

Hospital Area Development Plan

January 2008

Final



Hospital

Area Development Plan

January 2008



Contents

1 Introduction

Purpose	2
Process	2
Vision	2

2 The Setting

Location of ADP Study Limits	6
Character of ADP Study Limits	6
LRC Land Use Designation	6

3 Existing Site Character

Overview	8
Development Constraints	10
Buildable Areas	14
Facilities and Operations	22
Circulation Patterns	24

4 Program Requirements

Overview	26
Existing Tenants and Functions	26
Proposed Projects	26
Displaced Facilities	26
Long-Term Program Strategy	27
New Construction	27

5 Planning Principles

Overview	28
LEED for Neighborhood Development	29

6 Planning Framework

Overview	32
Required NEPA Documentation	32
Framework Plan Alternatives	32
Evaluation Criteria	32
Preferred Framework	34

7 Planning Recommendations

Development Strategy	36
Relationship to Long Range Development Plan	36
Environmental Strategies	40
Circulation Patterns/ Transportation Management	48
Security Strategy	51

8 Implementation

Phasing and Funding	52
Updating the Plan	52
Near Term Development Strategy	52
Long Term Development Strategy	52
LEED ND Certification	52

Appendices

Strategy for Existing Buildings	A-1
MWR Framework Plan (2030)	A-2
Central Plant Study	A-7
Sources	A-12
LEED ND Checklist	A-14
Davison Army Airfield	A-16
List of Figures	A-19
List of Tables	A-19

1 Introduction

Purpose

Area Development Plans (ADPs), by definition, address the site planning of a specific area of an installation – unified by function, identity, location or architectural style. The focus of this ADP is the relocation and expansion of the Fort Belvoir Community Hospital (formerly DeWitt).

In addition to analysis, drawings, and plans, the ADP will also include details or sketches that illustrate important features of the plan - such as architectural character, recommended solutions to circulation problems, etc. It will also indicate construction phasing and development priorities, which will correlate with the facility programming contained in the Short-Range Component (SRC), Military Construction (MILCON), and other project funding documentation.

Process

Developing an ADP is an inherently flexible process. While each ADP has its own unique focus, there are eight key steps that are general to creating an ADP. The intent is to use these steps in coordination with the Leadership in Energy and Environmental Design (LEED) for Neighborhood Development (ND) Rating System administered by the US Green Building Council (USGBC). At the time of publication LEED ND was in pilot form. The use of this program within the ADP will encourage and raise awareness of best practices in sustainable design.

- STEP 1: Set goals.
- STEP 2: Define area boundary.
- STEP 3: Define program requirements.
- STEP 4: Collect and analyze data.
- STEP 5: Develop alternative plans.
- STEP 6: Evaluate alternative plans.
- STEP 7: Develop final plan.
- STEP 8: Develop implementation plan.

Vision

There are currently four inpatient facilities in the National Capital Region (NCR) - Bethesda National Naval Medical Center, Walter Reed Army Medical Center, Malcolm Grow Medical Center and DeWitt Army Community Hospital. These four hospitals will merge into two, the Walter Reed National Military Medical Center (WRNMMC) and the Fort Belvoir Community Hospital, in an attempt to streamline medical care and make the system more efficient.

In addition to the goal of designing a world class hospital to serve both the Belvoir community and the armed forces as a whole, the hospital needs to be a dense, diverse, interconnected and open campus that is part of the post; not just a large building that is replacing the golf course.

- Redevelop the site west of Belvoir Road as a new health campus
- Create a clear north-south “patient care link” that clearly integrates offices, outpatient, inpatient and parking
- Identify future phases for expansion of ambulatory services without disrupting the campus and circulation
- Redevelop the area east of Gunston Road as a new office campus
- Create new ballfields and a small community center along the north side of 9th Street that is easily accessible
- Gray’s Hill site could also be available for appropriate adjacent use to the hospital.

Figure 1-1 The Setting: Future Hospital Campus

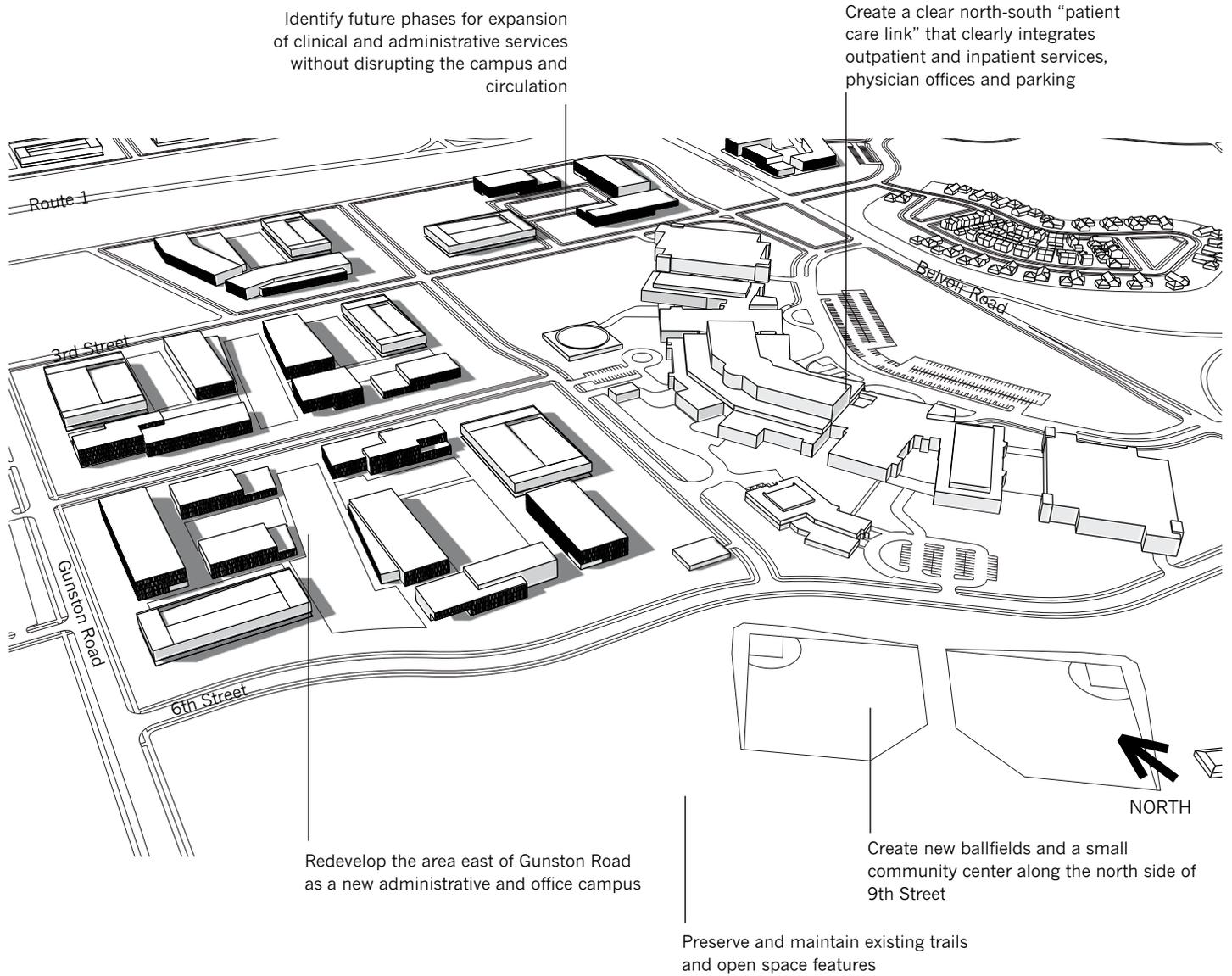
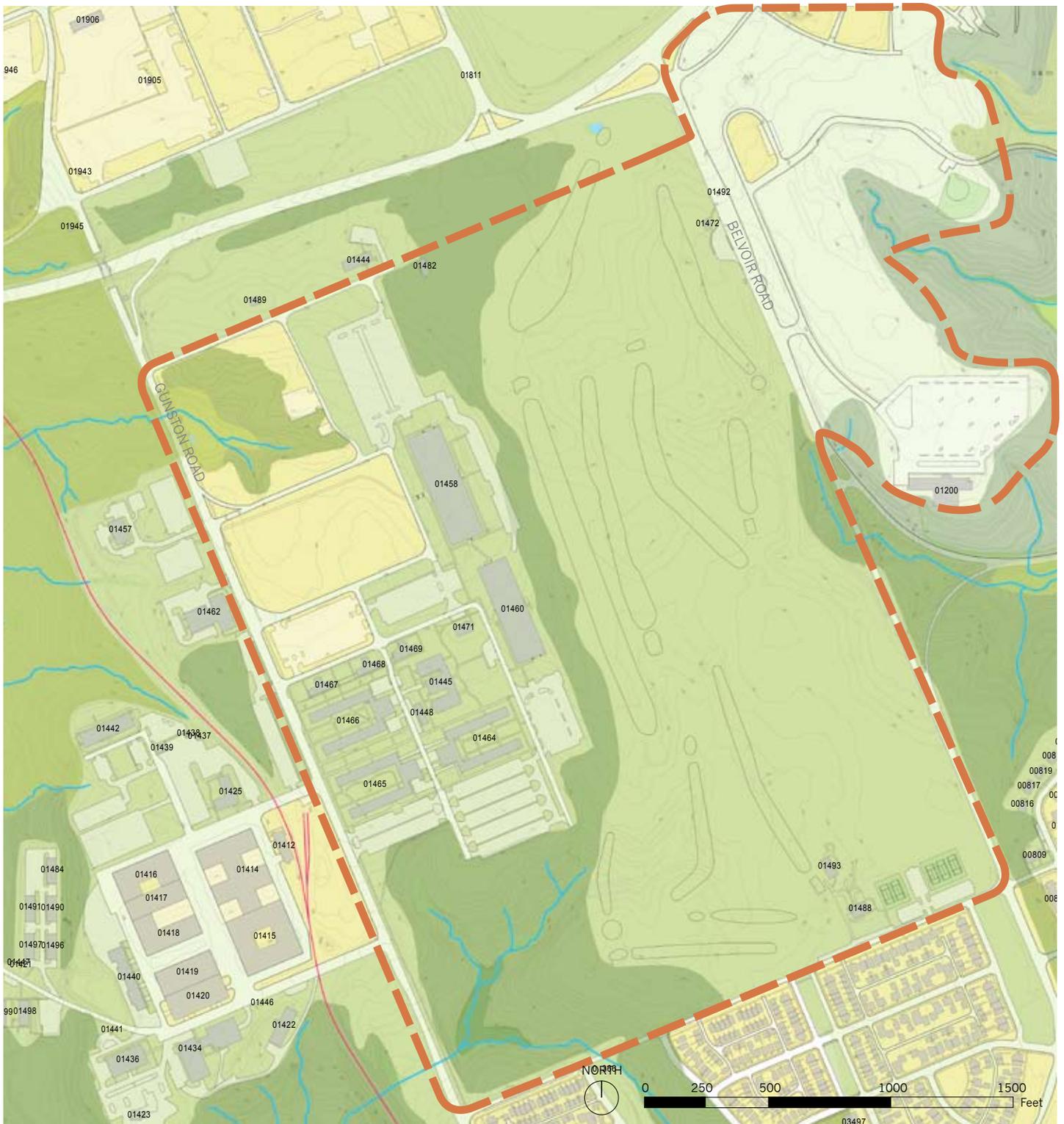


Figure 1-2 Existing Hospital Site



1200	GERBER HALL	1468	ADMIN, GEN PURP
1444	ADMIN, GENERAL PURPOSE	1469	ADMIN, GEN PURP
1445	ADMIN, GEN PURP	1471	CLINIC, MEDICAL
1448	EVAP COOL EQUIPMENT FACILITY	1472	INFO STAND, VISITORS CENTER
1458	AMC HEADQUARTERS	1482	GOLF MAINTENANCE FACILITY
1460	AMC HEADQUARTERS	1486	GOLF STORAGE
1464	HAUSE BUILDING	1488	SOUTHSIDE GRILL
1465	CID HEADQUARTERS	1489	SUBSTATION
1466	BROWN BUILDING	1492	SENTRY STATION (PENCE GATE)
1467	CLINIC, MEDICAL		

Figure 1-3 Long Term Proposal for the Hospital Area



legend

	Existing Buildings		Proposed Parking Garage		Streams		Engineered Open Space
	Proposed Buildings		Area Development Plan Bound		Foreste		Previously Developed Land
	Future Expansion		Proposed Block Framework		Grasslands		Recreational Fields

2 The Setting

Location of ADP Study Limits

The area where the new Ft. Belvoir Community hospital will be built is located between Belvoir Road to the east and the Army Materiel Command (AMC) buildings to the west; and Route 1 to the north and 9th Street to the south. Presently the site is only accessed from 9th street; however there are many infrastructure improvements that need to be made to create better access to and from the site for staff, patients and visitors.

Character of ADP Study Limits

The area where the new hospital will be sited (south 9 golf course) is an important community resource that is being replaced by a medical campus; which will also serve the community at large.

Although there are some stakeholders who are unhappy with the siting of the hospital on the South 9 golf course, there are few options on Ft. Belvoir where 1 million square feet can be built. Other options for the site were on Gray's Hill across the street from the golf course, and an option of building a smaller hospital and placing it in the North Post area.

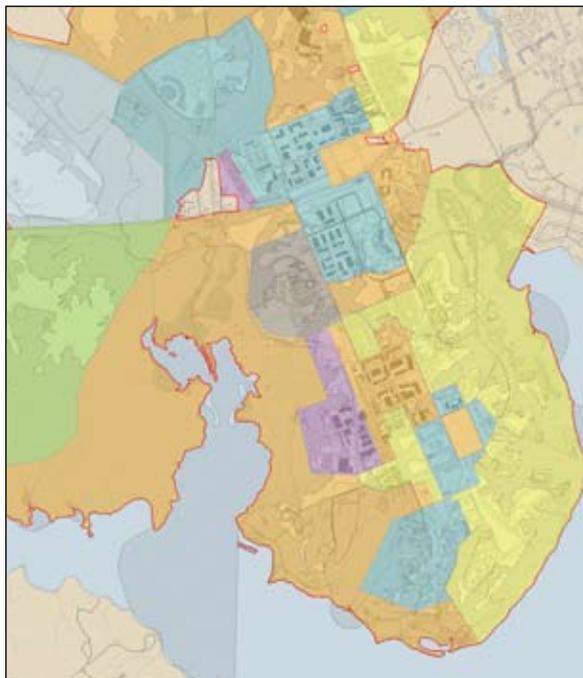
Defining an adjacent use on Gray's Hill has also been a goal of the installation. The installation has long identified the need to have a large hotel and conference center complex. The growth of the installation population and the presence of a major military hospital may make this need more acute, therefore, it is suggested that this use could be sited across from the hospital on Gray's Hill in order to accommodate all manner of conferences, workshops and training, especially the type that medical staff are required to attend.

LRC Land Use Designation

Today the area is labeled as "Community" because it is presently a 9-hole golf course; with a club house, tennis courts and parking at the south end of the site. The 2015 and 2030 Land Use Map shows the area as "Professional/Institutional" use; the site will then be used primarily as a medical campus.

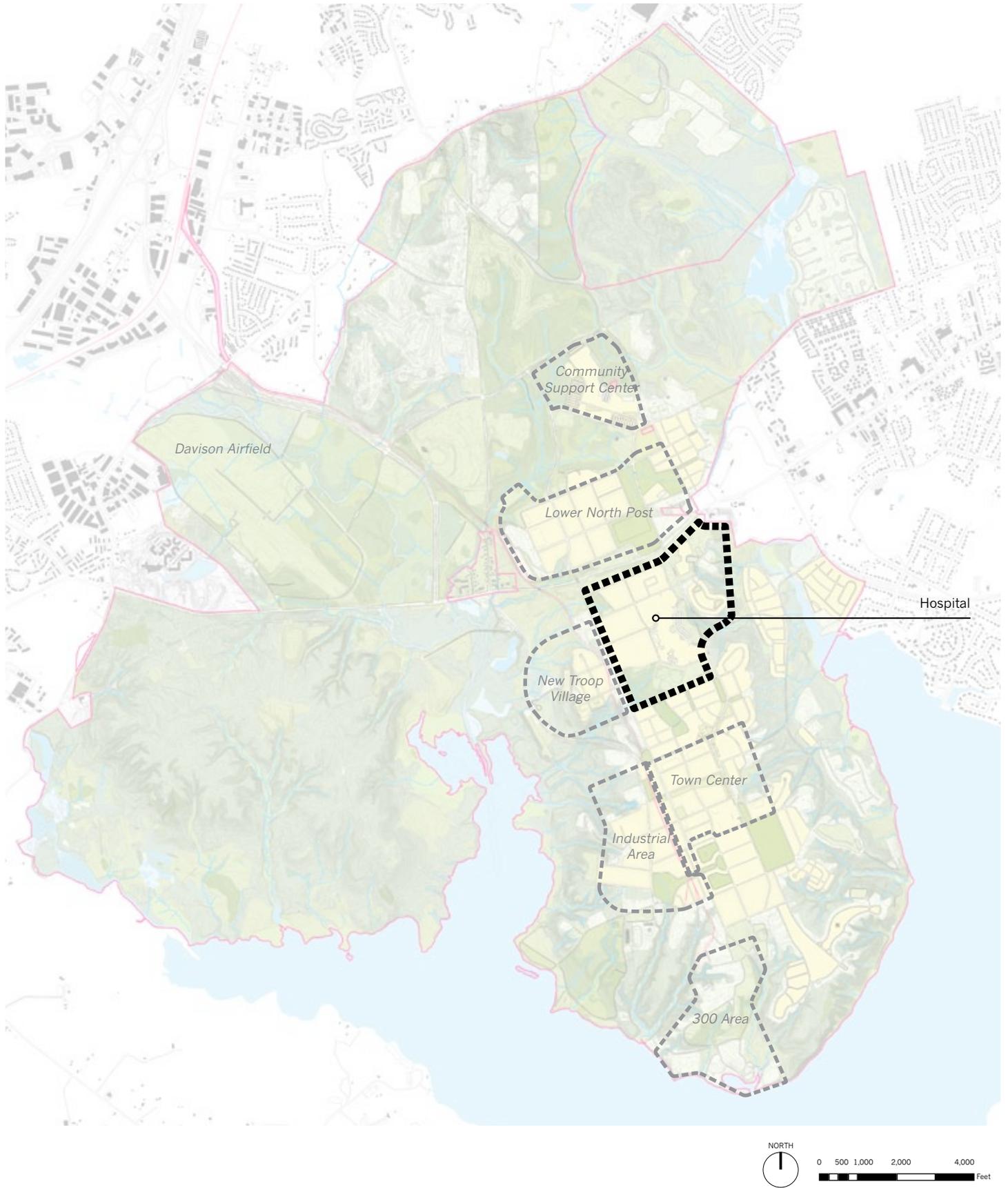
Land Use Legend

-  Constrained Areas Overlay
-  Main Post Installation Boundary
-  Airfields (AIR)
-  Community (CMY)
-  Industrial (IND)
-  Professional Institutional (PRO)
-  Residential (RES)
-  Ranges and Training (TNG)
-  Troop (TRP)



Land Use Map 2030

Figure 2-1 Main Post Neighborhoods



3 Existing Site Character

Overview

This section describes the existing character of the site by analyzing its existing natural constraints, buildable areas, structures, and circulation patterns.

Fort Belvoir is a significant part of the local and regional ecosystem. All decisions affecting Fort Belvoir's wealth of natural resources have a critical impact on the surrounding environment. It is important for the Hospital Area Development Plan to uphold the land-use planning goals as established by the post.

The way in which Fort Belvoir manages its ecosystem requires all proposed development to understand the delicate interrelationships that exist within and outside the installation boundaries.



Existing Tree Cover

FORT BELVOIR
South Post Golf Course
Tree Survey



Existing Hospital Area

Figure 3-1 Aerial Today (2007)



Development Constraints

From an environmental perspective, much of the plateau areas on the Hospital Area are developable as these areas have been disturbed by prior development. However, there are natural, cultural, historical, and operational environmental constraints within the Hospital Area. The methodology used to evaluate the environmental constraints on the Hospital Area was to populate a constraints matrix using a GIS-based tool that calculates the acreage or number of each environmental constraint within the footprint of the Hospital Area.

This methodology identified the following environmental constraints that could be affected by the developing within the Hospital Area:

- Resource Protection Areas (RPAs)
- Wetlands
- Riparian Buffers
- Special Species Areas
- Conservation Areas
- Steep Slopes
- Airfield Building Height Restrictions
- Former Training Range
- Petroleum Storage Areas
- Petroleum Release Sites
- Historic District
- Air Quality Permits
- Construction Permits

The constraint and the extent of these impacts are summarized in Table 3-1.

Table 3-1 Development Constraints Located in the Study Area

Resource	Size or Number	Units	Comment/Description
<i>Natural Resource Constraints</i>			
RPAs	20	Acres	Avoid where possible. Coordination with Fairfax County and VDEQ Chesapeake Bay Program
Wetlands	5.3	Acres	Avoid where possible. Permit may be required if impacting wetlands. Costs for wetland banking. Jurisdictional review by the USACE and VDEQ
Riparian Buffers	47.3	Acres	Implement Low Impact Development (LID) in these areas if avoiding completely is not possible.
Special Species Area	6.5	Acres	Avoid development impact on the area to help ensure the survival of the rare plant species communities.
Conservation Areas	37.9	Acres	Negligible impact on this resource is expected, however, ideally, no net impact would be expected if similar habitat elsewhere on Fort Belvoir were to be designated for preservation.
Steep Slopes	34.6	Acres	Engineering practices that allow for construction on steep slopes may be permitted should unconstrained land nearby not be available.
<i>Operational Resource Constraints</i>			
Airfield Restrictions	approx. 95-320	Feet	See Appendix for Airfield discussion. Further site studies should be done once the site is selected.
Former Training Range	1.4	Acres	GIS data based on historical data shows that 1.4 acres of the former training range known as Gunston Road 1000 Rifle Range are within the Hospital Area, however, there is conflicting information on the location at this range. The correct location has been identified as being outside the Health Campus west of Gunston Road.
Petroleum Storage Areas (PSAs)	23	Each	There are 7 active and 16 inactive PSAs in the Health Campus parcel. These could be aggressively addressed as part of the site preparations. A closure process involving administrative and decontamination process will be required. Confirmation samples collected beneath USTs and potentially some AST will likely be required to demonstrate no release has occurred. It can be expected that some USTs will have a release previously undiscovered. Mitigation measures could be integrated into the construction phase of the project in concert with the site preparation and earthwork features for minimal impact to the overall construction schedule.
Petroleum Release Site (PRS)	7	Each	Petroleum releases were discovered at these locations, pollutant complaint numbers (PC #s) were assigned by the VDEQ, and various corrective actions/remediation occurred at the sites. Any disturbance to the subsurface soil at these sites may require environmental remediation actions. Intrusive activities at the sites would require a Health and Safety Plan be prepared specifying construction workers protection and monitoring requirements at the site(s). PRSs located within a proposed building envelope could be aggressively addressed as part of the site preparations. Mitigation measures could be integrated into the construction phase of the project in concert with the site preparation and earthwork features for minimal impact to the overall construction schedule. Excavation and sampling of petroleum impacted soils areas will likely be the most effective manner to address these PRSs within an aggressive time frame.
<i>Cultural and Historic Resource Constraints</i>			
Fort Belvoir Historic District	97.6	Acres	Negligible impact would be expected. Development of the Health Campus would require mitigation to offset the loss of the potentially eligible South Post Golf Course, which has been identified as a contributing element to the Fort Belvoir Historic District. Mitigation would consist of photo-documentation of this resource.
<i>Other Environmental Regulatory Considerations</i>			
Air Quality	N/A	N/A	Air quality permitting requirements will require all development be involved in calculating pollution loads and determining most prudent air permitting course of action. The threshold value of 100 tons of NOx per year has would trigger additional permitting requirements for large Fort Belvoir development projects.
Construction Permits	TBD	N/A	Disturbance of wetlands would require permit. Sediment and Erosion Plan and Registration Statement also required for development projects.

3 Existing Site Character

Natural Constraints

RPAs. The Hospital Area includes 20 acres of RPAs (Figure 3-3). The RPAs are located primarily in the southwest corner of the parcel. There are also smaller portions of RPAs that can be found along the eastern border of the parcel. Development in these areas must be avoided. Any proposed road and bridge corridor crossing that would go through the RPAs are permitted but should be minimized.

The RPAs are used for planning purposes only and have not been field verified for perenniality. Because the affected RPAs are near the headwaters of streams, a perenniality determination would be conducted to determine which of these RPAs are associated with perennial streams. Those not associated with perennial streams may be available for development.

Wetlands. The Hospital Area includes 5.3 acres of wetlands (Figure 3-3). The wetlands are located in the southwest and northwest corners of the Hospital Area.

The wetlands shown in Figure 3-3 are used for planning purposes only. Wetlands have been jurisdictionally delineated on the Hospital Area, but only a portion of these have been approved by the Army Corps of Engineers. Construction in jurisdictional wetlands is possible but requires obtaining a Section 404 permit from the Corps, and requires mitigation such as wetland creation or banking.

Riparian Buffer Areas. The Hospital Area includes 47.3 acres of riparian areas (Figure 3-3). The majority of these riparian buffer areas are found in the southwest corner and northwest corners along perennial drainages that flow west and empty into Accotink Bay. There is also a small amount of riparian buffer areas along the eastern border, which overlap perennial drainages that flow east and empty into Dogue Creek.

Because of the importance of riparian areas as buffers for runoff filtration for water quality and habitat, these areas should be avoided. If

development in riparian areas is unavoidable, low impact development (LID) practices should be incorporated into design.

Special Species Areas. The Hospital Area includes 6.5 acres of sensitive flora habitat. The sensitive flora habitats of the small whorled pogonia and the Coastal Plain Piedmont Acidic Seepage Swamp are found along the eastern border of the Health Campus area. A negligible impact on this resource would be expected. Development impacts on the area should be avoided to help ensure the survival of the rare plant species communities.

Conservation Area. The Hospital Area includes 37.9 acres of conservation areas in the southwest corner of the proposed development area. This area is included within the Fort Belvoir designated Accotink/Pohick Wetland Conservation Area. A negligible impact on this resource would be expected, however, ideally, no net impact would be expected if similar habitat elsewhere on Fort Belvoir were to be designated for preservation.

Steep Slopes. The Hospital Area includes 34.6 acres of steep slopes, which are located in the southwest corner of the parcel as well as along tributaries on the western edge that flow east towards Dogue Creek. Steep slopes should be avoided, however engineering practices that allow for construction on steep slopes may be permitted should unconstrained land nearby not be available.

Operational Constraints

Airfield Building Height Restriction. The entire Hospital Area (277.2 acres) is within some level of building height restriction surface buffers for Davison Army Airfield. The restrictions are relative to the airfield runway elevation of 73 feet above mean sea level (Figure 3-5). The majority of the area, 270.6 acres, lies within the 500-foot building height restriction. The remaining 6.6 acres, located in the northwest corner, is under the 150-foot restriction. Designs for the Hospital Area should reflect the site-specific ceiling limits for each portion of the development area.

Former Training Range. Although available GIS data based on previous reports indicates that the Hospital Area contains 1.4 acres of a former training range, additional historical data coupled with on the ground surveys indicates that this is not the case. GIS data places the Gunston Road 1000 Rifle Range in the southwest corner of the parcel just to the east of Gunston Road. Further data indicates that the range was actually located to the west of Gunston Road, outside of the parcel. Historical aerial photography and record searches have indicated the range contained multiple firing points and multiple berms areas that could have been used as impact areas. While the range is outside the parcel boundary, related development would need to take the following factors into effect. Based on the use of the range as a small arms range, costly unexploded ordnance (UXO) removal is not warranted however, initial site investigations indicated elevated lead in soil. Further investigation is required to delineate the environmental impacts. Depending on the time frame of development for this area, this range may be addressed under the Military Munitions Response Program (MMRP) prior to development. If possible, the pending investigation of the area should be prioritized to aid in determining the unconstrained areas available for development.

Petroleum Storage Areas (PSAs). 23 PSAs, 7 active and 16 inactive, have been identified on the Hospital Area (Figure 3-5). Table 3-2 summarizes the active PSAs and Table 3-3 summarizes the inactive PSAs. Mitigating these PSA constraints is a straightforward decommissioning process. Many of the open PSAs are unregulated, so a costly formal closure process can be avoided. On average, 1 in 3 underground storage tanks (USTs) at Fort Belvoir have had a release so it can be expected that some USTs will have a release previously undiscovered. This mitigation measure could be integrated into the construction phase of the project in concert with the site preparation and earthwork features for minimal impact to the overall construction schedule.

Table 3-2 Active Petroleum Storage Areas in the Hospital ADP

ACTIVE			
TANK_ID	TANK_ID	TANK_ID	TANK_ID
01444A	01475B	01443B	01471A
01465A	01443A	01449A	

Table 3-3 Inactive Petroleum Storage Areas in the Hospital ADP

INACTIVE			
TANK_ID	TANK_ID	TANK_ID	TANK_ID
01468A	01493A	01493B	01493C
01475A	01481A	01485A	01486A
01456B	01488A	01487A	01493D
01200A	01481B	01201A	01485B

Petroleum Release Site (PRS).

Seven PRS have been identified in the Health Campus parcel. Figure 3-5 illustrates their locations around the Health Campus parcel. These PRS are summarized in Table 3-4. Petroleum releases were discovered at these locations, pollutant complaint numbers (PC #s) were assigned by the VDEQ, and various corrective actions/remediation occurred at the sites. Any disturbance to the subsurface soil at these sites may require environmental remediation actions. Intrusive activities at the sites would require a Health and Safety Plan be prepared specifying construction workers protection and monitoring requirements at the site(s).

PRSs located within a proposed building envelope could be aggressively addressed as part of the site preparations. Mitigation measures if required could be integrated into the construction phase of the project in concert with the site preparation and earthwork features for minimal impact to the overall construction schedule. Excavation and sampling of petroleum impacted soils areas will likely be the most effective manner to address any residual contamination associated with these PRSs within an aggressive time frame.

This constraint can be mitigated by employing a Health and Safety Program including qualified industrial hygienists and a HSP. Most large construction firms

3 Existing Site Character

are experienced in this area. The cost estimates for a Health and Safety Program to adequately address this issue are not considered significant as the specifications of the construction project itself will likely require a HSP. This requirement can be incorporated into the construction program without adding significant costs.

Table 3–4 Petroleum Release Sites in the Hospital ADP

INACTIVE			
TANK_ID	TANK_ID	TANK_ID	TANK_ID
01468A	01493A	01493B	01493C
01475A	01481A	01485A	01486A
01456B	01488A	01487A	01493D
01200A	01481B	01201A	01485B

Historic Districts. The Hospital Area includes 97.6 acres of the Fort Belvoir Historic District. The portion of the Fort Belvoir Historic District within the parcel is made up primarily by the South Post Golf Course. Development of the Health Campus would require mitigation to offset the loss of the potentially eligible South Post Golf Course, which has been identified as a contributing element to the Fort Belvoir Historic District. Mitigation would consist of photo-documentation of this resource.

Other Environmental Constraints

Air Quality. If the pollution loads of single proposed development in the Health Campus exceed the threshold standard of 100 tons of NOx per year, a nonattainment new source review (NSR) would be required. The reviews typically take 18-24 months to complete. If engineering controls such as selective catalytic recovery can be specified in the design of the backup power generator the pollution load can be lowered. The issue is installation-wide so Fort Belvoir should work with future tenants to address this critical path issue.

Fort Belvoir is currently near the threshold of their current Title V permit. Disaggregating emissions sources and permitting processes is a novel approach that requires support from VDEQ. However, disaggregation should be examined for this program as a form of mitigation.

Construction Permits. Construction activities that disturb wetlands would require a wetland permit. Fort Belvoir an agent or a contractor would also need to prepare and submit a sediment and erosion control plan to Fort Belvoir DPW-ENRD for approval as Fort Belvoir holds a MS4 Permit and self-regulates in this arena.

Health Campus Parcel Conclusions

In light of the numerous environmental constraints at Fort Belvoir these areas are relatively small when compared to the property as a whole with many environmental constrained areas avoided completely. The resources identified in Table 3–1 should be avoided where possible development of the Hospital Area may occur. If they cannot be avoided, mitigation measures for each of the constraints identified in Figures 3–3 to 3–6 and the text above would likely be required to be implemented.

Buildable Areas

Buildable areas within the study area are shown in Figure 3–2. Except for building height restrictions due to the airfield, buildable areas are not limited by the previously described development constraints. Because these areas are the most cost-effective and readily available, development plans will aim to completely utilize buildable areas before venturing on to constrained land. The Buildable Areas Overlay is generated by subtracting the constraints overlay area from the installation area. The constraints overlay utilizes all GIS constraint layers – natural, cultural and operational.

Figure 3-2 Buildable Areas Overlay Map



Legend

 Developable Areas Overlay

Source- Fort Belvoir DPW GIS Department

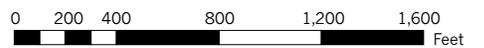
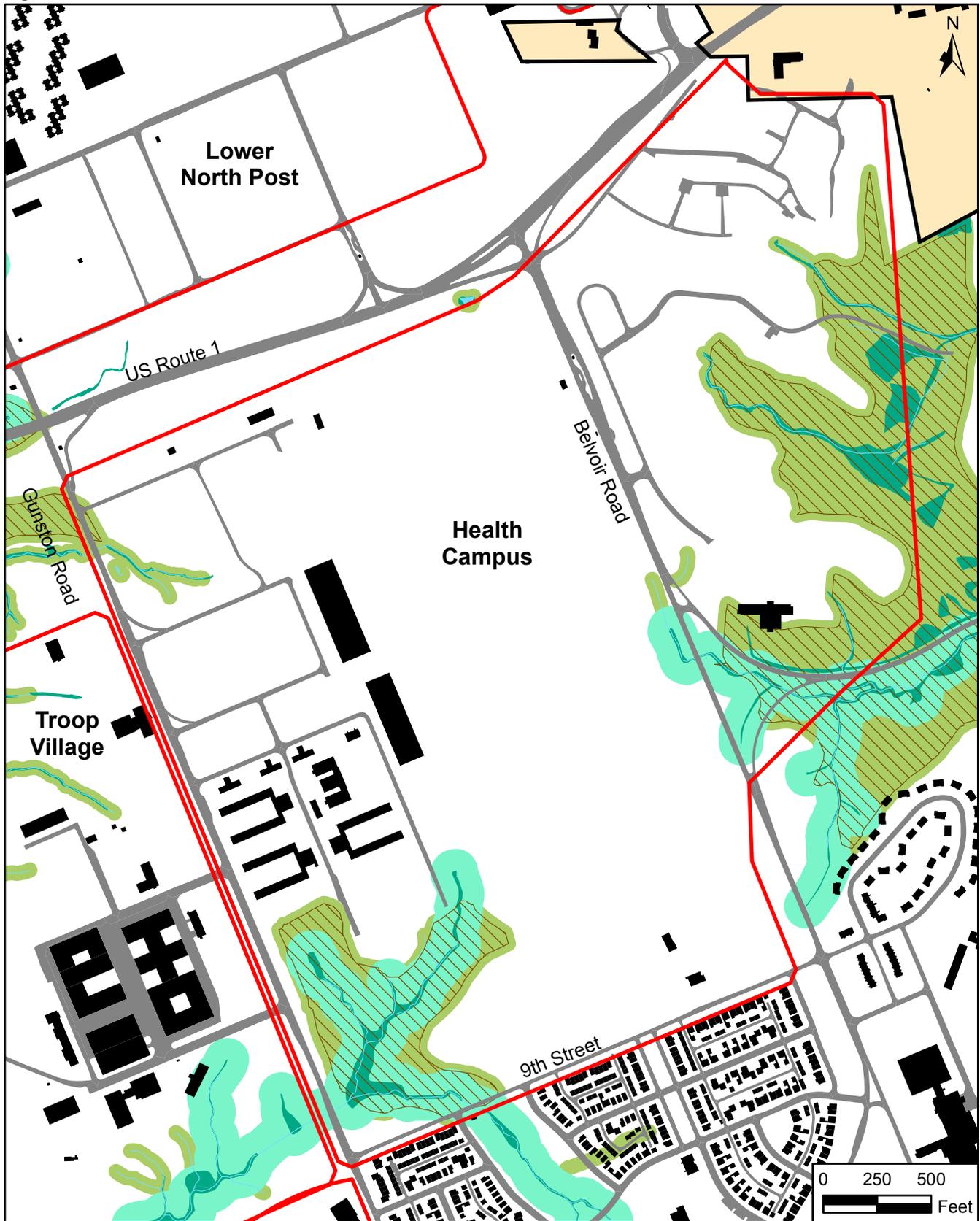


Figure 3-3 Water Resources

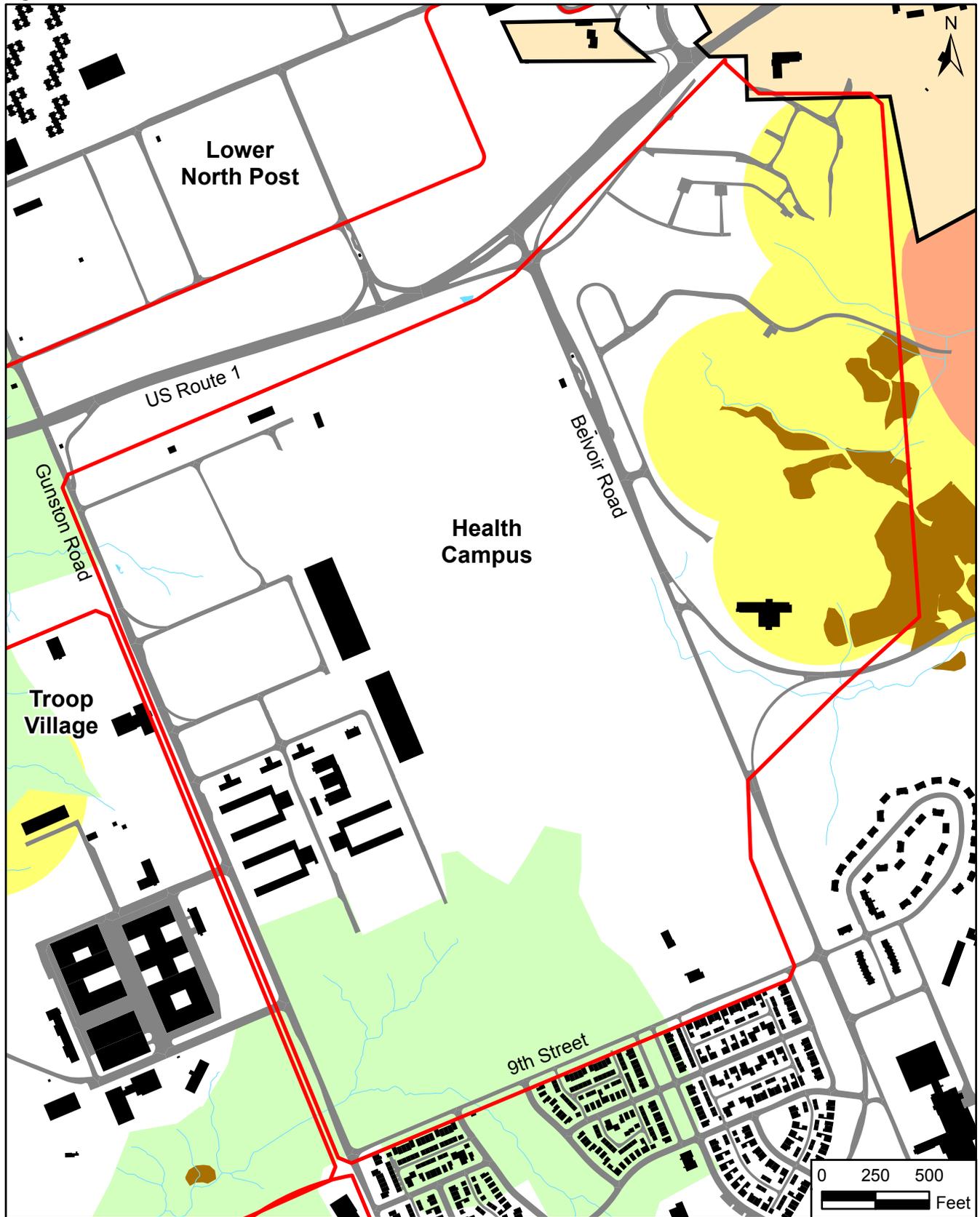


LEGEND

- ADP Boundary
- Wetland
- 100-Year Floodplain
- Steep Slopes
- RPA
- Riparian Area

**Health Campus
Water Resources**

Figure 3-4 Sensitive Habitat

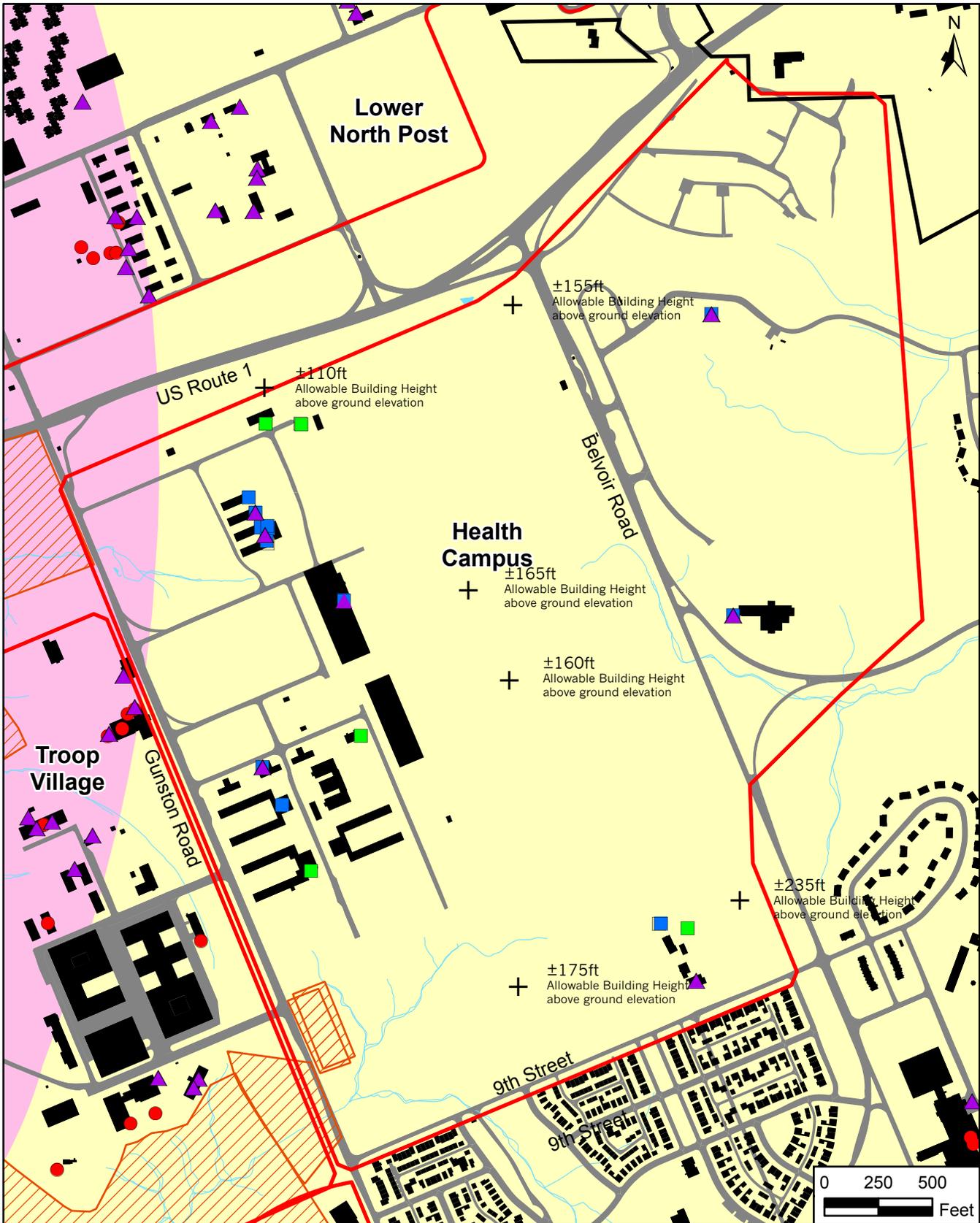


LEGEND

- | | | |
|---|--|--|
|  ADP Boundary |  Wildlife Management Area |  Migration Corridor |
|  Fauna Special Species Area |  Grassland Mangement Area |  PIF Priority Area |
|  Flora Special Species Area |  Conservation Area | |

**Health Campus
Sensitive Habitat**

Figure 3-5 Operational Constraints

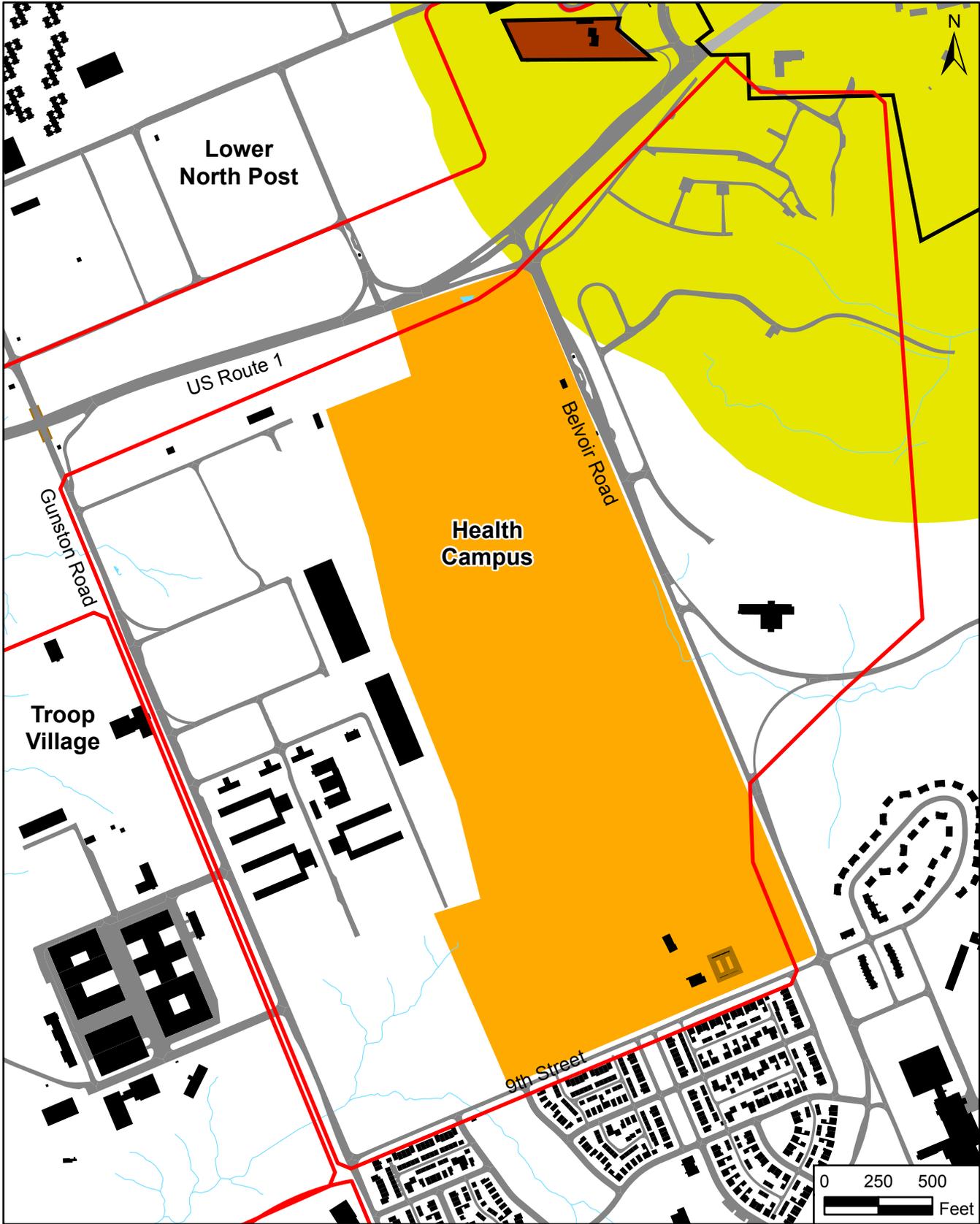


LEGEND

- | | | |
|-----------------------------------|-----------------------------|-----------------------------|
| ADP Boundary | Solid Waste Management Unit | Former Range |
| Petroleum Storage Area - Active | Petroleum Release Site | 500-ft Air Restriction Zone |
| Petroleum Storage Area - Inactive | 150-ft Air Restriction Zone | |

**Health Campus
Operational Constraints**

Figure 3-6 Cultural Resources

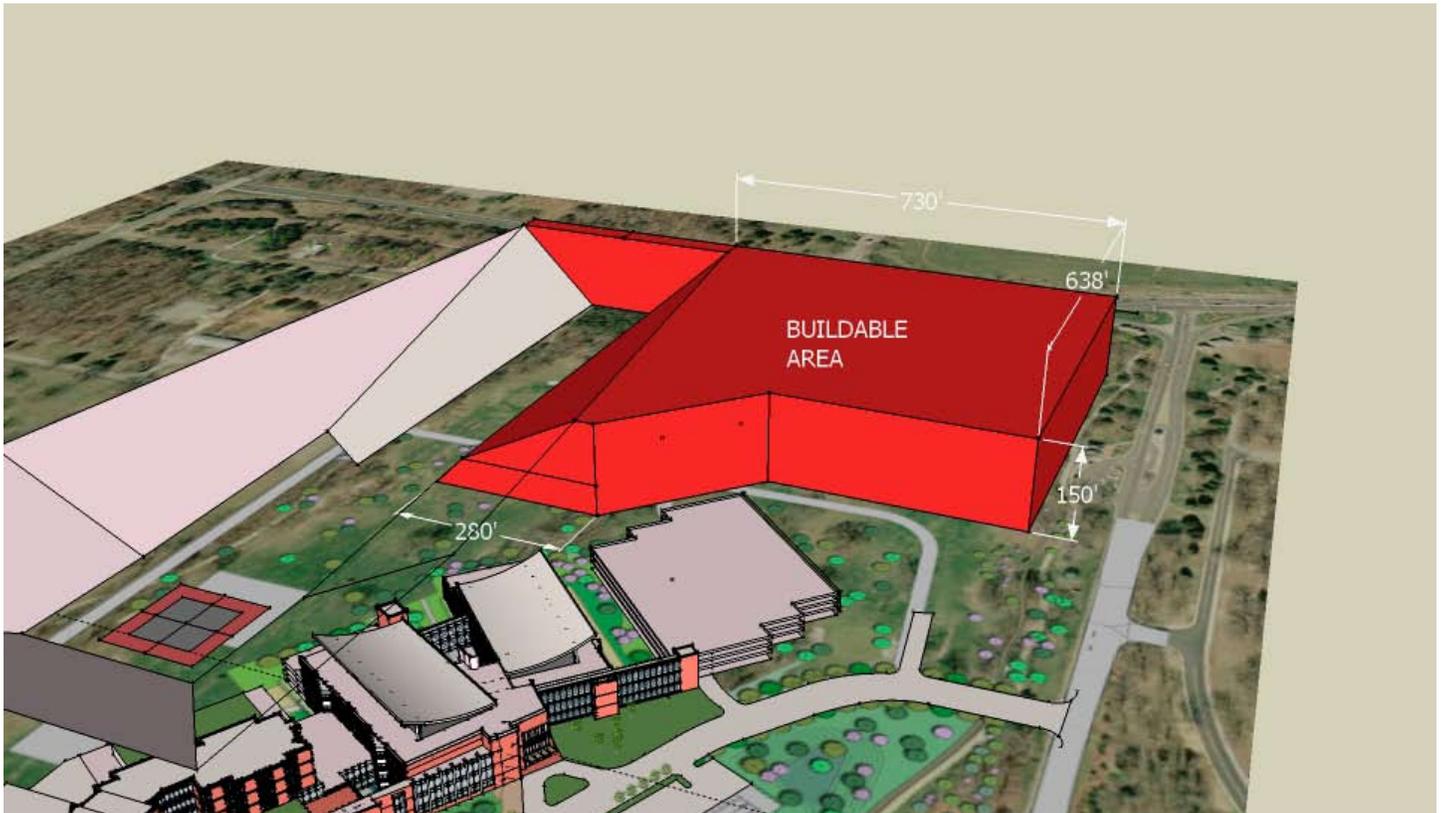


LEGEND

- ADP Boundary
- Cemetery
- Historic Overlay Buffer
- Historic Building
- Historic District

**Health Campus
Cultural Resources**

Figure 3-7 Hospital Helipad Buildable Area



Source: HDR/Dewberry

Hospital Helipad

The hospital Helipad must comply with the Standard visual flight rule (VFR) Helipad for Navy and Marine Corps and Limited Use VFR Helipad for Army and Air Force as shown in the diagram below. Following these restrictions, the potential buildable area is shown in Figure 3-7. Other Airfield restrictions in Figure 3-5 should be followed. Figure 3-8 shows the hospital helipad as a single ingress/egress. There are a few buildings that are impacted by the transitional surface. The buildings impacted are in red.

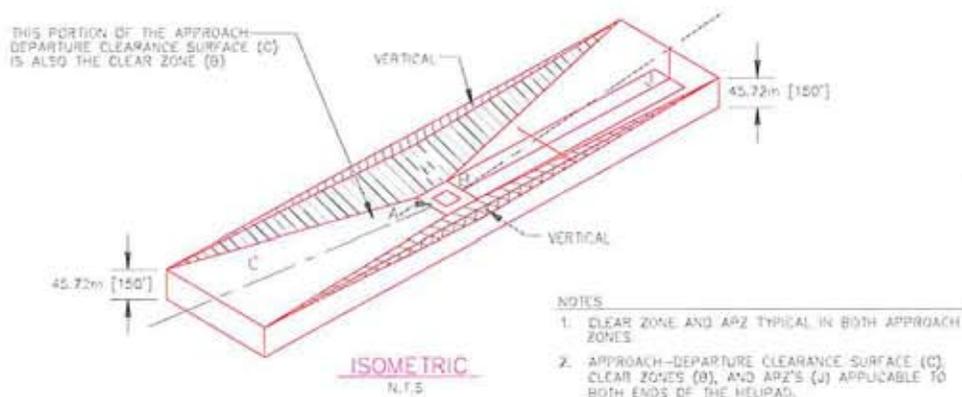
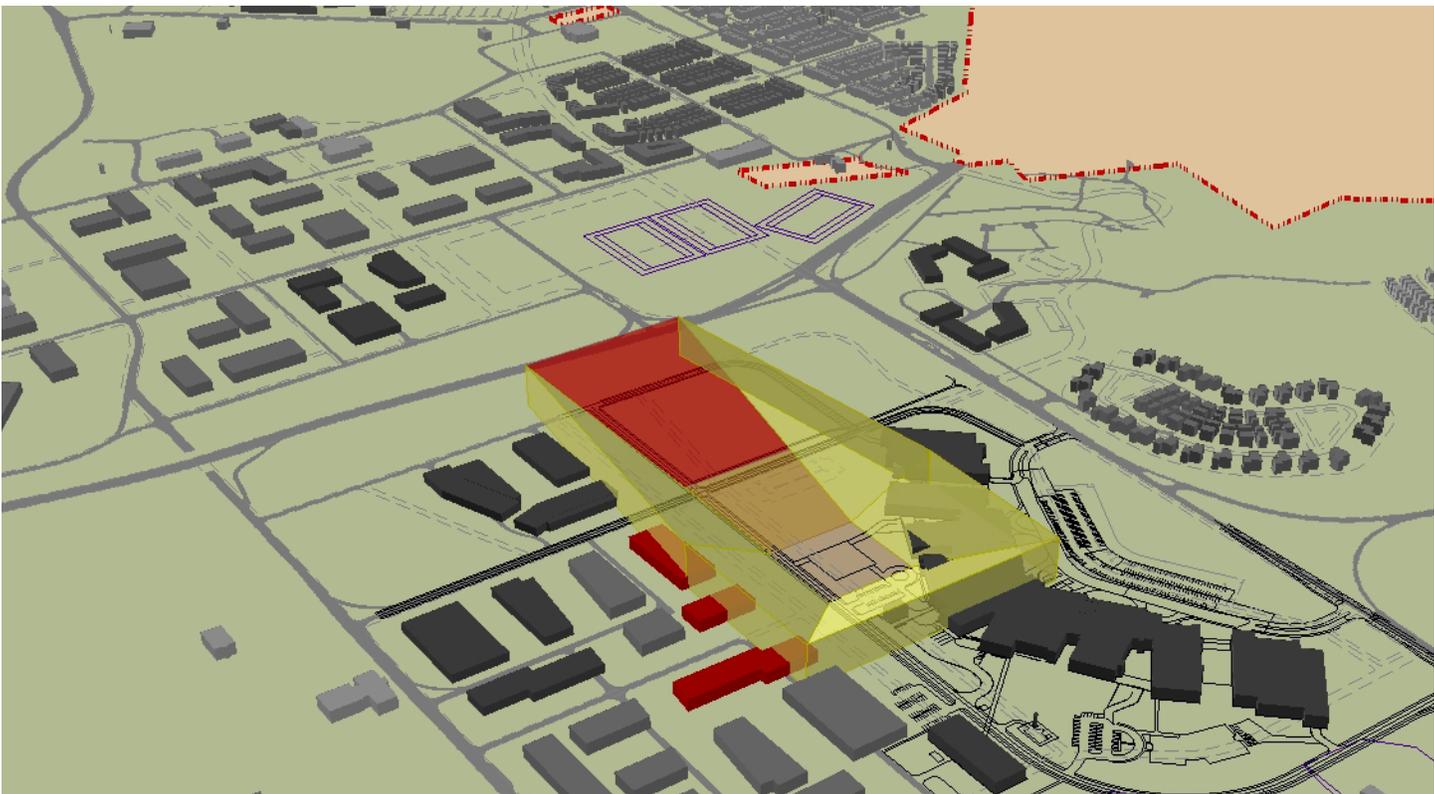
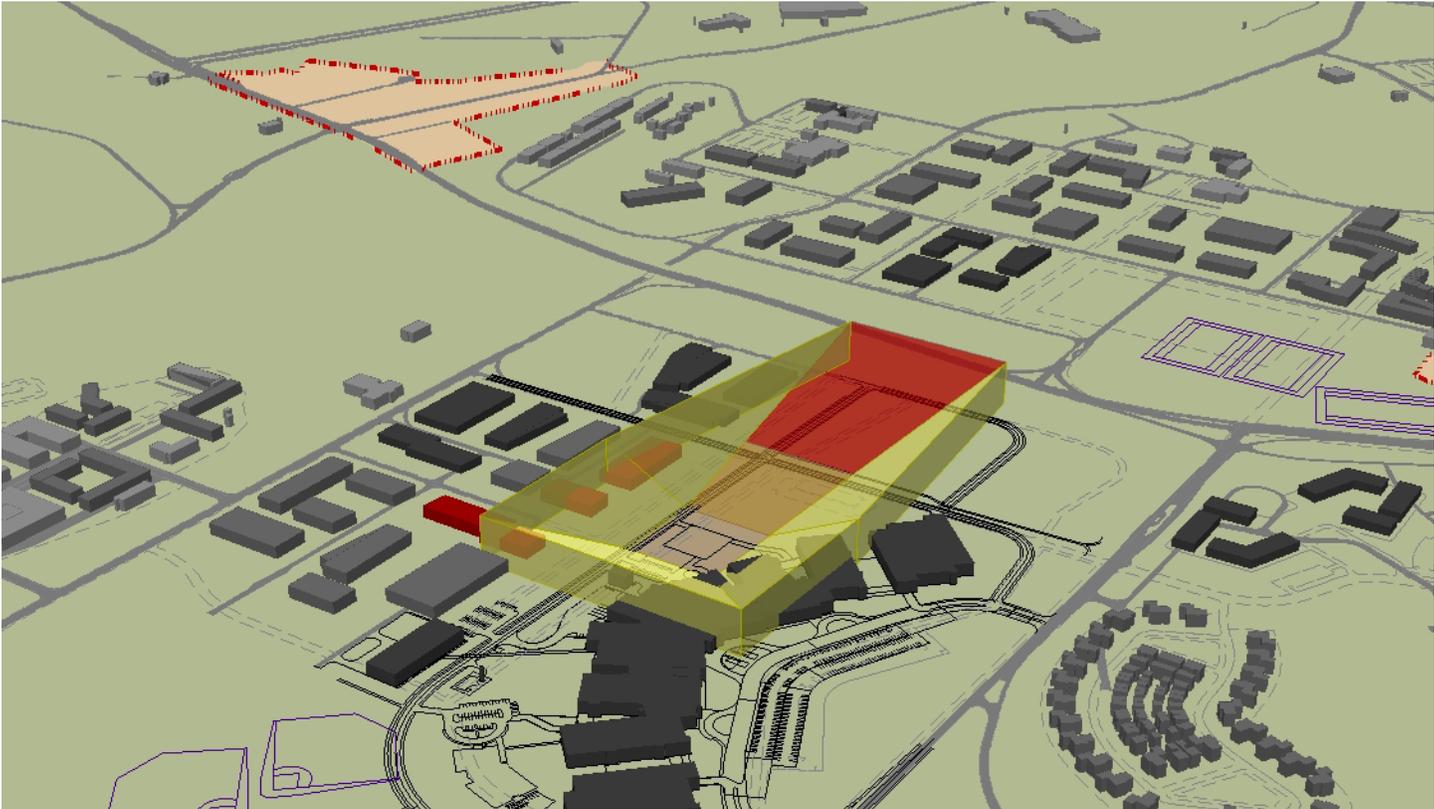


Figure 3-8 Hospital Helipad Height Limitations



Hospital helipad shown as single ingress/egress

3 Existing Site Character

Table 3–5 ISR Rating Definitions

Rating	Definition
Q-1 (Green)	Minor facility condition deficiencies and no significant facility configuration deficiencies, with negligible impact on the capability to support the tenant organizations' required missions.
Q-2 (Yellow)	Some facility condition deficiencies and/or configuration deficiencies that have limited impact on the capability to support the tenant organizations' required missions.
Q-3 (Red)	Significant facility condition deficiencies and/or configuration deficiencies that impair the capability to support some of the tenant organizations required missions.
Q-4 (Black)	Major facility condition deficiencies and/or configuration deficiencies that present significant obstacles to the tenant organizations accomplishment of required missions.

Table Sources:

1. Military Planning Technical Manual
2. U.S. Army Installation Management Agency, Public Works Digest Vol. XVIII No.1, Jan/Feb 2006, downloaded from http://www.ima.army.mil/sites/pw/digest/pwd_janfeb06.pdf

Facilities and Operations

Each item of real property is defined as a facility. The Army uses four facility types for analysis purposes:

Land (L) - Land (in acres) comprises whole, or part, of a military installation owned in fee by the Federal Government and/or under custody and accountability of the Army.

Building (B) - Buildings (in square feet) are constructed on a space of land that is completely enclosed by a roof, walls, and usually flooring. It normally serves the purpose of occupancy.

Utility (U) - A utility (in capacity) is a distribution system, commodity source, or commodity collection point that provides a service or commodity to more than one building or structure.

Structure (S) - A structure is any real property facility that is not classified as a building, utility system, or land by the previous definitions. Typical examples are airfield pavements, roads, firing ranges, and athletic fields.

Source:

1. Department of the Army, Pamphlet 415–28: Guide to Army Real Property Category Codes, 11 April 2006

Building Quantity

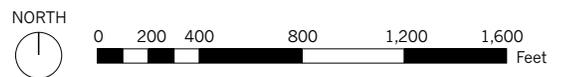
The study area contains about 20 buildings, totaling over 300,000 GSF. Appendix A-1 lists each existing building, its tenants, and functional use from the Real Property Inventory (RPI). Uses are classified by the current use category code (CUCC).

Building Quality

Installation buildings are always under consideration for maintenance and repair. In order to determine the current quality of a building, it is assigned a Quality or Q-Rating. These ratings are based on a ratio of restoration cost estimates (“cost to fix”) to facility plant replacement value (PRV). Restoration cost is based on facility condition assessments conducted by facility occupants. These Q-Ratings are used to derive an installation-wide Quality Rating at the Facility Class level. All military services report Q-ratings using the same DoD methodology.

Q-ratings for facilities can be found in the Installation Status Report (ISR). Q-rating colors are applied to the installation’s GIS data to create a graphic overlay that clearly shows ratings in the study area. See Table 3–5.

Figure 3-9 Building Installation Status Report



3 Existing Site Character

Circulation Patterns

The study area is bounded by U.S. Route 1 to the north, 9th Street to the south, Gunston Road to the west and Belvoir Road to the east. Gray's Hill is also included within the study area. Circulation in the study area is categorized into primary roadways, secondary roadways, and alleys. These designations are defined by roadway characteristics and frequency of use.

Primary roads provide main access into the Post and internal circulation between North and South Post, and are heavily traveled. Primary roadways serving the proposed Health Campus neighborhood include:

- Belvoir Road, which is the main access point from Route 1 into South Post via Pence Gate. Belvoir Road is currently one lane in each direction.
- Gunston Road, currently one lane in each direction with left turn bays, provides connection between Lower North Post and South Post, including the proposed Health Campus neighborhood.
- 9th Street, currently one lane in each direction, links Gunston and Belvoir Road

Within the Hospital neighborhood, a number of secondary roads provide internal circulation. These roadways do not link Gunston and Belvoir Roads at this time. 1st, 3rd, 4th, 5th and 6th Streets provide access to Gunston Road from office spaces located in this area.

Currently, there are not any signalized intersections along Belvoir and Gunston Road in the vicinity of the Hospital neighborhood, other than the intersection of U.S. Route 1 and Belvoir Road. All intersections are stop-controlled intersections, with the stop signs on the minor roadways. This causes access difficulties for vehicles exiting the area as Gunston Road is a major internal arterial for traffic circulation on Main Post.

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4 Program Requirements

Overview

The following is a summary of the near term requirement and long term program strategy.

Existing Tenants and Functions

The only existing tenant in the area is the MWR program which presently consists of the 9-hole golf course and a club house, tennis courts and parking. The golf course will be replaced with the hospital; however the club house and the 8 tennis courts will remain; in addition 2 more softballs will be placed at the western end of 9th Street.

Proposed Projects

In order to determine what the new hospital capacity will be there needed to be an evaluation of what current hospital capacity is and what the anticipated future needs are. The following are an evaluation of the present and future anticipated needs of the building capacity for the new hospital.

Total Building Requirements

Clinics	± 480,000 BGSF
Administration	± 210,000 BGSF
Public Spaces	± 35,000 BGSF
Nursing Units	± 120,000 BGSF
Diagnostics	± 120,000 BGSF
Support Services	± 100,000 BGSF
Subtotal	± 1,065,000 BGSF
Dental	± 35,000 BGSF
Total	± 1,100,000 BGSF

Source: HDR/Dewberry

Additional programs

- North Atlantic Regional Medical Command (NARMC) Headquarters
- 2 new softball fields

Displaced Facilities

The South 9 Golf Course will be displaced.

Table 4-1 Near Term Projects

Project Number	Project Name	PROJECT DESCRIPTION/ (COMMENTS)	FUNDING SOURCE	SIZE (GSF/PN)	CWE	1391 PROGRAM YEAR (FY)
64238 (EIS #4)	Hospital		BCA - Essential	Hospital: 784,076 SF Amb. Shelter: 2,164 SF Med. Adm.: 84,715 SF		2008-2010
65675	Hospital, Increment 1		BCA - Essential		\$403.4 M	2008
65676	Hospital, Increment 2		BCA - Essential		\$262.75 M	2009
65677	Hospital, Increment 3		BCA - Essential		\$70.85 M	2010
64293 (EIS #6)	Medical Guest House	(Project not yet recognized by BRAC)	TBD	100,000 SF	\$88 M	2012
65871 (EIS #7)	NARMC HQ Building		BCA - Essential	9,000 SF	\$11.4 M	2010
64241 (EIS #5)	Dental Clinic		BCA - Essential	16,000 SF	\$7 M	2010
66228 (EIS #16)	AMC Relocatables	Purchase existing rented temporary facilities. (Project on hold waiting justification.)	BCA - Essential	230,000 SF ~1,150 PN	\$20.5 M	2007

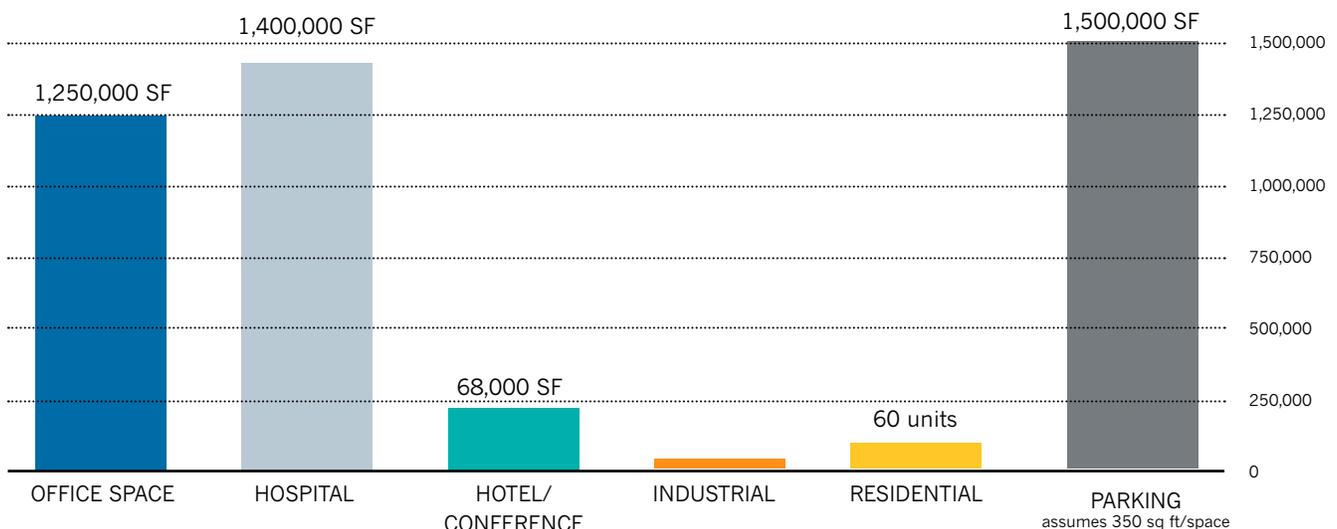
Long-Term Program Strategy

As determined by the preferred framework a long-term strategy of the Hospital Area could accommodate approximately 1,250,000 sq ft of office space with complimentary mixed-uses (civic, etc.) Although near-term needs are specific, long term overview is flexible to accommodate other uses.

New Construction

The new hospital area will consist of all new construction since it is essentially a “green field” site today. The core (patient bed area), the clinics, administrative facilities, parking garages and all supporting functions will be built new. This also includes the dental clinic and NARMC buildings at the north side of the property. At the south side of the property, along 9th street some of the recreation facilities will remain and two new softball fields will be built.

Figure 4-1 Long Term Program Capacity
Full capacity buildout as determined by preferred framework plan developed in Planning Framework, Chapter 6



5 Planning Principles



Figure 5-1 Hospital Area: Preparing to Meet Future Needs

Overview

The Belvoir New Vision master plan embraces many principles from connected street grids, accessible open space and appropriate and compact development.

The recently established LEED for Neighborhood Development (ND) pilot program is aligned with these principles and provides an open forum to further organize and raise awareness of these complex and comprehensive issues. LEED ND system emphasis is to:

- Revitalize existing urban areas
- Reduce land consumption
- Reduce automobile dependence
- Promote pedestrian activity
- Improve air quality
- Decrease polluted stormwater runoff
- Build more livable communities for people of all income levels

LEED for Neighborhood Development

Implementing best practices in sustainable design is key for the post to maintain its long standing commitment to conserve the natural beauty of the land and preserve their standing as one of America's enduring installations. The purpose of LEED ND pilot program is to provide an accessible and comprehensive framework to make environmentally sensitive and livable places. The framework incorporates the principles of smart growth, new urbanism and green building technologies. Participation in the program would be a first for the US Military and will help provide an example for other installations for Fort Belvoir to continue as a model world-class installation.

What is a "Neighborhood Development"? The LEED ND rating system is designed to certify exemplary development projects that perform well in terms of smart growth, new urbanism, and green building.

The LEED ND rating system is organized into three sections: smart location and linkage, neighborhood patterns and design, and green construction and technology.

Smart Location and Linkage

The goals and intent of the smart location and linkage principles are largely addressed within Chapter 3 (Existing Site Character) in the mapping of natural constraints and defining where not to build and where to build.

Neighborhood Design and Pattern

Chapter 6 (Planning Framework) addresses many of the credits in the Neighborhood Design and Pattern section regarding compact development, walkable neighborhoods and diversity of uses.

Green Technologies and Construction

Strategies to address the green technologies and construction are contained within Chapters 7 (Planning Recommendations) as well as Chapter 8 (Implementation) to ensure that the future projects within the ADP will maintain the highest standards of construction. This is in conjunction with meeting the current Federal Mandates in both water and energy consumption and achieving individual building certification under the LEED for New Construction where required.

General Planning Principles

Some of the goals for the future of the Hospital Campus are:

- **Buildings should reinforce the common campus edges.** This includes the central open space. Buildings should be in conversation with one another. An attention to the compatibility of uses and building typology is critical along any common campus areas.
- **Locate parking at the perimeter of each campus** area along the major access routes. This will reinforce standoff requirements and provide optimal development area for programs.
- **Connect buildings and places** with pedestrian paths and a series of “campus gardens”.
- **Maintain and preserve views** and sight lines to important open spaces from each campus area.
- **Develop a hierarchy of streets** and points of access that are coordinated with a larger transportation strategy.
- **Reinforce a comprehensive strategy for security** and AT/FP requirements that is integrated with building siting, access and overall development concept.
- **Initiate collective approaches** for stormwater management, ancillary uses, and remote truck inspection areas that share resources to optimize site development and program integration.
- **Promote sustainable strategies** that minimize development impact and embrace forward thinking and best practices in site planning, open space design, and architecture.
- **Develop a feasible and constructible strategy** that is sensitive to schedule and costs.
- **Anticipate future clinical expansion** by providing flexibility and clear linkages to all for future growth.

NOTE: Full page diagrams are included in the appendix on pages A-3 to A-7

6 Planning Framework

Overview

The goal of a planning framework is to establish a street framework and block pattern that can allow for a variety of scenarios of intensity or diversity of use. The planning principles endorsed with LEED ND encourage compact growth, promote pedestrian activity, improved air quality, and should work together to create a living framework that can be adjusted without sacrificing the quality of place in response to future needs of tenants as the neighborhood continues to grow and develop. The end state of the intensity and use will be balanced within the recommended framework and allows for a flexibility to respond to future demands.

Required NEPA Documentation

The new hospital and the out buildings associated with it; including the dental clinic and NARMC; were included in the larger Environmental Impact Statement (EIS) that covers all projects being built by 2011 as part of the BRAC action. This includes all roads and infrastructure; therefore there is no additional National Environmental Policy Act (NEPA) documentation required for this area of the post. Any future growth may need an additional Environmental Assessment (EA) including any additional roads improvements that may occur in the future.

The entire Master Plan documentation needs to have an EIS or EA approved once it is completed.

Framework Plan Alternatives

Before arriving at the preferred plan, several alternatives were explored in order to ensure all implications of a siting decision are understood and to illustrate different means of achieving the common planning principals. Each alternate scheme generates varying amounts of new building construction based on the amount of space designated for outdoor motor pools and storage. New building efficiencies are also affected by the building size and the amount of existing buildings that may be preserved.

Evaluation Criteria

Use the following determination factors when evaluating:

1. What are the environmental impacts and benefits?
2. What are the cost differentials?
3. What are the operational cost savings?
4. What are the long term maintenance implications?
5. Is the aesthetic and design consistent with the Installation Design Guide?
6. Are the strategies compatible with intended use?

Figure 6-1 Framework Plan Alternatives

Alternative A: Develop Gray's Hill / Maintain Golf Course

Keep the South Post 9 Hole golf course, develop the hospital on Gray's Hill, and redevelop the office campus east of Belvoir Road.

Alternative B: Urban Hospital

Develop Hospital with compact footprint along Route 1, create mixed use retail street where community meets the Hospital, and redevelop office campus east of Belvoir Road.

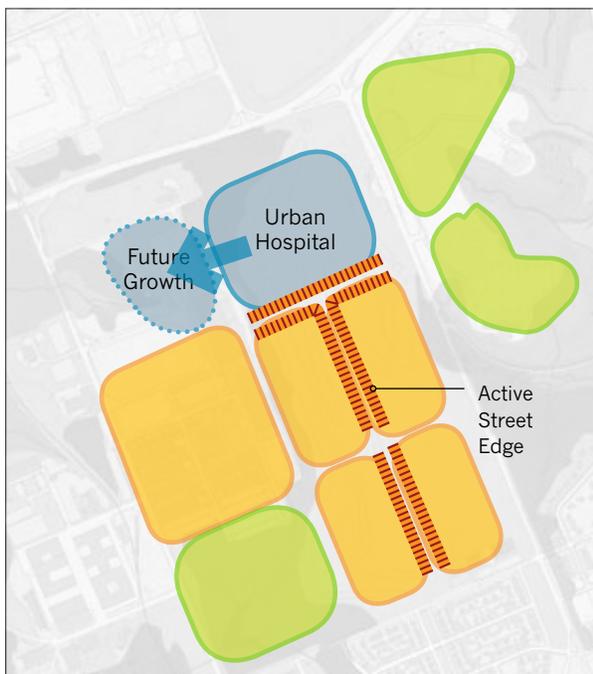
Alternative C: Hospital Campus

Develop new Hospital Campus on South Post 9 Hole, develop Gray's hill, and redevelop office campus east of Belvoir Road.

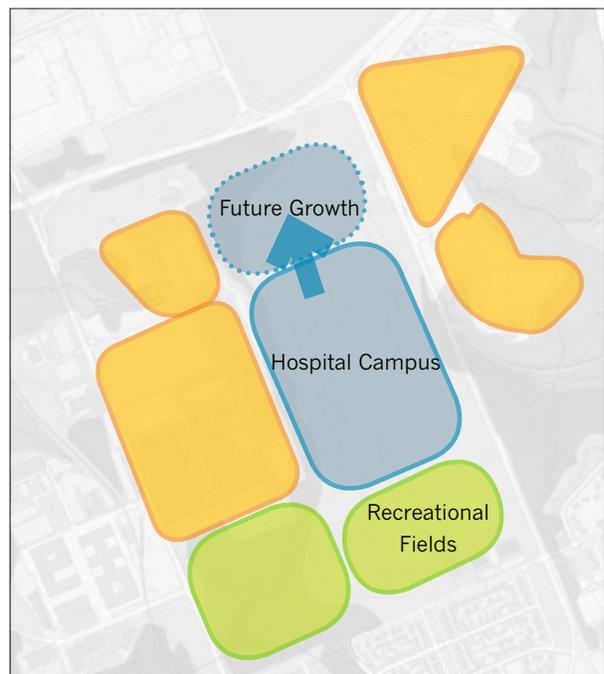
-  Hospital
-  Development / Redevelopment
-  Open Space
-  Active Street Fronts



Alternative A: Develop Gray's Hill / Keep Golf Course 



Alternative B: Urban Hospital



Alternative C: Hospital Campus



Preferred Framework

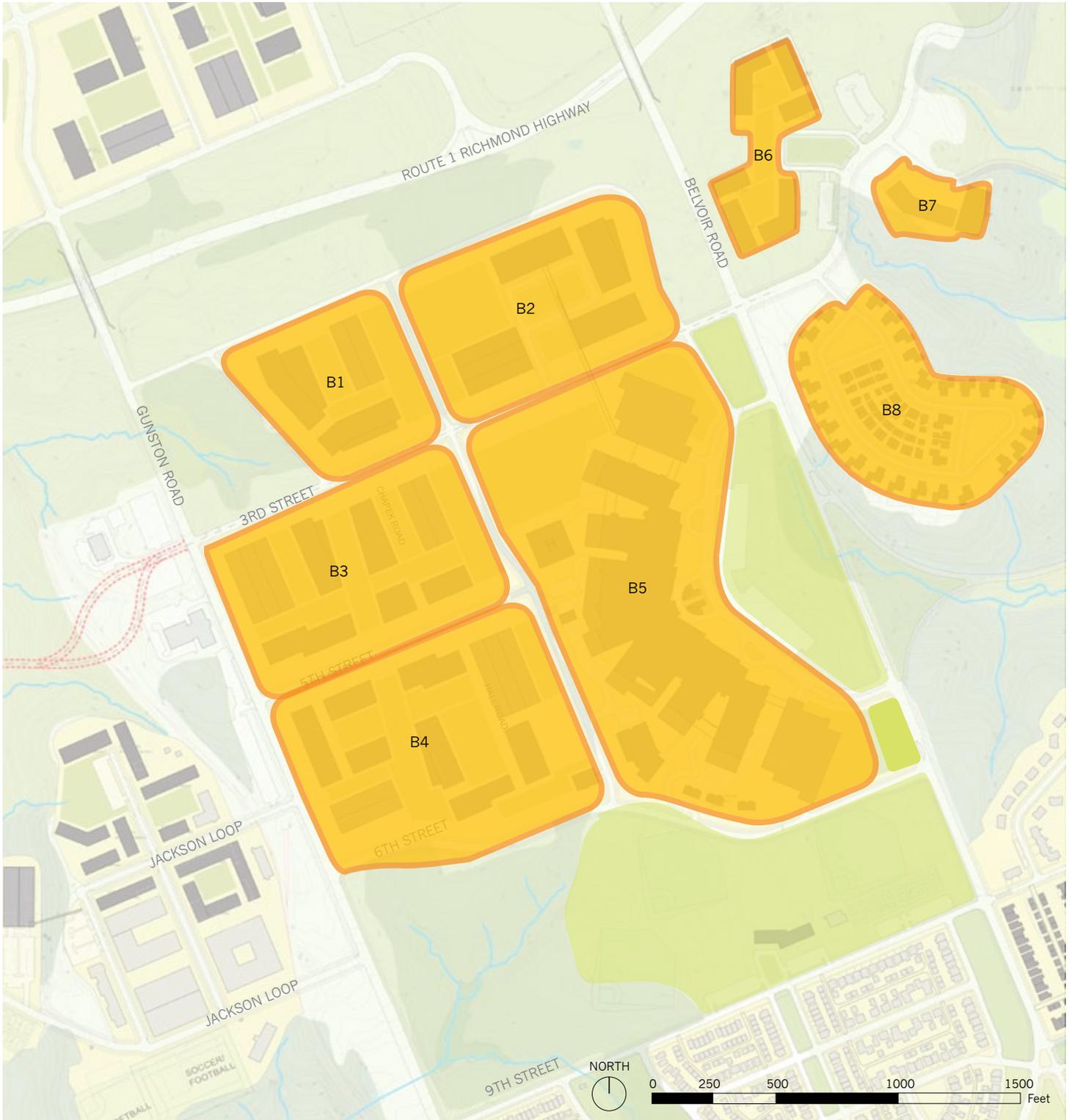
The preferred framework illustrated in figure 6–2 allows for the flexibility of any of the alternatives described in the previous chapter to be achieved. The intent of the compact development credit of the Neighborhood Pattern and Design section of the LEED ND program is to ‘Conserve land, promote livability, transportation efficiency and walkability.’ The goal of this ADP is to take advantage of the fact that the hospital area sits on the developable plateau of Belvoir and blocks that encourage vibrant, inclusive and sustainable pattern of development. The general emphasis has been to focus the Hospital Campus Area as a new administrative and health campus with a strong mix of office, retail and civic.

The framework encourages compact development with a recommended density for non-residential of 1.0 Floor Area Ratio (FAR) and build any residential components of the project at an average density of seven or more dwelling units per acre of buildable land available for residential uses.

Table 6–1 Hospital Campus Block Framework

Block No	Land Use	Area-SF (Measured)	Area-SF (Rounded)	Area (Acres)
B1	Medical Office	363,904	364,000	8.4
B2	Medical Office	508,288	509,000	11.7
B3	Medical Office	695,033	696,000	16
B4	Medical Office	877,161	878,000	20.2
B5	Hospital	1,406,885	1,407,000	32.4
B6	Education / Hotel Convention Center	310,000	310,000	7.2
B7	Hotel Convention Center			
B8	Residential	506,123	507,000	11.7
TOTAL AREA		5,544,555	5,550,000	127.8

Figure 6-2 Preferred Block Framework



7 Planning Recommendations

Development Strategy

- Patient Care Link that integrates all clinical, support, and parking
- Future 9th street ballfields and community center
- Identify multiple access points to the Hospital Campus
- Extend existing east-west streets to connect with Belvoir Road and Hospital Campus
- Separate visitor/patient parking from employee parking to clarify access to optimize parking and allow for logical clinical expansion strategies in the future
- Distinct Patient Care districts are linked by a clear path for patients
- Future expansion of inpatient, ambulatory, and support programs should be achieved within each area
- Each district can have its own “front door” and entry to provide easy access and mobility for patients
- Establish a clear and safe path for patients, families and visitors that connects main patient care facilities, parking and public spaces
- Integrate walkway with design of campus
- Anticipate future programs and planned expansion to locate along the patient care link

Relationship to Long Range Development Plan

Development of the Hospital Campus will also adhere to these important guiding principles, specifically:

- Increase density of current facilities
- Optimize use of existing roads, parking, outdoor loading areas, and other paved areas
- Increase diversity of campus functions – to allow locating noisy/unsightly facilities with bigger footprints behind buffers comprised of smaller, community-oriented facilities
- Increase diversity of functions within each cluster – to allow for a gradual transition between land use clusters and create better functioning, more visually appealing environments (Especially on Gray’s Hill and the possible addition of Malone/Fisher houses to the south; creating a buffer between the medical and residential functions)

Figure 7-1 Long Term Proposal for the Hospital Area



- | | | | | | |
|--|--------------------------------|---|--------------------------|---|---------------------------|
|  | Existing Buildings |  | Proposed Block Framework |  | Previously Developed Land |
|  | Proposed Buildings |  | Streams |  | Recreational Fields |
|  | Future Expansion |  | Foreste | | |
|  | Proposed Parking Garage |  | Grasslands | | |
|  | Area Development Plan Boundary |  | Engineered Open Space | | |

7 Planning Recommendations

Table 7-1 Proposed Hospital Building Development Summary

Block	Building Label	Primary Use	Building Footprint-SF	No. Floors	Total GSF	Dwelling Units 1,500 sf/DU	Parking Garage 350 sf/car	Notes
B1	1	OFFICE	50,000	3	150,000			Potential site for Child Development Center (CDC)
	2	OFFICE	37,000	3	111,000			
	3	PARKING GARAGE	34,000	5			490	
subtotal					261,000		490	
B2	1	OFFICE	36,000	3	108,000			NARMC Dental Clinic
	2	OFFICE	38,000	3	114,000			
	3	OFFICE	34,000	3	102,000			
	4	PARKING GARAGE	43,000	5			610	
subtotal					324,000		610	
B3	1	PARKING GARAGE	54,000	5			770	
	2	OFFICE	27,000	3	81,000			
	3	OFFICE	30,000	3	90,000			
	4	PARKING GARAGE	34,000	5			490	
	5	OFFICE	35,000	3	105,000			
	6	OFFICE	16,000	3	48,000			
	7	OFFICE	17,000	3	51,000			
subtotal					375,000		1,260	
B4	1	OFFICE	29,000	3	87,000			
	2	OFFICE	18,000	3	54,000			
	3	OFFICE	15,000	3	45,000			
	4	OFFICE	25,000	5	125,000			
	5	PARKING GARAGE	57,000	5			810	
	6	PARKING GARAGE	32,000	5			460	
	7	OFFICE	26,000	3	78,000			
	8	OFFICE	21,000	3	63,000			
	9	OFFICE	25,000	3	75,000			
	10	UTILITY	6,000	1	6,000			
subtotal					533,000		1,270	
B5	1	HOSPITAL	338,000	3	1,014,000			
	2	PARKING GARAGE	75,000	5			1,070	
	3	PARKING GARAGE	54,000	5			770	
	4	FISHER HOUSE	7,500	2	15,000			
subtotal					1,029,000		1,840	
B6	1	EDUCATION	21,000	3	63,000			Reserved for Educational Complex Reserved for Educational Complex
	2	EDUCATION	14,000	3	42,000			
	3	EDUCATION	10,000	3	30,000			
	4	EDUCATION	10,000	4	40,000			
	5	EDUCATION	14,000	4	56,000			
	6	EDUCATION	20,000	4	80,000		230	
subtotal					311,000		230	
B7	1	HOTEL	20,000	5	100,000			Reserved for Lodging and Educational Complex Potential conference center
	2	HOTEL	18,000	2	36,000			
subtotal					136,000			
B8	1	RESIDENTIAL	50,000	2	100,000	56		Potential site for Fisher Homes
B9	2	CIVIC	60,000	1	60,000	0		Field House
TOTAL (ROUNDED)					3,000,000	60	5,700	

Figure 7-2 Building Development Strategy for the Hospital Area



Environmental Strategies

Green Infrastructure

- Replicate hydrological processes of indigenous forest
- Equate allowable potable water use to average annual rainfall over site
- Increase native species diversity and area of coverage
- Attain carbon neutral post operations
- Retain and recycle all nutrients on-site using natural processes
- Maintain adjacent interior forest temperature in developed areas



Tree Coverage

Landscape

Bioretention Systems

Utilize native landscaping and soils to treat stormwater runoff by collecting it in shallow heavily landscaped swales and basins.

Environmental Benefits

- Detain and Filter Stormwater on site.
- Recharges groundwater and sustains flows to natural water bodies.
- Reduce Pollutants in Stormwater Runoff.
- Diversify Site Habitat

Financial Benefits

- Reduce Maintenance Costs - compared to conventional lawn surface or irrigated plantings.
- Aesthetic Value
- Reduce need for costly Stormwater Infrastructure



Bioswale

Figure 7-3 Building Strategies

Buildings - Green Roofs

Environmental Benefits

- Water conservation/ reduced stormwater runoff
- Fire prevention
- Habitat recreation
- Noise reduction

Financial Benefits

- Conservation of water management systems
- Extension of roof life
- Energy conservation
- Leed certification points
- Aesthetic value



LiveRoof System - www.LiveRoof.net

- Easily handled and transported
- Implement on both new and existing structures.
- Reduce Costs - Cultivate native plant life from seeds.
- Plantings can grow offsite during construction or retrofit or within vacant paved areas as temporary greenhouses.

Surface Parking

Reduce heat islands to minimize impact on microclimate and human and wildlife habitat.

Provide the following strategies for the non-roof impervious site landscape (including roads, sidewalks, courtyards, parking lots, and driveways):

- Shade (within five years of occupancy)
- Paving materials with a Solar Reflectance Index (SRI) of at least 29
- Open grid pavement system
- Place off-street parking spaces under cover

Porous Concrete

A specific mix of concrete creates stable air pockets to be encased within it, allowing water to drain uniformly through the material into the ground below.



Porous Pavement

Infrastructure Strategy

Long term planning and construction phasing

The Area Development Plan for the Hospital Area significantly reconfigures the existing road networks. New building locations as proposed in the ADPs will conflict with many of the existing utilities. Since much of the existing water, sanitary sewer, and storm drainage systems are over 50 years old and nearing the end of their useful life, we recommend that the construction plan provide for replacement of most of the existing systems in each area. This may also provide an opportunity to construct more efficient utility networks with potential operational savings; for example, some existing pump stations which will require replacement or expansion can be combined.

We have developed potential water distribution, storm drainage, and sanitary collection systems for each of the Area Development Plans to serve as guidance for replacing and relocating these systems as new development is funded. These are described below. Overall conceptual sanitary, water and storm layouts are shown in Figures 7-4 to 7-6.

We also developed preliminary calculations to determine the quantity control volumes needed with the anticipated growth. Approximate facility sizes are shown assuming a five-foot depth of storage. Quality control will also need to be provided; it could be provided within the quantity volumes shown or be provided separately. Facility locations were determined based on space and the topography of the area.

Ultimate development to the densities shown in the long-term strategy will require a combination of surface treatment for quality control, with above ground basins or below ground storage to provide the required quantity control. The conceptual storm plan can be used to guide location and design of drainage systems as future projects are authorized.

Design of all new facilities which require relocation or replacement of existing utilities should consider the ultimate anticipated development in the surrounding area, including the entire upstream sanitary or storm drainage-shed. New infrastructure should be designed to serve the new building; the existing adjacent facilities to remain; and, to the extent possible, the ultimate development in the adjacent area. For example, if a new building requires relocation of an existing 8-inch water main, and ultimate development requires the main to be increased to 12-inches; the portion of the main being relocated should be constructed to the ultimate 12-inch size. Similarly, new storm water conveyance facilities and new sanitary sewers should be designed and constructed for the ultimate anticipated flow from the upstream area. New storm water management facilities should be designed with adequate area to allow for expansion to serve future development in the drainage area.

Assuming that quality control is provided by rain gardens or similar low impact development (LID) facilities near each new building; additional quantity control is provided by a storage facility located to serve several blocks of the area. When the initial building is constructed, possibly with temporary surface parking, an LID facility is built adjacent to it, and the first portion of the quantity control facility is built. As additional buildings are constructed, surface parking is replaced with structured parking, additional LID facilities are built, and the quantity control facility is enlarged. Eventually, at full development, the quantity control facility may be replaced by an underground structure to provide quantity storage.

Conceptual Utility Plans

Sanitary:

The force main currently traversing the proposed New Fort Belvoir Hospital site will need to be relocated. Plans for this relocation are being prepared by the US Army Corps of Engineers.

Sewer service from the new Hospital will be routed to a lift station adjacent to the Hospital, which will connect via force main to the existing Fort Belvoir gravity sewer line along Route 1, approximately 1000 feet west of Belvoir Road. The connection into the Fort Belvoir sewer will be just upstream of its discharge into the Fairfax County gravity sewer along Route 1.

A new network of sanitary pipes will be needed to accommodate the Hospital support facilities located west of the Hospital. A new residential and office area is proposed to the east of the Hospital. Sanitary lines from both these areas should connect to the existing Fort Belvoir gravity sewer main along Route 1, or directly into the Fairfax County gravity sewer. These connections can be made by tying to the new Hospital lift station; providing a new, separate lift station; or connecting by a new gravity sewer. Routing these flows directly to the gravity sewers along Route 1 will reduce the flows to the overloaded existing gravity sewer system located southeast of the Hospital; it will also reduce the flows to Pump Station 97, which is also overloaded.

The new Hospital pump station may also be able to pump sewage from the Troop Housing Area, diverting more flow from Pump Station 97.

A direct tie in to the Fairfax County sewer will require coordination with the County and provision of a new meter. Connection to the existing Belvoir gravity sewer along Route 1 will require verification of the existing pipe capacity. At present the Belvoir gravity sewer along Route 1 has adequate capacity to convey additional flow from the Hospital and from other future development.

Final construction plans for the Hospital will provide detailed design of the sanitary sewer system on the Hospital site.

Refer to Figure 7-4 for the proposed Hospital area sanitary sewer system layout.

Storm water Management:

Conceptual storm water management (SWM) locations are shown on Figure 7-5 for the Hospital support facilities. SWM for the New Fort Belvoir Community Hospital will be provided on Hospital final plans.

The Hospital support area sits on a high spot in which the proposed SWM facilities will discharge to several different outfalls. The receiving waters to the west and east of the area will be Accotink Creek, and Dogue Creek, respectively.

Refer to Figure 7-5 for the Hospital Area proposed SWM plan.

Water:

Construction of the new Ft. Belvoir Hospital will require relocation of some existing water lines on the site. In order to provide adequate pressure and flow for the Hospital and for areas to the south, the existing 12 inch water main on Belvoir Road will need to be replaced with a 16 inch main. The US Army Corps of Engineers infrastructure plans and the Hospital plans include these replacements.

Most of the internal network serving the area west of the proposed hospital will need to be abandoned with construction of the hospital support facilities. A water line loop can be created around these blocks and connect to the existing water line along Gunston Road and the new water line at the Hospital.

Refer to Figure 7-6 for the proposed water system layout.

7 Planning Recommendations Infrastructure Strategies

Power

Existing System - Supply

The Main Post of Fort Belvoir is supplied power by Dominion Virginia Power under the rate schedule MS – Federal Government Installations.

Existing System - Distribution

In the Hospital Area, the current distribution system is adequate for existing functions. If additional supply is needed in the future, Dominion Virginia Power should be able to provide the Hospital Area with additional capacity.

Natural Gas

Existing System - Supply

Washington Gas supplies natural gas to Fort Belvoir and the surrounding community. The gas company has a robust distribution system in the area that appears capable of providing adequate natural gas.

Existing System - Distribution

The current distribution system is adequate for existing functions. If additional supply is needed in the future, Washington Gas will be able to provide it with additional capacity.

Steam and Chilled Water

Existing System

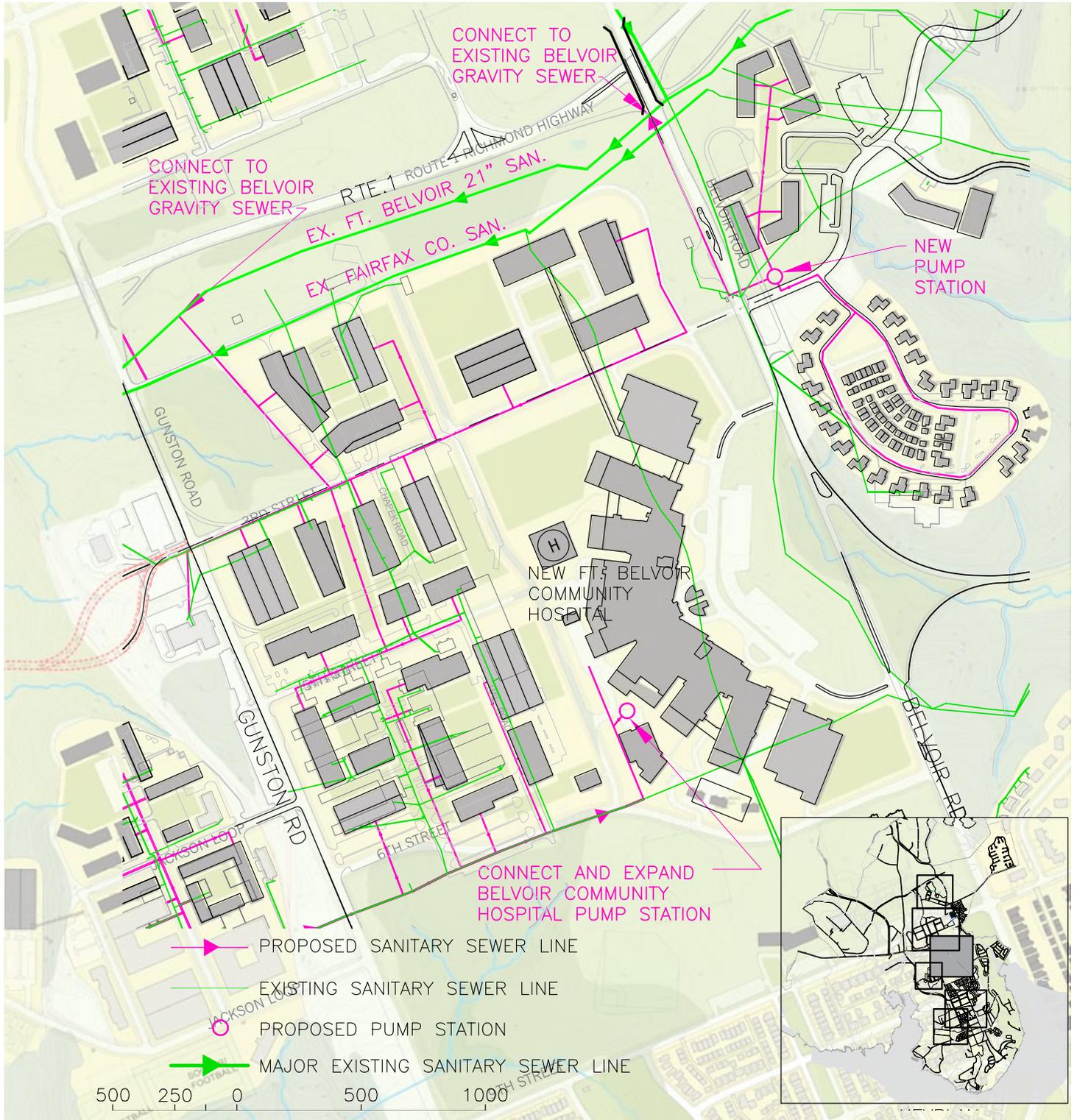
The existing Hospital Area Development does not contain any Central Energy Plant or piping distribution to multiple buildings.

Proposed New System

In the Hospital Area, it is recommended that Energy Systems (heating and chilled water) be provided on an individual building basis in lieu of centralized utilities.

Providing heating and cooling for these buildings on an individual building basis will allow each building to provide a unique solution to heating and cooling based upon building type while accomplishing the sustainability goals including energy reduction and water reduction. This will also allow buildings to be built based upon individual construction budgets and not have each tenant rely upon a central energy plant that would need to be constructed prior to any other development. The concept of individual energy sources for each building allows for maximum metering flexibility of the individual tenants and allows the phasing to be accomplished without reliance on outside energy resources. The individual buildings can then consider renewable alternatives such as solar photovoltaics and even solar hot water heating.

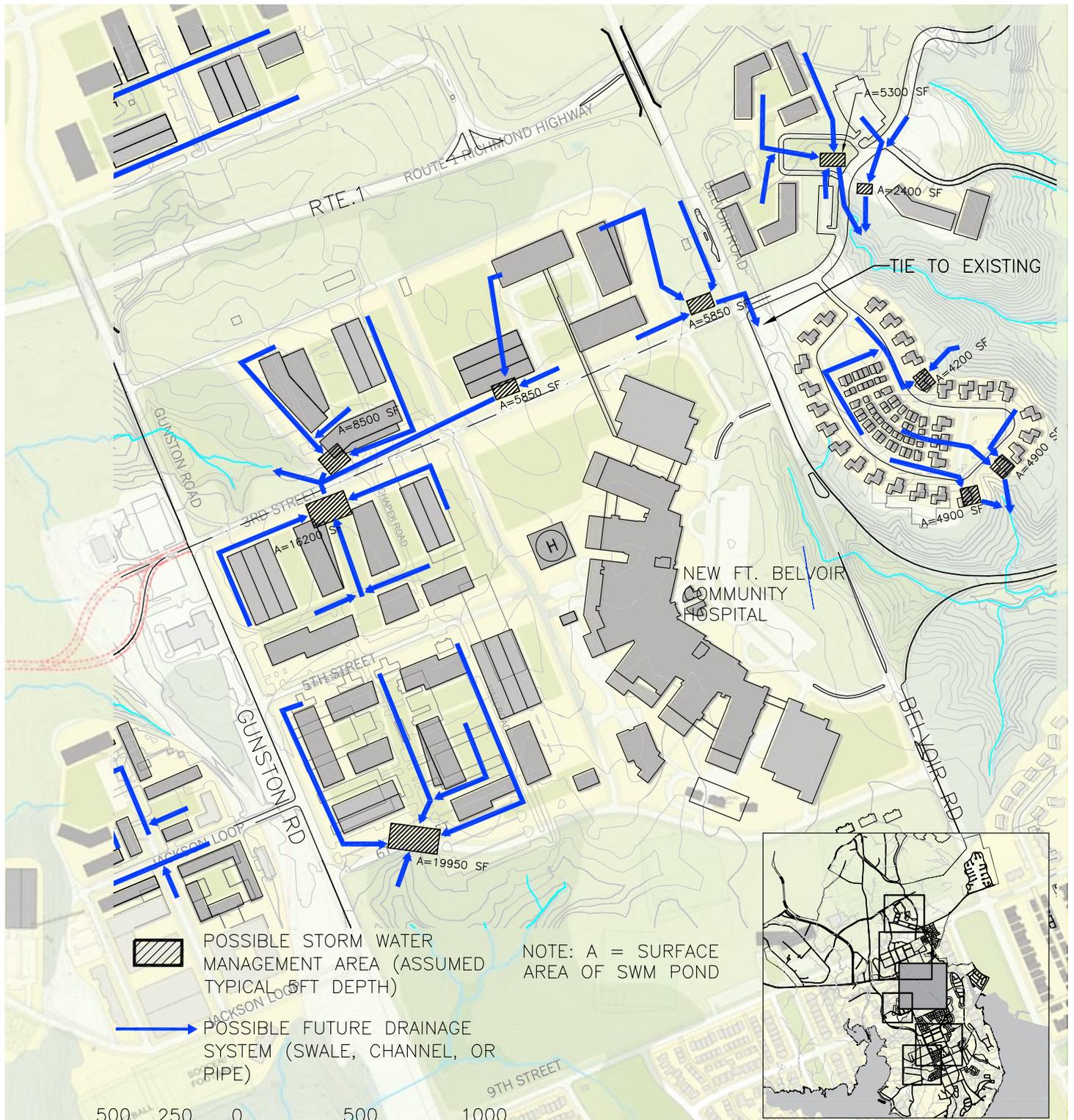
Figure 7-4 Infrastructure Strategies



Fort Belvoir Utilities: Full Build out Sanitary Sewer System

Proposed Sanitary Sewer Line

Figure 7-5 Infrastructure Strategies

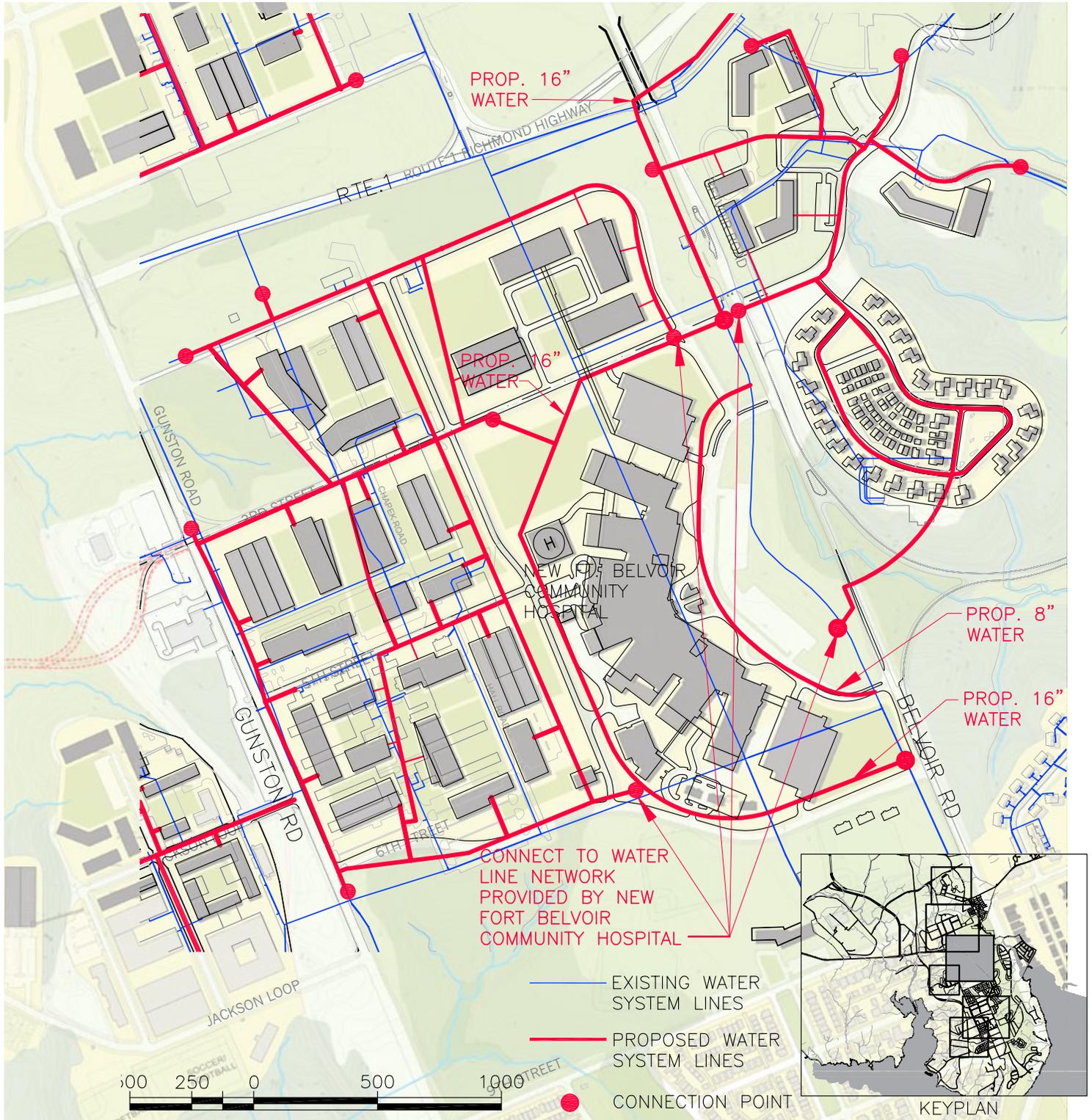


Fort Belvoir Utilities: Full Build Out Storm Sewer System

-  Possible Storm Water Management Area (Assumed Typical 5ft Depth)
-  Possible Future Drainage System (Swale, Channel, or Pipe)



Figure 7-6 Infrastructure Strategies



Fort Belvoir Utilities: Full Build Out Water System

— Proposed Water System Lines

● Connection Point



Circulation Patterns/ Transportation Management

The Master Plan lays out the long term vision for Fort Belvoir. It includes roadway improvements such as widening, intersection signalization and inclusion of pedestrian/ bicyclist circulation.

Vehicular Circulation

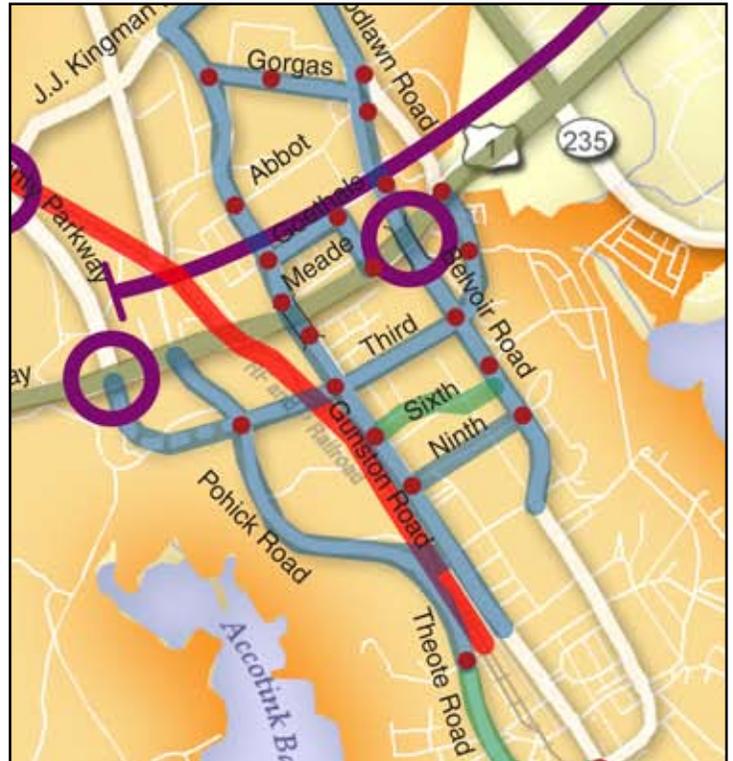
Because roadways are the primary means of transportation around the Post, these significantly impact the visual impression that visitors and Post personnel have of Fort Belvoir. Therefore, it is important that roadway design implement the following objectives:

- Facilitate orientation
- Provide efficient vehicular circulation
- Establish a clear circulation hierarchy to enhance the visual structure of the Post
- Enhance quality of life through greater safety and convenience
- Contribute to the image of Fort Belvoir as a unified, high-quality visual environment
- Improve and expand the present trail/bike path system by linking neighborhoods with schools, recreational areas, and points of interest On-Post
- Develop walking/jogging paths that link urban and natural areas on Post, while taking advantage of important views or vistas
- Enhance the character of streets with appropriate lighting, signage, furnishings, and plantings

Pedestrian Circulation

Strongly defined pedestrian corridors between major Post activity nodes – such as office buildings, and retail, residential and community support functions, etc. – are essential to successful development of a Post. Design considerations that improve pedestrian circulation should also:

- Encourage pedestrian travel and other outdoor activities
- Strongly define open spaces
- Improve the image of developed areas on Post



On-Post Transportation Improvements 2030

To meet these goals for vehicular and pedestrian circulation, the proposed roadway projects in the Health Campus neighborhood include:

- Extension of Belvoir Road as a four-lane road, including a grade-separation over Route 1, onto North Post and realigning into Woodlawn Road. A four-lane cross-section of Belvoir Road would continue south to 12th Street
- Widening of:
 - o Gunston Road to four lanes from Kingman Road to 12th Street
 - o 9th Street to four lanes between Gunston and Belvoir Roads
 - o 3rd Street to four lanes from Gunston Road to Belvoir Road, and extended to Route 1 with a new Access Control Point (ACP) to replace the Pence Gate ACP
- Extension of 6th Street from Gunston to

Figure 7-7 Campus Circulation and Parking



Based on HDR/Dewberry plan dated May 2, 2007

- Identify multiple access points to the Hospital Campus
- Extend existing east-west streets to connect with Belvoir Road and Hospital Campus
- Provide multiple access points to parking garages to efficiently distribute traffic and provide clear and easy access for patients and their families
- Separate visitor/patient parking from employee parking to clarify access to optimize parking and allow for logical clinical expansion strategies in the future

7 Planning Recommendations

- Belvoir road as a two-lane facility with a parking lane on each side
- Signalization of intersections:
 - o 1st Street with Gunston Road
 - o 3rd Street with Gunston Road and Belvoir Road
 - o 6th Street with Gunston Road and Belvoir Road
 - o 9th Street with Gunston Road and Belvoir Road
 - o extended 3rd Street with U.S. Route 1
 - o extended 3rd Street and the access to parcels B6 and B7 (see page 27)
- Inclusion of pedestrian and bicycle facilities as part of roadway improvements, so to provide internal circulation paths for pedestrian and cyclists, and to link the Lower North Post neighborhood to adjacent land uses.

These roadway projects and intersection improvements would improve the traffic circulation, and provide the opportunity for walking and cycling as an alternative to the automobile for short trips on Main Post.

A comprehensive Transportation Management Plan (TMP) has been developed for Fort Belvoir. The TMP outlines various strategies that the Fort Belvoir Employee Transportation Coordinator can use to reduce the rate of single occupancy vehicle trips by encouraging, but not limited to, carpooling/ridesharing, vanpool programs, transit services, and bicycling/walking. A transitway to the Franconia-Springfield Metrorail station would link Fort Belvoir to the regional transit system, potentially reducing Single-Occupancy Vehicle (SOV) trips. The short-term goal of the TMP is to reduce daily



Improve Connectivity and Enhance the character of streets with appropriate lighting, signage, furnishings, and plantings

SOV trips to Fort Belvoir by 10 percent. In developing site-specific TMP programs, the nature of the land use of the Hospital Campus should be considered.

Once fully redeveloped, the Hospital Area would contain compatible uses to the Hospital. It consists of medical facilities of the Hospital, medical offices, administrative offices, an educational campus and a potential hotel. These land-uses can support a TMP program. Circulator buses (or shuttle buses) would provide for post-wide access, as well as connect to the transit center to provide connections to points off-post. By promoting various strategies, workers coming to the Post could shift their commuting pattern from the SOV to carpool or transit. People staying at the hotel, or attending training programs at the educational center, can use the shuttle buses to circulate around Fort Belvoir.

Security Strategy

Fort Belvoir refocused the posture of its security and force protection efforts in response to the terrorist attacks on September 11, 2001. The result of this effort is the current Anti-Terrorism and Force Protection (AT/FP) Plan being used to guide the installation's preparedness posture. Concurrently, Fort Belvoir is being reconfigured to accommodate specific recommendations outlined first by the Base Realignment and Closure Commission Report in 2005, then enacted into public law and implemented through Army direction.

In order to ensure future building and infrastructure projects at Fort Belvoir are planned with appropriate consideration of AT/FP measures, the Long Range Component plan offer planners and decision makers an awareness of how the AT/FP Plan and Fort Belvoir's Real Property Master Plan complement and interrelate with each other.

AT/FP Planning

Because threats change over the life of a facility, building owners and facility managers should be aware that security elements can be more economically integrated within structures during the early planning and design phases of new construction projects than during subsequent additions or renovations.

Renovations to existing buildings can be challenging because the existing building systems must be able to accommodate increased security requirements and may not have the additional space or upgrade capacity. Therefore, it is imperative that AT/FP planning begin at the earliest opportunity. The key to a successful security master plan begins at the initial conception of both new construction and renovation projects and not at the end of the design process. Coordination and effective communication are essential in this process and should start prior to a Planning Charrette. The tenant or user should assemble a Planning Team which may include representative staff from Garrison Directorates: Logistics, Intelligence, Security, Operations, and Public Works. The team then begins the AT/FP planning:

- Step 1: Identify and categorize assets
- Step 2: Assess asset value
- Step 3: Identify aggressors and assess likelihoods
- Step 4: Identify tactics and severity
- Step 5: Consolidate into design basis threat
- Step 6: Determine levels of protection
- Step 7: Identify design constraints.

8 Implementation

Phasing and Funding

After the hospital is completed in 2011, there will be a need to study the capacity of the hospital over its first few years to insure that the present plan is serving the area well. The updates to the capacity study will determine if a new plan is needed, and if that plan needs to be studied as a way to determine if the expansions are necessary.

Updating the Plan

The plan should be modified to show the parts of the plan that have taken place over the past year, then should be completely updated every 5-years.

Near Term Development Strategy

Both of these plans are detailed in the “Near-Term Hospital” map; this includes details on the size and siting of the two projects. Along with this map and its annotations the “Proposed Framework Plan” for the area and its accompanying chart “Strategy for Future Development” detail the plans for the phasing and sizing of the near-term and future growth of the area.

Long Term Development Strategy

See figure 8-3.

LEED ND Certification

As stated in Chapter 5 Planning Principles it is the intent of the master plan and ADPs to implement best practices in sustainable design by encouraging the principles of the LEED ND pilot program. It is also the intent of the ADP to require each project and capital investment greater than 20 acres within the installation to meet the requirements of LEED ND certification. The full masterplan of Belvoir New Vision is participating in the LEED ND pilot program, and all future projects are expected to participate in the full program, which should launch in early 2009. A LEED ND checklist has been included in appendix A-16 and more information can also be accessed from the U.S. Green Building Council. The numerical rating presented in the checklist is based on the entire installation as one project the actual ratings based on individual projects will vary based on size and use.

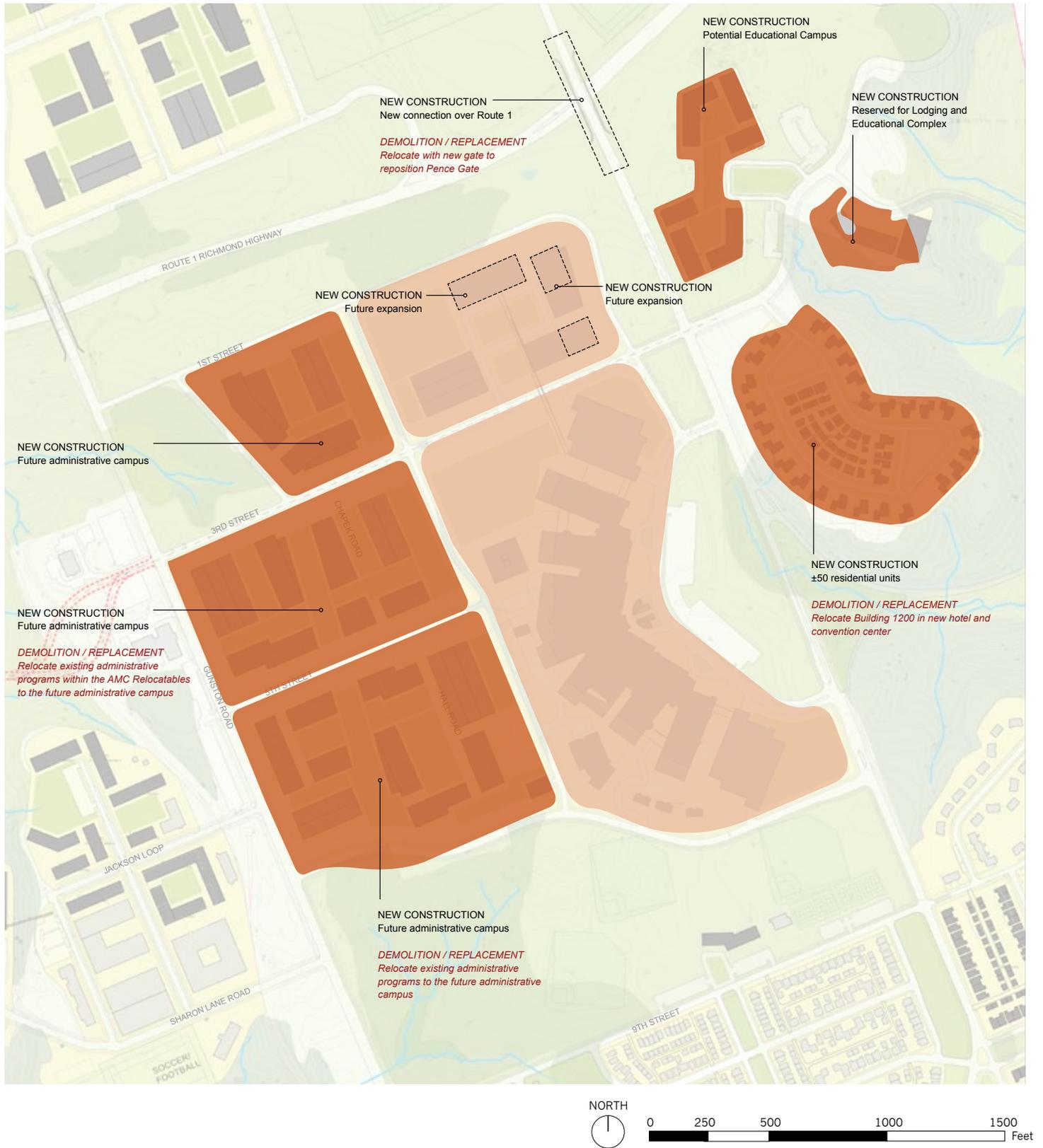
Figure 8-1 Future mixed-use Hospital as meeting place



Figure 8-2 Near-Term Development Strategy



Figure 8-3 Long-Term Development Strategy



Appendices

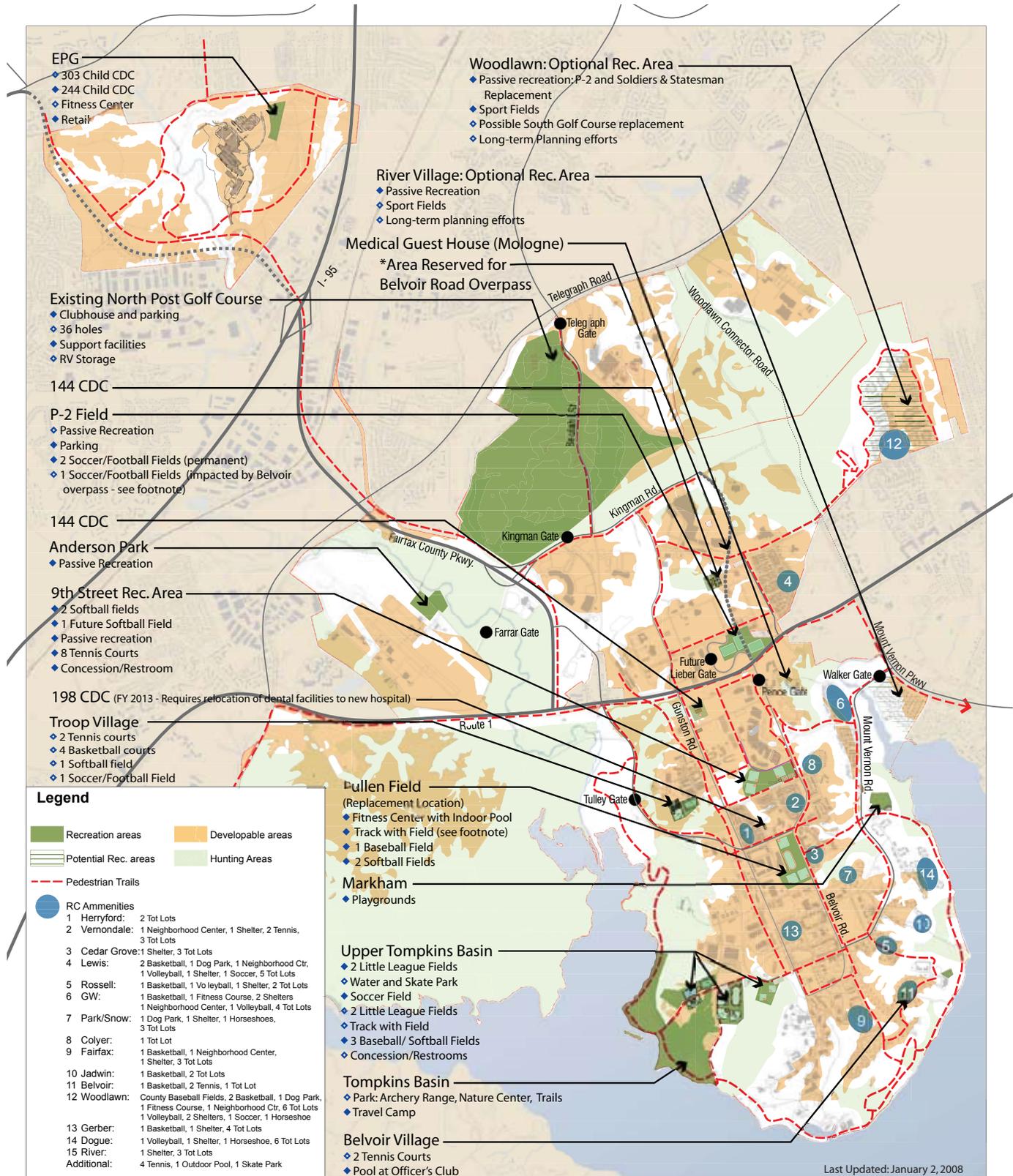
Strategy for Existing Buildings



Hospital Existing Buildings

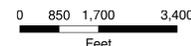
ID	STRUCTURE NAME	GROUND AREA	HEIGHT	LEVELS	BUILT	ISR RATING	USE	GSF	ACTIONS	ACTIONS NOTES
1200	GERBER HALL	19,801 SQFT	62.5 FT	1	1965	Q-1	CIVIC	23,252	Demolish-Long Term	Relocate in new convention center with the future hotel
1444	ADMIN, GENERAL PURPOSE	5,078 SQFT	14.5 FT	1	1967	Q-1	OFFICE	5,078	Remain	
1445	ADMIN, GEN PURP	20,787 SQFT	33.5 FT	3	1969	Q-2	OFFICE	52,156	Demolish-Long Term	Relocate within future admin campus
1448	EVAP COOL EQUIPMENT FACILITY	2,559 SQFT	20 FT	1	1992		UTILITY	2,559	Demolish-Long Term	Relocate within hospital area
1458	AMC HEADQUARTERS	65,851 SQFT	10 FT	2	2003		OFFICE	131,702	Demolish-Long Term	Relocate within future admin campus
1460	AMC HEADQUARTERS	50,677 SQFT	10 FT	2	2003		OFFICE	101,353	Demolish-Long Term	Relocate within future admin campus
1464	HAUSE BUILDING	27,487 SQFT	35 FT	3	1958		OFFICE	75,952	Demolish-Long Term	Relocate within future admin campus
1465	CID HEADQUARTERS	27,887 SQFT	35 FT	3	1956	Q-1	OFFICE	76,867	Demolish-Long Term	Relocate within future admin campus
1466	BROWN BUILDING	27,680 SQFT	35 FT	3	1956	Q-2	OFFICE	75,070	Demolish-Long Term	Relocate within future admin campus
1467	CLINIC, MEDICAL	3,908 SQFT	20 FT	1	1939	Q-1	OFFICE	3,908	Demolish-Long Term	Relocate within hospital area
1468	ADMIN, GEN PURP	3,904 SQFT	20 FT	1	1939	Q-1	OFFICE	3,904	Demolish-Long Term	Relocate within future admin campus
1469	ADMIN, GEN PURP	3,898 SQFT	20 FT	1	1939	Q-1	OFFICE	3,898	Demolish-Long Term	Relocate within future admin campus
1471	ADMIN, GEN PURP	2,798 SQFT	11 FT	1	1957	Q-1	OFFICE	2,798	Demolish-Long Term	Relocate within future admin campus
1472	INFO STAND, VISITORS CENTER	1,105 SQFT	16.5 FT	1	1979		OFFICE	1,105	Demolish-Long Term	Relocate Pence Gate after connection over Route 1
1482	GOLF MAINTENANCE	2,146 SQFT	12 FT	1	2003			2,146		
1486	GOLF STORAGE	2,160 SQFT		1				2,160		
1488	GOLFCOURSE CLUBHOUSE, SOUTH 9	3,640 SQFT	22 FT	1	0		RETAIL	3,640	Remain	
1489	SUBSTATION	1,075 SQFT	15 FT	1	1991	Q-1	UTILITY	1,075	Remain	Relocate Pence Gate after connection over Route 1
1492	SENTRY STATION (PENCE GATE)	185 SQFT	12.5 FT	1	1988		OFFICE	185	Demolish-Long Term	
								597,000		
	NEAR TERM DEMOLITION							0	SQFT	
	LONG TERM DEMOLITION							583,000	SQFT	
	RENOVATION							0	SQFT	
	REMAIN							15,000	SQFT	
	EXISTING USES									
	OFFICE							565,500	SQFT	
	RETAIL							4,000	SQFT	
	CIVIC							20,000	SQFT	
	UTILITY							4,000	SQFT	
	RESIDENTIAL							0	SQFT	
	INDUSTRIAL							0	SQFT	

Appendices MWR Framework Plan (2030)



MWR Framework Plan (2030)

Fort Belvoir / EPG
Fort Belvoir, Virginia



Campus Circulation and Parking



Based on HDR/Dewberry plan dated May 2, 2007

- Identify multiple access points to the Hospital Campus
- Extend existing east-west streets to connect with Belvoir Road and Hospital Campus
- Provide multiple access points to parking garages to efficiently distribute traffic and provide clear and easy access for patients and their families
- Separate visitor/patient parking from employee parking to clarify access to optimize parking and allow for logical clinical expansion strategies in the future



The Patient Care Link



Based on HDR/Dewberry plan dated May 2, 2007

- Establish a clear and safe path for patients, families and visitors that connects main patient care facilities, parking and public spaces
- Integrate covered and protected walkway with design of campus
- Anticipate future programs and planned expansion to locate along the patient care link



Campus Open Space



Based on HDR/Dewberry plan dated May 2, 2007

- Maintain existing trees along Belvoir Road as the main campus entry park
- Establish a series of smaller campus gardens that provide outdoor areas for patients and their families
- Promote the concept of a “campus in the park” and a healing environment
- Develop a series campus boulevards along the major east-west streets that lead to campus



Patient Care Districts



Based on HDR/Dewberry plan dated May 2, 2007

- Distinct Patient Care districts are linked by a clear path for patients
- Future expansion of inpatient, ambulatory, and support programs should be achieved within each area
- Each district can have its own “front door” and entry to provide easy access and mobility for patients



Appendices

Central Plant Study

Potential Hospital Long Range System

Options for future renovation work:

1. 1468 - Demolish existing building 1468 including existing steam generating equipment
2. 1448 - Consider relocating the existing chillers located within building 1448 to one of the new planned buildings in coordination with PEPCO as part of a potential renegotiation of the ESPC program currently in place. This equipment has a useful life of 25 years and is currently only 7 years old. This equipment has the potential to serve approximately 192,000 square feet of commercial office space (excluding redundancy)
3. 1422 – There are currently three Area Developments (Hospital, Town Center, and Troop Area) served by the steam plant equipment located within building 1422. Coordination between all three ADP's is required in order to fully determine the options available for this building and equipment. The current steam equipment has a useful life of 25-years and is currently only 7-years old. All of the recommendations below require the installation of all new piping distribution network (either steam/condensate return or hot water supply/return) and all options allow for the distribution of either steam or the addition of heat exchangers to allow for the distribution of hot water.
 - a. Maintaining the existing plant and equipment in the current configuration could provide services in the future as follows:
 - i. Existing Troop Area and Existing Town Center buildings already provided with service. The excess capacity would allow for approximately all of the future office space within the Town Center to also be served by this system. This arrangement assumes the Hospital ADP is no longer served from building 1422.
 - ii. All of the existing Town Center Buildings currently served and all of the new Town Center program. This would require independent energy sources for all of the Troop Area.
 - iii. All of the new Office Space planned for the Hospital Area. This would require independent energy sources for all of the Troop Area and Town Center
 - b. Maintain the existing plant and equipment and expand the capacity by adding additional boilers
 - i. This arrangement would allow for all of the existing to remain buildings currently served by the 1422 Plant to remain in service while allowing as much program as desired to be added to the facility. The existing plant would need to double in capacity in order to serve all of the existing to remain buildings currently served and all of the new programmed facilities. Note this would exclude the New Hospital Building but does include the remainder of the building within the Hospital ADP.

Existing Hospital



Existing Hospital

Existing System

The existing central energy plant, Building 1468, contains one (1) Weil-McLain 1078 steam boiler with an input capacity of 41 BHP. This steam is distributed to three (3) buildings.

The existing central energy plant, Building 1422, contains three (3) Cleaver Brooks steam boilers with an input capacity of 600 BHP each. This steam is distributed to five (5) buildings within the Hospital ADP. 1422 also serves Town Center and Troop Area.

The existing central energy plant, Building 1448, contains one (1) Trane 640 ton Centrifugal chiller. This chiller water is distributed to four (4) buildings.

The heat loss of steam distribution system is 52% of the total annual steam production per steam plant analysis by Fort Belvoir. The annual cost of heat loss is \$724,251 based on \$12.91/MBTU.

See Table 3 and 4 for the detail information

NORTH



NTS



Steam/Hot Water Line



Utility Plant

Table 3. Existing Hospital

Central Energy Plant	Type	Capacity	Quantity	Equipment	Owner	Year	SF Served
1468	Steam	41 BHP	1	Weil-McLain 1078			11,711
1422	Steam	1200 BHP	3	Cleaver Brooks steam	Pepco Government Services in 2000 as part of NCR ESPC - ECM 12	2000	202,947*
1448	Chiller	640 ton	1	Trane Centrifugal	Pepco Government services in 2000 as part of NCR ESPC - ECM 1	2000	200,388

* 1422 serves 3 Area Developments : Hospital 202,947 SF
 Town Center 255,406 SF
 Troop Area 331,670 SF

Table 4. Central Energy Plant for Individual Building of Hospital ADP

Hospital	Total Gross Square Footage	Building ID	Use	Gross Square Footage	Action
Central Energy Plant (CEP) Steam (1468)	11,711	1467	OFFICE	3,908	Demolish-Long Term
		1468	OFFICE	3,904	Demolish-Long Term
		1469	OFFICE	3,898	Demolish-Long Term
Central Energy Plant (CEP) Steam (1422)	202,947	1445	OFFICE	62,361	Demolish-Long Term
		1448	UTILITY	2,559	Demolish-Long Term
		1464	OFFICE	82,461	Demolish-Long Term
		1465	OFFICE	27,887	Demolish-Long Term
		1466	OFFICE	27,680	Demolish-Long Term
Central Energy Plant (CEP) Chiller (1448)	200,388	1445	OFFICE	52,156	Demolish-Long Term
		1464	OFFICE	75,952	Demolish-Long Term
		1465	OFFICE	76,867	Demolish-Long Term
		1466	OFFICE	75,070	Demolish-Long Term
Independent Building	155,556	1200	CIVIC	23,252	Demolish-Long Term
		1444	OFFICE	5,078	Remain
		1458	OFFICE	131,703	Demolish-Long Term
		1460	OFFICE	101,353	Demolish-Long Term
		1471	OFFICE	2,798	Demolish-Long Term
		1472	OFFICE	1,105	Demolish-Long Term
		1482		2,146	Remain
		1488	RETAIL	3,640	Remain
		1489	UTILITY	1,075	Remain
		1492	OFFICE	185	Demolish-Long Term
		1486	OFFICE	2,160	Remain

Potential Hospital



Potential Hospital

Long Range System
See the next page

NORTH



NTS



Steam/Hot Water Line



Utility Plant

Appendices

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Appendices

LEED ND Checklist



LEED for Neighborhood Development Pilot Project Checklist

Project Name:

Primary Contact:

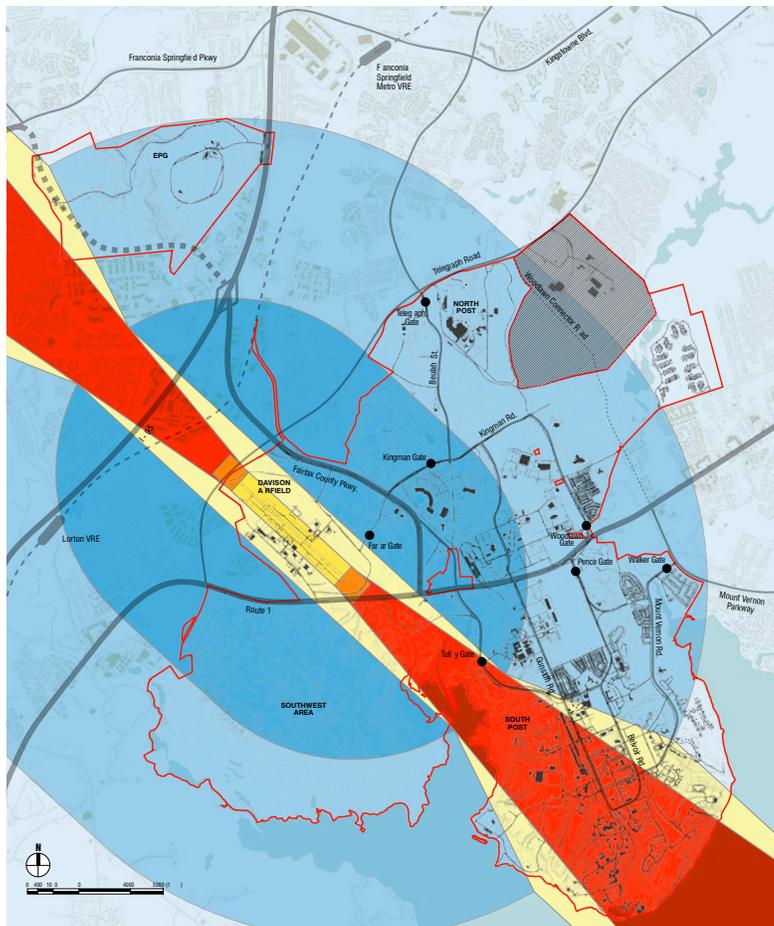
Instructions: In the Points Earned column, enter "Yes," "No," or "Maybe" for prerequisites and the expected number of points earned for credits. For prerequisites with more than one compliance path, enter the compliance path option # in column E, in the row under the prerequisite's name.

Points Earned				30 Points Possible
15		Smart Location & Linkage		
Yes	Prereq 1	Smart Location		Required
1		Option #:		
Yes	Prereq 2	Proximity to Water and Wastewater Infrastructure		Required
1		Option #:		
Yes	Prereq 3	Imperiled Species and Ecological Communities		Required
2		Option #:		
Yes	Prereq 4	Wetland and Water Body Conservation		Required
3		Option #:		
Yes	Prereq 5	Farmland Conservation		Required
2		Option #:		
Yes	Prereq 6	Floodplain Avoidance		Required
2		Option #:		
2	Credit 1	Brownfield Redevelopment		2
1	Credit 2	High Priority Brownfields Redevelopment		1
6	Credit 3	Preferred Location		10
1	Credit 4	Reduced Automobile Dependence		8
1	Credit 5	Bicycle Network		1
	Credit 6	Housing and Jobs Proximity		3
	Credit 7	School Proximity		1
1	Credit 8	Steep Slope Protection		1
1	Credit 9	Site Design for Habitat or Wetlands Conservation		1
1	Credit 10	Restoration of Habitat or Wetlands		1
1	Credit 11	Conservation Management of Habitat or Wetlands		1
18		Neighborhood Pattern & Design		39 Points Possible
Maybe	Prereq 1	Open Community		Required
Yes	Prereq 2	Compact Development		Required
2	Credit 1	Compact Development		7
2	Credit 2	Diversity of Uses		4
3	Credit 3	Diversity of Housing Types		3
2	Credit 4	Affordable Rental Housing		2
	Credit 5	Affordable For-Sale Housing		2
1	Credit 6	Reduced Parking Footprint		2
4	Credit 7	Walkable Streets		8
	Credit 8	Street Network		2
	Credit 9	Transit Facilities		1
	Credit 10	Transportation Demand Management		2
1	Credit 11	Access to Surrounding Vicinity		1
1	Credit 12	Access to Public Spaces		1
	Credit 13	Access to Active Public Spaces		1
1	Credit 14	Universal Accessibility		1
1	Credit 15	Community Outreach and Involvement		1
	Credit 16	Local Food Production		1

Appendices

22		Green Construction & Technology		31 Points Possible
Yes	Prereq 1	Construction Activity Pollution Prevention		Required
2	Credit 1	LEED Certified Green Buildings		3
1	Credit 2	Energy Efficiency in Buildings		3
3	Credit 3	Reduced Water Use		3
1	Credit 4	Building Reuse and Adaptive Reuse		2
1	Credit 5	Reuse of Historic Buildings		1
1	Credit 6	Minimize Site Disturbance through Site Design		1
1	Credit 7	Minimize Site Disturbance during Construction		1
1	Credit 8	Contaminant Reduction in Brownfields Remediation		1
5	Credit 9	Stormwater Management		5
	Credit 10	Heat Island Reduction		1
	Credit 11	Solar Orientation		1
	Credit 12	On-Site Energy Generation		1
1	Credit 13	On-Site Renewable Energy Sources		1
	Credit 14	District Heating & Cooling		1
	Credit 15	Infrastructure Energy Efficiency		1
1	Credit 16	Wastewater Management		1
1	Credit 17	Recycled Content for Infrastructure		1
1	Credit 18	Construction Waste Management		1
1	Credit 19	Comprehensive Waste Management		1
1	Credit 20	Light Pollution Reduction		1
1		Innovation & Design Process		6 Points
	Credit 1.1	Innovation in Design: Provide Specific Title		1
	Credit 1.2	Innovation in Design: Provide Specific Title		1
	Credit 1.3	Innovation in Design: Provide Specific Title		1
	Credit 1.4	Innovation in Design: Provide Specific Title		1
	Credit 1.5	Innovation in Design: Provide Specific Title		1
1	Credit 2	LEED® Accredited Professional		1
56		Project Totals (pre-certification estimates)		106 Points
Certified: 40-49 points, Silver: 50-59 points, Gold: 60-79 points, Platinum: 80-106 points				

Figure 2.43- Airfield Constraints Map



Airfield Facilities

Davison Army Airfield

Davison Army Airfield (DAA) is an operational and training facility. DAA accommodates five operational flying units within the Washington/National Capital Region Military District and a training unit of the District of Columbia Air National Guard. The five operational flying units are:

- 12th Aviation Battalion - Rotary
- Operational Support Airlift Agency (OSAA/OSACOM) - Fixed wing
- DC Air National Guard - Rotary
- Aviation Night Vision Lab - Rotary/ Fixed wing
- Civil Air Patrol - Fixed wing

The operational units are primarily responsible for supporting Post-related missions and operations. Currently DAA supports training and operations by both helicopter and fixed wing aircraft. DAA Air Traffic Services Staff's monthly activity records show that there were a total of 50,181 fixed wing and helicopter operations from April 2005 to April 2006. Helicopter operations account for approximately 60 percent of the total annual flight operations.

DAA is required to comply with guidelines and regulations to meet a Class A airfield as outlined in the Unified Facilities Criteria (UFC) 203-260-01, Airfield and Heliport Planning and Design. The maximum aircraft size which can be safely accommodated at DAA is UC-35 (Citation 560). Operations at the DAA accommodate a helicopter fleet ranging from small OH-6s to large UH-60 Blackhawks and CH-53 Stallions, while fixed wing aircraft operations range from small Cessna 182s to large C-130 Hercules aircraft. Although C-130 operations exceed the design weights and pavement geometry parameters of this Class A regulated airfield, they have occurred frequently and resulted in the rapid deterioration of the airfield pavements. Additionally, the existing facility layout often results in the interaction of helicopter and fixed wing aircraft operations, which reduces the operational safety and capacity of the airfield.

Figure 2.43 maps the imaginary surfaces associated with the runway at DAA. No manmade structures or natural features are allowed on the primary surface and clear zones. Height restrictions are imposed on the development and landscape below the rest of the surfaces. The DAA runway elevation is +74 ft MSL. The associated imaginary surfaces are calculated based on this level.

Maximum allowed height for development on any given parcel is determined by the topography and the imaginary surface the parcel falls under. Figure 2.44 depicts the maximum allowed height for development surrounding the airfield.

Figure 2.44- Maximum Building Heights based on Airfield Imaginary Surfaces Restrictions

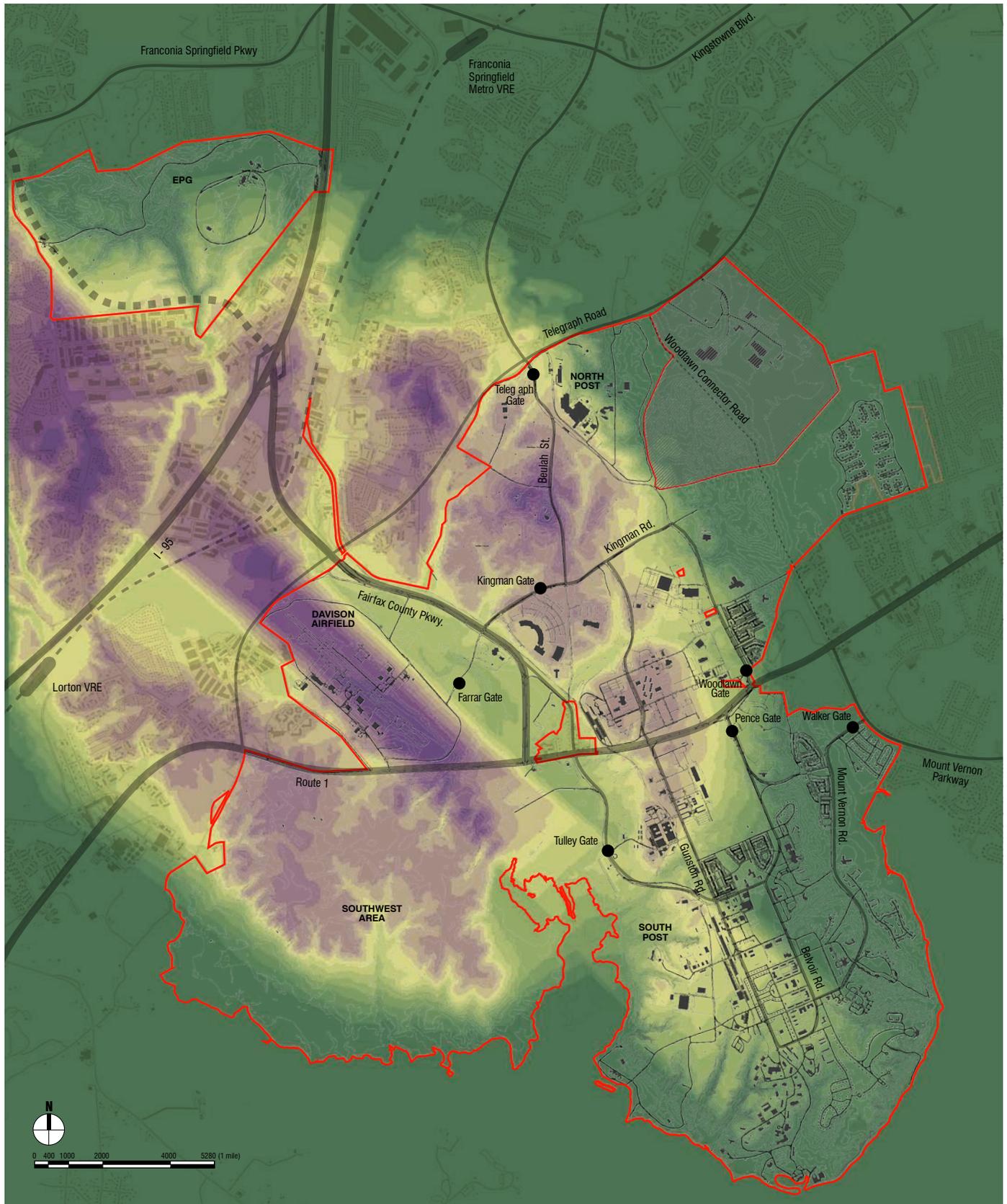


Table 2.21 - DAA Imaginary Surfaces, Existing On-Post Obstructions and Impacts on Development

Imaginary Surface	Definition	Development Impacts and Existing Obstructions*
Primary Surface	A surface longitudinally centered on the runway and extending 200 feet beyond each runway end. The width of the primary surfaces varies depending on the class of runway and coincides with the lateral clearance distance.	No manmade or natural features are allowed. Obstructions include building nos. 3136, 3137, 3138, 3140, 3141, 3230, 3231, 3233, 3234, 3237, and 3239.
Clear Zone (graded area only)	A surface located on the ground at the runway end and symmetrical about the runway centerline extended.	No manmade or natural features are allowed. No obstructions identified.
Approach-Departure Surface	An inclined plane arranged symmetrically about the extended runway centerline. The beginning of the inclined plane starts at the end of the primary surface and the elevation of the centerline at the runway end. The surface flares outward and upward from these points at a uniform slope.	No structure must puncture this surface. No obstructions identified.
Inner Horizontal Surface	An imaginary plane that is oval in shape and is located at a height of 150 feet above the established airfield elevation.	No structure must puncture this surface. Obstructions include building no. 2462.
Conical Surface	An imaginary surface that extends from the periphery of the inner horizontal surface outward and upward at a slope of 20 to 1 for a horizontal distance of 7,000 feet and a height of 500 feet above the established airfield elevation.	No structure must puncture this surface. Obstructions include building nos. 2901, 2902, 2903, 2905, and 2907.
Outer Horizontal Surface	An imaginary plane located at a height of 500 feet above the established airfield elevation, extending outward from the edge of the conical surface a horizontal distance of 30,000 feet.	No structure must puncture this surface. No obstructions identified.
Transitional Surface	An imaginary surface that extends outward and upward at right angles to the runway centerline at a slope of 7 to 1 and connects the primary and approach departure surfaces to the inner horizontal, conical and outer horizontal surfaces.	No structure must puncture this surface. No obstructions identified.

Note: * Existing Obstructions were calculated based on Fort Belvoir GIS data provided. Field investigations are required to verify these conclusions.

Planning Considerations

Current and future facilities should not penetrate the imaginary surfaces which are detailed in Figure 2.43, so that DAA may operate at its full capacity. Table 2.21 lists the existing facilities which conflict with the imaginary surfaces. While height restrictions apply to the entire Post and EPG, restrictions of 100 ft or lower only apply to parts of the North Post and Southwest area (Figure 2.44). Severe restrictions of 40 ft or lower apply to small areas within the North Post Golf Course and the eastern portion of the Southwest area. It is extremely important that existing obstructions are removed and potential future obstructions are prohibited. This will help DAA regain lost operational capacity and protect against further loss of overall airfield functionality.

DAA plays a key role in the National Emergency Response plan. In the event of a National Emergency, Andrews Air Force Base (AFB) will be used to launch fighter aircraft and the Presidential Command Control Berth. Andrews AFB will be locked down to all other operations. DAA will provide for simultaneous operations, such as evacuation of the Secretary of Defense and other key personnel. DAA's assets will be used primarily within the DC area Beltway. During a National Emergency, DAA will be in "lockdown", restricting personnel from leaving or accessing the airfield until the Emergency has passed. These National Emergency Response plans must be considered during land-use development planning.



Airfield Facilities

Appendices

List of Figures

Figure 1–1	The Setting: Future Hospital Campus	3
Figure 1–2	Existing Hospital Site	4
Figure 1–3	Long Term Proposal for the Hospital Area	5
Figure 2–1	Main Post Neighborhoods	7
Figure 3–1	Aerial Today (2007)	9
Figure 3–2	Buildable Areas Overlay Map	15
Figure 3–3	Water Resources	16
Figure 3–4	Sensitive Habitat	17
Figure 3–5	Operational Constraints	18
Figure 3–6	Cultural Resources	19
Figure 3–7	Hospital Helipad Buildable Area	20
Figure 3–8	Hospital Helipad Height Limitations	21
Figure 3–9	Building Installation Status Report	23
Figure 4–1	Long Term Program Capacity	27
Figure 5–1	Hospital Area: Preparing to Meet Future Needs	28
Figure 5–2	Hospital Area Planning Principles	31
Figure 6–1	Framework Plan Alternatives	33
Figure 6–2	Preferred Block Framework	35
Figure 7–1	Long Term Proposal for the Hospital Area	37
Figure 7–2	Building Development Strategy for the Hospital Area	39
Figure 7–3	Building Strategies	41
Figure 7–4	Infrastructure Strategies	45
Figure 7–5	Infrastructure Strategies	46
Figure 7–6	Infrastructure Strategies	47
Figure 7–7	Campus Circulation and Parking	49
Figure 8–1	Future mixed-use Hospital as meeting place	53
Figure 8–2	Near-Term Development Strategy	54
Figure 8–3	Long-Term Development Strategy	55

List of Tables

Table 3–1	Development Constraints Located in the Study Area	11
Table 3–2	Active Petroleum Storage Areas in the Hospital ADP	13
Table 3–3	Inactive Petroleum Storage Areas in the Hospital ADP	13
Table 3–4	Petroleum Release Sites in the Hospital ADP	14
Table 3–5	ISR Rating Definitions	22
Table 4–1	Near Term Projects	26
Table 6–1	Hospital Campus Block Framework	34
Table 7–1	Proposed Hospital Building Development Summary	38