | OVERTOPPING | 10-YR |
|---|---|---|---|
| P (inches) | 3.20 | 3.30 | 5.20 |
| CNd | 89 | 89 | 89 |
| Sd (inches) | 1.236 | 1.236 | 1.236 |
| Cd | 0.65 | 0.66 | 0.76 |
| CNcs | 83 | 83 | 83 |
| Scs | 2.0482 | 2.0482 | 2.0482 |
| Ccs | 0.50 | 0.51 | 0.65 |
| Ad (acres) | 21.55 | 21.55 | 21.55 |
| Acs (acres) | 267.40 | 267.40 | 267.40 |
| Existing peak flow at section (cfs) | 234.00 | 250.00 | 568.00 |
| Pi (%) | 10.48 | 10.43 | 9.42 |
| Allowable peak flow at section (cfs) | 209 | 224 | 514 |
| Provided peak flow at section (cfs) | 187 | 202 | 499 |

**WILLOW OAKS OUTFALL ANALYSIS FOR PROPOSED SWM/BMP POND**
**PROPORTIONAL IMPROVEMENT**

**100-YR FLOODING AT SECTION 4**

**GIVEN:**

| | | | | |
|---|---|---|---|---|
| Ad | = | Contributing drainage area of site | = | 21.55 acres |
| Acs | = | Contributing drainage area to section | = | 267.4 acres |
| CNd | = | Post run-off curve number for site | = | 89 |
| CNcs | = | Existing runoff curve number to section | = | 83 |

**THE CORRESPONDING PROPORTIONAL IMPROVEMENT IS CALCULATED AS:**

$$Pi = \frac{Cd\ Ad}{Ccs\ Acs} \times 100$$

Johnson and Meadows (1980) had developed and equation for converting CN values to C value:

$$C = 1 - \frac{S\,[1.2 - S/(P+0.8S)]}{P}$$

where: $S = (1000/CN) - 10$

| STORM EVENT | 100-YR |
|---|---|
| P (inches) | 7.30 |
| CNd | 89 |
| Sd (inches) | 1.236 |
| Cd | 0.82 |
| CNcs | 83 |
| Scs | 2.0482 |
| Ccs | 0.73 |
| Ad (acres) | 21.55 |
| Acs (acres) | 267.40 |
| Existing peak flow leaving pond (cfs) | 594.00 |
| Pi (%) | 9.05 |
| Allowable peak flow leaving pond (cfs) | 540 |
| Provided peak flow leaving pond (cfs) | 532 |
| Pre-dev. peak flow at section 4 (cfs) | 1165 |
| Post-dev. peak flow at section 4 (cfs) | 1078 |

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

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

This information is required under the following Zoning Ordinance paragraphs:

| | |
|---|---|
| Special Permits (8-011 2J & 2L) | Special Exceptions (9-011 2J & 2L) |
| Cluster Subdivision (9-615 1G & 1N) | Commercial Revitalization Districts (9-622 2A (12) & 14)) |
| Development Plans PRC District (16-302 3 & 4L) | PRC Plan (16-303 1E & 1Q) |
| 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 4,5,6.

☒ 3. Provide:

| Facility Name/ Type & No. | On-site area served (acres) | Off-site area served (acres) | Drainage area (acres) | Footprint area (sf) | Storage Volume (cf) | If pond, dam height (ft) |
|---|---|---|---|---|---|---|
| Dry Pond (e.g. dry pond A, infil, trench, underground, vault, etc.) | 19.91 | 110.19 | 130.1 | 206,200 | 1,897,800 | 18' |
| SWM Vault 1 | 21.77 | 0 | 17.0 | 16,800 | 183,000 | NA |
| SWM Vault 2 | 5.40 | 0 | 3.8 | 4,100 | 44,700 | NA |
| Totals | 47.08 | 110.19 | 150.9 | 226,900 | 2,125,500 | 18' |

☒ 4. Onsite drainage channels, outfalls and pipe systems are shown on Sheet 5,6. Pond inlet and outlet pipe systems are shown on Sheet 2,1.

☒ 5. Maintenance access (road) to stormwater management facility(ies) are shown on Sheet 4,5,6. Type of maintenance access road surface noted on the plat is 4,5,6 (e.g. asphalt, geoblock, gravel, etc.).

☒ 6. Landscaping and tree preservation shown in and near the stormwater management facility is shown on Sheet 4,5,6.

☒ 7. A stormwater management narrative which contains a description of how detention and best management practice requirements will be met is provided on Sheet 20.

☒ 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 20.

☒ 9. A description of how the outfall requirements, including contributing drainage areas of the Public Facilities Manual will be satisfied is provided on Sheet 20.

☒ 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 2.

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

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

Industry Letter 05-03 dated 02/02/05

NOTE:

THIS DEVELOPMENT APPLICATION REFLECT TWO (2) OUTFALLS: ONE AT WOODBURN ROAD, AND ONE AT WILLOW OAKS. THE NARRATIVES AND COMPUTATIONS GIVEN ON THIS SHEET WERE TAKEN FROM PCA 87-P-038-04 AND PROVIDED HERE FOR INFORMATION PURPOSES ONLY TO ADDRESS SWM, BMP AND OUTFALL ADEQUACY REQUIREMENTS FOR THE WILLOW OAKS OUTFALL.

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 21 of 29

**THIS SHEET WAS PRESENTED AS SHEET 20 APPROVED WITH SEA-15. NO CHANGES HAVE BEEN MADE ON THIS SHEET.**


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INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

KEY PLAN

SCALE

| No. | DATE | BY | Description |
|---|---|---|---|
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

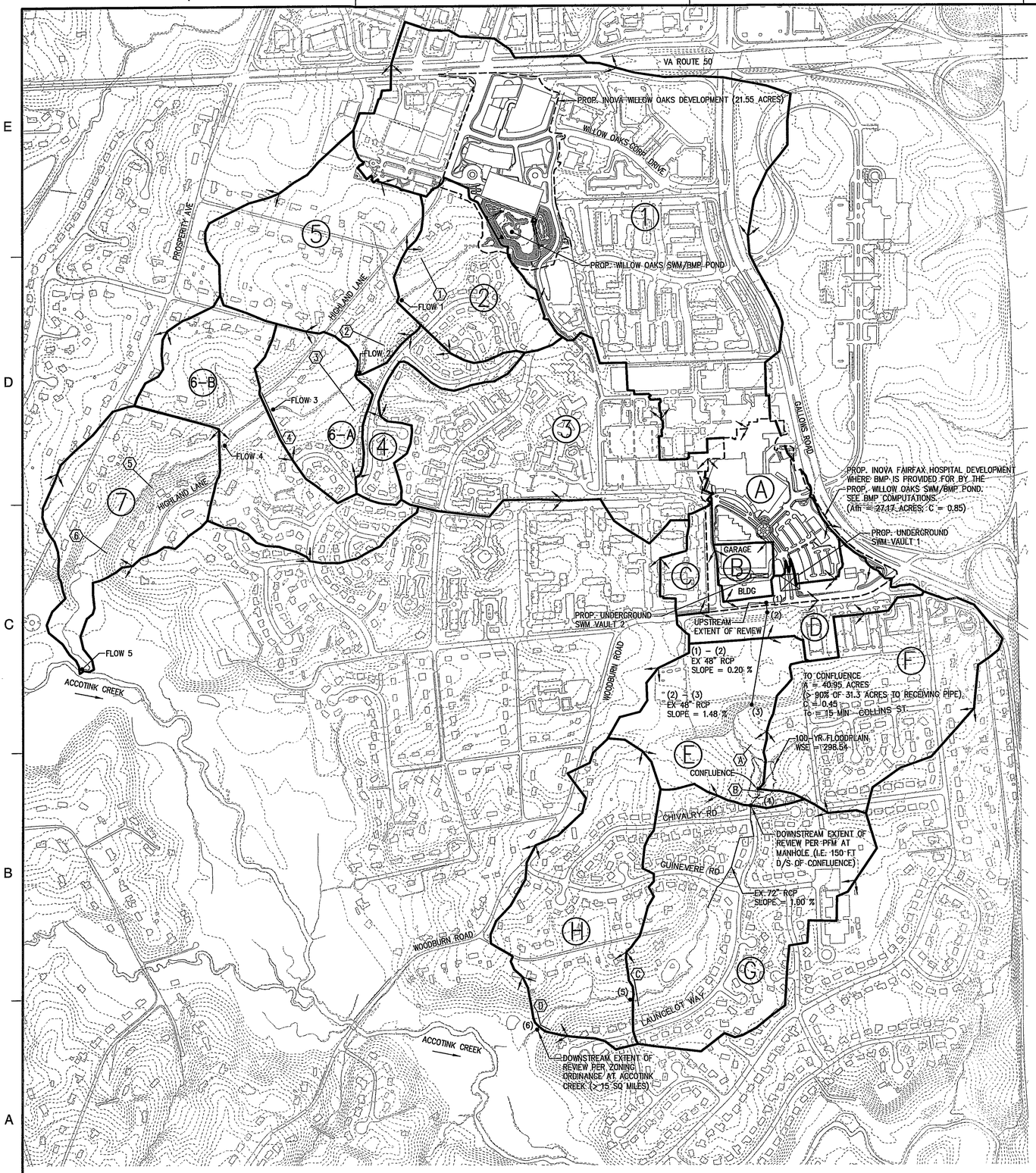
TITLE
INOVA
Fairfax Hospital Campus
SWM and Outfall Narratives
GDP / SEA

PROJECT NO.

20

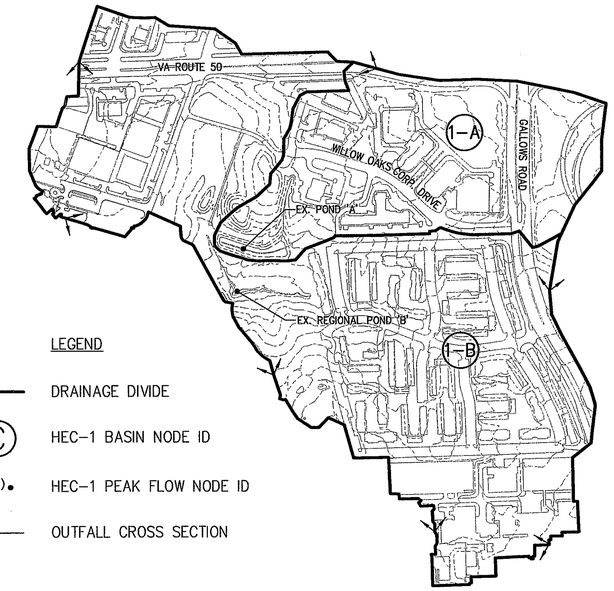
SHEET NO. 20 OF 28

M-10792




DEVELOPED CONDITIONS TO PROPOSED WILLOW OAKS SWM/BMP POND, UNDERGROUND SWM VAULTS AND OUTFALLS TO ACCOTINK CREEK

SCALE: 1" = 400'




LEGEND

- DRAINAGE DIVIDE
- 1 C — HEC-1 BASIN NODE ID
- FLOW 3 (1) — HEC-1 PEAK FLOW NODE ID
- 3 — OUTFALL CROSS SECTION

EXISTING CONDITIONS TO EXISTING REGIONAL POND 'B'

SCALE: 1" = 400'

HYDROLOGIC DATA

| HEC-1 BASIN NODE ID | ACRES | RCN | Tc (min) |
|---|---|---|---|
| 1-A | 37.1 | 84 | 10 |
| 1-B | 93.0 | 87 | 10 |
| 1 (FORESTED) | 130.1 | 62 | 25 |
| 1 (DEVELOPED) | 130.1 | 89 | 10 |
| 2 | 21.7 | 75 | 10 |
| 3 | 51.1 | 82 | 10 |
| 4 | 10.2 | 73 | 10 |
| 5 | 37.3 | 77 | 15 |
| 6-A | 17.0 | 77 | 10 |
| 6-B | 33.6 | 71 | 15 |
| 7 | 30.7 | 73 | 10 |

NRCS 24-HOUR PEAK FLOW SUMMARY ALONG WILLOW OAKS OUTFALL TO ACCOTINK CREEK

| | 2-YEAR | | 10-YEAR | | 100-YEAR | |
|---|---|---|---|---|---|---|
| LOCATION ** | PRE-DEV | POST-DEV | PRE-DEV | POST-DEV | PRE-DEV | POST-DEV |
| FLOW-1 | 96 | 49 | 278 | 136 | 689 | 600 |
| FLOW-2 | 145 | 98 | 362 | 251 | 877 | 789 |
| FLOW-3 | 234 | 187 | 568 | 499 | 1165 | 1078 |
| FLOW-4 | 257 | 209 | 624 | 564 | 1255 | 1165 |
| FLOW-5 | 263 | 216 | 628 | 558 | 1230 | 1145 |

** LOCATIONS SHOWN ON MAP THIS SHEET. ALSO REFER TO EXISTING AND ULTIMATE CONDITIONS HEC-1 MODELS PROVIDED IN THIS APPLICATION.

DEVELOPED CONDITIONS C-FACTOR TO PROP. WILLOW OAKS SWM/BMP POND

| LAND USE | IMP (%) | ACRES | IMP x ACRES |
|---|---|---|---|
| COMMERCIAL | 85 | 70.40 | 5984.0 |
| OPEN SPACE | 15 | 14.96 | 224.4 |
| TOWNHOMES | 70 | 34.57 | 2419.9 |
| MAJOR ROADS | 100 | 10.17 | 1017.0 |
| | | 130.1 | 9645.3 IMP = 74 % |

C = 0.05 + 0.009 (IMP) = 0.05 + 0.009 (74) = 0.72

HYDROLOGIC DATA

| HEC-1 BASIN NODE ID | ACRES | C | CA | Tc (min) |
|---|---|---|---|---|
| A | 17.0 | 0.85 | 14.45 | 5 |
| B | 3.8 | 0.85 | 3.23 | 5 |
| C | 10.5 | 0.60 | 6.30 | 10 |
| D | 8.8 | 0.55 | 4.84 | 5 |
| E | 25.5 | 0.30 | 7.65 | 20 |
| F | 41.0 | 0.45 | 18.45 | 15 |
| G | 54.4 | 0.45 | 24.48 | 15 |
| I | 39.0 | 0.45 | 17.55 | 15 |

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
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(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 22 of 29

**THIS SHEET WAS PRESENTED AS SHEET 21 APPROVED WITH SEA-15. NO CHANGES HAVE BEEN MADE ON THIS SHEET.**


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KEY PLAN

SCALE

AS SHOWN

| No. | DATE | BY | Description |
|---|---|---|---|
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| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY SCC
APPROVED BY PGY
CHECKED BY TCC
DATE April 18, 2011

TITLE

INOVA
Fairfax Hospital Campus
Outfall Map
GDP / SEA

PROJECT NO.

21

SHEET NO. 21 OF 28

M-10792

WILLOW OAKS OUTFALL ANALYSIS – CROSS SECTION COMPUTATION SUMMARY

| Label | Discharge ($ft^3/s$) | Channel Slope (ft/ft) | Roughness Coefficient | Normal Depth (ft) | Water Surface Elevation (ft) | Velocity (ft/s) |
|---|---|---|---|---|---|---|
| Cross Section 1: MAX Q | 662.45 | 0.01000 | 0.045 | 4.18 | 297.83 | 6.72 |
| Cross Section 1: 2YR | 49.00 | 0.01000 | 0.045 | 1.11 | 294.76 | 2.80 |
| Cross Section 1: 100YR | 600.00 | 0.01000 | 0.087 | 5.71 | 299.36 | 2.64 |
| Cross Section 2: MAX Q | 373.55 | 0.00770 | 0.045 | 4.10 | 291.73 | 5.49 |
| Cross Section 2: 2YR | 98.00 | 0.00770 | 0.045 | 2.10 | 289.73 | 3.64 |
| Cross Section 2: 100YR | 789.00 | 0.00770 | 0.075 | 5.86 | 293.49 | 3.41 |
| Cross Section 3: MAX Q | 225.69 | 0.00650 | 0.045 | 3.12 | 287.15 | 4.20 |
| Cross Section 3: 2YR | 187.00 | 0.00650 | 0.045 | 2.85 | 286.88 | 3.98 |
| Cross Section 3: 100YR | 1078.00 | 0.00650 | 0.053 | 5.51 | 289.54 | 3.51 |
| Cross Section 4: MAX Q | 307.44 | 0.01040 | 0.037 | 3.95 | 282.60 | 7.28 |
| Cross Section 4: 2YR | 187.00 | 0.01040 | 0.038 | 3.01 | 281.66 | 6.21 |
| Cross Section 4: 10YR | 499.00 | 0.01040 | 0.030 | 5.09 | 283.74 | 5.40 |
| Cross Section 4: 100YR | 1078.00 | 0.01040 | 0.046 | 6.27 | 284.92 | 4.39 |
| Cross Section 5: MAX Q | 246.33 | 0.00800 | 0.058 | 3.50 | 273.01 | 4.22 |
| Cross Section 5: 2YR | 216.00 | 0.00800 | 0.058 | 3.26 | 272.77 | 4.05 |
| Cross Section 5: 100YR | 1145.00 | 0.00800 | 0.078 | 5.35 | 274.86 | 3.39 |
| Cross Section 6: MAX Q | 268.73 | 0.00800 | 0.058 | 3.35 | 267.12 | 3.98 |
| Cross Section 6: 2YR | 216.00 | 0.00800 | 0.058 | 3.01 | 266.78 | 3.69 |
| Cross Section 6: 100YR | 1145.00 | 0.00800 | 0.067 | 5.31 | 269.08 | 3.41 |

## HY-8 Culvert Analysis Report for Highland Lane

**Site Data - 3-6X6 BOX AT HIGHLAND LANE**

Site Data Option: Culvert Invert Data
Inlet Station: 0.00 ft
Inlet Elevation: 274.71 ft
Outlet Station: 42.00 ft
Outlet Elevation: 274.50 ft
Number of Barrels: 3

**Culvert Data Summary - 3-6X6 BOX AT HIGHLAND LANE**

Barrel Shape: Concrete Box
Barrel Span: 6.00 ft
Barrel Rise: 6.00 ft
Barrel Material: Concrete
Barrel Manning's n: 0.0130
Inlet Type: Conventional
Inlet Edge Condition: 1:1 Bevel (45° flare) Wingwall
Inlet Depression: None

**Roadway Data for Crossing: EX HIGHLAND LANE**

Roadway Profile Shape: Irregular Roadway Shape (coordinates)
Irregular Roadway Cross-Section:

| Coord No. | Station (ft) | Elevation (ft) |
|---|---|---|
| 1 | 0.00 | 295.61 |
| 2 | 7.00 | 294.56 |
| 3 | 45.00 | 290.31 |
| 4 | 84.00 | 286.22 |
| 5 | 124.00 | 283.64 |
| 6 | 164.00 | 282.51 |
| 7 | 203.00 | 282.78 |
| 8 | 240.00 | 283.85 |
| 9 | 277.00 | 285.06 |
| 10 | 287.00 | 285.52 |
| 11 | 321.00 | 287.63 |
| 12 | 357.00 | 290.10 |
| 13 | 394.00 | 293.12 |
| 14 | 429.00 | 296.75 |

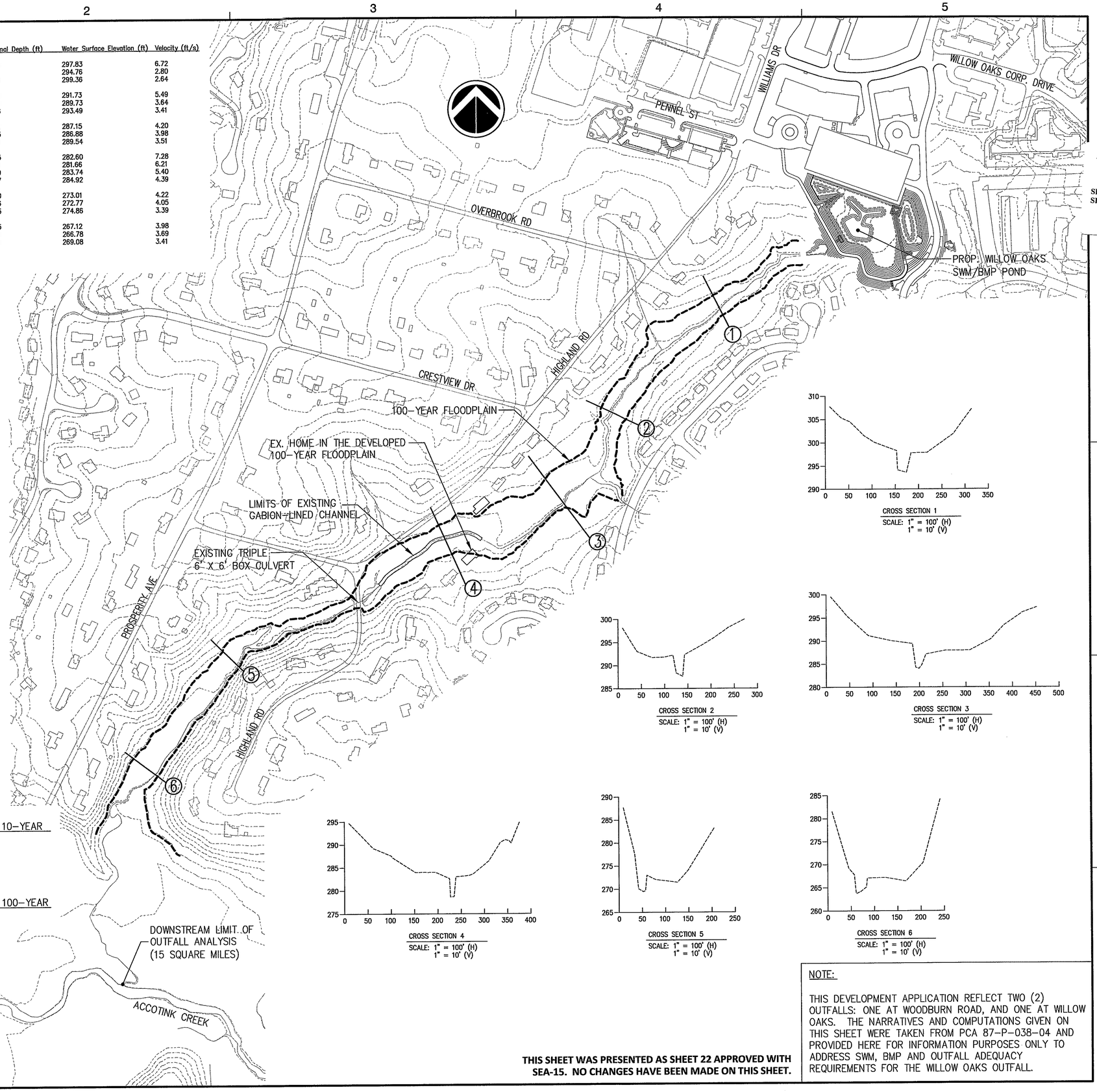
Roadway Surface: Paved
Roadway Top Width: 15.00 ft

**Culvert Summary Table: 3-6X6 BOX AT HIGHLAND LANE**

| Total Discharge (cfs) | Culvert Discharge (cfs) | Headwater Elevation (ft) | Inlet Control Depth (ft) | Outlet Control Depth (ft) | Flow Type | Normal Depth (ft) | Critical Depth (ft) | Outlet Depth (ft) | Tailwater Depth (ft) | Outlet Velocity (ft/s) | Tailwater Velocity (ft/s) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0.00 | 0.00 | 274.71 | 0.000 | 0.000 | 0-NF | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| 116.50 | 116.50 | 276.60 | 1.624 | 1.893 | 1-S1t | 0.959 | 1.094 | 1.808 | 1.798 | 3.580 | 3.066 |
| 233.00 | 233.00 | 277.65 | 2.578 | 2.938 | 1-S1t | 1.558 | 1.737 | 2.620 | 2.610 | 4.940 | 3.870 |
| 349.50 | 349.50 | 278.50 | 3.404 | 3.793 | 1-S1t | 2.081 | 2.276 | 3.251 | 3.241 | 5.973 | 4.409 |
| 466.00 | 466.00 | 279.25 | 4.177 | 4.544 | 1-S1t | 2.559 | 2.757 | 3.777 | 3.767 | 6.855 | 4.770 |
| 564.00 | 564.00 | 279.83 | 4.790 | 5.121 | 1-S1t | 2.983 | 3.131 | 4.160 | 4.150 | 7.532 | 4.924 |
| 699.00 | 699.00 | 280.57 | 5.604 | 5.857 | 1-S1t | 3.485 | 3.612 | 4.622 | 4.612 | 8.402 | 5.038 |
| 815.50 | 815.50 | 281.18 | 6.301 | 6.454 | 5-S1t | 3.924 | 4.003 | 4.974 | 4.964 | 9.109 | 5.091 |
| 932.00 | 932.00 | 281.73 | 7.009 | 7.023 | 5-S1t | 4.357 | 4.376 | 5.292 | 5.282 | 9.784 | 5.130 |
| 1048.50 | 1048.50 | 282.45 | 7.745 | 7.571 | 7-M1t | 4.783 | 4.733 | 5.582 | 5.572 | 10.435 | 5.163 |
| 1165.00 | 1132.10 | 283.01 | 8.285 | 7.966 | 7-M1t | 5.085 | 4.982 | 5.842 | 5.832 | 10.766 | 5.208 |

10–YEAR

100–YEAR




**THIS SHEET WAS PRESENTED AS SHEET 22 APPROVED WITH SEA-15. NO CHANGES HAVE BEEN MADE ON THIS SHEET.**

NOTE:

THIS DEVELOPMENT APPLICATION REFLECT TWO (2) OUTFALLS: ONE AT WOODBURN ROAD, AND ONE AT WILLOW OAKS. THE NARRATIVES AND COMPUTATIONS GIVEN ON THIS SHEET WERE TAKEN FROM PCA 87–P–038–04 AND PROVIDED HERE FOR INFORMATION PURPOSES ONLY TO ADDRESS SWM, BMP AND OUTFALL ADEQUACY REQUIREMENTS FOR THE WILLOW OAKS OUTFALL.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Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DPA) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 23 of 29

INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

KEY PLAN

SCALE

0' 200' 400'

| No. | DATE | BY | Description |
|---|---|---|---|
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

TITLE

Inova
Fairfax Hospital Campus
Outfall Map - Willow Oaks
GDP / SEA

PROJECT NO.

22

SHEET NO. 22 OF 28

M-10792

## WILLOW OAKS SWM/BMP POND SPILLWAY RATING CURVE (UNCLOGGED CONDITION)

RISER ORIFICE FLOW

| ORIFICE NO. | CENTROID ELEV. | AREA | C | DESCRIPTION |
|---|---|---|---|---|
| 1 | 301.33 | 0.349 | 0.6 | 8" EXT'D DETENTION INV=301.00 |
| 2 | 305 | 4.5 | 0.6 | 4.5' X 1' ORIFICE INV=304.50 |
| 3 (top) | 310.75 | 260 | 0.6 | TOP OF 26' X 10' RISER |

RISER WEIR FLOW

| WEIR NO. | CREST ELEV. | LENGTH | C |
|---|---|---|---|
| 1 | 307 | 2 | 3 |
| 2 (top) | 310.75 | 44 | 3 |
| 3 (headwall) | 312.5 | 26 | 3 |

EMER. SPILLWAY FLOW

CREST ELEV. =
WIDTH =
Z =
C =

CULVERT RATING CURVE
SIZE: DBL 10' X 8' RCBC

| ELEV. | DISCHARGE |
|---|---|
| 299 | 0 |
| 302.75 | 40 |
| 302.90 | 80 |
| 303.04 | 120 |
| 303.16 | 160 |
| 303.28 | 200 |
| 304.13 | 500 |
| 308.66 | 1500 |
| 311.48 | 2000 |
| 317.46 | 2800 |

| ELEV. | ORIFICES Q1 | Q2 | Q3 | WEIRS Q1 | Q2 | Q3 | RISER FLOW | CULVERT CAPACITY | Q P.S.W. (Control) | Q E.S.W. | TOTAL FLOW | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 301 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.3 | 0.0 | 0.0 | 0.0 | |
| 302 | 1.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.4 | 32.0 | 1.4 | 0.0 | 1.4 | |
| 305 | 3.6 | 21.7 | 0.0 | 0.0 | 0.0 | 0.0 | 25.3 | 913.2 | 25.3 | 0.0 | 25.3 | |
| 308 | 4.3 | 37.5 | 0.0 | 6.0 | 0.0 | 0.0 | 47.9 | 1354.3 | 47.9 | 0.0 | 47.9 | |
| 310.75 | 5.2 | 62.0 | 0.0 | 43.6 | 0.0 | 0.0 | 100.7 | 1871.0 | 100.7 | 0.0 | 100.7 | |
| 312 | 5.5 | 57.3 | 1399.7 | 67.1 | 184.5 | 0.0 | 314.4 | 2070.0 | 314.4 | 0.0 | 314.4 | |
| 314 | 6.0 | 65.0 | 2256.9 | 111.1 | 773.4 | 143.3 | 1098.8 | 2337.4 | 1098.8 | 0.0 | 1098.8 | |
| 316 | 6.4 | 71.9 | 2868.4 | 162.0 | 1587.9 | 510.7 | 2338.9 | 2604.8 | 2338.9 | 0.0 | 2338.9 | |
| 316.5 | 6.5 | 73.5 | 3001.9 | 175.7 | 1820.0 | 624.0 | 2699.7 | 2671.6 | 2671.6 | 0.0 | 2671.6 | culvert control |

## EXISTING POND 'A' SPILLWAY RATING CURVE

ORIFICE FLOW

| ORIFICE NO. | CENTROID ELEV. | AREA | C | DESCRIPTION |
|---|---|---|---|---|
| 1 | 307.96 | 3.142 | 0.6 | 24" ORIFICE AT INV=306.96 |
| 2 | | | | |
| 3 (riser top) | 316 | 28.274 | 0.6 | 6' DIA RISER AT TOP = 316.00 |

WEIR FLOW

| WEIR NO. | CREST ELEV. | LENGTH | C |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 (riser top) | 316 | 18.85 | 3 |

EMER. SPILLWAY FLOW

CREST ELEV. = 316.5
WIDTH = 170
Z =
C = 2.6

CULVERT RATING CURVE
SIZE: 48" RCP

| ELEV. | DISCHARGE |
|---|---|
| 306.96 | 0 |
| 310.59 | 30 |
| 313.67 | 60 |
| 314.90 | 90 |
| 316.54 | 120 |
| 318.57 | 150 |
| 320.99 | 180 |
| 323.78 | 210 |
| 326.97 | 240 |

| ELEV. | ORIFICES Q1 | Q2 | Q3 | WEIRS Q1 | Q2 | Q3 | RISER FLOW | CULVERT CAPACITY | Q P.S.W. (Control) | Q E.S.W. | TOTAL FLOW | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 306.96 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 309 | 15.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 15.4 | 16.8 | 15.4 | 0.0 | 15.4 | |
| 310 | 21.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.6 | 25.1 | 21.6 | 0.0 | 21.6 | |
| 312 | 30.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 30.4 | 43.7 | 30.4 | 0.0 | 30.4 | |
| 314 | 37.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 37.2 | 68.0 | 37.2 | 0.0 | 37.2 | |
| 316 | 42.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 42.9 | 110.1 | 42.9 | 0.0 | 42.9 | |
| 318 | 47.9 | 0.0 | 192.5 | 0.0 | 0.0 | 159.9 | 207.9 | 141.6 | 141.6 | 812.0 | 953.6 | culvert control |

### EXISTING POND 'A' STAGE STORAGE

| Elev. (ft) | Acres | Volume (ac-ft) Incremental | Cummulative |
|---|---|---|---|
| 306.96 | 0 | 0.0000 | 0.0000 |
| 308.0 | 0.03 | 0.0156 | 0.0156 |
| 310.0 | 0.46 | 0.4900 | 0.5056 |
| 312.0 | 0.58 | 1.0400 | 1.5456 |
| 314.0 | 0.69 | 1.2700 | 2.8156 |
| 316.0 | 0.81 | 1.5000 | 4.3156 |
| 318.0 | 0.81 | 1.6200 | 5.9356 |

### EXISTING REGIONAL POND 'B' STAGE STORAGE

| Elev. (ft) | Acres | Volume (ac-ft) Incremental | Cummulative |
|---|---|---|---|
| 299.22 | 0 | 0.0000 | 0.0000 |
| 302.0 | 0.03 | 0.0417 | 0.0417 |
| 304.0 | 0.13 | 0.1600 | 0.2017 |
| 306.0 | 0.63 | 0.7600 | 0.9617 |
| 308.0 | 0.83 | 1.4600 | 2.4217 |
| 310.0 | 1.31 | 2.1400 | 4.5617 |
| 312.0 | 1.62 | 3.1300 | 7.6917 |
| 314.0 | 2.44 | 4.2600 | 11.9517 |
| 315.0 | 2.44 | 2.4400 | 14.3917 |

## WILLOW OAKS SWM/BMP POND SPILLWAY RATING CURVE (CLOGGED CONDITION)

RISER ORIFICE FLOW

| ORIFICE NO. | CENTROID ELEV. | AREA | C | DESCRIPTION |
|---|---|---|---|---|
| 1 | 301.33 | 0 | 0.6 | 8" EXT'D DETENTION INV=301.00 |
| 2 | 305 | 0 | 0.6 | 4.5' X 1' ORIFICE INV=304.50 |
| 3 (top) | 310.75 | 260 | 0.6 | TOP OF 26' X 10' RISER |

RISER WEIR FLOW

| WEIR NO. | CREST ELEV. | LENGTH | C |
|---|---|---|---|
| 1 | 307 | 0 | 3 |
| 2 (top) | 310.75 | 44 | 3 |
| 3 (headwall) | 312.5 | 26 | 3 |

EMER. SPILLWAY FLOW

CREST ELEV. =
WIDTH =
Z =
C =

CULVERT RATING CURVE
SIZE: DBL 10' X 8' RCBC

| ELEV. | DISCHARGE |
|---|---|
| 299 | 0 |
| 302.75 | 40 |
| 302.90 | 80 |
| 303.04 | 120 |
| 303.16 | 160 |
| 303.28 | 200 |
| 304.13 | 500 |
| 308.66 | 1500 |
| 311.48 | 2000 |
| 317.46 | 2800 |

| ELEV. | ORIFICES Q1 | Q2 | Q3 | WEIRS Q1 | Q2 | Q3 | RISER FLOW | CULVERT CAPACITY | Q P.S.W. (Control) | Q E.S.W. | TOTAL FLOW | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 301 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 21.3 | 0.0 | 0.0 | 0.0 | |
| 302 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 32.0 | 0.0 | 0.0 | 0.0 | |
| 305 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 913.2 | 0.0 | 0.0 | 0.0 | |
| 308 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1354.3 | 0.0 | 0.0 | 0.0 | |
| 310.75 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1871.0 | 0.0 | 0.0 | 0.0 | |
| 312 | 0.0 | 0.0 | 1399.7 | 0.0 | 184.5 | 0.0 | 184.5 | 2070.0 | 184.5 | 0.0 | 184.5 | |
| 314 | 0.0 | 0.0 | 2256.9 | 0.0 | 773.4 | 143.3 | 916.7 | 2337.4 | 916.7 | 0.0 | 916.7 | |
| 316 | 0.0 | 0.0 | 2868.4 | 0.0 | 1587.9 | 510.7 | 2098.6 | 2604.8 | 2098.6 | 0.0 | 2098.6 | |
| 316.5 | 0.0 | 0.0 | 3001.9 | 0.0 | 1820.0 | 624.0 | 2444.0 | 2671.6 | 2444.0 | 0.0 | 2444.0 | |

## EXISTING REGIONAL POND 'B' SPILLWAY RATING CURVE

ORIFICE FLOW

| ORIFICE NO. | CENTROID ELEV. | AREA | C | DESCRIPTION |
|---|---|---|---|---|
| 1 | 300.47 | 4.909 | 0.6 | 30" ORIFICE AT INV=299.22 |
| 2 | | | | |
| 3 (riser top) | 311.02 | 19.635 | 0.6 | 5' DIA RISER AT TOP = 311.02 |

WEIR FLOW

| WEIR NO. | CREST ELEV. | LENGTH | C |
|---|---|---|---|
| 1 | | | |
| 2 | | | |
| 3 (riser top) | 311.02 | 15.708 | 3 |

EMER. SPILLWAY FLOW

CREST ELEV. = 312.5
WIDTH = 95
Z =
C = 2.6

CULVERT RATING CURVE
SIZE: 60" RCP

| ELEV. | DISCHARGE |
|---|---|
| 299.22 | 0 |
| 303.52 | 100 |
| 306.67 | 200 |
| 311.83 | 300 |
| 319.05 | 400 |
| 328.58 | 500 |
| 343.49 | 600 |
| 372.54 | 700 |
| 432.86 | 800 |
| 552.75 | 900 |

| ELEV. | ORIFICES Q1 | Q2 | Q3 | WEIRS Q1 | Q2 | Q3 | RISER FLOW | CULVERT CAPACITY | Q P.S.W. (Control) | Q E.S.W. | TOTAL FLOW | COMMENTS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 299.22 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | |
| 303 | 37.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 37.6 | 88.0 | 37.6 | 0.0 | 37.6 | |
| 304 | 44.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 44.4 | 115.3 | 44.4 | 0.0 | 44.4 | |
| 306 | 55.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 55.6 | 178.7 | 55.6 | 0.0 | 55.6 | |
| 308 | 64.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 64.9 | 225.8 | 64.9 | 0.0 | 64.9 | |
| 310 | 73.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 73.0 | 264.6 | 73.0 | 0.0 | 73.0 | |
| 312 | 80.3 | 0.0 | 93.6 | 0.0 | 0.0 | 45.7 | 126.0 | 302.4 | 126.0 | 0.0 | 126.0 | |
| 312.5 | 82.0 | 0.0 | 115.0 | 0.0 | 0.0 | 84.8 | 166.8 | 309.3 | 166.8 | 0.0 | 166.8 | |
| 314 | 86.9 | 0.0 | 163.2 | 0.0 | 0.0 | 242.4 | 250.1 | 330.1 | 250.1 | 453.8 | 703.9 | riser orifice control |
| 316 | 90.1 | 0.0 | 188.6 | 0.0 | 0.0 | 374.2 | 278.7 | 343.9 | 278.7 | 976.4 | 1255.1 | riser orifice control |

NOTE:

THIS DEVELOPMENT APPLICATION REFLECT TWO (2) OUTFALLS: ONE AT WOODBURN ROAD, AND ONE AT WILLOW OAKS. THE NARRATIVES AND COMPUTATIONS GIVEN ON THIS SHEET WERE TAKEN FROM PCA 87-P-038-04 AND PROVIDED HERE FOR INFORMATION PURPOSES ONLY TO ADDRESS SWM, AND OUTFALL ADEQUACY REQUIREMENTS FOR THE WILLOW OAKS OUTFALL.

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 24 of 29


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INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES COLLETTON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

KEY PLAN

SCALE

0' 300' 600'

| No. | DATE | BY | Description |
|---|---|---|---|
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY SCC
APPROVED BY PGY
CHECKED BY TCC
DATE April 18, 2011

TITLE

INOVA
Fairfax Hospital Campus
Rating Curves
GDP / SEA

PROJECT NO.

23

SHEET NO. 23 OF 28

M-10792

## Watershed Description

Part 1: List all of the Subareas and "C" Factors used in the BMP Computaions

| Subarea | Designation and Description (1) | "C" (2) | Acres (3) |
|---|---|---|---|
| A-1 | SITE AREA TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED | 0.80 | 18.60 |
| A-2 | SITE AREA TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED | 0.30 | 4.30 |
| U-1 | SITE AREA - UNCONTROLLED | 0.30 | 0.95 |
| U-2 | SITE AREA - UNCONTROLLED | 0.30 | 0.90 |
| U-3 | SITE AREA - UNCONTROLLED | 0.30 | 3.09 |
| UOS | SITE AREA - EX. WATER QUALITY MANAGEMENT AREA | 0.30 | 2.29 |
| U-4 | AREA RESERVED FOR BMP FOR FAIRFAX HOSPITAL IMPROVEMENTS - UNCONTROLLED | 0.85 | 21.77 |
| U-5 | AREA RESERVED FOR BMP FOR FAIRFAX HOSPITAL IMPROVEMENTS - UNCONTROLLED | 0.85 | 5.41 |
| A-3 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.85 | 12.85 |
| A-4 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.80 | 20.54 |
| A-5 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.70 | 34.38 |
| A-6 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.85 | 12.13 |
| A-7 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.80 | 14.00 |
| A-8 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.80 | 2.92 |
| A-9 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.30 | 6.54 |

** THESE AREAS CURRENTLY DO NOT HAVE BMPs AND WILL BE 100 % TREATED IN THE PROPSED WILLOW OAKS SWM/BMP POND

## Phosphorus Removal Calculations (Part 2 - 4)

Part 2: Compute the Weighted Average "C" Factor for the Site:

(A) Area Summary

| | | |
|---|---|---|
| TOTAL SITE AREA = | | 30.13 |
| AREA RESERVED FOR BMP = | | 27.18 |
| TOTAL OFF-SITE AREA = | | 103.36 |
| TOTAL BMP AREA = | (a) | 160.67 ac |

| Subarea | Designation and Description (1) | "C" (2) | | Acres (3) | | Product (4) |
|---|---|---|---|---|---|---|
| A-1 | SITE AREA TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED | 0.80 | x | 18.60 | = | 14.88 |
| A-2 | SITE AREA TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED | 0.30 | x | 4.30 | = | 1.29 |
| U-1 | SITE AREA - UNCONTROLLED | 0.30 | x | 0.95 | = | 0.29 |
| U-2 | SITE AREA - UNCONTROLLED | 0.30 | x | 0.90 | = | 0.27 |
| U-3 | SITE AREA - UNCONTROLLED | 0.30 | x | 3.09 | = | 0.93 |
| UOS | SITE AREA - EX. WATER QUALITY MANAGEMENT AREA | 0.30 | x | 2.29 | = | 0.69 |
| U-4 | AREA RESERVED FOR BMP FOR FAIRFAX HOSPITAL IMPROVEMENTS - UNCONTROLLED | 0.85 | x | 21.77 | = | 18.50 |
| U-5 | AREA RESERVED FOR BMP FOR FAIRFAX HOSPITAL IMPROVEMENTS - UNCONTROLLED | 0.85 | x | 5.41 | = | 4.60 |
| A-3 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.85 | x | 12.85 | = | 10.92 |
| A-4 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.80 | x | 20.54 | = | 16.43 |
| A-5 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.70 | x | 34.38 | = | 24.07 |
| A-6 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.85 | x | 12.13 | = | 10.31 |
| A-7 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.80 | x | 14.00 | = | 11.20 |
| A-8 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.80 | x | 2.92 | = | 2.34 |
| A-9 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.30 | x | 6.54 | = | 1.96 |
| | | | (b) | Total | = | 114.38 |
| (C) Weigthed average "C" factor | | | | (b) / (a) | = | 0.71 |

** THESE AREAS CURRENTLY DO NOT HAVE BMPs AND WILL BE 100 % TREATED IN THE PROPSED WILLOW OAKS SWM/BMP POND

Part 3: Compute the Total Phoshorus Removal for the Site

| Subarea | BMP Type | Removal Eff (%) | "C" | Acres | Area Ratio | C-factor Ratio | Product (%) |
|---|---|---|---|---|---|---|---|
| A-1 | SWM/BMP POND | 50 | 0.80 | 18.60 | 0.116 | 1.127 | 6.54 |
| A-2 | SWM/BMP POND | 50 | 0.30 | 4.30 | 0.027 | 0.423 | 0.57 |
| U-1 | NONE | 0 | 0.30 | 0.95 | 0.006 | 0.423 | 0.00 |
| U-2 | NONE | 0 | 0.30 | 0.90 | 0.006 | 0.423 | 0.00 |
| U-3 | NONE | 0 | 0.30 | 3.09 | 0.019 | 0.423 | 0.00 |
| UOS | WQ AREA | 100 | 0.30 | 2.29 | 0.014 | 1.000 | 1.40 |
| U-4 | NONE | 0 | 0.85 | 21.77 | 0.135 | 1.197 | 0.00 |
| U-5 | NONE | 0 | 0.85 | 5.41 | 0.034 | 1.197 | 0.00 |
| A-3 | SWM/BMP POND | 50 | 0.85 | 12.85 | 0.08 | 1.197 | 4.79 |
| A-4 | SWM/BMP POND | 50 | 0.80 | 20.54 | 0.128 | 1.127 | 7.21 |
| A-5 | SWM/BMP POND | 50 | 0.70 | 34.38 | 0.214 | 0.986 | 10.55 |
| A-6 | SWM/BMP POND | 50 | 0.85 | 12.13 | 0.075 | 1.197 | 4.49 |
| A-7 | SWM/BMP POND | 50 | 0.80 | 14.00 | 0.087 | 1.127 | 4.90 |
| A-8 | SWM/BMP POND | 50 | 0.80 | 2.92 | 0.018 | 1.127 | 1.01 |
| A-9 | SWM/BMP POND | 50 | 0.30 | 6.54 | 0.041 | 0.423 | 0.87 |
| | | | | (a) | Total | = | 42.33 |

Part 4: Determine Compliance with Phosphorus Removal

Select Requirement:

Water Supply Overlay District (Occoquan Watershed) = 50% (Fairfax County and Prince William County)

Chesapeake Bay Preservation Area (New Development) = 40% (Fairfax County) 50% (Prince William County)

Chesapeake Bay Preservation Area (Redevelopment) = [1-0.9x("I"pre/"I"post)]x100 = _____ %

Requirement (a) 40.00 %

**If Line 3(a) 42.33 >=Line 4(a) 40.00 then Phosphorus removal requirement is satisfied**

## BMP Storage Calculations (Part 7 - 8)

Part 7: Compute the Weighted Average "C" Factor for the Proposed BMP Facility

| Subarea | Designation and Description (1) | "C" (2) | | Acres (3) | | Product (4) |
|---|---|---|---|---|---|---|
| A-1 | SITE AREA TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED | 0.80 | x | 18.60 | = | 14.88 |
| A-2 | SITE AREA TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED | 0.30 | x | 4.30 | = | 1.29 |
| A-3 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.85 | x | 12.85 | = | 10.92 |
| A-4 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.80 | x | 20.54 | = | 16.43 |
| A-5 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.70 | x | 34.38 | = | 24.07 |
| A-6 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.85 | x | 12.13 | = | 10.31 |
| A-7 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.80 | x | 14.00 | = | 11.20 |
| A-8 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.80 | x | 2.92 | = | 2.34 |
| A-9 | EX. UNCONTROLLED OFF-SITE DEVELOPMENT TO PROPOSED WILLOW OAKS SWM/BMP POND - CONTROLLED ** | 0.30 | x | 6.54 | = | 1.96 |
| | | | (a) | 126.26 | (b) | 93.40 |
| (C) Weigthed average "C" factor | | | | (b) / (a)=( c ) | = | 0.74 |

Part 8: Determine the Storage Required for the Proposed BMP Facility

C = 0.74 (weighted "C" for area draining to Pond)

Chart A6-40 value (Appendix 4-3) for BMP storage per acre:

(4375 x C) - 875 = 2362.5 cf/ac

Design 1 (48hr Drawdown)

Effective Drainage Area to Pond = 126.26 ac

Storage Volume Required = 298,289 cf

Storage Volume Provided = 6.80 ac-ft 480,685 cf - Marsh 180,992 cf = 299,693 cf

2.21 ac-ft

At Stage Elevation = 304.50 ft

% Impervious of Effective Drainage Area to Pond = (C-0.05) / 0.009 = 76.67 %

Marsh Volume Required = 0.5" x % Imp x Effective Drainage Area to Pond (ac) = 175,698 cf

Marsh Volume Provided = 180,992 cf

WILLOW OAKS SWM/BMP POND STAGE STORAGE

| | Elev. (ft) | Acres | Volume (ac-ft) Incremental | Cummulative | |
|---|---|---|---|---|---|
| | 294.00 | 0.19 | 0.0000 | 0.0000 | |
| | 295.00 | 0.28 | 0.2350 | 0.2350 | |
| | 296.00 | 0.35 | 0.3150 | 0.5500 | |
| | 298.00 | 0.53 | 0.8800 | 1.4300 | |
| | 299.50 | 0.67 | 0.9000 | 2.3300 | |
| | 300.50 | 1.41 | 1.0400 | 3.3700 | |
| (Marsh WSE) | 301.00 | 1.73 | 0.7850 | 4.1550 | 180,992 cf |
| | 302.00 | 1.86 | 1.7950 | 5.9500 | |
| | 304.00 | 2.14 | 4.0000 | 9.9500 | |
| (BMP WSE) | 304.50 | 2.20 | 1.0850 | 11.0350 | 480,685 cf |
| | 306.00 | 2.32 | 3.3900 | 14.4250 | |
| | 308.00 | 2.44 | 4.7600 | 19.1850 | |
| | 310.00 | 2.61 | 5.0500 | 24.2350 | |
| | 312.00 | 2.83 | 5.4400 | 29.6750 | |
| | 314.00 | 3.10 | 5.9300 | 35.6050 | |
| | 316.00 | 3.54 | 6.6400 | 42.2450 | |
| | 316.50 | 3.65 | 1.7975 | 44.0425 | |
| (Top of Dam) | 316.65 | 3.77 | 0.5565 | 44.5990 | |
| | 318.00 | 4.23 | 5.4000 | 49.9990 | |

## BMP Outlet Computations

Part 9: Determine the Required Orifice Size for the Proposed BMP Facility

(A) BMP storage requirement from Part 8. (a) 298289 cf

(B) Maximum head (h) at the required BMP storage from the Stage-Storage curve for the facility. (b) 3.5 ft

(C) Peak Outflow Rate (Qp) at the maximum head for a drawdown time of 48 hrs [Qp=S/(0.5x3600x48)]

0.0000116xLine 9(a) 298289 = ( c ) 3.4524 cfs

(D) Required Orifice Area (A) [A=Qp/(0.6x(64.4xh)$^{0.5}$]

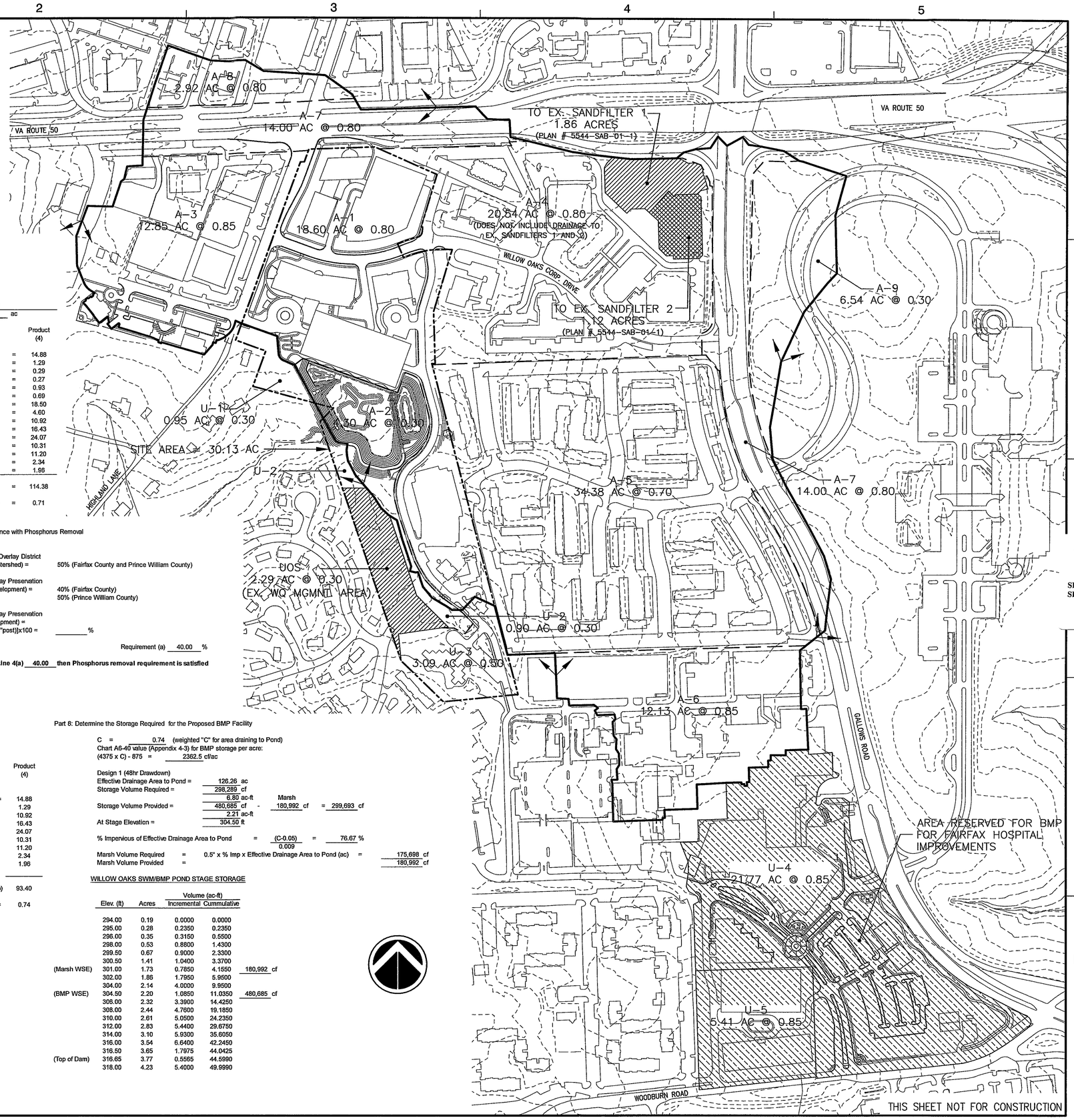
Line 9( c ) 3.4524 / [0.6x(64.4xLine 9(b) 3.5 )$^{0.5}$] = (d) 0.3833 sf

(E) Diameter of a circular orifice

2.0 x (Line 9(d) 0.3833 /3.1415927)$^{0.5}$ = (e) 0.699 ft

8.386 in

USE 8.0 in




THIS SHEET NOT FOR CONSTRUCTION

**Dewberry**


Dewberry & Davis LLC
8403 ARLINGTON BLVD.
FAIRFAX, VA 22031
PHONE: 703.849.0100
FAX: 703.849.0519
www.dewberry.com


# INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 25 of 29

SCALE

0' 200' 400'

| No. | DATE | BY | Description |
|---|---|---|---|
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY SCC
APPROVED BY PGY
CHECKED BY TCC
DATE April 18, 2011

TITLE

INOVA
Fairfax Hospital Campus
BMP OPTION 1 AND 2
GDP / SEA

PROJECT NO.

24

SHEET NO. 24 OF 28

M-10792

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X       XXXXX   X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                        HEC-1 INPUT                                          PAGE  1

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1         ID        WILLOW OAKS PROPOSED BMP/SWM POND AND OUTFALL
   2         ID        FAIRFAX COUNTY, VIRGINIA
   3         ID        SCS TYPE II, 24-HOUR RAINFALL DISTRIBUTION
   4         ID        FAIRFAX COUNTY PFM RAINFALL DEPTHS
   5         ID        EXISTING CONDITIONS DEVELOPMENT
             *DIAGRAM
   6         IT      5                   300
   7         IO      5
             *          2-YR     10-YR    100-YR  OVERTOP
   8         JR    PREC    3.2       5.2       7.3      3.3
             *

   9         KK     1-A
  10         KM  BASIN 1-A RUNOFF HYDROGRAPH TO EX POND A
  11         BA   0.058
  12         PB       1
             * SCS TypeII Rainfall Distribution Pattern
  13         IN       6
  14         PC     0.0  .00101  .00202  .00305  .00408  .00513  .00618  .00725  .00832  .00941
  15         PC  .01050  .01161  .01272  .01385  .01498  .01613  .01728  .01845  .01962  .02081
  16         PC    .022  .02321  .02442  .02565  .02688  .02813  .02938  .03065  .03192  .03321
  17         PC  .03450  .03581  .03712  .03845  .03978  .04113  .04248  .04385  .04522  .04661
  18         PC    .048  .04941  .05084  .05229  .05376  .05525  .05676  .05829  .05984  .06141
  19         PC    .063  .06461  .06624  .06789  .06956  .07125  .07296  .07469  .07644  .07821
  20         PC     .08  .08181  .08364  .08549  .08736  .08925  .09116  .09309  .09504  .09701
  21         PC    .099  .10101  .10304  .10509  .10716  .10925  .11136  .11349  .11564  .11781
  22         PC     .12  .12225  .12460  .12705  .12960  .13225    .135  .13785  .14080  .14385
  23         PC    .147   .1502  .15340   .1566   .1598    .163  .16628  .16972  .17332  .17708
  24         PC    .181  .18512  .18948  .19408  .19892    .204   .2094   .2152   .2214    .228
  25         PC    .235  .24268  .25132  .26092  .27148    .283  .30684  .35436  .43079  .56786
  26         PC    .663  .68196  .69864  .71304  .72516    .735  .74344  .75136  .75876  .76564
  27         PC    .772  .77796  .78364  .78904  .79416    .799   .8036    .808   .8122   .8162
  28         PC     .82  .82367  .82726  .83079  .83424  .83763  .84094  .84419  .84736  .85047
  29         PC  .85350  .85647  .85936  .86219  .86494  .86763  .87024  .87279  .87526  .87767
  30         PC     .88  .88229  .88455  .88679    .889  .89119  .89335  .89549   .8976  .89969
  31         PC  .90175  .90379   .9058  .90779  .90975  .91169   .9136  .91549  .91735  .91919
  32         PC    .921  .92279  .92455  .92629    .928  .92969  .93135  .93299   .9346  .93619
  33         PC  .93775  .93929   .9408  .94229  .94375  .94519   .9466  .94799  .94935  .95069
  34         PC    .952   .9533  .95459  .95588  .95716  .95844  .95971  .96098  .96224   .9635
  35         PC  .96475    .966  .96724  .96848  .96971  .97094  .97216  .97338  .97459   .9758
  36         PC    .977   .9782  .97939  .98058  .98176  .98294  .98411  .98528  .98644  .98760
  37         PC  .98875   .9899  .99104  .99218  .99331  .99444  .99556  .99668  .99779   .9989
  38         PC     1.0
  39         LS              84
  40         UD     0.1
             *

  41         KK      PA
  42         KM  ROUTE THROUGH EXISTING POND A
  43         RS       1    ELEV  306.96
  44         SA       0    0.03    0.46    0.58    0.69    0.81    0.81
  45         SE  306.96     308     310     312     314     316     318
  46         SQ       0    15.4    21.6    30.4    37.2    42.9   953.6
  47         SE  306.96     309     310     312     314     316     318
             *
1                                        HEC-1 INPUT                                          PAGE  2

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  48         KK     1-B
  49         KM  BASIN 1-B RUNOFF HYDROGRAPH TO EX POND B
  50         BA   0.145
  51         LS              87
  52         UD     0.1
             *

  53         KK    TO B
  54         KM  COMBINE PA HYDROGRAPH TO BASIN 1-B HYDROGRAPH
  55         HC       2
             *

  56         KK      PB
  57         KM  ROUTE "TO B" HYDROGRAPH THROUGH EXISTING REGIONAL POND B
  58         RS       1    ELEV  299.22
  59         SA       0    0.03    0.13    0.63    0.83    1.31    1.82    2.44    2.44
  60         SE  299.22     302     304     306     308     310     312     314     315
  61         SQ       0    37.6    44.4    55.6    64.9      73     126   166.8   703.9  1255.1
  62         SE  299.22     303     304     306     308     310     312   312.5     314     315
             *

  63         KK       2
  64         KM  BASIN 2 EXISTING RUNOFF HYDROGRAPH
  65         BA   0.034
  66         LS              75
  67         UD    0.10
             *

  68         KK  FLOW-1
  69         KM  COMBINE BASIN 2 HYDROGRAPH TO PB HYDROGRAPH
  70         HC       2
             *

  71         KK       5
  72         KM  BASIN 5 EXISTING RUNOFF HYDROGRAPH
  73         BA   0.058
  74         LS              77
  75         UD    0.15
             *

  76         KK  FLOW-2
  77         KM  COMBINE BASIN 5 HYDROGRAPH TO FLOW-1 HYDROGRAPH
  78         HC       2
             *

  79         KK       3
  80         KM  BASIN 3 EXISTING RUNOFF HYDROGRAPH
  81         BA    0.08
  82         LS              82
  83         UD    0.10
             *
1                                        HEC-1 INPUT                                          PAGE  3

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  84         KK  X-POND
  85         KM  ROUTE BASIN 3 EXISTING RUNOFF HYDROGRAPH THROUGH EX POND AT MONARCH RD
  86         RS       1    ELEV     290
  87         SA       0    0.22    0.24    0.56     1.8
  88         SE     290     292     295     300     305
  89         SQ       0     9.3    14.1    17.7   134.7   329.1   368.4  1197.7
  90         SE     290     292     294     296     298     300     302     304
             *

  91         KK       4
  92         KM  BASIN 4 EXISTING RUNOFF HYDROGRAPH
  93         BA   0.016
  94         LS              73
  95         UD    0.10
             *

  96         KK   COMB1
  97         KM  COMBINE X-POND HYDROGRAPH TO BASIN 4 HYDROGRAPH
  98         HC       2
             *

  99         KK   COMB2
 100         KM  COMBINE FLOW-2 HYDROGRAPH TO COMB1 HYDROGRAPH
 101         HC       2
             *

 102         KK    CR-1
 103         KM  CHANNEL ROUTE COMB2 HYDROGRAPH TO FLOW-3 NODE
 104         RD
 105         RC     0.1   0.045     0.1     600  0.0065
 106         RX       0     129     175     182     189     203     344     443
 107         RY  299.58  290.12  289.47  284.27  284.77  287.15  290.44  297.29
             *

 108         KK     6-A
 109         KM  BASIN 6-A EXISTING RUNOFF HYDROGRAPH
 110         BA   0.027
 111         LS              77
 112         UD     0.1
             *

 113         KK  FLOW-3
 114         KM  COMBINE BASIN 6-A HYDROGRAPH TO CR-1 HYDROGRAPH
 115         HC       2
             *

 116         KK    CR-2
 117         KM  CHANNEL ROUTE FLOW 3 HYDROGRAPH TO FLOW-4 NODE
 118         RD
 119         RC     0.1   0.045     0.1     435  0.0104
 120         RX       0     142     215     217     225     229     266  366.07
 121         RY   294.7  283.95   282.6  278.65  278.73     283  283.59  294.78
             *
1                                        HEC-1 INPUT                                          PAGE  4

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 122         KK     6-B
 123         KM  BASIN 6-B EXISTING RUNOFF HYDROGRAPH
 124         BA   0.053
 125         LS              71
 126         UD    0.15
             *

 127         KK  FLOW-4
 128         KM  COMBINE BASIN 6-B HYDROGRAPH TO CR-2 HYDROGRAPH
 129         HC       2
             *

 130         KK    CR-3
 131         KM  CHANNEL ROUTE FLOW-4 HYDROGRAPH TO FLOW-5 NODE
 132         RD
 133         RC     0.1  0.0575     0.1    2550   0.008
 134         RX       0      32      66      75      85      89     161   220.2
 135         RY  285.54  278.13  272.61  265.49  266.48  268.98  272.76   286.5
             *

 136         KK       7
 137         KM  BASIN 7 EXISTING RUNOFF HYDROGRAPH
 138         BA   0.048
 139         LS              73
 140         UD     0.1
             *

 141         KK  FLOW-5
 142         KM  COMBINE BASIN 7 HYDROGRAPH TO CR-3 HYDROGRAPH
 143         HC       2
             *
 144         ZZ
1
             SCHEMATIC DIAGRAM OF STREAM NETWORK
 INPUT
  LINE      (V) ROUTING            (--->) DIVERSION OR PUMP FLOW

  NO.       (.) CONNECTOR          (<---) RETURN OF DIVERTED OR PUMPED FLOW

   9         1-A
              V
              V
  41         PA
              .
              .
  48          .          1-B
              .           .
              .           .
  53        TO B...........
              V
              V
  56         PB
              .
              .
  63          .           2
              .           .
              .           .
  68       FLOW-1..........
              .
              .
  71          .           5
              .           .
              .           .
  76       FLOW-2..........
              .
              .
  79          .           3
              .           V
              .           V
  84          .        X-POND
              .           .
              .           .
  91          .           .           4
              .           .           .
              .           .           .
  96          .         COMB1..........
              .           .
              .           .
  99        COMB2..........
              V
              V
 102         CR-1
              .
              .
 108          .          6-A
              .           .
              .           .
 113       FLOW-3..........
              V
              V
 116         CR-2
              .
              .
 122          .          6-B
              .           .
              .           .
 127       FLOW-4..........
              V
              V
 130         CR-3
              .
              .
 136          .           7
              .           .
              .           .
 141       FLOW-5..........
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

| OPERATION | STATION | AREA | PLAN | | RATIOS APPLIED TO PRECIPITATION RATIO 1 3.20 | RATIO 2 5.20 | RATIO 3 7.30 | RATIO 4 3.30 |
|---|---|---|---|---|---|---|---|---|
| HYDROGRAPH AT + | 1-A | .06 | 1 | FLOW | 81. | 163. | 250. | 85. |
| | | | | TIME | 12.00 | 12.00 | 12.00 | 12.00 |
| ROUTED TO + | PA | .06 | 1 | FLOW | 29. | 40. | 170. | 29. |
| | | | | TIME | 12.25 | 12.25 | 12.08 | 12.25 |
| | | | ** PEAK STAGES IN FEET ** | | | | | |
| | | | 1 | STAGE | 311.59 | 314.83 | 316.28 | 311.77 |
| | | | | TIME | 12.25 | 12.25 | 12.08 | 12.25 |
| HYDROGRAPH AT + | 1-B | .14 | 1 | FLOW | 229. | 436. | 654. | 239. |
| | | | | TIME | 12.00 | 12.00 | 12.00 | 12.00 |
| 2 COMBINED AT + | TO B | .20 | 1 | FLOW | 253. | 470. | 695. | 264. |
| | | | | TIME | 12.00 | 12.00 | 12.00 | 12.00 |
| ROUTED TO + | PB | .20 | 1 | FLOW | 77. | 246. | 594. | 81. |
| | | | | TIME | 12.33 | 12.17 | 12.08 | 12.33 |
| | | | ** PEAK STAGES IN FEET ** | | | | | |
| | | | 1 | STAGE | 310.16 | 312.72 | 313.69 | 310.32 |
| | | | | TIME | 12.33 | 12.17 | 12.08 | 12.33 |
| HYDROGRAPH AT + | 2 | .03 | 1 | FLOW | 30. | 74. | 123. | 32. |
| | | | | TIME | 12.00 | 12.00 | 12.00 | 12.00 |
| 2 COMBINED AT + | FLOW-1 | .24 | 1 | FLOW | 96. | 278. | 689. | 99. |
| | | | | TIME | 12.00 | 12.17 | 12.08 | 12.00 |
| HYDROGRAPH AT + | 5 | .06 | 1 | FLOW | 50. | 115. | 190. | 53. |
| | | | | TIME | 12.08 | 12.08 | 12.00 | 12.08 |
| 2 COMBINED AT + | FLOW-2 | .29 | 1 | FLOW | 145. | 362. | 877. | 150. |
| | | | | TIME | 12.08 | 12.17 | 12.08 | 12.08 |
| HYDROGRAPH AT + | 3 | .08 | 1 | FLOW | 102. | 214. | 334. | 107. |
| | | | | TIME | 12.00 | 12.00 | 12.00 | 12.00 |
| ROUTED TO + | X-POND | .08 | 1 | FLOW | 76. | 187. | 294. | 82. |
| | | | | TIME | 12.08 | 12.08 | 12.08 | 12.08 |
| | | | ** PEAK STAGES IN FEET ** | | | | | |
| | | | 1 | STAGE | 297.00 | 298.54 | 299.64 | 297.10 |
| | | | | TIME | 12.08 | 12.08 | 12.08 | 12.08 |
| HYDROGRAPH AT + | 4 | .02 | 1 | FLOW | 13. | 32. | 55. | 13. |
| | | | | TIME | 12.00 | 12.00 | 12.00 | 12.00 |
| 2 COMBINED AT + | COMB1 | .10 | 1 | FLOW | 86. | 213. | 349. | 93. |
| | | | | TIME | 12.08 | 12.08 | 12.00 | 12.08 |
| 2 COMBINED AT + | COMB2 | .39 | 1 | FLOW | 231. | 545. | 1213. | 243. |
| | | | | TIME | 12.08 | 12.08 | 12.08 | 12.08 |
| ROUTED TO + | CR-1 | .39 | 1 | FLOW | 212. | 528. | 1094. | 227. |
| | | | | TIME | 12.08 | 12.17 | 12.17 | 12.08 |
| HYDROGRAPH AT + | 6-A | .03 | 1 | FLOW | 27. | 62. | 102. | 28. |
| | | | | TIME | 12.00 | 12.00 | 12.00 | 12.00 |
| 2 COMBINED AT + | FLOW-3 | .42 | 1 | FLOW | 234. | 568. | 1165. | 250. |
| | | | | TIME | 12.08 | 12.08 | 12.08 | 12.08 |
| ROUTED TO + | CR-2 | .42 | 1 | FLOW | 226. | 560. | 1146. | 241. |
| | | | | TIME | 12.17 | 12.17 | 12.17 | 12.08 |
| HYDROGRAPH AT + | 6-B | .05 | 1 | FLOW | 32. | 86. | 150. | 34. |
| | | | | TIME | 12.08 | 12.08 | 12.08 | 12.08 |
| 2 COMBINED AT + | FLOW-4 | .47 | 1 | FLOW | 257. | 624. | 1255. | 275. |
| | | | | TIME | 12.08 | 12.17 | 12.17 | 12.08 |
| ROUTED TO + | CR-3 | .47 | 1 | FLOW | 251. | 607. | 1196. | 269. |
| | | | | TIME | 12.25 | 12.33 | 12.33 | 12.25 |
| HYDROGRAPH AT + | 7 | .05 | 1 | FLOW | 38. | 97. | 166. | 40. |
| | | | | TIME | 12.00 | 12.00 | 12.00 | 12.00 |
| 2 COMBINED AT + | FLOW-5 | .52 | 1 | FLOW | 263. | 628. | 1230. | 282. |
| | | | | TIME | 12.25 | 12.33 | 12.33 | 12.25 |

1

*** NORMAL END OF HEC-1 ***

```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X               X
XXXXXXX  XXXX     X       XXXXX   X
X     X  X        X               X
X     X  X        X     X         X
X     X  XXXXXXX   XXXXX         XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

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DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
1                                        HEC-1 INPUT                                          PAGE  1

LINE         ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

   1         ID        WILLOW OAKS PROPOSED BMP/SWM POND AND OUTFALL
   2         ID        FAIRFAX COUNTY, VIRGINIA
   3         ID        SCS TYPE II, 24-HOUR RAINFALL DISTRIBUTION
   4         ID        FAIRFAX COUNTY PFM RAINFALL DEPTHS
   5         ID        2-YR AND 10-YR STORMS
   6         ID        FORESTED WATERSHED CONDITION
             *DIAGRAM
   7         IT      5                   300
   8         IO      5
             *          2-YR     10-YR
   9         JR    PREC    3.2       5.2
             *

  10         KK       1
  11         KM  BASIN 1 RUNOFF HYDROGRAPH - ASSUME 130.1 ACRE WATERSHED IS COMPLETELY FORESTED
  12         BA   0.203
  13         PB       1
             * SCS TypeII Rainfall Distribution Pattern
  14         IN       6
  15         PC     0.0  .00101  .00202  .00305  .00408  .00513  .00618  .00725  .00832  .00941
  16         PC  .01050  .01161  .01272  .01385  .01498  .01613  .01728  .01845  .01962  .02081
  17         PC    .022  .02321  .02442  .02565  .02688  .02813  .02938  .03065  .03192  .03321
  18         PC  .03450  .03581  .03712  .03845  .03978  .04113  .04248  .04385  .04522  .04661
  19         PC    .048  .04941  .05084  .05229  .05376  .05525  .05676  .05829  .05984  .06141
  20         PC    .063  .06461  .06624  .06789  .06956  .07125  .07296  .07469  .07644  .07821
  21         PC     .08  .08181  .08364  .08549  .08736  .08925  .09116  .09309  .09504  .09701
  22         PC    .099  .10101  .10304  .10509  .10716  .10925  .11136  .11349  .11564  .11781
  23         PC     .12  .12225  .12460  .12705  .12960  .13225    .135  .13785  .14080  .14385
  24         PC    .147   .1502  .15340   .1566   .1598    .163  .16628  .16972  .17332  .17708
  25         PC    .181  .18512  .18948  .19408  .19892    .204   .2094   .2152   .2214    .228
  26         PC    .235  .24268  .25132  .26092  .27148    .283  .30684  .35436  .43079  .56786
  27         PC    .663  .68196  .69864  .71304  .72516    .735  .74344  .75136  .75876  .76564
  28         PC    .772  .77796  .78364  .78904  .79416    .799   .8036    .808   .8122   .8162
  29         PC     .82  .82367  .82726  .83079  .83424  .83763  .84094  .84419  .84736  .85047
  30         PC  .85350  .85647  .85936  .86219  .86494  .86763  .87024  .87279  .87526  .87767
  31         PC     .88  .88229  .88455  .88679    .889  .89119  .89335  .89549   .8976  .89969
  32         PC  .90175  .90379   .9058  .90779  .90975  .91169   .9136  .91549  .91735  .91919
  33         PC    .921  .92279  .92455  .92629    .928  .92969  .93135  .93299   .9346  .93619
  34         PC  .93775  .93929   .9408  .94229  .94375  .94519   .9466  .94799  .94935  .95069
  35         PC    .952   .9533  .95459  .95588  .95716  .95844  .95971  .96098  .96224   .9635
  36         PC  .96475    .966  .96724  .96848  .96971  .97094  .97216  .97338  .97459   .9758
  37         PC    .977   .9782  .97939  .98058  .98176  .98294  .98411  .98528  .98644  .98760
  38         PC  .98875   .9899  .99104  .99218  .99331  .99444  .99556  .99668  .99779   .9989
  39         PC     1.0
  40         LS              62
  41         UD    0.25
             *
  42         ZZ
```

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

| OPERATION | STATION | AREA | PLAN | | RATIOS APPLIED TO PRECIPITATION RATIO 1 3.20 | RATIO 2 5.20 |
|---|---|---|---|---|---|---|
| HYDROGRAPH AT + | 1 | .20 | 1 | FLOW | 39. | 173. |
| | | | | TIME | 12.17 | 12.17 |

*** NORMAL END OF HEC-1 ***

**THIS SHEET WAS PRESENTED AS SHEET 24 APPROVED WITH SEA-15. NO CHANGES HAVE BEEN MADE ON THIS SHEET.**

Dewberry®

Dewberry & Davis LLC
8403 ARLINGTON BLVD.
FAIRFAX, VA 22031
PHONE: 703.849.0100
FAX: 703.849.0519
www.dewberry.com

INOVA FAIRFAX HOSPITAL CAMPUS
GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT
PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL
COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

KEY PLAN

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 26 of 29

| No. | DATE | BY | Description |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

TITLE
INOVA
Fairfax Hospital Campus
HEC-1 Models
GDP / SEA

PROJECT NO.

25

SHEET NO. 25 OF 28

M-10792

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

```
THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                        HEC-1 INPUT                                        PAGE  1

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1         ID        WILLOW OAKS PROPOSED BMP/SWM POND AND OUTFALL
  2         ID        FAIRFAX COUNTY, VIRGINIA
  3         ID        SCS TYPE II, 24-HOUR RAINFALL DISTRIBUTION
  4         ID        FAIRFAX COUNTY PFM RAINFALL DEPTHS
  5         ID        ULTIMATE CONDITIONS DEVELOPMENT
            *DIAGRAM
  6         IT      5                   300
  7         IO      5
            *          2-YR      10-YR     100-YR     OVERTOP
  8         JR    PREC      3.2      5.2      7.3      3.3
            *

  9         KK      1
 10         KM   BASIN 1 RUNOFF HYDROGRAPH - ASSUME DEVELOPED SITE AREA IS BUILT OUT
 11         BA   0.203
 12         PB      1
            * SCS TypeII Rainfall Distribution Pattern
 13         IN      6
 14         PC      0.0  .00101  .00202  .00305  .00408  .00513  .00618  .00725  .00832  .00941
 15         PC   .01050  .01161  .01272  .01385  .01498  .01613  .01728  .01845  .01962  .02081
 16         PC     .022  .02321  .02442  .02565  .02688  .02813  .02938  .03065  .03192  .03321
 17         PC   .03450  .03581  .03712  .03845  .03978  .04113  .04248  .04385  .04522  .04661
 18         PC     .048  .04941  .05084  .05229  .05376  .05525  .05676  .05829  .05984  .06141
 19         PC     .063  .06461  .06624  .06789  .06956  .07125  .07296  .07469  .07644  .07821
 20         PC      .08  .08181  .08364  .08549  .08736  .08925  .09116  .09309  .09504  .09701
 21         PC     .099  .10101  .10304  .10509  .10716  .10925  .11136  .11349  .11564  .11781
 22         PC      .12  .12225  .12460  .12705  .12960  .13225    .135  .13785  .14080  .14385
 23         PC     .147   .1502  .15340   .1566   .1598    .163  .16628  .16972  .17332  .17708
 24         PC     .181  .18512  .18948  .19408  .19892    .204   .2094   .2152   .2214    .228
 25         PC     .235  .24268  .25132  .26092  .27148    .283  .30684  .35436  .43079  .56786
 26         PC     .663  .68196  .69864  .71304  .72516    .735  .74344  .75136  .75876  .76564
 27         PC     .772  .77796  .78364  .78904  .79416    .799   .8036    .808   .8122   .8162
 28         PC      .82  .82367  .82726  .83079  .83424  .83763  .84094  .84419  .84736  .85047
 29         PC   .85350  .85647  .85936  .86219  .86494  .86763  .87024  .87279  .87526  .87767
 30         PC      .88  .88229  .88455  .88679    .889  .89119  .89335  .89549   .8976  .89969
 31         PC   .90175  .90379   .9058  .90779  .90975  .91169   .9136  .91549  .91735  .91919
 32         PC     .921  .92279  .92455  .92629    .928  .92969  .93135  .93299   .9346  .93619
 33         PC   .93775  .93929   .9408  .94229  .94375  .94519   .9466  .94799  .94935  .95069
 34         PC     .952   .9533  .95459  .95588  .95716  .95844  .95971  .96098  .96224   .9635
 35         PC   .96475    .966  .96724  .96848  .96971  .97094  .97216  .97338  .97459   .9758
 36         PC     .977   .9782  .97939  .98058  .98176  .98294  .98411  .98528  .98644  .98760
 37         PC   .98875   .9899  .99104  .99218  .99331  .99444  .99556  .99668  .99779   .9989
 38         PC      1.0
 39         LS              89
 40         UD      0.1
            *

 41         KK    POND
 42         KM   ROUTE BASIN 1 ULTIMATE RUNOFF HYDROGRAPH THROUGH PROPOSED SWM POND
 43         RS        1    ELEV     301
 44         SA     1.75    1.88    2.15    2.33    2.49     2.6    2.77    2.95    3.12    3.16
 45         SE      301     302     304     306     308     310     312     314     316   316.5
 46         SQ        0     1.4    25.3    47.9   100.7   314.4  1098.8  2338.9  2671.6
 47         SE      301     302     306     308  310.75     312     314     316   316.5
            *
1                                        HEC-1 INPUT                                        PAGE  2

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 48         KK      2
 49         KM   BASIN 2 EXISTING RUNOFF HYDROGRAPH
 50         BA   0.034
 51         LS              75
 52         UD    0.10
            *

 53         KK   FLOW-1
 54         KM   COMBINE BASIN 2 HYDROGRAPH TO POND HYDROGRAPH
 55         HC      2
            *

 56         KK      5
 57         KM   BASIN 5 EXISTING RUNOFF HYDROGRAPH
 58         BA   0.058
 59         LS              77
 60         UD    0.15
            *

 61         KK   FLOW-2
 62         KM   COMBINE BASIN 5 HYDROGRAPH TO FLOW-1 HYDROGRAPH
 63         HC      2
            *

 64         KK      3
 65         KM   BASIN 3 EXISTING RUNOFF HYDROGRAPH
 66         BA    0.08
 67         LS              82
 68         UD    0.10
            *

 69         KK   X-POND
 70         KM   ROUTE BASIN 3 EXISTING RUNOFF HYDROGRAPH THROUGH EX POND AT MONARCH RD
 71         RS        1    ELEV     290
 72         SA        0    0.22    0.24    0.56     1.8
 73         SE      290     292     295     300     305
 74         SQ        0     9.3    14.1    17.7   134.7   329.1   368.4  1197.7
 75         SE      290     292     294     296     298     300     302     304
            *

 76         KK      4
 77         KM   BASIN 4 EXISTING RUNOFF HYDROGRAPH
 78         BA   0.016
 79         LS              73
 80         UD    0.10
            *

 81         KK   COMB1
 82         KM   COMBINE X-POND HYDROGRAPH TO BASIN 4 HYDROGRAPH
 83         HC      2
            *
1                                        HEC-1 INPUT                                        PAGE  3

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 84         KK   COMB2
 85         KM   COMBINE FLOW-2 HYDROGRAPH TO COMB1 HYDROGRAPH
 86         HC      2
            *

 87         KK    CR-1
 88         KM   CHANNEL ROUTE COMB2 HYDROGRAPH TO FLOW-3 NODE
 89         RD
 90         RC      0.1   0.045     0.1     600  0.0065
 91         RX        0     129     175     182     189     203     344     443
 92         RY   299.58  290.12  289.47  284.27  284.77  287.15  290.44  297.29
            *

 93         KK     6-A
 94         KM   BASIN 6-A EXISTING RUNOFF HYDROGRAPH
 95         BA   0.027
 96         LS              77
 97         UD     0.1
            *

 98         KK   FLOW-3
 99         KM   COMBINE BASIN 6-A HYDROGRAPH TO CR-1 HYDROGRAPH
100         HC      2
            *

101         KK    CR-2
102         KM   CHANNEL ROUTE FLOW-3 HYDROGRAPH TO FLOW-4 NODE
103         RD
104         RC      0.1   0.045     0.1     435  0.0104
105         RX        0     142     215     217     225     229     266  366.07
106         RY    294.7  283.95   282.6  278.65  278.73     283  283.59  294.78
            *

107         KK     6-B
108         KM   BASIN 6-B EXISTING RUNOFF HYDROGRAPH
109         BA   0.053
110         LS              71
111         UD    0.15
            *

112         KK   FLOW-4
113         KM   COMBINE BASIN 6-B HYDROGRAPH TO CR-2 HYDROGRAPH
114         HC      2
            *

115         KK    CR-3
116         KM   CHANNEL ROUTE FLOW-4 HYDROGRAPH TO FLOW-5 NODE
117         RD
118         RC      0.1  0.0575     0.1    2550   0.008
119         RX        0      32      66      75      85      89     161   220.2
120         RY   285.54  278.13  272.61  265.49  266.48  268.98  272.76   286.5
            *
1                                        HEC-1 INPUT                                        PAGE  4

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

121         KK      7
122         KM   BASIN 7 EXISTING RUNOFF HYDROGRAPH
123         BA   0.048
124         LS              73
125         UD     0.1
            *

126         KK   FLOW-5
127         KM   COMBINE BASIN 7 HYDROGRAPH TO CR-3 HYDROGRAPH
128         HC      2
            *
129         ZZ
1
          SCHEMATIC DIAGRAM OF STREAM NETWORK
INPUT
 LINE     (V) ROUTING           (--->) DIVERSION OR PUMP FLOW

 NO.      (.) CONNECTOR         (<---) RETURN OF DIVERTED OR PUMPED FLOW

   9        1
            V
            V
  41      POND
            .
            .
  48        .          2
            .          .
            .          .
  53      FLOW-1...........
            .
            .
  56        .          5
            .          .
            .          .
  61      FLOW-2...........
            .
            .
  64        .          3
            .          V
            .          V
  69        .       X-POND
            .          .
            .          .
  76        .          .          4
            .          .          .
            .          .          .
  81        .        COMB1...........
            .          .
            .          .
  84      COMB2...........
            V
            V
  87      CR-1
            .
            .
  93        .         6-A
            .          .
            .          .
  98      FLOW-3...........
            V
            V
 101      CR-2
            .
            .
 107        .         6-B
            .          .
            .          .
 112      FLOW-4...........
            V
            V
 115      CR-3
            .
            .
 121        .          7
            .          .
            .          .
 126      FLOW-5...........

    PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                    FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                   TIME TO PEAK IN HOURS

                                                       RATIOS APPLIED TO PRECIPITATION
OPERATION        STATION     AREA    PLAN          RATIO 1  RATIO 2  RATIO 3  RATIO 4
                                                      3.20     5.20     7.30     3.30

 HYDROGRAPH AT
+                      1      .20      1   FLOW      345.     636.     939.     359.
                                           TIME     12.00    12.00    12.00    12.00

 ROUTED TO
+                   POND      .20      1   FLOW       34.     106.     532.      37.
                                           TIME     12.67    12.42    12.17    12.58

                                      ** PEAK STAGES IN FEET **
                                       1   STAGE   306.81   310.78   312.56   307.02
                                           TIME     12.67    12.42    12.17    12.58

 HYDROGRAPH AT
+                      2      .03      1   FLOW       30.      74.     123.      32.
                                           TIME     12.00    12.00    12.00    12.00

 2 COMBINED AT
+                 FLOW-1      .24      1   FLOW       49.     136.     600.      52.
                                           TIME     12.00    12.08    12.08    12.00

 HYDROGRAPH AT
+                      5      .06      1   FLOW       50.     115.     190.      53.
                                           TIME     12.08    12.08    12.00    12.08

 2 COMBINED AT
+                 FLOW-2      .29      1   FLOW       98.     251.     789.     104.
                                           TIME     12.08    12.08    12.08    12.08

 HYDROGRAPH AT
+                      3      .08      1   FLOW      102.     214.     334.     107.
                                           TIME     12.00    12.00    12.00    12.00

 ROUTED TO
+                 X-POND      .08      1   FLOW       76.     187.     294.      82.
                                           TIME     12.08    12.08    12.08    12.08

                                      ** PEAK STAGES IN FEET **
                                       1   STAGE   297.00   298.54   299.64   297.10
                                           TIME     12.08    12.08    12.08    12.08

 HYDROGRAPH AT
+                      4      .02      1   FLOW       13.      32.      55.      13.
                                           TIME     12.00    12.00    12.00    12.00

 2 COMBINED AT
+                  COMB1      .10      1   FLOW       86.     213.     349.      93.
                                           TIME     12.08    12.08    12.00    12.08

 2 COMBINED AT
+                  COMB2      .39      1   FLOW      184.     464.    1125.     197.
                                           TIME     12.08    12.08    12.08    12.08

 ROUTED TO
+                   CR-1      .39      1   FLOW      168.     451.    1034.     179.
                                           TIME     12.17    12.08    12.17    12.08

 HYDROGRAPH AT
+                    6-A      .03      1   FLOW       27.      62.     102.      28.
                                           TIME     12.00    12.00    12.00    12.00

 2 COMBINED AT
+                 FLOW-3      .42      1   FLOW      187.     499.    1078.     202.
                                           TIME     12.08    12.08    12.17    12.08

 ROUTED TO
+                   CR-2      .42      1   FLOW      181.     478.    1055.     192.
                                           TIME     12.17    12.08    12.17    12.08

 HYDROGRAPH AT
+                    6-B      .05      1   FLOW       32.      86.     150.      34.
                                           TIME     12.08    12.08    12.08    12.08

 2 COMBINED AT
+                 FLOW-4      .47      1   FLOW      209.     564.    1165.     226.
                                           TIME     12.08    12.08    12.17    12.08

 ROUTED TO
+                   CR-3      .47      1   FLOW      204.     530.    1112.     220.
                                           TIME     12.25    12.25    12.33    12.25

 HYDROGRAPH AT
+                      7      .05      1   FLOW       38.      97.     166.      40.
                                           TIME     12.00    12.00    12.00    12.00

 2 COMBINED AT
+                 FLOW-5      .52      1   FLOW      216.     558.    1145.     233.
                                           TIME     12.25    12.25    12.33    12.25

1
*** NORMAL END OF HEC-1 ***
```

```
X     X  XXXXXXX   XXXXX           X
X     X  X        X     X         XX
X     X  X        X                X
XXXXXXX  XXXX     X        XXXXX   X
X     X  X        X                X
X     X  X        X     X          X
X     X  XXXXXXX   XXXXX          XXX
```

```
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DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

1                                        HEC-1 INPUT                                        PAGE  1

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1         ID        WILLOW OAKS PROPOSED BMP/SWM POND AND OUTFALL
  2         ID        FAIRFAX COUNTY, VIRGINIA
  3         ID        SCS TYPE II, 24-HOUR RAINFALL DISTRIBUTION
  4         ID        FAIRFAX COUNTY PFM RAINFALL DEPTHS
  5         ID        ULTIMATE CONDITIONS DEVELOPMENT
  6         ID        SPILLWAY DESIGN MODEL
  7         ID        SDF = 1.5 X 100-YR; FBH = 2.5 X 100-YR
            *DIAGRAM
  8         IT      5                   300
  9         IO      5
            *          SDF     FBH
 10         JR    PREC   10.95   18.25
            *

 11         KK     ULT
 12         KM   BASIN ULTIMATE RUNOFF
 13         BA   0.203
 14         PB      1
            * SCS TypeII Rainfall Distribution Pattern
 15         IN      6
 16         PC      0.0  .00101  .00202  .00305  .00408  .00513  .00618  .00725  .00832  .00941
 17         PC   .01050  .01161  .01272  .01385  .01498  .01613  .01728  .01845  .01962  .02081
 18         PC     .022  .02321  .02442  .02565  .02688  .02813  .02938  .03065  .03192  .03321
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 20         PC     .048  .04941  .05084  .05229  .05376  .05525  .05676  .05829  .05984  .06141
 21         PC     .063  .06461  .06624  .06789  .06956  .07125  .07296  .07469  .07644  .07821
 22         PC      .08  .08181  .08364  .08549  .08736  .08925  .09116  .09309  .09504  .09701
 23         PC     .099  .10101  .10304  .10509  .10716  .10925  .11136  .11349  .11564  .11781
 24         PC      .12  .12225  .12460  .12705  .12960  .13225    .135  .13785  .14080  .14385
 25         PC     .147   .1502  .15340   .1566   .1598    .163  .16628  .16972  .17332  .17708
 26         PC     .181  .18512  .18948  .19408  .19892    .204   .2094   .2152   .2214    .228
 27         PC     .235  .24268  .25132  .26092  .27148    .283  .30684  .35436  .43079  .56786
 28         PC     .663  .68196  .69864  .71304  .72516    .735  .74344  .75136  .75876  .76564
 29         PC     .772  .77796  .78364  .78904  .79416    .799   .8036    .808   .8122   .8162
 30         PC      .82  .82367  .82726  .83079  .83424  .83763  .84094  .84419  .84736  .85047
 31         PC   .85350  .85647  .85936  .86219  .86494  .86763  .87024  .87279  .87526  .87767
 32         PC      .88  .88229  .88455  .88679    .889  .89119  .89335  .89549   .8976  .89969
 33         PC   .90175  .90379   .9058  .90779  .90975  .91169   .9136  .91549  .91735  .91919
 34         PC     .921  .92279  .92455  .92629    .928  .92969  .93135  .93299   .9346  .93619
 35         PC   .93775  .93929   .9408  .94229  .94375  .94519   .9466  .94799  .94935  .95069
 36         PC     .952   .9533  .95459  .95588  .95716  .95844  .95971  .96098  .96224   .9635
 37         PC   .96475    .966  .96724  .96848  .96971  .97094  .97216  .97338  .97459   .9758
 38         PC     .977   .9782  .97939  .98058  .98176  .98294  .98411  .98528  .98644  .98760
 39         PC   .98875   .9899  .99104  .99218  .99331  .99444  .99556  .99668  .99779   .9989
 40         PC      1.0
 41         LS              89
 42         UD     0.10
            *
            * ASSUME PROP. RISER IS CLOGGED AND START ROUTING AT TOP OF EMERGENCY SPILLWAY
1                                        HEC-1 INPUT                                        PAGE  2

LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 43         KK    POND
 44         KM   ROUTE BASIN ULT THROUGH PROPOSED SWM POND
 45         RS        1    ELEV  310.75
 46         SA     1.75    1.88    2.15    2.33    2.49     2.6    2.77    2.95    3.12    3.16
 47         SE      301     302     304     306     308     310     312     314     316   316.5
 48         SQ        0   184.5   916.7  2098.6    2444
 49         SE   310.75     312     314     316   316.5
            *
 50         ZZ

    PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                    FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                   TIME TO PEAK IN HOURS

                                                 RATIOS APPLIED TO PRECIPITATION
OPERATION        STATION     AREA    PLAN          RATIO 1  RATIO 2
                                                     10.95    18.25

 HYDROGRAPH AT
+                    ULT      .20      1   FLOW     1458.    2483.
                                           TIME     12.00    12.00

 ROUTED TO
+                   POND      .20      1   FLOW     1273.    2231.
                                           TIME     12.08    12.00

                                      ** PEAK STAGES IN FEET **
                                       1   STAGE   314.60   316.19
                                           TIME     12.08    12.00

*** NORMAL END OF HEC-1 ***
```

**THIS SHEET WAS PRESENTED AS SHEET 25 APPROVED WITH SEA-15. NO CHANGES HAVE BEEN MADE ON THIS SHEET.**


**Dewberry**®

Dewberry & Davis LLC
8403 ARLINGTON BLVD.
FAIRFAX, VA 22031
PHONE: 703.849.0100
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www.dewberry.com


# INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL: COMMONWEALTH OF VIRGINIA — TIMOTHY CHARLES CULLETON — Lic. No. 20112 — 12.5.2011 — PROFESSIONAL ENGINEER

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 27 of 29

SCALE

| No. | DATE | BY | Description |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY JMC
APPROVED BY
CHECKED BY PGY
DATE April 18, 2011

TITLE
INOVA
Fairfax Hospital Campus
HEC-1 Models
GDP / SEA

PROJECT NO.

26

SHEET NO. 26 OF 28

M-10792

```
X     X  XXXXXXX   XXXXX        X
X     X  X        X     X      XX
X     X  X        X             X
XXXXXXX  XXXX     X      XXXXX  X
X     X  X        X             X
X     X  X        X     X       X
X     X  XXXXXXX   XXXXX       XXX

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL   LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

                                  HEC-1 INPUT                                          PAGE  1
1
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

  1         ID        INOVA FAIRFAX HOSPITAL
  2         ID        FAIRFAX COUNTY, VIRGINIA
  3         ID        SCS TYPE II, 24-HOUR RAINFALL DISTRIBUTION
  4         ID        FAIRFAX COUNTY PFM RAINFALL DEPTHS
  5         ID        WOODBURN ROAD OUTFALL MODEL
  6         ID        2-, 10-, AND 100-YR
            *
  7         IT       5
  8         IO       5
  9         JP       3
            *
            *
            *

 10         KK       A
 11         KM  2-YEAR RUNOFF HYDROGRAPH TO PROPOSED SWM VAULT 1
 12         KO                                      22
 13         QI       0   78.75   50.72   37.57   30.06   24.85    21.1    18.5    15.9   14.45
 14         QI   12.86   11.85   10.69    9.83    8.96    8.09    7.08    6.21    5.35    4.48
 15         QI    3.61    2.75    1.73    0.87       0
 16         KP       2
 17         KM  10-YEAR RUNOFF HYDROGRAPH TO PROPOSED SWM VAULT 1
 18         QI       0  105.05   67.63      50   40.03   33.09   28.03   24.28   21.24   18.93
 19         QI   17.05   15.61   14.31   13.15   11.99   10.69    9.54    8.38    7.23    5.92
 20         QI    4.77    3.61    2.46    1.16       0
 21         KP       3
 22         KM  100-YEAR RUNOFF HYDROGRAPH TO PROPOSED SWM VAULT 1
 23         QI       0  177.74  115.06   85.44   67.55   56.54   47.87   42.09   37.39   33.96
 24         QI   30.53      28   25.65   23.48   21.31   19.33   17.16   14.99   12.82   10.66
 25         QI    8.49     6.5    4.34    2.17       0
            *

 26         KK  VAULT1
 27         KM  ROUTE HYDROGRAPHS THROUGH PROPOSED SWM VAULT 1
 28         KO                                      22
 29         RS       1    ELEV     328
 30         SV       0   1.638   1.641   3.053   3.053
 31         SE     328     335  335.01     339     341
            * 8" ORIFICE AT INV 328; 20' WEIR AT ELEV 339
 32         SL  328.33   0.349     0.6     0.5
 33         SS     339      20       3     1.5
            *

 34         KK       B
 35         KM  2-YEAR RUNOFF HYDROGRAPH TO PROPOSED SWM VAULT 2
 36         KO                                      22
 37         QI       0    17.6   11.34     8.4    6.72    5.56    4.72    4.13    3.55    3.23
 38         QI    2.87    2.65    2.39     2.2       2    1.81    1.58    1.39     1.2       1
 39         QI    0.81    0.61    0.39    0.19       0
 40         KP       2
 41         KM  10-YEAR RUNOFF HYDROGRAPH TO PROPOSED SWM VAULT 2
 42         QI       0   23.48   15.12   11.18    8.95     7.4    6.27    5.43    4.75    4.23
 43         QI    3.81    3.49     3.2    2.94    2.68    2.39    2.13    1.87    1.62    1.32
 44         QI    1.07    0.81    0.55    0.26       0
 45         KP       3
                                  HEC-1 INPUT                                          PAGE  2
1
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 46         KM  100-YEAR RUNOFF HYDROGRAPH TO PROPOSED SWM VAULT 2
 47         QI       0   39.73   25.72    19.1    15.1   12.64    10.7    9.41    8.36    7.59
 48         QI    6.82    6.26    5.73    5.25    4.76    4.32    3.84    3.35    2.87    2.38
 49         QI     1.9    1.45    0.97    0.48       0
            *

 50         KK  VAULT2
 51         KM  ROUTE HYDROGRAPHS THROUGH PROPOSED SWM VAULT 2
 52         KO                                      22
 53         RS       1    ELEV     328
 54         SA   0.083   0.083   0.083   0.083   0.083
 55         SE     328     335  335.01     339     341
            * 8" ORIFICE AT INV 328; 20' WEIR AT ELEV 339
 56         SL  328.33   0.349     0.6     0.5
 57         SS     339      20       3     1.5
            *

 58         KK       C
 59         KM  2-YEAR RUNOFF HYDROGRAPH FROM DOWNSTREAM OF 2 VALUTS TO (1)
 60         KO                                      22
 61         QI       0   16.19   28.98   21.42   14.87   11.47    9.39    7.88    6.68    5.73
 62         QI    4.91    4.35    3.78    3.47    3.15    2.84    2.52    2.21    1.89    1.58
 63         QI    1.26    0.95    0.63    0.32       0
 64         KP       2
 65         KM  10-YEAR RUNOFF HYDROGRAPH FROM DOWNSTREAM OF 2 VALUTS TO (1)
 66         QI       0   20.48    37.3   28.54   19.78   15.31   12.54   10.52    8.88    7.62
 67         QI    6.55     5.8    5.04     4.6    4.22    3.78    3.34    2.96    2.52    2.08
 68         QI     1.7    1.26    0.82    0.44       0
 69         KP       3
 70         KM  100-YEAR RUNOFF HYDROGRAPH FROM DOWNSTREAM OF 2 VALUTS TO (1)
 71         QI       0   28.98   63.79   50.95   34.97   27.56   22.52   19.14   17.09    15.2
 72         QI   14.02   13.15   12.44   11.42    10.4    9.37    8.27    7.25    6.22     5.2
 73         QI    4.17    3.15    2.05    1.02       0
            *

 74         KK       1
 75         KM  COMBINED RUNOFF HYDROGRAPHS FROM 2 VAULTS AND BASIN C
 76         HC       3
            *

 77         KK       D
 78         KM  2-YEAR RUNOFF HYDROGRAPH TO (2)
 79         KO                                      22
 80         QI       0   26.38   16.99   12.58   10.07    8.32    7.07     6.2    5.32    4.84
 81         QI    4.31    3.97    3.58    3.29       3    2.71    2.37    2.08    1.79     1.5
 82         QI    1.21    0.92    0.58    0.29       0
 83         KP       2
 84         KM  10-YEAR RUNOFF HYDROGRAPH TO (2)
 85         QI       0   35.19   22.65   16.75   13.41   11.08    9.39    8.13    7.11    6.34
 86         QI    5.71    5.23    4.79     4.4    4.02    3.58    3.19    2.81    2.42    1.98
 87         QI     1.6    1.21    0.82    0.39       0
 88         KP       3
 89         KM  100-YEAR RUNOFF HYDROGRAPH TO (2)
 90         QI       0   59.53   38.54   28.62   22.63   18.94   16.03    14.1   12.52   11.37
 91         QI   10.22    9.38    8.59    7.87    7.14    6.47    5.75    5.02     4.3    3.57
                                  HEC-1 INPUT                                          PAGE  3
1
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

 92         QI    2.84    2.18    1.45    0.73       0
            *

 93         KK       2
 94         KM  COMBINED RUNOFF HYDROGRAPHS FROM 1 AND BASIN D
 95         HC       2
            *

 96         KK       E
 97         KM  2-YEAR RUNOFF HYDROGRAPH TO (4)
 98         QI       0    11.4   19.35    24.1   26.16   23.87   17.37   12.78   10.48     9.1
 99         QI    8.11    7.27    6.73     6.2    5.58    5.05    4.51     3.9    3.37    2.83
100         QI    2.22    1.68    1.15    0.54       0
101         KP       2
102         KM  10-YEAR RUNOFF HYDROGRAPH TO (4)
103         QI       0   15.15   25.78   32.13   34.88   31.82    23.1   16.98      14   12.09
104         QI   10.79    9.72    8.95    8.19     7.5    6.73    5.97     5.2    4.51    3.75
105         QI    2.98    2.22    1.53    0.77       0
106         KP       3
107         KM  100-YEAR RUNOFF HYDROGRAPH TO (4)
108         QI       0   13.67   32.13   50.97   60.44   49.25   36.15   28.97   24.38   21.32
109         QI   19.13   17.88   16.73    15.3   13.96   12.53   11.19    9.75    8.42    6.98
110         QI    5.55    4.21    2.77    1.43       0
            *

111         KK     A-A
112         KM  PROPOSED RUNOFF HYDROGRAPH TO CROSS SECTION A-A
113         HC       2
            *

114         KK       F
115         KM  2-YEAR RUNOFF HYDROGRAPH TO CONFLUENCE
116         QI       0   30.44   58.67   71.96   60.33   42.62   32.47    26.2   21.59    17.9
117         QI   14.76   12.36   10.15    9.23    8.49    7.56    6.83     5.9    5.17    4.24
118         QI    3.32    2.58    1.66    0.92       0
119         KP       2
120         KM  10-YEAR RUNOFF HYDROGRAPH TO CONFLUENCE
121         QI       0   40.59   78.23    94.1   80.44   56.83   43.17   34.87   28.78    23.8
122         QI   19.74   16.42   13.47   12.36   11.25   10.15    9.04    7.93    6.83    5.54
123         QI    4.43    3.32    2.21    1.11       0
124         KP       3
125         KM  100-YEAR RUNOFF HYDROGRAPH TO CONFLUENCE
126         QI       0   64.81  138.14  162.59  131.23   89.71   73.11   62.96   55.35   49.82
127         QI   45.66    42.2   38.75   35.52   32.29   29.06   25.83    22.6   19.37   16.14
128         QI   12.92    9.69    6.46    3.23       0
            *

129         KK       4
130         KM  PROPOSE RUNOFF HYDROGRAPH TO EXISTING 72" STM AND CROSS SECTION B-B
131         HC       2
            *
                                  HEC-1 INPUT                                          PAGE  4
1
LINE        ID.......1.......2.......3.......4.......5.......6.......7.......8.......9......10

132         KK       G
133         KM  2-YEAR RUNOFF HYDROGRAPH TO (5)
134         KO                                      22
135         QI       0   40.39   77.85   95.47   80.05   56.55   43.08   34.76   28.64   23.75
136         QI   19.58    16.4   13.46   12.24   11.26   10.04    9.06    7.83    6.85    5.63
137         QI    4.41    3.43     2.2    1.22       0
138         KP       2
139         KM  10-YEAR RUNOFF HYDROGRAPH TO (5)
140         QI       0   53.86   103.8  124.85  106.73    75.4   57.28   46.27   38.19   31.58
141         QI   26.19   21.79   17.87    16.4   14.93   13.46      12   10.53    9.06    7.34
142         QI    5.88    4.41    2.94    1.47       0
143         KP       3
144         KM  100-YEAR RUNOFF HYDROGRAPH TO (5)
145         QI       0   85.99  183.29  215.73  174.11  119.03      97   83.54   73.44    66.1
146         QI   60.59      56   51.41   47.12   42.84   38.56   34.27   29.99    25.7   21.42
147         QI   17.14   12.85    8.57    4.28       0
            *

148         KK       5
149         KM  COMBINED RUNOFF HYDROGRAPHS FROM 4 TO BASIN G
150         HC       2
            *

151         KK       H
152         KM  2-YEAR RUNOFF HYDROGRAPH TO (6)
153         KO                                      22
154         QI       0   28.96   55.81   68.45   57.39   40.54   30.89   24.92   20.53   17.02
155         QI   14.04   11.76    9.65    8.78    8.07     7.2    6.49    5.62    4.91    4.04
156         QI    3.16    2.46    1.58    0.88       0
157         KP       2
158         KM  10-YEAR RUNOFF HYDROGRAPH TO (6)
159         QI       0   38.61   74.41   89.51   76.52   54.05   41.07   33.17   27.38   22.64
160         QI   18.78   15.62   12.81   11.76   10.71    9.65     8.6    7.55    6.49    5.27
161         QI    4.21    3.16    2.11    1.05       0
162         KP       3
163         KM  100-YEAR RUNOFF HYDROGRAPH TO (6)
164         QI       0   61.64  131.41  154.66  124.82   85.34   69.54   59.89   52.65   47.39
165         QI   43.44   40.15   36.86   33.78   30.71   27.64   24.57    21.5   18.43   15.36
166         QI   12.29    9.21    6.14    3.07       0
            *

167         KK       6
168         KM  COMBINED RUNOFF HYDROGRAPHS FROM 5 TO BASIN H
169         HC       2
            *
170         ZZ
```

```
PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
                  FLOWS IN CUBIC FEET PER SECOND,  AREA IN SQUARE MILES
                                 TIME TO PEAK IN HOURS

                                                            RATIOS APPLIED TO FLOWS
OPERATION        STATION      AREA    PLAN          RATIO 1
                                                       1.00

 HYDROGRAPH AT
+                   A          .00      1   FLOW       79.
                                            TIME       .08
                                        2   FLOW      105.
                                            TIME       .08
                                        3   FLOW      178.
                                            TIME       .08

 ROUTED TO
+                VAULT1        .00      1   FLOW        5.
                                            TIME      1.58
                                        2   FLOW        5.
                                            TIME      1.58
                                        3   FLOW       57.
                                            TIME       .42

                                     ** PEAK STAGES IN FEET **
                                        1   STAGE   336.19
                                            TIME      1.58
                                        2   STAGE   338.41
                                            TIME      1.67
                                        3   STAGE   339.92
                                            TIME       .83

 HYDROGRAPH AT
+                   B          .00      1   FLOW       18.
                                            TIME       .08
                                        2   FLOW       23.
                                            TIME       .08
                                        3   FLOW       40.
                                            TIME       .08

 ROUTED TO
+                VAULT2        .00      1   FLOW        3.
                                            TIME       .83
                                        2   FLOW        4.
                                            TIME       .92
                                        3   FLOW        5.
                                            TIME      1.08

                                     ** PEAK STAGES IN FEET **
                                        1   STAGE   331.54
                                            TIME       .83
                                        2   STAGE   332.98
                                            TIME       .92
                                        3   STAGE   337.56
                                            TIME      1.08

 HYDROGRAPH AT
+                   C          .00      1   FLOW       29.
                                            TIME       .17
                                        2   FLOW       37.
                                            TIME       .17
                                        3   FLOW       64.
                                            TIME       .17

   3 COMBINED AT
+                   1          .00      1   FLOW       34.
                                            TIME       .17
                                        2   FLOW       43.
                                            TIME       .17
                                        3   FLOW       89.
                                            TIME       .42

 HYDROGRAPH AT
+                   D          .00      1   FLOW       26.
                                            TIME       .08
                                        2   FLOW       35.
                                            TIME       .08
                                        3   FLOW       60.
                                            TIME       .08

   2 COMBINED AT
+                   2          .00      1   FLOW       51.
                                            TIME       .17
                                        2   FLOW       66.
                                            TIME       .17
                                        3   FLOW      110.
                                            TIME       .17

 HYDROGRAPH AT
+                   E          .00      1   FLOW       26.
                                            TIME       .33
                                        2   FLOW       35.
                                            TIME       .33
                                        3   FLOW       60.
                                            TIME       .33

   2 COMBINED AT
+                 A-A          .00      1   FLOW       70.
                                            TIME       .17
                                        2   FLOW       91.
                                            TIME       .17
                                        3   FLOW      157.
                                            TIME       .42

 HYDROGRAPH AT
+                   F          .00      1   FLOW       72.
                                            TIME       .25
                                        2   FLOW       94.
                                            TIME       .25
                                        3   FLOW      163.
                                            TIME       .25

   2 COMBINED AT
+                   4          .00      1   FLOW      136.
                                            TIME       .25
                                        2   FLOW      178.
                                            TIME       .25
                                        3   FLOW      302.
                                            TIME       .25

 HYDROGRAPH AT
+                   G          .00      1   FLOW       95.
                                            TIME       .25
                                        2   FLOW      125.
                                            TIME       .25
                                        3   FLOW      216.
                                            TIME       .25

   2 COMBINED AT
+                   5          .00      1   FLOW      231.
                                            TIME       .25
                                        2   FLOW      303.
                                            TIME       .25
                                        3   FLOW      518.
                                            TIME       .25

 HYDROGRAPH AT
+                   H          .00      1   FLOW       68.
                                            TIME       .25
                                        2   FLOW       90.
                                            TIME       .25
                                        3   FLOW      155.
                                            TIME       .25

   2 COMBINED AT
+                   6          .00      1   FLOW      300.
                                            TIME       .25
                                        2   FLOW      393.
                                            TIME       .25
                                        3   FLOW      672.
                                            TIME       .25

 *** NORMAL END OF HEC-1 ***
```

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 28 of 29

**THIS SHEET WAS PRESENTED AS SHEET 26 APPROVED WITH SEA-15. NO CHANGES HAVE BEEN MADE ON THIS SHEET.**

**Dewberry®**


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INOVA FAIRFAX HOSPITAL CAMPUS

GENERALIZED DEVELOPMENT PLAN / SPECIAL EXCEPTION AMENDMENT PLAT

PROVIDENCE DISTRICT
FAIRFAX COUNTY, VIRGINIA

SEAL

COMMONWEALTH OF VIRGINIA
TIMOTHY CHARLES CULLETON
Lic. No. 20112
12-5-2011
PROFESSIONAL ENGINEER

KEY PLAN

SCALE

| No. | DATE | BY | Description |
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| 5 | 12.05.11 | JMC | |
| 4 | 11.01.11 | JMC | |
| 3 | 10.05.11 | JMC | |
| 2 | 08.26.11 | JMC | |
| 1 | 07.15.11 | JMC | |

REVISIONS

DRAWN BY JMC

APPROVED BY

CHECKED BY PGY

DATE April 18, 2011

TITLE

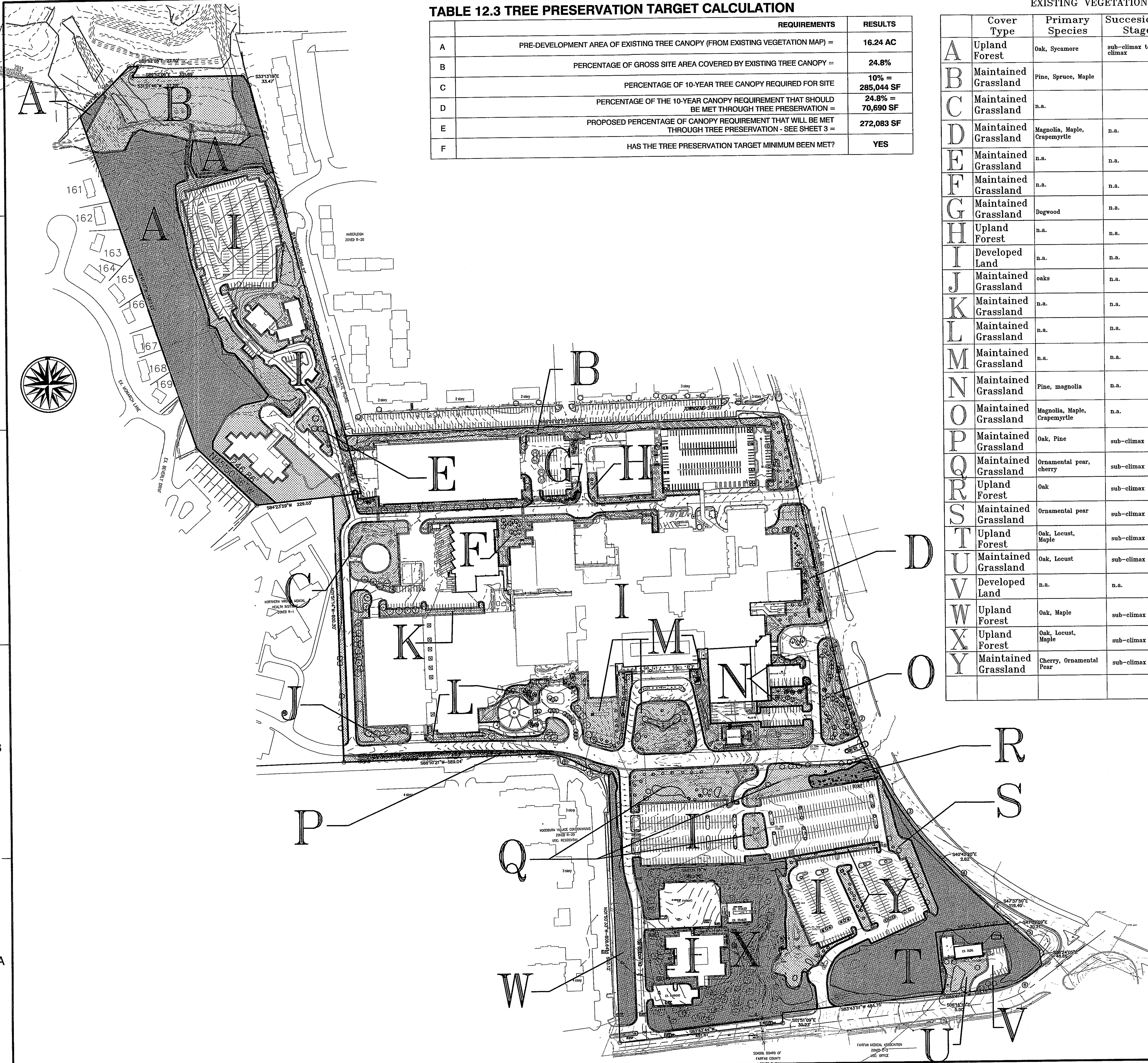
INOVA
Fairfax Hospital Campus
HEC-1 Models

PROJECT NO.

27

SHEET NO. 27 OF 28

M-10792




## TABLE 12.3 TREE PRESERVATION TARGET CALCULATION

| | REQUIREMENTS | RESULTS |
|---|---|---|
| A | PRE-DEVELOPMENT AREA OF EXISTING TREE CANOPY (FROM EXISTING VEGETATION MAP) = | 16.24 AC |
| B | PERCENTAGE OF GROSS SITE AREA COVERED BY EXISTING TREE CANOPY = | 24.8% |
| C | PERCENTAGE OF 10-YEAR TREE CANOPY REQUIRED FOR SITE | 10% = 285,044 SF |
| D | PERCENTAGE OF THE 10-YEAR CANOPY REQUIREMENT THAT SHOULD BE MET THROUGH TREE PRESERVATION = | 24.8% = 70,690 SF |
| E | PROPOSED PERCENTAGE OF CANOPY REQUIREMENT THAT WILL BE MET THROUGH TREE PRESERVATION - SEE SHEET 3 = | 272,083 SF |
| F | HAS THE TREE PRESERVATION TARGET MINIMUM BEEN MET? | YES |

## EXISTING VEGETATION MAP COVER TYPE SUMMARY

| | Cover Type | Primary Species | Succesional Stage | Condition | Acreage | Comments |
|---|---|---|---|---|---|---|
| A | Upland Forest | Oak, Sycamore | sub-climax to climax | good | 5.04 ac.± | many mature oaks, sycamores and maples. Several with greater than 20" caliper. Some honeysuckle, dogwood understory. |
| B | Maintained Grassland | Pine, Spruce, Maple | | good | 6.08 ac.± | Mostly Pine and Spruce, some Maple and Cherry. Screening, foundation plantings, and Stormwater managment ponds. |
| C | Maintained Grassland | n.a. | | good | 0.47 ac.± | Grassed area surrounding water tank |
| D | Maintained Grassland | Magnolia, Maple, Crapemyrtle | n.a. | good | 0.67 ac.± | Ornamental plantings along Gallows Road |
| E | Maintained Grassland | n.a. | n.a. | good | 0.14 ac.± | Parking lot island planting |
| F | Maintained Grassland | n.a. | n.a. | good | 0.45 ac.± | Landscaped plazas and foundation/street plant |
| G | Maintained Grassland | Dogwood | n.a. | good | 0.06 ac.± | Dogwoods and small evergreens to screen transformers |
| H | Upland Forest | n.a. | n.a. | good | 0.20 ac.± | Grassed area |
| I | Developed Land | n.a. | n.a. | n.a. | 38.59 ac.± | Hospital campus buildings and roads/parking/ travelways |
| J | Maintained Grassland | oaks | n.a. | good | 0.50 ac.± | Grass and street trees |
| K | Maintained Grassland | n.a. | n.a. | good | 0.14 ac.± | Grass and ornamental/foundation plantings |
| L | Maintained Grassland | n.a. | n.a. | good | 0.43 ac.± | Grass and ornamental/foundation plantings |
| M | Maintained Grassland | n.a. | n.a. | good | 1.86 ac.± | Grass and ornamental/foundation plantings |
| N | Maintained Grassland | Pine, magnolia | n.a. | good | 0.22 ac.± | Parking lot screening, entry planting |
| O | Maintained Grassland | Magnolia, Maple, Crapemyrtle | n.a. | good | 0.50 ac.± | Ornamental plantings along Gallows Road |
| P | Maintained Grassland | Oak, Pine | sub-climax | good | 0.32 ac.± | Screening between hospital campus and Woodburn Village, holly shrubs in addition to oaks and pines |
| Q | Maintained Grassland | Ornamental pear, cherry | sub-climax | good | 1.32 ac.± | grassed areas, swm, trees along loop road |
| R | Upland Forest | Oak | sub-climax | good | 0.18 ac.± | Mix of mature forest with ornamental cherries along loop road. |
| S | Maintained Grassland | Ornamental pear | sub-climax | good | 0.30 ac.± | Grassed slope adjacent to surface parking, with ornamental pears |
| T | Upland Forest | Oak, Locust, Maple | sub-climax | good | 2.87 ac.± | Mature oak and honeylocust, with some with some mature maple. Dogwood understory. |
| U | Maintained Grassland | Oak, Locust | sub-climax | good | 0.24 ac.± | Foundation Planting and grassed area in front of Woodburn Place, clump of mature oaks |
| V | Developed Land | n.a. | n.a. | n.a. | 0.27 ac.± | Woodburn Place building and parking |
| W | Upland Forest | Oak, Maple | sub-climax | good | 0.67 ac.± | Mature oak and honeylocust, with some with some mature maple. Dogwood understory. |
| X | Upland Forest | Oak, Locust, Maple | sub-climax | good | 3.26 ac.± | Mature oak and honeylocust, with some with some mature maple. Dogwood understory. |
| Y | Maintained Grassland | Cherry, Ornamental Pear | sub-climax | good | 0.68 ac.± | Parking lot landscaping |
| | | | | Total Acreage | 65.46 ac.± | |

Application No. PCA 2008-PR-009 Staff WOD
Concur w/ SEA 80-P-078-16
APPROVED DEVELOPMENT PLAN
(DP) (GDP) (CDP) (FDP) (SEA PLAT)
SEE PROFFERS DATED 12/5/2011
SEA CONDS DATED 12/5/2011
Date of (BOS) (PC) Approval 2-28-2012

Sheet 29 of 29

NO CHANGES TO THE EVM SUBMITTED WITH SEA-15

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SCALE
0' 140' 280'

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Existing Vegetation Map

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28


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