

FUNCTION ANALYSIS CONCEPT DEVELOPMENT REPORT

FY 2001 MCON Project Q-404

SOC AIR OPERATIONS FACILITY

NAVAL AMPHIBIOUS BASE, LITTLE CREEK
Virginia Beach, VA



April 13-22, 1999

DESIGN AGENCY

Atlantic Division
Naval Facilities Engineering Command
Norfolk, VA

FACD/VALUE ENGINEERING CONSULTANT

Pacific Environmental Services, Inc.
560 Herndon Parkway, Suite 200
Herndon, Virginia 20170-5240

FACD WORKSHOP

VALUE ENGINEERING OFFICER:

Mr. William A. Bogue, Jr., PE, CVS

FUNCTION ANALYSIS CONCEPT DEVELOPMENT REPORT (FACD)

**FY 2001 MCON Project P-404
SOF AIR OPERATIONS FACILITY**

**NAVAL AMPHIBIOUS BASE, LITTLE CREEK
Virginia Beach, VA**

April 13-22, 1999

LANTNAVFACENGCOM

JOB ORDER NUMBER: 9F9027

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Atlantic Division
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FACD/VALUE ENGINEERING CONSULTANTS

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Function Analysis Concept Development Report

P-404, SOF Air Operations Facility

FOR

Naval Amphibious Base Little Creek
Virginia Beach, VA

APPROVED BY:

REPRESENTING:

DATE:

AL FARROW / al Farrow NAB LCREEK 4/22/99
SITE IS OK ONCE RSL'S ARE RELOCATED!

ROGER WOOD / Rg-1 / Wood SOVT-2 (CNSWG-2) 4/22/99

PRC Robert E CORRA / Robert E Corra ST-4 4/22/99

STEPHEN J. RUSSELL PRC SEAL TEAM TWO 4/22/99

CURTIS E. EMMERT PRC SEAL TEAM EIGHT 4/22/99

Function Analysis Concept Development Report

P-404, SOF Air Operations Facility

FOR

Naval Amphibious Base Little Creek
Virginia Beach, VA

APPROVED BY:



REPRESENTING:

LANTDIV STRUCTURAL

DATE:

4/22/99



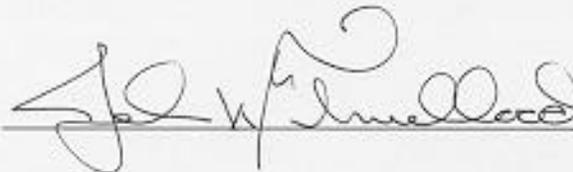
LANTDIV COST

4/22/99



LANTDIV FLEET

4/22/99



LANTDIV Arch

4/22/99



NSWC-2

4/22/99



NSWC-2

22Apr99



SOCOM

4/22/99

Function Analysis Concept Development Report

P-404, SOF Air Operations Facility

FOR

Naval Amphibious Base Little Creek
Virginia Beach, VA

APPROVED BY:

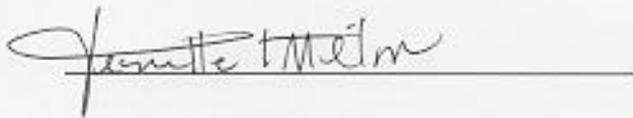
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DATE:



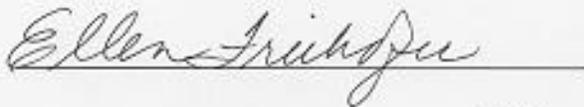
LANTDIV 401L

4-22-99



LANTDIV Planning

4-22-99



LANTDIV PM

4/22/99



LANTDIV

4/22/99



LANTDIV FIRE

4/22/99



LANTDIV MECH

4/22/99



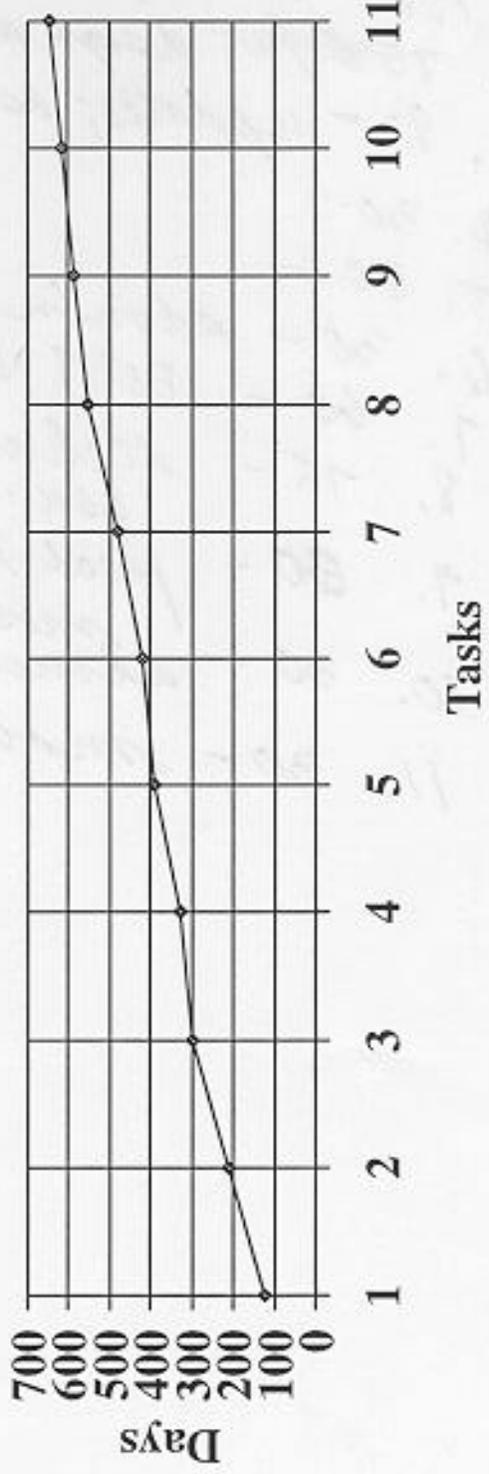
LANTDIV CIVIL

4/22/99

MILESTONES FOR DESIGN AND CONSTRUCTION AWARD

Project Schedule:	Days	Date	Days	Date
1. 0 - 35% Design	120	06/99	7. Request Technical Proposals	60 05/00
2. Design Authorization	75	08/99	8. Review Technical	75 07/00
3. 35% - 100% Design	90	11/99	9. Request Price Proposals	30 09/00
4. Review	30	12/99	10. Award Contract	30 10/00
5. Final Design Complete	60	02/00	11. Begin FY01 Construction	30 11/00
6. Release Solicitation	30	03/00	Time Required	645

P404 Design Schedule



COMMENTS ON FACD REPORT

Project: **P-404, SOF Air Operations Facility**
Naval Amphibious Base, Little Creek

Comments by: Terry Riley/John Blackburn

Date: 22 April 1999

ITEM NO.	COMMENT	FACD TEAM RESPONSE
1	Examine the possibility of rotating the new	Will comply
	SOF Air Ops building 180 degrees on the site	
	for improved site functions.	

COMMENTS ON FACD REPORT

Project: **P-404, SOF Air Operations Facility**
 Naval Amphibious Base, Little Creek

Comments by: Dave Wohlscheid

Date: 22 April 1999

ITEM NO.	COMMENT	FACD TEAM RESPONSE
1	Research liquid drainage and fill	Research and activity input will be
	of parachute rinse tanks.	completed prior to 35% submittal.
		Coordinate with Base Environmental.
2	Recess fire extinguisher cabinets in select	Fire extinguisher cabinet sizes will be
	areas.	coordinated with Base and Group2.
		Locations to be determined per code.
		Recessed in admin. area/hook mounted
		in shop areas.
3	Are relative humidity controls required to be	Yes, the same conditions are required for
	the same for parachute tower and large	the tower, packing and storage areas.
	folding area?	

COMMENTS ON FACD REPORT

Project: **P-404, SOF Air Operations Facility**
 Naval Amphibious Base, Little Creek

Comments by: Kathy Bethany

Date: 22 April 1999

ITEM NO.	COMMENT	FACD TEAM RESPONSE
1	Suggest adding a sink and countertop with	Base and wall cabinets to be located in
	cabinets in kitchenette.	Kitchenette. Location of sink,
		, refrigerator to be discussed with user.

COMMENTS ON FACD REPORT

Project: **P-404, SOF Air Operations Facility**
 Naval Amphibious Base, Little Creek

Comments by: LCDR McGarrity

Date: 22 April 1999

ITEM NO.	COMMENT	FACD TEAM RESPONSE
1	Provide breakdown of BFR by CAT Code in	Provide to LCDR 4/22/99
	report	
2	May want to consider double pane-shatter	LCDR to provide info to design team.
	resistant windows for blast protection (force	Architect to research window/glazing.
	protection) and hurricane/storm protection.	Structural to input also.
3	Exterior signage should be included in project	Signage to be incorporated in project.
	for facility I.D. and traffic control/flow	

COMMENTS ON FACD REPORT

Project: **P-404, SOF Air Operations Facility**
 Naval Amphibious Base, Little Creek

Comments by: Jeanette Milton

Date: 22 April 1999

ITEM NO.	COMMENT	FACD TEAM RESPONSE
1	Section 2 page 8 Naval Ordinance is not final approval authority based on N.E.W. of ordinance stored. Please change to Dept. of Defense Explosive Safety Board.	So noted
2	Section2, 1391 Block 11 Substandard # should be OSM. That shows you have a deficit to build.	So noted
3	Section 4, probably important to include phone conversation recorded with Al Farrow. Little Creek Base Civil and Jeanette Milton LANTDIV planning had talk with Rick Adams of Naval Ordinance Center regarding Concept 3 Site Plan (4/19). Access road-	Explosive arcs will be moved to another site. Present MWR Trailer storage.
	trucks will only be allowed to point A to B, but can not stop inside the arc. Tarmac is	Comment noted

COMMENTS ON FACD REPORT

Project: **P-404, SOF Air Operations Facility**
 Naval Amphibious Base, Little Creek

Comments by: Jeanette Milton continued.....

Date: 22 April 1999

ITEM NO.	COMMENT	FACD TEAM RESPONSE
3...	not related to ordinance stored in RSL,	
	personnel cannot be permitted inside the	
	arc. 4000lbs. of explosives would have to	
	go to Dept. of Defense Explosives Safety	
	Board for review. NAVORD would only	
	like to see grass within the arc.	
4	Section3, change heading on cost sheet to	So noted
	indicate Concept 4.	

COMMENTS ON FACD REPORT

Project: **P-404, SOF Air Operations Facility**
 Naval Amphibious Base, Little Creek

Comments by: Steve Russell

Date: 22 April 1999

ITEM NO.	COMMENT	FACD TEAM RESPONSE
1	Increase number of air drops throughout building	Steve Russell, please provide specific locations required. EH/403.
2	Provide load test points in various points in the FF2/ALT shop and packing area.	Will research lifting beam in FF2 shop/ 500# min to 1000# capacity...
3	Provide suspended hurricane fans(2 ea) over G-11 packing areas to facilitate repacking.	Type and location to be coordinated with activity EH/403.
4	Provide lighted portion of packing tables at canopy end to facilitate static during parachute repacking	Will comply
5	Tie in PA/intercom system to telephone vice stand-alone PA system.	Will comply
6	Mirror the facility including tarmac	Will comply
7	Provide floor receptacles throughout packing area.	Will comply

COMMENTS ON FACD REPORT

Project: **P-404, SOF Air Operations Facility**
 Naval Amphibious Base, Little Creek

Comments by: PRC Bob Corra, Seal Team 4

Date: 22 April 1999

ITEM NO.	COMMENT	FACD TEAM RESPONSE
1	Identify location for Hazmat lockers	Will comply
2	Define HVAC requirements in tower	Tower will be conditioned (IAW
		NAVAIR 13-1-6.2) to 75 degrees 60%
		RH, plus or minus 10% EH/403.
3	I.D. Locations of specific hazard: CRRC(gas)	Will coordinate with user
	02	
4	Define lighting in tower	Fluorescent
5	Define gate opening/monitoring system.	Will comply
6	Air Ops memorial outfront	Will comply
7	Define hoist system in tower	Winch and hoist system to be determined
		and coordinated with user.

COMMENTS ON FACD REPORT

Project: **P-404, SOF Air Operations Facility**
 Naval Amphibious Base, Little Creek

Comments by: Curt Emmert

Date: 22 April 1999

ITEM NO.	COMMENT	FACD TEAM RESPONSE
1	Will new parking spaces interfere with	Will comply and remove parking spaces
	turning radius of back compound access	which interfere with the turning radii of
	gate (between ST8 and ST2)?	cranes and trucks.
2	Are provisions made for outdoor water	Yes, hose bibbs will be provided.
	spigots (tarmac side)?	
3	Exhaust fans in CRRC rigging area?	Yes, fans will be provided.
4	Is wall mounted lighting in tower recessed?	No, will consider recess, will also provide
		Receptacles in tower area.

COMMENTS ON FACD REPORT

Project: **P-404, SOF Air Operations Facility**
 Naval Amphibious Base, Little Creek

Comments by: J Higgins

Date: 22 April 1999

ITEM NO.	COMMENT	FACD TEAM RESPONSE
1	Generator backup? Required?	Hook up for portable generator set
2	Parachute wash tanks discharge to sanitary or storm? Check with environmental	Will probably go to sanitary, but will check with environmental.
3	O2 sensor in O2 room required?	Don't believe will be required, but will look into for 35%.
4	Do we need two separate fire systems for each building?	Will provide separate fire alarm control panels for each building to meet typical JHH/408.
5	Ductbank back to Group2 QD for security and lan.	Will coordinate with activity.
6	Love the idea of rotating building 180 degree	Will comply

COMMENTS ON FACD REPORT

Project: **P-404, SOF Air Operations Facility**
 Naval Amphibious Base, Little Creek

Comments by: Ellen Freihofer

Date: 22 April 1999

ITEM NO.	COMMENT	FACD TEAM RESPONSE
1	(Basis of design)	
	1. Base does not want privacy slats in the	There will be no privacy slats in any
	fence.	slats in any fencing. 7ft high fence will
		be provided.
2	Is CCTV still required?	Yes

SECTION 2

EXECUTIVE SUMMARY

Section 2

EXECUTIVE SUMMARY

Introduction

Function Analysis Concept Development (FACD) is a cooperative effort by the Designer, Users and Engineering Field Division personnel. It includes on-site development of a conceptual design in response to functional, aesthetic, environmental, Base planning, site, budgetary and other requirements with consideration of life cycle consequences of alternative design solutions. The purposes of FACDs include (1) confirmation of budget, (2) verification of scope, (3) early exposure and resolution of design issues and (4) minimization of the expense and time delays associated with changes during subsequent design efforts. FACDs are intended to improve design quality and execution.

A FACD Workshop was conducted on P-404, SOF Air Operations Facility, NAB Little Creek, Virginia Beach, VA during the period April 13-22, 1999. Participants included representatives of LANTDIV (planning, value engineering and project management staff), design team members from LANTDIV, Pacific Environmental Services (Facilitator), Naval Special Warfare Command, Naval Special Warfare Group-2 (NSWG), and Seal Teams 2, 4 and 8. A complete Meeting Attendee List is included later in this section.

FACD Kickoff

A pre-workshop kickoff meeting was conducted at Seal Team 8 Building at Little Creek on February 2nd as part of the Pre-design Meeting. It was attended by the design team as well as NSWG representatives. The LANTDIV Value Engineer attended this meeting, presented the concepts of FACD and obtained user endorsement of the concept. The importance of accomplishing preliminary work (Draft Concept) in advance of the on-site work was stressed to the design team.

The FACD Facilitator met separately with the design team on March 2nd to review the procedures that will occur during the workshop and to reinforce the importance of preparation prior to the beginning of the FACD.

At the on-site workshop kickoff meeting, the Team Facilitator again reviewed FACD concepts for the benefit of those who did not attend the pre-study kickoff at Little Creek. The Facilitator then explained the FACD process and reviewed the planned agenda. Emphasis was placed on user participation throughout the process.

Project Background

The present paraloft facility was constructed in 1967; its primary function was to support operations and maintenance for personnel parachutes. The facility currently supports four seal teams with the added responsibility of maintaining G11 cargo parachutes, which are considerably larger than personnel support equipment. The existing tower is undersized to support appropriate drying methods. In the drying tower the clear area beneath the manual hoists is approximately 40 feet; G11 parachutes need a minimum of 75 feet clear area beneath a hoist to prevent the canopy from resting on the deck while drying. Additionally, the folding / packing area is not long enough to allow the complete extension of the canopy and rigging of a G11 parachute for packing, unless doors on either end of the room are opened. Therefore, this equipment cannot be prepared during inclement weather. Storage space is also inadequate, with the result that the users currently employ over 40 cargo containers for storage. The current building is 8354 square feet.

The new facility will provide approximately 33,000 square feet of additional space including a wet/dry tower with a minimum hoist height of 75 feet, enlarged parachute packing area, equipment repair and maintenance area, training room, locker/shower facilities and a high bay packing/load out area for cargo requirements. The existing building will be allocated as a storage facility, with minimal modifications required to function in this capacity.

In December 1998 the project received design authorization up to the 35% level. It is currently scheduled for the 2001 program, with an anticipated construction completion of 400 days.

User Requirements

User involvement is critical for a successful FACD. The Naval Special Warfare Group and Seal Team personnel participated throughout the eight-day period. Users were asked: What do you do and how do you do it? What do you need vice want out of this project? With whom do you interface? How do you interrelate with the other facilities on the complex? What are your comments on the current floor area program allocation? What do you like and dislike about your previous facilities or new facilities you may have experienced? Finally, discussions revolved around the question, "What do you like or dislike about Concept 1?"

User functional requirements are shown in Section 4. It became apparent several primary functions were critical to the NSWG relating to this facility. These functions were parachute functions, accommodate consolidation, maintain equipment and administer Air Operations.

A significant user participant in this FACD was the Base Planning Department who helped expose the issues relating to development on this site (RSLs). The addition of these units took place after initial planning for this project had been completed.

Concept #1

The Design Team presented the project as it existed at the beginning of the FACD effort including a discussion of preliminary site layouts as well as floor plans and general assumptions. The scope for this project included the items as defined in the scope of work, information obtained at the kickoff and subsequent meetings with the user, as well as basic assumptions made by the Design Team and included in the initial concept.

The proposed Concept 1 project includes construction of a one story, 36,000 square foot facility located south of the existing Paraloft Building Number 3805. There are no current plans to renovate the existing facilities. Space within the new structure will be provided for four seal team office areas, a training room, a parachute drying tower, parachute repairs, parachute packing, four seal team storage areas, and para-rigging of inflatable rubber boats. The P-404 Air Ops Facility provides the space necessary to store parachutes and related gear under proper temperature and humidity conditions. Also included is an outside concrete tarmac area, parking for twenty cars and other miscellaneous site improvements. The maximum programmed area for this facility includes 41,964 SF. The new facility in conjunction with the existing facility total 44,198 SF. Total area must therefore be reduced by 2,234 SF.

Architecturally, the building will have an exterior face of split faced CMU, smooth faced CMU and metal panels. Windows will be thermal break aluminum with tinted, low reflective vision glass. The roof shall be pitched at ½ inch per foot consisting of granule-impregnated modified bituminous membrane. Typical interior partitions will be CMU for durability. Proposed finishes include VCT for corridors, offices, conference room and classroom. Carpet will be used at the parachute folding/packing and staging areas. Walls will be painted and ceramic tile will be used in toilet areas. Ceilings will be painted structure in shop areas, suspended gypsum board in toilets and lockers, and suspended acoustical tile in classroom, offices and conference rooms.

The cooling system for the facility will include air-handling units using either chilled water or DX cooling coils and hydronic heating coils. Packing and storage areas shall have space relative humidity limited to 50%. Supplemental cooling will be included in the classrooms to accommodate high loads. The parachute-drying tower shall utilize minimal outside air and dehumidification control with hot water reheat for use during parachute drying operations. Domestic hot water will be provided using base steam and will be tempered to 110 degrees F. A compressed air system will be included in the rubber boat storage area. The building will contain a complete automatic wet pipe sprinkler system with appropriate interior fire alarm and smoke evacuation systems.

Electrical characteristics will be 3 phase, 4 wire, 480/277 volts for power and lighting and 120 V for receptacles. Interior lighting will generally be fluorescent for general illumination. Fluorescent 2'X4' trofers will be used for offices, classroom and locker rooms. Industrial fluorescent fixtures will be used in storage areas and in all spaces with open ceilings. High-pressure sodium (HPS) wall packs will be used for security lighting. A public address system will be provided throughout the building. In addition, the tower will include lightning protection.

A cost estimate was prepared for the project as described above. The total estimated construction cost for Concept 1 was \$5,149,000. This compares to the direction given by LANTDIV project management for a design to ECC of \$5.3 million. Based on this information, a budget problem does not exist at this concept stage.

Function and Issue Analysis

A discussion of Function resulted in the Users generating a list of what they envision being the “Functions” this project performs. This discussion enlightened the attendees as to the User’s perspective of the project. Further discussion resulted in issues that needed to be addressed and/or resolved in this design. Some of the more significant issues noted for resolution were:

- Impact arc conflict from the ready service locker (RSL) location
- Classification of existing paraloft building
- HVAC system to be used in the paraloft tower
- Landscaping vice security requirements
- Truck access requirements to the site

A complete listing of Functions and Issues discussed is included in Section 4 of this report.

Creative and Preliminary Analysis Phase

The Creative Phase was based on the issues listed in the previous discussion. Each issue was brainstormed to develop alternatives to help resolve that particular problem. The creative idea listing was generated to include new ideas that may be incorporated in the next phase of this project. No discussion of the ideas occurred until the brainstorming session was complete. A total of 53 ideas was presented for consideration by the FACD team and is included in Section 4 of this report.

Each of the creative ideas generated by the team was evaluated and discussed. A determination was made to incorporate the idea, consider it for further evaluation or drop the idea completely. Of the total list of ideas, 37 will be carried forward and incorporated in the design to the extent possible for the next iteration.

Concept #2

In an effort to continue forward progress on this project, the FACD team concentrated on resolving two main issues. The first involved the RSL relocation and the second concerned the classification of the existing paraloft facility. Both of these issues have a dramatic impact on the siting of this project and of the size of the new facility. Concept #2 was developed using comments received from various parties, the User functional requirements and incorporating as many ideas as practical from the Creative Listing previously generated.

Additional research determined the book value used for the existing paraloft facility was approximately \$1,000,000. This implies to justify demolition of the building, at least 75% of this value would have to be spent on upgrading the building. Based on field surveys and engineering judgement a proper building rehabilitation could be performed for substantially less. It was therefore concluded the existing facility remained and will be utilized in some capacity by the User. At this time the extent of rehabilitation, if any, was not determined. The area allocation of the building will be included as part of the total allowed for this project.

The RSL units were evaluated by the Users, and it was determined they are over rated in terms of storage capacity. It is proposed to reduce the impact arc from 150 to 106 feet. It is also proposed to relocate the RSL units to the southeast from their current position to allow for arc clearance of all structures and public thoroughfares. Regulations state the arc could not intersect any inhabited building or public transportation route (PTR). These proposed changes will be submitted through the appropriate channels for approval, but the FACD team will proceed assuming they will be approved.

The building location on the site remained approximately the same but the size was reduced approximately 3,400 square feet to conform to program requirements. The size of the tarmac was increased slightly to improve truck-turning radii. The RSL units were relocated approximately 50 meters to the southeast of the original location. The site entry gate off Helicopter Road was relocated west to allow trucks to pull completely off the roadway to prevent traffic problems on Helicopter Road.

Architecturally, no major exterior finish changes were proposed. However, the floor plan was revised to reflect changes based on functional comments received during the week and subsequent meetings with the User. The administration area was consolidated into one area in lieu of four separate team offices. A total of 12 workstations are included. The training room was enlarged slightly and provisions were included to divide the room in half. A kitchenette was provided for a break area. A quarterdeck/entrance area separates this administration function from the main building.

In the main building, space was removed from the team storage designation to bring the facility within area requirements. In addition, the drying tower was relocated to the south end of the building to allow direct access from the tarmac. The size of the parachute folding and staging area was reallocated to provide adequate length for the large chutes. Additional minor revisions were included to refine the areas to the particular needs of each function being performed in that area.

No major changes were developed for the electrical, mechanical or landscaping for this concept. Project management was informed that a budget reduction had occurred however. The revised design to ECC was now \$5.0 million in lieu of \$5.3 as previously described. A revised estimate was not prepared for this concept. However, even with the budget reduction the team does not believe there are severe budget issues at this time.

Creative and Preliminary Analysis Phases

In order to pursue a best value design, and in order to achieve direction towards meeting the main project issues, an additional “issue session” followed the presentation. The intent of this session was to reaffirm the design team had all the information necessary to properly develop the next concept in more detail. Additional meetings were scheduled to answer the questions raised by this session, and eight (8) additional ideas were generated as a result of the “issues session” that will be incorporated in the next iteration of the project documents. The main goal to be achieved by the next presentation is to include additional detail in each discipline to finalize the conceptual layouts for this project.

Concept #3

Based on the discussions and creative ideas generated following the presentation on Friday, the FACD Team generated the third concept design with the main goals of including additional detail and ensuring all functional needs of the User are being met. This presentation occurred on Tuesday morning of the second week.

Landscaping was reduced from the previous concept with the trees being removed from Helicopter Road for security reasons. The rear break area remains with a barbecue being included. Recycled plastic benches and a picnic table are also shown.

The civil area had minor site changes. The most significant change in the civil design was the relocation of the RSLs off site which was determined to be feasible during the development of Concept 3. This allows the site to be used completely and safely with no consideration given to impact arcs. The gate access to the site includes sliding gates with a card access system. POV parking will occur on the West Side of the building with no normal POV access to the tarmac area.

Architecturally the floor plan had additional details and modifications to incorporate input from the User. The team storage area was divided into four separate areas of 826 SF each. The gear issue room indicates rack storage and an area of 1506 SF. The 1450 SF fabrication/repair shop shows location of sewing machines and other equipment. A bunkroom was added behind the quarterdeck for staffing if needed. The tower was relocated to the southwest corner of the building with a separate mechanical court outside. The para-rigging is now in the south center of the building sized for 2000 SF. The locker room space has been reallocated to include 20 male lockers and 4 female to more accurately reflect the ratio foreseen by the user. A general maintenance shop has been included as well as an 1190 SF supply room with shelving. A 10-Ton bridge crane has been included in the para-rigging area.

Both the mechanical and electrical systems had minor changes in details. A mechanical courtyard has been indicated on the southwest exterior corner of the building to accommodate the special needs of the paraloft tower.

A revised cost estimate was generated for this concept and resulted in an estimated construction cost of \$4,787,000 vice the design to ECC of \$5,000,000. The project therefore is still within budget at this time. This implies approximately \$213,000 would be available for rehabilitation of the existing paraloft facility.

Creative and Preliminary Analysis Phases

In order to verify no additional unanswered questions remain, an additional “issue session” followed the presentation. The intent of this session was to reaffirm the design team had all the information necessary to properly develop the design. An additional ten (10) ideas were generated as a result of the issue session that will be incorporated in the final iteration of the project documents.

The direction given during these meetings included revising the tower height to 85 feet. This will allow adequate inside clearance for all appropriate parachutes. It was also decided to continue analysis of cost advantages of using a pre-engineered building for part of the project. This may allow additional funds for rehabilitation of the existing paraloft facility. Direction was given to prepare a design for the rehabilitation of the existing facility to the extent necessary for it to be used as proper storage for the Seal Teams. This would include demolition of the existing tower as it is no longer required. It is the intent this design will be packaged in such a way that portions could be incorporated into the project during bidding depending on the bidding climate. It also may be feasible to fund the additional rehabilitation under separate funding, but a complete design is required. This analysis will not be completed during the timeframe of this FACD effort.

Concept #4-Final Concept

A final presentation of Concept #4 followed on Thursday morning, which is presented in detail in Section 3 of this FACD report including refined floor plans and cost estimates. The entire project was presented from front to back with all disciplines being discussed. Comments received at this meeting were responded to in writing by the FACD team, are included in Section 1 of the FACD report, and were distributed at the sign-off meeting conducted on Thursday afternoon. Concept 4, inclusive of these comments, will become the basis for the 35% design submission.

Outstanding Issues and Plan for Resolution

The majority of questions raised at the final presentation and on Thursday afternoon will be addressed in the 35% submittal of this project. The following issues are or may be a pending concern at that time:

- 1.) Naval Ordinance must approve the final revisions proposed for the relocation of the RSLs. This process could take up to 5 months, but LANTDIV planning indicated every effort would be made to expedite the process.

- 2.) Environmental issues need to be verified. These include the need for an asbestos survey of the existing paraloft facility, as well as site approval for the new building. Previous approval was based on a building addition.
- 3.) Additional analysis of the existing facility needs to be performed to determine the extent of rehabilitation necessary to properly upgrade the building. This includes a structural evaluation as well as mechanical and electrical systems analysis. Current Code analysis as well as what the building use will be are factors to also be considered.
- 4.) Mechanical systems will be evaluated concerning the energy source to be used (steam vice natural gas).
- 5.) Use of a pre-engineered building for a portion of the new structure will be evaluated as a value improvement opportunity. Savings realized could benefit any existing facility rehabilitation expenses.
- 6.) Following completion of the soil borings, an evaluation will be made regarding the use of timber piles in lieu of concrete piles as a value improvement opportunity

FACD WORKSHOP AGENDA

***FY 01 MCON P-404
SOF Air Operations Facility***

***Naval Amphibious Base, Little Creek
Virginia Beach, Virginia***

April 13 - 22, 1999

Location: Quality Inn Lake Wright, Virginia/Colonial Rooms
6280 Northhampton Boulevard, Norfolk

Facilitator: David Wohlscheid, PE, CVS 703-471-8383
Pacific Environmental Services, Inc. (PES)

Monday – April 12, 1999

All Day – The FACD team has access to the meeting room for set up of equipment, etc.

Tuesday – April 13, 1999

0800 - KICK-OFF MEETING – CONCEPT #1

All

Introductions

W. Bogue

Opening remarks. Identify key contacts and determine appropriate station level for sign-off on the Final Concept Design.

Review FACD Process and Agenda

**D. Wohlscheid/
Users**

Review FACD process and planned agenda. Solicit and identify user requirements (function statements of objectives and problem issues). User, sponsor etc. presentation (what they do, how they do it, etc.). Develop an understanding by all of the User needs and requirements.

Presentation of Starting Scope (DD1391)

Design Team

Present draft conceptual design cost estimate (**Concept #1**). Each discipline makes a presentation of their initial concept for the project. The team should indicate how the design responds to

functional requirements based on their current understanding of the project. Identify any obvious concerns and issues.

Tuesday – April 13, 1999 – continued

Discuss specific needs of the project. Discuss functions performed within the building and how each interrelates with required adjacencies, as well as to other buildings on-site and to the site itself. Discuss absolute needs vs. desires/wants for this project. Complete function lists and identify issues that need to be resolved during this FACD.

**D. Wohlscheid/
Users**

Creative Phase

Brainstorm projects for potential ideas for incorporation in the next iteration. Creative ideas should address improvement of the design's response to functional requirements, lowering of total life cycle costs, inclusion of sustainable design features or resolving known issues.

**D. Wohlscheid/
All**

Evaluation Phase

Develop and rank criteria for judging creative ideas. Judge generated ideas to determine if idea warrants further consideration. Carry high ranked ideas forward to be incorporated in the next concept.

All

Make task assignments in preparation for the next Concept presentation.

**D. Wohlscheid/
Design Team**

Wednesday – April 14, 1999

TBD Executive In-Brief, if Required

Summarize progress and direction of the FACD process to appropriate station personnel. Advise concerning the need for endorsement of the Final Concept Design.

**Selected FACD
Team Members**

Workday

Develop Concept #2 and based on input received on first day's efforts. Solicit additional input from user as required.
Develop cost estimate for Concept #2 as concept is developed.
Begin developing sections of the FACD report as appropriate.
Research alternatives, questions, and issues, as required.

Design Team/User

Thursday – April 15, 1999

Workday and TAX Day!!

Continue design. Prepare for presentation of Concept #2.

Design Team

Friday – April 16, 1999

0800 - PROGRESS REVIEW MEETING #2 – CONCEPT #2

Present Concept #2. Each discipline will present their findings and recommendations. The presentation should include revised plans with handouts as required to inform participants and to invite their comments. Present updated cost estimate.

Design Team

Discuss any needs and wants the user would like to see added.

User/Wohlscheid

Solicit additional input from user and get everyone to participate in the acceptance/rejection of major alternatives.

D. Wohlscheid

Creative Phase

D. Wohlscheid/All

Generate additional ideas to address improvement of the design's response to functional requirements, lowering of life cycle cost, or resolving known issues.

Evaluation Phase

D. Wohlscheid/All

Judge the ideas to determine feasibility of implementation.

Begin implementing the appropriate ideas into the project concepts. Tasks are assigned and work is begun on Concept #3.

Design Team

Monday – April 19, 1999

Workday

Continue development of Concept #3. Include input from users. Obtain additional input as needed and research any missing data needed to finalize layouts. Develop cost estimate for Concept #3. Begin development of the abbreviated Basis of Design. Coordinate with ROICC for constructability input. Prepare for the Concept #3 presentation.

Design Team

Tuesday – April 20, 1999

0800 - PROGRESS REVIEW MEETING #3 – CONCEPT #3

Present findings and alternates for all disciplines to date. Present updated cost estimate.

Design Team

Tuesday – April 20, 1999 - continued

User/Wohlscheid

Discuss any additional needs and wants the user would like to see added.

Solicit additional input from user and get everyone to participate in the acceptance/rejection of major alternatives.

D. Wohlscheid

Generate additional ideas to improve value and address any remaining issues confronting the project.

D. Wohlscheid/All

Judge the ideas to determine feasibility of implementation.

D. Wohlscheid/All

Begin implementing the appropriate ideas into the project concepts. Work begins on development of Concept #4.

Design Team

Wednesday – April 21, 1999

Workday

Finalize development of Concept #4 and cost estimate. Refine Concept #4 to include all input and layouts from all disciplines. Refine cost estimate and develop a bid additive list if required. Identify construction methods, phasing and schedule for the project (if applicable). Prepare for the final presentation of Concept #4.

Design Team

Generate write-ups for the Basis of Design. Generate write-ups for FACD Recommendations. Generate FACD report and prepare for presentation.

**D. Wohlscheid/
Design Team**

Thursday – April 22, 1999

0800 – FORMAL PRESENTATION CONCEPT #4

Present final concept and cost estimate including a short summary of all disciplines.
Solicit questions and comments on the proposed facilities.
Summarize issues, resolutions or plans for resolution.

Design Team

Distribute the FACD report. Solicit comments on the report in writing.

D. Wohlscheid

Thursday – April 22, 1999 – continued

TBD – SIGN-OFF MEETING

Review and respond in writing to all comments received on the FACD report.
Have attendees sign-off on presented concept indicating they concur with the final concept, comments and responses.

Design Team

TBD - Executive Out-Brief, If Required

Present project to appropriate station personnel including as much detail as requested. Obtain Executive endorsement of the Final Concept Design.

**Selected FACD
Team Members**

FACD MEETING ATTENDEES

Project: P-404, SOF Air Operations Facility, Naval Amphibious Base Little Creek, Virginia Beach, VA

Dates April 13-22, 1999

Meeting Location: Quality Inn Lake Wright, Norfolk, VA

NAME	ORGANIZATION	POSITION	PHONE NO.	FAX NO.
David Wohlscheid	Pacific Environ. Services, Inc.	FACD Team Facilitator	(703)471-8383	(703)481-8296
Bill Bogue	LANTDIV	Value Engineer	(757)322-4442	(757)322-4415
Carl E. Finney	CNSWG-2 (AIROPS)	Air Ops Coordinator	(757)462-2269	(757)462-2401
Todd R. Tucker	Seal Team 8 (AIROPS)	Air Ops LPO	(757)462-8786	
Roger Wood	Seal Delivery Vehicle TM2	Air Ops LPO	(757)462-4330	
John Carraway	NSWG-2, N9	Engineer Tech	(757)462-2348	(757)462-2433
LTjg Jonathan Higgins	NSWG-2 N9	Staff Civil Engineer	(757)462-2347	(757)462-2401
CDR L. A. Bremsisth	CNSWG-2 CSO	Chief Staff Officer	(757)462-2201	
LCDR W. E. Dunning	CNSWC N41	Force Civil Engineer	(619)437-0880	(619)437-0927
Steve Russell	Seal Team 2	Air Operations Officer	(757)462-4043	(757)462-3195
Bob Corra	Seal Team 4	Air Operations Dept Head	(757)462-7663	(757)462-7663
Ellen Freihofer	LANTNAVFACENGCOM	Project Manager	(757)322-8338	(757)322-8362
Jeanette Milton	LANTNAVFACENGCOM	Facilities Planner	(757)322-4872	(757)322-4859
Bill Crone	LANTDIV Design	Design Director	(757)322-4400	(757)322-4415
Gary Colehamer	LANTDIV Design	Head Architectural Branch	(757)322-4401	(757)322-4415
Kathy Bethany	US Dept. Of State, Office of Foreign Buildings	Value Engineering Manager	(703)875-6369	(703)875-6204
Al Farrow	NAB Little Creek	Master Planner	(757)462-7064	(757)462-3724

FACD MEETING ATTENDEES

Project: P-404, SOF Air Operations Facility, Naval Amphibious Base Little Creek, Virginia Beach, VA

Dates April 13-22, 1999

Meeting Location: Quality Inn Lake Wright, Norfolk, VA

NAME	ORGANIZATION	POSITION	PHONE NO.	FAX NO.
Peyton Glenn	LANTDIV Design	Head Elect Branch	(757)322-4404	(757)322-4280
Ellsworth Spicher	LANTDIV Cost Engineer	Cost Engineer	(757)322-4322	(757)322-4416
Richard Yonieshige	PACDIV Design Dept.	Architect	(808)474-5398	(808) 471-5870
Marshall Sakai	PACDIV Design Dept.	Electrical Engineer	(808)474-5358	(808)471-5870
Roberto Estrella	LANTDIV Cost Engineer	Cost Engineer	(757)322-4329	(757)322-4416
Santora Mckinney	LANTDIV	Architect	(757)322-4365	
Don Anderson	LANTDIV-Structural	Structural Engineer	(757)322-4231	(757)322-4415
John W. Trueblood	LANTDIV- Code 401	Architect	(757)322-4377	(757)322-4415
John Sirris	LANTDIV- Code 404	Electrical Engineer	(757)322-4276	(757)322-4280
James Hogenson	LANTDIV –Code 408	Fire Protection Engineer	(757)322-4342	(757)322-4280
Eric Hodies	LANTDIV –Code 403	Mechanical Engineer	(757)322-4245	
Mark Stephenson	LANDTIV- Code 405	Civil Engineer	(757)322-4281	(757)322-4280
John Blackburn	LANTDIV- Code 401L	Landscape Architect	(757)322-4380	(757)322-4415
Terry A. Riley	LANTDIV- Code 405 (civil)	Civil Engineer	(757)322-4286	(757)322-4280
Curt Emmert	Seal Team 8	Airops Dept. Head	(757)462-8786	(757)462-3199
LCDR Bob McGarrity	U.S. SOCOM	Military Engineer	(757)968-7670	(757)968-6296
Lee Mytych	LANTDIV – CODE 202LM	Facilities Planner	(757)322-4871	(757)322-4859
Ray Bunch	LANTDIV Architect	Architect	(757)322-4362	(757)322-4415

1. Component USSOCOM	FY 2001 MILITARY CONSTRUCTION PROJECT DATA			2. Date SEP 1998
3. Installation and Location/UIC: NAVAL AMPHIBIOUS BASE, LITTLE CREEK NORFOLK, VIRGINIA		4. Project Title SOF AIR OPERATIONS FACILITY		
5. Program Element 11020108BB	6. Category Code 143-41	7. Project Number P-404	8. Project Cost (\$000) 6,100	
9. COST ESTIMATES				
Item	U/M	Quantity	Unit Cost	Cost (\$000)
PRIMARY FACILITY		317		3,801
PARALOFT/PARACHUTE MAINTENANCE FACILITY	SM	3,900	949	(3,701)
BUILT-IN EQUIPMENT	LS	-	-	(100)
SUPPORTING FACILITIES	LS	-	-	1,655
SPECIAL CONSTRUCTION FEATURES	LS	-	-	(230)
ELECTRICAL UTILITIES	LS	-	-	(266)
MECHANICAL UTILITIES	LS	-	-	(115)
ROADS, PARKING AND SIDEWALKS	LS	-	-	(225)
SITE IMPROVEMENTS	LS	-	-	(819)
ESTIMATED CONTRACT COST				5,456
CONTINGENCY (5%)				<u>273</u>
SUBTOTAL				5,729
SUPERVISION, INSPECTION AND OVERHEAD (5%)				<u>344</u>
TOTAL REQUEST				6,073
TOTAL REQUEST (ROUNDED)				6,100
EQUIPMENT PROVIDED FROM OTHER APPROPRIATIONS				(850)
10. Description of Proposed Construction				
<p>Construct a steel frame structure with a high multi-purpose tower. Facility will be concrete masonry structure on concrete slab on grade beams and pile foundation. The multi-story building will have high bays, associated utilities, fire protection, climate control support systems, intrusion detection system, built-up roof system, necessary roads, parking, and site improvements. Air conditioning: 300kW.</p>				
11. Requirement: 3,900 SM Adequate: 776 SM Substandard: 2,370SM				
<p><u>PROJECT</u>: Construct an air operations support, parachute maintenance, paraloft facility for Naval Special Warfare Group Two (NSWG-2).</p> <p><u>REQUIREMENT</u>: Provide adequate facilities for NSWG-2 to support air operations and maintenance requirements which include parachute packing, storage, drying, maintenance, lay-down and instructional areas.</p> <p><u>CURRENT SITUATION</u>: The current facility is inadequately sized and configured for the air operations conducted by the East Coast's Naval Special Warfare units. The current facility's lack of storage space forces the majority of approximately 600 parachutes and related gear to be stored in 40 milvan cargo shipping containers, which are not capable of maintaining required temperature and humidity conditions. Limited facility size/configuration requires the opening of outside doors to stretch out and pack cargo parachutes (cargo parachutes cannot be packed during inclement weather). Additionally, parachute rinsing operations in the facility's outdoor tanks must be curtailed in inclement weather.</p>				

1. Component USSOCOM		FY 2001 MILITARY CONSTRUCTION PROJECT DATA		2. Date SEP 1998	
3. Installation and Location/UIC: NAVAL AMPHIBIOUS BASE, LITTLE CREEK NORFOLK, VIRGINIA			4. Project Title SOF AIR OPERATIONS FACILITY		
5. Program Element 11020108BB		6. Category Code 143-41	7. Project Number P-404	8. Project Cost (\$000) 6,100	

IMPACT IF NOT PROVIDED: Air operations for East Coast-based Naval Special Warfare Command personnel will continue to be significantly impacted by insufficient space for parachute packing and repair, wet/dry loft, team rooms and instructional areas. Inadequate storage conditions subject parachutes and critical life safety equipment to accelerated deterioration and can shorten usable life from 12-13 years to 5-6 years and increase the risk to personnel.

12. Supplemental Data:

A. Estimated Design Data:

(1) Status:

(a) Date Design Started:	99 Jun
(b) Parametric Cost Estimates Used to Develop Costs:	No
(c) Percent Complete as of Jan 1999:	60%
(d) Date 35% Designed:	99 Jun
(e) Date Design Complete:	00 Jun

(2) Basis:

(a) Standard of Definitive Design:	No
(b) Where Design Was Most Recently Used:	N/A

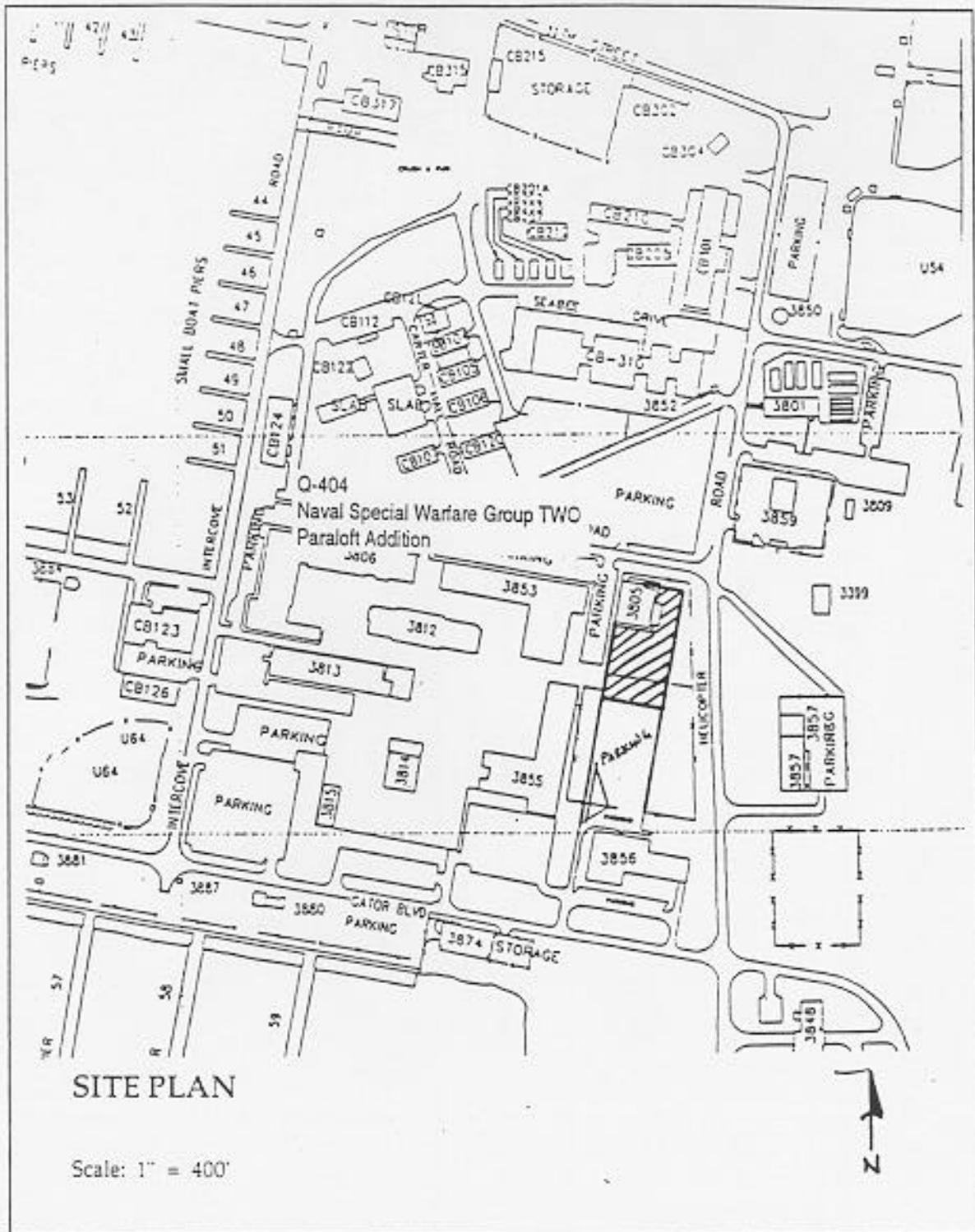
(3) Total Cost (c) = (a) + (b) or (d) + (e): (\$000)

(a) Production of Plans and Specification:	240
(b) All Other Design Costs:	360
(c) Total:	600
(d) Contract:	420
(e) In-House:	180

(4) Construction Start: 00 Dec

B. Equipment associated with this project will be provided from other appropriations:

	<u>O & M, DA</u>	<u>O & M, DA</u>
Amount:	\$500,000	\$350,000
Year:	FY01	FY02



SECTION 3

CONCEPTUAL DESIGN DESCRIPTION

This section of the FACD report presents the Concept Design that resulted from this effort. Included in this section is the cost estimate summary sheet, the abbreviated basis of design, and the concept design drawings

**Q404 SOF AIR OPERATIONS FACILITY
NAB LITTLE CREEK, VA
CONCEPT NO. 4**

FACILITY SIZE: 32,436 SF

	U/M	QUANTITY	UNIT PRICE	COST/PROJECT UOM BASED ON TOTAL AREA	TOTAL COST
PRIMARY FACILITIES					<u>\$3,400,911</u>
<i>Paraloft/Parachute Maintenance Facility</i>				101.77	<u>3,300,911</u>
Grade Beam	CY	195	475.00	2.86	92,625
Pile Cap	CY	107	425.00	1.40	45,475
Structural slab	CY	1,002	395.00	12.20	395,790
Structural (Column & Beams)	TN	12	1,085.00	0.38	12,478
Roof Structure, Joist	SF	32,436	7.52	7.52	243,778
Metal Deck Roofing	SF	32,436	3.33	3.33	108,109
Insulation	SF	32,436	5.78	5.78	187,318
Exterior Wall, 8" & 12" Split face & Regular Blocks	SF	11,900	17.99	6.60	214,140
Interior Wall, Regular 8", 12" & 4" Blocks	SF	18,336	13.47	7.61	247,000
Interior Finishes	SF	32,436	3.50	3.50	113,526
Doors	SF	1,240	43.50	1.66	53,940
Windows	SF	1,200	25.75	0.95	30,900
Specialties	SF	32,436	5.85	5.85	189,751
Plumbing-Domestic	EA	18	1,888.13	1.05	33,986
HVAC	TN	60	6,866.67	12.70	412,000
Compressed Air	CF	50	335.79	0.52	16,789
Bridge Crane, 10 tons	TN	10	5,653.73	1.74	56,537
Steam to Hot Water Converter	LS	1	18,000.00	0.55	18,000
Sprinklers	SF	32,436	1.20	1.20	38,923
Fire Alarm	SF	32,436	0.27500	0.28	8,920
Power	KW	300	538.75	4.98	161,625
Lighting	SF	32,436	3.61	3.61	117,175
Telephone	SF	32,436	0.10	0.10	3,244
Public Address System	SF	32,436	0.69	0.69	22,300
Intrusion Detection System	SF	32,436	0.28	0.28	9,082
85' High Dry/Wet Tower	SF	1,700	275.00	14.41	467,500
Others					100,000
Built-in Equipment					100,000
SUPPORTING FACILITIES					<u>\$1,495,951</u>
<i>Special Construction Features</i>					232,155
Land Piling	LF	14,070	16.50	7.16	232,155
<i>Electrical Utilities</i>					86,529
Electrical Distribution	LF	900	30.25		27,225
Substation/Transformer	KVA	300	63.75		19,125
Area Lighting (35' conc poles w/ 250W HPS fixtures)	EA	7	2,500.00		17,500
Area Lighting wall mount flood lights 400W HPS fixtures)	EA	2	675.00		1,350
Perimeter/Security Lighting, 100W HPS fixtures	EA	10	496.65		4,967
Communication Telephone	LF	850	19.25		16,363
<i>Mechanical Utilities</i>					287,961
Water Distribution	LF	180	27.30		4,914
Sanitary Sewer distribution	LF	783	35.50		27,797
Storm Sewer distribution	LF	715	67.90		48,549
Heat Distribution, Underground	LF	850	234.42		199,257
Fire Protection	LF	210	35.45		7,445
<i>Roads, Parking and Sidewalks</i>					137,200
Asphalt Pavement	SY	2,646	43.75		115,763
Sidewalk	SY	250	85.75		21,438
<i>Site Improvements</i>					671,490
<i>Site Demolition & Relocation</i>					
Remove Sanitary Line	LF	230	18.00		4,140
Demo Chainlink Fence	LF	453	3.58		1,622
Demo Pavement	SF	880	8.25		7,260
<i>Site Earthwork</i>					
Grading	SY	10,355	2.60		26,923
Excavation	CY	7,500	12.75		95,625
Backfill Materials	CY	3,850	18.75		72,188
<i>Site Improvements</i>					
Concrete Pad	SY	2,655	116.75		309,971
Fence	LF	164	18.65		3,059
24' Wide Gate	EA	2	5,680.00		11,360
Topsoil/Seed/Sod	SY	1,500			
Landscaping	LS	1	46,075.00		46,075
Environmental Protection	LF	1,500	6.75		10,125
<i>Relocate Existing MWR</i>					46,280
Gravel Base	SY	1,112	33.15		36,863
8' High Fence	LF	388	18.65		7,236
12' Gate	LS	1	2,181		2,181
<i>Relocate Existing RSL</i>					34,336
Lightning Protection	LS	1	7,018		7,018
IDS Protection	LS	1	7,968		7,968
Move Existing Storage	LS	1	4,500		4,500
New Concrete Pad	SF	1,200	12		14,850
TOTAL FACILITY COST					<u>\$4,896,862</u>
TOTAL AMOUNT ALLOCATED FOR REPAIR OF EXISTING BUILDING					<u>\$103,138</u>
TOTAL BUDGET (95% Design to ECC)					<u>\$5,000,000</u>

Cost Estimate Escalated to Midpoint of Construction. Program Year 2001.

GEOTECHNICAL DESIGN

A. Foundation:

The soil borings for this site are not complete at this time. Based on previous soil borings in the area, the building is anticipated to be supported on a 305 mm concrete pile foundation. The piles are expected to bear approximately 20 meters below the existing ground surface and have a capacity of approximately 400 kN. Timber piles of the same length and a capacity of 225 kN will be considered if economical. At this time, the floor slab is anticipated to require structural support similar to the Combat Swimmer Trainer building immediately to the south. Improvement of the site beyond standard stripping and compaction of the subgrade is not anticipated. The actual foundation type, capacity and the need for site improvement will depend on the results of the site soil borings.

B. Pavement:

The laboratory tests on soil sampled from the subgrade are not complete at this time. The following is a very rough estimate of the proposed pavement sections based on the soil type and consistency indicated in previous soil borings in the area.

- Pavement in areas trafficked almost exclusively by automobiles consists of a 50 mm bituminous surface and 200 mm aggregate base on a compacted subgrade.
- Pavement in areas frequented by trucks and busses consists of a 75mm bituminous surface and 300 mm aggregate base on a compacted subgrade.
- Pavement in loading areas and dumpster pads will be 200 mm portland cement concrete on a compacted subgrade. An aggregate work pad and drainage layer under the concrete pavement may or may not be used.

The above pavement sections may change after receipt of the laboratory soils tests.

CIVIL DESIGN

A. Site Layout:

Approximately 1.27 Hectares will be used for this facility. Storage millvans located in the Northeast, and the government prior to construction will remove southern area of building 3805. A concrete storage and loading area is provided in the rear of the facility with the capability of loading and maneuvering a 18-wheeler semi-trailer truck. Access to the site for the semi-trailer truck will be provided off of Helicopter road. 23 POV parking spaces will be provided on the West Side of the building with one truck loading space located in front of the mechanical room. There will be an access from the Tarmac area to the back door of building 3805 (the existing paraloft facility).

B. Utilities:

Sanitary sewer, water, fire protection, and electrical are being provided for the building. Sanitary sewage and water line sizing is based on Base PWC-Civil information. The new sanitary will utilize 3 sanitary manholes, 2 sanitary clean-outs, 170 meters of 300mm sanitary pipe, 66 meters of 150mm sanitary pipe.

C. Drainage:

The site is currently graded so that water drains to the North and North-East where it is collected by three catch basins and drained off site. New storm drainage will also utilize Three catch basins, two curb drop inlets 1 storm manhole, and 350mm-storm drainage pipe.

D. Fencing:

A 2-meter existing chain link fence surrounds the site. Some of the existing fence will be demolished and a new 2-meter chain link fence will be added. The new building will be totally surrounded by a fence starting at the NorthWest corner of the building and ending at the Southwest corner of the building. The entire West Side of the building will remain open for access to the entrance.

E. Demolition:

An existing 250-millimeter sanitary sewer line, which runs across the sight, will be demolished, along with 1 sanitary manhole. 116 SM of the concrete driveway between buildings 3853 and 3865 will be demolished to provide additional room for the new parking lot. 138 M of 2M fence will be demolished. 45.2 SM of concrete sidewalk will be demolished at the rear of building 3805 to accommodate the truck access from the Tarmac area to the rear of the building. The RSL,s will have to be relocated to the present location of the MWR trailer site.

F. Environmental:

There are no additional permits required for the environmental site assessment, however the original site assessment was based on the new facility being a building addition. There may be a requirement for a new environmental site assessment due to the fact that our new facility is a separate stand-alone facility.

LANDSCAPE DESIGN

A. Existing Conditions

The site for the New Paraloft Facility is presently void of vegetation with the exception of Bermuda grass and a few weeds.

B. Compliance with NAB Little Creek Base Criteria

The landscape design will comply with the intent of the BEAP and Design Criteria Manual.

C. Design Considerations

- a. New Street Tree Plantings along Helicopter road and Desert Cove road will be avoided in order to meet security requirements.
- b. Foundation shrub plantings will be provided along the North, East, and West sides of the New Paraloft Facility. These plants will serve to add a visual transition from the building façade to the surrounding site. Shrubs will also be added to the West Side of the existing Paraloft Facility for aesthetic purposes and to provide a visual tie between the two buildings.
- c. Small evergreen trees will be added to screen utility appurtenances where required.
- d. An outdoor BBQ/Patio will be provided on the East Side of the new facility. It is anticipated that this area will serve several functions for varied outdoor gatherings, including eating, relaxing, gatherings, etc. This area will be provided with a concrete hard surface area, benches, trash receptacles, landscaping, a BBQ Grille and picnic tables.
- e. Shade tree plantings will be provided at various locations and will serve to screen/buffer undesirable views and provide visual relief and beauty elsewhere.
- f. Special ornamental tree plantings will be furnished at the West Side entrances to the New Paraloft Facility to provide visual separation from the adjacent parking area and accentuate the building design.

D. Sustainable Design

- a. All plant materials utilized will be drought tolerant, suitable for the existing soils, and hardy with respect to disease and pest resistance. They will require very little maintenance. River run stone contained by steel edging and provided with weed control fabric underneath, will be provided at all shrub beds. This system will provide the best solution for reducing weeding requirements.
- b. Benches and picnic tables will utilize recycled plastic board members for durability, longevity and aesthetics.

ARCHITECTUARL DESIGN

A. Area Tabulation - Proposed Building

Administrative Area

▪ Quarterdeck / Bunkroom	430 sf
▪ Training Rooms	1220 sf
▪ Administration	1220 sf
▪ Common heads / Jan.	288 sf
▪ Kitchenette	354 sf

Total	3512 sf (net)
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Shop Areas:

▪ Parachute Maintenance Shop (includes 2000 sf floor packing / staging area)	10880 sf
▪ Paraloft Tower	1496 sf
▪ Fabrication / Repairs	1450 sf
▪ Para-rigging /Inflatable rubber boats (includes 600 sf of storage)	2000sf
▪ Supply	1190 sf
▪ O2 room	280 sf
▪ FF2 / Alt.	280 sf
▪ Maint. Shop Office	280 sf
▪ General Storage	656 sf
▪ Team Storage (4 @ 828sf)	3312 sf
▪ Gear Issue / Office	1790 sf
▪ Mechanical	520 sf
▪ Electrical	150 sf
▪ Lockers	
Men	1200 sf
Women	624 sf

Total	26108 sf (net)
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Proposed Building (net)	29620 sf (includes mechanical)
	2816 sf (includes ext./int wall area, corridors, misc...)

Proposed Building (gross)	32436 sf
Exist. BLDG 3805 (gross)	8354 sf

Primary Facilities (gross)	40790 sf
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DD1391 Area Limit (gross)	41964 sf	- 1174 sf
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B. Exterior Walls:

The major portion of the facility will be constructed with concrete masonry unit (CMU) load bearing walls with the parachute wet and dry towers requiring reinforced cast in place concrete walls. Exterior walls shall be a make-up of split-face CMU, smooth-face CMU and metal panels

C. Windows

Tinted, low reflectance vision glass in thermally broken anodized aluminum frames.

D. Doors:

Heavy-duty anodized aluminum storefront doors and frame at the primary entrance to the facility. All other exterior personnel doors shall be extra-heavy-duty, insulated hollow metal doors in steel frames, painted. Overhead doors shall consist of vertical-coiling heavy-duty insulated steel slats with motor operators, weather seals and safety edge strips.

E. Roofing:

All roofs shall be pitched at ½” per foot slope, consisting of granule-impregnated modified bituminous membrane, torch applied over rigid perlite, mechanically fastened through polyiso insulation to substrate metal decking. Roof edges shall be formed from stainless steel sheet.

F. Miscellaneous:

Exterior vehicle entry points shall have opening jambs protected by painted, concrete filled steel pipe bollards. Exterior louvers shall be anodized aluminum.

G. Paraloft Tower:

Shell shall be constructed of reinforced cast-in-place concrete, 12 inches thick. Finish surface shall receive one coat latex block filler, plus one coat application of a textured, water based, acrylic paint.

H. Interior Design:

Interior Partitions: All interior walls throughout the facility shall be constructed of concrete masonry units (CMU) for sake of durability.

Interior Finishes: Shall be durable quality as follows:

- Flooring: Thinset terrazzo in Quarterdeck

Vinyl composition tile in offices, conference room and classrooms

Ceramic tile and base at toilets and showers

Epoxy coating at shops and storage areas

Carpet at parachute folding/ packing and staging area

Vinyl wall base at terrazzo tile, VCT and carpet floors

- Walls: Paint throughout – acrylic “eggshell” latex enamel
Ceramic tile at wet walls in toilets and showers
- Ceiling: Painted exposed roof structure at all shop areas
Paint on gypsum wallboard over suspended metal furring at toilets and showers
Suspended acoustical panel ceiling at Quarterdeck and all offices, conference rooms, and classrooms

Miscellaneous Interior Items: Shall be as follows:

- Doors: Painted hollow metal in steel frames, heavy duty
- Storefront: Tempered / Safety glazing in aluminum frame
- Wire mesh partitions will be utilized throughout for dividing team storage areas
- Casework: Plastic laminate covered cabinets at Quarterdeck and the coffee mess in the classroom

Interior Specialties: Shall be as follows:

- Toilet Partitions: 1-inch thick phenolic resin compartment and urinal screen
- Signage: Plastic door signs with embedded graphics
- Fire Ext. Cabinets: Located per NFPA, semi-recessed
- Projection Screen: Electric operating, one the classroom, one at conference room
- Markerboards: 4'H x 8'W - one at classroom, one at conference room

I. Special Design Considerations:

Handicapped Accessibility: The proposed facility will be composed exclusively of able-bodied, active-duty military personnel. Access to most facility areas is limited to authorized personnel only. There will be no civilian support personnel employed at this facility, and there is infrequent contact with civilian personnel. A letter documenting the able-bodied personnel stipulation has been furnished to NAVFACENGCOM by the activity.

J. **Sustainable Design Features:**

- Use of Best Management practices (BMP) to provide water quality and water quantity control for stormwater runoff
- Use of oil and water separator to minimize pollutants from entering sanitary and storm sewers.
- Use of “low energy” materials such as concrete, concrete masonry and steel.
- Limited use of high-end energy materials such as aluminum.
- Use of materials with recycled content: insulation, carpet, ceiling panels
- Specification of finish materials which can be reclaimed by manufacturer at the end of useful life: carpet, ceiling panels
- Inclusion of high performance glazing and window shades to reduce interior glare and solar gain
- Use of finish materials with little or no-gassing of chemicals
- Practice of energy conservation throughout design
- Ease of access for changing of air filters in order to maintain air quality
- Use of direct digital control system for energy efficiency, reduced maintenance costs.
- Provision for DDC contacts for tie-in to future base wide energy management control system.
- Provision of natural and mechanical ventilation systems in accordance with current ASHRAE and LANTDIV standards for indoor air quality concerns.
- Reclaiming and reprocessing of parachute drying tower conditioned air for energy efficiency and life cycle cost.
- Convenient placement of central plant HVAC equipment for ease of maintenance access and reduced pumping costs.
- Provision of easily accessible maintenance space around HVAC equipment for personnel efficiency and ease of future renovations.
- Prohibition of hazardous compounds such as lead, asbestos, mercury, formaldehyde
- Inclusion of natural daylighting where possible
- Use of drought tolerant, low water demand turf and plants at exterior landscaping
- Use of high energy-efficient lighting fixture ballasts and lamps
- Use of low-water demand plumbing fixtures, including water closets and shower heads

K. **Security Features:**

- Provision of 8 feet high perimeter site security fence with privacy slats and clear zone at rear staging area with lockable personnel and vehicle gates at entry points.
- Provision for site lighting permitting nighttime surveillance of secure areas and rooftop.
- Provision for CCTV system for monitoring from Duty Officer Quarterdeck

STRUCTURAL DESIGN

The SOC Air Operations Facility will be constructed on an existing open site at NAB Little Creek. Soil conditions investigated north and south of the site for previous NAVY construction warrants that little to no effective or economical, corrective actions can be made to support higher soil bearing pressures and a shallow foundation design. Based upon the existing geological information at the adjacent sites, it is reasonable to assume a deep foundation. The deep system will use either 70 feet (21.5 m) x 12 inch (305 mm) square, pre-cast concrete piles with an effective design capacity of 45 tons (40.85 tons-metric) each or (if economically feasible) timber piles at 60 to 70 feet (18.5 to 21.5 m) in length with a design capacity of 25 tons (22.70 tons-metric) each. The remaining components of the deep foundation design will include reinforced concrete pile caps, reinforced concrete grade beams, and structurally supported floor slab systems.

The major portion of the facility will be constructed with CMU bearing walls; open web steel roof joists, and steel metal deck roofing (diaphragm). The parachute wet and dry towers will require reinforced concrete walls to support anticipated vertical dead and live loads, as well as design lateral loads.

Design Live Loads shall be as follow:

Roof Live Loads	20 psf (1 kPa)
Floor live loads	
Storage, Repair, and	
Light Material Assembly Areas.....	125 psf (6 kPa)
Lobbies	100 psf (5 kPa)
Locker Rooms and Restrooms.....	75 psf (4 kPa)
Offices and Admin Spaces	50 psf (2.5 kPa)
Classrooms	100 psf (5 kPa)
Conference Rooms	100 psf (5 kPa)
Mechanical Rooms	125 psf (6 kPa)

Lateral design for wind shall be in accordance with ASCE Standard, ASCE 7-95, Minimum Design Loads for Buildings and Other Structures, approved on June 6, 1996.

Basic Wind Speed (3-second gust speed)

120 mph (54 m/s)

Seismic design shall be in accordance with US Army Corp of Engineers Technical Instruction TI 809-04 dated 31 December 1998. The “Alternate Provisions for the Design of Masonry Structures” in the Appendix to Chapter 11 of FEMA 302/February 1998-NEHRP Recommended Provisions for Seismic Regulations for New Buildings and Other Structures may be substituted for the standard design method.

MECHANICAL DESIGN

Design Conditions:

The design air conditions are as follows:

	Winter (FDB)	Summer(FDB/FWB)
Outside Air	23	91/76
Training Room	68	76/63.3 (50% RH)
Administration Room	68	76/63.3 (50% RH)
Oxygen Room	68	76/63.3 (50% RH)
Altimeter Room	68	76/63.3 (50% RH)
Storage Areas	68	76/63.3 (50% RH)
Parachute Repair	68	76/63.3 (50% RH)
Parachute Packing	68	76/63.3 (50% RH)
Rubber Boat Room	68	-----
Mechanical Room	50	-----
Electrical Room	50	-----

Design Criteria:

Plumbing

National Standard Plumbing Code
NAVFAC Design Manual DM-3.01, May 1986

Mechanical

ASHRAE Fundamentals
ASHRAE Standard 62-89 Ventilation for Acceptable Indoor Air Quality
MIL-HDBK-1028/1B, Aircraft Maintenance Facilities
MIL-HDBK- 1003.03, Nov. 95 Heating, Ventilating, Air Conditioning, and
Dehumidifying
SMACNA HVAC Duct Construction Standards

PLUMBING DESIGN

A 6” water supply line will service the sprinkler system and domestic water system. The pressure is adequate without a need for booster pumps. The water supply will be protected using a reduced pressure backflow device. Two sanitary lines shall be routed from the building to the existing sanitary line. Domestic hot water will be generated using base district steam and stored at 140 degrees F in a centralized hot water storage tank. Hot water will be tempered to 110 degrees F at the fixtures. A hot water recirculation system will be utilized.

The Rubber Boat Room, Oxygen Room and Altimeter Room shall be provided with a compressed air system located in the mechanical room. The air supply shall have a

minimum capacity of 60 psi. to the Rubber Boat Room and Oxygen Room and 10 psi. to the Altimeter Room.

HVAC DESIGN

Building heating will be served by the base-wide steam distribution system. The existing high pressure (125psig) steam line currently on site will be tapped and routed to a pressure reducing station inside the mechanical room where the steam will be reduced to 15 psig.. The building will utilize 160 degree F hot water from a steam-hot water converter. Condensate produced within the building shall be routed to a french drain outside the building.

Cooling for the Administrative Area of the building will be provided by a roof mounted packaged air handling unit using either chilled water or DX cooling coils and hydronic heating coils. Cooling for the Packing and Storage areas will be provided by a constant volume air handling unit located in the Mechanical Room, using either chilled water or DX cooling coils and hydronic heating coils. Packing and Storage areas shall have space relative humidity limited to 50%, plus or minus 10%. Humidification shall be provided in the Parachute Packing and Storage Areas to maintain the space relative humidity within the prescribed limits. Supplemental cooling will be provided in the Training Room to handle the high occupancy loads. The Vestibule will be tempered by a hydronic cabinet unit heater. Round duct will be utilized to the greatest extent possible.

The Parachute Drying tower shall be provided with an air handling unit located in the mechanical court yard and using either chilled water or DX cooling coils and hydronic heating coils. It shall utilize minimal outside air and dehumidification control with hot water reheat for use during parachute drying operations. This system will be capable of operating on minimal outside air requirements when parachute drying operations are not required.

The Rubber Boat Area will be heated by hydronic unit heaters.

The Mechanical Room will be heated by a hydronic unit heater and exhausted at 20 air changes per hour (AC/Hr) by a centrifugal exhaust fan. The Electrical Room will be exhausted at 10 AC/Hr by centrifugal exhaust fans. The Oxygen Room will be exhausted at 10 AC/Hr. The Repair Shop will be provided with an exhaust hood over the cutting table. Toilet and Shower areas shall be exhausted at 2 cfm/ft².

ELECTRICAL DESIGN

A. Interior Distribution System:

- a. Electrical service shall be at 480Y/277 volt, 3 phase, 4 wire secondary for power and lighting and 120 V, for receptacles. The utilization voltage 480Y/277 V shall be derived from the 12.47 kV underground system, by using a 300 KVA step down pad mounted transformer. Connection to the existing system will be achieved at the nearest power manhole. (MH#3)
- b. The estimated connected electrical load was calculated based on a watts per square foot basis.
- c. All wiring shall be in conduit. Galvanized Rigid steel (GRS) for main service above ground, concrete encased PVC ductbank below ground. For branch circuits conduit shall be electrical metallic tubing (EMT), Galvanized Rigid steel (GRS), or intermediate metal conduit (IMC). Polyvinyl chloride (PVC) conduit will be allowed in concrete floor slabs.
- d. All power and lighting circuit conductors shall be copper, with THHN or THWN insulation.
- e. Design of this project shall comply with the current edition of the National Electrical code, and LANTDIV's design guide.
- f. Voltage drop shall be limited to 5% total.
 1. Main feeder runs less than 2%.
 2. Branch circuit runs less than 3%.
- g. Lighting levels shall be in accordance with MIL-HDBK-1190 "Facility Planing and Design Guide" and Illuminating Engineering Society (IES) of America handbook. The following lighting intensities will be provided.

Wet/dry tower area	30 FC
Parachute packing areas	50 FC
Offices	50 FC
Conference rooms	30 FC
Mechanical room	15 FC
Electrical room	15 FC
Storage rooms	15 FC
Toilets	20 FC
Corridors	10 FC

- h. In general fluorescent lighting fixtures will be used to provide general illumination. Fluorescent 2'X4' troffers will be used for offices, classroom and locker rooms. Industrial type fluorescent lighting fixtures will be used in storage areas and in all

spaces with open ceiling. For the wet/dry tower area weatherproof wall mount fluorescent will be used for grade level and pendant mount over catwalks at higher elevation. High-pressure sodium (HPS) wall pack luminaires will be used for security lighting. These luminaires will be mounted above doors and on exterior walls along the perimeter of the building. Area lighting will consist of HPS luminaires mounted on the top of 35' high concrete poles. Flood lights mounted on building exterior wall in conjunction with pole mounted lights will illuminate the Tarmac area. Energy saving lamps and ballasts will be used and photocell/time clock control of exterior lights.

B. Specialty Systems

- a. Public address system: A complete system including amplifier, wiring in conduit and ceiling speakers will be provided in areas with acoustic ceiling. Horn type loud speakers will be provided in other areas.
- b. Cable television system (CATV): Outlets and wiring in conduit will be provided.
- c. Lightning protection will be provided for the wet/dry tower only. Lightning rods, down conductors and grounding rods will be provided as part of the lightning protection system.
- d. Communications system: This project will provide: Voice /data outlets (one data port and one telephone port) at locations indicated by activity. A 4-pair 24 gage UTP cable in 3/4" conduit between each RJ45 outlet and telephone backboard. A 4'X8' telephone backboard.
- e. A complete empty conduit system including junction boxes at locations required will be provided for an intrusion detection system. Devices and wiring for the intrusion detection system will be provided by others.

C. Outside Distribution Systems

- a. The electrical characteristics of the existing electrical primary system are 13.2 kV, 3 phase, 3 wire.
- b. The total estimated connected load for this project is 300 kVA.
- c. The primary and secondary distribution voltage has been selected based on the existing available primary system and the most economical secondary system.
- d. The project will require tapping the existing primary circuit at an existing manhole. The buildings' service transformer will be pad-mounted style.

- e. The underground circuit will be extended by underground ductbank to pad mounted transformer. The secondary circuit from the transformer to the main distribution panelboard (MDP) will be run underground in concrete encased ductbank.
- f. 4" PVC conduit, with pull wire from telephone backboard to a wood pole located to the east of the facility (concrete encased ductbank) for connection to the base telephone system.

D. Outline Specifications

BASIC ELECTRICAL MATERIALS AND METHODS
UNDERGROUND ELECTRICAL WORK
INTERIOR DISTRIBUTION SYSTEM
PAD MOUNTED TRANSFORMERS
INTERIOR LIGHTING
EXTERIOR LIGHTING
STRUCTURED TELECOMMUNICATIONS
INTERCOMMUNICATION SYSTEM
LIGHTNING PROTECTION SYSTEM
INTRUSION DETECTION SYSTEM
CABLE TELEVISION SYSTEM

FIRE PROTECTION DESIGN

A. Criteria

NFPA 101 Life Safety Code	1997 Edition
Uniform Building Code	1997 Edition
Mil-Hdbk 1008C Fire Protection for Facilities Engineering, Design, and Construction	10 June 1997
NFPA 1 Fire Prevention Code	1996 Edition
NFPA 10 Standard for Portable Fire Extinguishers	1994 Edition
NFPA 13 Standard for the Installation of Sprinkler Systems	1996 Edition
NFPA 70 National Electric Code	1999 Edition
NFPA 72 National Fire Alarm Code	1996 Edition
NFPA 90 A Standard for the Installation of Air Conditioning and Ventilating Systems	1996 Edition

B. Building Code Analysis

- a. Use Group: Mixed Occupancy

B, Business (Administration Areas)
F-1, Moderate Hazard Industrial (Para-rigging and parachute areas)

- b. Basic Allowable Floor Area:

Type IIN – Non-combustible Construction
12,000 sq. ft. (UBC Table 5-C).

- c. Allowable Area Increases:

Section 506(a)2, Separation on 3 sides

There is a minimum 60 feet separation on 3 sides, permitting a 100% increase to 24,000 sq. ft.

Section 506(c) Increase for automatic sprinkler systems.

A twofold increase is permitted for automatic sprinklers, permitting an increase to 48,000 sq. ft.

The total allowable floor area is **48,000 sq. ft.**

d. Allowable Height:

Fifty-five feet per UBC Table 5-C. With the exception of the tower, which is 85 feet tall, the building will be 16 feet tall. The tower may exceed 55 feet per Exception 1 to UBC Section 506.

C. Life Safety Analysis

a. Exiting and Egress Requirements of NFPA 101

Minimum Egress Requirements

Business/Assembly Occupancies

Occupant Load: Business 100 Gross Sq Ft / Person

Assembly 15 net Sq. Ft/ Person

Approx. Area: Business 2740 sq. ft. ~ 28 people

Assembly 1220 sq. ft. ~ 82 people

Exits Required: Business ~ 2

Assembly ~2

Corridor/Ramp Width: 44 inches

Common Path of Travel: 100 ft with an automatic sprinkler system

Travel distance to exits: 300 ft with an automatic sprinkler system

Industrial Occupancies

Occupant Load: 100 Gross Sq Ft / Person

Approx. Area: 20,220 ~203 people

Exit Width: ~ 70 inches

Corridor/Ramp Width: 0.2 in / person ~41 inch clear

Common Path of Travel: 100 ft with an automatic sprinkler system

Travel distance to exits: 400 ft with an automatic sprinkler system

D. Automatic and Manual Fire Suppression Systems

The building shall be protected throughout by an automatic sprinkler system in accordance with Mil-Hdbk 1008C and the 1996 edition of NFPA 13. The sprinkler system shall be hydraulically calculated. Occupancy is classified as follows:

Sprinkler system design criteria:

Administration Areas

Occupancy Classification	Light Hazard
Design Area	3000 Sq Ft
Design Density	0.10 GPM / Sq Ft
Outside Hose Stream	250 GPM

Par-Rigging Area, Storage Areas, Supply, Fabrication Shop and Wet and Dry Tower

Occupancy Classification	Ordinary Hazard, Group II
Design Area	3000 Sq Ft
Design Density	0.20 GPM / Sq Ft
Outside Hose Stream	500 GPM

E. Water Supply Data

Fire protection water for the facility will be from an existing 8-inch water main fed Desert Cover Road. From recent water flow test, there is a static pressure of 53 psi with 1680 gpm flowing at a residual pressure of 48 psi. The water supply data will be sufficient to meet the fire flow demand.

F. Fire Hydrants

The existing fire hydrants located on site will be utilized. New hydrants will not be required.

G. Fire Extinguishers

Location, spacing, size, type, etc. of fire extinguishers shall be in compliance with NFPA 10 and Mil-Hdbk 1008C § 6.8.

H. Interior Fire Alarm System

a. Fire Alarm Control Panel (FACP)

Based on the size of the building, a conventional FACP will be provided. It will be located in the entrance lobby. The fire alarm control panel will be sized to encompass existing Air Ops Building.

b. Alarm and Supervisory Alarm Initiating Devices

Automatic sprinkler system pressure shall be provided at the sprinkler system riser.

Tamper switches on all sprinkler system control valves.

Manual pull stations at all exit doors.

Duct mounted smoke detectors.

c. Alarm Notification Appliances

Combination horn-strobes will be provided throughout.

d. Alarm Reporting

Little Creek Amphibious base utilizes a Gamewell fire reporting system. An auxillary transmitter shall be provided adjacent to the fire alarm control panel in the building.

I. Miscellaneous Items

a. New Transformer:

New 300 KVA oil filled transformer will located a minimum of 25 feet from the building.

b. Explosion Proof Electrical Equipment:

The Para-rigging area has been identified to require explosion proof electrical fixtures due to the quantity of fuel for the zodiacs. This area will be Class I Division 2 up to a level of 18 inches above floor finish.

c. Oxygen Gas Cylinder Storage:

The oxygen gas storage area will be located on the exterior of the building and shall be at least 20 feet from combustible materials such as wood, paper, oil, grease, and where they will not be exposed to excessive rise in temperature, physical damage, or tampering. This outside area shall be open and well ventilated.



Q404 SOC Air Operations Facility
NAB Little Creek
Virginia Beach, Virginia
Concept 4

Prepared by:

Atlantic Division, Naval Facilities Engineering Command

1510 Gilbert Street

Norfolk, Virginia

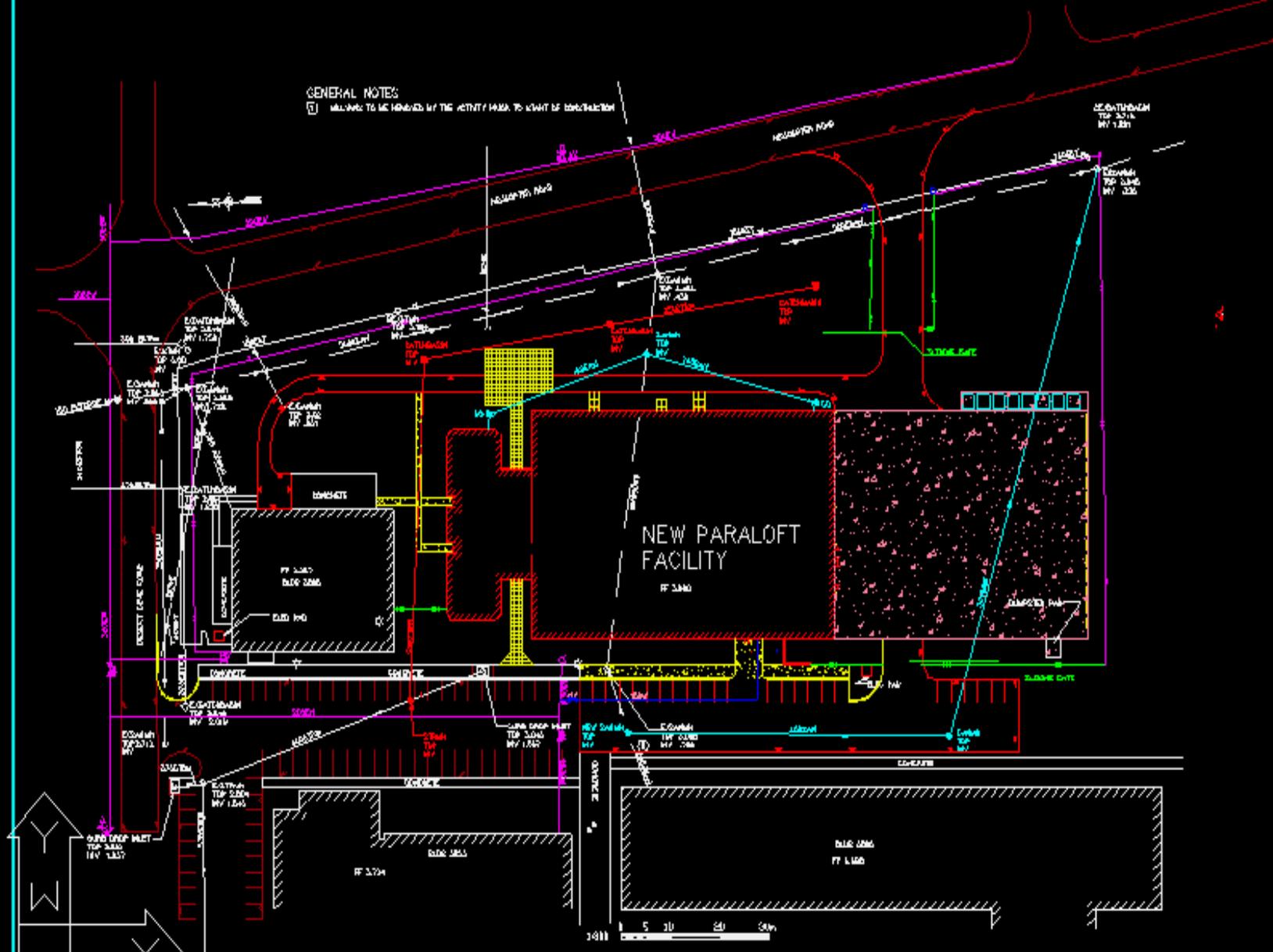






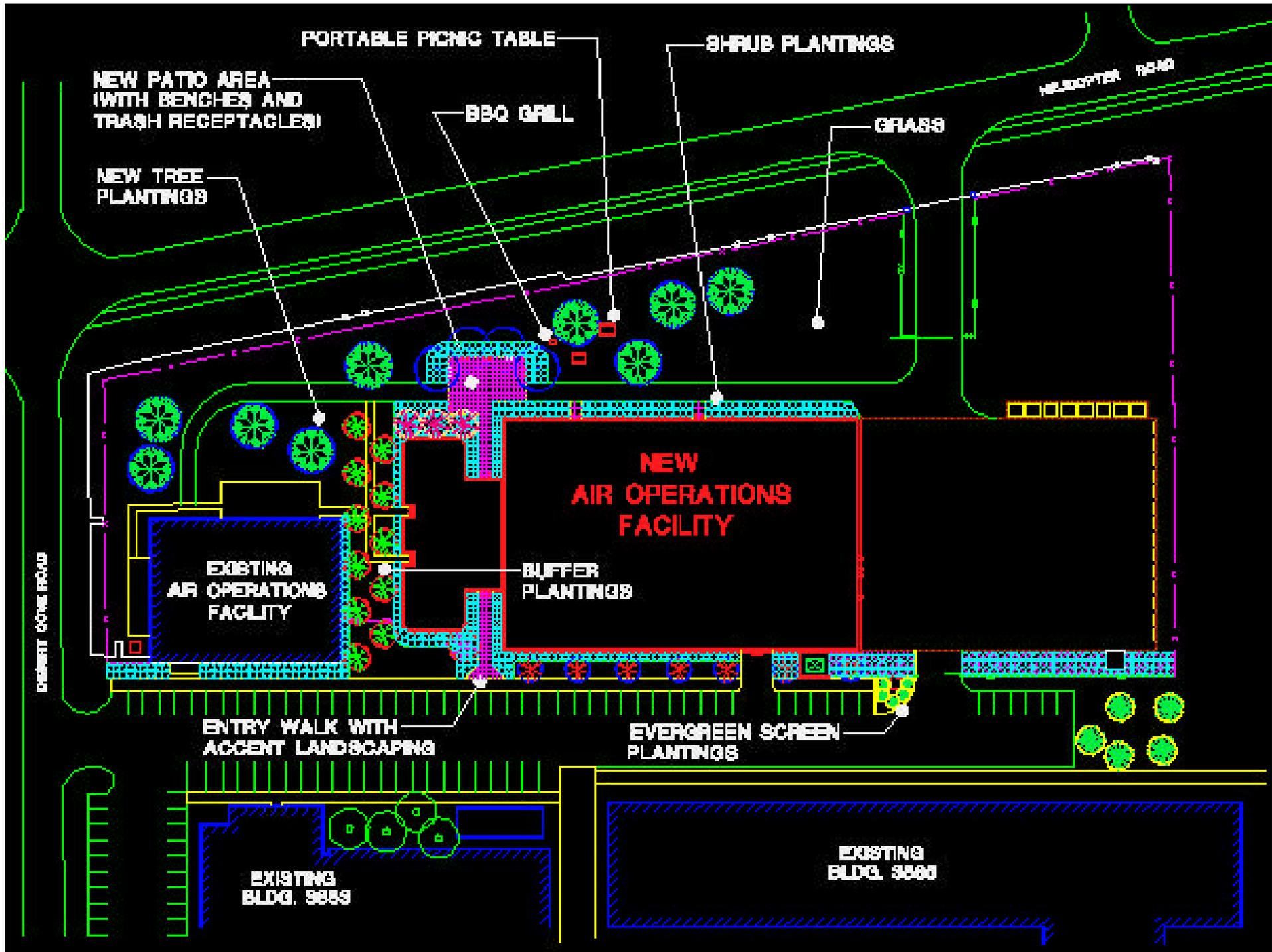
GENERAL NOTES

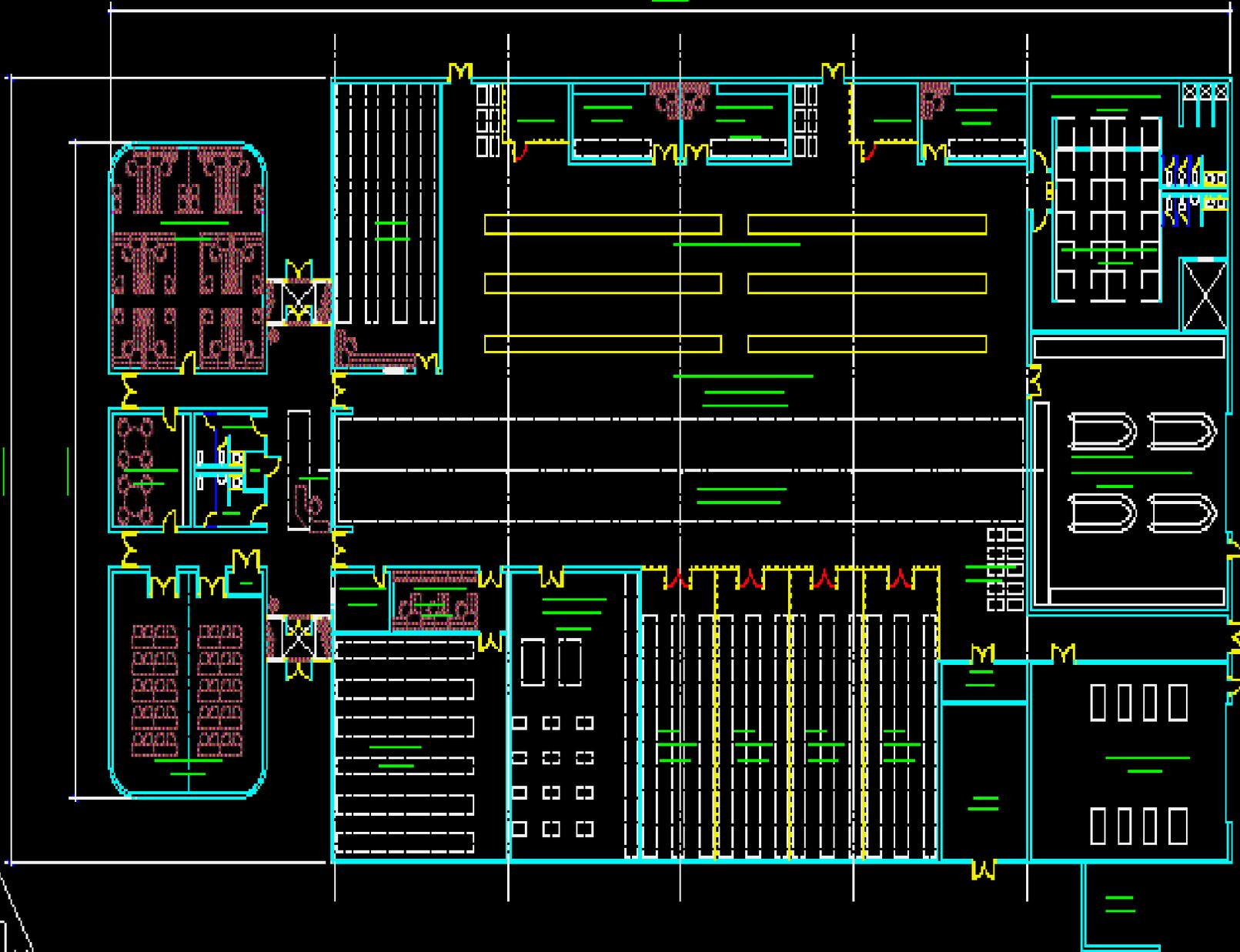
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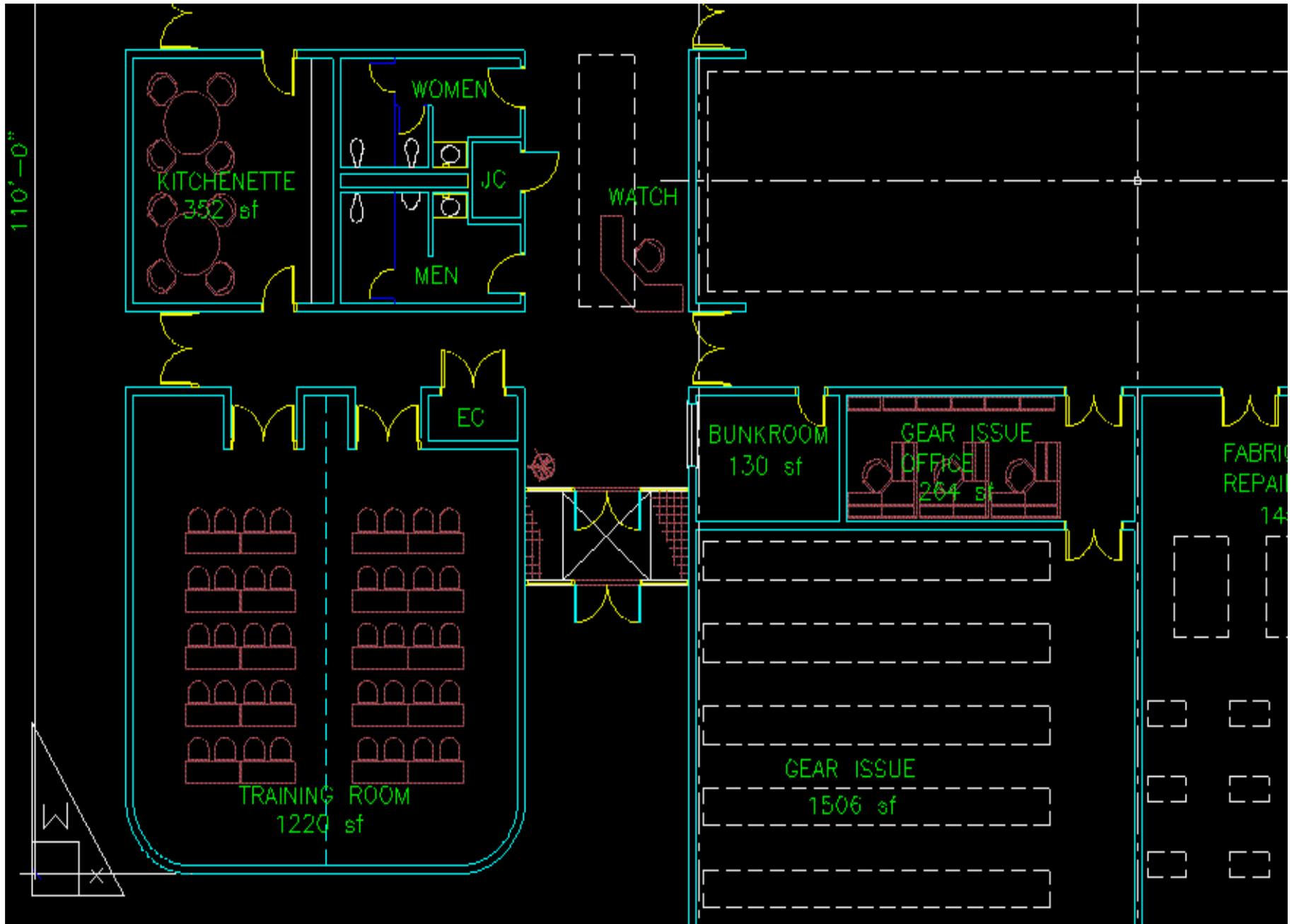
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NAB Little Creek, Virginia Beach, Virginia

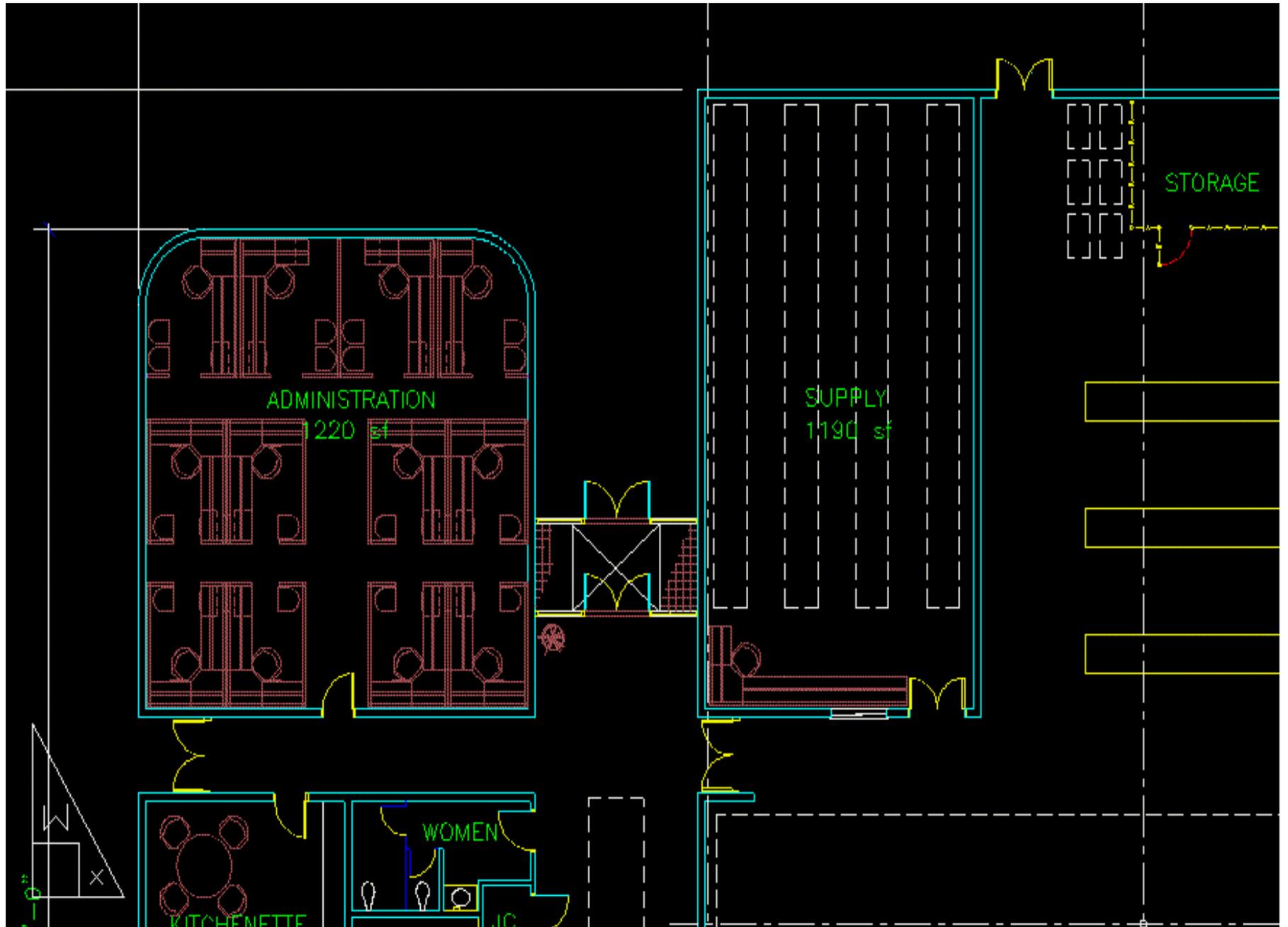


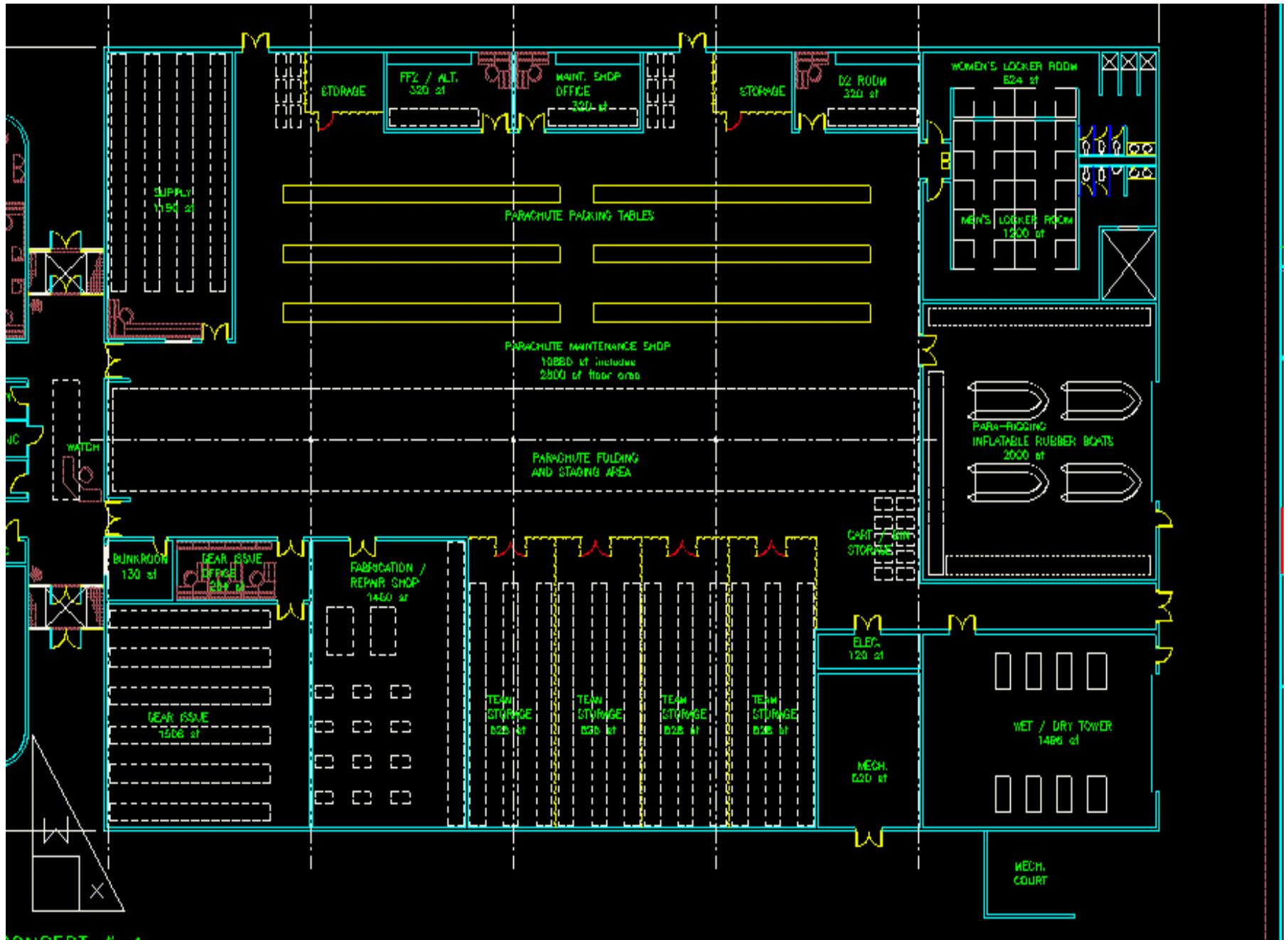




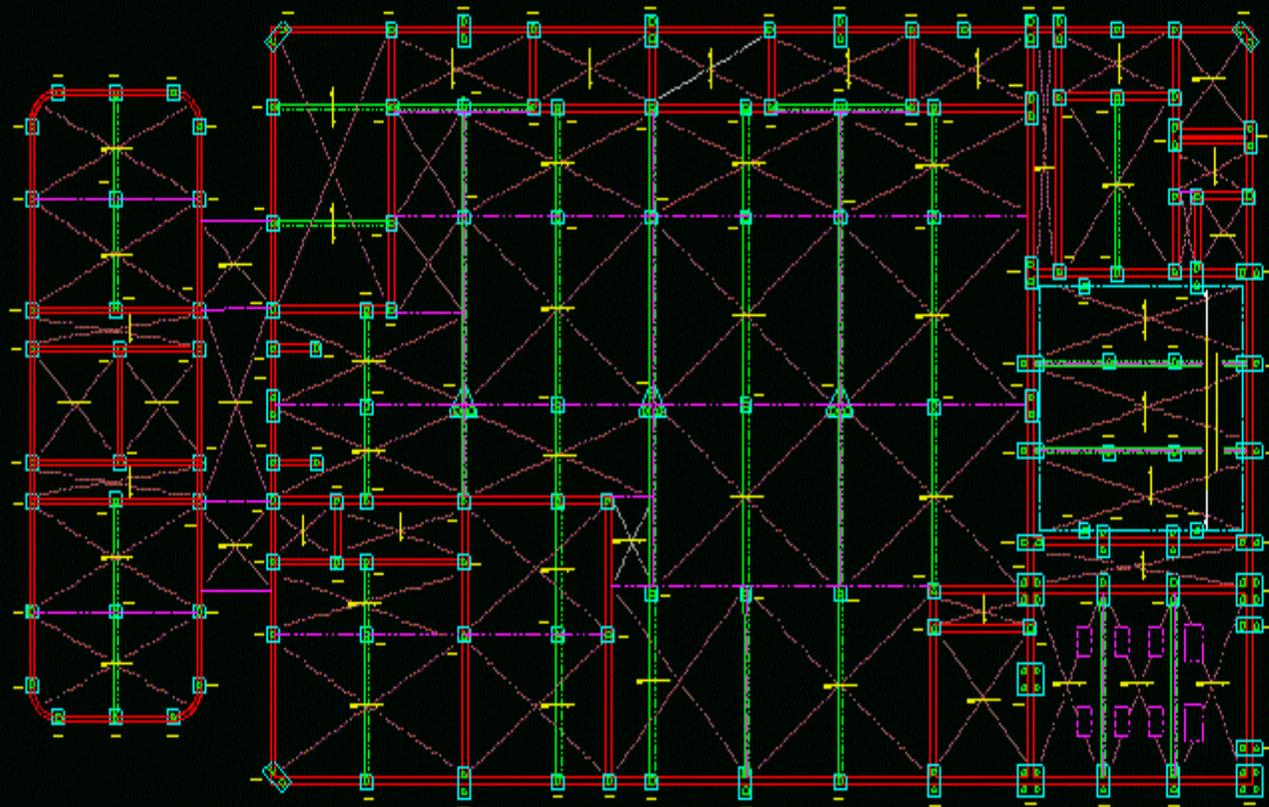
FLOOR PLAN - CONCEPT #4







CONCEPT # 4

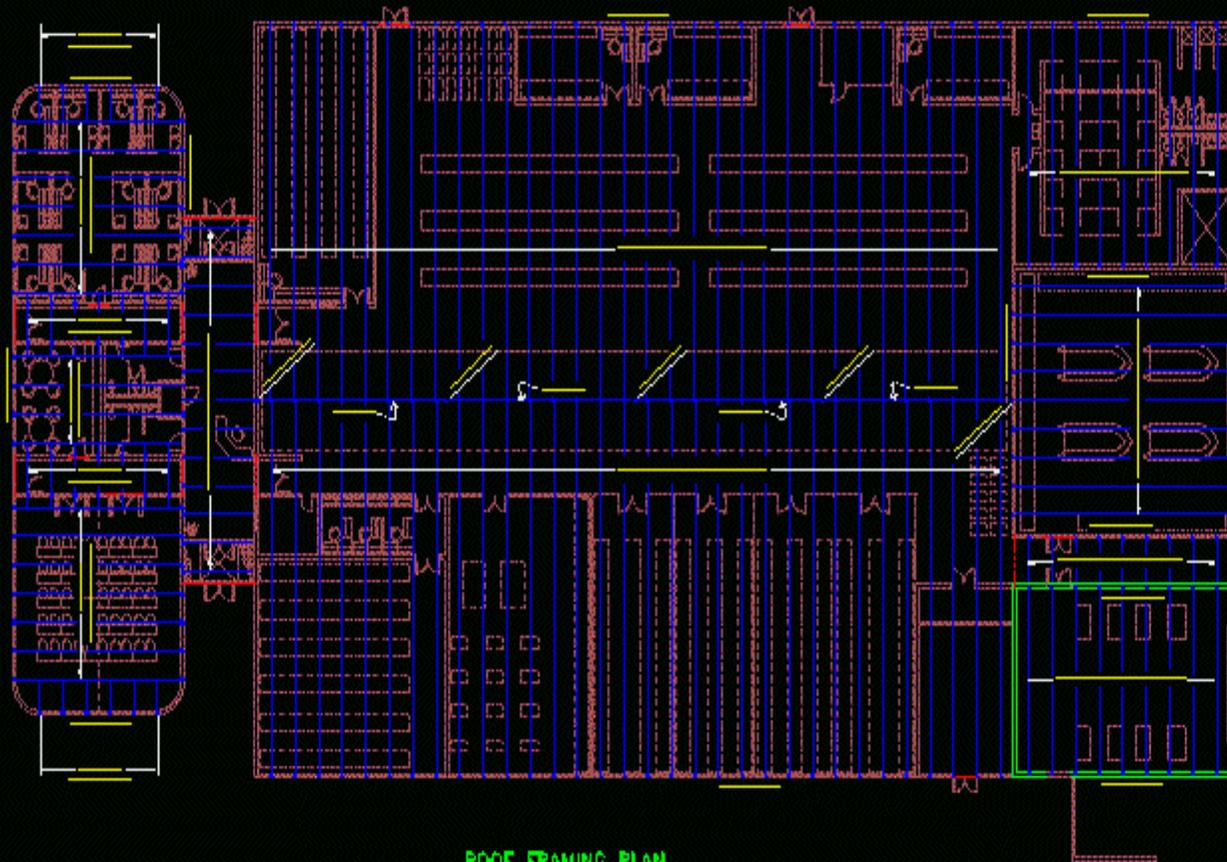


FOUNDATION AND 1ST FLOOR PLAN



Project 0404, SOC Air Operations Facility
 NAB Little Creek, Virginia Beach, Virginia



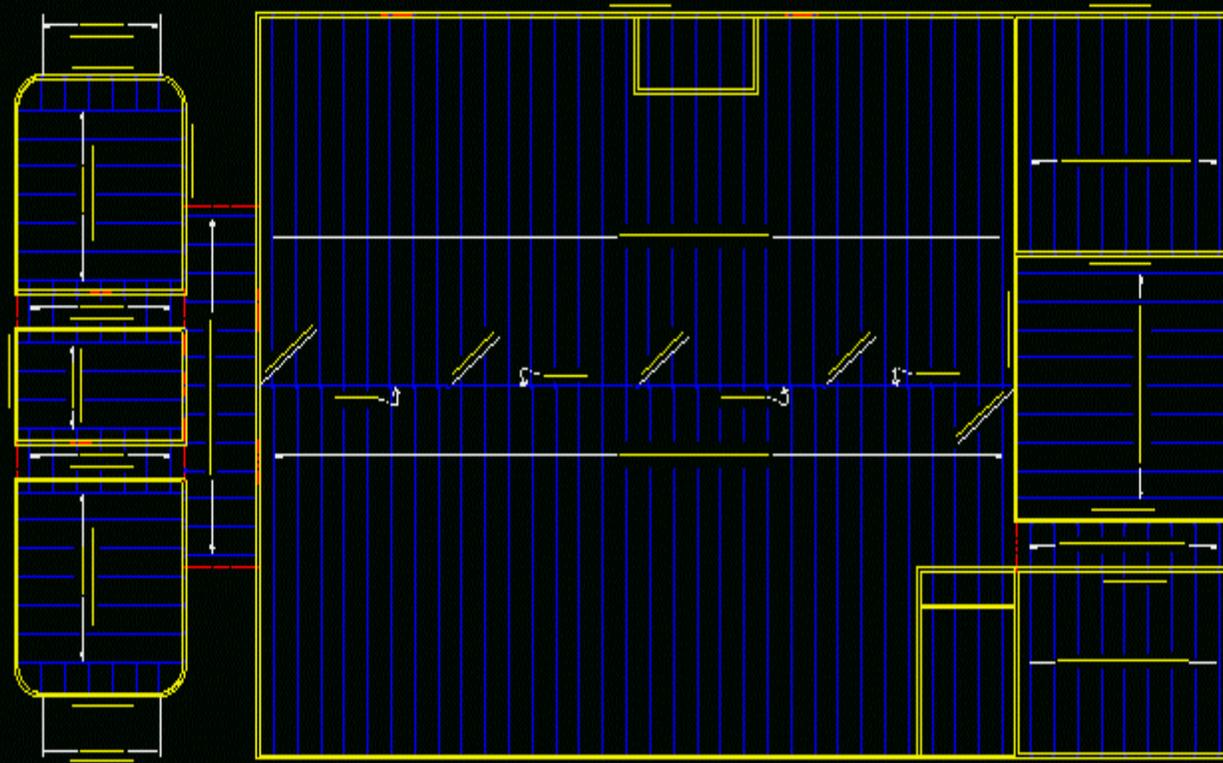


ROOF FRAMING PLAN



Project 0404, SOC Air Operations Facility
NAB Little Creek, Virginia Beach, Virginia



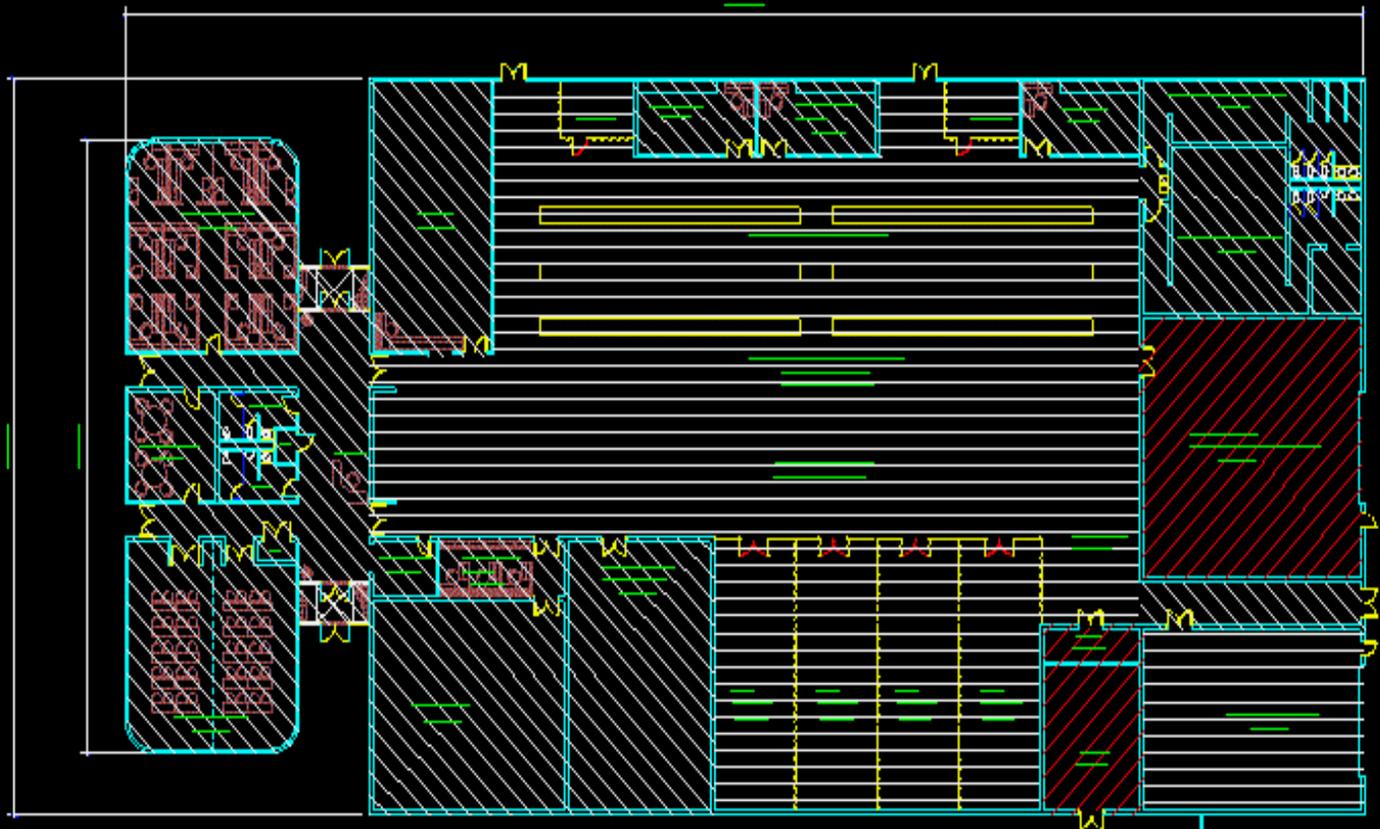


ROOF FRAMING PLAN



Project 0404, SOC Air Operations Facility
NAB Little Creek, Virginia Beach, Virginia



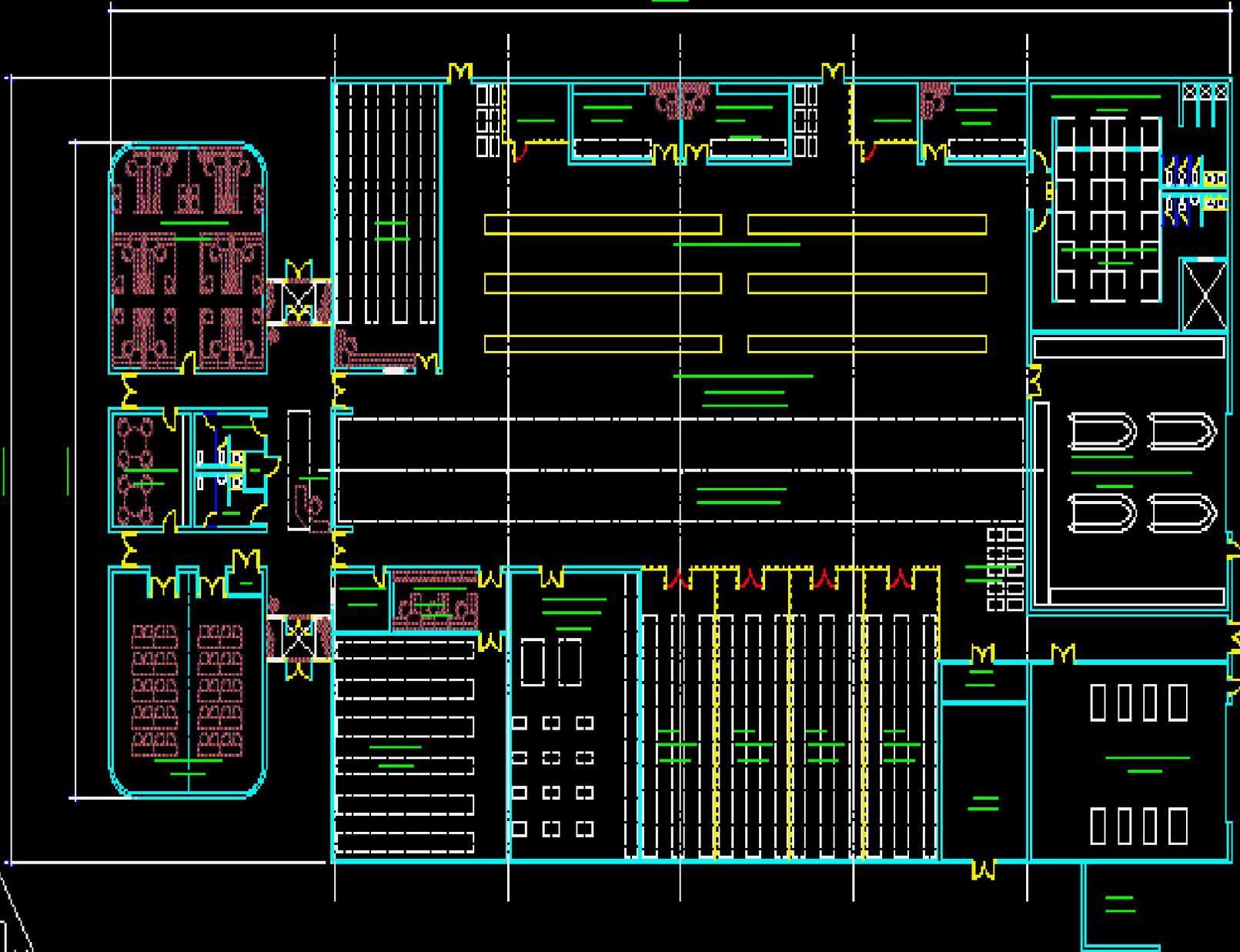


FLOOR PLAN - CONCEPT # 4

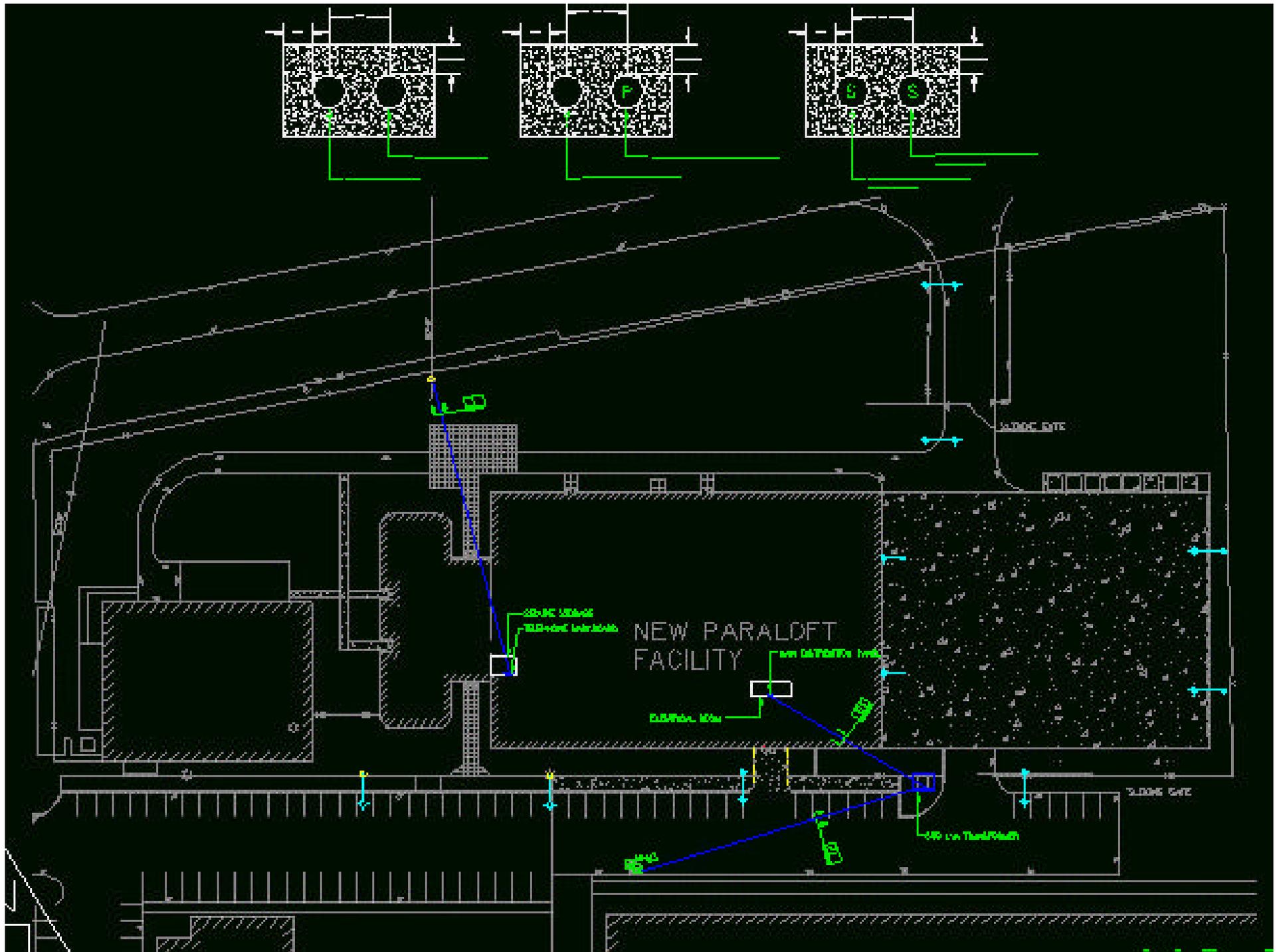
-  HEATED AND/OR VENTILATED
-  HEATED, VENTILATED & COOLED
-  SPECIAL HVAC SYSTEM (HUMIDIFICATION, DEHUMIDIFICATION)

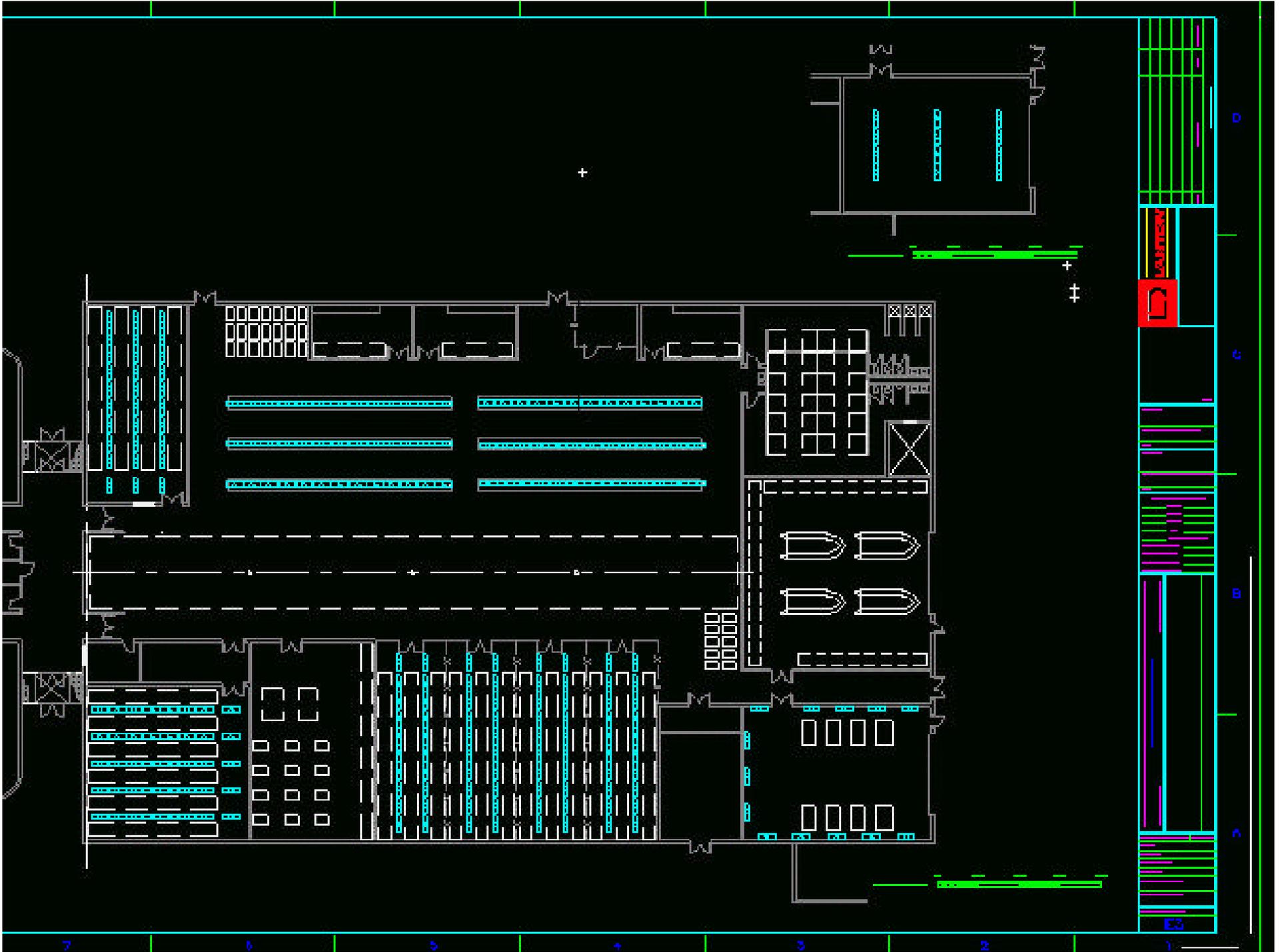
Project 0404, 50F Air Operations Facility
 NAB Little Creek, Virginia Beach, Virginia





FLOOR PLAN - CONCEPT #4





SECTION 4
FACD PROCESS

Section 4 FACD Process

Team Configuration

The U.S. Navy, LANTDIV, performed this project as an in-house design. The assigned design task included conducting a Functional Analysis Concept Development Workshop (FACD) as part of the project design process which will improve the functional working of this project.

The primary FACD Team included personnel from the LANTDIV design team, LANTDIV project management and planning, Naval Special Warfare Command, Naval Special Warfare Group-2 (NSWG), Seal Teams 2, 4 and 8, and a VE consultant facilitator (Pacific Environmental Services, Inc.) as completely listed in Section 2 of this report.

Activities and Schedule

The basic FACD approach to this project was to utilize the function analysis techniques and job plan associated with value engineering to identify the users' functional operating and facility needs. These will translate into a set of issues/criteria documents that will allow the project design to progress to a stage where the 35% design submittal can be prepared in a very short time frame. At the same time, project costs were evaluated to validate authorized budget limitations.

The Value Engineering Job Plan was followed as a guide to establish work activities and schedule. The Job Plan consists of five phases including: Information Gathering (including Function Analysis); Speculation or Creative Session; Analysis or Judging Phase; Development Phase; and Presentation Phase.

The FACD Team began investigating project requirements and obtaining available information prior to the formal start of the study. A FACD kickoff meeting was conducted at Little Creek on February 2, 1999 as part of the Pre-design meeting to present the schedule and discuss events that will occur during the study.

The schedule followed during the concentrated eight day long on-site study period can be found in the On Site Agenda found in Section 2. During the on-site workshop, a substantial number of formal and informal meetings were conducted with the user personnel, LANTDIV design staff and Base personnel in an attempt to keep all informed as to the status of the project. The main thrust for this particular study was to develop a project that could be constructed within budget, remain within the allowable area requirements as defined in the DD1391, will comply with the requirements presented in all appropriate Mil Hdbks and will still provide the users with facilities that will meet

their needs. Pertinent meeting agendas, “Meeting Minutes” and “Phone Conversation Records” are listed in chronological order on a separate cover sheet, and included as attachments at the end of this section.

The first information phase document analyzed was a cost summary sheet indicating where the costs are incurred in this project. This sheet is the estimate summary breakdown included with the Concept 1 presentation in Section 2 of this report. The costs included are based on the Concept 1 layout developed by the Design Team. Costs were shown in current construction dollars. Based on discussions held with user staff, the project as shown in Concept 1 however, did meet the budget limitations imposed on this project, and therefore budget issues were not a problem at the time of the Concept 1 submittal.

Based on the program requirements, user interviews and site visits, the team initiated function and function analysis studies. At the on site kickoff meeting, users were asked to identify in their mind the basic function of this project, as well as what they felt was critical to this project. Site relationships were developed from this information and suggestions for site modifications were given to the design team. In addition, the floor plan layout was discussed in detail, and a preliminary reassessment made for each function.

A discussion on Function resulted in the Users generating a list of what they envision being the “Function” this project performs. Additional discussions resulted in issues being discussed and listed by the FACD team. These items were determined to be areas that were goals for the team to resolve during the course of this study. Several issues had major impacts on the viability of using the proposed project site as well as the proposed size of the new facility. These major issues included relocation of the RSL units and the classification of the existing facility. Evaluation of these issues continued throughout the length of the FACD effort.

The FACD Team was led by the VE Facilitator through several brainstorming sessions following the presentation of each Concept Design, after which ideas were analyzed and rated. For this project, all ideas that were acceptable were evaluated to a certain level for further evaluation if they were not already included in the project design. The ideas generated are documented on a listing presented later in this section.

From April 13th, functional floor plans, perspectives, and site plans were developed along with electrical, mechanical and civil engineering concepts. These were presented in several iterations to the user as Concepts #1 and #2 and ultimately refined into the Concept Design section of this report as Concept #3. Slight refinements were made to this Concept that resulted in Concept #4 included in the Final Presentation made on Thursday and in Section 3 of this report.

The FACD Team refined this Report and began the process of obtaining formal acceptance signatures from all appropriate representatives. This was accomplished on April 22nd, and a copy of the Endorsements is included in Section 1 of this report.

Other Criteria and Documentation

The following is a generic outline of the information obtained and used during the development of this workshop:

- a. Existing utility drawings and other information were obtained by the civil and electrical project team members to a sufficient extent that utility services were established and verified.
- b. New survey and topographic information was obtained and used by the team.
- c. Geotechnical information will be obtained following final siting of the building
- d. Numerous site photographs were taken documenting the entire project.

Cost Data

Generally, Means Estimating Guide was used as the main source of unit cost data for this effort. Location cost indices were adjusted to reflect local Norfolk, VA rates. Local supplier quotes and LANTDIV in-house data base unit prices were also used as a reference when needed.

A cost estimate was prepared by the team based upon the agreed upon project scope and design concept represented by the information presented in the Conceptual Design Description Section of this report. This information indicates the project can be constructed within the funding limitation.

FACD WORKSHOP
FUNCTIONS IDENTIFICATION

Project: P-404, SOF Air Operations Facility

FUNCTIONS

Rinse parachutes
Dry parachutes
Repair parachutes
Pack parachutes
Build “ducks”
Store “ducks”
Store equipment/gear
Replace inadequate facility
Accommodate unit consolidation
Train/brief personnel
Load trucks
Oxygen maintenance
Equipment maintenance
Store ISO-90
Issue gear
Administer Air Ops

FACD WORKSHOP
ISSUES IDENTIFICATION

Page 1 of 1

Project: P-404, SOF Air Operations Facility

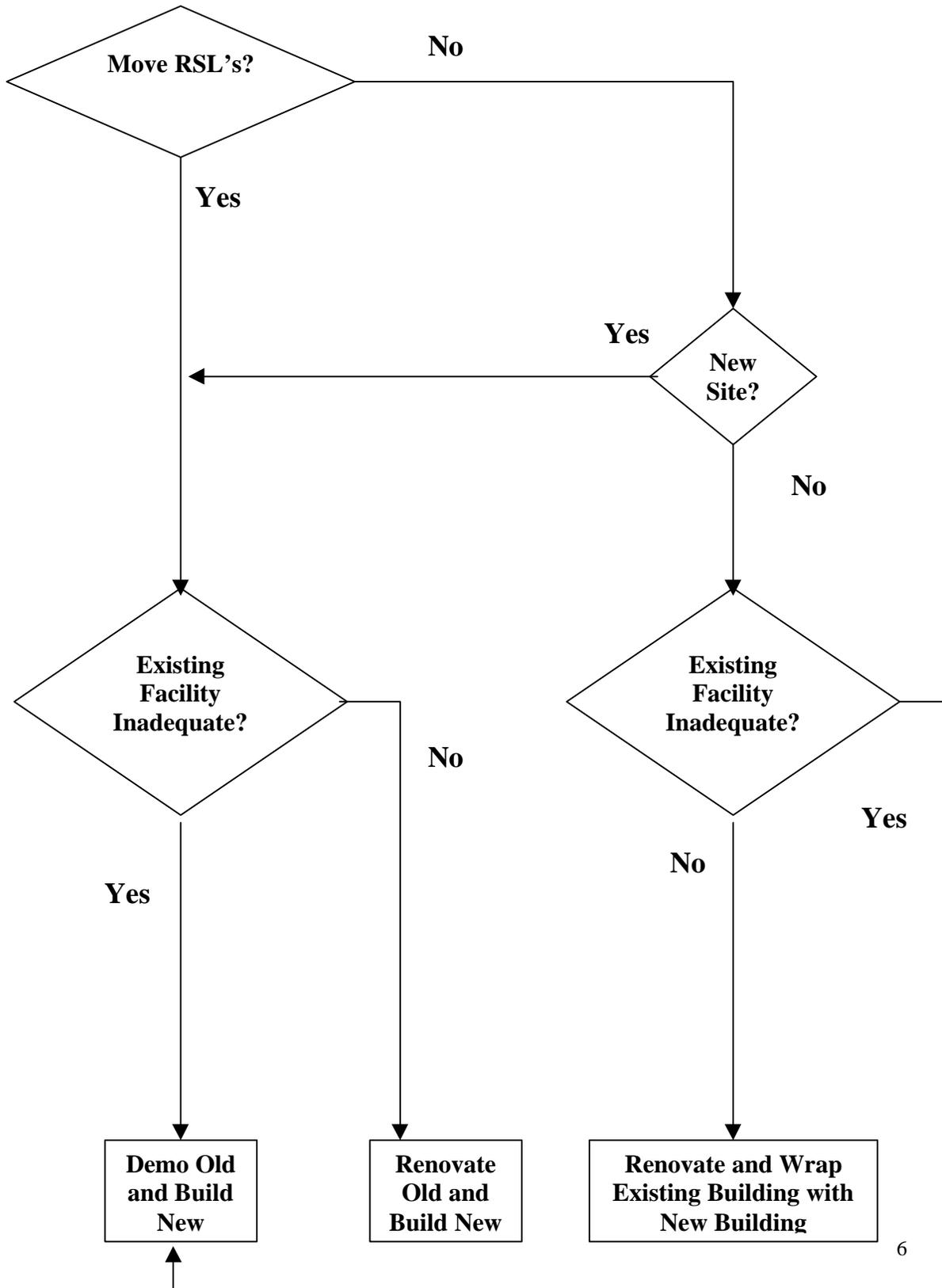
ISSUES

Explosive Arc conflict
Site access for trucks
Facility square footage
Disposition of existing paraloft
Handicap accessibility
Tower HVAC
Crane/monorail needs
Repelling tower
Security needs-IDS
Outside terminal lighting
Interior lighting
PA System/Intercom
Female population
Barbecue area requirements
Landscaping vs. security
Turning radii
Smoke vents for shops/paraloft
Use of gas vs. steam
Aircraft lights on paraloft
Include EMCS provisions

FACD WORKSHOP

PROJECT TITLE: P-404, SOF Air Operations Facility, Naval Amphibious Base Little Creek

ISSUE DECISION FLOWCHART



SPECULATION AND EVALUATION

Project:
Facility

P-404, Air Operations

NO.	IDEA	RATING (TBC = to be considered)
1	Demo existing building	X
2	Relocate RSL's to another site	TBC
3	Use Golan magazine	X
4	Use Berm for arc reduction	X
5	Wrap existing building with new building	X
6	Apply for waiver for blast arc	X
7	Resite new building	X
8	Relocate gate to allow trucks to pull off roadway	TBC
9	Build turn lane in Helicopter Rd.	X
10	Reduce/Eliminate oversized areas	TBC
11	Demo existing building	X
12	Renovate existing building	TBC
13	Classify existing building	TBC
14	Demo tower and renovate building	X
15	Provide administrative area and main heads with handicap accessibility	TBC
16	Provide fully accessible building	TBC
17	Install fans in paraloft tower	TBC
18	Revise air flow down in paraloft tower	TBC
19	Use dehumidification in paraloft tower	TBC
20	Discharge air/ do not recirculate air in paraloft tower	TBC
21	Use five ton crane	TBC
22	Use the correct lift to match needs	TBC
23	Delete repelling feature of tower	TBC
24	Provide climbing wall on tower	X
25	Provide IDS for building	TBC
26	Provide access controls on doors	TBC
27	Provide outside lighting for tarmack and drying tower area	TBC
28	Revise tower lighting in the interior	TBC
29	Provide internal PA system	TBC
30	Decrease female lockers by 4 and increase males by 6	X
31	Total male lockers to be 20	TBC
32	Re-label "female" areas or decrease locker size to 4 feet by 5 feet	TBC
33	Delete patio area	X
34	Keep patio area	TBC
35	Decrease plantings for site	TBC

SPECULATION AND EVALUATION

Project:

P-404, Air Operations Facility

NO.	IDEA	RATING (TBC = to be considered)
36	Determine plantings vs. security requirements	TBC
37	Use curb/gutter instead of barriers	TBC
38	Keep concrete barriers	X
39	Reduce trees at Cove Rd.	TBC
40	Check vehicle turning radius in tarmac area	TBC
41	Explain traffic flow in next presentation	TBC
42	Add dumpster pad in tarmac area	TBC
43	Use a smooth finish on “tarmac” area for chute layout	TBC
44	Check the need for smoke vents at shops and paraloft	TBC
45	Evaluate gas vs. steam for energy source	TBC
46	Investigate need for obstruction lights on paraloft for aircraft warnings	TBC
47	Revise building layouts/flow	TBC
48	Use dryers ILO loft system for parachute drying	X
49	Consolidate administrative area	TBC
50	Separate repair areas	TBC
51	Use pre-engineered building	TBC
52	Investigate timber piles	TBC
53	Minimize interior CMU walls	X
54	Minimize the fire exits to increase the boat area	TBC
55	Reduce the size of quarterdeck area	TBC
56	Decide on the wall between the gear issue and repair shop	TBC
57	Verify the size of the gear issue room	TBC
58	Verify the number of men’s fixtures	TBC
59	Decide whether to use 4 cages in team storage area with double doors	TBC
60	Add janitor’s closet	TBC
61	Evaluate the need for personnel building access	TBC
62	Add building access from existing building to new building	TBC
63	Raise tower to 85’ in height	TBC
64	Include no work to existing paraloft facility	X
65	Leave fencing at new RSL site	TBC
66	Define location for ISO-90	TBC
67	Use pre-engineered building	TBC
68	Locate dumpster off tarmac	TBC
69	Use anti-static carpet in parachute folding area	TBC
70	Demo existing tower as separate additive bid item	X

MEETING AGENDAS,
MEETING ATTENDEES
AND
MEETING NOTES

1. The current plant value of the existing building was discussed on April 14, 1999.
2. The drying tower height was discussed on April 14, 1999.
3. RSL issue was discussed on April 14, 1999.
4. Existing facility and blast arcs were discussed on April 14, 1999.
5. The exterior communications requirements were discussed on April 15, 1999.
6. FAA clearance was discussed on April 16, 1999.
7. Relocation of the RSL's was discussed on April 19, 1999.

FACD WORKSHOP

MEETING MINUTES/PHONE CONVERSATION RECORD

DATE: April 14, 1999
TIME: 10:00
LOCATION (if meeting): PWC Little Creek
RE: Drying tower height

ATTENDEES/PARTICIPANTS

<u>Name</u>	<u>Function</u>	<u>Organization</u>
<u>Eric Hodies</u>	<u>Mech</u>	<u>LANTDIV</u>
<u>Bert Estrella</u>	<u>Cost</u>	<u>LANTDIV</u>
<u>John Sirris</u>	<u>Elec</u>	<u>LANTDIV</u>
<u>Sandy Bay</u>	<u>Elec</u>	<u>PWC Little Creek</u>
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ITEMS DISCUSSED/COVERED:

Sandy stated that there is an in-house project to design a paraloft facility on Little Creek in close proximity to the LANTDIV proposed paraloft facility. This Little Creek designed facility has an 85 foot drying tower.

FACD WORKSHOP

MEETING MINUTES/PHONE CONVERSATION RECORD

DATE: April 14, 1999
TIME: 11:00
LOCATION (if meeting): Lake Wright meeting room (telephone call)
RE: RSL issue

ATTENDEES/PARTICIPANTS

<u>Name</u>	<u>Function</u>	<u>Organization</u>
<u>John Trueblood</u>	<u>AIC</u>	<u>LANTDIV</u>
<u>Bill Bogue</u>	<u>VE</u>	<u>LANTDIV</u>
<u>Lt. Higgins</u>		<u>SPECWARCOM</u>
<u>LCDR. Dunning</u>		<u>SPECWARCOM</u>
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ITEMS DISCUSSED/COVERED:

Activity has extreme reluctance to move RSL's. Explosive Arcs may be redrawn smaller to minimize impact on new facility. Lt. Higgins will investigate the possibility of shifting RSL's to the Southeast to minimize impact on our proposed site. He will also get clarification concerning whether or not the explosive arc may include the tarmac area of our project, parking, roads, etc.....

FACD WORKSHOP

MEETING MINUTES/PHONE CONVERSATION RECORD

DATE: April 14, 1999
TIME: 14:00
LOCATION (if meeting): Quality Inn Lake Wright
RE: Existing facility and blast arcs

ATTENDEES/PARTICIPANTS

<u>Name</u>	<u>Function</u>	<u>Organization</u>
<u>Lt. Jonathan Higgins</u>	<u>Staffcivil</u>	<u>HSWG-2</u>
<u>CDR W.E. Dunning</u>	<u>Forceciv</u>	<u>CNSWC</u>
<u>Dave Wohlscheld</u>	<u>Facilitat</u>	<u>PES</u>
<u>John Trueblood</u>	<u>AIC</u>	<u>LANTDIV</u>
<u>Bill Bogue</u>	<u>VE</u>	<u>LANTDIV</u>
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ITEMS DISCUSSED/COVERED:

1. Existing paraloft area will be reused to some extent. Directions are to rehabilitate to the minimum extent practical.
2. RSL's can be relocated. Ammunition rating will be revised to 1000 pounds per container vs. 2,500 pounds. This reduces the Arc to 106 feet. A revised site plan and application will be submitted by NSWG-2. The location can be moved on site. No occupied building or public transit routes can be intersected with Arc. All parking, tarmacs etc.... must be indicated on site plan with application.
3. It was requested that a cost alternate be prepared indicating using a 85 foot tower (paraloft), a bridge crane and provision and space to rig and lift an 11meter RIB.

FACD WORKSHOP

MEETING MINUTES/PHONE CONVERSATION RECORD

DATE: 4/16/99
TIME: _____
LOCATION (if meeting): Telephone conversation
RE: FAA clearance

ATTENDEES/PARTICIPANTS

<u>Name</u>	<u>Function</u>	<u>Organization</u>
Ellen Freihofer	PM	LANTNAVFACENGCOM
Dennis Atkins		Norfolk Airport Authority
Jerry Bordeaux		FAA (Norfolk Area)
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
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_____	_____	_____

ITEMS DISCUSSED/COVERED:

FAA reviewed the location and proposed height of new paraloft tower. Proposed height was 85' plus the height of the obstruction lighting. Site elevation is 12' MSL.

FAA stated that the maximum height is 108' MSL. Since the proposed total height is well below that, the facility is cleared and no further action is required.

SECTION 5

FACD RECOMMENDATIONS

FACD PROPOSAL for Value Opportunities

Project Name: P-404, SOF Air Operations Facility, Little Creek, VA Proposal No.: C1
Proposal Description: Reduce plantings and coordinate with security requirements near fence line.
Page 1 of 3

Prepared By: Blackburn Discipline: Landscape

ORIGINAL CONCEPT:

A generous distribution of trees and shrubs was provided.

PROPOSED CHANGE:

Quantities of trees and shrubs will be reduced. Trees and shrubs will be coordinated with security requirements.

JUSTIFICATION:

Extensive plantings are not desired by the users. Plantings provided must be coordinated with security requirements, especially along the fenceline.

COST SUMMARY

	<u>INITIAL COST</u>	PRESENT WORTH OF OPERATING <u>COSTS</u>	TOTAL LIFE-CYCLE <u>COST</u>
<i>ORIGINAL CONCEPT</i>	55,000	32,200	87,200
<i>PROPOSED CHANGE</i>	33,300	14,000	47,300
DIFFERENCE	21,700	18,200	39,900

COST ESTIMATING WORKSHEET

Project Name: P-404, SOF Air Operations Facility, Little Creek, VA

Proposal No.: C1

Page : 2 of 3

ORIGINAL CONCEPT

<u>ITEM</u>	<u>UNITS</u>	<u>QTY</u>	<u>UNIT COST</u>	<u>TOTAL</u>	<u>SOURC CODE</u>
Stone mulch	Cu	55	50.00	2,750	
Steel edging	LF	1300	5.00	6500	
Grass Sod	SF	2500	0.31	770	
Shrubs	EA	500	25.00	12,500	
Large Deciduous Trees	EA	93	300.00	27,900	
Ornamental Trees	EA	10	200.00	2,000	
Evergreen Trees	EA	10	250.00	2,500	
			SUBTOTA	54,950	
			MU	-0-	
			<u>TOTAL</u>	55,000	

PROPOSED CHANGE

<u>ITEM</u>	<u>UNITS</u>	<u>QTY</u>	<u>UNIT COST</u>	<u>TOTAL</u>	<u>SOURC CODE</u>
Stone Mulch	CU	55	50.00	2,750	
Steel Edging	LF	1,200	5.00	6,000	
Grass Sod	SF	200	0.31	62	
Shrubs	EA	500	25	12,500	
Large Deciduous Trees	EA	17	300	5,100	
Ornamental Trees	EA	23	200	4,600	
Evergreen Trees	EA	9	250	2,250	
			SUBTOTA	33,262	
			MU	-0-	
			<u>TOTAL</u>	33,300	

SOURCE CODE: 1. Project Cost Estimate 2. CES Data Base 3. CACES Data Base
 4. Means Estimating Manual 5. Richardson's6. Vendor (Specify)
 7. Other (Specify)

LIFE CYCLE COST ANALYSIS - Present Worth Method

Project Name: P-404, SOF Air Operations Facility, Little Creek, VA

Proposal No.: C1

Page : 3 of 3

ECONOMIC LIFE: 25 YEARS

ANNUAL PERCENTAGE RATE = 4.9%

INITIAL COSTS	ORIGINAL DESIGN		PROPOSED DESIGN	
	ESTI-MATE	PRESENT WORTH	ESTI-MATE	PRESENT WORTH
Base Cost				
Interface Cost				
Other Initial Costs				
TOTAL INITIAL COSTS				

OPERATING COSTS

SINGLE PAYMENT	YEAR	PRESENT WORTH FACTOR	ORIGINAL DESIGN		PROPOSED DESIGN	
			ESTI-MATE	PRESENT WORTH	ESTI-MATE	PRESENT WORTH
SUBTOTAL						
ANNUAL PAYMENT	YEARS	PRESENT WORTH FACTOR	ORIGINAL DESIGN		PROPOSED DESIGN	
			ESTI-MATE	PRESENT WORTH	ESTI-MATE	PRESENT WORTH
113 Trees @ \$20	25	14.236	2,260	32,200		
49 Trees @ \$20					980	14,000
SUBTOTAL				32,200		14,000
TOTAL OPERATING COSTS						

FACD PROPOSAL for Value Opportunities

Project Name: P-404, SOF Air Operations Facility, Little Creek, VA Proposal No.: A1
Proposal Description: Meet Base Facility Requirements (BFR) and DD1391 building size
limitations by reducing new building Page 1 of 3

Prepared By: _____ Discipline: Architectural

ORIGINAL CONCEPT:

Concept Number 1 indicated a 35,844 SF building with a 70 foot high tower.

PROPOSED CHANGE:

Concept Number 4 indicates a 32,436 SF building with a 85 foot high tower.

JUSTIFICATION:

The BFR and DD1391 building size limit is 42,000 SF inclusive of the new building and the 8,534 SF existing building. With the new building at 32,436 SF we are well within the BFR and DD1391 limitations. The Operation and Maintenance on the building is estimated at \$1 per square foot per year.

COST SUMMARY

	<u>INITIAL COST</u>	PRESENT WORTH OF <u>OPERATING COSTS</u>	TOTAL LIFE-CYCLE <u>COST</u>
<i>ORIGINAL CONCEPT</i>	3,525,800	510,300	4,036,100
<i>PROPOSED CHANGE</i>	3,300,900	461,800	3,762,700
DIFFERENCE	224,900	48,500	273,400

COST ESTIMATING WORKSHEET

Project Name: P-404, SOF Air Operations Facility, Little Creek, VA

Proposal No.: A1

Page : 2 of 3

ORIGINAL CONCEPT

<u>ITEM</u>	<u>UNITS</u>	<u>QTY</u>	<u>UNIT COST</u>	<u>TOTAL</u>	<u>SOURC CODE</u>
Total SF of building with 70 foot	SF	35,844	98.37	3,525,818	
			SUBTOTA	3,525,818	
			MU	-0-	
			<u>TOTAL</u>	3,525,818	

PROPOSED CHANGE

<u>ITEM</u>	<u>UNITS</u>	<u>QTY</u>	<u>UNIT COST</u>	<u>TOTAL</u>	<u>SOURC CODE</u>
Total SF of building with 85 foot	SF	32,436	101.77	3,300,911	
			SUBTOTA	3,300,911	
			MU	-0-	
			<u>TOTAL</u>	3,300,911	

SOURCE CODE: 1. Project Cost Estimate 2. CES Data Base 3. CACES Data Base
 4. Means Estimating Manual 5. Richardson's 6. Vendor (Specify)
 7. Other (Specify)

LIFE CYCLE COST ANALYSIS - Present Worth Method

Project Name: P-404, SOF Air Operations Facility, Little Creek, VA

Proposal No.: A1

Page : 2 of 3

ECONOMIC LIFE: 25 YEARS

ANNUAL PERCENTAGE RATE = 4.9%

INITIAL COSTS	ORIGINAL DESIGN		PROPOSED DESIGN	
	ESTI-MATE	PRESENT WORTH	ESTI-MATE	PRESENT WORTH
Base Cost				
Interface Cost				
Other Initial Costs				
TOTAL INITIAL COSTS				

OPERATING COSTS

SINGLE PAYMENT	YEAR	PRESENT WORTH FACTOR	ORIGINAL DESIGN		PROPOSED DESIGN	
			ESTI-MATE	PRESENT WORTH	ESTI-MATE	PRESENT WORTH
SUBTOTAL						
ANNUAL PAYMENT	YEARS	PRESENT WORTH FACTOR	ORIGINAL DESIGN		PROPOSED DESIGN	
			ESTI-MATE	PRESENT WORTH	ESTI-MATE	PRESENT WORTH
35,844 SF @ \$1	25	14.236	35,844	510,300		
32,436 SF @ \$1					32,436	461,800
SUBTOTAL				510,300		461,800
TOTAL OPERATING COSTS						

FACD PROPOSAL for Value Opportunities

Project Name: P-404, SOF Air Operations Facility, Little Creek, VA Proposal No.: A2
Proposal Description: Eliminate tower rappelling feature

Page 1 of 2

Prepared By: Discipline: Architectural

ORIGINAL CONCEPT:

Concept Number 1 indicated a parachute tower that could also be used for rappelling.

PROPOSED CHANGE:

Eliminate the rappelling feature of the tower.

JUSTIFICATION:

Other facilities exist nearby for rappelling training.

COST SUMMARY

	<u>INITIAL COST</u>	PRESENT WORTH OF <u>OPERATING COSTS</u>	TOTAL <u>LIFE-CYCLE COST</u>
<i>ORIGINAL CONCEPT</i>	7,250	-0-	7,250
<i>PROPOSED CHANGE</i>	-0-	-0-	-0-
DIFFERENCE	7,250	-0-	7,250

COST ESTIMATING WORKSHEET

Project Name: P-404, SOF Air Operations Facility, Little Creek, VA

Proposal No.: A-2

Page : 2 of 2

ORIGINAL CONCEPT

<u>ITEM</u>	<u>UNITS</u>	<u>QTY</u>	<u>UNIT COST</u>	<u>TOTAL</u>	<u>SOURC CODE</u>
Tower with rapelling platform &	LS	1	7250	7,250	
			SUBTOTA	7,250	
			MU	-0-	
			<u>TOTAL</u>	7,250	

PROPOSED CHANGE

<u>ITEM</u>	<u>UNITS</u>	<u>QTY</u>	<u>UNIT COST</u>	<u>TOTAL</u>	<u>SOURC CODE</u>
Eliminated		-0-		-0-	
			SUBTOTA	-0-	
			MU		
			<u>TOTAL</u>	-0-	

SOURCE	1. Project Cost Estimate	2. CES Data Base	3. CACES Data Base
CODE:	4. Means Estimating Manual	5. Richardson's	6. Vendor (Specify)
	7. Other (Specify)		