COMPLETION REPORT

COVERING THE DESIGN OF

CAMP LEJEUNE U. S. MARINE BARRACKS NEW RIVER, NORTH CAROLINA

Lentra [Heating Plant

FOR THE

U. S. NAVY Bureau of Yards and Docks CONTRACT NOy 4751 APRIL 15, 1941 - SEPTEMBER 30, 1942

PREPARED BY CARR AND J. E. GREINER COMPANY ARCHITECT ENGINEERS

DURHAM. NORTH CAROLINA

VOL. I

J. E. GREINER COMPANY BALTIMORE, MARYLAND

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G. W. CARR, ARCHITECT DURHAM, NORTH CAROLINA

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CARR AND J. E. GREINER COMPANY ARCHITECT ENGINEERS DURHAM, N. C.

GEO. WATTS CARR, A. I. A. JOHN E. GREINER, HON. M. AM. SOC. C. E. HERSCHEL H. ALLEN, M. AM. SOC. C. E.

Officer-in-Charge, Contract NOy-4751, Camp LeJeune, New River, North Carolina.

Dear Sir:

We are submitting herewith our Completion Report -"Contract NOy-4751 for Architectural Services for Marine Corps Training Base at New River, Jacksonville, N. C."

The work covered by this report was started immediately upon the execution of the contract, April 15, 1941, and was terminated on September 30, 1942. Between October 1, 1942 and March 13, 1943 certain of the key personnel of our organization were retained at the site for the purpose of completing the report and certain of the work under our contract which had not been completed prior to September 30, 1942.

The facilities included in the Marine Corps Training Base may be divided into twelve separate types, as follows:

- 1. Housing and Training Center with Recreational and Administrational Facilities for One Division of Five Regiments and One Battalion of Post Troops.
- 2. Industrial and Supply Area.
- 3. 700 Bed Base Hospital.
- 4. Residential Area consisting of 180 Commissioned
- 5. Rifle Range.
- 6. Balloon Barrage Training Area and Housing for One Battalion.
- 7. Amphibian Base.
- 8. Parachute Training Area.
- 9. Glider Training Base.

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BALTIMORE, MD.

REPLY TO 1201 ST. PAUL STREET BALTIMORE, MD.

July 17, 1943.

Officers' Homes and Quarters for Bachelor Officers.

- 10. Tent Camps:
- 11. Residential Area of 700 Low Cost Housing Units.
- 12. Impact and Combat Areas, Umpire and Fire Control Facilities.

The report is divided into two parts: the first of which comprises a brief history and chronological development of the preliminary work and a summary of the facilities provided; and the second part is a brief description of the engineering work performed in the seventeen and one-half month period during which the Architect-Engineer Contract was in operation.

In general, the work involved original designs, although a small part involved the adaptation of typical plans previously prepared by the Navy Department. All work was performed at the site under the general supervision and direction of the Officer-in-Charge representing the Chief of the Bureau of Yards and Docks, who, under the terms of the contract, is the authorized representative of the Navy Department for the purposes of the administration of the contract.

Between April 15, 1941, when the work was started, and July 10, 1942, the work was performed under the supervision of Mr. W. C. Roberts, Project Manager, representing the Architect-Engineers. Between July 10, 1942 and September 30, 1942 the work was performed under the supervision of Mr. W. C. Munroe, Project Manager. During the period between October 1, 1942 and March 13, 1943 the work was performed under the supervision of Mr. B. E. Beavin, Project Manager.

The Officer-in-Charge, representing the Chief of the Bureau of Yards and Docks as Contracting Officer under the Contract, was Lieut. Commander Madison Nichols, for the period between April 15, 1941 and August, 1942; and between the dates of August, 1942 and March 13, 1943 the work has been done under the direction of Lieut. Commander Richard A. Williams. During the entire period the United States Marine Corps was represented by Col. W. P. T. Hill, and we would like to take this occasion to express our appreciation of the cooperation and assistance which has been extended to us throughout the entire period of the contract on the part of the Navy and Marine Corps personnel with whom we have been in contact.

Respectfully submitted,

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CARR AND J. E. GREINER COMPANY by Cutbarr G. W. Carr

CHAPTER A PART I

PURPOSE AND SCOPE OF THE REPORT

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Officer-in-Charge, Sontract Nov-1751

12. Minister and fembal Areas, Umpire and Fire Centrel, Factifies.

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Respectively submitted.

ALP AND J. E. GREINER COMPANY CAU Carr Star Bar

The purpose of the report is to present in concise form a record of the conception, engineering procedure and design of the project. The report is a condensed statement of the work performed by the Architect-Engineers and in the future will serve as a source of information for those concerned with the operation of the various activities.

Part I covers generally the events leading up to the design of the project. fundamental engineering data. and a summary of the facilities provided.

Part II covers the work involved in the actual design of the project. This part is sub-divided so as to present the work of the various departments into which the Architect-Engineers organization was divided. Part II also contains lists of the drawings and specifications prepared.

In referring to various parts of this report, it should be noted that construction of the original project was not completed at the end of the period covered (Sept. 30, 1942) and that new areas were developed and original areas and their structures modified and enlarged subsequently. The design of these extensions and modifications will be covered in a Supplementary report.

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CHAPTER B

ARCHITECT - ENGINEERS' CONTRACT

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B-1. The J. E. Greiner Company, Engineers of Baltimore, Maryland, and G. W. Carr, Architect, Durham, North Carolina, were associated as Architect-Engineers to design a Marine Corps Training Base situated on both sides of New River near Jacksonville, North Carolina. The contract was executed on April 15, 1941, on a fixed fee basis. The Secretary of Navy was authorized by an act of Congress approved April 25, 1939 (Public -#43-76th. Congress) to enter into such a contract without reference to the Classification Act of 1923 (42 STAT.1488) as amended (5 U.S.C. ch. 13) or to Section 3709 of the Revised Statutes of the United States (41 U.S.C.5).

B-2. Under the terms of the contract, the Architect-Engineers were required to organize and establish properly a field office in the vicinity of Jacksonville, N. C. with a competent, adequate and experienced architectural and engineering organization properly supervised by specialists in electrical, mechanical, structural, architectural, municipal, sanitary, specification work and field surveys, to render all services required by the Chief of the Bureau of Yards and Docks or his authorized representative for the effective planning, coordination and execution of all construction and including:

(1) Cadastral, hydrographic, topographic, and location surveys; staking out work and checking lines and grades; soil tests, test piles, borings and associated work; and establishment of permanent monuments and bench marks.

(2) Engineering investigations and reports to obtain complete data for design of buildings and utilities; such other investigations, surveys, preliminary plans, estimates and reports as may in the opinion of the Chief of Bureau of Yards and Docks be required for future development; and a final technical report for record purposes describing general scope of work performed including physical and technical features, difficulties encountered and methods used.

(3) Preliminary studies, designs, sketches, estimates, working drawings, renderings, progress charts, detail drawings, record drawings, subsurface drawings, large scale drawings, maps, etc., complete including necessary drawings and specifications for tent camp, grading and fencing; concrete masonry, timber and structural steel work; sewers, sewage treatment plants and incinerators; distribution systems for water, electric power, and steam; water supply and purification power plants; drainage, roads, railroads, streets and pavements; plumbing, heating, air conditioning, mechanical and electrical equipment; pumping stations; temporary landing fields, parade grounds and recreational facilities; communication and signal systems; waterfront development including piers, bulkheads, dredging, bridges and trestles. and all new construction required in the project.

(4) The adaptation, including modifications and extensions of existing plans and specifications for utilities and for permanent structures, and for emergency structures of a temporary nature which may be required in the

PART T

(5) Checking and approving of all shop drawings on work or equipment which will be under contract, or under requisition in connection with the development of the project.

The Architect-Engineer further was required to pass upon materials, samples, and models upon request.

The Navy Department was to provide office and drafting room supplies and equipment, electricity, heat, office space, typewriters, adding machines, calculators, desks, filing cases and chairs, together with all necessary blue printing, photostating, and similar services.

Note: The Navy Department furnished the inspection staff which had complete control of construction work, interpretation of specifications and plans, and the collection of as-built data. The Architect-Engineer handled the design phase of the project only, doing only the field work necessary for the preparation of plans and specifications, and passing upon part of the shop drawings. Some structures were designed by the Contractor. It should be noted that most of the features of the project were of permanent construction with complex mechanical and electrical installations, increasing the design work far beyond that required for the usual cantonment.

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(2) Engineering insections and remains to obtain boundary duty for sould any maildings and antibition, such other insections formation, correct, problemane plane, estimate and supprise or say in the optained of the GRINE of Suran M Cards and locate is required for future developments and a final sectorized report for record (stronged to contain adopt of ward here formal including investor and teaching futures, divided a supervise to record including investor and teaching futures, divided a supervise to the sector of teaching teaching futures, divided a supervise to record including investor and teaching futures, divided a supervise to record in the supervise of teaching futures, divided a supervise to record the supervise of teaching futures.

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CHAPTER C . PART I

REPORT OF U. S. MARINE BOARD

C-1. Inasmuch as the design of the entire project was based fundamentally on the studies made by the U. S. Marine Board, appointed to submit preliminary plans for the establishment of a Division Training Center, New River, N. C., it has been considered advisable to reproduce the record and report of the board in order that the same may be available for future ref-

C-2. On February 24, 1941, the Major General Commandant wrote the following letter outlining the scope of the project.

COPY

HEADQUARTERS U. S. MARINE CORPS WASHINGTON

1975-30 AE-277-g.jf

From: To:	The Major General Commandan The President of the Board establishment of Division
~	River, North Carolina,
Subject:	Units and activities contemp Division Training Center, vi River, North Carolina.
Enclosures:	 (A) Table of Organization-Ma (B) Table of Organization-De (C) Table of Organization-Am
1. stationed at the Tentative Tables	It is contemplated that the Division Training Center, Ne

- (a) One Marine Division.
- Four Defense Battalions. (b)
- (c) One Amphibian Battalion
- Post Troops and Specialists Training Center. (d)

2. It is expected that the following activities will be conducted within the Division Training Center by the various units stationed

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24 February 1941

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to submit plans for raining Center, New

plated for the cinity of New

arine Division. fense Battalion. phibian Battalion.

following units will be w River, North Carolina. Organization of these units are enclosed herewith:

- Rifle range firing. (a)
- Long range and antiaircraft machine gun firing. (b)
- Combat practice firing. (c)
- Antiaircraft artillery firing. (d)
- Light artillery firing. (e)
- Medium artillery firing. (f)
- (g) 5" firing at towed targets.
- Boat gun firing at beach targets. (h)
- Anti-boat gun firing at beach targets. (i)
- Troop Landing operations thru surf. etc.
- Maneuvering and training in rubber boats. (k)
- Land and water training with amphibians. (1)
- Maneuvering and training in use of artillery and tank (m) lighters.
- Maneuvering and training landing boat crews. (n)
- Ship and boat loading. (0)
- Tank and antitank training. (p)
- Training of parachute troops. (q)
- (r) Balloon barrage training.
- (s) Training in tactics and maneuvers on land.
- (t) Training in beach defense.
- Training of hospital units. (u)

Copy for: The Quartermaster

The Board had organized on February 21, 1941, and on April 10, 1941, submitted the following report:

COPY

A-36-ptl

demander of the

Board to submit plans for establishment of Division Training Center, New River Area, North Carolina.

The Board met at 0900, February 21, 1941, pursuant to orders of Major General Commandant, original prefixed marked "A". A letter of instruction from the Major General Commandant to the Board is prefixed "B".

Present:

Colonel Julian C. Smith Colonel Earl C. Long Colonel Pedro A. del Valle

(Colonel del Valle was detached 8 March 1941)

It was decided that no formal meetings would be held but that each

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it is expected that the following activities will be one

/s/

A. A. VANDERGRIFT Acting

21 February 1941

member would proceed on duties assigned in connection with map and ground studies of the area under consideration and report the results of his work at meetings called from time to time by the Senior Member. After a careful study of all available maps and ground reconnaissance, the Board submits the following facts and recommendations regarding the location, boundaries and various contemplated training, housing and supply facilities to be constructed with the Training Center. (See attached map marked Exhibit "1").

1. LOCATION, BOUNDARIES AND DESCRIPTIONS:

(a) Semant president Findage.
 (a) Addiptrendly art. Life, Survey.

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(a) The East Coast Training Center is located on both banks of the New River in Onslow County, North Carolina. It is adjacent to Jacksonville, North Carolina, which is on U. S. Highway No. 17. The nearest large towns are Wilmington, 50 miles to the southwest and New Bern on the Neuse River, 37 miles to the northeast, both on Route 17. The nearest seaports are Wilmington and Morehead City, the latter of which is 46 miles from Jacksonville on N. C. Route No. 24. Both of these ports have thirty foot dredged channels and docking facilities. Both are connected with Jacksonville by railroad. There is a branch of the Atlantic Coast Line Railroad running through a part of the reservation which joins the main line of the Atlantic Coast Line Railroad at Wilmington and the Norfolk Southern Railroad at New Bern. The Atlantic and North Carolina Railroad connects New Bern with Morehead City.

(b) The contemplated air base on the Neuse River is approximately 30 miles or about 10 minutes flight time distant. This will permit of close cooperation and combined training of air and ground troops.

(c) The terrain is generally flat. The area is trapezoidal in shape and extends about 15 miles from the beach inland with about 10 miles of ocean front. It contains approximately 83,000 acres of land area and 20,000 acres of water area. The inland waterway parallels the ocean beach. The New River divides the area with approximately one-fourth of the land area on the right bank and three-fourths on the left bank. There is a 10-foot dredged channel from the sea to Jacksonville. The terrain is essentially flat pine land with some clearing, consisting of low, well-drained ridges about 30 feet above sea level and gulleys drained by creeks into the New River (with improvements they will furnish drainage for the housing areas). There is some swampy land along the creeks but not sufficient in extent to interfere materially with the housing and training facilities.

(d) The boundaries in general are natural terrain features, - the ocean, inlets, creeks and public highways. The dredged channel at the mouth of New River was selected as a boundary and a number of small islands included in the reservation in order that they be kept under Government control in case it should be considered advisable at some future date to widen and deepen the New River Channel as well as to give access to the channel. The area north of North East Creek was included for future development of officers ! Quarters, a possible temporary camp ground after the emergency landing field is in operation and in order to prevent the establishment of residences or other installations on its banks with consequent polution of the water. It furnishes a suitable location for an emergency landing field during occupation of the temporary camp and a permanent secondary landing

- 6 -

field as well as a site for a C.C.C. Camp.

3. ARTILLERY TRAINING AREA:

The location and extent of the artillery impact and firing areas were determined as furnishing ample manouver and firing facilities and causing the least possible interference with training and movements of troops and supplies. They permit traverse of 500 miles at a maximum range of approximately 20,000 yards. Guns may be landed through the surf, -- open fire, displace forward as much as 5,000 yards from the initial firing position and re-open fire. As all firing points are to the west of the main highway through the Training Center and fire is generally in a northwesterly direction, no interference with other activities will be encountered, -- except that the artillery firing will have to be coordinated with boat gun and anti-boat gun practice. In order to give variation in problems, firing may also be conducted in a general southerly direction from the vicinity of the emergency flying field.

4. INFANTRY, INCLUDING TANK AND ANTI-TANK, COMBAT TRAINING:

The infantry combat training area and infantry weapons impact area lie east of the central highway, railway, power line and warehouses. It covers an area approximately 7,500 yards square and is conveniently located with respect to other training and maintenance activities. Troops will be able to reach it with a minimum of marching and all infantry weapons may be used simultaneously without interference with the normal operations of the post maintenance and supply facilities or with the training of other troops. For instance, with proper safety precautions, .30 caliber and .50 caliber machine gunnery at ground targets, tank and anti-tank gunnery practice, infantry combat practice and rifle range firing can be conducted at the same time. Antiaircraft practice at towed sleeves can be conducted with .30 and .50 caliber weapons or any weapon with a maximum range not exceeding 7,500 yards but the use of the infantry combat area by other troops will be restricted during such firing. The guns can be so located however as not to interfere with the use of the rifle range.

5. RIFLE RANGE:

The rifle range area was selected so that the direction of fire will be approximately due north, which permits the best use of the range during all daylight hours. As there are no hills on the reservation to form backstops, it will be advisable to mark out a danger zone corresponding to the extreme range of the M2 ammunition, approximately 4,000 yards. (2,900 yards is the safety limit set in Army regulations for this ammunition and 3,900 yards for the M1 ammunition as it is considered that only an accidental shot will be fired with the rifle held at an elevation giving a greater range). By locating the rifle range so that the greater part of its danger zone lies within the impact area of the infantry combat range, the combined areas of the danger zones are reduced to a minimum.

6. BOAT GUN AND ANTI-BOAT GUN RANGES :

(a) The New River furnishes boat gun and anti-boat gun ranges. Troops may embark in boats immediately adjacent to their barracks, proceed across

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the river to points in the artillery impact area and conduct boat gun firing followed by landings with advances inland. All infantry weapons may be fired in these practices without restriction except as to direction.

(b) Anti-boat gun practice may be held with guns set up in the barracks area and targets towed up or down the westerly side of the river firing into the artillery impact area.

7. ANTIAIRCRAFT PRACTICE:

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Long range antiaircraft fire and machine gun antiaircraft fire may be conducted from the vicinity of the ocean beach subject only to the customary safety precautions. The sea lanes are 25 miles out and the only interference would be from small fishing boats, or if the guns were set up inland of the inland waterway, from boats using the waterway.

8. FIVE-INCH GUN PRACTICE:

Five-inch gun practice at towed targets can be fired from the vicinity of the beach with the same facility and subject only to the same restrictions as apply to antiaircraft practice. Destroyers, tugs or other towing craft will find limited harbor at Morehead City about 25 miles distant.

9. BOATS AND BOAT CREW TRAINING:

(a) The main boat basin should be located as near as practicable to the mouth of the river in order to shorten the run to the open sea, Court House Bay, which is sheltered and within easy access of main roads and located northeast of Marines, seems to offer the best location; although some dredging will be required. It is about 3 miles from the mouth of the river and of ample size to accommodate all the boats, tank lighters, etc., of a division. There are some buildings and deep wells in the vicinity of Marines that could be used.

(b) A secondary boat basin can be constructed in Frenchs Creek in the vicinity of the barracks area --where boats could be kept for such training as may be conducted in the river. Amphibian boats can operate from this location or others along the river or sea coast.

(c) Rubber boats can be used for elementary training in the river and for more advanced training in the ocean with landing practice through the surf.

(d) All conditions of water, swamp and land are to be found in the Training Center for any type of training with landing boats, amphibians, tank lighters or rubber boats.

10. BALLOON BARRAGE:

A balloon barrage may be operated along the main road through the Training Center without interfering with firing or other training activities.

8

11. PARACHUTE TROOPS:

- 8 -

Parachute troops may be trained in their particular specialty on the emergency landing fields, the parade ground or any other open space of cleared land in the Training Area. All the facilities of the Training Center will be available to them for their active combat training.

12. TACTICS AND MANEUVERS ON LAND:

The whole area is well suited to training in tactics of land warfare, lacking only hills and rolling terrain. The highest point is some 30 feet above sea level. There is room for extensive land maneuvers including attack and defense of a river line; attack, defense, limited pursuits and withdrawals, with displacement of artillery and supply units; extended marches with bivouac, outpost problems, etc., can be undertaken by regiments or combat teams, or even with the whole division. It is well suited for instruction in small wars and jungle warfare.

13. LANDING OPERATIONS:

For training in landing operations, the conditions are ideal. Both banks of the New River for about 13 miles are within the limits of the Training Center. It varies in width from one mile to two miles, is shallow with about one foot rise and fall of tide and very slight current. Opposite the barracks area is the artillery impact area with a beach about five miles in extent where landing operations may be practiced supported by the fire of infantry weapons and boat guns. Advances of from two to five miles inland may be made depending on the point of landing. The technique of landings without firing may be practiced at other points along the river with no interference or conflict with the firing of any weapons or the training of other units. There is an ocean beach approximately 10 miles in extent which may be utilized for landings from transports lying off the coast. A landing on a $4\frac{1}{2}$ mile front may be made by all elements of a Marine Division with an advance inland of 8 miles. A great variety of tactical landing and beach defense problems may easily be worked out within the limits of the Training Center.

14. BEACH DEFENSE:

For beach defense operations there is ample frontage and depth for the deployment of an entire division in defense of the 10 miles of ocean frontage, while the 20 or more miles of New River shore line offer terrain suitable to an almost infinite number of defensive problems for smaller units.

15. HOSPITAL UNITS:

The terrain is as suitable in every way for the training of medical units in tactics and technique as it is for the other elements of a Marine Division.

16. EMERGENCY LANDING FIELD:

The area selected for the emergency landing field lies between the highway No. 17 and the right-of-way of the Atlantic Coast Line Railroad. It is approximately 2 miles long by 1 mile wide, with its length in the general direction of the prevailing winds unich are southeast or northwest. It is partly cleared. An alternate field is suggested just to the northwest of the bridge over North East Creek. As this is nearer the Training Area than the

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previously mentioned field, it may eventually prove more desirable for permanent use.

17. TEMPORARY CAMP SITE:

The site of the emergency landing field was also chosen for the temporary camp. It has ample space to tent 10,000 men, is partly cleared, well drained and is close to both railroad and highway. It can be occupied without interference with the construction of the main base. All clearing for the temporary camp will be utilized for the landing field. For the requirements of tentage, warehousing, mess halls, sewage disposal, see Exhibit "2". Wells will be required for water supply. The Board was directed by the Major General Commandant to lay out the camp in 600 men plots, each to contain tentage, mess halls, sanitary and storage facilities. The tentative location of the camp is shown on Exhibit "1".

AREAS OTHER THAN THOSE FOR TRAINING

18. BARRACKS -- BATTALION HEADQUARTERS, MESS HALLS, ORGANIZATION STOREROOMS:

(a) The site chosen for barracks is on the East bank of the New River between Wallace Creek and Frenchs Creek. The advantages of this location are accessibility to training areas, high ground, best orientation as regards summer breezes, reasonable first costs, small amount of low ground, drainage, attractiveness and comparative freedom from mosquitos.

(b) Construction utilizing the rectangular scheme is considered the most desirable, - sketch appended marked "3". The advantages of this scheme are comparative compactness, reasonable installation costs, ease of communication, simplifies the road net, provides ready access for power, sewer and water lines, convenient parking area for motor vehicles and allows space for future additional building. It is not necessarily intended this scheme should be adopted as presented but after further study, particularly involving costs that generally the rectangular layout be utilized. After consideration of various building materials for temporary barracks and other buildings, it is considered that strip steel prefabrication offers such advantages over wood frame structures that the Board recommends such construction. Advantages are: comparative favorable first cost, less time to build, termite proof, ease of erection, reduced painting costs, less maintenance expense, longer life, better sound insulation (assuming concrete floors) and more pleasing appearance. Also the Board considers that a modified standard B-1 Navy Type layout having a 58-man squadroom (single bunks) as shown by Exhibit "4" is the one most suited to Marine Corps needs. It offers sufficient space for emergency requirements and, by the installation of movable steel partitions, various interior arrangements may be made to provide a recreation room, a sergeants' room, offices, etc. Generally a 58-man squadroom conforms to peacetime organization training allowances without undesirable mixing of units. The Board believes aquamedias (projecting approximately 36 inches) over dormitory or squadroom windows, such as are in practice by the U. S. Army, to be most essential, and also recommends consideration be given them for use over buildings devoted principally to offices. (Aquamedia is a term adopted by the U. S. Army for a skirt or canopy on buildings allowing open windows during rainfall, -- particularly desirable in warm weather.

(c) The schematic layout indicates locations for certain organization

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storehouses, mess halls and battalion headquarters. It is recommended that the same building materials. - prefabricated strip steel be used in these buildings for reasons stated above. The standard Marine Corps mess hall ("family service") with kitchen equipment for a minimum of 600 men is considered the most satisfactory. A floor plan is appended marked "6". As it is believed urgent in the interests of economy. it is recommended that barracks be constructed for the present in lieu of battalion headquarters. buildings and storerooms. - that those activities be housed in barracks until funds are available to provide for them in locations as shown by the rectangular lavout.

(d) Recommendation for large storehouses for special equipment such as artillery, antiaircraft, motor vehicles, etc., is not made part of this report.

19. DIVISION HEADQUARTERS

This area was selected according to usual practice. - that it be centrally located in regard to other headquarters and generally for all activities. If usual Army plans are followed, hostess houses, assembly halls (pictures and other gatherings) will be located in this area.

20. GENERAL PARADE GROUND

This area is contrally located and selected so that it may be enlarged from time to time as funds are available. To secure a satisfactory parade ground requires a composition having sufficient rock to provide an armored surface to prevent breaking-up tractors, tanks and other motorized equipment.

21. HOSPITAL

Hadnot Point logically suggests itself since it is centrally located. yet providing privacy and quist. It is unusually well situated to secure the greatest degree of relief from summer heat. This location, as well as all areas along the river bank affords an opportunity for beautification by simple landscaping. There is ample space allowed for any future expansion either as regards buildings or grounds. If a tent camp for 6,000 troops is to be immediately established, thought should be given to attendant required hospitalization which suggests early construction on Hadnot Point. 1

22. RECREATION FOR ENLISTED MEN

Because of the isolation of the New River Training Area, special attention should be paid to providing for every reasonable field sport. football, baseball, cinder path, tennis, basketball, handball, etc. Tentatively, areas adjacent to the parade ground have been selected for these forms of exercise. A further study on the ground may suggest combining these areas. However, should the strength of the post approximate 20,000 enlisted, it is considered very desirable to have several recreation areas in order to encourage various forms of athletics by providing facilities nearby the barracks. - possibly in each regimental area. Both the river and the ocean beach provide splendid opportunity for swimming. It may be desirable to locate a hostess house, - assembly hall (moving pictures) in each

regimental area.

23. RECREATION FOR OFFICERS, WARRANT OFFICERS AND NONCOMMISSIONED OFFICERS (FAMILIES)

Because of the isolation of this station, it is considered that more ' than usual attention need be paid to some provision for athletics for all interested persons residing in the post. Accordingly, tentative areas have been selected (as. indicated on the enclosed map) in each quarters group, officers, warrant officers and noncommissioned officers.

24. UTILITIES - SUPPLY

Adequate railroad, highway and power facilities are not now in the Training Area. As all will be urgently needed on beginning construction. steps to initiate them should be taken immediately, particularly as regards the railroad and power line. A later study should be made in connection with providing docking facilities on the river for ocean-going vessels. However, a tentative location has been selected in the vicinity of Marines. Also, attention should be given at a later date to docking facilities at Morchead City. - particularly if it appears that wharfage at Wilmington will prove inadequate in an emergency. Barging between the Training Area and Morehead City does not appear to offer satisfactory transportation possibilities, hut should be kept in mind.

25. WIRE COMMUNICATIONS

As neither telephonic or telegraphic communications are sufficient to cover proposed installations. a determination of requirements should be made, and the utility companies concerned informed accordingly.

26. RAILROAD-HIGHWAY--HIGH TEMSION LINE

A proposed general location for a railroad, a main highway and pole lines (entering the reservation) are indicated on the attached map.

27. SANITATION

(a) As it is very undesirable to have raw sewage discharged into the river, adequate sewage disposal plants will need to be installed.

(b) Because of the presence of sluggish creeks and marshy areas, and the report of the presence of malaria and the anopheles mosquito, it is considered urgent that surveys be made without delay in order that mosquito control may be established.

28. WATER SUPTLY

A deep-well water supply is being explored by sinking test wells.

29. QUARTERMASTER

A general area for such quartermaster supply activities as shops.

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bakery, laundry, commissary, cold storage, fuel, lumber, clothing, and equipment material storage is indicated on the accompanying layout, leaving details of construction as a matter for future study. Since a bakery, laundry, cold storage and commissary will be early requisites of the more permament construction, they should be provided among the first buildings as their facilities can well be utilized in the very near future by the temporary tent camp.

30. C. C. C. CAMP:

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A suggested site for a C. C. C. Camp is indicated on the accompanying map. It would be necessary to provide water at their camp.

31. LABOR CAMP:

Should a labor camp be necessary or desirable, it could be on the reservation at any location convenient to construction activities, and near water.

32. OFFICERS' WARRANT OFFICERS' AND NONCOMMISSIONED OFFICERS' QUARTERS:

These areas were selected after locating the barracks areas. Thought for these locations was mainly directed by accessibility to all activities, installation costs, reasonable privacy and utilization of river scenery which is most attractive as the water is clear, little current or tide, and with stretches of clean sandy beaches. The areas are located with officers' and warrant officers' quarters to the northward as this allows of shorter distances for correissioned officers to travel to their duties. Because of the cost limit placed by law on these quarters, it is probable that resort will be necessary to modified Navy Low Cost Defense Housing. In this connection, the Federal Housing Activity has interesting layouts, including small towns. They are worthy of study and consideration. The layout for officers' quarters and noncommissioned officers' quarters contemplates approximately 200-feet frontage for general officers, 100-feet for commissioned officers, 60-feet for warrant officers and 50-feet for noncommissioned officers' quarters. It is believed a pleasing landscape effect will be secured by laying out a river drive, and locating quarters with this as the controlling theme but following, in a modified way, the usual city plan of streets at right angles. It should be noted that the plan contemplates quarters only in each alternate block. This allows all quarters to face upon a small park already planted with native trees and shrubs. These unoccupied blocks can be built upon at a later date if found necessary but it is believed it will prove very desirable to keep them for their landscape value, -- a place where tennis courts, etc., may be installed and providing readily accessible playgrounds for children. Also retention of as many trees and shrubs as practicable will have a tendency to moderate hot summer days.

33. LANDSCAPING:

It is considered desirable that where practicable all existing trees, shrubs, etc., be carefully preserved, not only for their landscape value, but to minimize blowing sand, to reduce summer temperature and to retain ground moisture. As previously mentioned, a riverside drive is contemplated for the fine scenery it will unfold and its usefulness as a

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miles east to Bear Inlet, and extends inland approximately to miles in the vicinity of Jacksonville, N.C. Approximately one fourth of the land area is west of the New River and three fourths east of the New River. The importance of the U.S. Marine Barracks, New River, N.C., is due to its size, which affords a base on the east coast where large units of marines can assemble intact, and to varied and extensive training facilities which permit of both landing and shore operations, and the firing of artillery.

TOPOGRAPHY. The terrain of the entire area comprising 2. the U.S. Marine Barracks, New River, N.C., is generally flat, the highest elevation being under 30 feet. The vegetation of the area consists of pine and oak with underbrush of varying density. The wooded areas inland from the coastal beach for a distance of approximately 2 miles are very dense and difficult of passage, except over occasional unimproved roads and trails. As the elevation increases inland, the vegetation becomes less dense. Forest fires have burned over many sections within the area, and appearances indicate frequent and extensive fires during the dry seasons. The only indication of extensive agriculture is in the south central section of that area northeast of New River, where a belt of cultivated areas extend along the southern border of the Gillett-Duck Creek-Starling road, and the southern border of the Gillett-Duck Greek-Starling road, and in the area west of the New River, particularly north and west of Stone Bay, and in the vicinity of Holmes Point. The soils on the reservation are Lakewood fine sand, Onslow sandy loam, Portsmouth fine sand muck and tidal marsh. Lakewood fine sand is found extensively inland, where the terrain is more elevated and the vegetation sparse. The soil of tidal marsh varies from dark gray to bluish drab or steel colored loam, 6 to 8 inches deep. The soil in the cultivated areas is mostly Norfolk fine The soil in the cultivated areas is mostly Norfolk fine deep. The sub-soil is black, bluish or steel colored clay loam, sand. extending to depths of 3 feet or more. The tidal marsh supports a luxuriant growth of marsh grass.

3. INTRACOASTAL WATERWAY. The New York-Key West section of the intracoastal waterway, passes through the reservation, closely paralleling the coastal beach. Construction of the Anodat pič ontrad deglič otkradnosti podato žiteli i stano žiteli naditeli. Store v zako žiteli stano žiteli stano žiteli i stano žiteli stano žiteli stano žiteli stano žiteli stano žiteli Anodat v žiteli stano žiteli stano

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Headquarters, First Marine Division, Fleet Marine Force, Marine Barracks, Quantico, Virginia.

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STUDY ON

NEW RIVER MARINE BASE (Revised) Supersedes study on same subject dated 21 June , 1941.

1. GENERAL. The area comprising the U.S. Marine Barracks, New River, N.C., is located on the southeastern coast of North Carolina, along both banks of the New River. It is adjacent to Jacksonville, N.C., being located south and southeast of that city, and is comprised of approximately 83,000 acres of land and 20,000 acres of water area. The area has approximately 11 miles of coastal beach, reaching from the New River Inlet northeast to Bear Inlet, and extends inland approximately 15 miles in the vicinity of Jacksonville, N.C. Approximately one fourth of the land area is west of the New River and three fourths east of the New River. The importance of the U.S. Marine Barracks, New River, N.C., is due to its size, which affords a base on the east coast where large units of marines can assemble intact, and to varied and extensive training facilities which permit of both landing and shore operations, and the firing of artillery.

TOPOGRAPHY. The terrain of the entire area comprising 2. the U.S. Marine Barracks, New River, N.C., is generally flat, the highest elevation being under 30 feet. The vegetation of the area consists of pine and oak with underbrush of varying density. The wooded areas inland from the coastal beach for a distance of approximately 2 miles are very dense and difficult of passage, except over occasional unimproved roads and trails. As the elevation increases inland, the vegetation becomes less Forest fires have burned over many sections within the dense. area, and appearances indicate frequent and extensive fires during the dry seasons. The only indication of extensive agriculture is in the south central section of that area northeast of New River, where a belt of cultivated areas extend along the southern border of the Gillett-Duck Creek-Starling road, and in the area west of the New River, particularly north and west of Stone Bay, and in the vicinity of Holmes Point. The soils on the reservation are Lakewood fine sand, Onslow sandy loam, Portsmouth fine sand muck and tidal marsh. Lakewood fine sand is found extensively inland, where the terrain is more elevated and the vegetation sparse. The soil of tidal marsh varies from dark gray to bluish drab or steel colored loam, 6 to 8 inches The soil in the cultivated areas is mostly Norfolk fine deep. The sub-soil is black, bluish or steel colored clay loam, sand. The tidal marsh supports extending to depths of 3 feet or more. a luxuriant growth of marsh grass.

3. INTRACOASTAL WATERWAY. The New York-Key West section of the intracoastal waterway, passes through the reservation, closely paralleling the coastal beach. Construction of the induction antiquidate ntutatell anti-filateri' sectore heak ellering against artist an pairist . and the state of a post because the second state of the se

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intracoastal waterway, which runs from Boston, Mass., to the Rio Grande, Texas, was authorized by Congress. It is maintained, regulated, and controlled by the Corps of Engineers, U.S. Army, and no toll is charged along its route. Within the limits of the U.S. Marine Barracks area the intracoastal waterway had a controlling depth of 11 feet at mean low water in June, 1940, and the channel has a width of approximately 90 feet. The shore lines, which are regular and clearly defined, are approximately 70 yards apart. The course of the intracoastal waterway is approximately 500 yards from the coastal beach at Brown's Inlet, 300 yards from the coastal beach at Hurst Ferry and aproximately 575 yards from the coastal beach at Salliers Bay. On any advance inland from the coastal beach, the intracoastal waterway offers an almost immediate obstacle which must be overcome in order to make an advance inland.

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Approximately 2,000 yards south of the road intersection at Duck Creek, the Hurst Ferry operates over the intracoastal waterway. In the past this has been a state owned and operated ferry. The present ferry has a capacity of 8 tons and will carry approximately 40 equipped men or 2 passenger cars. The ferry is powered by an outboard motor, and maintained in position by a steel cable during crossings. To allow the passage of watercraft along the intracoastal waterway, the cable is slackened and lowered to the channel bottom. Time required for crossing is approximately 3 minutes.

4. ROADS. The reservation has a fairly good road net. The main roads are either improved, or with hard natural surface. U.S. Highway #17 forms the southwestern boundary of the reservation, with several roads branching off into that part of the reservation southwest of the New River. N.C. Route #24 forms the northern boundary of the reservation. The Starling-Duck Creek road runs through the eastern and southeastern part of the reservation. The Piney Green-Duck Creek-Hurst Ferry road runs generally north and south through the central part of the area east of the New River, the south terminal being on the beach. Many unimproved roads connect the main roads laterally. The unimproved roads are in most cases former logging no longer used for this purpose. Troops and all mechroads, anized equipment can be moved over these unimproved roads if However, they will not hold up under heavy the weather is dry. usage, and in wet weather will soon develope bad stretches in low places which must be corduroyed or filled in if continued use of roads is required. Bridges over the small streams with-in the area generally have an 8 ton capacity. Bridges are in

most cases narrow in width and can be readily reinforced. In addition to the Piney Green-Duck Creek-Hurst Ferry, road, the following roads are suitable for movement inland from the coastal beach:

(a) Approximately 800 yards northeast of Hurst Ferry, an unimproved road known locally as Horseheads road, runs in northwesterly direction from the intracoastal waterway, and intersects the Duck Creek-Hurst Ferry road approximately 200 yards south of the Duck Creek road intersection. A direct extension of this road exists southeast of the intracoastal waterway, and terminates on the coastal beach, a passage having been cut through the sand dunes.

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(b) Approximately 750 yards south southwest of Hurst Ferry, an unimproved road runs in a northwesterly direction from the intracoastal waterway, intersecting the Duck Creek-Gillett road approximately 750 yards southwest of Duck Creek. A direct extension of this road exists southeast of the intracoastal waterway, and terminates on the coastal beach, a passage having been cut through the sand dunes.

(c)Approximately 1600 yards southwest of Hurst Ferry, an unimproved road runs in a northerly direction from the intracoastal waterway, converging into the road noted in (b) above, at a point approximately 1250 yards inland from the intracoastal waterway. A direct extension of this road exists south of the intracoastal waterway, and terminates on the coastal beach, a passage having been cut through the sand dunes.

(d) Approximately 2400 yards southwest of Hurst Ferry, an unimproved road runs in a northerly direction from the intracoastal waterway, intersecting the Duck Creek-Gillett road approximately 2000 yards southwest of Duck Creek. A direct extension of this road exists south of the intracoastal waterway, and terminates on the coastal beach, a passage having been cut through the sand dunes.

(e) At Gillett's Landing, opposite Brown's Inlet, an unimproved road runs in a northerly direction, intersecting the Duck Creek-Starling road 1500 yards north of the intracoastal waterway.

5. RAILROADS. A branch of the Atlantic Coast Line passes along the southwest boundary of the reservation, and joins the main line of the Atlantic Coast Line at Wilmington, N.C., and the Norfolk and Southern Railroad at New Bern, N.C. A spur from the Atlantic Coast Line has been laid into the reservation.

6. CITIES AND TOWNS. Jacksonville, N.C., is immediately adjacent to the U.S. Marine Barracks, New River, N.C. Other large towns are New Bern, N.C., 37 miles to the northeast, and Wilmington, N.C., 47 miles to the southwest. All above noted cities are on U.S. Highway #17. Kinston, a large tobacco center, is 40 miles to the North on U.S. Highway #258, while Moorehead City, a well known summer resort, is 44 miles to the east on U.S. Highway #70.

7. TIDES. The high water interval along the coastal beach at the U.S. Marine Barracks, New River, N.C., is 7 hours and 12 minutes, with normal mean range of 3 feet.

8. TEMPERATURE. The mean maximum temperature at 71.8, and the mean minimum is 54.6. The mean temperature is 63.1.

9. BEACHES, GENERAL. The coastal beach of the reservation is approximately 19,000 yards long, extending from New River Inlet to Bear Inlet. The shore line is most uniform in appearance and character and is broken only by the flow of Brown's Inlet, 5800 yards southwest of Bear Inlet. The coastal beach is composed of white and light gray, fine or medium to coarse sand. Sea shells are scattered throughout the sand, which is very hard and has a depth of several feet. The beaches are broad and flat, and shoal very gradually for a distance of approximately 500 yards off shore, where the depth sheers off abruptly to an average of 18 feet. Many shallow troughs exist offshore, the seaward sides of which have well rounded crowns and present the appearance of low sand bars in evidence only

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at low water. Other than this the entire beach is characterized by the absence of rocks, reefs or other barriers which would offer obstacles to the landing of troops from seaward. The entire coastal beach must be classed as very favorable for the landing of infantry. Heavy equipment, including artillery, scout cars, tanks and trucks can be landed along the beach, but for this purpose advantage must be taken of favorable tide and surf conditions. Incoming tides, from midhigh to high water, or ebbing tides from high water to midlow, with medium surf conditions are most favorable for landings. Froperly handled boats, not using anchors astern, can be grounded close inshore, insuring a short run to the beach for wheeled vehicles or tanks, and a minimum carry for cargo. A freshening surf to medium offers no material bar to landings, but aids retraction of boats. Due to the straight coast line of the reservation, and low terrain inland, surf conditions are subject to rapid charge. Except at high tide, all type of vehicles and equipment can be moved laterally along the beach. Along its entire length, the beach is backed by sand dunes, approximately 12 to 15 feet high. The dunes are kept from excessive shifting by a growth of long grass, which generally covers them. From Brown's Inlet to New River Inlet, immediately inland from the sand dunes, a belt of vegetation comprised of myrtle, cedar and scrub oak, and approximately 15 to 20 feet high and varying in width from 25 to 75 yards, extends the length of the sector. Except for extensive cleared stretches in the Salliers Bay and Hurst Beach-Onslow Beach area, and occasional trails elsewhere, passage through this vegetation is difficult, and lanes must be cut for the passage of troops and equipment.

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Centrally located on the coastal beach are some 40 cottages which formerly comprised the Hurst Beach and Onslow Beach summer colonies. The Hurst Ferry-Duck Creek road which terminates on the beach, separates these beaches, Hurst Beach being north and Onslow Reach couth of the road. Immediately in rear of the row of

Beach south of the road. Immediately in rear of the row of cottages a hard surface road extends the full length of the two beaches for a distance of 2,000 yards.

10. AREA BETWEEN COASTAL BEACH TO INTRACOASTAL WATERWAY. Along certain sections of the coastal beach, the terrain immediately inland is such that passage of troops and equipment cannot be made directly to the intracoastal waterway. From Bear Inlet to Brown's Inlet, the area is flooded by the waters of these inlets, and covered with a network of streams and creeks, bordered with tidal marsh and deep swamps which are continually under water and are impassible. From Brown's Inlet to the northeast end of Hurst Beach, the area inland is swampy with tidal marsh. The depth of water within this area **tw**erages from 6 inches near Hurst Beach to 20 inches near Brown's Inlet. The channels of several meandering creeks are somewhat deeper. There is a firm bottom under approximately 8 inches of mud. Lightly equipped infantry can cross this area to the intracoastal waterway, but the movement would be slow and difficult. From the northeast end of Hurst Beach to a point opposite Craig Point, a distance of approximately 6,800 yards, the terrain inland is dry and passage to the intracoastal waterway feasible. From the coastal beach opposite Craig Point to the New River Inlet the terrain is flooded by the waters of the New River Inlet the terrain is flooded by the waters of the New River Inlet and passage to the intracoastal waterway cannot be made.

11. INLAND FROM THE INTRACOASTAL WATERWAY. The wooded areas inland from the intracoastal waterway for a distance of approximately 2 miles are very dense, and feasible only for the advance inland of infantry. Unless new roads are cut through the wooded

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areas, advance inland of vehicles and other heavy equipment to the Gillett-Duck Creek-Starling road can be made only over the roads indicated as suitable for this purpose in paragraph 4. The following areas are unfavorable for advance inland:

(a) The swamps and marshes bordering Tull Creek and Brown's Creek.

(b) The dense woods extending from the unimproved road 1600 yards southwest of the Hurst Ferry to Salliers Bay.

(c) The marshes and swamps extending from Salliers Bay southwest and west to the New River.

(d) An extensive swamp area in the south central portion of the area bounded by the Starling-Duck Creek and the Piney Green-Duck Creek roads, and approximately 6000 yards northeast of Duck Creek.

12. THE NEW RIVER. The New River runs generally north and south through the western part of the reservation, extending from the intersection of New River Inlet and the intracoastal waterway near Traps Bay north to Jacksonville, N.C., from which place it narrows into a small stream. The New River follows a very irregular course, and varies in width from 600 yards to 3,600 yards, with an approximate average width of 2,000 yards. It is shallow in depth, but has a 10 feet dredged channel from the intracoastal waterway to Jacksonville, N.C. The outlet of the New River to the sea is through the New River Inlet which extends from the coast a distance of 3,400 yards inland, where it intersects the intracoastal waterway and merges with the New River. Several wide expanses of water along the course of the New River, particularly Stone Bay, Farnell Bay and Morgan Bay, afford suitable locations for the landing of seaplanes.

13. NEW RIVER INLET. Experienced boatmen, with shallow draft boats under favorable tide conditions can effect passage through the New River Inlet. If the above conditions do not obtain, the passage should not be attempted. The entrance is narrow with a shifting channel, and is difficult to buoy. There is a strong ebb current from the inlet sometimes as long as 3 hours after low tide, which causes a heavy break on the bar when there is any sea running outside, and results in a bad chop, particularly when the ebb current runs against south and southeast winds. The controlling depth at mean low water in the entrance was one foot in June, 1939, but the entrance channel is subject to change.

14. BROWN'S INLET. Approximately 4500 yards northeast of Hurst Beach. Brown's Inlet offers an approach to the inland areas of New River marine barracks via the intracoastal waterway. The channel is narrow and winding in passing between the sand dunes at the mouth of the inlet and follows in general the left bank. Experienced boatmen with shallow draft boats under favorable tide conditions can transport both infantry and equipment through the inlet. The channel has not been buoyed in the past. At last recording of depth Brown's Inlet was reported to have 2 feet of water at mean low tide. Light tanks have been transported through this inlet, and landed at Gillett's landing.

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15. BEAR INLET. Bear Inlet has not been extensively investigated for possible use in connection with training at the New River marine reservation. In the past it has been used as a harbor by local boats. The entrance is about 1/4 mile wide between high sand dunes. It has a broad straight channel, and is marked by buoys, which are shifted from time to time as the position of the channel changes. Strangers should not attempt to enter the inlet, or pass to the intracoastal waterway with-out the aid of a local pilot.

U.S. Weather Bureau Meteorological Table

	Air Temperature M e a n			Precipi- tation	<u>Wind</u> Average	number of days gales	Number o	of
Month	For Mon.	Mean Max.	Mean Min.	Average Fall	Hourly Velocity	32 miles or over	days fog	
January February March April May June July August September October November December Mean	$\begin{array}{r} 46.5\\ 47.9\\ 53.3\\ 62.0\\ 70.8\\ 79.1\\ 77.6\\ 73.1\\ 65.3\\ 56.0\\ \underline{49.1}\\ 63.1 \end{array}$	$56.3 \\ 57.8 \\ 63.9 \\ 70.6 \\ 78.4 \\ 84.3 \\ 86.9 \\ 86.1 \\ 82.1 \\ 73.4 \\ 64.6 \\ 57.5 \\ 71.8 \\ $	$\begin{array}{c} 38.2\\ 39.6\\ 45.4\\ 52.4\\ 61.2\\ 68.3\\ 71.9\\ 70.9\\ 66.3\\ 55.6\\ 45.7\\ \underline{39.4}\\ 54.6\end{array}$	3,29 3.26 3.17 2.66 3.44 5.10 7.13 6.36 4.51 1.96 2.78 2.78	8.2 8.7 9.0 9.2 7.9 7.2 7.9 7.2 7.1 7.6 7.6	$ \begin{array}{c} (2)\\(2)\\(2)\\(2)\\(2)\\(2)\\(2)\\(2)\\(2)\\(2)\\$	$ \begin{array}{c} 2 \\ 1 \\ 2 \\ (2) \\ (2) \\ (2) \\ (2) \\ 1 \\ 1 \\ 2 \\ 12 \end{array} $	
Total			and the second second	10.30		~~~~~		

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Lt. -Col., USMC,

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Source and degree of authenticity.

- (a) Inside route pilot, Intracoastal waterway-New York to Key West 1936.
- (b) U.S. Engineer office, Wilmington, N.C., chart of New River from Intracoastal waterway to Jacksonville, N.C., April 15, 1939.
- (c) Department of Agriculture pamphlet, Soils of Onslow County, North Carolina. 1933, and colored chart same subject. (d) H.O. Chart 777. New River, North Carolina.

- (e) Tide Tables, Atlantic Odean, 1941.
 (f) Report to MGC of Board to investigate New River for Marine Corps Training site.
- (g) Personal reconnaissance and observation.

BY COMMAND OF BRIGADIER GENERAL P.H. TORREY.

LeR. P. HUNT, Colonel, U.S. Marine Corps, Chief of Staff.

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TIDE TABLES FOR NEW RIVER INLET, NORTH CAROLINA, MONTH OF OCTOBER, 1941. (Standard Time)

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1992	October 1			October 7	Freet
Hour 0121 0428 0729	MH H ML	Feet 1.96 3.02 1.96	Hour 0218 0526 0834	L MH H	0.7 2.2 3.6 2.2
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0212 0518 0725 1131 1436 1740 2046 2352	October 2 MH H ML L MH H ML L	2.1 3.3 2.05 0.8 2.1 3.4 2.1 0.7	0252 0600 0908 1217 1526 1827 2127	October 8 L MH H ML L MH H ML	0.8 2.2 3.5 2.2 0.9 2.0 3.1
0257 0601 0910 1219 1520 1821 2027	October 3 MH H ML L MH H ML L	2.1 3.5 2.1 0.7 2.1 3.4 2.1	0026 0325 0635 0945 1255 1604 1905 2205	October 9 ML MH H ML L MH H	$2.0 \\ 0.9 \\ 2.2 \\ 3.4 \\ 2.2 \\ 1.0 \\ 2.0 \\ 3.0 $
0032 0337 0642 0952 1301 1601 1901 2210	October 4 L MH H ML L MH H ML	0.7 1.7 3.6 2.1 0.7 2.1 3.4 2.0	0103 0400 0711 1022 1334 1646 1945 2244	October 10 ML MH H ML L MH H	2.0 1.0 2.2 3.4 2.3 1.1 2.0 2.9
0109 0415 0720 1030 1339 1639 1938 2241	October 5 L MH H ML L MH H ML	0.6 2.1 3.6 2.2 0.7 2.0 3.3 2.0	0104 0441 0752 1103 1419 1735 2034 2332	October 11 ML L MH H ML L MH H	2.1 1.1 2.2 3.3 2.3 1.2 2.0 2.8
0144 0450 0756 1106 1416 1715 2014 2316	October 6 L MH H L L MH H ML	0.6 2.1 3.6 2.2 0.7 2.0 3.3 2:0	0232 0532 0840 1148 1510 1832 2126	October 12 ML L MH H ML L MH H	2.0 1.2 2.2 3.2 2.2 1.2 2.0

TIDE TABLES (continued)

Hour 0020 0326 0632 1006 1240 1665 1930 2226	October 13 H ML L MH H ML L MH	Feet 2.7 2.0 1.2 1.7 3.1 2.2 1.2 2.0	Hour 0259 0605 0915 1225 1524 1823 2131	October 19 MH H ML L MH H ML L	Feet 2.1 3.8 2.1 0.4 2.2 3.5 1.9
0121 0428 0737 1039 1341 1665 2029 2329	October 14 H ML L MH H ML L MH	2.7 2.0 1.2 2.2 3.1 2.1 1.1 2.0	0039 0346 0653 1004 1315 1614 1912 2219	October 20 L MH H ML L MH H ML	0.2 2.1 4.0 2.3 2.0 3.0 3.0 1.9
0228 0534 0840 1143 1446 1805 2123	October 15 H ML L MH H ML L MH	2.8 2.0 1.1 2.1 3.1 2.1 1.0	$\begin{array}{c} 0126 \\ 0435 \\ 0743 \\ 1054 \\ 1405 \\ 1703 \\ 2001 \\ 2306 \end{array}$	October 21 L MH H ML L MH H ML	0.1 2.1 4.1 2.2 0.2 1.9 3.5 1.8
0028 0332 0637 0942 1245 1547 1901 2215	October 16 MH H ML L MH H ML L	2.0 3.0 2.1 1.1 2.1 3.0 1.9 0.8	0211 0522 0833 1144 1455 1755 2054 2357	October 22 L MH H ML L MH H ML	0.1 2.1 4.1 2.2 0.2 1.9 3.5 1.9
0121 0427 0733 1039 1341 1643 1954 2305	October 17 MH H ML L MH H ML L	2.1 3.3 2.1 0.8 2.1 3.4 2.0 0.6	0259 0612 0925 1236 1547 1847 2147	October 23 L MH H ML L MH H ML	0.2 2.1 4.0 2.2 0.4 1.9 3.3
0210 0516 0825 1133 1433 1732 2043 2353	October 18 MH H ML L MH H ML L	2.1 3.5 2.1 0.6 2.1 3.5 2.2 0.4	0048 0350 0705 1019 1331 1642 1943 2243	October 24 ML MH H ML L ML L MH H	1.9 0.4 2.2 3.9 2.3 0.7 1.9 3.1
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TIDE TABLES (continued)

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0247 0554 0904 1214 1532 1850 2148	October 26 ML MH H ML L MH H	1.9 0.8 2.1 3.4 2.1 0.8 1.9	0058 0408 0714 1019 1324 1629 1933 2237	October 30 MH H ML L MH H ML L	2.0 3.0 1.9 0.8 2.0 3.1 1.9 0.7
0045 0355 0705 1012 1319 1637 1955 2256	October 27 H ML L MH H ML L MH	2.9 1.9 0.9 2.1 3.2 2.0 0.8 1.9	0146 0456 0804 1111 1413 1715 2019 2322	October 31 MH H ML L MH H ML L	2.0 3.2 2.0 0.8 2.0 3.1 1.9 0.6
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34. COMMENT:

(a) In planning utilization of the base, consideration was given in the order name to training and combat areas, covenient location of barracks thereto, -- quarters, and services. Careful study has been given each installation in order that any future systematic expansion will logically follow the general plan, and, prove to be desirable and staisfactory. Thisstatement also is intended to include provision for areas not mentioned herein, and engineer park, tank park, amphibian park, or other required space.

(b) Because of greatly increased travel over public highways on the perimeter of the area, and to the river and ocean beaches through the area, the danger from forest and brush fires is increasing to such an extent as to become a matter of concern with the approach of dry summer weather. Accordingly, it is suggested that as soon as the Government has title to the area that an adequate fire partol be organized, -- observation towers constructed and telephonic communication installed, -- the towers later to be utilized for artillery fire control, and safety measures.

The following maps, sketches, etc., are appended and marked as indicated below: (Note: It was found impracticable to reproduce these exhibits in the completion report of the Architect-Engineers.)

General Map of the Area..... Memo to Chief of Bureau of Yards & T

Re material, storehouses, etc., tent camp to accommodate 6,000 m Regimental Layout (Typical)..... Barracks Floor Plan....

First and second floors and estimates....

Sections through Dormitory and co Wing showing "Aquamedias"

Mess Hall - Floor Plan..... Street Layout (Typical).....

Commissioned Officers' Quarters Block Layout (Typical).....

Commissioned Officers' Quarters Suggested School Building (Children Alternate Mess Hall (Seating 1000).

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C-3. On April 14, 1941, the report of the Board was approved subject to certain exceptions which are shown below:

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HEADQUARTERS U. S. MARINE CORPS WASHINGTON

The Report of the Board to submit plans for Establishment of a Division Training Center, New River Area, North Carolina, is approved subject to the following comments:

a. Paragraph 18 - Type of construction will be subject to further recommendations by the Quartermaster after consultation with the Bureau of Yards & Docks. Mess Halls will have a capacity of approximately 900 men.

The Quartermaster will provide plans for storehouses, administrative activities, and facilities not covered in subject report.

b. Paragraphs 19 and 22. It would appear desirable to locate moving picture theatres, and possibly hostess houses, in proximity to each regimental area, if sufficient funds are available.

c. Enclosure 1 is approved as to the general location of the various facilities. If sufficient funds are not available to complete all of the regimental areas indicated, sufficient areas will be omitted, beginning in the southeast, to come within available funds.

d. Enclosure 3 (A) is the accepted plan for a regimental area. Three mess halls, for approximately 900 men each, will be provided.

e. Enclosures 4 and 5 are approved as the general layout for the barracks with the exception that necessary office space will have to be provided in certain squad-rooms.

f. Buclosures 6 and 10 - Mess Halls in the regimental areas shall have a capacity of approximately 900 men.

g. Enclosures 7 and 8 - It is desired that a new plan for typical plat layout for officers' quarters be prepared by the Quartermaster. In order to conserve funds, the following general principles will apply:

(1) Size of lots approximately as proposed in subject report. (2) Streets will be reduced to a minimum even though this necessitates greater distances in going from one part of the area to another.

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J. C. Smith, Colone., U.S.M.C. Senior Member

Z. C. Long, Colonel, U.S.M.C. Member

14 April 1941

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(1) there of the approximation of propriets of the subject reports.
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(3) Garages will not be provided for initial installation, but consideration will be given as to the possible location of garages for subsequent development.

h. Enclosure 9 - The general plan for the school building is approved for construction when funds become available.

General layouts, based on further reconnaissance and surveys will be submitted by the Quartermaster to the Major General Commandant for approval.

T. Holcomb

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CHAPTER D PART I

CHANGES OF SITES FOR VARIOUS ACTIVITIES

D-1. Tent Camps #1 and #2. The Marine Board report contemplated locating the tent camps just east of the Atlantic Coast line Railroad and about a mile south of Brinson Creek, with emergency banding fields #2 and #3 located on the east side of U. S. Route 17, one North and one South of an existing earth road. Careful examination disclosed the fact that the proposed tent camp site was so poorly drained that it was not suitable for housing troops and the location therefore was changed to the site formerly considered for Emergency Landing Field No. 2. Very thorough study was given the proposed site for Emergency Landing Field No. 3 and it was found to require such expensive drainage and other construction that a new site was selected on New River between Peterfield Point and South West Creek. This field later was developed into a glider training base.

D-2. Residential Area. Generally speaking, the quarters for officers were provided in the locality shown on the general area map prepared by the U. S. Marine Board with the exception that the warrant officers and noncommissioned officers' quarters are being provided in Midway Park.

D-3. Rifle Range. The Rifle Range originally was planned for the area between French's Creek and Bear Creek. It was felt that firing on the range would conflict with regular use of the combat area and the location therefore was changed to the west side of Stone Bay between Stone Creek and Everett's Creek.

D-4. Balloon Barrage Area. The location originally suggested for this area was along the Main Access Road into the Division Training Area. After the date of the Marine Board report, water-borne balloon barrage training became necessary and the location therefore was shifted to Courthouse Bay. The new location possessed also the advantage of remoteness from flying fields, main roads, power lines, radio stations, and combat areas.

- D-5. Additional Areas. Additional areas provided were: (1) An area for parachute training and jumping towers along the
 - main access road to the Division Training Area. (2) A small camp for a Tank Battalion on U. S. 17 about 2 miles
 - south of Tent Camps 1 and 2.
 - west side of New River at Peterfield Point.
 - (4) A small camp for the housing and training of about 1500 colored troops at Mumford Point.

D-6. With the exception of the tent camps, landing field, rifle range and balloon barrage area, the final layout of the area conforms very well with the layout prepared by the U. S. Marine Board. This is most remarkable inasmuch as no topographic map ever had been made of the area at the time the Marine Board report was drawn.

D-7. Sites for the various activities are discussed in detail in Chapter D, Part II, "Site Planning".

(3) A small camp for temporary housing of Amphibian Troops on the

CHAPTER E - PART T

DESIGN CONSIDERATIONS AND RESTRICTIONS

In the design of all structures, utilities, etc. as well as in the planning of building sites, the following criteria were established:

(1) Fire zones with a minimum width of 300 feet were established between all regimental areas. Officers' homes in Residential Area were of necessity grouped into isolated sections because of the numerous natural drainage features that indent the New River shore line.

(2) All buildings were spaced not less than 60 feet apart.

(3) In regimental areas buildings were grouped according to battalions providing housing, administrational, storage and subsistence facilities.

(4) Limits of roadways were set at 70 feet for two lane roads and 130 feet for divided highway construction, with center parkway. This provided flat slopes for side ditches and allowed easy maintenance with road / patrol machinery.

(5) Soil bearing foundations were fixed at not less than 1'-4" below grade not only to eliminate any trouble from frost but to reach soil capable of sustaining loads. A maximum depth was set at three feet in order to stay above a plastic clay stratum peculiar to this locality and that in some locations came within eight feet of grade. Pile foundations varied as discussed in Chapter F of Part II.

(6) Soil bearing pressures were held to a maximum of 2,000 pounds per square foot.

(7) Drawoff of wells was limited to a maximum of 600,000 gallons per square mile per day,

(8) Type of architecture was modified early American except in Industrial and Supply Area where industrial architecture prevailed. Permanent masonry construction was adopted as directed by the Officer in Charge.

(9) The height of structures had to be considered carefully in locating the same in order to preserve the necessary gliding angle for landing fields.

(10) Careful attention had to be given to the location of buildings and utilities to avoid infringement upon combat and impact areas.

(11) Rifle ranges had to be located so as that the beaten zone did not create a hazard to life and property.

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(12) The climate is warm and humid in the summertime, therefore water-front locations and careful attention to prevailing winds help to secure a more favorable layout.

(13) Accessibility to roads and railroads was an important item in the location of some of the activities.

(14) For purposes of camouflage and to enhance the beauty of the base, a great deal of study was given to each projected site to avoid unnecessary damage to existing trees and shrubs.

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CHAPTER F PART I

ENGINEERING DATA

F-1. Rainfall. Average annual precipitation is 50 inches. Monthly precipitation averages as percentages of annual rainfall are:

January	
February	
March	
April	(
May	
June	10
July	13
August	12
September	
October	E
November	. 4
December	E

F-2. Runoff. Average annual runoff available for sewage dilution in New River is estimated to be 20% of the rainfall.

F-3. Temperature. The average annual temperature is 63 degrees with a high of 103 degrees and a low of 3 degrees.

F-4. Winds. The prevailing direction of the wind is from the Southwest for 19% of the time. Other winds are:

> From South 14% of the time. From Northeast 13% of the time. From Northwest 12% of the time. From North 12% of the time. From West 8% of the time. From East 7% of the time. From Southeast 7% of the time.

Average velocity, 8 miles per hour.

Maximum velocity, 45 miles per hour. (Gusts of 60 miles per hour were logged at Courthouse Bay December 1, 1942).

F-5. Humidity. The relative humidity averages 73% with a maximum for summer months of 86%.

F-6. Snowfall. Snowfall annual average is two inches.

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7.22% 7.38% 7.33% 6.42% 7.59% 0.73% 3.48% 2.60% 9.38% 3.33% .76% 5.78%

F-7. Groundwater. The depth of groundwater below grade varied, but was found within 3 or 4 feet of the surface in some sections of the Base. Water from comparatively shallow wells, that is, from above the underlying Coquina Rock, is fairly high in bicarbonates and contains appreciable quantities of iron, aluminum and silica. The total hardness is about 200 parts per million. Calcium salts form most of this hardness, but there is also a small amount of magnesium present. pH is about 7.4. Water from the deep wells, although considerably softer than that from the shallow wells, is relatively high in alkalinity and sulphates, and contains considerably more mineral matter. Considerable amounts of silica, iron and aluminum are found in this water. pH is above 8.0. Ground water temporature is about 60 degrees F.

F-8. Soil. Soils consist of fine sands, silts, clays and a bluish gumbolike mud of great plasticity. Pocosins are numerous and particularly near swales and gulleys the strata dip in such a manner as to indicate subsidence due to underlying ancient river channels or solution channels in the limestone. From an agricultural standpoint, the soil is poor.

F-9. Distances from Nearby Centers of Population.

Town	Distance			
Jacksonville	10 miles			
Morehead City	45 miles			
Wilmington	59 miles			
Kinston	51 miles			
New Bern	46 miles			

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F-10. Malarial Conditions. Malarial incidence among population inhabiting area on which Base is now located varied from 2% to 20% of the population. Heavy breeding of the Anopheles mosquito was found in all areas except along the coast. Malarial control program was handled entirely by the U. S. Navy Bureau of Medicine and Surgery.

F-11. Tides. There is practically no periodic tide in New River above Hatch Point. Ordinary tides observed during 1941 and 1942 ranged between 0.1 and 0.4 feet above mean sea level. The highest tide observed during this period occurred on October 16, 1942, after several days of heavy rainfall, with moderate winds. At this time the tide reached an elevation of 2.3 feet above mean sea level.

F-12. Horizontal and Vertical Datum. Coordinates are based on North Carolina State System of plane coordinates as described in U. S. Department of Commerce special publication No. 218 - "First and Second Order Triangulation and Traverse in North Carolina (1927 datum) - Volume II".

Elevations are referred to mean sea level.

F-13. Magnetic Declination. The declination varies considerably over the reservation. The average for 1942 is 4 degrees 20 minutes (west of true north.)

Population

3000 3500 32,980 11,350 11,975

CHAPTER G - PART I

SUMMARY OF FACILITIES PROVIDED

As of the termination date of the Architect-Engineers' Contract, September 30, 1942, the U. S. Marine Barracks located on New River, in Onslow County, North Carolina, provided the following facilities:

(1) A division training center for the housing of five regiments, and one battalion of Post Troops, including reoreational and administrational facilities.

(2) An Industrial and Supply Area providing six warehouses with 327,350 sq. ft. storage, a laundry, a cold storage plant, a bakery, a commissary, a gasoline and oil storage area, a central heating plant (for Division Training Area and this area), two garages, a repair shop, 772,000 sq. ft. of motor storage area, three railroad sidings and miscellancous equipment building and material sheds.

(3) Base Hospital, including a 650-bed main hospital, a 50-bed family hospital and housing for the personnel.

(4) Residential Area of 180 homes for commissioned officers and housing for bachelor commissioned officers.

(5) Rifle Range consisting of three 50-target ranges and one Pistol Range with 50 mechanical targets.

(6) Balloon Barrage Training for one battalion including separate housing area for this group.

(7) Amphibian Base for the harboring, repair and servicing of landing boats, tank lighters, amphibian tanks, etc.

(8) Parachute Training, including mock-up planes, and three jumping towers.

(9) Glider Training Base, consisting of three 5,000 ft. runways, a weaplane ramp and glider repair shops.

- (10) Four temporary Tent Camps for:
 - (a) Housing 16,000 troops (Tent Camps No. 1 & 2)
 - (b) Housing Tank Battalion

 - (d) Housing 1500 colored troops (Mumford Point)*

(11) Residential area of 700 low-cost housing units for noncommissioned officers and civilian personnel connected with the Base.

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ind. Soil. Sails conclubed fine sands, silts, clave and a blutch guade-stone. From of the bound i found have not sone and

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Elevations are performed to much son invol.

F-13. Megnetic Bashinstinn. The declination varies considerably over the reservation. The average for 1942 is 4 degreed 23 minutes (west of true Lastrout.

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(c) Housing Engineer Battalion (formerly used by amphibian troops)

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(12) Impact and combat areas, umpire and fire control facilities.

To provide these facilities there had to be provided 1431 buildings, 1050 hut buildings, two incinerator plants, 117 miles of roads, 17 bridges, 51 miles of sewers, 9 sewage pumping stations, 5 sewage treatment plants, 78 miles of water mains, 51 wells with pumping stations, 2 water treatment and pumping plants, 200 miles of electric distribution lines, 6 electric substations, 83 miles of telephone lines, 3 automatic telephone exchanges, 3 manual telephone exchanges, 14 miles of railroad, 18 1/2 miles of steam mains, 12 central heating plants, and 5 1/2 miles of propane gas lines.

Buildings designed contained over 102,000,000 cubic feet.

These facilities will serve an approximate population of 43,000.

The estimated cost of the Base as described is \$58,000,000.

The Base is situated on both sides of the New River between Jacksonville and the Sneads Ferry bridge and on the east side of the river from this point to the ocean. This area comprises approximately 155 square miles, of which about 20 per cent is New River and tributaries, and has an ocean frontage of approximately 11 miles. New River has an average width of one mile and extends approximately 20 miles from the Atlantic Ocean to Jacksonville, Altogether, the location and terrain for the Base seem well adaptabed for the training to be given.

* This area also is known as Montford Point.

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General Area Map

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To provide these facilities, there had to be previded 1451 back to salls VII . at all recenters out . anathling dan 0801 . mathling . i wisers of males of another property of another beautions, 5 severe treater mant planta, 78 miles of water mains, 91 wolls with purphy stations, 2 water treatment and puncing plants, 200 miles of electric distribution lines, 6 electric substations, 83 miles of telephone lines, 3 automatic tolophange exchanges, 3 manual telephone exchanges, 14 miles of railrood, is in a start of a start maine, is contral basting plants, and 6 1/2 miles of

Buildings designed contained over 108,000,000 subis feet. These facilities will serve as approximate population of 65,000.

The estimated cost of the lase as described is \$88,000,000. 1. 1. 1. 1. 1.

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CHAPTER A - PART II PROJECT MANAGER'S OFFICE

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A-1	Introducti
A-2	Offices
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A-4	Per sonnel
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CHAPTER A - PART II

PROJECT MANAGER'S OFFICE

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1. 1.

A-1. Introduction. On April 18, 1941, a party consisting of Mr. W. Calvert Roberts, Project Manager, and Messrs. Walter C. Munroe, R. B. Maxwell and E. Everett Beavin, left the Baltimore office for New River. North Carolina. The party reported for duty on the morning of April 19th. to the representative of the Navy Department, who then was located temporarily in a small building on the grounds of the Starling Livery Stable just outside of Jacksonville. At this time, the most pressing problems confronting the company were as follows:

(a) To become familiar with the terrain of the Base and to initiate vertical and horizontal control surveys and the preparation of topographic maps of proposed sites.

(b) Rushing the preparation of site plans for Tent Camp No. 1.

(c) Expanding the initial personnel to a size capable of handling the project and devising departmental scheme which would divide responsibilities for the work and the natural sub-divisions

(d) Providing adequate office space, together with the necessary drafting equipment, computing machines, office supplies and equipment, communications, and other necessary services.

A-2. Offices. Offices occupied by the company were as follows:

April 19, 1941 to April 29, 1941, part of Navy office at Starling Livery Stables.

April 30, 1941 to May 4, 1941, in the Gurganus farm house at Tent Camp No. 1. This building later was converted into a residence for the Commanding General.

May 4, 1941 to November 22, 1941, occupied warehouse building at the corner of "1st" and "C" streets, Tent Camp No. 1.

From November 22, 1941 to September 30, 1942, the offices were located in Barracks No. 205, Division Training Area. The entire northeast wing, part of the first and second floors in the central part, and all of the second floor in the southwest wing, were devoted to the purposes of the Architect-Engineers.

A-3. Organization. Shown hereinafter is the arrangement of the organization for the period of the contract.

The Project Manager reported to the Naval Officer representing the Chief of the Bureau of Yards and Docks. From the beginning of the project, Lt. Commander Madison Nichols was in charge until August 5, 1942, at which time he was succeeded by Lt. Commander Richard A. Williams who remained until the termination of the contract.

The Project Manager's duties were administrative. He was charged with the building up of the organization, securing equipment, obtaining

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ten big bester at an an entre entre entre against de la la la set al entre entre entre entre entre entre entre L'entre britshiet at en en ene en entre entre against againment, autouriser necessary typical plans and specifications from the Navy Department, handling the funds of the association and making decisions concerning design. Mr. William Calvert Roberts served in this capacity from the beginning of the work until his resignation on July 10, 1942. Mr. Walter C. Munroe then became Project Manager and served until September 30, 1942. At that time the Architect-Engineers' contract was terminated and Mr. B. Everett Beavin thenceforth served in the dual capacity of project manager to close out the affairs of the Architect-Engineers and as engineer in charge of the technical and clerical forces which then were transferred to the payroll of the Contractors, Contract NOy-4750.

Reporting directly to the Project Manager were the heads of the following departments:

Office Engineer. Mr. William H. Pahl served as Office Engineer until June 29, 1942, at which time his duties were assumed by Mr. Greston E. Funk who remained in charge until the post of Office Engineer was abolished on September 7, 1942.

Auditing Department. Mr. Leo E. Earnes served as Auditor throughout the entire project.

Site Plannir; Tepartment. Mr. R B Manual served as head of the department until june 8, 1942, at which time his assistant, Mr. Andrew H. Knecht assumed the duties of site planner and curried on until the termination of the contract.

Architectural Department. The work of this department was in charge of Mr. C. W. Goudy, Jr. assisted by Mr. J. D. Rivers. After the termination of the contract, Mr. Rivers remained in charge of architectural work.

Structural Department. Structural work was under the direction of Mr. C. W. Goudy, Jr. until January 3, 1942 at which time Mr. Hugh L. Waugh took charge of this work and continued until the termination of the contract.

Mechanical Department. Was headed by Mr. W. J. McClain until about November 1, 1941, at which time Mr. H. A. Akers took charge. On January 19, 1942, Mr. W. C. Munroe took charge of this department and, upon becoming Project Manager on June 10, 1942, he was succeeded by Mr. Charles S. Wilmot who remained in charge until the termination of the contract.

Electrical Department. This department was headed by Mr. W. J. McClain until about November 1, 1941, at which time Mr. H. A. Akers took charge of this department and was succeeded on June 10, 1942, by Mr. A. E. McCall who remained in charge until September 12, 1942. Mr. Joseph G. Thompson then took charge until the termination of the contract.

Plumbing. The Plumbing work was under the direction of the Mechanical Department until January 15, 1942, at which time it was placed under the direction of Mr. W. M. Wallace II, who remained in charge until the termination of the contract. nos ser vivia si the arcadation and method from any logariment, haids in the fields of the arcadation and metho feeridises andomping design or willism beinger for arcadation and metho feeridises andomping of the rick world bie seargestics as fair 10, 2,000 for her fielder 5. Makers the rick the architect brackston and arread until servasher 50, 1000 for a the the architect. Secures of arread until servasher 50, 1000 for a the the architect. Secures of arread until servasher 50, 1000 for a the the architect. Secures of arread until servasher 50, 1000 for a the the architect. Secures of the secure of a the test of the sec the the architect. Secures of the secure of a test of the secure the test of the architect of the secure of the test of the secure are the architect. Secures of the secure of the test of the secure the test of the secure of the secure of the test of the secure are the test of the secure of the secure of the test of the secure of the test of the secure of the secure of the test of the secure are the test of the secure of the secure of the test of the secure are the test of the secure of the secure of the test of the secure are test of the secure of the secure of the test of the secure of the test are test of the secure of the secure of the test of the secure of the secure are test of the secure of the secure of the test of the secure of the secure are test of the secure of the secure of the test of the secure of the secure of the secure are test of the secure of the test of the secure of

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Central Heating Plants. The work of designing all central heating plants was under the Mechanical Department until January 9, 1942, at which time Mr. J. M. Shutt was given control of the design of the Main Central Heating Plant. On September 1, 1942, Mr. Shutt was given the responsibility for all central heating plants and continued in charge until the termination of the contract.

Communications. Work of this department was under the control of the Electrical Department until January 20, 1942, at which time Mr. H. B. D'Oyley assumed full responsibility for design and remained in that position until the termination of the contract.

Roads, Railroads, Drainage and Airports. Mr. Nathan L. Smith was in charge of this department until February 14, 1942. Mr. H. B. McDonald was in charge until September 12, 1942, at which time Mr. A. E. Ellington took the responsibility of the work until the termination of the contract.

Water Supply and Distribution. Mr. Walter C. Munroe was in charge of this department until July 10, 1942 and Mr. F. D. Kramer was in charge until the termination of the contract.

Sewage Collection and Treatment. Mr. W. C. Munroe was in charge of this department also until July 10, 1942, at which time he was succeeded by Mr. B. E. Beavin who remained in charge until the termination of the contract.

Surveys. Mr. Joseph O. Sime was in charge of this department until July 8, 1942, at which time Mr. B. E. Beavin took charge until the termination of the contract.

Record Mapping. This department was instituted on June 17, 1942. Mr. B. E. Beavin was in charge of this department until the termination of the contract.

A-4. Personnel. Due to the sparsely settled area in which the project is located, extreme shortage of housing and transportation facilities and to the large amount of war-time construction already underway, it was with great difficulty that competent employees were persuaded to remain at the site of the work, in sufficient numbers to expedite the work. Various sources of supply were utilized. Many engineers applied for work at the local offices. The majority so applying had had very little professional experience, although some very good men were secured from this source. The Baltimore and Durham offices of the firm procured a number of employees and advertisements were placed with engineering employment services, the Engineering News-Record, employment and technical publications in New York, Baltimore, Durham, Chicago, and Philadelphia. In addition, representatives of the company visited Washington, Baltimore, Philadelphia and New York interviewing applicants and hiring the most promising ones. In spite of all the handicaps, a compact, well-balanced, and qualified organization was built up rapidly and was ready at any time to furnish the services required by the Officer in Charge. A tabulation of the number of employees appearing at monthly intervals is given below:

Date	Number	of Emp
(muil 19, 1941		4
Mor 1 1941		60
Inne 1 1941		213
July 1, 1941		229
August 1, 1941		231
Sontember 1, 1941		195
October 1, 1941		194
November 1, 1941		188
December 1, 1941		185
January 1, 1942		200
February 1, 1942		225
March 1, 1942		263
April 1, 1942		255
May 1, 1942		245
June 1, 1942		201
July 1, 1942		164
August 1, 1942		134
September 30, 1942		82

A-5. Office Procedure. In order to remove matters of detail from the Project Manager, a rather complete filing system was installed which is outlined below:

A-5.01. The regular filing systems consisted of three (3) complete files: Correspondence file, Topic file, and Reading file. These files covered copies of all correspondence and communications written by the entire organization of the Carr and J. E. Greiner Company, as well as copies of all written correspondence from the Navy Department and certain other outside organizations.

(a) The Correspondence File was a complete file of all correspondence filed chronologically, according to the Addressee of the letter. Certain deviations follow:

1. Letters to and from the Navy were filed chronologically in the same folder with transmittal letters to Department Heads attached to the original letters from the Navy.

2. Routine letters such as Survey reports, personnel additions and reductions, etc. were filed in individual folders.

3. Advertisements, letters to employment agencies, other organizations, etc. regarding future employees were filed together in the same folder (Applications General).

The correspondence file copy of the diary was filed separately in loose-leaf notebooks, which books remained in the possession of the Project Manager. Copies of all letters pertaining to any individual member of the organization or any former member of the organization were filed in the personnel files. (Explained in Sec. 5.02, Faragraph a.)

ject Manager's office where each letter was read and reviewed.

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(b) The Topic File was a complete file, arranged as its name implies, according to topics. All letters written about or in regard to a definite project were filed under that project number. Letters that had no definite project number or referred to no certain project were filed in accordance with a special file list. Each project folder of the topic file carried an index at the front in the form of a brief description, which index was kept up to date periodically, approximately once or twice a month. The topic file copy of the diary was filed separately in loose-leaf folders according to the department in which it originated.

(c) The Reading File was a complete file. arranged in daily chronological order in the same folder, and grouped according to the Addressor of the letter. The reading file diary was arranged exactly as the regular file but was placed in a separate folder. Copies of all telegrams in the reading file were placed together in an individual folder. At monthly intervals, these telegrams were checked against the invoice from the telegraph company and were turned over to the Accounting Department along with invoice for payment.

The above files enabled one to find any correspondence by either of the following methods: (1) Whom the letter was addressed to (Addressee): The subject of the letter (Topic): (3) Whom the letter was from (Addressor).

The Topic and Reading files were filed daily, thus being kept up to date. The Correspondence file was usually delayed one or two days while it was being reviewed and diary notes recorded.

A-5.02. In addition to the three (3) regular files, certain other files were maintained as follows: Specification file, Weekly Status of , Plans and Specifications file, Personnel file, Application file, Estimate file, Advance Planning and Follow-up File.

(a) The Specification File consisted of one copy of each specification with addenda issued by the Carr and J. E. Greiner Company. These specifications were filed according to project numbers, with the main specifications on top and other specifications and addenda following. An index sheet was kept in the front of each folder with the specifications and addenda listed in the order in which they were issued.

(b) The Weekly Status of Plans and Specifications File consisted of weekly schedules of working drawings including revisions and specifications including addenda, which schedules were prepared by the Office Engineer.

(c) The Personnel Files consisted of a complete and separate folder for each employee. In these folders was a copy of each person's experience record and a copy of each letter to, from or pertaining to the individual employee. These copies of letters regarding employee were taken from the correspondence file and were not found in the regular correspondence file, but in the employee's personal folder. At the termination of an employee's services, his personnel file was placed in a separate portion of the file and marked "Closed".

(d) The Application File consisted of applications for employment with this organization. These applications were filed according to the department in which the applicant was applying for work, such as Architectural, Structural, Mechanical, Survey, etc. A complete index of these files, listing applicants with their addresses and date of application, was kept separately for each specific branch of work. A form letter along with other correspondence to the applicant were filed in the application file unless the person was employed, then, the employee's application together with all correspondence pertaining to him was withdrawn and placed in a separate folder in the Personnel Active file. An employment questionnaire was used to inquire as to an employee's references and qualifications regarding former employment. These questionnaires, when returned, were also filed in the Personnel folders.

(e) The Estimate File consisted of a copy of all estimates filed in loose-leaf binders according to project numbers. In the event that the estimate pertained to no particular project and there was no project number, the estimate was placed in a folder in the Topic File marked "Estimates General". These copies were in addition to the three file copies and were used for quick reference.

(f) The Advance Planning and Design Data File consisted of

copies of letters from the Navy Department requesting preliminary sketches estimates, working drawings, etc. and forwarding copies of drawings and reference material to be used in the preparation of these requirements. This file was arranged according to project numbers. General letters, not pertaining to a particular project were filed in a miscellaneous or general folder.

(g) The Follow-up File consisted of copies of letters from Navy Department requesting preliminary sketches, estimates, working drawings, etc. and transmitting copies of drawings and reference material to be used in the preparation of these requirements. These letters were used to follow-up and expedite the requirements requested and also to ascertain the return of all reference material. Each of these letters was indexed, according to date, in a loose-leaf folder, in order to facilitate followup procedure. Copies of these letters were retained in a notebook until the required work had been performed, or the reference material had been returned. Then, they were placed in the follow-up files to no definite project number, being placed in folders of miscellaneous nature. (The advance planning file was duplicated in the follow-up file).

A-5.03 Miscellaneous. Passes, Personnel Charts, Defermonts, Distribution of Correspondence and Mail.

(a) Passes were obtained from the Navy Department to permit the entrance of friends and relatives of employees into the reservation. The permanent passes were issued in the form of a pass which might be used indefinitely or until notice of expiration. Temporary passes were issued in the form of a letter requesting that instructions be given the Sentry to permit entrance of the person or persons. A record was kept of all permanent passes issued, which record included name of person, relationship to the employee, pass number, and expiration date, if such was designated. The return of those passes which were issued for a given

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length of time or those which were in the possession of persons who left our employ was requested so that each pass might be accounted for.

(b) Personnel Charts. A personnel chart with each employee's name under the department to which he was assigned was retained in the Project Manager's office. When an employee was transferred from one department to another or an addition or reduction was made in the organization, the change was indicated immediately so that the chart might be kept up to date at all times. At frequent intervals a total was made of the number of employees in each department, as well as a grand total of the entire personnel. These totals were also posted in the Project Manager's office. At intervals of approximately two weeks, a typewritten list was made up of the personnel as it stood at that time. This list was in alphabetical order, with the employee's name, together with the department to which he was assigned.

(c) <u>Deferments</u>. Copies of letters requesting deferment from selective service were filed according to the regular schedule with the exception of the Correspondence copy. This copy was placed in the employee's personal folder. Also, letters from Draft Boards designating classifications, deferment expiration dates, etc. were filed in the personal folders. For quick reference an index was kept of each employee's deferment status.

(d) Distribution of Correspondence and Mail. All outgoing and inter-office correspondence, with all copies attached, was directed to the Project Manager's office. The outgoing correspondence was reviewed, routed, and delivered or stamped and mailed. The inter-office correspondence was routed and delivered to the various departments. Three copies were detached and retained in this office for our files. Letters originating in this office were routed and distributed in the same manner. Mail for the entire organization was picked up twice a day and delivered to this office. From here it was distributed to the individual departments. All outgoing mail was received in this office and placed in the Post Office immediately before each mail left.

A-6. Administration of Project. The organization had no connection with construction work and was limited to fundamental data, typical plans, information and directives from the Officer in Charge. Preliminary surveys and topographic maps were provided by the Survey Department.

The administration of the project thus became a problem of maintaining an organization qualified to produce plans and specifications for the various projects which were authorized from time to time. The Project Manager was prepared to conduct the preliminary conferences and to assign various parts of the work to appropriate departments. Much of the work was handled in this fashion although in many instances during the first year, department heads and individual draftsmen, designers, and specification writers were given their instructions directly by the Officer in Charge or his representatives.

All matters concerning salary were submitted to the Officer in Charge for approval.

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Most of the drafting, computing, and office equipment and furniture were secured through the Officer in Charge.

The relations with the Contractors, Contract NOy-4750, and with the Liaison Officer, U. S. Marine Corps, and his staff were most cordial and every courtesy was extended us by these groups.

We feel that the Contractor carried out a very successful scheme for the construction of the project. Railroad and access roads were installed at the earliest possible moment to insure easy and economical access of material and men to all parts of the job. Water and sewer line construction was pushed through in order that building construction could be carried on without being hampered by the presence of numerous and deep excavations. The buildings as constructed have a very pleasing appearance and are a credit to the U. S. Marine Corps.

The Project Manager relied upon the several department heads and exercised general supervision over their work without interfering in the routine technical work for which they were well fitted as specialists in their respective lines. Appropriate standards of design were followed. In some cases, design assumptions, loads, and stresses were made the subject of directives rather than being arrived at by independent investigation on the part of this company.

The approval of shop drawings constituted an important part of the work although many of the drawings were handled directly by the Officer in Charge.

The Project Manager participated in the discussions leading up to the preparation of site plans and used these plans as a guide for coordinating the work of the various departments concerned with outside utilities.

Generally speaking, the architectural floor plans were used as a basis for coordinating the work of the departments interested in mechanical and electrical installations within the buildings. Most of the detailed coordination was accomplished by direct contact between the several departments with the Project Manager helping to perfect such cooperation.

The progress of the work was checked carefully at all times and continual effort made to obtain necessary design data and to expedite the work by issuing plans and specifications according to priorities set up by the Officer in Charge and according to needs reported at progress meetings. The Contractor always had a back-log of work for which the plans and specifications were ready.

A-7. Narrative. In order that a clear picture may be had of the time involved from the conception of the project to the termination of Carr & J. E. Greiner Company's contract, a brief outline, arranged in chronological order, is given below:

February 21, 1941

The United States Marine Board convened to begin study of the proposed base.

	Statt of the desiring antendered, antendered, and an address and the dealers and the dealers and the dealers an	February 24, 1941	The Major General Comma Marine Board the activi the units to be housed
	and the second second second second second to a second to a second second second second second second second s Life and Difficulty and a second s Second second	April 10, 1941	U. S. Marine Board subm lishment of the Marine
	and a second in the second second second and a second second second second second second second second second s	April 14, 1941	The Major General Comma of the board subject to
	and a second second and a second second to parameters and and a second se	April 15, 1941	Architect-Engineers' co
		April 18, 1941	Parties began topograph
		April 21, 1941	Contract NOy-4750 was s of the project.
	and the second second second at an analysis and the second second second second second second second second se Second second	April 30, 1941	Construction started on
	real and a second s A second second A second secon	May 15, 1941	First preliminary site Area prepared.
		May 22, 1941	Received from Navy Depa required in the Divisio
-	i one of the second statement is interference agains in the second statement of the second second second second All second second second is policited and second	May 26, 1941	Plans for hospital at H the Officer in Charge.
	in a solo se site plane and and an baragerian fraction for the second and a solo is a solo second and the second the second seco	May 26, 1941	Preliminary plans for b to the Officer in Charg
	and the second	June 6, 1941	Received from the Offic list of buildings to be Training Area.
	and a second of the second of the department of the department of the second of the se	June 13, 1941	First preliminary site pital submitted.
	parte de la comparte	June 18, 1941	Received directive to p main buildings in Divis
	and in a second seco Second second second Second Second	June 2, 1941	Directed to proceed wit pital for Division Trai
	stately with fighter and dreaw as probabling a first special to canting the state of the state	July 11, 1941	Directed to prepare pre project between Northea
	the second se	July of these	northerly side of North
	in the second at the second of the second of the second second at the second second second second second second	July 21, 1941	Preliminary site plan f
		oury 31, 1941	Industrial and Supply A
	study at the proposed branes.	August 1, 1941	Started re-study of hou provide for 700 houses requested.

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mandant outlined for the U.S. vities to be conducted and d at the new Marine Base.

bmitted report for the estabe Base.

mandant approved the report to certain comments.

contract executed.

phic surveys of Tent Camp Area.

signed for the construction

on Tent Camp No. 1.

e plan of Division Training

partment a list of buildings ion Training Area.

Hadnot Point requested by

barracks building submitted rge for approval.

cer in Charge an authorized be located in the Division

e plan for Hadnot Point hos

proceed with detail design of ision Training Area.

th design of a 200-bed hosaining Area.

eliminary maps for housing east Creek and Piney Green on th Carolina State Highway # 24,

for housing project approved.

Area site plan approved.

ousing project site plans to s instead of 1200 as originally

and an and an	August 5, 1941	Site plan for entire Division approved.
and the second	August 7, 1941	Freliminary site plan submit
and the descent of the	September 3, 1941	Officers' Quarters site plar
ansarets and will coll the filled will also an	September 24, 1941	Site plan of housing project Works Agency signed by Offic
	October 24, 1941	- Hospital site plan approved.
and the region and the set of the set of the	November 2, 1941	Notified by Officer in Charge designed for 700 beds.
	November 5, 1941	Bachelor Officers' Quarters
and Andrews and the second structure of the	November 11, 1941	New site plan for hospital a
TRANSIE AND TRANSIE TO AND	December 8, 1941	Directed to prepare plans fo
	December 9, 1941	Site for Rifle Range near Di
out of empire	December 16, 1941	Regimental Area No. 5 site p
and the second	December 16, 1941	Landing ^F ield site plan appr
	December 21, 1941	Tent Camp No. 2 site plan ap
	January 3, 1942	Parachute Training Area site
de mont i vienes inter i rem th	January 9, 1942	Directed to prepare site pla
	January 13, 1942	Rifle Range site plan approv
	January 30, 1942	Hospital Area site plan appr
	February 15, 1942	First Balloon Barrage Area s
t a maint of a size 1	March 2, 1942	Amphibian Base site plan app
inter at historical and the president	March 10, 1942	Magazine Area site plan appr
	April 20, 1942	Mumford Point Tent Camp site
and a control and the second sec	April 24, 1942	Directed to prepare plans fo Creek.
a fig meridial level	May 27, 1942	Seaplane Base site plan appr
Low Miles and Low Low Constants	June 19, 1942	Notified to proceed with uti chute Training Area.
Addate 1, 1161	June 22, 1942	Separate department set up f

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the set of		August 5, 1942	Lieutenant Commander R Commander M. Nichols a
and a second processing the second	sider of the total	September 30, 1942	Carr and J. E. Greiner
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H W. C. Roberts as project J. E. Greiner Company.

approved.

ith detail plans for Glider nding Field.

R. A. Williams succeeded Lt. as Officer-in-Charge.

Company contract terminated.

CHAPTER B - PART II

OFFICE ENGINEER

B-1. General. For the majority of the work, the standards of design. types of construction, and the fundamental data were controlled by Standard Navy Specifications, cost estimates, directives from the Officer in Charge, directives from other governmental bureaus, and towards the latter stages of the work, by availability of materials.

The work done by this office consisted of:

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- (a) Coordinating and expediting the efforts of the individual departments towards the common goal of issuing working drawings and specifications at the proper intervals so that the conbe purchased well in advance of their installation.
- (b) The arrangement and charge of drawing and specification numbering systems and the filing of the drawings and specifications for all departments.
- (c) The routing of all shop drawings to the various departments and expediting their approval.
- (d) Maintaining adequate blue printing and mimeographing departments.
- (e) Securing information for all departments to aid them plan their respective work.
- (f) Making recommendations for types of foundations for various structures.
- (g) The preparation of a weekly index, mimeographed in pamphlet form, of all plans, revisions to plans, specifications and addenda to specifications, that had been issued to date for the Navy and Contractors' use.
- (h) Handling many of the matters pertaining to personnel difficulties after their employment, and
- (i) Maintaining janitor service.

B-2. Drawing and Specification Numbers.

B-2.01. Drawings: Division Training Area. Drawing numbers were assigned consecutively by departments as follows; 1 to 100, 101 to 199, 1100 to 1199, 2100 to 2199, etc., General and Preliminary.

200 to 299, 1200 to 1299, 2200 to 2299, 3200 to 3299, etc. Roads, Railroads, Walks, Runways, Drainage, and Bridges.

struction forces would not be delayed and that materials could

300 to 399, etc., Site Plan.

400 to 499, 1400 to 1499, etc., Sewers and Sewage Disposal.

500 to 599, 1500 to 1599, etc., Water Supply, Storage, ... Treatment and Distribution.

600 to 699, 1600 to 1699, 2600 to 2699, 3600 to 3699, etc. Mechanical, Heating, Plumbing, Ventilation and Refrigeration.

Electrical and Communications.

800 to 1099, 1800 to 1899, 2800 to 2899, 3800 to 3899, etc. Architectural and Structural.

B-2.02. Drawings; Tent Camps 1 and 2. Drawing numbers were assigned consecutively but were not segregated by Departments and were prefixed by T. C. as follows;

> TC 1 to TC 199, Tent Camp No. 1. TC 200 to TC 499. Tent Camp No. 2.

B-2.03. Drawings: Outlying Tent Camps. Drawing numbers were assigned consecutively and prefixed by letters designating the location, but were not segregated by Departments as follows;

> TB 1 to TB 99, Tank Battalion. CCC 1 to CCC 99. CCC Camp. MP 1 to MP 99, Mumford Point Tent Camp.

B-2.04. Drawings: Low Cost Housing Development. Drawing numbers were assigned consecutively but were not segregated by Departments and were prefixed by L.C.H. as follows:

LCH 1 to LCH 99, Low Cost Housing.

B-2.05. When a drawing number was assigned to a department, an index card was prepared with the same number, and title of drawing and project number was inserted if known.

When a drawing was issued as evidenced by copy of transmittal letter routed to clerk assigned, entry was made as to date of drawing, date of approval and date of issue.

When a drawing was revised, as evidenced by copy of transmittal letter routed to clerk assigned, entry was made as to revision letter, date of revision and date of issue.

At the time of recording issue of drawings and revisions entry was also made on a weekly check sheet, from which the weekly list of drawings and revisions was prepared.

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(b) The arrent and and charge of dramins and manufilmental manherers

700 to 799, 1700 to 1799, 2700 to 2799, 3700 to 3799, etc.

Master sheets were provided for each department, each sheet

B-2.05 (Cont'd) bearing 100 numbers, with columns provided for recording, after each drawing number, the project number, Y. & D. drawing number, specification number, title of drawing, date of drawing, approval date, issue date, and revision dates and issue. Master sheets were kept posted from the index cards daily. (See P.W. Drawings Nos. 26 to 69 incl., and No. 84).

Linen tracings of each master sheet were brought up to date periodically so that prints could be had as necessary.

B-2.06. Specifications, Specification numbers were assigned consecutively by departments but with no segregation by areas except as follows:

> 100 to 199. Tent Camp Areas. 200 to 299, Roads, Railroads, Walks, Runways, Drainage, and Bridges. 300 to 399, Site Plan. 400 to 499, Sewers and Sewage Disposal. 500 to 599, Water Supply, Storage, Treatment and Distribution. 600 to 699, Mechanical, Heating, Plumbing, Ventilation, Refrigeration. 700 to 799, Electrical and Communications. 800 to 979, Architectural. 980 to 1000, Miscellaneous.

If Mechanical, Heating, Plumbing, Ventilation, Refrigeration, Electrical Specifications were issued as Sections, the same specification number was used as for the corresponding architectural specification. Table of Contents tabulated the sections by number and title and was kept up to date as sections and addenda were issued.

B-2.07. Specification Number Index: When a specification number was assigned to a department, an index card was prepared with the same number, and title of project and project number was inserted if known.

When a specification was issued, as evidenced by copy of transmittal letter routed to a clerk assigned, entry was made as to date of specification and date of issue.

As additional sections and addenda were anticipated, numbers were assigned and recorded on the index card, and, when issued, dates were recorded the same as for the original specification.

At the time of recording issue of specifications, additional sections and addenda, entry was also made on a weekly check sheet, from which the weekly list of specifications and addenda was prepared.

B-2.08. Weekly List of Drawings and Specifications. Weekly check sheet was compared with similar sheets kept by each department and discrepancies adjusted. Then issue of plans and specifications was posted

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100 to 199, font Camp Arens, 200 to 200, Roods, Ruitroods, Waiks, Runwys, Drainogo, and Bridges. 300 to 899, Strars and Sowago Disposal. 500 to 693, Mator Supply, Starage, Frantmant and Distribution. 300 to 699, Machanical, Hosting, Plumbing, Ventilation, Refrigeration.

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8-2.08. Wookly List of Drawings and Specifications. Weakly check at was compared with similar sheets kept by and department and disto the previous weekly list, dates changed on each page, new projects added as they occurred, and stencils cut for mimeographing a complete new book weekly. When plan and specification issue was reduced to a minimum in the closing stages of the contract, only supplementary lists were prepared weekly, tabulating only the weekly issue of plans and specifications, and complete weekly list was not issued until a final book could be published after all plans and specifications were issued.

B-2.09. Tracings. Tracings were filed in flat, shallow drawers by building name, utility, roads, site plans, preliminary sketches and miscellaneous drawings; files all being located at one central point.

When a tracing was removed from the file an "Out" slip was placed in the drawer, designating the drawing number, project number and title and to whom the drawing was charged.

When a tracing was removed from the file for blue printing, "Out" slip was prepared in duplicate, one (1) placed in the file and one (1) accompanying the tracing or group of tracings as an order for prints to the blue print room.

As tracings were returned, "Out" slips were destroyed.

Some file drawers contained more than one project, in which case folders were provided to separate the project.

Frequent checks were made with the drawing schedule book to be sure all tracings were filed or accounted for.

B-2.10. Y. & D. Numbers. During the progress of the project very few Y. & D. numbers were used. After the rush of the work was over, the tracings were re-grouped by building and utility types and consecutive Yards and Docks numbers assigned, thus it is possible in most cases to find all working drawings pertaining to any one building filed as a group. It is recommended that henceforth all these drawings be filed in numerical order with the Y. & D. numbers. Chapter Q. Part II, furnishes a convenient list of the drawings prepared. P. W. drawings numbers P. W. 26 to P. W. 69, inclusive, and P. W. 84 show the drawings prepared, their Y. & D. numbers, revisions, approval dates, and other pertinent information. A list of specifications prepared is shown in Chapter R, Part II.

B-3. Foundation Recommendations. The soils are very spotty and consist of top soil, peaty soils, silts, sands of various types, clay, mixtures of sand and clay in widely different proportions, and a gumbo-like mud of varying placticity.

It was assumed that the gumbo-like mud would sustain a load of 500 lbs. per square foot and that the pressures through the over-lying strata would spread on 1/2 to 1 slopes. An allowable soil pressure of 1000 lts. per square foot was recommended where there was a minimum of 5 ft. of good material over-lying the gumbo. Where this overburden amounted to a minimum of 8 ft. an allowable soil pressure of 2000 lbs. per square foot was recommended; by direction, this was considered a maximum. the provisus workly list, deter charged on each page, nam projects and as they occurred, and statells out for minnerruphing a complete new at each relation plan and aposition there was reduced to a minimum the closing stages of the constant, only supplementary lists ware proest matrix, because in any the workly instead of plans and specifications constantly list was not instead with a first back could be putted attact all plans and specifications to restrict a second and start all plans and specifications to restrict.

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B-3. (Cont'd).

To determine the allowable soil bearing, hand auger borings were taken at the site of each building. The size and type of the structure determined the number of borings, which were usually taken to a depth of 12 feet. After visual inspection of the samples, recommendations were made to the Officer in Charge for his approval. The Officer in Charge would satisfy himself as to recommendations made and in cases where agreements could not be reached load bearing tests were taken by the Navy. Field notes covering soil borings are listed in Chapter O, Part II.

The majority of the structures had spread footing foundations, the allowable soil values of which were determined as noted above. Where the soil conditions did not permit spread footings, piling (timber, composite, and cast-in-place concrete) was used. By direction of the Officer in Charge, an allowable pile load of 20 tons was used for the timber and composite piling, and 40 tons for the cast-in-place concrete piles.

CHAPTER C - PART II

AUDITING DEPARTMENT

The personnel of the Auditing Department was made up of the following:

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1. Chief Auditor

- 2. Auditor
- 3. Accountant

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- 4. Cost Clerk
- 5. Payroll Clerk
 - 6. Stenographer Typist

The Chief Auditor, assisted by the Auditor. supervised the work of this department and hired and supervised all administrative personnel. He arranged for all rental agreements on equipment. purchased all insurance and the more expensive equipment and materials required by the Architect-Engineer.

In purchasing the equipment and supplies for the company, every C-2. endeavor was made to obtain the lowest possible price on equipment and materials. Purchase order, Form 7/24030 in sextuplicate. was prepared showing the various items and their cost, which was submitted to the Officer in Charge for approval or disapproval. If approved, the original of the purchase order was sent to the vendor on which it was drawn, this serving as an order. When the material was received it was checked and inspected by a Government checker and a Receiving and Inspection Report, Form #26505, was then made up in triplicate.

C-3. Invoices for material purchased, which were required in quadruplicate, were checked upon receipt against the purchase order for price, terms, freight and mathematical accuracy, and then checked against the receiving report for quantity. After checking the invoice in every respect they then were discounted and paid. In paying the invoice, three copies of the invoice together with Form #FC409 were returned to the vendor to be receipted and signed, with a request that they be returned to us immediately. Upon receiving the invoices from the vendor, properly receipted, they were entered on a Transmittal Summary, Form #FC411, and forwarded, together with a copy of the check, purchase order and Receiving and Inspection report to the Navy Project Auditor for audit purposes. Re-imbursements to the Architect - Engineer for proper expenditures were made as follows: Semi-monthly reimbursement request, Form #FC308, was made up in triplicate and forwarded to the Navy Auditor who prepared a Public Voucher, Form #77, and forwarded both documents to the Naval Operating Base for the purpose of a post audit, after which they were sent to Washington for reimbursement.

C-4. All non-expendable material and equipment had to be returned to the government. Therefore an accurate record was kept of each such item. Upon issuance of a purchase order for non-expendable equipment, an Equipment Receiving and Inspection report, Form #FC501, was made up and upon receipt of the equipment in question it was checked and inspected by a government inspector and charged to us accordingly. Each employee using this equipment was charged with the particular piece of equipment so that upon his termination of employment the equipment could be returned to us and the employee credited. Upon termination of our contract all of the non-expendable equipment was inventoried in the presence of a government inspector and returned to the government. Upon the return of this non-expendable equipment to the government the Navy Project Auditor signed the Equipment Receiving and Inspection report showing that the return had been made to the government satisfactorily.

C-5. This department arranged for the rental of the Transits and Levels used in Survey work. This equipment was rented on a monthly basis and purchase orders were made out periodically to cover. Insurance, freight and repairs on rented equipment were paid for by the lessor.

C-6. The Auditing Department handled the Architect-Engineer's payrolls. Before being placed on the payroll, each employee was required to submit proof of citizenship; a complete record of previous employment, which was filed with the current personnel record maintained on the project; and he finger-printed for record and further investigation. Salaries were set in accordance with an approved scale. A time clock was used to record each employee's working time and this was figured on the time card, allowance being made to the one quarter hour. This time was then transferred to the payroll sheets which were prepared in quadruplicate.

C-7. Payrolls were disbursed in the presence of a government witness and individual pay receipts were signed in his presence by each recipient. The receipts contained the following information -

> Employee's name Badge Number Total number of hours Rate Gross amount Social security tax deduction Net amount Signature of employee Signature of Government Time Checker

Two copies of the payroll were sent to the Navy Project Auditor in whose office the calculation of hours and extensions was audited and checked against the pay receipts. The payroll was broken down by departments in order to show the cost of any given department for that particular payroll period.

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Payroll authorizations were secured in writing from the C-8. Officer in Charge and any changes of salary due to promotions or otherwise were also submitted to the Officer in Charge for approval in writing. A further approval from the Officer in Charge was secured in writing for all overtime. The department head or Project Manager was designated to approve this overtime but in accordance with letter from Officer in Charge. individual department heads were relieved from signing the pavroll or Public Voucher.

A personnel chart was maintained by the Project Manager's C-9. Office from information furnished by this office. The personnel chart showed the names of each employee by department together with the heads of the respective departments.

The accounting system used was in accordance with the regula-C-10. tions of the Navy Manual. When invoices were received they were entered in a voucher register, Form #FC402, and distributed in this voucher register to the proper cost accounts. When checks were made in payment of these invoices they were recorded in a check register. U. S. Government Printing Office Form #313416. All cash receipts were entered in a cash receipts register, Form #FC407.

C-11. A very comprehensive cost system was maintained. When payrolls were made out a direct charge was made by this department to the proper project number, which was furnished to us by the Navy Department. and each payroll was supported by a cost break-down showing the amount of money expended by each department for each project worked on during the course of that particular pay period. These cost break-downs were forwarded in duplicate to the Navy Project Auditor when requesting reimbursement. When the final voucher was prepared it was supported by a cost break-down of the entire project cost, together with a statement of cost of overtime. a release signed by the Architect-Engineers, and all other data required by the Bureau of Yards and Docks in connection with the request for final payment.

CHAPTER D PART II

SITE PLANNING

D-1 General Location

D-1.01 This subject has been satisfactorily covered in the report of the U. S. Marine Board, under date of April 10, 1941. (See Chapter C Part 1) This report in a general way limited the areas to be occupied by the proposed activities, and it therefore was the problem of the Carr & J. E. Greiner Company to arrange the various elements of the camp in their proper relation over the terrain selected. The important factors considered in making the selections of the various areas were as follows:

- (a) Accessibility of training areas.
- (b) Character of the terrain.

Generally speaking, the section is part of the flat Atlantic Coastal Plain, including the following types of land:

- 1. Open sandy farm land, formerly used for the growing of farm crops peculiar to the section.
- 2. Timber covered areas, occupied by stands of yellow pines, ly drained.
- 3. Swamps and sloughs. These areas occurred at frequent other post purposes.
- (c) Proximity to New River. Every effort was made to keep the freedom from mosquitoes.
- (d) Location of combat area, impact area, and rifle range. By and other functions to be described subsequently.
- (e) Economy in road and utility installation.
- (f) Foundation Conditions. These conditions are discussed in Part II, Chapter B.

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mixed hardwoods, and heavy undergrowth. Generally speaking, these areas were quite rough, and in many cases, poor-

intervals along the shore line and presented steep, rough or wet ground totally unsuited for building sites or for

various housing units of the post as near to the water as possible. By so doing we were able to secure the full value of pleasant aspects, cool prevailing breezes, and comparative

locating the housing and barracks areas along the river bank, the rough, wet and otherwise unsuitable areas were left in the rear to be used for the various training purposes given above

D-2. Preliminary Plans

D-2.01 The general preliminary studies were based on all of the above factors, plus certain directives given by the Officials in charge. Perhaps the most important of these was the one asking for a plan to embody eight (8) regimental areas, with the proper planning to increase these to sixteen (16) areas in the future. Such planning obviously required large areas, and necessitated, in the early studies, the introduction of a second tier of regimental areas abutting the tier along the river edge. Later the number of areas was reduced to five (5), and these were incorporated in the final plan. Another factor influencing the size of the regimental area. and therefore the total amount of land occupied, was the spacing between buildings, and the relation of the three (3) battalions within each regimental area. In all, a total of eleven (11) general preliminary studies was made, involving various spacings, locations, and patterns before a final selection was made. This selection was made at a conference attended by General Williams, Captain Cotter, Commander Madison Nichols and Officials of the Carr and J. E. Greiner Company. This plan is entitled "Site Development Plan No. 11", M.B. Drawing No. 26, Y & D Drawing No. 162061, and was signed by the Resident Officer on August 5, 1941. Briefly, this plan provided for five (5) Regimental Areas arranged along the edge of New River, and symmetrically arranged as far as the limiting factors of terrain. economy of construction, and other factors would permit. The areas were limited on the south by the River Road, on the north by the Service Road, and on the east and west by company streets. Certain large areas of included land were not used for the reasons cited above. The suggestion is made that such areas be carefully improved and protected for purposes of recreation. They will in most cases make attractive small parks. Suggestions for improving these areas may be found on page 9. of Specification No. 301, under the heading of "Woodland Improvement". Perhaps the most interesting of these parks is the one along the river edge and limited by the River Road. No buildings encroach on this area except Division Headquarters.

D-3. Final Site Plans

D-3.01 Regimental Areas. Five regimental areas have been developed bounded on the north by Main Service Road, on the south by River Road, and the east by "O" Street, and on the west by Cross Street. The Main Access Road (Holcomb Blvd.) bisects Area No. 3, and is terminated by the Division Headquarters Building, which stands as an accent feature in a commanding position. Each Regimental Area includes the following buildings:

- 12 Barracks
- 3 Mess Halls
- 12 Battalion Warehouses
- 1 Regimental Headquarters
- S Battalion Headquarters
- 1 Post Exchange
- 1 Regimental Infirmary
- 1 Regimental Theater
- 1 Regimental Service Club

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D-3.02 Post Troops This group of buildings is centrally located at the corner of Holcomb Blvd. and Service Road. This location offers the greatest economy in the installation of utilities and in the convenience of administration. The Post Headquarters Building stands as an imposing structure at the traffic circle.

D-3.03 Naval Hospital. Hadnot Point was the logical location for this imposing group of buildings. It is centrally located, yet privacy and quiet are provided, together with beautiful surroundings. It is well located to secure the greatest degree of relief from summer heat and to take advantage of the aesthetic qualities of beautiful woodlands and water views.

D-3.04 Industrial and Supply Area. After much study this area was located on the east side of the Holcomb Blvd., approximately 3500 feet northeast of the Regimental Areas. In this position the functions of the area can be carried on with a minimum of annoyance to the troops housed near by. An area 450 fest wide has been reserved as a park between the Industrial and Supply Area and Holcomb Blvd. The natural tree growth on this land should be carefully preserved. This growth together with new plantings will afford a screen to partly hide the buildings and activities in the Industrial and Supply Area. In the Area are located warehouses, shops, laundry, bakery, storage buildings, central heating plant, gas and oil stations, and propane gas stations all carefully placed with respect to railroad, roads, and each other.

D-3.05 Residential Arca. Homes for commissioned officers have been located at Paradise Point along the edge of New River. In this location the homes are accessible to all activities by way of the River Road which crosses Wallace Creek. At this location the officers and their families may enjoy privacy, beautiful river scenery, sandy beaches, and the comfort of prevailing south west breezes. A pleasing landscape effect has been secured by basing the lots on a winding river road located at varying distances from the water-edge. A modified system of the rectangular lot pattern has been developed with pleasing effect. Where rough or wet ground has been encountered, these areas have not been used, but have been reserved as small interesting parks. An outstanding feature of the Officers Homes Area is the location and treatment of the Bachelor Officers' Quarters. Twelve buildings constitute this group. They lie mostly between the River Road and the edge of New River. The spot selected is separated from the other officers homes by a deep wooded valley. This gives a desired privacy to both groups. The Officers Mess and Club has been placed as the central feature of the group. This arrangement provides convenience, economy of installation, and attractiveness. Along the northeast edge of the Area, quarters were provided for servants, while along the westerly edge, but somewhat separated from the group, a guest house was located to accomodate ton to twelve guests.

D-3.06 Other Housing (Warrant Officers and Civilian Employees) Building sites have been provided for additional homes along River Drive at points well removed from the Commissioned Officers Area. Such sites are well suited for Warrant Officers' homes or for civilian employees, as the proper authorities may elect.

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Definition Control Control (Control Officers and Civilian Employees) Suiding structure been provid d for additional homes along River Drive at points will removed from the Control Officers Area. Such attas are will mutted for Terrar Officers' ones or for civilian amployees, as the proper rether rety alorts. A large area has been allocated for Low Cost Defense homes along Route #24 near the main entrance and between Northeast Creek and Piney Green. Provision has been made for 346 single family units and 177 double family units. This site plan has been developed on the curvilinear pattern, which provides for groups of homes arranged around small interior parks. A central area has been provided for certain public buildings such as a church, school, and community building. A central playground has also been provided. The final plan was the outgrowth of about three weeks of study, in which several studies were made showing various arrangements of the elements involved. A trip to Washington was necessary in order that the plans might be placed before the proper reviewing authorities.

D-3.07 Parade Ground. The site selected for the parade ground lies between the Industrial and Supply Area and the Main Service Road. It runs easterly from the Holcomb Blvd. a distance of approximately 3500 feet. This parcel of ground is now lightly wooded, and only a small amount of grading will be required. The cost of conversion will therefore be held at a minimum.

D-3.08 Tent Camp Areas. The location and general arrangement of the Tent Camp was the first site planning problem to be solved. After careful field study, a site was selected on Route #17 about two miles southwest of Jacksonville. After consultation with all departments, a camp to house about 6,000 troops was laid out on the rectangular pattern. This plan was approved on May 3, 1941. Later in the year the camp was doubled, with possible extension to a capacity of 16,000. This second Tent Camp Site Plan was signed by the Officer in Charge on December 21, 1941.

D-3.09 Rifle Range. This area was located on the easterly side of New River near Stone Bay, and is well removed from all other areas and operations. Three 50-target rifle ranges, with firing lines at 200 yards, 300 yards, 500 yards and 600 yards; 1 pistol range and a future machine gun range have been provided. On the basis of six weeks being required to train a regiment on a range of this size and that the target season is only 7 months, every man in the Division Training Area should be able to shoot at least once a year. A tunnel from the butts to the 200-yard and 300-yard firing lines was provided for direct communication between these lines and the target operators. Housing and other incidental buildings were provided to accomodate one battalion while in training.

D-3.10 Balloon Barrage Battalion and Amphibian Base Area. This area was located also, in a location remote from all other activities, principally because of the nature of its activities. Located on the East side on New River, at Courthouse Bay, it is approximately 5 miles from the nearest activities at the Rifle Range and the Division Training Area, and 9 1/2 miles from other air activities at the Glider Training Base.

The area consists of three principal sections: (1) a residential and housing section, (2) a balloon barrage school section, and (3) an amphibian base. The residential and housing section was located on the river front at what was formerly the village of Marines. This section commands a pleasing view of the river and enjoys the prevailing southwest winds in the summer. The school section was located approximately 1800

-47-
feet northeast of the residential and housing section, and along Marines Road, the Access Road to the balloon barrage section of this area. The amphibian base was located on the northwest shore of Courthouse Bay just off of New River. Provisions have been made for storage, repair, and servicing of amphibious units. An entrance channel, eight feet deep and one hundred and twenty feet wide was provided from the existing navigation channel in New River to an eight foot deep basin in front of the base. Courthouse Bay, which is a naturally land locked estuary, therefore, was transferred into a well protected harbor.

D-3.11 Parachute Training Area. This area is located along the west side of Holcomb Blvd. near the Industrial and Supply Area and about a mile northeast of the Division Training Area. Generally speaking, the area is astride the ridge between Bearhead Creek and Beaverdam Creek. Adequate area for expansion and activities has been provided by this location without encroaching upon space for future expansion of the Division Training Area. Being in the vicinity of the Division Training Area, housing for this area is at present provided by the Division Training Area. However, space has been allocated for the housing of an entire battalion at this location. The area was originally designed for a captive tower, a free drop tower, a parachute building and a parachute training building. Later, another free drop tower was added. The free drop towers are provided with a cleared and graded landing field of 600 foot radius all around the tower.

D-3.12 Glider Training Base. This area was originally laid out as an air field in connection with the training of parachute troops. Later buildings with facilities for glider training were added. It is located about one and a half miles southeast of Tent Camp No. 2 and on the west side of New River across from the Residential Area. This location was chosen because the terrain was sparsely wooded, fairly level and was accessible to other activities.

As of October 1, 1942, the following were provided:

1. Two 5000-feet long runways, 150 feet wide, north - south and northeast - southwest.

2. Future northwest - southeast runway.

3. 2700-foot x 3600-foot parachute landing field.

4. Glider Training facilities.

5. Taxiway and ramp for seaplanes.

Minimum side clearance of 500 feet each side of center line and end clearance of 1000 feet were provided for each runway. At extreme edges of end cleared areas, the clearance width was increased to 650 feet each side of runway center line produced.

D-3.13 Magazine Area. Location of this area is naturally remote from all other operations. The closest area is the Division Training Area, which is almost 2 miles away. A very densely wooded section on the Snead's

A large grade addition allocated for Low Cost Defense homes along Routh Ale morth - mann battande and batwoon Northoast Greek and Finey. foreits which is all all becales been developed on the birth . attor of the estra terretar flene courte begaette school to squere which for out daids 'A constant area then been provided for cortain public buildings such as a most cale and providy and and a simblifue of interest in the provide and the second of growings. The final plan was the outgrowth of about three wheth of staty. out to simonogeneria moirney painted then oney on into Lendica donry at east hads to be a western was here and the the stands of the order that the the sugar is closed bofore the proper reviewing authorities.

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D.5.09 Rifle Mongar. Inte eron vie locates on the easterly side of Mon River near Stond Boy, and is well ricords from all other areas and, operations, force 60-target wife indee, with firing lines at 200 yards. sou yards, 800 yards and 800 yards; I pisto I range and a future machine town or the have term trovided. On the basse of sis weeks boing roquired to train a regiment on a range of this size and that the target survey is only / nontony, every out in the Division Training Area should be shie to she she she and she she to the Sub-yard and sadibilited letrebioni radio Date garauch, . tautarego cogras and bus anti ware previded to "recomponent end betatlen while in trainings

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Ded.11 Personnts Training area. This area is loosted along the wast adde of Volcoub Siver and Tobustrial and Supply Area and about a hile sorther at the Division fraining Area. Generally speaking, the area is for expansion and serverties has been provided by this location without ona paradaute hullding and a parasing of training indiffice later, another from drop tower was added: The frae drop towers are provided with a cleared and

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D-S.15 Harathe Area. Loostin of this area is naturally ronote inerA. Mainter operations. The classet area is the Division Training Areas allound out to notrees tobeow yleanet your A ... ways ballen S roonin at dot

Ferry Road was selected as the site. It is bounded on the west by French Creek, on the north by Cowhead Creek and on the south by Jumping Run Creek.

Six small arms magazines were provided with a minimum clear distance between them and from the Snead's Ferry Road of 300 feet. Nine fuse and detonator magazines were provided with clear distances of 200 feet. The fixed ammunition magazines were located as far from Snead's Ferry Road as possible. Clear distances between buildings were held to a minimum of 400 feet. A complete system of roads connects all the buildings.

D-3.14 Numford Point Tent Camp. This site was originally a small tent camp for housing Post Troops. After these troops moved into the Division Training Area, it was decided to expand the camp to house 1500 men. and to use the area for the training of colored marines. The original area was rearranged to suit layout of "Homasote" type of buildings and a new area was added about three times the size of the original one. Location is on the northerly side of Northeast Creck about two miles from Jacksonville.

D-3.15 Other smaller sites that were all laid out in a rectangular pattern were: (1) Peterfield Point Tent Camp, (2) Tank Battalion Tent Camp on U: S. Highway #17 about 3 1/2 miles south of Jacksonville, (3) C.C.C. Camp on north side of Northeast Creek, (4) White Cemetery on North Carolina State Highway #24 at Mumford Point Landing Road, and (5) a colored cemetery on U. S. Highway #17 about seven miles south of Jacksonville.

D-4 Recreation

D-4.01 Because of the isolation of this station, it has been thought proper to pay more than the usual attention to this matter. Space has therefore been provided for every reasonable field sport such as football, baseball, track, tennis, basket-ball, etc., for both Officers and men. A large central athletic field has been set aside north of Service Road, and east of "K" Street. In addition smaller local fields have been set aside, distributed more or less uniformly over the area. These fields are specifically shown on the Landscape Development Plans.

D-5 Landscape Treatment

D-5.01 The value of tree and shrub growth on the area has been an influencing factor throughout the site planning. Our purpose has been to preserve the native growth not only for the aesthetic qualities, but for the comfort to be offorded by their presence. Trees, shrubs, and smaller plant growth tend to minimize the blowing of sand, to reduce summer temperatures, and to retain ground moisture. A specification has therefore been prepared (No. 301, dated February 1942) outlining proper ways and means to preserve and improve the existing growth, and to add trees and shrubs where the need is obvious. A set of landscape planting plans has been prepared to accompany this specification. Both plans and specification were turned over to the Officer in Charge under date of May 20, 1942. These plans were modified later by the Contractors.

D-6 Summary

D-6.01 To describe briefly the magnitude of the site planning work,

it was necessary to propage site plans for 17 different locations, including two cemeteries, and involving 74 barracks, 28 Mess Halls, 174 Warehouses, 10 Infirmaries, 10 post exchanges, 11 Theaters, 19 Battalion Headquarters, 196 Officers Quarters, 523 Low Cost Defense Houses, and other miscellaneous buildings. In all there were 1431 buildings that had to be located and on which floor elevations had to be set. A complete schedule of buildings according to areas is shown in Part II, Chapter E, Section E-18 and according to type of buildings in Part II, Chapter E, Section E-19.

In all 100 site plans (See Table D-6.02), and 22 landscaping plans: were propared. 17 of these plans were for the Division Training Area and five were for the Naval Hospital Area.

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Farry Boad was selected as the alte. It is bounded on the west by French. Credit, on the north by Company and on the south by dumping Kun Greek.

Sin anall arms difference were provided with a minimum clear distance bornean them and from the Enced's Formy Soad of 500 fees. Mine fuse and detenator majzaland were recorded with clear distances of 200 feet. The fixed arrunition cards into were located as far from from dread's Ferry Road as opecials. Glear distances of reads connects all the build to a minimum of 400 feet. A consister arcter of reads connects all the buildings.

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D-5.15 Other shallor atten that ware all laid out in a roctangular pathim ware: (1) Poterizoid Moint Cont Gamp. (2) Tank Battalion Tank Camp on U.S. Highway 417 about 5 1/2 miles south of Jacksonville. (3) 6.010. Carp on morth side of Fortheast Oreck. (4) White Comptony on Morth Carolina State Highway F24 at Munford Fount Landing Houd, and (5) a colored comptony on U.S. Highway 417 about south miles south of Jacksonville.

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D-4.01 Redeute of the isolation of Whis station, it has been thought proper to pay more than the usual struction to this matter. Space has therefore been provided for every reasonable field sport such as foothall, baseball, rands, teamin, basist-ball, etc., for both Officers and son. A large control structs field has been set saide north of Service Road, and east of "1" Structs in addition scaller local fields have been set aside, distributed nore or less uniformity over the area. These fields are specificateball, structs the landston scaller local fields have been set aside. dis-

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D-C.O. To describe briefly the magnitude of the site planning works,

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TOTAL SITE DRAWINGS PREPARED

Table D-6.02

AREA	No. of Appr'd.	Plans
Division Training, Including Post Troops	18	
Industrial & Supply	2	
Naval Hospital	5	
Residential	10	
Riflo Rango	4	
Balloon Barrago & Amphibian Baso	5	
Parachute Training	3	
Glider Training Base	2	
Tent Camps Nos.1 & 2	4	
Mumford Pt. Camp No. 1	2	
Poterfield Pt. Tent Camp	1	
Tank Battalion Tent Camp	1	
Midway Park Rosidential	3	
C. C. C. Camp	1	
White Cometery	2	•
Colored Cemetery	1	
Magazine	3	

Totals:

"He was nooppasty to propare site clans for 17 different loostlone, include And two constantion, and involving 74 barrache, 28 Mosa Halls, 174 Aarow nouses, 10 Infirmation, 10 post exchanges, 11 Theaters, 19 Battalion Hardquarters, 196 Officers Questors, 527 Low Cost Defense Houses, and other socialismoous buildings. Is all there were 1431 buildings that had to buy loosted and on which fleer elevations had to be set. A complete schedule of buildings according to argas is shown in Fart II, Chapter E, Sootion E-18 and according to type of billdings in Fart 41. Chapter E. Section E-19.

. ic all 100 site plans (See Table D-8.08), and 22 landscaping plans word croppend. If of those plans were for the Division Training Area and

No. of Prelim.	Plans	Total Prepar	Plans	
1.4			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
14		32		1
5		7		
1		6		
11		21		
1		5		
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0		5		
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CHAPTER E PART II

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ARCHITECTURAL DEPARTMENT

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Total Plana	No. of Prolim, Pla	Pluna	No . of Appr 14.	AZGA
85	NJ			Division Training, Including Fost Traops
7				Industrial & Supply
	1			istigzon isvat
IS	11 .			
	1			RILLO ANDRO
				Balloon Baresgo & Amphibium Baso
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Section E-1 E-2 E-3 E-4 **E-5** E-6 E-7 E-8 E-9 E-10 E-11 E-12 E-13 E-14 E-15 E-16 E-17 E-18

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Introduction Division Training Area Post Troops Activities Industrial & Supply Area Naval Hospital Area Residential Area Rifle Range Area Barrage Balloon & Amphibian Base Parachute Training Area Glider Training Base Tent Camp No. 1 Tent Camp No. 2 Mumford Point Camp No. 1 Peterfield Point Camp Tank Battalion Camp Midway Park Residential Area Miscellaneous Schedule of Buildings by Areas Schedule of Buildings by Type

E-1. Introduction

The Architectural Department under the direction of Charles W. Goudy, Jr., Chief Architect and Joseph D. Rivers, Principal Assistant, designed all buildings at the Marine Barracks, New River, North Carolina.

The buildings are of Modified Early American Colonial Architecture and designed in keeping with the Government plan for conservation of strategic materials.

The Marine Barracks, New River, North Carolina, in general, includes the areas listed in the table of contents on the preceding page.

The following report describes the buildings as designed and does no take into account unreported field changes.

E-2. Division Training Area

E-2.01 Location. The area is located on the east bank of New River near the center of the reservation and is composed of five (5) Regimental Areas, each include the following number and type of buildings:

- 12 Barracks Buildings
- 3 Mess Halls
- 12 Battalion Warehouses
- 1 Regimental Infirmary
- 1 Post Exchange

Provide This Advantage A sea

- 1 Regimental Theater
- 3 Battalion Headquarters Buildings
- 1 Regimental Headquarters Building
- 1 Regimental Service Club

Additional utility buildings are covered in the chapters on the various utilities.

E-2.02 Barracks Buildings: Two story H shape building

Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

First Floor:

Dormitories (2) Bed Rooms (2) Shower Rooms (2) Drying Rooms (2) Wash Rooms (2) Toilet Rooms (2) Connecting Bath 145' x 157 11056 sq. ft. 11056 sq. ft. 22,112 sq. ft. 318,546 cu. ft.

7964 sq. ft. 272 sq. ft. 394 sq. ft. 256 sq. ft. 384 sq. ft. 384 sq. ft. 72 sq. ft.

storage Rooms closets Stairs and Corridors

Second Floor:

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Dormitories (2) Bed Rooms (.2) Shower Rooms (2) Drying Rooms (2) Wash Rooms (2) Toilet Rooms (2) Connecting Bath Storage Rooms closets Stairs and Corridors

Toilets and Wash Rooms:

First Floor:

Shower Rooms (2) 6 showers (each) Wash Rooms (2) 12 lavatories (each) Toilets (2) 6 urinals, 5 water closets, 1 service sink (each) Connecting Bath 2 water closets, 2 lavatories, 1 shower

Second Floor:

Shower Rooms (2) 6 showers (each) Wash Rooms (2) 12 lavatories (each) Toilets (2) 6 urinals, 5 water closets, 1 service sink (each) Connecting Bath 2 water closets, 2 lavatories, 1 shower

Each Dormitory: 58 Beds single deck Each Building: 232 men single deck Each Bed: 69 square feet of floor Each shower head: 10 men Each Urinal: 10 men Each Water Closet: 12 men Each Lavatory: 5 men

General Construction:

Strip steel frame; concrete floor slabs on fill or supported; 4" brick veneer walls.

Foundations:

Either plain or reinforced concrete spread footings or piles. Soil pressures 1000 to 2000 lbs. per square foot. Pile capacity 15 tons each.

130	sq.	ft.
12	sq.	ft.
975	sq.	ft.

7964	sq.	ft.
272	sq.	ft.
394	sq.	ft.
256	sq.	ft.
384	sq.	ft.
384	sq.	ft.
72	sq.	ft.
226	sq.	ft.
12	sq.	ft.
879	sq.	ft.



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E-2.03

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Finishes:

Cement floors, plaster walls and ceilings, steel windows and asbestos & shingle roof.

Design Loads:

Roof - Liveload 20 pounds per square foot First and Second Floors - Liveload 75 lbs. per sq. ft. Wind - 30 pounds per square foot

E-2.03 Mess Halls: One story, irregular "T" shape

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Mess Hall seating 912 men or 14.8 sq.ft. per man Galley Scullery Storage Refrigerator Room Preparation Rooms Machinery Room Garbage Cooks Quarters Toilet Room Office Gear Room Corridors

Toilets: 2 water closets, 2 showers, 3 lavatories

General Construction:

Structural steel frame with strip steel secondary framing; concrete floor slab or fill; 4" brick veneer walls

Foundations:

Spread footings Soil pressures 700 to 2000 pounds per square foot

Finishes:

Cement floors, plaster walls and ceilings, steel sash, asbestos shingle roof.

Design Loads:

Roof - Liveload 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

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167' x 267'
22,065 sq. ft.
484,532 cu. ft.
 13,143 sq. ft.
   3450 sq. ft.
    504 sq. ft.
    903 sq. ft.
    504 sq. ft.
    684 sq. ft.
    380 sq. ft.
    288 sq. ft.
    690 sq. ft.
    132 sq. ft.
     96 sq. ft.
     60 sq. ft.
    780 sq. ft.
```

E-2.04. Battalion Warehouses: One story, rectangular shape

Ground Area Covered Floor Area Cubic Contents Clear Ceiling Height

General Construction;

(a) Strip steel frame; 4" brick veneer walls; concrete floor ... slab on fill (b) Solid 8" brick bearing walls; strip steel roof trusses; concrete floor slab on fill

Foundations:

Spread footings Soil pressures 1000 or 2000 lbs. per sq. ft.

Finishes:

Cement floor, steel windows and asbestos shingle roof.

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Design Loads:

1 - .

Roof - Live load 20 pounds per sq. ft. Wind - 30 lbs. per sq. ft.

E-2.05. Regimental Infirmary: One story, rectangular shape

Ground Area Covered Floor Area Cubic Contents

Design Data as follows:

Entrance Porch Waiting Rooms and Corridors Heads (Officers, Men's, Vener Offices Wards, Dressing Rooms, Diet Kitchen Gear and Store Room Main Dressing Room Lab. Pharmacy, X-Ray, Dark Rod Dental Offices

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33' x 113' 3526 sq. ft. 48,501 cu. ft. 9" - 0"

41' x 111' 3382 sq. ft. 57,305 cu. ft.

	144	sq.	ft.
	630	sq.	ft.
ceal)	260	sq.	ft.
	870	sq.	ft.
	590	sq.	ft.
	40	sq.	ft.
	258	sq.	ft.
om	378	sq.	ft.
	212	sq.	ft.

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E-2.04

BATTALION WAREHOUSE





General Construction:

Strip steel frame; concrete floor slabs on fill or supported; 4" brick veneer walls

Foundations:

Spread footings. Soil pressures 1000 or 2000 lbs. per sq. ft.

Finishes:

Cement, tile and linoleum floors, plaster walls and ceilings, steel windows and asbestos shingle roof.

Design Loads:

Roof - Live load 20 pounds per square foot First Floor - Live load 75 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-2.06. Post Exchange: One story, rectangular shape

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Porches and stoop Vestibule Sales Space Barber Shop (8 chairs) Toilet Storage Office Tailors and Cobblers Shop Receiving Room

Toilet: 3 water closets, 3 urinals, 3 lavatories

General Construction:

Strip steel frame; concrete floor slabs on fill; 4" brick veneer walls.

Foundations:

Spread footings Soil pressures 1000 to 2000 lbs. per sq. ft.

45' x 107' 3322 sq. ft. 47,841 cu. ft.

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204 sq. ft.
122 sq. ft.
1867 sq. ft.
521 sq. ft.
115 sq. ft.
157 sq. ft.
131 sq. ft.
 96 sq. ft.
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B-2.07

E-2.06



POST EXCHANGE



REGIMENTAL THEATER

Finishes:

Cement floors, plaster walls and ceiling steel windows and asbestos shingle roof.

Design Loads

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-2.07 Regimental Theater: One story, rectangular shape building with mezzanine across front.

> Ground Floor Area Seating Capacity First Floor Area Mezzanine Area Total Area Cubic Contents

Design data as follows:

Auditorium Stage Stage Dressing Rooms and Toi Offices Public Toilets Projection and Winding Rooms Lobby, Vestibule, Entries, and Halls

Stage Toilets 2, 1 water closet, 2 showers, 1 lavatory (each) Mens Toilet, 3 water closets, 3 urinals, 2 lavatories, 1 service sink Ladies Toilet; 2 water closets, 4 lavatories

General Construction:

Structural steel frame; concrete floor slab on fill; $12\frac{1}{2}$ " solid brick walls.

Foundations:

Spread footings or composite piles. Soil pressures 1000 or 2000 lbs. per sq. ft. Pile capacity 20 tons each.

Finishes:

Cement, wood and tile floors, wood wainscot, plaster and accustical plaster walls and ceilings steel windows and metal roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq.ft.

78' x 138' 1000 seats 10.205 sq. ft. 1560 sq. ft. 11,765 sq. ft. 346,106 cu. ft.

	7059	sq.	ft.	
	1365	sq.	ft.	
ilets	547	sq.	ft.	
	254	sq.	ft.	
	559	sq.	ft.	
S	510	sq.	ft.	
Stairs				

1460 sq. ft.

E-2.08. Battalion Headquarters: One story, "T" shape building

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Porch. Lobby and Corridors Toilets Storage, Closets and Gear Offices

Toilet for Officers: 2 water closets, 2 urinals, 3 lavatories Toilet for Enlisted Men: 2 water closets, 2 urinals, 3 lavatories

General Construction:

Strip steel frame; concrete floor slabs supported; 4" brick veneer walls.

Foundations:

Spread footings Soil pressures 1000 to 2000 lbs. per sq. ft.

Finishes:

Tile and acphalt tile floors, plaster walls and ceilings, tile wainscots in toilets, wood windows, asbestos shingle roof.

Design Loads;

Roof - Tive load 20 lbs. per sq. ft. First floor - Live load 75 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-2.09 Regimental Headquarters; One story, "U" shape building

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Lobby and Corridors Toilets Storage Offices

Officers Toilet: 2 water closets, 2 urinals, 3 lavatories Enlisted Mens Toilet: 2 water closets, 2 urinals, 3 lavatories

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62' x 127' 4569 sq. ft. 79.988 cu. ft.

> 1052 sq. ft. 252 sq. ft. 166 sq. ft. 3099 sq. ft.

61' x 137' 6351 sq. ft. 101,922 ou. ft.

> 1467 sq. ft. 341 sq. ft. 191 sq. ft. 4352 sq. ft.



BATTALION HEADQUARTERS

E-2.08

E-2.09



REGIMENTAL HEADQUARTERS

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General Constructions:

strip steel frame; concrete floor slab supported; 4" brick venser walls.

Foundations:

Spread footings Soil pressures 1500 or 2000 lbs. per sq. ft.

Finishes:

Tile and asphalt tile floors, plaster walls and ceilings, tile wainscot in toilet rooms, wood windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Floor - Live load 75 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-2.10 Regimental Service Club: One story building with center unit two stories, rectangular in shape with center unit projecting at front and rear.

> Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

First Floor:

Entrance Hall and Entries Locker Rooms Toilets . . Bowling Alleys (6) & Bleacher Seats for 70 Game Rooms Fountain Room: 24 tables, 94 s Office Storage and Gear

Second Floor:

Library

Toilet Rooms:

1-Men's: 5 water closets, 5 urinals, 4 lavatories 1-Women's: 3 water closet, 3 lavatories 2-Helps: 1 water closet, 1 lavatory (each)

75')	x 252	3 *
12,159	sq.	ft.
2900	sq.	ft.
15,059	sq.	ft.
297.145	cu.	ft.

	1175	sq.	ft.
	156	sq.	ft.
	568	sq.	ft.
	3970	sq.	ft.
	3970	sq.	ft.
eats	1840	sq.	ft.
	112	sq.	ft.
	368	sq.	ft.

2900 sq. ft.

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REGIMENTAL SERVICE CLUB



MESS HALL (REAR VIEW)

General Construction:

Strip steel frame: concrete floor slabs supported; 4" brick veneer walls.

Foundations:

Spread footings Soil pressures 1500 or 2000 lbs. per sq. ft.

Finishes:

Wood floors and tile floors, plaster walls and ceilings, tile wainscots in toilets wood windows asbestos shingle and built up roofs.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. First Floor - Live load 100 lbs. per sq. ft. Second Floor - Live load 125 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

Post Troops Activities: E-3.

E-3.01 Location. These activities extend over the entire reservation. Most of the buildings are in an area which adjoins and is northeast of the Regimental Areas and includes the following number and types of buildings:

- 1 Post Headquarters Building 1 Division Headquarters Building 1 Brig 1 Post Exchange 4 Barracks Buildings 4 Battalion Warehouses
- 1 Mess Hall

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1 Battalion Headquarters Building 1 Hostess House 1 Post Dispensary 1 Protestant Chapel 1 Catholic Chapel 1 Firehouse 1 Post Theater 1 Water Treatment Plant 1 Incinerator 1 Radio Transmitter Building 1 Post Tailor and Cobbler Shop 1 Waller Gunnery Building 1 Boat House and Toilet Building

1 Gate House

Additional utility buildings are covered in the chapters on the various utilities.

E-3.02. Post Headquarters Building: Two story building with partial basement, "U" shape, two story portion with one story wing in center at rear.

Ground Area Covered Basement Floor Area First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

Basement:

Corridors and Stairs Storage Vault Offices

First Floor:

Corridors, Stairs and Lobbid Portico Toilets and Gear Rooms Storage Post Office Department Vaults Offices

Second Floor:

Corridors, Stairs and Lobbies Portico Toilets and Gear Room Storage Vaults

112	' X	2051
2614	sq.	ft.
14,809	sq.	ft.
12,852	sq.	ft.
30,275	sq.	ft.
535.196	cu.	ft.

463	sq.	ft.
620	sq.	ft.
124	sq.	ft.
1407	sa.	ft.

9 S	3210	sq.	ft.	
	238	sq.	ft.	
	691	sq.	ft.	
	413	sq.	ft.	
	2510	sq.	ft.	
	152	sq.	ft.	
	7595	sq.	ft.	

S	3466	sq.	ft.
	238	sq.	ft.
	750	sq.	ft.
	425	sq.	ft.
	140	sq.	ft.



Offices

Toilet Rooms;

First Floor:

Officers (2): 2 water closets, 2 urinals, 2 lavatories (each) Enlisted Men (2): 3 water closets, 2 urinals, 2 lavatories (each)

Womens (2): 1 water closet, 2 lavatories (each) Private Toilet Room: 1 water closet, 1 lavatory

Second Floor:

Private Toilet Rooms (4): 1 water closet, 1 lavatory (each) Enlisted Mens (2): 2 water closets, 2 urinals, 2 lavatories (each) Officers (2): 2 water closets, 2 urinals, 2 lavatories (each) Womens: 1 water closet, 2 lavatories

General Construction:

Strip steel roof trusses on $12\frac{1}{2}$ " brick bearing walls; concrete floor slabs supported, 2'-O" thick concrete slab in basement floor.

Foundations:

Spread footings Soil pressure 1500 lbs. per sq. ft.

Finishes:

Terrazzo, tile, asphalt tile and linoleum floors, plaster walls, tile wainscots in toilet rooms, accustical tile ceilings, wood windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. First Floor - Live load 100 lbs. per sq. ft. Second Floor - Live load 75 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-3.03. Division Headquarters: Two story "U" Shape building

Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

7831 sq. ft.

96' x 185' 9259 sq. ft. 9103 sq. ft. 18,362 sq. ft. 297,866 cu. ft.

First Floor:

Corridors, Lobby and Stairs Toilets Storage Offices Vaults Court Room Porch

Second Floor:

Corridors and Stairs Toilets Storage Staff Rooms Offices Vaults

Toilet Rooms:

First Floor:

Officers: 2 water closets, 2 urinals, 3 lavatories Womens: 3 water closets, 2 lavatories Enlisted Mens: 3 water closets, 2 urinals, 3 lavatories

Second Floor:

Officers: 3 water closets, 2 urinals, 3 lavatories Enlisted Mens: 3 water closets, 2 urinals, 3 lavatories Private Toilets (2): 1 water closet, 1 lavatory (each)

General Construction:

Strip steel roof trusses on $12\frac{1}{2}$ " brick bearing walls Concrete floor slabs supported

Foundations:

Concrete foundation walls on wall footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Terrazzo, tile, asphalt tile, and linoleum floors plaster walls, tile wainscots in toilets, accustical tile ceilings, wood windows and asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. First floor - Live load 75 and 50 lbs. per sq. ft. Second floor - Live load 75 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

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2248	sq.	ft.
451	sq.	ft.
483	sq.	ft.
4965	sq.	ft.
139	sq.	ft.
780	sq.	ft.
193	sq.	ft.

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322	sq.	ft.
192	sq.	ft.
1025	sq.	ft.
5627	sq.	ft.
29	sq.	ft.

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E-3.04. Brig: Two story "U" shaped building

Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

First Floor:

Design data as follows:

Corridors, Stairs and Lobby Portico and Entry Toilets, lavs., and Wash Room Storage Offices Cooks Dormitory (10 beds) Guards Dormitory (20 beds) Guards Bed Room (2 Beds) Galley and Mess Hall (132 seats)

Second Floor:

Corridors and Stairs Toilets, Wash Rooms and Showers Storage Dormitories for Prisoners (90 me Solitary (8 cells) Padded Cells (2 cells)

Toilet Rooms:

First floor:

Shower Room: 5 shower heads Wash Room: 6 lavatories Toilet Room: 3 water closets, 3 urinals Private toilet room: 1 water closet. 1 lavatory Bath: 1 water closet, 1 lavatory, 1 shower

- 65 -

79 '	x	190'
8434	sq.	ft.
8391	sq.	ft.
16,825	sq.	ft.
246,128	cu.	ft.

Capacity 100 prisoners single deck

	1035	50.	ft.
	2000	54.	
	604	sq.	IT.
	636	sq.	ft.
	1166	sq.	ft.
	677	sq.	ft.
	600	sq.	ft.
	1088	sq.	ft.
	208	sq.	ft.
)	2790	sq.	ft.

	1436	sq.	ft.
	1112	sq.	ft.
	42	sq.	ft.
n)	4945	sq.	ft.
	716	sq.	ft.
	140	sq.	ft.

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Second Floor:

Shower Rooms (2) 7 shower heads (each) Wash Rooms (2) 10 lavatories (each) Toilet Rooms (2) 5 toilets, 5 urinals (each)

General Construction:

Strip steel roof trusses on $12\frac{1}{2}$ " brick bearing walls; Concrete slab floors on fill on first floor, supported on second floor.

Foundations:

Concrete foundation walls on wall footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, salt glazed brick walls, plaster ceilings, steel windows and asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Floor - Live load 75 lbs. per sq. ft. Stairways - Live load 100 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.



E-3.04



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E-3.06

E-3.05: Post Exchange, Barracks, Battalion Warehouses, Mess Hall, Battalion Headquarters: These buildings are similar to types as described under "Division Training Area."

E-3.06. Hostess House: Two story "T" shape building.

Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

First Floor:

Porches Lounge Office . Coat Room Refreshment Room Dining Room (22 tables, 88 Kitchen Kitchen Entry and Stores Cooks Wash Room Gear Rooms Toilets and Baths Bed Rooms (4) Linen Closet Closets Stairs and Corridor

Second Floor.

Stairs, Corridors and Alcove Toilets, and Baths Gear Room Linen Room Closets Bed Rooms (25)

Toilet and Bath Rooms:

First Floor:

Cooks Wash Room: 1 water closet, 1 lavatory Mens Bath: 2 water closets, 2 urinals, 2 lavatories, 1 shower Womens Bath: 2 water closets, 2 lavatories, 1 tub Bath: 1 water closet, 1 lavatory, 1 tub Bed Rooms: 1 lavatory (each)

128' x 149' 7062 sq. ft. 6103 sq. ft. 13,165 sq. ft. 218,492 cu. ft.

sq.	ft.
sq.	ft.
	sq. sq. sq. sq. sq. sq. sq. sq. sq. sq.

1447	sq.	ft.
411	sq.	ft.
60	sq.	ft.
120	sq.	ft.
175	sq.	ft.
3890	sq.	ft.

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Second Floor:

Mens Bath: 3 water closets, 1 urinal, 2 lavatories, 2 showers Womens Bath: 4 water closets, 2 lavatories, 2 tubs Bed Rooms: 1 lavatory (each)

General Construction:

Wood frame; 4" brick veneer walls Supported concrete slab floors in kitchen and service rooms. Supported wood floors elsewhere.

Foundations:

Spread footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Wood and tile floors, plaster walls, and ceilings, wood windows and asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Floors - Bed rooms 40 lbs. per sq. ft.; Public rooms 100 lbs. per square foot

Wind - 30 lbs. per sq. ft.

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Ground Area Covered Basement Floor Area First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

Basement:

Storage Transformer Room Elevator, Stairs and Halls

First Floor:

Corridors, Stairs, Lobbies, Elevator and Waiting Room Portico Toilets Storage Vaults Offices and Treatment Rooms

This floor contains seven departments viz: Outpatient; Eye, Ear, Nose and Throat; Venereal; X-Ray; Laboratory and Pharmacy; Malaria Control and Executive.

Second Floor:

Corridors, Stairs, Elevator and Waiting Rooms Portico Toilets, Locker Rooms and Gear Rooms Storage Offices, Treatment Rooms, Wards and Rooms

This floor contains three departments viz: Complete Dental Clinic (21 chairs) Operating Suite and Hospital (4 private rooms and 1-22 bed ward.)

E-3.07. Post Dispensary: Two story building with partial basement,

147:	х	2241
2133	sq.	ft.
16,052	sq.	ft.
16,052	sq.	ft.
34,237	są.	ft.
688,688	cu.	ft.

713	sq.	ft.
655	sq.	ft.
477	sq.	ft.

4380	sq.	ft.
242	sq.	ft.
465	sq.	ft.
2521	sq.	ft.
24	sq.	ft.
6683	sq.	ft.

3938	sq.	ft.
242	sq.	ft.
998	sq.	ft.
118	sq.	ft.
9004	sq.	ft.

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Toilet Rooms:

First Floor:

Senior Medical Officers: 1 water closet, 1 lavatory Executive Officers: 1 water closet, 1 lavatory Officers: 1 water closet, 1 lavatory, 1 urinal Enlisted Mens; 2 water closets, 1 lavatory, 1 shower O. D.'s Bath: 1 water closet, 1 lavatory, 1 shower Womens: 1 water closet, 1 lavatory Nurses: 1 water closet, 1 lavatory Venereal: 1 shower, 2 straddle troughs, 2 lavatories Outpatient: (2) 1 water closet, 1 lavatory (each)

Second Floor:

Officers: 2 water closets, 1 urinal, 1 lavatory Corpsmen's: 2 water closets, 1 urinal, 1 lavatory Senior Dental Officers: 1 water closet, 1 lavatory Medical Officers: 1 water closet, 1 lavatory Connecting Bath Between Private Rooms: 1 water closet, 1 lavatory, 1 shower Connecting Bath Between Quiet Rooms: 1 water closet, 1 lavatory, 1 shower Nurses: 1 water closet, 1 lavatory Ward Bath and Toilet: 2 water closets, 3 lavatories, 2 urinals, 2 showers

General Construction:

Reinforced Concrete frame and floors, 122" masonry walls, wood framed roof.

Foundations:

Pile foundation, concrete walls.

Finishes:

Terrazzo, tile, lincleum and asphalt tile floors plaster walls and ceilings. tile wainscots in corridors, toilets and some treatment rooms, wood windows, asbestos shingle roofs.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Floors - Live load 75 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

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E-3.07

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E-2.02

E-3.08 Protestant Chapel: One story building, rectangular in shape

Ground Area Covered Floor Area Cubic Centents

Design data as follows:

Number of Pews Seating Capacity Narthex Nave Chancel Choir Room Sacristy Toilets Entries Closet

General Construction:

Built from Y&D plans on foundations designed by Carr & J. E. Greiner Company.

Foundations:

Soil pressure 2000 lbs. per sq. ft.

Finishes:

Asphalt tile floor, painted cinder block walls, open timber trusses with fiber beard ceilings, wood windows and asbestos shingle roofs.

E3.09. Catholic Chapel: One story building, rectangular in shape

Ground Area Cowered Floor Area Cubic Contents

Design data as follows:

Number of Pews Seating Capacity Narthex Nave Sanctuary Sacristy No. 1 Sacristy No. 2 Passage Gear Closet Toilet Entry

57' x 123' 5935 sq. ft. 214,574 cu. ft.

54		
600		
600.	sq.	ft.
4300	sq.	ft.
580	sq.	ft.
160	sq.	ft.
160	sq.	ft.
50	sq.	ft.
62	sq.	ft.
23	sq.	ft.

56' x 126' 5839 sq. ft. 184,309 ou. ft.

60		
650		
217	sq.	ft.
4300	sq.	ft.
305	sq.	ft.
106	sq.	ft.
193	sq.	ft.
94	sq.	ft.
9	sq.	ft.
40	sq.	ft.
25	sq.	ft.



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ES. C. Conselle Chart is and shows build they meeting its shaper

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General Construction:

Built from Y&D Plans on foundations designed by Carr and J. E. Greiner Company.

Foundations:

Soil pressures 2000 lbs. per sq. ft.

Finishes:

Asphalt tile floor, painted cinder block walls, open timber trusses, fiberboard ceilings, wood windows and asbestos shingle roofs. E-3.10. Firehouse: Two story building, irregularly rectangular in shape 42' x 75' 2680 sq. ft. 2247 sq. ft. 4927 sq. ft. 177 cu. ft. Design data as follows: First Floor: 550 sq. ft. 405 sq. ft. 502 sq. ft. Second Floor: 50 sq. ft. 280 sq. ft. 240 sq. ft. lavatories, 2 showers General Construction:

Ground Area Covered	
First Floor Area	
Second Floor Area	4
Total Floor And	2
Gubin Floor Area	4
Cubic Contents	65
-	

Engine	Room	(3 eng	ines)	15
Hose Ro	om			4
Day Roo	m and	Alarm	Room	5

Dormitory (20 men)		15
Charge		2
Shower and Toilet Room		2
- water closets, 2 urinals.	4	101

Strip steel frame; 1st floor concrete floor slabs on fill; 4" brick veneer walls.

Foundations:

Spread footings or creosoted wood piles Soil pressure 1000 lbs. per sq. ft. Pile capacity 20 tons each
Finishes!

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Cement floors, plaster walls and ceilings, steel windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Second floor - Live load 75 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-3.11. Post Theater: Plan, fan shaped, with part basement, mezzanine floor and balcony.

Ground Area Covered Seating Capacity Total for Bldg. First Floor Area Mezzanine Floor Area Balcony Floor Area Basement Area Total Floor Area Cubic Contents

Design data as follows:

Basement:

Transformer Room Battery Room Mechanical Pit Toilet Room Access to Mechanical Equip. Stairs and Circulation Storage

First Floor:

Stage Orchestra Pit Auditorium Lobby, Stairs and Corridors Dressing Rooms and Toilets Office, Check Room and Box Off Entrance Portico and Side Entr

Mezzanine Floor:

Corridors, Stairs and Circulati Toilets Dressing Rooms

130'	х	177'
1985	sq.	ft.
17,378	sq.	ft.
4262	sq.	ft.
8748	sq.	ft.
4597	sq.	ft.
34,985	sq.	ft.
301,783	cu.	ft.

192	sq.	ft.
112	sq.	ft.
216	sq.	ft.
144	sq.	ft.
850	sq.	ft.
138	sq.	ft.
2476	sq.	ft.

•	3396	sq.	It.
	404	sq.	ft.
8	3713	sq.	ft.
2	2404	sq.	ft.
	703	sq.	ft.
ice	282	sq.	ft.
ances	455	sq.	ft.

ion	1880	sq.	ft.
	940	sq.	ft.
	990	sq.	ft.

Balcony Floor:

Balcony Dressing Room Storage Corridors and Stairs Machine Room Projection Room Winding Room

Toilets:

Basement Toilet: 2 water closets, 2 lavatories First Floor Dressing Room Toilets (6): 1 water closet. 1 shower (each) First Floor Dressing Rooms (6): 1 lavatory (each) Mezzanine Mens Toilet: 6 water closets, 8 urinals, 6 lavatories Mezzanine Womens Toilet: 7 water closets, 6 lavatories Mezzanine Dressing Room Toilets (2): 2 water closets, 2 showers (each) Mezzanine Dressing Rooms (2): 3 lavatories (each) Balcony Dressing Room Toilet (1): 2 water closets, 2 showers Balcony Dressing Room (1): 3 lavatories Balcony, Operators Toilet: 1 water closet, 1 urinal, 1 lavatory, 1 service sink

General Construction:

Wood roof trusses; 13" brick bearing walls; Reinforced concrete balcony and mezzanine; Reinforced concrete floor slabs and stairs. First floor concrete slab on fill.

Foundations:

Concrete foundation walls and wall footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Terrazzo, tile and cement floors, plaster and unfinished masonry walls, wood wainscots in Lobby and auditorium, tile wainscots in public toilcts, accustical plaster ceiling in auditorium other ceilings plaster, wood windows, built-up roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Balcony - Live load 60 lbs. per sq. ft. Other public floor space - Live load 100 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

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Butrous Farthas and Side Enbrances 456 ag. Pa.

Conclusion dist and dimensional 1980 adv ft. To Labora sti spa 040 980 ag. 2%.

4956	sq.	ft.
495	sq.	ft.
607	sq.	ft.
992	sq.	ft.
432	sq.	ft.
504	sq.	ft.
130	sq.	ft.

E-3.12. Water Treatment Plant: Building designed under the supervision of the Water and Sanitary Department. All design data is noted E-3.13. Incinerator: One story building with full basement, rectang-Ground Area Covered 44' x 49: Ground Floor Area 1152 sq. ft. First Floor Area 1112 sq. ft. Total Floor Area 2264 sq. ft. Cubic Contents 42,335 cu. ft. Design data as follows: - based on 15-ton capacity 2 Destructors, 7 1/2 ton capacity each Ground Floor: Destructor Room 1125 sq. ft. Ash Hoist 27 sq. ft. First Floor: Charging Floor Area (6 chutes)872 sq. ft. Can Washing Room 201 sq.ft. Toilet (1 water closet, 1 lavatory) 39 sq. ft. Reinforced concrete beam and slab construction throughout Spread footings Soil pressure 2000 lbs. per sq.ft.

in the report of the aforementioned department. ular shaped General Construction: with concrete walls - 60'-0" free standing brick stack. Foundations: Finishes:

Cement floors, unfinished concrete walls and ceilings, steel windows and built up roof.

Design Loads:

Charging floor designed for live load of two ten-ton truck concentrations Wind - 30 lbs. per sq. ft.

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Basement Floor Area First Floor Area Total Floor Area Cubic Contents

E-3.14. Radio Transmitter Building: One story, rectangular shape 29' x 81' Ground Area Covered 2077 sq. ft. 2005 sq. ft. 4082 sq. ft. 61,702 cu. ft. Design data as follows: 2077 sq. ft. Basement First Floor: 1646 sq. ft. Transmitter Room 128 sq. ft. Office or Sleeping Room 18 sq. ft. Closet Toilet (1 shower, 1 water 37 sq. ft. closet, 1 lavatory 176 sq. ft. Work Shop Strip steel roof trusses on 13" brick bearing walls; Concrete 1st.

General Construction:

floor slabs supported - Basement slab on fill.

Foundations:

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Concrete foundation walls on wall footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floor, plaster walls and ceilings, steel windows and asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. First floor - Live load 200 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-3.15. Post Tailor and Cobbler Shop: One story building, rectangular in shape.

> Ground Area Covered Floor Area Cubic Contents

57' x 192' 9385 sq. ft. 199.766 cu. ft.

Design data as follows:

Service Area & Tailoring Dept. 1158 sq. ft. Offices Cleaning & Pressing Dept. Womens Toilet (2 lavatories. 2 water closets) Mens Toilet (2 lavatories, 2 water closets, 1 urinal 94 sq. ft. Toilet Room (1 lavatory, 1 water closet) Cobbler Shop

General Construction:

Strip steel roof trusses on 8" brick bearing walls; concrete floor slab on fill.

Foundations:

Redio Transitter Building, One there, rootangular shows

1017 Apr 1104

100 Guide 10. 100, 200 au. 10.

Concrete foundation walls Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement and tile floors, plaster walls and ceilings, steel windows asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 20 lbs. per sq. ft.

E-3.16. Waller Gunnery Building (Navy Type): Two story building, "L" shaped, constructed from Yards and Docks plans and specifications.

> Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

First Floor:

Training Room Mechanical Room Work Room Office Toilet (1 water closet, 1 lavatory, 1 urinal) Hall, vestibule and Stair

460 sq. ft. 5375 sq. ft. 86 sq. ft. 63 sq. ft. 1673 sq. ft.

46' x 61' 2217 sq. ft. 873 sq. ft. 3090 sq. ft. 58,589 cu. ft.

> 1340 sq. ft. 184 sq. ft. 327 sq. ft. 80 sq. ft. 52 sq. ft. 234 sq. ft.

Second Floor:

Gallery Stair

· Equipment Space

E-3.17.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Mens Toilet (2 water closets, 2 lavatories) Womens Toilet (2 water closets, 2 lavatories)

General Construction:

Wood frame; concrete slab floor on fill; asbestos shingle siding.

Foundations:

Concrete foundation walls and wall footings.

Finishes:

Cement floors, wood walls and ceiling wood windows, asbestos shingle roof.

E-3.18. Boat House: One story building, rectangular shape, with projecting wing on one end.

> Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Cance Shed (42 cances) Locker Room(84 lockers) Hall Office Store Room

General Construction:

Wood frame, asbestos shingle siding.

Foundations:

Built on timber deck

Detten data as follows:

gervior area ? Tailering Dept. 1168 age ft. .5'S : 178 603+ store mainers & preasing Bapty acostotates St felleren epst 17 NO. 35 and a second that sole ? . 22 . po 8731

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74 sq. ft. 81 sq. ft. 718 sq. ft. Toilet Building (Boat Basin): One story, rectangular shape 13' x 22' 226 sq. ft. 3228 cu. ft. 113 sq. ft. 113 sq. ft.

39' x 115' 3319 sq. ft. 46,445 sq. ft.

> 2367 sq. ft. 700 sq. ft. 36 sq. ft. 108 sq. ft. 108 sq. ft.

Finishes:

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Wood floors, wood walls, unfinished ceilings, wood sash asbestos shingle roof.

Design Loads:

Roof live load 20 lbs. per sq. ft. Wind - 20 lbs. per sq. ft.

E-3.19. Gate House: One story, part two story, irregular "L" shaped .building.

> Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

First Floor:

Porch Waiting Room Offices Exam. Room, Eye and Ear T and Prophylaxis Static Toilets and Gear Storage Detention Room Guards Room Heater Room Corridors and Stairs

Second Floor:

Dormitory Bath Stairs

Toilet and Bath Rooms:

Mens Toilet: 2 water closets, 2 urinals, 1 lavatory Womens Toilet: 2 water closets, 2 lavatories Prophylaxis Station: 1 water closet, 1 urinal, 1 lavatory Mens Toilet (office): 1 water closet, 1 urinal, 1 lavatory Womens Toilet (office): 1 water closet, 1 lavatory Guards Toilet: 1 water closet, 1 lavatory

- 79 -

```
79' x 106'
  5372 sq. ft.
  720 sq. ft.
  6092 sq. ft.
61,636 cu. ft.
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	1090	sq.	ft.
	445	sq.	ft.
	1055	sq.	ft.
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on	830	sq.	ft.
e	520	sq.	ft.
	95	sq.	ft.
	93	sq.	it.
	92	sq.	ft.
	88	sq.	ft.
	367	sq.	ft.

430	sq.	ft.
153	sq.	ft.
63	sq.	ft.

Second Floor Bath:

Ground Area Covered Floor Area Cubic Contents:

Design data as follows:

Guards Room

General Construction:

Wood frame; concrete floor slabs on fill; 4" brick veneer walls to second floor, wood siding above.

Foundations:

Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement or asphalt tile floors, plaster walls and ceilings, wood windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Second floor - Live load 75 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

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Bath: 1 water closet, 1 urinal; 2 lavatories, 1 shower

Gate House Guard Station: 1 story octagonal shaped building

11' x 17' 157 sq. ft. 1838 cu. ft.

135 sq. ft.

E-4. Industrial and Supply Area:

Schond Floor Babby

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Gate I am Ganere Studies 1 story constant shaped building

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E-4.01. Location. This area is situated east of the Division Training Area and Post Troops Area, and includes the following number and types of buildings:

1 Gas and Oil Station 1 Filling Station 5 Warehouses 24 Open Side Motor Sheds 4 Open Shed Warehouses 1 Connissary 1 Post Shop Building 1 Cold Storage 4 Lumber Sheds 1 Balloon Storage Building 1 Firehouse 1 Bakery 1 Post Exchange Storehouse 1 Reclamation Building 1 Laundry Building 2 Garage and Repair Buildings 1 Propane Gas Building 1 Central Heating Plant 1 Scale House

Additional utility buildings are covered in the chapters on the various utilities.

E-4.02. Gas and Oil Station: One story rectangular shaped building.

> Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Porch Office Toilets Storage Officers Toilet: 1 water closet, 1 lavatory Mens Toilet: 1 water closet, 1 lavatory

General Construction:

Wood roof on concrete block walls; concrete floor slab.

Foundations:

Concrete foundation walls, piers and footings Soil pressure 2000 lbs. per sq. ft.

21' x 29' 599 sq. ft. 6733 cu. ft.

130 sq. ft. 92 sq. ft. 64 sq. ft. 235 sq. ft.

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Finishes

Cement floors, painted masonry walls, asbestos board and wood ceilings, wood windows, and asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-4.03. Filling Station: This building similar to Gas and Oil Station except Officers Toilet becomes Womens Toilet.

E-4.04. Warehouses: One story rectangular shaped buildings with loading platform on both long sides.

> Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Loading Platforms Storage Office Corridor Toilets

Officers Toilet: 1 water closet, 1 urinal, 1 lavatory Enlisted Mens Toilet: 2 water closets, 1 urinal, 2 lavatories

General Construction:

Monitor type reinforced concrete building with 12" concrete block outside walls; concrete floor slab and loading platforms.

Foundation

Spread footings or piles Soil pressure 2000 lbs. per sq. ft.; pile capacities 15 and 20 tons

Finishes:

Cement floors, unfinished masonry walls, unfinished concrete slab ceilings, steel windows, built up roofs.

Design Loads:

Live load on loading platform 250 lbs. per sq. ft. Live load on first floor 600 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

200' x 360' 72,000 sq. ft. 1,411,383 cu. ft.

7200 sq. ft. 62,424 sq. ft. 678 sq. ft. 95 sq. ft. 161 sq. ft.

General floors, painted mesonry walls, sebestos board and wood slines, wood windows, and asbestos shingle roof.

Bool - Live load 20 Liss par sq. ft.

Telion, Milling Stution, This building similar to Sas and Oil . Joilor sa mood a encoded ballor charling space wabdat

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WAREHOUSE



GARAGE AND REPAIR SHOP

E-4.17

E-4.04

E-4.05. Open Side Motor Sheds: One story rectangular shaped building, open on one entire side.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Storage of 13 motor vehicles

General Construction:

.

Wood roof trusses on 8" cement block bearing walls, concrete floor slab.

Foundations:

Spread footings Soil pressures 750 to 2000 lbs. per sq. ft.

Finishes:

Cement floor. Unfinished masonry walls, no ceilings, steel windows and asbestos shingle roof.

Design Load:

Roof - Live load 20 lbs. per sq. ft. Wind - 10 lbs. per sq. ft.

E-4.06. Open Shed Warehouses: One story rectangular shaped buildings open on side except end bays.

> Ground Area Covered Floor Area Cubic Contents

General Construction:

Wood frame, galvanized corrugated iron siding; concrete floor slabs

Foundations:

Spread footings Soil pressure 3000 lbs. per sq. ft.

Finishes:

Cement floors, unfinished walls, no ceilings, steel windows, metal roof.

Design Load:

Wind - 30 lbs. per sq. ft.

31' x 157' 4420 sq. ft. 76,936 cu. ft.

28' x 180' 5040 sq. ft. 85,680 cu. ft.





E-4.08

E-4.05

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E-4.07. Commissary: One story rectangular shaped building with loading platform on one entire long side and part of other long side.

> Ground area Covered Floor Area Cubic Contents

Design data as follows:

Porches, Platforms and Steps Warehouse Store Room Sales Store Commissary Store Room Butcher Shop Refrigerator Boxes Machine Room Offices Corridor Toilets

Mens Toilet: 2 water closets, 2 urinals, 2 lavatories, 1 service sink Womens Toilet: 2 water closets, 2 lavatories

General Construction:

.

Reinforced concrete building with 8" concrete block curtain walls; concrete floor slab, concrete loading platform.

Foundation:

Foundation walls and wall footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, part plastered, part unfinished masonry walls, part plaster walls, part unfinished concrete slab ceilings. Steel windows, built-up roofs.

- 84 -

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Floor - Live load 600 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

103' x 368' 33,759 sq. ft. 541,005 cu. ft. 4959 sq. ft. 18,215 sq. ft. 5068 sq. ft. 2399 sq. ft. 209 sq. ft. 721 sq. ft. 115 sq. ft. 655 sq. ft. 210 sq. ft. 268 sq. ft.

Commission One story reachangular shaped building with	el a milosof	E-4.08. building.	Post Shop Building:	One story,
			Ground Area Covered	
1085 x 1801			First Floor Area	
1 . COT 2. 199 037, 750 33, 750 86. 28.			Second Floor Area	
Mr. and JOH. LNE Start rent and rent "Ide")			Metal Plane Anea	
ANT PROPERTY AND			Total Floor Area	
			Cubic Contents	
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			Design data as follow	VS:
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and will have a			Office Toilets	
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and the second Se			Plumbing Shop Offi	.ce
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MO18/03/123.2			Plumbing Tool Room	1
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All I have a second sec			Blacksmith Shop Of	fice
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			Electrical File Po	om
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			Camerel Stack D	tent Room
			General Stock Room	1
			Special Store Room	15
			Refrigerator Shop	
STIRM ALUGBOUT D'ALST' THE S OF STATE			Refrigerator Shop	Store Room
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X			Sprav Room	
			Paint Office	
	·		Paint Stone as	
			Faint Storage	
A STATE OF			Plaster and Mason'	s Room
et una els cati des cati de la cati de la cation de la ca			Labor's Call Room	
			Heater and Air Com	pressor Roc
			Transformer Room	
			Carpenters Shop	
			Cabinet and Gluing	Room
			Tool Makers Room	
			Corportora Maal Da	0
			Compositions 1001 HO	Olit
			Carpenters UIIIce	
			Carpenters Store R	oom
and the second			Corridors, Stairs	and Entranc

part two story, "E" shaped 181' x 360' 45,693 sq. ft. 3521 sq. ft. 49,214 sq. ft. 853,438 cu. ft. 550 sq. ft. 140 sq. ft. 180 sq. ft. 50 sq. ft. ilet 1050 sq. ft. 800 sq. ft. 74 sq. ft. 210 sq. ft. 3650 sq. ft. 200 sq. ft. 2670 sq. ft. 3780 sq. ft. 180 sq. ft. 550 sq. ft. 850 sq. ft. 110 sq. ft. 85 sq. ft. 1740 sq. ft. 190 sq. ft. 150 sq. ft. 150 sq. ft. 1150 sq. ft. 780 sq. ft. 1400 sq. ft. 150 sq. ft. 2850 sq. ft. 300 sq. ft. 300 sq. ft. 580 sq. ft. 590 Sq. ft. 780 sq. ft. 275 sq. ft. om 210 sq. ft. 11,455 sq. ft. 760 sq. ft. 182 sq. ft. 85 sq. ft. 85 sq. ft. 310 sq. ft. ces 3470 sq. ft.

Second Floor:

Dormitory Storage Rooms Toilet and Gear Rooms Office Stairway

First Floor Toilets:

Office Toilets: (2) 1 water closet, 1 lavatory (each) White Shower and Toilet Room (2): 4 water closets, 4 urinals, 6 lavatories, 3 showers (each) Colored Shower & Toilet Room (2): 2 water closets, 3 urinals, 4 lavatories, 3 showers (each)

Second Floor Toilet:

2 Water closets, 2 showers, 2 lavatories

General Construction:

Reinforced concrete building with 12" cement block walls on second story and front wall of first story. Other walls concrete, concrete floor slabs; concrete beam and slab roof with concrete monitors.

Foundation:

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Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement and asphalt tile floors, part plaster, part painted masonry walls, part plaster part painted concrete slab ceilings, steel windows, built-up roofs.

Design Load:

Roof - Live load 20 lbs. per sq. ft. Second Floor - Live load 75 lbs. per sq. ft.

E-4.09. Cold Storage Building: One story rectangular shaped building with loading platforms on both long sides.

> Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Loading Platforms Offices and Tcilets Trucking Hallway Vegetable Storage Receiving, Meat Storage & Issue Room

1742	sq.	ft.
883	sq.	ft.
200	sq.	ft.
171	sq.	ft.
161	sq.	ft.

138' x 180' 22,785 sq. ft. 386,415 cu. ft.

2733 sq. ft. 670 sq. ft. 1342 sq. ft. 4518 sq. ft. 5686 sq. ft.

Dry Storage Fish Storage Ice Storage, Freezing Tank and Machinery Room

Toilet in Storage Area: 2 water closets, 2 urinals, 2 lavatories, 1 shower Toilet in Machinery Area: 1 water closet, 1 lavatory

General Construction:

Reinforced concrete building with 12" concrete block curtain walls stucceed on outside, concrete loading platform, concrete floor slabs.

Foundations:

Pile foundation Pile capacities - 20 tons each

Finishes:

Cement floors, plaster walls and ceilings steel windows and built-up roof.

Design Loads:

sides.

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-4.10. Lumber Sheds: One story rectangular shaped open all

 Ground Area Covered
 22'x 113', 42' x 113'

 Floor Area
 2306 sq. ft., 4545 sq. ft.

 Cubic Contents
 42,666 cu. ft., 90,900 cu.ft.

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Design data as follows:

All buildings divided into eight bays each approximately 14' center to center.

General Construction:

Wood frame

Foundation:

Continuous concrete footings

Finishes:

Dirt floor, unfinished end walls, no ceiling. Rolled mineral surface roofing.

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769 sq. ft. 445 sq. ft.

5297 sq. ft.

E-4.11. Balloon Storehouse and Shop: One story "U" shaped

building.

Ground	i Area	Covered	1
Floor	Area		1
Cubic	Contes	nts	10

Design data as follows:

7630 sq. ft. Storage Receiving, Boxing and Carting 2320 sq. ft.

General Construction:

Wood roof on concrete block walls, concrete floor slab.

Foundation:

Concrete foundation walls and footing Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, painted masonry walls, asbestos board ceiling steel windows asphalt roll roofs.

E-4.12. Firehouses: This building similar to type as described under Post Troops Area.

E-4.13. Bakery: One story, rectangular in shape with loading platform on one long side and part of other long side.

Ground Area	Covered	1
Floor Area		-2
Cubic Conten	nts	, 4

Design data as follows:

Loading Platforms	1
Flour Storage	8
Bakery	6
Ingredient Room	3
Cold Storage Room	
Ferméntation Room	4
Bread Storage and Issue Room	3
Storage	
Office	
Toilet, Shower & Locker Room	
Toilet: 3 water closets, 2 uri	na

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S'animpine b actuals noted & water classical in the

100' x 140' 10,400 sq. ft. 02.268 cu. ft.

142' x 162' 20,736 sq. ft. 169,227 cu. ft.

792 sq. ft. 3425 sq. ft. 5160 sq. ft. 340 sq. ft. 58 sq. ft. 400 sq. ft. 3870 sq. ft. 840 sq. ft. 280 sq. ft. 458 sq. ft. als, 3 lavatories

General Construction:

Reinforced concrete building with 8" concrete block curtain walls, stuccoed; concrete floor slabs and loading platform.

Foundation:

Concrete foundation walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement and terrazzo, painted masonry and plaster walls, plaster and painted concrete slab ceilings, steel windows, built-up roofs.

Design Load:

Roof - Live load 20 lbs. per sq. ft. Floor - Live load 300 lbs. per sq. ft. Loading Platform - Live load 250 lbs. per sq. ft.

E-4.14. Post Exchange Warehouse: One story rectangular shaped building with loading platforms on one long side and one end.

Ground	Area	Covered	73
Floor	Area		11,850
Cubic	Conter	nts	194.92

Design data as follows:

Loading	Platforms		18
Storage			69
Offices			14
Storage	(Valuable	Md'se)	2
Toilets		,	14

Mens Toilet: 1 water closet, 1 lavatory Womens Toilet: 1 water closet, 1 lavatory

General Construction

Reinforced concrete building with 8" concrete block curtain walls; concrete loading platform and floor slabs.

Foundation:

Concrete foundation walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, plaster walls in offices, and toilets, unfinished walls elsewhere wood windows built-up roof.

Ground Area Comerca 100' x 190' Stron Area 10 400 aga 15. Stron Area 10.200 aga 15.

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72' x 158' 11,850 sq. ft. 194,925 cu. ft.

> 300 sq. ft. 12 sq. ft. 14 sq. ft. 230 sq. ft. 12 sq. ft. 1 lavatory

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E-4.13

E-4.16



Design Load:

Roof - Live load 20 lbs. per sq. ft.

E-4.15. Reclamation Building: One story rectangular shape.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Storage Shops Offices Toilets Corridors

White Toilet: 2 water closets, 3 urinals, 3 lavatories Colored Toilet: 2 water closets, 3 urinals, 3 lavatories, 1 service sink

General Construction:

Reinforced concrete building with 8" concrete block curtain walls; concrete floor slab.

Foundation:

Concrete foundation walls. Soil pressure 2000 lbs. per sq. ft.

Finishes:

Built up roof unfinished walls and ceilings except in toilets where plaster finish is used. Cement floors, steel windows.

Design Load:

Roof - Live load 20 lbs. per sq. ft.

E-4.16. Laundry Building: One story rectangular shaped building with wings at both ends.

> Ground Area Covered Floor Area Cubic Contents

Design data as follows:

- 90 -

76' x 150' 10,050 sq. ft. 158,138 cu. ft.

> 4279 sq. ft. 4508 sq. ft. 317 sq. ft. 296 sq. ft. 191 sq. ft.

143' x 293' 25,491 sq. ft. 490,384 sq. ft.

Receiving Room	25
Nork and Delivery Space	15,
Marking Room	8
Disinfecting Rooms	5
Mechanical Equipment	9
Shop	6
storage	9
Office	3
Locker Rooms	12
Toilets	5

40 sq. ft. 505 sq. ft. 383 sq. ft. 53 sq. ft. 95 sq. ft. 25 sq. ft. 10 sq. ft. 50 sq. ft. 01 sq. ft. 35 sq. ft. Office Toilet: 1 water closet, 1 lavatory service sink tories, 1 service sink

White Mens Toilet: 2 water closets, 1 urinal, 2 lavatories White Mens Locker Room: 16 lockers White Womens Toilet: 3 water closets, 2 lavatories, 1 White Womens locker Room: 18 lockers Colored Womens Toilet: 8 water closets, 8 lavatories Colored Womens Locker Room: 72 lockers Colored Mens Toilet: 3 water closets, 2 urinals, 3 lava-Colored Mens Locker Room: 30 lockers

General Construction:

Structural steel frame; 13 inch terra cotta tile walls; concrete floor slab.

Foundations:

Spread footings Soil Pressure 2000 1bs. per sq. ft.

Finishes:

Cement floors, painted masonry walls, painted ceilings, steel windows and built up roof.

Design Load:

Storage and loading platform - Live load 300 lbs. per sq. ft. Other floors - Live load 100 lbs. per sq. ft.

E-4.17. Garage and Repair Building: One story rectangular building with mezzanine floor in one end.

Ground Area Covered	162
First Floor Area	57.
Tetzanine Floor Area	502
Tubio Good Area	62,23
contents	1,161,27

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' x 360' 210 sq. ft. 25 sq. ft. 35 sq. ft. ,271 cu. ft.

Design data as follows:

First Floor:

Offices

1132 sq. ft. Chauffers Waiting Room 257 sq. ft. Toilets, Showers and Locker Rms. 1250 sq. ft. Pedestrian Circulation 1208 sq. ft. Vehicular Circulation 13,617 sq. ft. Vehicular Parking Space 19,520 sq. ft. Work Shops 12,729 sq. ft. Storage 5541 sq. ft.

Mezzanine Floor:

Dormitory Night Officers Room Toilets and Showers Storage

Office Toilet: 1 water closet, 1 lavatory White Toilet & Showers: 2 water closets, 4 urinals, 7 lavatories, 7 showers Colored Toilet & Showers: 3 water closets, 4 urinals, 4 lavatories, 5 showers Mezzanine Toilet & Showers: 3 water closets, 4 urinals, 7 lavatories, 5 whowers

General Construction:

Reinforced concrete building with monolithic concrete walls; concrete floor slab.

Foundation:

Spread footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, painted masonry walls and concrete ceilings except in toilets, showers and locker rooms, these are cemen't plsater, steel windows and built-up roof.

Design Load:

Roof - Live load 25 lbs. per sq. ft. Mezzanine Floor - Live load 50 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

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3360 sq. ft. 217 sq. ft. 417 sq. ft. 425 sq. ft.

E-4.18. Building for Propane Gas System: One story rectangular shaped building with platform on one end and part of one side.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Platforms Equipment Space

General Construction:

Reinforced concrete slab roof on 8" brick bearing walls; concrete floor slab.

Foundations:

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Concrete foundation walls and footings Soil pressure 1000 lbs. per sq. ft.

Finishes:

Cement floors, unfinished brick walls, wood windows, built up roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft.

E-4.19. Central Heating Plant: Rectangular shaped building with projection at rear.

> Ground Area Covered Ground Floor Area Mezzanine Floor Area Operating Floor Area Scale Platform Floor Area Boiler Access Floor Area Catwalks over Boilers Area Surge Tank Floor Area Convey Floor Area Total Floor Area Cubic Contents

General Construction:

Structural steel frame with $12\frac{1}{2}$ " brick curtain walls above operating floor level and concrete walls below; Floors, concrete slabs or metal grating; Reinforced concrete coal handling pits.

- 93 -

201 x 261 467 sq. ft. 6150 Cu. Ft.

141 sq. ft. 273 sq. ft.

891	x	150'
10,971	sq.	ft.
398	sq.	ft.
10,624	sq.	ft.
5400	sq.	ft.
945	sq.	ft.
379	sq.	ft.
1259	sq.	ft.
1220	sq.	ft.
31,196	sq.	ft.
45.199	cu.	ft.



E-4.19

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Foundations:

Concrete piers and concrete filled; steel shell piles. Pile capacities 40 tons each

Finishes:

Cement floors painted brick walls, steel windows, built up roof.

Design Loads:

Floor generally designed for a live load of 150 lbs. per sq. ft. except the operating floor where the slabs are designed for a 400 lb. live load on the slabs and 250 lbs. on the beams.

E-4.20. Scale House: One story rectangular building with platform scales located beyond building.

> Ground Area Covered Ground Area Covered Scale Platform Area Building Area Total Area Cubic Contents Cubic Contents

General Construction:

Wood roof on concrete block bearing walls, concrete floor slab on fill.

Foundations:

Concrete foundation walls

Finishes:

Cement floor, unfinished walls, no ceiling, wood windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft.

E-5. Naval Hospital Area:

E-5.01. Location. This area is situated on Hadnot Point, northwest of the Division Training Area, and includes the following number and types of buildings:

23' x 30' scales & bldgs. 10' x 14' building only 300 sq. ft. 140 sq. ft. 440 sq. ft. 2898 cu. ft. scales & bldg. 1470 cu. ft. building only

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1 Administration Building, Mess' Hall and Recreation Building 11 Wards and Corridors 1 Nurses Home 1 Family Hospital 1 civilian Nurses Home 1 Medical Warehouse 1 Garage 1 Shop Building 1 Heating Plant 1 Warehouse 1 Laundry 2 Corpsmen's Barracks 3 Officers Quarters 1 Warrant Officers Quarters 1 Bachelor Officers Quarters 1 Servant Quarters for Men 1 Servants Quarters for Women 4 Transformer Buildings

Additional utility buildings are covered in the chapters on the various utilities.

E-5.02. Administration Building, Mess Hall and Recreation Building, Wards and Corridors: Irregular-shaped building, part two-story, part threestory, with partial basement.

> Ground Area Covered Basement Floor Area First Floor Area Second Floor Area Third Floor Area Total Floor Area Cubic Contents

The basement of the building is designed as a tunnel under the main connecting corridor with additional areas at service bays and under the Administration Building. The basement houses mechanical piping and equipment. It also may be used as a bomb shelter if necessary.

The first floor of the Administration Building contains the executive and administrative offices, telephone offices, emergency suite and elevators No. 1 and No. 2.

The first floor of the Mess Hall and Recreation Building contains a mess hall for patients and corpsmen seating 512 men; a mess hall for officers seating 48 men; a mess hall for Chief Petty Officers seating 48 men and the galley, preparation and storage rooms for the preparation of food.

The first floor of the Wards and Corridors consist of eleven ward buildings connected by corridors. In these corridors are four service bays in which are located elevators Nos. 3, 4, 5 and 6.

- 95 -

400' x 986' 23.143 sq. ft. 154,296 sq. ft. 144,542 sq. ft. 24,841 sq. ft. 346.822 sq. ft. 5.471.458 cu. ft.



E-5.02

NAVAL HOSPITAL - ADMINISTRATION BUILDING



E-5.02

NAVAL HOSPITAL - GENERAL VIEW

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The eleven wards designated numbers 6 through 16, (numbers 1 through 5 were used to indicate sections of Administration Building, Wess Hall and Recreation Building) contain the following:

No. 6. Sick Officers Quarters; 14 private rooms, 2-2 bed wards, 18 beds.

Nos. 7, 8, 9, 10, 12, 13, 14 and 15, Medical Wards, 27 beds per ward and 2-2 bed wards, 31 beds each.

No. 11, Urological Ward; 27 beds in ward and 2-2 bed wards,

No. 16, Neuropsychiatric Ward; 25 beds in ward and 4 strong rooms, 29 beds.

The second floor of the Administration Building contains the pharmacy, laboratories, the dental clinic, eye, ear, nose and throat clinic, the library and board room.

The second floor of the Mess Hall and Recreation Building contains the recreational facilities consisting of an auditorium, with 594 seats. 516 on main floor and 78 in the balcony; a Recreation Room with refreshment area, a patient library, post office, tailor shop, ship store, barber shop and large terraces.

Second floor of Wards and Corridors is similar to the first floor and contains the following:

Ward Nos. 6 and 12, Sick Officers Quarters; 14 private rooms, 2-2 bed wards. 18 beds each.

Wards Nos. 7, 8, 9, 10, 13, 14 and 15, Surgical Wards; 27 beds per ward and 2-2 bed wards, 31 beds each. Ward No. 11, Dermatology and Syphilis Ward; 27 beds in ward

and 1-2 bed ward, 29 beds.

31 beds.

Ward No. 16. Isolation Ward: 4-2 bed wards, 5-3 wards and 1-5 bed wards, 28 beds.

Third floor of Administration Building and Mess Hall and Recreation Building contains the X-Ray suite, sundry treatment rooms, operating suite, fan room and the upper part of the auditorium and balcony.

In addition to the beds listed above, which total 637, there are 371 additional emergency beds, or a grand total of 1,013 beds which can be set up in the Wards and connecting corridors.

Design data as follows:

Basement Administration, Mess Hall and Recreation Building: 1125 sq. ft. Pipe Tunnel 900 sq. ft. Mechanical Rooms

Transformer Room 396 sq. ft. Stairs, Elevators and Circulation 1504 sq. ft. Window Areas 320 sq. ft.

Basement Wards and Corridors: Pipe Tunnel Mechanical Rooms Transformer Rooms

6050 sq. ft. 1052 sq. ft. 437 sq. ft. zanitunia en linea e branche e la companya e a companya e a

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Steads , 64 Mintel and a start of the sta

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Stairs, Elevators and Circulation Window and Entrance Area

First Floor Administration Buildi

Lobby, Corridors, Waiting Rooms Stairs and Elevators Offices P. B. X. Officer of the Day Examination and Treatment Rms. Wards (5 beds) Toilets, Gear, Utility, Closets etc. Storage

First Floor Mess Hall Buildings:

Corridors, Stairs and Circulation General Mess Hall Officers Mess Hall C. P. O. Mess Hall Sculleries (2) Service Pantry (Officers Mess) Offices Gallev Bake Shop Refrigerator Rooms Proparation Rooms Storage Rooms Garbage Room Mechanical Room Toilets, Locker Room and Gear

First Floor Wards and Corridors:

Corridors, Stairs, Elevators, and Porches 2 Wards and Sick Rooms 5 Treatment Rooms and Doctors Office Sun Rooms Closets, Storage, and etc. Baths, Toilets, Utility Rms. & Gear Rooms Diet Pantries

Second Floor Administration Build:

Waiting Rooms, Corridors, Stairs & Elevators

	6350 972	sq.	ft. ft.
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	713	sq.	ft.
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	9683	sq.	ft.
	975	sq.	ft.
	990	sq.	ft.
	840	sq.	ft.
	318	sq.	ft.
	6148	sq.	ft.
	462	sq.	ft.
	1674	sq.	ft.
	1034	sq.	ft.
	260	sq.	ft.
	182	sq.	ft.
	445	sq.	ft.
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00	,135	sq.	10.
	4419	sq.	ft.
	4492	sq.	ft.
	6089	sq.	ft.
	6193	SC.	ft.
	2475	sq.	ft.
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5747 sq. ft.

Pharmacy Eye, Ear, Nose & Throat Clinic Laboratories Dental Clinic Offices & Treatment Rooms Library and Board Room Red Cross Room Toilets Closets and Storage

Second Floor Mess Hall Building (

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Corridor Passage and Stairs Auditorium Stage and Back Stage Recreation Room Refreshment Room and Kitchen Patients Library and Library We Room Post Office Barber Shop Tailor Shop Ship Store Chaplins Office & Interviewing Room Terraces Toilets, Locker Rooms and Gear Rooms Closets and Storage

Second Floor Wards and Corridors:

Corridors, Stairs and Elevators Wards and Sick Rooms Treatment Rooms and Doctors Office Sun Rooms Closets, Storage, etc. Toilets, Baths, Utility Rooms and Gear Diet Pantries

Third Floor Administration Building

Corridors, Stairs and Elevators X-Ray Suite Offices and Treatment Rooms Operating Suite

Breakdown of Operating Suite:

Waiting Room, Corridors & Nurses Stations Sterilizing and Steril Storage

		· · ·				
с	864 1572 1530 630 1361 1029	sq. sq. sq. sq. sq. sq.	ft. ft. ft. ft. ft.			
	210 563 712	sq. sq. sq.	ft. ft. ft.			
(Rec	reati	on):				
	1441 3885	sq. sq.	ft. ft.			
	897 1770 810	sq. sq.	ft.			1 : *
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	1004 240 343	sq. : sq. :	ft. ft.			
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Operating Rooms (3) Anesthesia Room Recovery Room Toilets, Locker and Dressing Rms. 360 sq. ft. Fan Room Auditorium Balcony Projection Room Dressing Rooms and Passage (back stage) Control Room Toilets and Gear Rooms Closets, Dressing Rooms and Storage

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Toilets and Baths: First Floor, Administration Building:

Womens Toilets: 1 water closet, 1 lavatory Mens Toilets: 1 water closet, 1 lavatory, 1 urinal Ward Bath and Utility Rooms: 1 shower, 1 water closet, 1 lavatory, 1 utility sink, 1 bedpan sterilizer 0. 0. D's Bath: 1 water closet, 1 lavatory, 1 shower Office Toilets: (3) 1 water closet, 1 lavatory (each) Officers Toilet: 1 water closet, 1 lavatory, 1 urinal Corpsmens Toilet: 1 water closet, 2 lavatories, 2 urinals

First Floor Mess Hall and Recreation Building:

Helps Toilet: 2 water closets, 5 lavatories, 4 urinals, 2 showers Office Toilets (2): 1 water closet, 1 lavatory (each)

First Floor Wards and Corridors: Ward No. 6, Sick Officers Quarters:

Connecting Baths (7): 1 water closet, 1 shower (each) Private Baths (2): 1 water closet, 1 tub (each) Nurses Toilet: 1 water closet, 1 lavatory Utility Room: 1 utility sink, 1 bodpan sterilizer Doctors Toilet: 1 water closet Doctors Office: 1 lavatory Sick Rooms: 1 lavatory, in each room

Wards 7, 8, 9, 10, 12, 13, 14 and 15, Medical Mards:

Toilet: 3 water closets, 2 urinals, 1 lavatory Wash Rooms: 4 lavatories, 2 dental lavatories Shower Room: 2 showers Utility Room: 1 utility sink, 1 bedpan sterilizer Nurses Toilet: 1 water closet, 1 lavatory Connecting Bath: 1 shower, 1 water closet Doctors Toilet: 1 water closet Sick Room: 1 lavatory in each room

1133 sq. ft. 220 sq. ft. 202 sq. ft. 1888 sq. ft. 603 sq. ft. 200 sq. ft. 232 sq. ft. 214 sq. ft. 871 sq. ft. 1257 sq. ft.

Doctors Office: 1 lavatory

Ward No. 11. Urological Ward:

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Toilet: 3 water closets, 2 urinals, 1 lavatory Wash Room: 3 lavatories, 2 dental lavatories Shower Room: 2 showers Infections Toilet: 1 water closet, 1 shower, 1 lavatory, 1 dental lavatory Utility Room: 1 utility sink, 1 bedpan sterilizer Nurses Toilet: 1 water closet, 1 lavatory Connecting Bath: 1 water closet, 1 shower Sick Room: 1 lavatory (each) Doctors Toilet: 1 water closet Doctors Office: 1 lavatory Treatment Room: 1 straddle trough, 1 sitz bath, 1 treatment lavatory

Ward No. 16, Neurosychiatric Ward:

Toilet: 3 water closets, 2 urinals, (Tamper proof fixtures) Wash Room: 4 lavatories (Tamper proof fixtures) Shower Room: 3 shower heads (Tamper proof fixtures) Bath: 1 continuous flow bath tub, 1 lavatory (Tamper proof fixtures)

Utility Room: 1 utility sink, 1 bedpan sterilizer Nurses Toilet: 1 water closet, 1 lavatory Doctors Toilet: 1 water closet, 1 lavatory Treatment Rooms: 1 lavatory Strong Room Bath: 1 tub, 1 water closet, 1 lavatory Service Bay Toilets and Utility Rooms (4): 1 water closet, 1 lavatory, 1 bedpan sterilizer and 1 service sink (each)

Second Floor Administration Building:

Mens Toilet: 2 water closets, 1 urinal, 1 lavatory Womens Toilet: 2 water closets, 1 lavatory Dental Office Toilet: 1 water closet, 1 lavatory Office Bath: 1 water closet, 1 lavatory, 1 shower Corpsmens Toilet: 2 water closets, 1 lavatory Red Cross Toilet: 1 water closet, 1 lavatory

Second Floor Mess Hall and Recreation Building:

Chaplins Office: 1 water closet, 1 lavatory Mens Toilet and Bath: 2 water closets, 2 showers, 2 lavatories, 1 urinal Womens Toilet: 2 water closets, 2 lavatories Toilet Back Stage: 1 water closet, 1 lavatory

Second Floor Wards and Corridors: Ward Nos. 6 and 12, Sick Officers Quarters, same as No. 6 first floor.

Ward Nos. 7, 8, 9, 10, 13, 14 and 15, Surgical Wards, same as Nos. 7, 8, 9, 10, 13, 14 and 15 first floor.

Ward No. 11, Dermatology and Syphilis:

Toilet; 3 water closets, 2 urinals. 1 lavatory Wash Room: 3 lavatories, 2 dental lavatories Shower Room: 2 showers Utility Room: 1 utility sink, 1 bedpan sterilizer Infectious Toilet: 1 water closet, 1 shower, 1 lavatory, 1 dental lavatory Nurses Toilet: 1 water closet, 1 lavatory Private Bath: 1 water closet. 1 shower

Sick Room: 1 lavatory Doctors: 1 water closet Doctors Office: 1 lavatory Treatment Rooms: 1 continuous bath tub, 1 treatment

lavatory

Treatment Toilet: 1 water closet

Ward No. 16, Isolation Ward:

Ward Baths (8): 1 water closet, 1 shower, 1 lavatory (each)

Connecting Bath: 1 water closet, 1 shower Sick Rooms: 1 lavatory (each) Utility Rooms: 1 utility sink, 1 bedpan sterilizer Bath: 1 bath tub

Disinfector Room: 1 disinfector Doctors Toilet: 1 water closet Doctors Office and Treatment Room: 1 lavatory (each)

Service Bay Toilet and Utility Rooms (4) same as service bay rooms on first floor.

Third Floor Administration Building and Mess Hall and Recreation Building:

Mens Toilet: 2 water closets, 2 lavatories, 1 urinal Womens Toilet: 2 water closets. 2 lavatories Treatment Room Toilet (3): 1 water closet (each) Toilet Rooms (X-Ray suite) (4): 1 water closet, 1 lavatory (each) Doctors Office Toilet: 1 water closet, 1 lavatory Corpsmen's Toilet: 2 water closets, 1 lavatory, 1 urinal Officers Toilet: 2 water closets, 1 lavatory. 1 urinal Operating Suite Toilet: 1 water closet. 1 lavatory

General Construction:

Reinforced concrete and strip steel frame; concrete floor slabs; 4" brick veneer walls.

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Foundations:

Concrete foundation walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

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Floors generally asphalt tile with terrazzo, ceramic tile, quarry tile, linoleum and cement finishes being used in special places. Walls generally painted plaster. Ceilings, generally painted plaster. Windows generally wood with steel windows in operating rooms and psychiatric wards. Roof, asbestos shingle.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. plus 200 lbs. concentrated load Floors - Live load 75 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-5.03. Nurses Home: Two story building "H" shape

Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows: This building was designed to accommodate one supervising nurse, 1 chief nurse, 1 housekeeper, 70 nurses and 2 guests. In addition to their room, provisions were made for living and recreation rooms, dining rooms, galley and a small infirmary for

First Floor:

Lobby, Stairs and Corridors Reception Room Living Room Library Recreation Room Supervising Nurses Suite Housekeepers Suite Guest Rooms (2) Nurses Hooms (24) Dining Room Kitchen Kitchen Stores and Refrigerators Loading Platform Trunk Room Laundry Linen Rooms (Clean and Soiled) Storage and Closets Toilets, Baths and Gear

181' x 235' 17,785 sq. ft. 15,257 sq. ft. 33,042 sq. ft. 456.614 cu. ft.

2915	sq.	ft.
665	sq.	ft.
1704	sq.	ft.
296	sq.	ft.
345	sq.	ft.
464	sq.	ft.
464	sq.	ft.
286	sq.	ft.
3432	sq.	ft.
1604	sq.	ft.
1230	sq.	ft.
475	sq.	ft.
150	sq.	ft.
281	sq.	ft.
138	sq.	ft.
247	sq.	ft.
403	sq.	ft.
839	sq.	ft.


Second Floor:

Corridors and Stairs Infirmary Utility Room Sewing Room Chief Nurses Suite Nurses Rooms (46) Linen Rooms (clean and soiled) Closets and Storage Toilets, Baths and Gear

Toilets and Baths First Floor:

Second Floor:

Connecting Baths (23): 1 water closet, 1 shower (each) Bath (chief nurse): 1 water closet, 1 shower, 1 lavatory Utility Room: 1 sink, 1 service sink, 1 water closet Nurses Rooms: (46) 1 lavatory (each)

General Construction:

Strip steel frame; concrete floor slabs; 4 inch brick veneer wall.

Foundations:

Soil pressure 2000 lbs. per sq. ft.

Finishes:

Floors, ceramic tile in toilets, cement in storage rooms, etc., and asphalt tile elsewhere. Plaster walls and ceilings painted. Wood windows and asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. First floor - Live load 75 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

3242	sq.	ft.
253	sq.	ft.
83	sq.	ft.
206	sq.	ft.
420	sq.	ft.
6578	sq.	ft.
388	sq.	ft.
688	sq.	ft.
993	sq.	ft.

basement.

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E-5.04. Family Hospital: Two story "T" shaped building with partial

Ground Area Covered Basement Floor Arca First Floor Area Second Floor Area Penthouse Floor Area Total Floor Area Cubic Contents

The basement is designed to house the mechanical equipment including transformers, steam equipment, blowers and elevator pit.

The first floor contains the administrative offices, examining and treatment rooms, the laboratories, galley and food preparation areas, a dining room for nurses, a delivery suite and six rooms for obstetrical patients.

The second floor contains the operating suite, childrens wards, and twenty-five rooms for patients.

The penthouse contains air conditioning equipment and elevator machinery.

Design data as follows:

First Floor:

Lobby, Waiting Room, Corridors, stairs and elevator Record Office and Storage Doctors Offices and Treatment Rooms X-Ray and Dark Room Laboratory and Storage Nurses Dining Room Galley Storage and Refrigeration Laundry Cooks Bed Room, Closet and Bath Pharmacy and Drug Vault Patients Rooms & Closets (6 each) 877 sq. ft. Delivery Suite Delivery Room Labor Room

```
175' x 231'
    185 sq. ft.
 15,096 sq. ft.
13,952 sq. ft.
    515 sq. ft.
29,748 sq. ft.
443,022 cu. ft.
```

3096 sq. ft. 306 sq. ft. 2302 sq. ft. 243 sq. ft. 198 sq. ft. 315 sq. ft. 881 sq. ft. 315 sq. ft. 159 sq. ft. 200 sq. ft. 198 sq. ft. 1240 sq. ft. 207 sq. ft. 180 sq. ft.

<pre>Construction applies new energy applies that applies appl</pre>	Sterilizing 45 sq. ft. Scrub Up 32 sq. ft. Nursery 234 sq. ft. Preparation Room 104 sq. ft. Formula Room 72 sq. ft.
	Isolation Roem 56 sq. ft. Toilet 28 sq. ft. Circulation 282 sq. ft. Utility Pace
in the second second Second second	Diet Kitchen 1 Nurses Stations 1 Toilets and Gear Rooms 5 Closet and Storage 1
	Sun Room 4 Porches 93 Terrace 50
	Second Floor:
	Sun Rooms (2) Patient Rooms (25) Patients Closets (25) Childrens Ward (8 beds) Surrical Dragsing D
	Diet Kitchens (2) Utility Rooms (2) Nurses Station Toilets, Baths and Gear Storage and Closets
	Operating Suite Operating Room 360 sq. ft. Scrub Up Room 48 sq. ft. Sterilizing Rooms 172 sq. ft. Operating and
	Fracture 238 sq. ft. Examining Room 126 sq. ft. Recovery Room 217 sq. ft. Sterile Supply Rm.360 sq. ft. Surgeons Dressing
	Room 140 sq. ft. Nurses Dressing Station 64 sq. ft.
	Total
	105
	- 105 -

1240 sq. ft. 96 sq. ft. 140 sq. ft. 126 sq. ft. 558 sq. ft. 172 sq. ft. 290 sq. ft. 418 sq. ft. 938 sq. ft. 507 sq. ft. 3288 sq. ft. 781 sq. ft. 3617 sq. ft. 275 sq. ft. 522 sq. ft. 164 sq. ft. 304 sq. ft. 280 sq. ft. 88 sq. ft. 989 sq. ft. 336 sq. ft. -1725.sq. ft.

Toilets and Baths:

First Floor:

Labor Room Toilet: 1 water closet, 1 lavatory Patients Baths (3): 1 water closet, 1 lavatory, 1 shower (each) Nurses Toilet: (2) 1 water closet, 1 lavatory (each) (each)

Doctors Office Toilets (3): 1 water closet, 1 lavatory Mens Toilet: 1 water closet, 1 lavatory, 1 urinal Womens Toilet: 1 water Closet, 1 lavatory Cooks Bath: 1 water closet, 1 lavatory, 1 shower Helps' Toilet (men): 1 water closet, 1 lavatory, 1 urinal Helps' Toilet (women): 1 water closet, 1 lavatory

Second Floor:

Patients Baths (10): 1 water closet, 1 lavatory, 1 shower (each) Patients Bath (3): 1 water closet, 1 lavatory, 1 tub (each)

Childrens Bath and Toilet: 1 water closet, 1 lavatory,

1 shower, 1 tub Nurses Toilet: 1 water closet, 1 lavatory Surgeons Dressing Room: 1 water closet, 1 lavatory, 1

shower

Nurses Dressing Room: 1 water closet, 1 lavatory

General Construction:

Reinforced concrete frame up to second floor with $12\frac{1}{2}$ " brick bearing walls above; wood roof trusses; first floor curtain walls, 122" brick and

Foundations:

Concrete foundation walls and footings Soil pressures 2000 lbs. per sq. ft. except at elevator pit where it was reduced to 1500 lbs. per sq. ft.

Finishes:

Floors, terrazzo in lobby, operating suites etc., linoleum in corridors, cement in storage rooms, etc., tile in toilets, asphalt tile elsewhere. Painted plaster walls; painted concrete or plaster ceilings, wood windows,

Design Loads:

Roof - Live load 20 lbs. per sq. ft. plus concentrated loads of 125 1bs. at lower chord roof truss panel points. Floors--Live load 75 lbs. per sq. ft.

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105-11 1725 sq. ft.

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E-5.04

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FAMILY HOSPITAL



CORPSMEN'S BARRACKS



E-5.05. Civilian Nurses Home: Two story irregular shaped building.

Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

First Floor:

Living Room Kitchen Head Nurses Room Nurses Home (5) Toilets and Bath Rooms Closets and Storage

Second Floor:

Corridors and Stairs Nurses Rooms (7) Sewing Room Toilets and Bath Rooms Closets and Storage

Baths and Toilets:

First Floor:

Head Nurses Bath: 1 water closet, 1 lavatory, 1 tub Mens Toilet: 1 water closet, 1 lavatory Bath: 2 water closets, 2 lavatories, 2 showers Nurses Bed Rooms (5): 1 lavatory (each)

Second Floor:

Bath: 2 water closets, 2 lavatories, 2 showers Nurses Bed Rooms (7): 1 lavatory (each)

General Construction:

Wood frame, wood floors, 4" brick vencer walls up to second floor with wood siding above.

Foundations:

Concrete Soil pressure 2000 lbs. per sq. ft.

Finishes:

Wood floors, plaster walls, and ceilings, painted Wood windows, asbestos shingle roof. - 107 -

7	8' x	64 1	
2	891	sq.	ft.
30	228	sqi	ft.
6	099	sq.	ft.
83,	465	cu.	ft.

Corridors, Stairs and Reception Rm. 607 sq. ft. 372 sq. ft. 113 sq. ft. 154 sq. ft. 799 sq. ft. 252 sq. ft. 125 sq. ft.

> 550 sq. ft. 1264 sq. ft. 137 sq. ft. 200 sq.ft. 598 sq. ft.

Design Loads:

Roof - Live load 20 lbs. per sq. ft.

E-5.06. Medical Warehouse: One story rectangular shaped building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Loading Platform Medical Storage General Storage Bag Storage Blanket Storage Narcotics Vault Alcohol Vault Cold Room Office Autopsy Room Mortuary Refrigerator Machine Room Toilets Closet

Toilets and Baths:

Officers Toilet: 1 water closet, 1 lavatory Mens Toilet: 2 water closets, 1 lavatory, 1 urinal Bath: 1 water closet, 1 lavatory, 1 shower

General Construction:

Reinforced concrete building with concrete floor slabs and loading platform.

Foundations:

Concrete foundation walls and footings.

Finishes:

Office floor asphalt tile, autopsy room terrazzo, toilets tile other floors cement. Walls painted plaster or unfinished brick. Plaster ceilings except in storage spaces which are unfinished. Steel windows,

Design Loads:

Platform - Live load 250 lbs. per sq. ft.

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74' x 2	224+	
14,640	sq.	ft.
223,252	cu.	ft.

1440	sq.	ft.
3692	sq.	ft.
5691	sq.	ft.
1600	sq.	ft.
173	sq.	ft.
152	sq.	ft.
171	sq.	ft.
72	sq.	ft.
198	sq.	ft.
480	sq.	ft.
100	sq.	ft.
85	sq.	ft.
152	sq.	ft.
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E-5.07.

Floor Area Cubic Contents

Ground Area Covered 49' x 120' 5260 sq. ft. 76,503 cu. ft. Design data as follows: Garage 4225 sq. ft. Storage 478 sq. ft. Office 172 sq. ft. Toilets and Wash Rooms 120 sq. ft. Office Toilet: 1 water closet, 1 lavatory Wash Room: 1 water closet, 1 lavatory, 1 urinal, 1 shower 39' x 109' 4202 sq. ft. 62,487 cu. ft. Office 145 sq. ft. Carpentry Shop 1967 sq. ft. Paint Shop 633 sq. ft. Plumbing Shop 650 sq. ft. Electric Shop 292 sq. ft. Stock Room 172 sq. ft. Toilet 78 sq. ft. Toilet: 1 water closet, 1 urinal, 1 lavatory, 1 shower

Garage: One story rectangular shaped building Reinforced concrete building with 8" brick curtain walls; Concrete foundation walls and footings Soil pressure 2000 lbs. per sq. ft. Floors, asphalt tile in office, terrazzo in toilet, cement Roof - Live load 20 lbs. per sq. ft. E-5.08. Shop Buildings: One story rectangular shaped building. Ground Area Covered Floor Area Cubic Contents Design data as follows:

General Construction: concrete floor slab. Foundations: Finishes: elsewhere, walls painted plaster in office and toilet, painted brick elsewhere. Painted plaster ceilings in office and toilet, painted concrete elsewhere. Steel windows, built up roof. Design Loads:

- 109 -

General Construction:

Strip steel roof trusses on 8" brick bearing walls; concrete floor slab.

Foundations:

Concrete foundation walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Floors, office asphalt tile, toilet terrazzo, cement elsewhere. Walls painted brick or plaster. Painted plaster ceilings. Steel

Design Loads:

Roof - Live load 20 lbs. per sq. ft. plus 250 lbs. concentrated load at center. Wind - 30 lbs. per sq. ft.

E-5.09. Heating Plant: One story rectangular shaped building.

Ground	d Area	Covered	2
Floor	Area		0
Cubio	Claut	1	2
OUDIC	conter	nts	67,

Design data as follows:

Boiler Room	24
Office	7
Toilet	T
Closet	
Platform over Office &	
Toilet	19

Toilet: 1 water closet, 1 lavatory, 1 shower

General Construction:

Reinforced concrete frame with 12" brick curtain walls; concrete floor slabs.

Foundations:

Concrete foundation walls on wall footings and column footings. Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, painted brick walls, painted concrete ceiling. Steel windows, built up roof.

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37' x 82' 2840 sq. ft. .894 cu. ft.

15 sq. ft. 112 sq. ft. 57 sq. ft. 10 sq. ft. 198 sq. ft.

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NAVAL HOSPITAL - HEATING PLANT AND LAUNDRY



E-5.18

E-5.09

E-5.11

NAVAL HOSPITAL - TRANSFORMER BUILDING



Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 20 lbs. per sq. ft.

E-5.10 Warehouse: One story rectangular shaped building.

Ground	d Area	Covered	391
Floor	Area	4	4202
Cubic	Conter	nts	61,98

Design data as follows:

Storage Room

General Construction:

Strip steel roof trusses on 8" brick bearing walls; concrete floor slab and loading platform.

Foundations:

Concrete foundation walls on wall footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, unfinished walls, painted plaster ceiling. Steel windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. plus 250 lbs. concentrated load.

E-5.11. Laundry: One story rectangular shaped building.

Groun	d Area	Covered	621
Floor	Area		7904
Cubic	Conter	nts	135,297

Design data as follows:

Receiving Area	300
Working Area	5223
Sorting and Delivery	707
Infected Room	100
Disinfected Room	154
Mechanical Room	206
Office	137

x 109' 2 sq. ft. 80 cu.ft.

4007 sq. ft.

x 136' sq. ft. cu. ft.

sq. ft. sq. ft. sq. ft. sq. ft. sq. ft. sq. ft. sq. ft.

Office Toilet White Women's Toilet Colored Men's Toilet 179 sq. ft. Colored Women's Toilet 234 sq. ft. Storage

Toilets:

Office: 1 water closet, 1 lavatory White Women: 1 water closet, 1 lavatory Colored Men: 1 water closet, 2 urinals, 3 lavatories, 1 shower Colored Women: 3 water closets, 3 lavatories

General Construction:

Reinforced concrete frame with 8" brick curtain walls. Concrete floor slabs.

Foundations:

Concrete foundation walls and wall footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, painted brick or plaster walls painted plaster ceilings. Steel windows, built up roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Monorail - 3000 lbs. Wind - 30 lbs. per sq. ft.

E-5.12 Corpsmen's Barracks: Two story H shaped building.

Ground	l Area	Covered	1
First	Floor	Area	11.4
Second	Floor	r Area	93
Total	Floor	Area	20.8
Cubic	Conter	nts	248,1

Design data as follows:

First Floor Porches]
Corridors and Stair	•	
Halls		1
Lounge		
Game Room		
Dormitories (4)		4

- 112 -

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52 sq. ft. 61 sq. ft. 161 sq. ft.

105' x 171' 410 sq. ft. 396 sq. ft. 806 sq. ft. 177 cu. ft.

1390 sq. ft. 1254 sq. ft. 983 sq. ft. 278 sq. ft. 4076 sq. ft.

Bed Rooms (8) Toilets, Baths and Gear Closets and Storage

Second Floor:

Corridors and Stair Halls Reading Room Scrub Deck Dormitories (4) Bed Rooms (8) Toilets, Baths and Gear Closets and Storage

Toilet and Baths:

Toilets, Baths and Wash Rooms (4), 3 water closets, 3 urinals, 6 lavatories, 3 showers (each) Connecting Baths (8) 1 water closet, 1 lavatory, 1 shower Dormitories: 12 men each 96 men single deck or 192 men double deck Single Deck Equals 85 sq. ft. per bed or 765 cu. ft. per bed 1 Shower Head per 8 men 1 Urinal for 1 Water Closet for 8 men 1 Lavatory for 8 men 4 men

General Construction:

Strip steel frame, concrete floor slabs; 4" brick veneer walls

Foundations:

Concrete foundation walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Floors, tile in toilets, cement in storage rooms etc., asphalt tile elsewhere, painted plaster walls and ceilings. Wood windows, asbestos

Design Loads:

Roof - Live load 20 lbs. per sq. ft. First and Second floors - Live load 75 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

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278 ag. 25. 4076 ag. 25.	Den horn Denie (4)

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1088 sq. ft. 830 sq. ft. 416 sq. ft. 1154 sq. ft. 569 sq. ft. 278 sq. ft. 4076 sq. ft. 1088 sq. ft. 830 sq. ft. 384 sq. ft.

E-5.13 Officers Quarters: Two story, part one story, building of irregular shape.

> Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

First Floor:

Porches Living Room Dining Room Kitchen Heater Room Bed Room Bath Hall and Stairs Closets

Second Floor:

Hall and Stairs Bed Rooms (3) Baths (2) Closets

Baths:

First Floor: 1 water closet, 1 lavatory, 1 tub with shower over Second Floor: 1 water closet, 1 lavatory, 1 shower Second Floor: 1 water closet, 1 lavatory, 1 tub shower

General Construction:

Wood frame; wood floors and siding

Foundations:

Brick and concrete

Finishes:

(i) tan 63 D R

a service better with bort

Wood floors, painted plaster walls and ceilings. Wood windows, asbestos shingle roof.

Design Loads:

Roof - Live loud 20 lbs. per sq. ft.

34' x 68' 1566 sq. ft. 1025 sq. ft. 2591 sq. ft. 29,867 cu. ft.

189	sq.	ft.
306	sq.	ft.
196	sq.	ft.
131	sq.	ft.
45	sq.	ft.
226	sq.	ft.
45	sq.	ft.
176	sq.	ft.
38	sq.	ft.

103	sq.	ft.
580	sq.	ft.
101	sq.	ft.
68	sq.	ft.

Securit Officers Quarters Two story, part one story, building of

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o story, part one story, but	E-un 13 <u>0671 auto Quartarias</u> Two ul r shebe.	inst in	E-5.14 Warrant Officers Quarters:	One story irregular building
*08 x 948 •03 .ps 3887 •04 .ps 301	S wind war bureto num, marin dari dari dari dari		Ground Area Covered Floor Area Cubic Contents	57' x 58' 1895 sq. ft. 22,640 cu. ft.
.23 .05 Y88,85			Design data as follows:	

Porches Halls Living Room Dining Room Kitchen Bed Rooms (3) Bath Closets and Storage (7)

Bath: 1 water closef, 1 lavatory, 1 tub with shower over

General Construction:

Wood frame; wood floors and siding

Foundations:

Brick foundation walls and piers on concrete footings

Finishes:

Wood floors, painted plaster walls and ceilings. Wood windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft.

E-5.15 Bachelor Officer Quarters: Two story, part one story, part basement irregular building.

> Ground Area Covered Basement Floor Area First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

Basement, Boiler Room and Cold Storage

- 115 -

225	sq.	ft.
126	sq.	ft.
284	sq.	ft.
184	sq.	ft.
140	sq.	ft.
496	sq.	ft.
58	sq.	ft.
89	sq.	ft.

67' x 237' 371 sq. ft. 8412 Eq. ft. 7905 sq. ft. 16,688 sq. ft. 237,955 cu. ft.

371 sq. ft.

First Floor:
Reception Hall
Public Lounge
Private Lounge
Powder Room
Corridors, and Stair Halls
Dining Room
Galley
Galley Storage
Refrigerator Room
Compressor Room
Cooks Bed Room
Cooks Bath
Stewards Room
Stewards Bath
Trunk Room
Bed Rooms (10)
Toilets and Wash Room
Closets and Storage (17)

Second Floor:

Corridors and Stair Halls Bed Rooms (26) Toilet and Wash Room (2) Trunk Room Closets and Storage

Baths, First Floor:

Toilet and Wash: 2 water closets, 2 urinals, 1 lavatory 2 showers Stewards Bath: 1 water closet, 1 shower Cooks Bath: 1 water closet, 1 shower Powder Room: 1 water closet, 1 lavatory All Bed Rooms: 1 lavatory each

Second Floor.

Toilets and Wash Rooms (2): 3 water closets, 2 urinals, 1 lavatory, 2 showers (each) All Bed Rooms: 1 lavatory each

General Construction:

Wood frame; wood floors; 4" brick veneer walls

Foundations:

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South Part of the Section

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Concrete foundation walls and footings Soil pressure 2000 lbs. per sq. ft.

472	sq.	ft.
686	sq.	ft.
222	sq.	ft.
79	sq.	ft.
1083	sq.	ft.
1216	sq.	ft.
544	sq.	ft.
228	sq.	ft.
49	sq.	ft.
34	sq.	ft.
137	sq.	ft.
27	sq.	ft.
125	sq.	ft.
27	sq.	ft.
170	sq.	ft.
1730	sq.	ft.
137	sq.	ft.
165	sq.	ft.

1460 sq. ft. 4498 sq. ft. 306 sq. ft. 304 sq. ft. 297 sq. ft.

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Finishes:

cement floors in galley, storage rooms, refrigeration rooms, etc., asphalt tile or ceramic tile in toilets, wood elsewhere . Walls and ceilings painted plaster. Wood windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Floors - Live load 100 lbs. per sq. ft. in public rooms and work rooms; 40 lbs. per sq. ft. in bedrooms.

E-5.16 Servants Quarters for Men: One story rectangular building.

Ground Floor Area Floor Area Cubic Contents

Design data as follows:

Living Rooms (2) Bed Rooms (4) Dormitory (asst. cooks) 11 beds single deck Dormitory 17 beds single deck Toilet and Wash Room Closets and Storage Boiler Room Hall Porch

Toilet and Wash Room: 4 water closets, 4 urinals, 4 showers, 6 lavatories, 1 service sink

General Construction:

Wood frame, wood floors, asbestos cament shingle siding.

Foundations:

Concrete block piers and concrete footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors in toilet rooms, storage rooms etc., wood floors elsewhere. Painted plaster walls and ceilings. Wood windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

51' x 184' 5310 sq. ft. 84,278 cu. ft.

> 584 sq. ft. 476 sq. ft. 1026 sq. ft. 1582 sq. ft. 425 sq. ft. 124 sq. ft. 227 sq. ft. 80 sq. ft. 436 sq. ft.

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E-5.17 Servants Quarters for Women: One story U-shaped building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Living Rooms (2) Corridors Sewing Room Laundry Bed Room (20) 2 beds each Baths (2) Boiler Room Closets and Storage

Baths (2): 4 water closets, 6 lavatories, 4 showers each

General Construction:

Wood frame; wood floors; asbestos cement shingle siding

Foundations:

Concrete block piers and concrete footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors in toilet and boiler rooms, wood floors elsewhere. Painted plaster walls and ceilings. Wood windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-5.18 Transformer Buildings: One story rectangular building, manhole below.

> Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Manhole Transformer Room

57' x 122' 6306 sq. ft. 99,368 cu. ft.

> 770 sq. ft. 936 sq. ft. 123 sq. ft. 95 sq. ft. 2696 sq. ft. 526 sq. ft. 216 sq. ft. 251 sq. ft.

12' x 21' 168 sq. ft. 2652 cu. ft.

51 sq. ft. 120 sq. ft.

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General Construction

Wood roof on 122" brick bearing walls; concrete floor slab.

Foundations:

Concrete foundations walls and wall footings Soil pressure 1300 lbs. per sq. ft.

Finishes:

Cement floor, unfinished walls. Wood windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft.

E-6. Residential Area:

E-6.01 Location: This area is situated northwest of the Division Training Area beyond Hadnot Point the site of the Naval Hospital and includes the following number and types of buildings:

- 180 Married Officers Quarters
- 8 Bachelor Officers Quarters
- 1 Officers Recreation Building combined with Bachelor Officers Mess Hall
- 1 Guest House
- 1 Servants Quarters for Men
- 1 Servants Quarters for Women
- 1 Firehouse

Additional utility buildings are covered in the chapters on the various utilities.

E-6.02 Married Officers Quarters: Two story building, rectangular in shape with one story wing at one side and porch at other. Plan of all buildings alike, with ten different elevation designs.

> Ground Floor Area First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

- 119 -

12 NOR 10 -

36' x 71' 1640 sq. ft. 1016 sq. ft. 2656 sq. ft. 29,937 cu. ft.



MARRIED OFFICERS QUARTERS



MARRIED OFFICERS QUARTERS GROUP

E-6.02

E-6.02

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First Floor:

Porches Hall and Stairs Living Room Dining Room Heater Room Lavatory Servants Quarters (bed rm., bath, closet) Garage

Second Floor:

Hall and Stairs Bed Rooms (3) Closets Baths (2)

General Construction:

Wood frame; wood floors and siding

Foundations:

Brick foundation walls on concrete wall footings.

Finishes:

Floors, tile in bathrooms, cement in heater and store rooms, wood elsewhere. Walls and ceilings painted plaster, wood windows, tile roof.

E-6.03 Bachelor Officers Quarters: Two story rectangular building with projections front and rear.

> Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

First Floor:

Corridors, Entries and Reception Room Toilets, Wash Rooms and Gear Trunk Room

- 120 -

208	sq.	it.
116	sq.	ft.
305	sq.	ft.
200	sq.	ft.
44	sq.	ft.
28	sq.	ft.
126	sq.	ft.
112	sq.	·ft.

sq.	ft.
sq.	ft.
sq.	ft.
sq.	ft.
	sq. sq. sq. sq.

58' x 208' 7346 sq. ft. 6841 sq. ft. 14,187 sq. ft. 189,816 cu. ft.

> 1710 sq. ft. 378 sq. ft. 164 sq. ft.



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BACHELOR OFFICERS QUARTERS



GUEST HOUSE

E-6,03

E-6.05

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Storage Closets Public Lounge Private Lounge Bed Rooms (17 Officers an 1 Steward) Bed Room Closets

Second Floor:

Corridors and Stairs Toilets, Wash Room and Gear Linen Closet Trunk Room Bed Rooms (22 officers) Bed Room Closets

Toilets and Baths:

First Floor:

Officers Toilet & Wash Rooms (2): 2 water closets, 2 showers 2 urinals, 1 lavatory, 1 service sink (each) Ladies Toilet: 1 water closet, 1 lavatory Stewards Bath: 1 water closet, 1 shower

Second Floor:

Officers Toilet and Wash Rooms (2): 3 water closets, 2 showers, 2 urinals, and 1 lavatory (each)

One lavatory in each bed room first and second floor.

General Construction:

Wood frame; wood floors; 4" brick veneer walls

Foundations:

"Concrete walls piers and footings Soil pressure 1000 or 2000 lbs. per sq. ft.

Finishes:

Floors, tile in toilets and wash rooms, wood elsewhere. Painted plaster walls and ceilings. Wood windows, tile roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

- 121 -

	200	sq.	ft.	
	767	sq.	ft.	
	260	sq.	ft.	
nd				
	2720	sq.	ft.	
	135	sq.	ft.	

1262 sq. ft. 287 sq. ft. 62 sq. ft. 288 sq. ft. 3811 sq. ft. 173 sq. ft.

and the second sec	E-6.04 Officers Recrestion Puilding
The Local States and States and States	Mess Hall: One story, part two story, irregular building
app. Gb. a statist marking and and	Channel in the second statisting.
	First Floor America 225' x 357'
age (2011)	Second Floor Area 32,250 sq. ft.
·[0	Total Floor Area 1242 sq. ft.
in the second	Cubic Contents 701,211 cu st
	Solybii Gu, IC.
and the second	Design data as follows:
	Lobby. Corridors and Personne 7975
	Stairs 50 and rassages 5275 sq. ft.
the faith that is a set of the se	Coat Room 275 sq. ft
were bright the second s	Telephone Alcove 116 sq. ft.
	Office and Information 297 sq. ft.
	B. O. Mess Hall 6350 sq. ft.
	Public Dining Room 4756 sq. ft.
· 1 · C · C · C	Bar Storers 2596 sq. ft.
	Lounge 350 sq. ft.
	Card Rooms 2290 sq. ft.
A state was to be a state of a state of the	Toilets 646 ou St
the second se	Galley, Scullery, and Chefs'
Resident and the second s	Office 4005 sq. ft
	Galley Storage 1431 sq. ft.
	Cold Storage 327 sq. ft.
	Garbage 119 sq. ft.
	Office 396 sq. ft.
Tradition of Man States and States	Helps Toilet and Locker Dama 129 sq. ft.
	Gear Rooms 506 sq. ft.
	Transformer Room 120 sq. ft.
(Lenand)	Refrigerator Machine Room 114 so ft
	Boiler Room 1326 sq. ft.
and a second of the second	forend m
x and the second s	Second Floor:
	Telephone Exchange
start to the start of the start	Office 290 sq. ft
at as a wark on a to be the public of the	Stairs and Corridor 317 sq. ft.
the lot of	Toilets.
the formation of the second	Mens Toilet: 4 water closets, 5 urinals. 1 shower of
	lavatories
	Womens Toilet: 4 water closets, 4 lavatories
to , Wid decimation	Colored Mens (help): 1 water closet, 1 lavatory
and the second	lavatories. 1 shower
a second s	Colored Womens (help). 1 water alast 2
	(P). 1 mater closet, 2 lavatories

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- 122 -



OFFICERS RECREATION BUILDING & BACHELOR OFFICERS MESS E-6.04 (FRONT VIEW)



OFFICERS RECREATION BUILDING & BACHELOR OFFICERS MESS (REAR VIEW)

8-6.04

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General Construction:

Wood roof on 8" brick bearing walls wood floors.

Foundations:

Concrete foundation walls and footings.

Finishes:

Floors, terrazzo in bar room, ceramic tile in toilet rooms, asphalt tile in corridors, card rooms office etc., cemont in galley, etc. wood or wood block elsewhere. Painted plaster walls and ceilings. Wood windows, tile roof.

Design Loads:

Roof - Live loads 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-6.05 Guest House: Two story rectangular building with wing at both ends and small basement.

Ground Area Covered	42' x 57'
Basement Floor Area	95 sq. ft.
First Floor Area	1532 sq. ft.
Total Floor Area	1532 sq. ft.
Cubic Contents	3159 sq. ft.
CADIO COMPENIOS	38,460 cu. ft.

Design data as follows:

First Floor:

Living Room Hall and Stairs Bed Rooms (3) Baths (2) Closets	352 sg 127 sg 596 sg 85 sg 40 sg	 ft. ft. ft. ft. ft.
Second Floor:		
Hall and Stairs Bed Rooms (4) Baths (3) Closets	185 sq 854 sq 150 sq 83 sq.	ft. ft. ft.

Each bath contains: 1 water closet, 1 lavatory, 1 tub or shower

General Construction:

Wood frame with 4" brick veneer walls wood floors

Foundations:

Condrete foundation walls and footings

Finishes:

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Tile floors in bathrooms, wood elsewhere. Wood panelled walls in living room, painted plaster elsewhere. Ceilings painted plaster, wood windows, tile roof.

E-6.06	Servants Quarters for Men:	One	story re	ecta
	Ground Area Covered		40	x
	Floor Area		4113	sq.
	Cubic Contents		66,002	cu.

Design data as follows:

Living Rooms (2)	576	sq
Dormitories (2)	2714	sq.
Storage Rooms	88	sq.
Closets	66	sq.
Toilets, Showers & Wash Room	422	sq.
Porches	171	sq.

Toilet, Showers and Wash Room: 3 water closets, 3 urinals, 3 showers, 6 lavatories, 1 service sink

General Construction:

Wood frame; wood floors; asbestos shingle siding

Foundations:

Concrete walls, piers and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Wood floors in corridors and bed rooms, cement elsewhere. Plaster walls and ceiling. Wood windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

angular building.

164 ' ft. ft.

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E-6.07 Servants Quarters for Women: One story rectangular building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Living Room Corridor Bed Rooms (6) Storage and Linen Closet Toilet and Wash Room Porches

Toilet and Wash Room: 2 water closets, 2 lavatories, 1 shower, 1 service sink

General Construction:

Wood frame; wood floors; asbestos cement shingle siding

Foundations:

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Concrete walls piers and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Wood floors in dormitories, cement floors elsewhere. Plaster walls and ceilings. Wood windows asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-6.08 Firehouse: Similar to type described under Post Troops Area.

E-7 Rifle Range Area:

E-7.01 Location: This area is situated across New River and southwest of Division Training Area and includes the following number and types of buildings:

- 4 Barracks
- 1 Mess Hall
- 4 Battalion Warehouses
- 1 Regimental Theater
- 1 Regimental Infirmary
- 1 Post Exchange

- 125 -

35' x 71' 1840 sq. ft. 27,969 cu. ft.

300	sq.	ft.
197	sq.	ft.
808	sq.	ft.
85	sq.	ft.
183	sq.	ft.
72	sq.	ft.

1 Armory and Office Building

- 1 Heating Plant
- 3 Target Houses (Rifle Range)
- 2 Target Houses (Pistol Range)
- 1 Firing Line Shelter (Pistol Range)
- 4 Range Houses

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- 4 Magazines
- 9 Toilet Buildings
- 5 Married Officers Quarters
- 1 Bachelor Officers Quarters

Additional utility buildings are covered in the chapters on the various utilities.

E-7.02 Barracks, Mess Hall, Battalion Warehouses, Regimental Theater, Regimental Infirmary and Post Exchange are similar to type as described under Division Training Area.

E-7.03 Armory and Office Building: Two story H shaped building.

Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

First Floor:

Corridors and Stairs Armorv Toilets Telephone Room Supply Room Closets Offices (6) Store Room

Second Floor:

Corridors and Stairs Supply Room Toilets Offices (7) Class Rooms (4)

Toilets:

Officers (1st and 2nd floors): 2 water closets, 2 urinals, 2 lavatories, 1 shower Enlisted Mens (1st and 2nd floors): 3 water closets, 2 urinals, 3 lavatories, 1 service sink

- 126 -

117' x 162' 9357 sq. ft. 9357 sq. ft. 18,714 sq. ft. 232,666 cu. ft.

937	sq.	ft.
2824	sq.	ft.
350	sq.	ft.
81	sq.	ft.
72	sq.	ft.
54	sq.	ft.
1357	sq.	ft.
2824	sq.	ft.

94	sq.	ft.
105	sq.	ft.
350	sq.	ft.
1500	sq.	ft.
5621	sq.	ft.

General Construction:

Strip steel frame with 4" brick veneer walls concrete floor slabs.

Foundations:

Concrete foundation walls and footings. Soil pressure 1000 lbs. per sq. ft.

Finishes:

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Cement floors, painted plaster walls and ceiling. Steel windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-7.04 Heating Plant: One story rectangular building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows: One room housing 2 boilers and other equipment: 1 water closet and service sink placed in a corner

General Construction:

Reinforced concrete frame with $12\frac{1}{2}$ " brick spandrel walls; concrete slab floors, 40' free standing brick stack.

Foundations:

Spread footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, unfinished walls. Steel windows, built-up roof. Design Loads:

Roof - Live load 100 lbs. per sq. ft. on slab and 80 lbs. per sq. ft. Wind - 20 lbs. per sq. ft.

- 127 -

34' x 56' 1312 sq. ft. 40,674 cu. ft.

E-7:05 Target House (Rifle Range): One story rectangular in shape with platforms at both ends.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Platforms Repair Room and Storage

General Construction:

Reinforced concrete roof on 8" brick bearing walls; concrete floor slab.

Foundations:

Concrete foundation walls and footings

Finishes:

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Cement floor, unfinished walls and ceiling. Steel windows, built-up. roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft.

E-7.06 Target House (Pistol Range): One story rectangular in shape.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Repair Shop and Storage

General Construction:

Wood frame and siding, concrete floor slab.

Foundations:

Concrete foundation walls and footings

Finishes:

Cement floor, unfinished walls, wood windows, asbestos shingle roof.

- 128 -

21' x 90' 1862 sq. ft. 11,341 cu. ft.

> 618 sq. ft. 1126 sq. ft.

15' x 30' 443 sq. ft. 5360 cu. ft.

406 sq. ft.

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E-7.07 Firing Line Shelter (Pistol Range): One story rectangular in shape open on all sides except for control room at center.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Control Room Open Shed

General Construction:

Wood roof on wood columns

Foundations:

Concrete foundation walls and pedestals

Finishes:

Roll roofing.

E-7.08 Range Houses: One story rectangular in shape.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Porch Statistical Office Toilets Storage

Toilets:

Officers: 1 water closet, 1 urinal, 1 lavatory Enlisted Men: 3 water closets, 4 urinals, 3 lavatories

3 Drinking fountains on porch

General Construction:

Wood roof on 8" brick bearing walls; concrete floor slab.

Foundations:

Concrete foundation walls and footings Soil pressure 1500 lbs. per sq. ft.

15' x 253' 3900 sq. ft. 22,959 cu. ft.

> 53 sq. ft. 3830 sq. ft. Shed divided into 20 bays 12' center to center of posts.

30' x 41' 1222 sq. ft. 14,515 cu. ft.

> 415 sq. ft. 114 sq. ft. 210 sq. ft. 355 sq. ft.

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Design Loads:

Finishes:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-7.09 Magazines: These buildings were not designed by Carr and J. E. Greiner Company, Bureau of Yards and Docks plans used.

E-7.10 Toilet Buildings: One story rectangular in shape. Those on range designed with pitched roof, those behind butts designed with flat roof.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Toilet Room

General Construction:

Wood roof (except at Butts where a concrete flat slab roof was used) on 8" brick bearing walls. Concrete floor slab.

Foundations:

Concrete foundation walls and footings Soil pressure 1500 lbs. per sq. ft.

Finishes:

Cement floors, painted masonry walls, plaster ceiling, steel windows, asbestos shingle roof. (built-up roof where flat slab roof was used)

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-7.11 Married Officers Quarters and Bachelor Officers Quarters: Are similar to type described under Residential Area.

- 130 -

cement floors, masonry walls with glazed tile wainscoting, asbestos board ceilings. Steel windows, asbestos shingle roof.

12' x 14' 162 sq. ft. 1658 cu. ft. on range 1445 cu. ft. behind butts

128 sq. ft. 2 water closets, 2 urinals, 1 lavatory, 1 drinking fountain

E-8 Barrage Balloon Battalion and Amphibian Base Area:

E-8.01 Location: This area is situated south of the Division Training Area at the site of the former village of Marines and includes the following number and types of buildings:

1 Battalion Headquarters Building 4 Barracks Buildings 1 Mess Hall 4 Battalion Warehouses 1 Post Exchange 1 Regimental Infirmary 1 Regimental Theater (Drill and Recreation Building) 8 Married Officers Quarters 2 Heating Plants 1 Administration Building 1 Barrage Balloon School Building 1 Balloon Building 1 Transportation Building 1 Storage and Supply Building 1 Field Operation Building 1 Tractor Storage Building 1 Machine Shop

1 Carpenter Shop

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Additional utility buildings are covered in the chapters on the various utilities.

E-8.02 Battalion Headquarters Building, Barracks Buildings, Mess Hall, Battalion Warehouses, Post Exchange, Regimental Infirmary and Regi-mental Theater are similar to type described under Division Training Area.

E-8.03 Married Officers Quarters: Are similar to type described under Residential Area.

E-8.04 Heating Plant: Is similar to type described under Rifle Range.

E-8.05 School Heating Plant, Administration Buildings, Barrage Balloon School Building, Balloon Building, Transportation Building, Storage and Supply Building, Field Operation Building and Tractor Storage Building were not designed by Carr and J. E. Greiner Company.

E-8.06 Machine Shop: One story rectangular building. Ground Covered 85' x 178' Floor Area 13,611 sq. ft. Cubic Contents 297,155 cu. ft.

Design data as follows:

- 131 -

Motor Repair Area Dynamometer Test Machine Shop Parts and Supplies Degreasing Propeller Shop Tractor Shop Battery Shop Office Office Toilet Wash Room

Toilets:

Office Toilet: 1 water closet, 1 urinal, 1 lavatory Wash Room: 2 water closets, 2 urinals, 4 lavatories

General Construction:

Reinforced concrete frame with concrete spandrel walls; concrete floor slabs.

Foundation:

Service in 1.1

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Spread footings Soil pressure 1500 or 2000 lbs. per sq. ft.

Finishes:

Floors, asphalt tile in office, cement elsewhere. Plaster walls and ceilings in offices and toilet rooms, plain concrete elsewhere. Steel windows, built-up roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-8.07 Carpenter Shop: One story rectangular building.

fround .	Area	Covered
loor A	rea	
ubic C	onten	its

Design data as follows:

Primary Work Space Secondary Work Space Work Area and Lumber Storage Paint Shop

- 132 -

6974	sq.	ft.
1140	sq.	ft.
1130	sq.	ft.
1140	sq.	ft.
380	sq.	ft.
370	sq.	ft.
760	sq.	ft.
370	sq.	ft.
285	sq.	ft.
45	sq.	ft.
342	sq.	ft.

85' x 178' 13,611 sq. ft. 297,443 cu. ft.

> 7070 sq. ft. 1450 sq. ft. 2337 sq. ft. 372 sq. ft.

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Offices (3) Office Toilets (2) Wash Room Boiler Room

Toilets:

Office Toilets (2): 1 water closet, 1 urinal, 1 lavatory each Wash Room: 2 water closets, 2 urinals, 4 lavatories

General Construction:

Reinforced concrete frame with concrete curtain walls; concrete floor slab.

Foundations:

Spread footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Floors, asphalt tile in offices, cement elsewhere. Plaster or concrete walls. Plaster ceilings in offices and toilet rooms. Steel windows, built up roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-9 Parachute Training Area:

E-9.01 Location: This area is situated northwest of Division Training Area and includes the following buildings:

3 Buildings under Parachute Towers 1 Parachute Training Building 1 Parachute Building

1 Heating Plant

Additional utility buildings are covered in the chapters on the various utilities.

E-9.02 Buildings Under Parachute Towers: Two story square buildings.

Ground Area Covered	
First Floor Area	3
Second Floor Area	1
Total Floor Area	2
Cubic Contents	32

- 133 -

1052 sq. ft. 96 sq. ft. 355 sq. ft. 372 sq. ft.

35' x 35' 1225 sq. ft. 1225 sq. ft. 2450 sq. ft. ,346 cu. ft.
Design data as follows:

First Floor:

Machinery Room Transformer Room Storage Room

Second Floor:

Office Drying Room Toilet Storage

Toilets: 2 water closets, 4 urinals, 2 lavatories

*

General Construction:

Wood roof on 8" tile bearing walls, stuccoed; concrete floor slabs

Foundations:

Concrete foundation walls and spread footings Soil pressure - 2000 lbs. per sq. ft.

Finishes:

Cement floors. Walls, painted plaster in drying tower, unfinished brick or tile elsewhere. Ceilings, unfinished concrete in machinery and storage rooms, plaster elsewhere. Steel windows, asbestos shingle roof.

Design Loads:

Roof - Live loads - 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-9.03 Parachute Training Building: One story, portion two story, rectangular building.

> Ground Area Covered First Floor Area Second Floor Area Total Floor Area Cubic Contents

Design data as follows:

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- 134 -

898 sq. ft. 101 sq. ft. 121 sq. ft. 81 sq. ft.

89 sq. ft. 135 sq. ft. 810 sq. ft.

90' x 120' 8670 sq. ft. 488 sq. ft. 9158 sq. ft. 385,573 cu. ft.

First Floor:

Recreation and Training Ha Enlisted Mens Toilet Officers Toilet Storage Rooms (2) Stair Hall and Entrance Vestibules

.

Second Floor:

Stairs Projection Room Generator Room-

Toilets:

Enlisted Mens: 2 water closets, 3 lavatories, one 8' urinal Officers: 1 water closet, 2 lavatories, one 5' urinal

General Construction:

Wood frame

Foundations:

Grade beams on buttress footings and spread footings Soil pressure 2000 lbs. per sq. ft.

E-9.04 Parachute Building: One story rectangular building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Packing Room Parachute Storage Rigger School and Work Shop Drying Room Shake Out Room Supply Room Passages Toilets Office Closet

Toilets:

Enlisted Mens: 4 water closets, 8 lavatories, two 6' urinals Officers: 1 water closet, 1 lavatory

- 135 -

Restan data as follows:

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all	7515	sq.	ft.
	180	sq.	ft.
	106	sq.	ft.
	192	sq.	ft.
	252	sq.	ft.

74 sq. ft. 193 sq. ft. 114 sq. ft.

107' x 272' 29,024 sq. ft. 673,540 cu. ft.

18,522	sq.	ft.
1279	sq.	ft.
3324	sq.	ft.
2454	sq.	ft.
1213	sq.	ft.
434	sq.	ft.
488	sq.	ft.
421	sq.	ft.
175	sq.	ft.
33	sq.	ft.

188 800 . . urs id. igein bath

General Construction:

Wood frame

Foundations:

Concrete grade beams Soil pressure 2000 lbs. per sq. ft.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 20 lbs. per sq. ft.

E-9.05 Heating Plant: One story rectangular building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Boiler Room

In one corner of boiler room is a water closet enclosed by a wooden screen and a service sink.

General Construction:

Wood frame; wood siding; concrete floor slab; free standing brick stack, 36'-0" high

Foundations:

Concrete foundation walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floor, unfinished walls. Wood windows, roll roofing

E-10 Glider Training Base:

E-10.01 Location: This base is located on the west side of New River west of the Residential Area, and includes the following number and types of buildings:

1 Administration Building 1 Operations Building 1 Utility Shop "A" 1 Carburetor Test Shop "B"

1 Nose Hangar "C"

- 136 -

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28' x 33' 562 sq. ft. 13,927 cu. ft.

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A GROWLINE BREIDE G

1 Utility Shop "D"

1 Paint and Dope Storage Shed "E"

1 Heating Plant

1 Transformer House near Operations Building

1 Transformer House near Shop

Additional utility buildings are covered in the chapters on the various utilities.

E-10.02 Administration Building: One story rectangular building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Flight Control Room Corridor Squad Commanders Office Cadet Radio Room Cadet Ready Room Locker Room Parachute Issue Room Winter Flying Gear Toilets

Toilets:

Officers Toilet: 1 water closet, 1 lavatory Enlisted Mens Toilet: 3 water closets, 2 urinals, 4 lavatories, 1 service sink

General Construction:

Wood frame, wood siding and floors

Foundations:

Concrete piers and footings Soil pressure 1000 lbs. per sq. ft.

Finishes:

Floors, cement in toilet rooms, wood elsewhere. Plaster walls and ceiling, wood windows, roll roofing.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Floor - Live load 75 lbs. per sq. ft.

62' x 96' 4488 sq. ft. 82,335 cu. ft.

305	sq.	ft.
338	sq.	ft.
262	sq.	ft.
315	sq.	ft.
1013	sq.	ft.
1005	8q.	ft.
305	sq.	ft.
150	sq.	ft.
226	sq.	ft.

E-10.03 Operations Building: One story with two story control tower. rectangular building.

> Ground Area Covered First Floor Area Second Floor Area Total Area Cubic Contents

Design data as follows:

Operations Office Ready Room Bunk Room (10 Bunks) C.P.O's Bed Room Locker and Gear Rooms (2) Toilets Visiting Pilots Rooms (2) Officer of the Day Passages Heater Room Storage and Closets

Second Floor:

Control Room Toilets (2): 2 water closets, 2 urinals, 2 lavatories, 2 showers each

General Construction:

Wood frame, wood floors; 4" brick veneer walls

Foundations:

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10 Sec. 2 4

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Concrete walls piers and footings Soil pressure 2000 los. per sq. ft.

Finishes:

Floors cement in heater room, tile in toilet, wood elsewhere. Painted plaster walls and ceiling, wood windows, asbestos shingle roof.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

- 138 -

59' x 75' 3563 sq. ft. 289 sq. ft. 3852 sq. ft. 63,498 cu.ft.

256	sq.	ft.
640	sq.	ft.
576	sq.	ft.
119	sq.	ft.
376	sq.	ft.
380	sq.	ft.
266	sq.	ft.
116	sq.	ft.
76	sq.	ft.
132	sq.	ft.
127	sq.	ft.

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and a fair and h			110 5001 9 50
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	Floor	rea	15
	Cubic (ontents	180
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	Test	Shop	13
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	E-10.06 Nose Ha	ngar "C": Two story	rectangular
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Second Floor Area Total Floor Area Cubic Contents

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- 139 -

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lar building.

50' x 80' 6 sq. ft. 2 cu. ft.

> 8 sq. ft. 5 sq. ft. 8 sq. ft. 4 sq. ft. 20 sq. ft. 8 sq. ft. 6 sq. ft. 3 sq. ft. 3 sq. ft.

quare building.

2'4" x 12'4" 51 sq. ft. Ol cu. ft.

37 sq. ft.

building.

)' x 116' 6561 sq. ft. 2500 sq. ft. 9061 sq. ft. 133,155 cu. ft.

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			First Floor.
			How we we do
A SUCCESSION REPORT FOR SUCCESSION APPROXIMATION APPROXIMATIONATICA APPROXIMATICA APPROX			nangar Area
			Engine Storage Room
the second s			Tool Room
			Locker Room (61 lockers)
			Toilet Boom
			Stains
			DUALIS
			Service Area
Provide a state of the second state and the second state of the se			Covered Passage
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			Second Floor .
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			Floor Area
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- 109 -			
		E-10.10	Transformer House near Operations
		bular building.	
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			Ground Area Covered
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			- 140 -

1608	sq.	ft.
520	sq.	ft.
512	sq.	ft.
240	sq.	ft.
145	sq.	ft.
60	sq.	ft.
2890	sq.	ft.
240	sq.	ft.

2500 sq. ft.

rinals, one 54" semi-circular

ctangular building.

31' x 68' 1401 sq. ft. 17,274 cu. ft.

> 397 sq. ft. 317 sq. ft. 317 sq. ft. 317 sq. ft. 317 sq. ft.

One story square building.

12' 4" x 12' 4" 151 sq. ft. 1801 cu. ft.

137 sq. ft.

pe described under Parachute

s Building: One story rectan-

17' x 25'

Floor Area Cubic Contents

Design data as follows:

Transformer Room

General Constructions:

Wood roof on 12" brick bearing walls, concrete floor slab

Foundations:

Concrete walls and footings

Finishes:

. ..

:

· · · ·

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Transformer Room

General Construction:

Wood roof on 12" brick bearing walls. Concrete floor slab.

Foundations:

Concrete walls and footings.

Finishes:

Cement floor, unfinished walls, wood windows, asbestos shingle roof E-11 Tent Camp No. 1:

E-11.01 Locations This camp is located in the northwestern corner of the reservation on U. S. Highway No. 17 about 2 miles southwest of Jacksonville, N. C., and includes the following number and types of buildings:

- 2 Mess Halls
- 34 Small Warehouses
- 6 Large Warehouses
- 41 Enlisted Mens Wash Rooms
- 8 Officers Wash Rooms

- 141 -

377 sq. ft. 4338 ou. ft.

300 sq. ft.

Cement floor, unfinished walls, wood windows, asbestos shingle roof. E-10.11 Transformer House Near Shop: One story rectangular building.

> 15' x 18' 206 sq. ft. 2335 cu. ft.

1 Ice Storage Building 1 Hospital 1 Hospital Storehouse 1 Hospital Laboratory 1 Hospital Administration Building 1 Recreation Building 1 Chapel 1 Incinerator 1 Central Heating Plant 2 Open Side Sheds Additional utility buildings are covered in the chapters on the various utilities. E-11.02. Mess Halls: One story irregular building. Ground Area Covered 227' x 257' Floor Area Cubic Contents 35,247 sq. ft. 588,131 cu. ft. Design data as follows: Mess Halls (7) 1596 seats (solisted men) 20,556 sq. ft. Mess Hall (1) 150 seats (Officers) Cafeteria Serving Spaces (4) 2609 sq. ft. Sculleries (4) 2688 sq. ft. Passages (2) 1956 sq. ft. 246 sq. ft. Galley Preparation Rooms 2938 sq. ft. Refrigerated Storage 521 sq. ft. 520 sq. ft. Mechanical Room 200 sq. ft. Storage 732 sq. ft. Office Toilets and Gear Room 100 sq. ft. 375 sq. ft. Corridor 536 sq. ft. Toilets: Officers: 4 water closets, one 6' urinal and 7 lavatories Help's: 2 water closets, one 5' urinal and 2 lavatories General Construction: Strip steel frame; concrete floor slab; gunite exterior wall finish Foundations:

Concrete walls and footings

Soil pressure 4000 lbs. per sq. ft.

- 142 -

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Finishes:

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Cement floors, walls, wood ceiling in scullery, open studs in mess halls, other rooms plywood. Ceilings, wood in galley and scullery, fibre board elsewhere. Wood windows, roll roofing.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-11.03 Small Warehouses: One story rectangular buildings.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Storage Room

General Construction:

Steel frame, metal roof and siding concrete floor slab Foundations:

Concrete walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, celotex ceiling. Steel windows

E-11.04 Large Warehouses: One story rectangular buildings. Ground Area Covered Floor Area

Cubic Contents

Design data as follows:

loading Platforms Storage Room

General Construction:

Steel frame, metal roof and siding, concrete floor slab Foundations:

Concrete walls and footings.

- 143 -

24' x 108: 2592 sq. ft. 33,048 cu. ft.

2439 sq. ft.

80' x 152' 12,124 sq. ft. 189,071 cu. ft.

2968 sq. ft. · 8873 sq. ft.

Finishes:

cement floors, celotex ceiling, steel windows.

E-11.05 Wash Rooms for Enlisted Men: One story rectangular buildings.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Wash Room Toilet Room Shower Room Drying Room Scrub Deck Room

Fixtures:

Wash Room: 40 positions at wash sinks, 4 drinking fountains Toilet Room: 18 water closets, four 4' and four 5' urinals Shower Rooms: 12 heads Scrub Deck Rooms: 16 positions at scrub decks

General Construction:

Wood frame and siding, concrete floor slab

Foundations:

Concrete foundation walls and footings

Finishes:

Cement floors, wood ceiling or walls and ceiling. Wood windows, roll roofing.

E-11.06 Wash Rooms for Officers: One story rectangular buildings.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Wash Room Toilet Room Shower Room Drying Room

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- 144 -

40' x 50' 2012 sq. ft. 30,421 cu. ft.

> 540 sq. ft. 492 sq. ft. 205 sq. ft. 220 sq. ft. 400 sq. ft.

22' x 31' 671 sq. ft. 8555 cu. ft.

> 182 sq. ft. 201 sq. ft. 144 sq. ft. 92 sq. ft.

Fixtures:

Wash Room: 10 lavatories Toilet: 6 water closets, two 6' urinals Shower Room: 8 heads

General Construction:

Wood frame and siding, concrete floor slab

Foundations:

Concrete foundation walls and footings

Finishes:

Cement floors, wood ceiling on walls and ceiling. Wood windows, roll roofing.

E-11.07 Ice Storage Building: One story rectangular building with loading platforms;

> Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Loading Platforms Ice Storage Room

General Construction:

Wood frame and siding, concrete floor slab; wood loading platform

Foundations:

Concrete walls and footings

Finishes:

Wood grating on cement floors, 4" rock cork board on walls and ceiling. Roll roofing.

E-11.08 Hospital: One story irregular shaped building.

Ground Area Covered Floor Area Cubic Contents

- 145 -

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36' x 80' 1753 sq. ft. 17,573 cu. ft.

> 829 sq. ft. 800 sq. ft.

230' x 380' 35,898 sq. ft. 578,684 cu. ft.

Open Covered Passages Lobby and Corridors Wards and Sick Rooms (229 beds) Baths, Toilets and Utility Rooms Diet Kitchens Storage, Closets and Gear Rooms Offices, Examination and Treatment Room's Operating Suite Consisting of: Operating Room 38 Sterilizing Rm. 10 Scrub Up Room 9 Surgeons Locker Room 10 Toilet 5 X-Ray Room 13 Dark Room 8	sign data as fo	llows:	
Open Covered Passages Lobby and Corridors Wards and Sick Rooms (229 beds) Baths, Toilets and Utility Rooms Diet Kitchens Storage, Closets and Gear Rooms Offices, Examination and Treatment Room's Operating Suite Consisting of: Operating Room 38 Sterilizing Rm. 10 Scrub Up Room 9 Surgeons Locker Room 10 Toilet 8 X-Ray Room 13 Dark Room 8			
Lobby and Corridors Wards and Sick Rooms (229 beds) Baths, Toilets and Utility Rooms Diet Kitchens Storage, Closets and Gear Rooms Offices, Examination and Treatment Room's Operating Suite Consisting of: Operating Room 38 Sterilizing Rn. 10 Scrub Up Room 9 Surgeons Locker Room 10 Toilet 9 X-Ray Room 13 Dark Room 8	Open Covered F	assares	
Wards and Sick Rooms (229 beds) Baths, Toilets and Utility Rooms Diet Kitchens Storage, Closets and Gear Rooms Offices, Examination and Treatment Room's Operating Suite Consisting of: Operating Room 33 Sterilizing Rm. 10 Scrub Up Room 33 Surgeons Locker Room 10 Toilet 5 X-Ray Room 13 Dark Room 8	Lobby and Corr	idors	
Baths, Toilets and Utility Rooms Diet Kitchens Storage, Closets and Gear Rooms Offices, Examination and Treatment Room's Operating Suite Consisting of: Operating Room 33 Sterilizing Rm. 10 Scrub Up Room 33 Surgeons Locker Room 10 Toilet 5 X-Ray Room 13 Dark Room 8	Wards and Sick	Rooms (229 hede	1
Diet Kitchens Storage, Closets and Gear Rooms Offices, Examination and Treatment Rooms Operating Suite Consisting of: Operating Room 33 Sterilizing Rm. 10 Scrub Up Room 9 Surgeons Locker Room 10 Toilet 5 X-Ray Room 13 Dark Room 8	Baths, Toilets Rooms	and Utility	,
Storage, Closets and Gear Rooms Offices, Examination and Treatment Room's Operating Suite Consisting of: Operating Room 36 Sterilizing Rm. 10 Scrub Up Room 9 Surgeons Locker Room 10 Toilet 9 X-Ray Room 13 Dark Room 8	Diet Kitchens		
Offices, Examination and Treatment Room's Operating Suite Consisting of: Operating Room 36 Sterilizing Rm. 10 Scrub Up Room 9 Surgeons Locker Room 10 Toilet 9 X-Ray Room 13 Dark Room 8	Storage, Close Rooms	ts and Gear	
Treatment Room's Operating Suite Consisting of: Operating Room 33 Sterilizing Rm. 10 Scrub Up Room 9 Surgeons Locker Room 10 Toilet 5 X-Ray Room 13 Dark Room 8	Offices, Exami:	nation and	
Operating Suite Consisting of: Operating Room 33 Sterilizing Rm. 10 Scrub Up Room 9 Surgeons Locker Room 10 Toilet 9 X-Ray Room 13 Dark Room 8	Treatment Re	oom's	
Consisting of: Operating Room 38 Sterilizing Rm. 10 Scrub Up Room 9 Surgeons Locker Room 10 Toilet 9 X-Ray Room 13 Dark Room 8	Operating Suite	3	
Sterilizing Rm. 10 Scrub Up Room Surgeons Locker Room 10 Toilet S X-Ray Room 13 Dark Room 8	Consisting of:	Operating Room	3
Scrub Up Room S Surgeons Locker Room 10 Toilet S X-Ray Room 13 Dark Room 8	/	Sterilizing Rm.	10
Surgeons Locker Room 10 Toilet 5 X-Ray Room 13 Dark Room 8		Scrub Up Room	
Room 10 Toilet 5 X-Ray Room 13 Dark Room 8		Surgeons Locker	
Toilet 5 X-Ray Room 13 Dark Room 8		Room	10
X-Ray Room 13 Dark Room 8		Toilet	
Dark Room 8		X-Ray Room	13
	4	Dark Room	8

Officers of the Day Bed Room 104 sq. ft.

Baths and Toilets:

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Officers Quarters (2): 1 water closet, 1 lavatory, 1 tub with shower over (each) Officers Quarters (2): 1 water closet, 1 lavatory, 1 shower (each) 0. 0. D's Bath: 1 water closet, 1 lavatory, 1 shower Ward Toilets (2): 3 water closets, 2 urinals, 3 lavatories, 1 service sink, 1 bedpan sterilizer (each) Ward Bath (2): 2 showers 1 tub with shower over (each) Surgeons Toilet: 1 water closet, 1 lavatory, 1 shower Wards Toilet (2): 5 water closets, 4 urinals, 8 lavatories, 1 service sink, 1 bedpan sterilizer (each) Ward Bath (2): 4 showers, 1 tub with shower over (each) Isolation Baths (2): 1 water closet, 1 lavatory, 1 shower

(each)

Isolation Bath: 1 water closet, 1 lavatory, 1 tub with shower over

Isolation Utility Room: 1 bedpan sterilizer, 1 service sink Ward Bath: 4 lavatories, 2 showers, 1 tub with shower over, 1 service sink

Ward Toilet: 3 water closets, 2 urinals, 1 bedpan sterilizer

General Construction:

Wood frame and siding, concrete floor slab

- 146 -

3118 sq. ft. 3577 sq. ft. 19,468 sq. ft. 2308 sq. ft. 956 sq. ft. 944 sq. ft. 1743 sq. ft. 917 sq. ft. 50 sq. ft. 00 sq. ft. 94 sq. ft. 04 sq. ft. 54 sq. ft. 31 sq. ft. 34 sq. ft.

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Foundations:

Concrete walls and footings Soil pressure 2500 lbs. per sq. ft.

Finishes:

Cement floors, plywood or plaster walls, fibreboard or plaster ceilings. Wood windows, roll roofing.

E-11.09 Hospital Storehouse: One story rectangular building:

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Storage Room

General Construction;

Wood frame and siding, concrete floor slab

Foundations:

Concrete foundation walls and footings

Finishes:

Cement floors, unfinished walls and ceiling. Wood windows, roll roofing.

E-11.10 Hospital Laboratory: One story rectangular shaped building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Vestibule Laboratory Room

General Construction:

Wood roof, wood frame and siding, concrete floor slab.

Foundations:

Concrete foundation walls and footings .

Finishes:

Cement floors, plywood walls and ceilings, wood windows, roll roofing

24' x 108' 2625 sq. ft. 34,991 cu. ft.

2494 sq. ft.

17' x 25' 377 sq. ft. 4810 cu. ft.

28 sq. ft. 312 sq. ft.

E-11.11 Hospital Administration Building: One story rectangular building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Corridors Offices (10) Toilet Utility Room Closets (10)

Toilet: 2 water closets, 2 urinals, 1 lavatory

4 2

General Construction:

Wood frame, wood floors and siding

Foundation:

Concrete walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Floors, linoleum in toilet, wood elsewhere Walls, painted plywood. Ceiling, painted fibreboard. Wood windows, roll roofing.

E-11.12 Recreation Building: One story part two story T shaped building.

> Ground Area Covered First Floor Area Balcony Floor Area Total Floor Area Cubic Contents

Design data as follows:

First Floor:

Auditorium (669 seats) Stage Dressing Rooms Lobby Library

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36' x 108' 2827 sq. ft. 49,350 cu. ft.

585 sq. ft. 1678 sq. ft. 96 sq. ft. 84 sq. ft. 133 sq. ft.

136' x 213' 9260 sq. ft. 1960 sq. ft. 11,220 sq. ft. 484,424 cu. ft.

> 5356 sq. ft. 462 sq. ft. 208 sq. ft. 425 sq. ft. 981 sq. ft.

Reading Room Writing Room Fountain Room -Passages and Stair Halls Toilets Storage Porches

Balcony Floor:

Auditorium Balcony (135 seats) 1144 sq. ft. Projection Room Vestibules (2)

Toilets:

Main Toilet: 3 water closets, 3 lavatories, 6 urinals, 1 service sink Waiting Room Toilet: 1 water closet, 1 lavatory Dressing Room Toilets (2): 1 water closet, 1 lavatory each

General Construction;

Wood frame and siding; concrete floor slab

Foundations:

Concrete walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, fibreboard walls and ceiling. Wood windows, roll roofing.

E-11.13 Chapel: One story cross shaped building.

Ground	1 Area	Covered		
Floor	Area	e e e e e e e e e e e e e e e e e e e	•	
Cubic	Contes	nts		121
				101

Design data as follows:

Nave			
Secondary	Navo		2
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350 sq. ft. 285 sq. ft. 1283 sq. ft. 451 sq. ft. 265 sq. ft. 151 sq. ft. 424 sq. ft.

279 sq. ft. 137 sq. ft.

92' x 159' 6267 sq. ft. 1,720 cu. ft.

2052 sq. ft. 459 sq. ft. 675 sq. ft. 134 sq. ft. 392 sq. ft. 210 sq. ft. 146 sq. ft.

Offices (2) Toilets (3) Closets -Confessionals (5) Boiler Room

Toilets:

Womens': 2 water closets, 1 lavatory Men's: 2 water closets, 2 urinals, 2 lavatories

General Construction:

Wood frame; wood floors and siding

Foundations:

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Concrete piers and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, fibreboard walls and ceilings. Wood windows, roll roofing.

Design Loads:

Roof - Live load 2000 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-11.14 Incinerator: Two story rectangular building.

Ground Area Covered First Floor Area Second Floor Area Tobal Floor Area Cubic Contents

Design data as follows:

Stoking Room (1-71 ton destructor) . Charging Space

General Construction:

Reinforced concrete frame with concrete walls; concrete floor slabs, free standing brick stack 65'0" high.

- 150 -

403 sq. ft. 176 sq. ft. 40 sq. ft. 57 sq. ft. 131 sq. ft.

20' x 45' 640 sq. ft. 640 sq. ft. 1280 sq. ft. 12.276 cu. ft.

> 540 sq. ft. 64C sq. ft.

Foundations:

Spread footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

cement floors, unfinished walls and ceiling. Roll roofing.

Design Loads:

Charging floor - Live load, 15 ton truck

E-11.15 Central Heating Plant: One story L shaped building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Boiler Room Toilet (1 water closet, 1 service sink)

General Construction:

Steel frame, concrete floor slab corrugated galvanized iron siding.

Foundations:

Concrete walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floor unfinished walls steel windows, corrugated galvanized iron roofing.

E-11.16 Open Lide Sheds: One story rectangular building.

Ground Area Covered Floor Area Cubic Contents

General Construction:

Steel frame, metal siding

Foundations:

Concrete walls and pedestals

121

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33' x 79' 2138 sq. ft. 56,397 cu. ft.

2014 sq. ft.

15 sq. ft.

28' x 160' 4480 sq. ft. 40,320 cu. ft.

Finishes:

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No state in the line working the

paved floor. Steel windows, metal roof.

E-12 Tent Camp No. 2

E-12.01 Location: This camp is located south of and adjacent to Tent Camp No. I and includes the following number and types of buildings:

2 Mess Halls 1 Officers Mess Hall 38 Small Warehouses 5 Large Warehouses 32 Enlisted Mens Wash Rooms 8 Officers Wash Rooms 1 Recreation Building 1 Post Exchange 1 Hostess House 1 Heating Plant

Additional utility buildings are covered in the chapters on the various utilities.

E-12.02 Mess Halls: One story irregular shaped buildings.

Ground	i Area	Covered	
Floor	Area		3
Cubic	Conter	nts	58

Design data as follows:

Mess Halls (8) (1824 enlisted men) Cafeteria Serving Spaces (4) Sculleries (4) Passages (2) Galley Preparation Rooms Refrigerated Storage Mechanical Room Garbage Room Storage Office Toilet and Gear Room Corridor

Toilet:

Helps Toilet: 2 water closets, one 5' urinal, 2 lavatories.

- 152 -

227' x 257' 35,247 sq. ft. 38,131 cu. ft.

23,504 sq. ft. 2688 sq. ft. 1956 sq. ft. 246 sq. ft. 2938 sq. ft. 521 sq. ft. 520 sq. ft. 96 sq. ft. 98 sq. ft. 732 sq. ft. 100 sq. ft. 165 sq. ft. 536 sq. ft.

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General Construction:

Strip steel frame; concrete floor slabs; gunite exterior wall finish

Foundations:

Concrete walls and footings Soil pressure 4000 lbs. per sq. ft.

Finishes:

Cement floors, plywood walls except in mess rooms, wood ceiling, wood windows, roll roofing.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-12.03 Officers Mess Hall: One story irregular shaped building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Refreshment Room (120 seats) Toilet Room Refreshment Storage Mess Halls (2) Cafeteria Scullery Passages (2) Galley Corridors (2) Office Refrigerated Storage Mechanical Room Storage Preparation Room Garbage Room Helps Toilet Porches

Toilets:

Offices: 5 water closets, 6 urinals, 10 lavatories, 1 service sink

Galley Toilet: 2 water closets, 2 urinals, 2 lavatories White Womens: 2 water closets, 3 lavatories, 15 lockers Colored Women: 1 water closet, 1 lavatory, 5 lockers White Men: 1 water closet, 1 urinal, 1 lavatory, 10 lockers Colored Men: 1 water closet, 1 urinal, 1 lavatory, 10 lockers

181' x 247' 15,284 sq. ft. 300,601 cu. ft.

1848	sq.	ft.
320	sq.	ft.
136	sq.	ft.
6668	sq.	ft.
623	sq.	ft.
547	sq.	ft.
214	sq.	ft.
1854	sq.	ft.
427	sq.	ft.
130	sq.	ft.
296	sq.	ft.
124	sq.	ft.
559	sq.	ft.
476	sq.	ft.
105	sq.	ft.
681	sq.	ft.
276	sq.	ft.

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General Construction:

Wood frame and siding, concrete floor slabs

Foundations:

concrete walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, plywood walls, fibreboard ceilings except in galley and scullery where wood ceiling is used. Wood windows, roll roofing.

Design Loads:

Roof - Live load 20 lbs. per sq. ft. Wind - 30 lbs. per sq. ft.

E-12.04 Small Warehouses, Large Warehouses, Wash Rooms for Enlisted Men, Wash Rooms for Officers and Recreation Building are of similar type and design to those described under Tent Camp No. 1.

E-12.05 Post Exchange and Hostess House were not designed by Carr and J. E. Greiner Company.

E-12.06 Central Heating Plant: One story rectangular building.

Ground Area Covered	
Floor Area	130
Cubic Contents	31,00

Design data as follows:

Boiler Ro	mom			12
Toilet: 1	water	closet,	1	40
service	sink			

General Construction:

Wood frame and sheathing, corrugated galvanized iron siding, concrete fl. slab, free standing brick stack 40'-0" high

Foundations:

Concrete foundation walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, unfinished walls. Steel windows, corrugated galvanized iron roofing.

33' x 39' 00 sq. ft. 00 cu. ft.

216 sq. ft.

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E-13 Mumford Point Camp No. 1: E-13.01 Location: This camp is located south of North Carolina state Highway No. 24 about 3 miles east of Jacksonville, N. C. and includes the following number and types of buildings: 1 Mess Hall 1 Recreation Building 1 Brig 2 Large Warehouses Dispensary Chapel Post Exchange Enlisted Mens Wash Rooms 7 1 Administration Building 1 Heating Plant Additional utility buildings are covered in the chapters on the various utilities. E-13.02 Mess Hall: One story irregular shaped building. Ground Area Covered 121' x 247: Floor Area 12,474 sq. ft. Cubic Contents 247,578 cu. ft. Design data as follows: Mess Halls (2) Scullery Cafeteria Galley Corridors Refrigerated Storage Mechanical Room Storage Rooms Preparation Room Garbage Room Office Toilets Porch

Toilets:

Office: 1 water closet, 1 lavatory Helps: 2 water closets, 2 urinals, 2 lavatories

- 155 -

6668	sq.	ft.
560	sq.	ft.
623	sq.	ft.
1854	sq.	ft.
427	sq.	ft.
296	sq.	ft.
124	sq.	ft.
520	sq.	ft.
476	sq.	ft.
105	sq.	ft.
130	sq.	ft.
153	sq.	ft.
538	sq.	ft.

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General Construction:

Wood frame and siding, concrete floor slab

Foundations

Concrete walls and footings Soil pressure 2000 lbs, per sq. ft.

Finishes:

Cement floors, wood walls in scullery, open studs in mechanical room, plywood walls elsewhere. Wood ceiling in galley, scullery and garbage rooms, fibreboard ceilings elsewhere. Wood windows, roll roofing.

E-13.03 Recreation Building: Is of similar type and design to that described under fent Camp No. 1.

E-13.04 Brig: One story T shaped building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Office Guard Room (3 bunks) Toilet 0. 0. D's Office Toilet Corridors Heating Room Storage Dormitory (10 bunks) Solitary Cells (8) Prisoners Toilets

Toilets:

0. 0. D's: 1 water closet, 1 lavatory

Guards: 1 water closet, 1 lavatory, 1 service sink Prisoners: 2 water closets, 1 urinal, 3 lavatories, 2 showers

General Construction:

Wood frame; wood floors and siding

- 156 -

45' x 76' 2358 sq. ft. 38,532 cu. ft.

152	sq.	ft.
140	sq.	ft.
50	sq.	ft.
83	sq.	ft.
36	sq.	ft.
292	sq.	ft.
86	sq.	ft.
40	sq.	ft.
604	sq.	ft.
432	sq.	ft.
176	sq.	ft.

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Foundations:

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Concrete walls, piers and footings Soil pressure 2000 lbs, per sq. ft.

Finishes:

Cement floors, plywood walls, fiberboard ceiling, wood windows, roll roofing.

E-13.05 Large Warehouses: One story rectangular building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Store Room Office

General Construction:

Wood frame and siding, concrete floor slab.

Foundations:

Concrete foundation walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, unfinished walls, wood windows, roll roofing.

E-13.06 Dispensary: One story rectangular building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Waiting Room Corridor Examining Room Dental Offices (2 chairs) Drug Room Ward Offices (2) Diet Kitchen Thilets and Gear Linen Closet

61' x 153' 9320 sq. ft. 149,120 cu. ft.

5-1-1

8697 sq. ft. 407 sq. ft.

32' x 96' 3099 sq. ft. 55,896 cu. ft.

180	sq.	ft.
230	sq.	ft.
196	sq.	ft.
232	sq.	ft.
32	sq.	ft.
1336	sq.	ft.
204	sq.	ft.
95	sq.	ft.
251	sq.	ft.
18	sq.	ft.

Toilets:

.

Toilet: 2 water closets, 2 lavatories, 1 tub Venereal Toilet: 2 straddle troughs, 1 lavatory

General Construction:

Wood frame, wood floors and siding

Foundations:

concrete walls, piers and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

cement floors, plywood walls, fibreboard ceiling. Wood windows, roll roofing.

E-13.07 Chapel: Is similar in type and design to Chapel in Tent Camp No. 1.

E-13.08 Post Exchange: One story rectangular building.

Fround A	rea Covere	ed	
Floor Ar	ea		- 3
ubic Co	ntents		52

Design data as follows:

Porches and Stoop	
Vestibule	
Sales Space	
Barber Shop	
Toilet	
Storage	
Office	
Tailors & Cobblers	s Shop
Receiving Room	

Toilet: 3 water Closets, 3 urinals, 2 lavatories, 1 service sink

General Construction:

Wood frame and siding, concrete floor slab

Foundations:

Soil pressure 2000 lbs. per sq. ft.

Concrete walls and footings

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46' x 110' 3438 sq. ft. ,259 cu. ft.

238 sq. ft. 123 sq. ft. 1862 sq. ft. 531 sq. ft. 116 sq. ft. 167 sq. ft. 132 sq. ft.

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Finishes:

Cement floors, plywood walls, fibreboard ceiling. Wood windows, roll roofing. E-13.09. Enlisted Men's Wash Rooms: These are similar in type and design to those under Tent Camp No. 1. E-13.10. Administration Building: One story rectangular building. Ground Area Covered 36' x 108' Floor Area 2561 sq. ft. Cubic Contents 49,350 cu. ft. Design data as follows: Corridors 609 sq. ft. Offices (10) 1770 sq. ft. Toilets 182 sq. ft.

Toilets:

Officers: 2 water closets, 2 urinals, 1 lavatory Enlisted Men's: 2 water closets, 1 urinal, 1 lavatory, 1 service sink

General Construction:

Wood frame, wood floors and siding

Foundation:

Concrete piers and footings Soil pressure 2000 libs. per sq. ft.

Finishes:

Wood floors, plywood walls, fibreboard ceilings. Wood windows, roll roofing.

E-13.11 Central Heating Plant: One story rectangular building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Boiler Room Toilet (1 weter closet, 1 service sink

- 159 -

281 x 331 940 sq. ft. 20,557 cu. ft.

837 sq. ft.

General Construction:

Wood frame and siding; concrete floor slab. Free standing brick stack 48'-0" high.

Foundations:

Concrete walls and footings Soil pressure 2000 lbs. per sq. ft.

Finishes:

Cement floors, unfinished walls. Steel windows, galvanized corrugated iron roofing.

E-14 Peterfield Point Camp:

E-14.01 Location: This camp is located about 2 miles from and east of Tent Camp No. 2 and includes the following number and types of buildings:

1 Galley 3 Open Shed Warehouses Quarters and Wash rooms at this camp are standard Homasote Huts.

E-14.02 Galley: One story rectangular building.

Ground Floor Area Floor Area Cubic Contents

Design data as follows:

Galley Room

To this Galley were attached several standard huts which provide space as Mess Halls.

E-14.03 Open Shed Warehouses: Were not designed by Carr and J. E. Greiner Company.

E-15 Tank Battalion Camp:

E-15.01 Location: This camp is located about 2 miles southwest of Tent Camp No. 2, east of U. S. Highway No. 17 and includes the following number and types of buildings:

1 Galley

2 Open Shed Warehouses .

- 160 -

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28' x 57' 1517 sq. ft. 22,755 cu. ft.

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and the function following moment and types of buildings

E-15.02 Galley: Is similar in type and design to those under Peterfield Point Camp.

Quarters and wash rooms at this camp are standard Homasote E-15.03 Open Shed Warehouses: These were not designed by Carr and

Huts. J. E. Greiner Company.

E-16 Midway Park:

E-16.01 Location: The area is located north of Highway No. 24 and neross from Main Entrance to the Reservation and includes the following number and types of buildings:

346 Single Family Houses 177 Double Houses

E-16.02 Single Family Houses: One story rectangular building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Living Room Kitchen Bed Rooms (2) Bath Heating Alcove Hall and Entry Storage Closet Closets (4)

Bath: 1 water closet, 1 lavatory, 1 tub Nitchen: 1 combination laundry tray and kitchen sink

General Construction:

Wood frame and asbestos shingle siding. Wood floors.

Foundations:

Concrete piers and footings.

-

Finishes:

Wood floors, plastor walls and ceilings. Wood windows, asbestos shingle roofing.

- 161 -

25' x 31' 806 sq. ft. 10.874 cu. ft.

> 186 sq. ft. 113 sq. ft. 246 sq. ft. 33 sq. ft. 9 sq. ft. 45 sq. ft. 34 sq. ft. 29 sq. ft.

E-16.03 Double Houses: One story rectangular building.

Ground Area Covered Floor Area Cubic Contents

Design data as follows:

Living Rooms (2) Kitchens (2) Bed Rooms (4) Baths (2) Heating Alcoves (2) Halls and Entries (2) Storage Closets (2) Closets (8)

Baths (2): 1 water closet, 1 lavatory, 1 tub each Kitchens (2): 1 combination laundry tray and kitchen sink each

General Construction:

Wood frame and asbestos shingle siding , wood floors.

Foundations:

Concrete piers and footings.

Finishes:

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Wood floors, plaster walls and ceilings, wood windows, asbestos shingle roof.

E-17 Miscellaneous;

E-17.0] Magazine Area:

6 Small Arms Magazines

8 Fixed Ammunition Magazines

9 Fuse and Detonator Magazines

None of the above buildings were designed by Carr and J. E. Greiner Company, they were built from U. S. Navy Bureau of Yards and Docks Drawings.

E-17.02 Office and Tool House for Cemetery: One story rectangular building.

Floor Area

Ground Area Covered

- 162 -

25' x 61' 1607 sq. ft. 21,706 cu. ft.

> 372 sq. ft. 226 sq. ft. 492 sq. ft. 66 sq. ft. 18 sq. ft. 90 sq. ft. 68 sq. ft. 58 sq. ft.

14' x 29' 427 sq. ft.

- applelled relayedors	State Boligers Oce stary
	Structure and Converted
23, 208 cm. (b.	10-10-10-10-10-10-10-10-10-10-10-10-10-1
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Cubic Contents

Design Data as follows:

Office Tool Room Porch

General Construction: 1

Wood roof and wood frame with 4" brick veneer. Concrete floor slab.

Foundations:

Concrete foundation walls and footings.

Finishes:

Cement floors, plywood walls and ceilings in office, unfinished walls and ceiling in tool room. Wood windows, asbestos shingle roof.

E-17.03 Camp Knox: No buildings in this area were designed by the Architectural Department of Carr and J. E. Greiner Company.

E-17.04 U. S. S. Mock-Up: This structure, built at the waters edge to simulate a ship, is a dock, 362 feet long, variable in width, and having an area of 7802 sq. ft. The docks at the waters edge vary in height and size as follows:

> Forecastle Deck: 86' long, 16' above water Bridge Deck: 240' long, 22' abo water After Deck: 36' long, 16' above

water

4360 cu. ft.

107	sq.	ft.
204	sq.	ft.
44	sq.	ft.

	1398	sq.	ft.	
ve	960	sq.	ft.	
	612	sq.	ft.	

CHAPTER E - PART II

E-18 - SCHEDULE OF BUILDINGS BY AREAS

					Octo
					100 million 100
1.2.2	and the second	×	E-18.01	Regimental	Area No. 1
	i. An an an an			1.0	-
		and the second se	P-101-1	12	Barracks
		Arms a the second second	P-101-2	3	Mess Halls
halfs reaching and the second s	AND INCLUSION OF CALLER		P-227-6	6	Battalion Warehouses
	C		P-101-3	6	Battalion Warehouses
			P-101-4	1	Regimental Infirmary
		and the second	P-101-5	1	Post Exchange
			P-209	1	Regimental Theater
			P-210	3	Battalion Headquarters
		19 LILLY	P-211	1	Regimental Headquarters
			P-212	1	Regimental Service Club
Tools to when here's pression to be a main to be partition to the		1			
and the second of the second second		- L- ab lates			
			E-18.02	Regimental,	Area No. 2
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and a first strategies is the second state of the first state of the second state of t	eres and a second second	The second states and second	P-101-1	12	Barracks
			P-101-2	3	Mess Halls
			P-101-3	6	Battalion Warehouses
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The garden of the		a a sette	P-101-5	1	Post Exchange
			P-209	1	Regimental Theater
			F-210	3	Battalion Headquarters
	2		P-211	1	Regimental Headquarters
a the and states			P-212	1	Regimental Service Club
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and and seed	and the same of the second				
		·	E-18-03	Regimental	Ares No. 3-
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			P-101-1	12	Barracks
			P-101-2	3	Mess Halls
			P-101-3	6	Battalion Warehouses
			P-227-6	6	Battalion Warehouses
			P-101-4	1	Regimental Infirmary
			F-101-5	1	Post Frebonge
			P=107-4	· 1	Pagimental Theater
			P-210	7	Regimental meadourters
			P-211	1	Parimontal Hoadquarters
			P-212	1	Regimental Readquarters
				T	Regimental bervice club
			P-18 04	Destautel	it a
				Regimental .	1rea 110. 4.
			F-101 1	10	Designed
			P-101-1	12	Barracks
1 e.			P-101-2	3	Mess Halls
			P-207 0	6	Battalion Warehouses
			P-101	6	Battalion Warehouses
			+ -101-4	4	Regimental Infirmary

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October 1, 1942

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	is About - 1.18	Series -		E-18.04 (Cont	'd)	
	n sana in ann ann a	and the second second		P-101-5	1	Post Exchange
	See Barrel			P-209	1 3	Regimental theat
THAT A PERSON				P-210	1	Bactalion Headque
				P=212	1	Perimental Carrie
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	the end of	* <u>1</u> -				
		× • •	+ C. + C	E-18.05	Regimental	Area No. 5.
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	and the first state of the		T DDwg	P-200-1	12	Barracks
	The second second second second second			P-200-2	3	Mess Halls
			10:4-49	P-200-3	6	Battalion Warehou
	The second is solution to be		. Castron	P-227-6	6	Battalion Warehou
	there through the set of the set			F-200-4	1	Regimental Infirm
	A had been a second and a second		(* (<u>*</u> (<u>*</u>	P-200-5	1	Post Exchange
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				P-200-6	3	Battalion Headque
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				P-212	1 1	Pogimontal Garris
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	the state of the second second		N- 101+1	1	-	DIVISION Meauquat
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			and the second second	P-201-4	1	Post Headquarters
				P-107-5	7	Post Exchange
				P-201-2	1	Brig
				P-201_1	1	Mess Hall
		and the second s	a second s	P-201 3	4	Barracks
				P-210	4	Battalion Warehou
				P-214	1	Battalion Headqua
				P 400 7	1	Hostess House
				1-±00-5	1	Post Dispensary
	and the second			F=220	1	Chapel - Protesta
				F-220	T	Chapel - Catholic
				1-101-6	1	Firehouse
				2-301-12	1	Post Theater
				r-108-4	1	Main Water Pumpin
	Muldan and a start and a start of the			P-108-5	1	Main Sewage Pumpi
		,		P-108-5	1	Sludge Fumping an
						Station and Labo
						(Sewage Treatmo
				P-108-5	1	Sludge Control St
						ment Plant)
	A CONTRACTOR OF A		34 - LALAMER	P-108-12	1	Incinerator
				P-120	1	Radio Transmitter
			and the second sec	P-221-7	1	Post Tailon and C
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P-226		1		Wallace Cre
P-221-4		1		Gate House
P-221-4		1		Guard House
P-108-4		10		Well Pump H
P-230-1		1		Emergency P
P-219-1		11		Well Dimp H
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E-18.08	I	ndustrial	and	Supply Area
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P-108-11		Ţ		Main Gas and
r-108-4		1		Ground Water
P-108-11		1		Control Box
F-108-11		1		Fost Exchan
P-227-3		1		Warehouse
P-206-1		2		Warehouses
r-106-2		2		Warehouses
F-106-1		4		Open Shed We
P-227-1		24		Open Side Me
F-107-8	• /	1		Commissary
P-207		ìl		Tost Shop Bi
NF-107-9		1		Cold Storage
F-227-5		4		Lumber Stors
F-227-2		1		Balloon Stor
P-221-1		1		Fireboure No
F-208		1		Pricowse M
F-227-4		1		Dakery
P-221-6		1		lost Exchang
1-207 3		1		Reclamation
1-107-0		1		Laundry
1 - 220 D 221 E		1		Garage and H
1-221-5		1		Garage and H
1-127		1		Tropane Gas
1-108-7		1		Central Heat
r-221-3		1		Scales House
E-18.09	Ne	aval Hospi	tal	Area
1-400-1-5	. 1	11		Wards
1-400-1-4		1		Administrati
1-400-1-4		1		Mess Hall an
1-400-1-7		1		Nurses Home
I-134		1		Family Hospi
1-134-1		1		Civilian Nur
I-400-1-8		1		Medical Stor
1-400-1-9		1		Garage
1-400-1-1	3	1		Shop
1-400-1-1	3	1		Lowon Llent
F-400-1-1	2	1		Lowor Litant
1-400-1-1	2	1		Launary
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Houses No. 1-10 incl. Pumping Station Houses No. 11 to 21 incl.

nd Oil Station er Storage Recorder x (Gasoline Tank Farm) nge Filling Station

Narehouses Motor Storage Sheds Building ge Building rage Sheds orehouse and Shop No. 3

nge Storehouse n Building

Repair Shop (Division) Repair Shop (rost Troops) s Building ating lant

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(Central Heating Flant)

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		12-5	1-400-1-14	3	Officers Quarter
			1-400-1-15	1	Warrant Officers
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			F-104-2	1	Guest House
		1. 1	1-215	1	B.O.Q. Mess and O
		1	1-107-6	1	Fire House
			r-215	1	Mon Servant's Qua
		-47	1-215	1	Women Sorventie
			F-108-5	1	River Road Service
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			7-203-1	4	5
			1-203-2	· · ·	Barracks
			1-227-6	1	Moss Hall .
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			1-203-16	1	Theater (Drill & R
			1-203 14	1	Bachelor Officers'
			1-207 4	1	lost Exchange
			1-207 10	1	Armory and Office
		· · · · · · · · · · · · · · · · · · ·	1-203-19	1	Infirmary
		2	1-303-13	1	Central Heating Pl
			1-203-6	2	Target House- list
			1-203-20	1	Range House - Tist
			1-216	1	Magazine - listol
			1-203-7	1	Firing Line Shed -
				3	Range Houses - Rif
		1 mart 1	1-216	3	Magazines - Rifla
			1-203-20	9	Toilets - Riflo Des
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			1-203-12	1	Chlorington Variation
	<u>(</u>		1-205-1	5	Officers August
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nd Officers' Club

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			P-202-9	1	Mess Hall
			P-202-16	1	Central H
the start			P-202-20	1	Infirmary
			P-202-8	4	Barracks
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唐 府 自			P-202-4	1	Bannara D
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			P-123-3	1	Parachute
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				Glider Training	g Base
		and the second	P-115		
		Cardina and Car	P-142-1	1	Operations
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		all a second	P-142 1	1	Transformer
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	and the second of and an it and all a second		2-142-6	1	Carburetor
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Building Training Building Training Area Heating Plant Tower House (Free) Tower House (Captive) Tower House (Free) mping Station No. 9

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		P-112	1	Office
		p-112	1	Well Hor
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	in Stand	P-155	1	Sewage H
	1	F-1-5	4	Moss Hal
	2-272-2	P-1-0	34	Warchous
	1-500mg	P-400-2-4	1	Warehous
	2-505-5	P-1-7	- 6	Warehous
		P-1-15	41	Enlisted
	2-302.41	P-1-16	8	Officers
	x 1-SOS+9	P-1-18	1	Ice Hous
	3-503-7	P-1-19-1	1	Hospital
	2 - SUS-R	P-400-2-12	1	Hospital
	1-302-M -	P-7	1	Recreati
	1.1.49.2-1	P-8	1	Chapel
	1-12.24	P-140	1	Incinera
		P-1-17	2	Open Sid
	1.3142	P-1-10	1	Central
	and the second se	P-400-2-7	1	Laborator
	1774-17	E-18.18	Tent Camp	No. 2.
	112-12			annan ann an ann an an an an an an an an
	1. 191-5 A.	P-250-1-4	6	Well Hou
	- 571 - 5	P-250-1-5	2	Mess Hall
	and the second	P-250-1-6	1	Officers
	-1-1-4-6	P-250-1-7	38	Warehouse
		P-250-1-8	5	Warehouse
		P-250-1-15	30	Inlisted
	A LAND A LAND	P-400-2-10	2	Enlisted
* Annual and a second s		P-250-1-16	8	Officers
		P-250-1-18	1	Recreatio
		P-250-1-19	1	Post Exch
	1	P-250-1-20	1	Hostess F
	14 14 14 14 14	P-250-1-11	1 /	Central H
		P-250-1-17	2	Open Side
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		E-18.19	Mumford Po	int Camp No 1
Zania a la construcción de la const				The count MO. T
		P-500-3	2	Well Tons
	A		2	HOLL HOUS

and Tool House louse W. C.-1

uses No. A to G incl. and BH-1 orating, Chlorinating and mping Station 1 Feed and Chlorinating Bldg. wage Treatment Plant) use (Sowage Treatment Plant) Fumping Station No. 8 11s sos (Small) se (Small) ses (Large) d Men's "ashrooms ' Washrooms se Administration Bldg. ion Building (R-2) ator le Motor Storage Sheds Heating Plant ory and Generator ses No. H to M incl. 15 Mess es (Small) es (Large) Men's Washrooms Men's Washrooms ' Washrooms on Building (R-2) hange (Remodeled Large Warehouse) House * Heating Plant e Motor Storage Sheds

uses No. Z and Z-1

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and the second	· · · ·				
		Called State	E-18.19. (Cont'd)	a san an a	N
				and a starting in the state of	alany menerina dari dan ana ang kanang dari ang menerina ang kanang dari dari dari dari dari dari dari dari
		and the second sec	P-500-4	1	Mess Hall
		A A A A A A A A A A A A A A A A A A A	P-500-2	1	Chlorinator Hous
		·			Plant)
			P-500-5	1	Recreation Build
			P-500-6	1	Brig
		1.42	P-500-7	2	Warehouses (Larg
			P-500-11	1	Infirmary
the state of the s		·	P-500-12	1	Chapel
		1	P-500-13	1	Post Exchange
	× .		P-500-14	7	Enlisted Men's W
			P-500-15	1	Administration E
		·	P-500-16	1	Central Heating
			1		
			E-18.20	Peterfield Pos	int Camp
		1 m at			n an
		1, 14 J	P-250-4-9	1	Galley 28' x 56'
		- 1 m 2	P-250-4-7	6	Enlisted Men's W
			P-250-4-8	1	Officers' Washro
			P-250-4-10	3	Open Shed Wareho
		-1-1			
		TATE STATE	E-18.21	Tank Battalior	1 Camp
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		and the second sec	P-250-3-4	1	Well House No. 0
and the second second second second second		102	P-250-3-8	7	Enlisted Mon's W
		A COMPANY OF THE OWNER OF THE OWNER OF	P-250-3-7	1	Galley 28' x 56'
			P-250-3-10	2	Steel Shed's (100
			P-250-3-9	1	Officers Washroom
			P-250-3-4	1	Water Balancing
		100 Colored Barrier			
		Crow and Company			
			P 10 00		
		the state of the s	<u>E-18.22</u>	Midway Park Re	sidential Area
		All de la companya de	D 701 001		
			P-301-201	177	Double Unit Dwell
			P-301-202	346	Single Unit Dwell
		120-1	F-301-407	2	Well Houses L.C.H
		A CONTRACTOR OF	r-301-405	1	Sewage Pumping St
		171-17			
		24	F 19 97		2
			5-10.20	Camp Knox	
and the second sec		and the second	P-108 65 0	2	
the state of the s			1-100-09-2	2	Well Houses C.C.C
			E-18 24		~
		- State - State -		Magazine Areas	-
			P-216	0	
			P-216	0	Small Arms Magazi
		Charles and the second	P-216	3	Fuse and Detonato
and the second of the second o			- 510	0	Fixed Ammunition
		a free of the second			1

House (Sewage Treatment Building (R-2)

(Large)

ge n's Washrooms ion Building ting Plant

56' n's Washrooms (Huts) ashroom (Hut) rehouses *

Vo. 0 's Washrooms (Huts) 56' (100 x 28) Shops * shroom (Hut) ing Tank Building

Dwellings Dwellings L.C.H. -1 and L.C.H. -2 ng Station No. 6.

.C.C. -1 and C.C.C. -2

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 Section 1. Section 3. Section 3. Sec. 1 1 and the second 2- 23.7.7 See 1- 17.7.7 · · · · · · · · W Rollingal Tricados Lucity

E-18.25	Mock-Up	¥
P-132 P+132	1	Well House No Mockup Ship

Total Bldgs. 1431

The total figure does not include approximately 1030 Homasote huts provided for housing.

Prefix "P" indicates accounting project number.

* Indicates buildings designed by others.

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CHAPTER E - PART II

E-19 - SCHEDULE OF BUILDINGS BY TYPES

A.) i "lauso" i o. X Slockię "Rušp

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P-19.01	Barracks
	, ann an fean ann an t-ann ann ann ann ann ann ann ann ann ann
p-101-1	Regimental Area No. 1
p-101-1	Regimental Area No. 2
P-101-1	Regimental Area No. 3
P-101-1	Regimental Area No. 4
P-200-1	Regimental Area No. 5
P-201-1	Post Troops
P-203-1	Rifle Range
P-202-8	Barrage Balloon Battalion and
	Amphibian Base
P-400-1-6	Naval Hospital Corpsman's Barracks
E-19.02	Mess Halls
P-101-2	Regimental Area No. 1
P-101-2	Regimental Area No. 2
P-101-2	Regimental Area No. 3
P-101-2	Regimental Area No. 4
P-200-2	Regimental Area No. 5
P-201-2	Post Troops
P-203-2	Rifle Range
P-202-9	Barrage Bailoon & Amphibian Dase
P=400=1=4	Naval Hospital Mess hall and
D 215	Recreation Diug.
P-210	Tent Comp No. 1
P-250 1 5	Tent Comp No. 2
P-250-1-6	Tent Comp No. 2 Officers Mess
P-500-4	Mumford Point Mess Hall
P-250-3-7	Galley (28' x 56') Tank Battalion
P-250-4-9	Galley (28' x 56') Peterfield Point
E-19.03	Warehouses
F-101-3	Battalion - Regimental Area No. 1
P-227-6	Battalion - Regimental Area No. 1
P-101-3	Battalion - Regimental Area No. 2
P-227-6	Battalion - Regimental Area No. 2
P-101-3	Battalion - Regimental Area No. 3
P-227-6	Battalion - Regimental Area No. 3
P-101-3	Battalion - Regimental Area No. 4
P-227-6	Battalion - Regimental Area No. 4
P-200-3	Battalion - Regimental Area No. 5
P-207 7	Battalion - Regimental Area 10. 5
1-201-3	Battallon - Fost froops

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TI Thank & B Soldard &		E-19.03	Warehouses (Cont'd)		Totals	
4. A set of the set		P-227-6	Battalion - Post Troops	2		71.
		P-203-3	Battalion - Rifle Range Battalion - Rifle Range	2		
		P-202-10	Battalion - Barrage Balloon and Rifle	2		
	1 Carling	n 227-6	Range	2		
		P-106-1	Open Shed Warehouses - Ind. Area	4		
	- Stan	P-250-4-10	Open Shed Warehouses - Peterfield Pt.	* 3		
	1-131-1	P-106-2	Concrete Warehouse- Industrial Area	2		
	-111.0	P-227-3	Concrete Warehouse- Industrial Area	1		
	L-JOS-U	P-400-1-13	Naval Hospital Warehouse	1		
	1-16224	P-1-6 P-400-2-4	Warehouse (Small) Tent Camp No. 1 Warehouse (Small) Tent Camp Mognital	34		
	9-202-2	P-250-1-7	Warehouse (Small) Tent Camp No. 2	38		
	L-L-Colar	P-1-7	Warehouse (Large) Tent Camp No. 1	6		
*		P-250-1-8 P-500-7	Warehouse (Harge) Tent Camp No. 2 Warehouse (Large) Numford Point	5 2		
	304914	P-227-4	Post Exchange Storehouse - Ind. Area	ĩ		
	A CONTRACTOR OF A CONTRACTOR OF	P-400-1-8	Naval Hospital Medical Storehouse	1	2.54	
	Stat Office	P-202-3	Amphibian Ease Amphibian Storehouse	⊧ ⊥	174	
	1-402-1 3-4002-1					4
	S-Edu-	E-19.04.	Infirmaries			
	a Charles and	P-101-4	Regimental Areas Nos. 1.2.3 and 4	4		
		P-200-4	Regimental Area No. 5	1		
	7-3 M-1	P-203-19 P-202-20	Rifle Range - Regimental	1 .		
	E-Leiner-	P-500-11	Mumford Point Infirmary	1		
	715-9	P-1-19-1	Tent Camp Hospital	1		
	the first and the	P-400-3	Post Dispensary	1	10	
	2-19-2-2	E-19.05	Hospitals			
	and the Constant	P-400-1-5	Naval Hospital - Words	37		
	Date Martin	P-134	Family Hospital	1	12	I
	to fair the second	E-19.06	Hospital Administration Buildings			
	8-1 I-	P-400 2 4				
		P-400-2-12	Naval Hospital Administration Building	1	2	
	14552-9		tone camp nospicar Administration Bldg.	T	2	
	2-12-1-	E-19 07				
	C 441 C Same	<u>1-13.07</u>	Furses Homes			
		P-400-1-7	Naval Hospital Nurses Home	1		
		F-134-1	Civilian Nurses Home	1	2	
a second second second second second second second	- Carl Street					
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				F-19-08	Post Frahangas
				<u></u>	rost Exchanges
			and the second s	P-101-5	Regimental Areas Nos. 1. 2. 3. and
			· - · · · · · · · · · · · · · · · · · ·	P-200-5	Regimental Area No. 5
				P-201-4	Post Troops
			and the second second	P-203-14 P-202-11	Rifle Range
				P-250-1-20	T. C. No. 2 Post Exchange (remodele
					large warehouse)
				P-500-13	Mumford Point
		 In the second secon second second sec			
				F-19-09	Theatone
				<u>B-10.000</u>	meacers
				P-209	Regimental Areas Nos. 1 2 and 4
				P-107-4	Regimental Area No. 3
				P-200-15	Regimental Area No. 5
		Max and a second se		P-201-12	Post
				r-202-19	(Drill & Page Hell)
				P-203-17	Rifle Range (Drill & Regrastion Hell
				P-7	Tent Camp No. 1 (Recreation (R-2) F
			· Art Carl	P-250-1-18	Tent Camp No. 2 (Recreation (R-2* B)
				P-500-5	Mumford Point (Recreation (R-2) Buil
				E-19.10	Regimental Service Clubs
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			· - 101-5 - 1	P-212	Regimental Areas Nos. 1,2,3,4, and 5
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					bactation headquarters ,
			Sta Lar C	P-210	Regimental Area No. 1
				P-210	Regimental Area No. 2
	1			P-210	Regimental Area No. 3
				P-200-6	Regimental Area No. 4
	X			P-210	Post Troops
			1-1-1-1-1	P-202-12	Barrage Balloon and Amphibian Base
				P-500-15	Mumford Point - Administration Bldg.
				r-203-4	Armory and Office Building Rifle Rang
			-1-0-0-1	E-19.12	Regimental Headquarters
				P. 011	
				P-200 7	Regimental Areas Nos. 1,2,3, and 4
		· · · · · · · · · · · · · · · · · · ·		20047	Regimental Area No. 5
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E-19.13	Post Headquarters
P-107-10-1	
E-19.14	Division Headquarters
P-107-2	
E-19,15	Brigs
P1075 P-500-6	Post Troops Mumford Point
E-19.16	Chapels
P-220 P-220 P-8 P-500-12	D.T.A Protestant D.T.A Catholic Tent Camps Nos. 1 and 2 Mumford Point Tent Camp
5-19.17	Firehouses
2-107-6 2-221-1 2-107-6	Post Troops Activities Supply and Industrial Area Residential Area
-19.18	Incinerators
-108-12 -140	Post Troop Activities Tent Camp No. 1
-19.19	Radio Transmitter Building
-120	
-19.20	Post Tailor and Cobbler Shop
-221-7	
19.21	Waller Gunnery Trainer Building
130	

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E-19.22	Wallace Creek Boat House		Totals		
7-226	•	1	2		
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E-19.23	Toilets				
P-226	Wallace Creek Bost House Tailet				
r-203-20	Rifle Range Toilets	9	10		
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7 10 24	Color W				
E-13.64	Gate House				
P-221-4	2	1	1		
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7 19 25	Current II.				
	Guara nouse				
-221-4		1	• 1		
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-19,26	Anon Sida Mater Standard		~		
1 10.20	open side motor storage Sheds				
-227-1	Supply and Industrial Area	24			
-1-17	Tent Camp No. 1	2			
-250-1-17	Tent Camp No. 2	2	28		
2-19.27	Gasoline and Oil Stations				
102.11	(· · · · · · · · · · · · · · · · · · ·				
-108-11	Main Gasoline and Oil Station	1			
100-11	rost Exchange Filling Station	1	2		
-19.28	Control Box - Gasoline Tank Farm				
-108-11			1922		
		1	1		
-19.29	Commissary				
-107-8		2			
		1	1		
10 70					
-19.30	Shop Buildings				
-207	lost Shop Building	1			
-400-1-13	Naval Hospital Shop	1		13	
-202-5	Amphibian Base Carpentry Shop	1			
202-6	Amphibian Base Machine Shop	1		A	
	Tank Battalion Steel Sheds (100' x 28')	0			-
-227-2	Balloon Storehouse and Shon	2	17		
	and bird and and and birdp	T	1		

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E-19.31	Garages			Totals	
P-221-5	Garage and Repair Shon	(Post Troops)	1		
P-228	Garage and Repair Shop	(Division)	1		
P-400-1-9	Naval Hospital Garage	(1	3	
E-19132	Cold Storage Building	(S. and I. Area)			
	and destate the shore of the state of the st				
P-107-9			1	1	
E-19.33	Icehouse (Tent Camp No	. 1)			
- 1 10	· · · ·	n ang sa			
P-1-10			1	1	
E-19.34	Lumber Storage Sheds (S. and I. Area)		1 I.	
P-227-5		and a second			
F=221=0			4	4	
E-19.35	Bakery (S. and I. Area) ^			
P-208					
r-200		Ŧ	1	1	
E-19,36	Reclamation Building (3. and I. Area)			
P-221-6			1		
		L	1	1	
E-19.37	Laundries				
P-107-3	Laundry - Sumply and T	dustrial Arra	1		
P-400-1-12	Naval Hospital Laundry	iuusuriai Area	1	2	
	J		-	2	э. -
E-19.39	Drenena (7 . 7 .			
	rropane Gas Bldg. (Supp	ity & Ind. Area)			
P-127			1	1	
				-	
E-19.39	Officers! Augetan-				
	VILLOUIS, QUARTERS				
P-105-1	Residential Area		133		
P-400 -1 -14	Residential Area		47		
P-205-1	Naval Hospital		3		
P-205-1	Barrage Balloon		5	100	
	ANT AREA PATTOON		0	190	
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<u>E-19.40</u>	Bachelor Officers' Qu	uarters		Totals	
P-104-1	Residential Area		0		×
P-203-16	Rifle Range		8		
P-402	Naval Hospital		l	10	-
	-				
E-19.41	Naval Hospital Warran	t Officers Qu	arters		
P-400-1-15			1		
			1	1	1
E-19.42	Servants Quarters				
- 407					
P=403 P=403	Naval Hospital Men Se	ervants'Quarte	ers 1		
P-215	Bachelor Officer's Our	Servants'Quar	rters 1		
P-215	Quarters	THE SEA PROVIDED	l		
1-210	Quarters.	ters Women Se	ervants'		
			1	4	
E-19.43	Hostess Houses	1			
P-104-2	Pophelas 000:	-			
P-214	Hostess House - Regime	rters Guest H	ouse 1		
P-250-1-20	Hostess House - Tent C	amp No. 1	 >#c }	7	
				0	
E-19.44	Target Houses				
F-203-6	Pistol Rance				
P-203-6	Rifle Range		2	-	
			0	5	
E-19.45	Range Houses	· •			
P-203-20	Dictol D	-			
P-203-20	Rifle Range		1		
	0.		3	4	
E-19.46	Firing Line Shed - Dist	ol Down			
P-20.3-7	bino oneu - Fist	oi kange			
			l	1	
E-19.47	Magazines				
P-216	Small Arms - Monoria	L.			
P-216	Fuse and Detonators - Magazine A	reas	* 6		
F-216	Fixed Ammunition - Magan	zine Areas	* 8		
P-216	Rifle Range		. 1		
	, G		3	27	
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	E-19.48
+ If he was a first the second s	P-202-4
	P-202-4
Sec. 1	P-202+4
	P 202-4
	P=202=1
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	- 10 10
	<u>E-19.49</u>
	P-115
	P-142-1
	E-19.50
	P-138
	E-19.51
	P-138
	E-19.52
	P-123-3
	P-129-1
x	
	E-19.53
	and the second sec
	P-112
	P-1-3
	E-19.54
	P-301-201
	P-301-202

Barrage Balloon School Area				
Administration Building Barrage Balloon School Balloon Building Transportation Building Storage and Supply Building Gas Generator Shed Gas Cylinder Storage Shed Field Operations Building	* 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1 * 1	8		
Glider Training Base				
Operations Building Administration Building Paint and Dope Storage Shed Utility Shop Utility Shop Nose Hangar Carburetor Test Shop	1 1 1 1 1 1	7		
Parachute Building - Parachute Tr. Are	a			
	1	1		
Parachute Training Bldg Parachute Tr.	Area			
	1	1		
Parachute Tower Houses				
One Free and One Captive One Additional Free	2 1	3		
Tool Houses				
White Cemetery - Office & Tool House Tent Camp No. 1 - Tool House (Former Chlorinator House)	1	2		
Midway Park Residential Area Dwellings				
Double Unit Dwellings Single Unit Dwellings	177 346	523	-	
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E-19.55	Mockup Ship
P+132	
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E-19.56	Sewage Pumping Stations
P-108-5 P-123-6 P-108-5 P-108-5 P-108-5 P-108-5 P-202-15 P-301-405 P-133	Main Station No. 1 Parachute Troops Area No. 9 Naval Hospital No. 2 Wallace Creek No. 3 Autumn Oval No. 5 River Road No. 4 Barrage Balloon & Amphibian Base No. Midway Park No. 6 Tent Camp No. 8
E-19.57	Sewage Treatment Plants
P-108-5 P-108-5 P-203-12 P-202-15	D.T.ASludge Pumping and Chlorinating Station and Laboratory D.T.ASludge Control Station Rifle Range - Chlorinator House Barrage Balloon and Amphibian Base- Chlorinator House
P-133 P-133 P-500-2	T. C. No. 1 Chemical Feed & Chlorinati Building Tent Camp No. 1 Sludge Pumping Station Mumford Point Chlorinator House
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E-19.60	Emergency Pumping Station -
P-230-1	
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P-400-1-22	Nevel Versitel m H Hot 5
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P-400-1-22	Naval Hospital T.H. "D"
P-142-6	Glider Training Base
P-142-6	Glider Training Base Transfo
P-19 65	Control Vection Tilent
3-10,00	Central neating Flants
P-108-7	D.T.A Industrial Area
P-400-1-18	Naval Hospital
P-203-13	Rifle Range
P-202-16	Barrage Balloon and Amphibia
P-202-4	Barrage Balloon School Area
P-138	Parachute Training Area
P-142-1	Glider Training Base
P-250 1 11	Tent Camp No. 1
P = 500 = 16	Mumford Point Text Com
	Muniford Point Tent Camp
P-19.66	Enlisted Men's Washrooms
P-1-15	Part Group No. 2
P-250-1-15	Tent Camp No. 1
P-400-2-10	Tent Camp No. 2
P-500-14	Numford Daint Tout and
P-250-4-7	Peterfield Daint (ULL-)
P-250-3-8	Tank Battalion (Huta)
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E-19,67	Officers' Washrooms
P-1-16	Tent Camp No. 1
P-250-1-16	Tent Camp No. 2
P-250-4-8	Peterfield Point (Huts)
P-250-3-9	Tank Battalion (Huts)

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Total Buildings

The total figure does not include a proximately 1030 Homasote huts provided for housing.

* Indicates buildings designed by others.

Prefix "P" indicates accounting project number.

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CHAPTER F - PART II STRUCTURAL DEPARTMENT

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Section				
00001011		*	5	
F-1				Scope
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F-1. Scope. This Department was responsible for the design of the structural elements of all the buildings and other structures and facilities designed by Carr & J. E. Greiner Company.

F-2. Types of Structures. The buildings and other facilities fall into two classes: (a) permanent structures, intended to form part of the permanent establishment in the New River Area, and (b) temporary structures.

The majority of the permanent buildings carrying light loads were, by direction, of strip steel frame construction with brick veneer walls. The use of strip steel was later discontinued, in order to conserve steel, and subsequent buildings of this type, by direction, were built either with solid masonry bearing walls and wood roof trusses or of wood frame with brick veneer walls.

Permanent buildings, such as the buildings in the Industrial Area, which are subjected to heavy loadings, have reinforced concrete frames in most cases. Structural Steel was used in buildings where special conditions, such as long spans, made the use of reinforced concrete impractical for certain elements.

In the case of some buildings, such as the Central Heating Plant in the Division Training Area, the nature of the building was such that structural steel was the only practicable material for use in the frame and supports for the heavy equipment installed in the building. As a general rule, however, in order to conserve steel, the use of structural steel was limited to applications where there was no satisfactory substitute.

The permanent Officers' Quarters were of wood frame construction throughout.

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With a few minor exceptions, the temporary buildings were of wood construction throughout

Chapter E, Part II of this report gives a list of all buildings constructed and a brief description of each, including their principal structural features.

In addition to the buildings, numerous other structures were designed by this Department. These include fixed and pontoon bridges, piers and other waterfront structures and structures for water supply and sewage facilities

In general, the type of structure and materials to be used were fixed by directive. Also certain structures were built from plans furnished by the Bureau of Yards and Docks. In some cases these plans were modified to meet local conditions.

F-3. Specifications and Design Data. During the first nine months, the design of all structures incorporating either structural steel or reinforced concrete was based on Navy Department Specifications, "Standards of Design for Structural Steel, #12Yb" or "Standards of Design for Concrete, # 3Yb". In the same period the concrete mixes used were based on the Navy Department Specification for "Concrete Construction, #13Yc". In general, Class Dl or Class El concrete, as described in the specification referred to above, was used, the latter being specified for concrete work in contact with water.

On January 17, 1942, following a request by the Department, permission was granted by the Officer in Charge to use the American Institute of Steel Construction Building Code, adopted in 1936, and the American Concrete Institute Building Code, adopted in 1941. This substitution permitted the employment of higher working stresses for these materials, resulting in general economies throughout the structures affected. Moreover, the designers being more familiar with the A.I.S.C. and A.C.I. Codes, the rate of turning out plans was accelerated materially. The adoption of the A.I.S.C. code increased the basic working stress for structural steel from 18,000 to 20,000 pounds per square inch. The basic working stresses of 18,000 and 875 pounds per square inch for reinforcing steel and concrete, respectively, were raised to 20,000 and 1125 pounds per square inch.

On February 21, 1942, the Bureau of Yards and Docks issued addenda to the Navy Department standards of design, revising the working stresses for steel and concrete. The new stresses for structural steel, as set forth in these addenda, conform generally to the stresses allowed under the A.I.S.C. Code. Also the stresses governing the welding of structural steel were increased to conform to the stresses currently employed in general practice. With respect to stresses in reinforced concrete, these addenda completely revised the working stresses of the various mixes, generally moving Class A concrete to Class B, Class B to Class C and so on. At the same time, allowable stress for reinforcing steel bars was increased from 18,000 to 20,000 pounds per square inch for intermediate and hard grade steel. Further modifications of the "Standards of Design for Concrete" were received on April 1, 1942 and May 19, 1942. The former consisted of an addendum to the Navy

Department Specification for "Concrete Construction, No. 13Yc" and was a directive reducing the cement factor on the basis of climatic conditions. This directive was complied with immediately. The latter modification, an addendum entitled, "Design Precepts for Reinforced Concrete Construction" completely revised the design standards to conform generally to Joint Committee Specifications for 1940. This latter specification is practically identical with the A.C.I. Code and thereafter was used in place of the A.C.I. Code.

On August 1, 1942 a letter from the Bureau of Yards and Docks revised the class of concrete for buildings from "D" to "C" and for other relatively important structures from "E" to "D". On September 22, 1942 a directive further increased the basic stress for reinforcing steel to 24,000 pounds por square inch.

Prior to August 11, 1942, all timber structures were designed in accordance with the latest published information of the Timber Engineering Company. In general the structures were designed for timber meeting the requirements of 1200 pound stress grade lumber and the normal working stresses for this grade were used. On the above date instructions were received from the Bureau of Yards and Docks governing all subsequent designs in wood. These instructions were embodied in "Bureau of Yards and Docks, Design Standards for Timber Construction, June 1942" and "Bureau of Yards and Docks, Lumber for Emergency Construction, June 1942". The effect of the former was to increase working stresses by 15% for all temporary wood construction. The latter set forth the recommended practice with regard to selection of grades and species with reference to the intended use of the lumber.

F-4. Foundations. The type of foundation for all structures as well as the allowable soil pressure or pile bearing value and type of pile were determined by the Officer in Charge. In this he was guided by the recommended soil bearing value as determined by the Office Engineer who was responsible for conducting soil investigations. Chapter B, Part II, of this report contains a discussion of soil conditions in this area.

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PART II - CHAPTER G

MECHANICAL DEPARTMENT

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G-7	Ventilation
G-8	Mechanical

G-1. Heating:

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G-1.01. General: The design of heating facilities as applied to the Marine Base has included numerous problems not found in ordinary practice. Accordingly the conventional methods of setting up basic computations governing loads and load factors have, in many instances required extensive modification, in order to meet the numerous conditions peculiar to an institution of this character. The result has been that while some buildings have been treated in a conventional manner, many have had to be treated in the light of unusual peak load conditions. In taking these unusual conditions into account, we have had to rely on observvation of similar installations already in use, together with very helpful comments and suggestions made from time to time by officers of the Navy and the Marine Corps. In general, heating computations have been based on transfer coefficients and technical data as set forth in current copies of the"Guide" published by the American Society of Heating and Ventilating Engineers. Deviations from this procedure have occurred only on process and industrial loads where equipment manufacturers recommendations have been followed when available. Where no recommendations or standards have been readily available, empirical formulae set up by our engineering staff have been used. The general subject of heating for the purpose of this report is broken down into the following divisions: "Heating of Buildings", "Heating of Hot Water", and "Heating for Process Use".

G-1.02. Heating of Buildings: (a) In the heating of the various and sundry buildings on this base, two primary methods of approach have been used; one, the central station system comprising a steam generating

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nlant connected to the various buildings by means of a distribution system, and the other, the individual heating system wherein each building has a heating plant of its own. The steam generating plants are covered under Chapter "J" of this report and the distribution systems are covered under Chapter "G", Section G 2 of this report. (b) All thermal loss computations used in the sizing of heating units for the heating of buildings are based on an outside temperature of $+15^{\circ}$ and an inside temperature ranging from 45° to 80° depending on the use to which the building is to be put. (c) Buildings serviced by central stations receive steam from their respective systems at pressure ranging from 175 p.s.i. to 15 p.s.i. Within each building the pressure is reduced to 5 p.s.i. for use in radiators and 5 p.s.i. or 50 p.s.i. for use in unit heaters, blast coils, air conditioning units, pipe coils, etc. Steam used for heating of buildings is returned 100% to the central station in the form of condensate by means of turbine type pumps. The five pound condensate is returned direct from the system to the condensate receiver while the return from all systems operating at pressures higher than five pounds is passed through an e conomizer coil in the hot water generator to reduce its temperature below the flash point prior to introducing it into the condensate receiver. In the sizing of steam lines within the building, we have used the Babcock formula and its tabular form "Economical Pipe Sizing" published by Grinnell Company. Care has been taken properly to balance out the systems and the sizing has been based on a total pressure drop not to exceed 2 p.s.i. throughout the longest run. In putting this type of heating system into operation care must be taken to ascertain whether or not the building is in active use. If this proves to be the case. a check should be made to make sure that the hot water generator is full of water. If the hot water generator is empty or if the building proves not to be in full use, the economizer coil must be by-passed to the drain in order to prevent dangerous over-heating of the generator. Care also must be taken to make sure that the valves in the building and steam distribution manhole, which control the condensate return on the discharge side of the condensation return pump, are open. Should they be in closed position the pump, if operated, very likely will be seriously damaged due to over pressure. (d) Many of the smaller buildings, especially in the outlying areas, are heated individually by means of independent heating systems of the forced hot water or forced warm air type. The forced hot water systems are of the two pipe reverse flow type and their design has been based on data set forth in Bell & Gossetts handbook on hot water heating and the "Guide" published by the American Society of Heating and Ventilating Engineers. The "Guide" has also been used as the standard reference for the design of the forced warm air systems.

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G-1.03. Heating of Hot Water: The heating of hot water has been covered in Section I of this report in so far as quantity requirements is concerned. Throughout the Division Training Area the actual heating has been accomplished by means of storage generators, heated by steam at 50 p.s.i. steam pressure. Tent Camp No. 1 has been equipped with instantaneous type generators operating at 50 lbs. steam pressure. Tent Camp No. 2 has been equipped in part with instantaneous hot water heaters and in part with oil fired water heaters. The officers homes and a few isolated small buildings have been equipped with electric hot water

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heaters. These electric heaters were selected and purchased by the Marine Corps.

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G-1.04. Heat for Process Use: Steam for process use is in general supplied to laundry equipment, sterilizer equipment, galley equipment, oil heating units, etc. The pressure at which the steam is furnished has been determined by equipment manufacturers' recommendations when such has been available. When such data has not been ready at hand, computed thermal requirements have been the determining factor.

G-1.05. Summary: A tabular summary follows which sets forth in detail, by project number, the buildings treated in our design, the number of buildings covered by each project, the type of heat supplied, the number of radiators or unit heaters employed with their size and the amount of hot water and process load handled.

ORIGINAL TENT CAMP # 1

*Note: R - Radiator; U.H. - Unit Heater; P.C. - Pipe Coil; H.W. - Hot Water; O.S.H. - Oil Space Heater

Project	Buildin	0.0	BTU Requ	uirements	Lbs.	Type
	Туре	No.	101 0	ALIUING	Stoam Por Bdg	System
1-5	Moss Hall	2	64 U.H. H. W. Process Total *	1,843,200 773,500 1,730,900 4,347,600	4672	Contra. Staticn Steam
1-12	Fuel Oil Dist.	l	Process Total	381,250 381,250	434	**
1-15	Enlisted Men's Washrooms	32	3 U.H. H. W. Total	178,800 867,700 1,046,500	1150	11
1-16	Officers' Wash- rooms	4	2 U.H. H. W.	100,800 945,700 1,046,500	1150	n
1-19-1	Hospital	1	103 R. H. W. Process Total	965,145 1,321,200 4,855 2,291,200	2459	
5	Add. Officers' Washrooms	4	1-0.S.H. H. W.	50,000 166,600 216,600		Individual Oil Fired Heater

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Original Tent Camp #1 (Cont'd)

No	Duridin	6	Per Bi	uirements uilding	Lbs.	Type of
	Type	No	•		Per Bd	g. System
6	Add. Enlisted					
	Men's Washrooms	8	1-0.5 H	50,000		
	1944 · · ·		H. W.	30,000		Individual
	- · · · · · · · · · · · · · · · · · · ·		Total	216,600	-	Oil Fired
7	R-2 Reamontion					neater
	neereation	1	52 R.	511,440		Central
			4 U.H.	292,000		Station
			H. W.	92,083	*	Steam
			Total	895,523	938	
8	Chapel	7	39 P	704 050		
		4.	Total	324,050		
			TOCAL	324,050		(H.W. Hoat)
400-2-3	Add to Hospital	1	124 R	1 100 010		1
	2	-	H. W	1,406,315		Central
			Process	1,117,060		Station
	× + '		Total	2 542 510	0.773 5	Steam
					.2711	
00-2-12	Admin. Building	1	18 R.	165 400		
			Total	165,420	2 50	Ħ
	·			100,420	172	
50-1-19	P.X. (Romod. Sh-13)	1	9 U. H.	500,000		
			Total	500,000	548	
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		TEN	T CAMP NO.	2		
50-1-5	Mess Halls	2	C4			
	torra d by	4	04 U.H.	1,843,200		Central
			п. W.	773,500		Station
			Process	1,730,900		Steam
			rotal .	4,347,600	4672	.]
0-1-6	Officers' Mess	1	8 R	. 00 540		
			20 11 11	1 107 570		
			H. W.	510 250		ъ.
			Process	510,350		
			Total	2 302 001	0503	
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0-1-13	Fuel & Oil Dist.	1	Process	102 000		
			Total	102,000	116	**
0-1 15	Th. 7		×	±0~,000	110	u
0-1-10	Enlisted Men's	30	1-0.S.H.	50,000		Fornad
	mashrooms		H. W.	166,600		Warm At-
			Total	216,600		haim hir
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Tent Camp No. 2 (Cont'd)

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A A A A A A A A A A A A A A A A A A A										Type	NO			Steam	System
														Per Bdg.	
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15 11 14		5 5 500.7							250-1-16	Officers' Washrms.	8	1-0.S.H.	50,000		Forced
All Margaret		العومو مربعة الربية وممرارية	N. 84 1.					·				H. W.	166,600		Warm Ain
		41 State										Total -	216,600		North ATT
													- 20,000		
			•						250-1-18	R-2. Recreation	7	52 R	511 440		0
10,11,11,01		1997 A. C. 199	•					1.00		Building	-	ATTU	202 000		Central
200020										2000 200000		± Uefie	292,000		Station
												H. W.	92,083		Steam
					*			Start Start				Total	895,523	938	1
									050 7 0						
NT. TR. IN		1.2.1. 2. 2. 2. 1.							250-3-8	Enlisted Men's	7	1-0.S.H.	50,000		Forced
••••••••••••••••••••••••••••••••••••••										Washrooms		H. W.	166,600		Warm Air
Same Alice Mar		AND BELLY										Total	216,600		
		1.8. 5.1						1.000	250-3-9	Officers ! Washrms.	1	1-0.S.H.	50,000		
		an and a straining										H. W.	166,600		
		off of the second of										Total -	216 600		
									1			TODAT	210,000		
17		CSP Pa Det E	10 - 1 Ca			100			250-4-7	Enlisted Ments	6	1001	50 000	-	
	STI	0	1.82.1					1000		Weshrooms	0	I=U.D.H.	50,000		
								1000		Masin Joins		H. W.	166,600		
			· · · · · ·					1000				Total	216,600		11
• 54									250 4 9	0.001		the same said			
								1000	£00-4-8	Officers' Washrms.	1	1-0.S.H.	50,000		
								A second second				H. W.	166,600		
			177 T									Total	216,600		tt
		1													
Frank marks		1							400-2-10	Enlisted Men's	2	1-0.S.H.	50,000		
		1 2 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1								Washrooms		H. W.	166,600		
		8 120 20										-	216,600		11
and the second second		and the second second													
										DIVISTO	N TRA	NTNG AREA			
		1. Carl By							101-1	Barracks	4.8	84 D	050 000		
		1,14 , STO	10.100					1.000			TO	UT TT	000,960		Central
		185, C 13						1.000				n. w.	957,180	1045	Station
		S. 1. 189	0.19.207.41.					1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1				Total 1	,816,140	1945	Steam
	1238	Page 1							101-2	Mona Talla	20		-		- i
									101-2	Mess Halls	12	12 R.	99,600		•
				1	 1			1000				1 U.H.	750,000		
	5.827	Call Control I										H. W.	506,850		
	the state	and the second										Process 2,	691,955		
						· ·	100	1000				Total 4,	048,405	4394	tt.
AND THE REAL		and the second second	a 11 and 11 and 1		5								*		
and U		and the second			1. 1. J. 1. 1.				101-4	Reg. Infirmaries	4	26 R.	219,461		
		150 San C 224										H. W.	187 790		
								A CONTRACTOR				Process	63 812		
												Total	171 067	FOF	
								A COLOR				10 001	11,000	000	

Division Training Area (Cont'd)

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Froje	Build	ling	BTT	Requirement	ta 11		
NO.			Per	Building	Lbs.	Type	
	Туре		No.	Durtutug	or	of	
			And the second s		Steam	System	
101-5	Post Deal				Fer Bdg.		
101-0	Post Exchange		4 16 R.	205.32	0		
			H. W.	187.79	0	Central	
			Total	393.11	0 420	Station	
104-1	B- 0 0		× .		Thu a	Steam	
	2. 0. 4.		8 66 R.	513,60	0		
			H. W.	580,12	5		
			Total	1,093,72	5 1171	19	
104-2	Guest House		1 00 -				
			1 22 R.	111,400)	Forced	
			H. W.	83,300)	Hot Weter	
			Total	194,700	5	tto o ma cel.	
105-1	Officers! Quarters		IC D	6-		•	
	Types A, A-1, A-2.		TO K.	97,000	1	Forced	
	B, C, B-1, C-1, D.		TOTAL	97,000		Hot Water	
	E, D-1, E-1, H, I.						
	H-1, I-1, J.						
	0.001						
	Ullicers' Quarters		16 R.	100 700			
	Types F, G, F-1,		Total	100,700		Forced	
	G-T.					Hot Water	
107-2	Division Woodat					· · . 20	
	neadqurs.	1	80 R.	616,920		Contral	
			H. W.	227,630		Station	
			Total	844,550	892	Steam	Lat.
107-3	Laundry	1	27 **	3 05		Ducam	
		T	LO U.H.	1,825,000			
			Re We]	6,327,480		•	
			Total	0,802,635			
107 4			TO VAL - 2	4,955,115	28,339	tt	
107-4 1	Theater (3rd. Reg.)	1	18 R.	143 500			
		-	1 U.H.	1.650.000			
			H. W.	209 669			
			Total	2.003.188	2 100		
107-5 P	min			,000,100	c • 190	ŋ	
	n TR	1	87 R.	969.840			
			1 U.H.	17.000			
			H. W.]	,381,250			
			Total 2	,368,090	2.818	17	
.07-6 F:	irehouse	0	10		,010		
		2	10 R.	93,720			
			4 U.H.	109,700			
			H. W.	227,630			
			Total	431,050	418	12	
						K	1.000

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Division Training Area (Contid)

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		Projec No.	t Buildi Type	.ng No.	BTU Re Per E	equirements Building	Lbs. of Steam Per Bdg.	Type of System
		107-8	Commissary	1	4 R. 4 U.H. H. W. Total	55,860 467,700 184,143 707,703	747	Central Station Steam
		107-9	Cold Storage Plant	1	2 U.H. Total	60,340 60,340	67	11
		107-10	Post Headquarters	< 1	135 R. H. W. Total	1,032,720 276,250 1,308,970	1379	
		108-4	Water Treatment	1	15 R. Total	153,680 153,680	160	
		108-5	Sludge Pumping	1	1-W.A. Water E	Furnace 114,90 Boiler 250,800	DO BTU; 1-Gas BTU.	Fired
		108-7	Gasoline and Oil Storage	1	Process Total	3,050,000 3,050,000	3472	Central Station Steam
	13-802 (Charles of the	123-2	Parachute Tower	2 .	Electri	c Unit Heaters		
		127	Propane Gas	1	Process	354	354	19
		130	Waller Gunnery	l		1		11
		134	Family Hospital	l	Total	3,098,456	3310	11
		138	Parachute Training Tower	2	Electric	Unit Heaters		
4		200-1	Barracks	12	84 R. H. W. Total	856,680 957,180	1942	
		200-2	Mess Hall	3	12 R. 1 U.H. H. W. Process Fotal	99,600 750,000 506,850 2,691,955 4,048,405	4394	u
		200-4 H	Reg. Infirmary	1 2 F	26 R. H. W. Process	219,461 187,790 63,812	1001	
2 · · · · · · · · · · · · · · · · · · ·				I	otal	471,063	505	15

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Division Training Area (Cont'd)

1 37 R.

1 18 R.

	- <u>1995</u> - <u>1</u> 995 - 1995		- <u>2011-001</u> 	A Constant of Cons	Project No.	Building Type	No	BTU Per
			er inderine, i	3= 90Z	200-5	P. X.	,	16 R. H. W. Total
· A	3.1	- 694-200 - 687-200 - 687-200	M : 1 ⁴¹ 年 日 借ひ :		200-6	Battalion Headqtrs.	3	31 R. H. W. Total
- 1 <u>1</u>	2-32 1		्रे दर्शकों के इत्य के स्टार्ट	re militaria	200 7	Reg. Headquarters	1	37 R. H. W. Total
27 - 45		- 008 (³) - 166, -1 - 16 (³			200-15	Theater	1	18 R. 1 U.H.
Maria e	nafilel, statistica 	Galanda (Canada), and an	and a second second					H. W. Total
1. 1911:11. 1921:12:2	2 8 7 8 F	1. 2. (2. (2. (2. (2. (2. (2. (2. (2. (2.		. Territori	201-1	Barracks	4	84 R. H. W. Total
1		27 74			201-2	Mess Hall	1	12 R. 1 U.H. H. W.
		X	1. C.	025				Total
				151	201-4	P. X.	1	16 R. H. W. Total
• 16		068.0 062.0		. 1-006	201-12	Theater	1	18 R. 1 U.H. H. W. Total
			2	-508	202-4	Administration	1	22 R. H. W. Total
					202-4	School	1	29 R. H: W. Total
		197,180, 197,030 197,030 197,030			202-4	Balloon	1	5 U.H. Fotal

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BTU Requirements Per Building	Lbs. of Steam Per Bdg.	<u>Type</u> of System
1 16 R. 205,320 H. W. 187,790 Total 393,110	420	Central Station Steam
3 31 R. 240,242 H. W. 60,166 Total 300,408	319	11
1 37 R. 282,240 H. W. 60,166 Total 342,400	360	n
18 R. 143,520 1 U.H. 1,650,000 H. W. 209,668 Total 2,003,188	2190	"
84 R. 856,680 H. W. 957,180 Total 1,813,860	1942	n
12 R. 99,600 1 U.H. 750,000 H. W. 506,850 Process 2,691,955		
Total 4,048,405	4394	11
H. W. <u>187,790</u> Total <u>393,110</u>	420	n
18 R. 143,520 1 U.H. 1,650,000 H. W. 209,668 Total 2 003 188	21.00	
22 R. 130,560 H. W. 60,166	5190	u
Total 190,726 29 R. 207,120 H. N. 60,166	202	17
Total 267,286	282	ŧ
Total 468,000	488	12

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Division Training Area (Cont*d)

Project No.	Building Type	No.	BTU Re Per E	quirements Building	Lbs. of Steam Per Bdg.	Type of System
202-4	Transport	1	2 U.H. Total	56,000 56,000	58	Central Station Steam •
202-4	Supply & Storage	1	2 R. 3 U.H. Total	24,000 123,000 147,000	154	U
202-5	Carpenter Shop	1	6 R. 6 U.H. H. W. Total	90,408 868,000 63,360 1,021,768	1064	н
202-6	Machine Shop	1	4 R. 7 U.H. H. W. Process Total	56,064 861,700 63,360 78,431 1,059,555	1106	n
202-8	Barracks	4	84 R. H. W. Total	856,680 957,180 1,813,860	1942	n
202-9	Mess Hall	1	12 R. 1 U.H. H. W Process Total	99,600 750,000 506,850 2,691,955 4,048,405	4394	11
202-11	P. X.	1	16 R. H. W. Total	205,320 187,790 393,110	420	
202-12	Battalion Headqtrs.	1	31 R. H. W. Total	240,242 60,166 300,408	319	11
202-19	Drill & Recreation	1	18 R. 1 U.H. H. W. Total	143,520 1,650,000 209,668 2,003,188	2190	11
202-20	Infirmary	1	26 R. H. W. Process Total	219,461 187,790 63,812 471,063	505	"

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Division Training Area (Cont'd)

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		n Byber					203-1	Barrad
and a loss	68 .							
		3. S. et 2 .				5+205	203-2	Mess H
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		2013 (194 2017 (1947)		9 19 - 19 10 12		Denie G	007 4	
ж. :		Mar and a					203-4	Armory
		007, COD -			10-1 s	5-22	203-14	P. X.
н. Н	3050 m			3			203-16	B. O. O
				- <u>1</u> 18	- 14	9-210-		
	an deal.					g-tai	203-17	Drill &
и				а			203-19	Infirma
		105, 201 167, 280				11-2013		
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11		Barris -					205-1	Officers
		Ollay, Bara Ollay, Bara Silay, Solay					205-1	Officers
8							207	Post of
		082,80 007,70 303,63	2000 S.		· · · · · · ·			rost Shop
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Per Bui Type No. racks 84 R. 4 H. W. Total I. s Hall 1 12 R. 1 U.H. H. -W. Process 2, Total - 4,0 ory & Office . 1 59 R. H. W. Total 1 16 R. H. W. Total Q. 1 66 R. 5 H. W. 5 Total 1,0 & Recreation 1 18 R. 14 1 U.H. 1,6 H. W. 20 Total 2,00 mary 1 26 R. 21 H. W. 18 Process Total 47 House 4-0.S.H. 8 H. W. 132 Total ers! Quarters 55 16 R. 110 Total 116 ers' Quarters 5 16 R. 110 Total 110 hop 1 30 U.H. 2,525 29 P.C. 526 H. W. 635 Total 3,686

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BTU Requirements	The		
Per Building	of	Type	
	Steam	System	
	Ter Bo	ng.	
4 R. 856,680		Central	
• W. 957,180		Station	
otal 1,813,860	1942	Steam.	
2 R. 99,600		· *	
U.H. 750,000			
-W. 506,850			
rocess 2,691,955			
ta1 - 4,048,405	4394	n	
R. 788,040			
W. 60,166		•	
tal .848,206	887		
R. 205.320			
W. 187.790	. •		
tal 393,110	420	11	
R. 513.600			
W. 580.125			
tal 1,093,725	1171	11	
R. 143.520			
.H. 1,650,000			
₩. 209,668			
al 2,003,188	2190	11	
R. 219,461			
187,790			
63,812			
4/1,063	505	Ħ	
S.H. 82,200		Forced	
132,600		Warm Air	
214,800			
. 116,400		Fornad	
1 116,400		Hot Water	
. 116.400			
1 116,400	121	Central	
	TOT	Station	
H. 2,525,000			
526,000			
3 686 275			
0,000,375	4044	n	
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Division Training Area (Cont'd)

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Project No.	Building Type	No.	BTU Req Per I	uirements Building	Lbs. of Steam Per Bdg.	Type of System
208	Bakery	1	4 R. 6 U.H. H. W. Process Total	46,944 680,195 141,440 198,135 1,066,714	1201	Central Station Steam
209	Theater	3	18 R. 1 U.H. H. W. Total	143,520 1,650,000 209,668 2,003,188	2190	u
210	Battalion Headqtrs.	13	31 R. H. W. Total	240,242 60,166 300,408	319	n
211	Regimental Headqtrs.	4	37 R. H. W. Total	282,240 60,166 342,406	360	n
212	Reg. Service Clubs	5	40 R. H. W. Total	495,744 60,166 555,910	582	Ħ
214	Hostess House	1	80 R. H. W. Process Total	592,752 255,248 110,304 958,304	1018	н
215	B. O. Q. Mess	1	65 R. 3 U.H. H. W. Process Total	744,000 900,000 655,200 1,356,461 3,655,661	3969	n
215	Servants' Qtrs. (M)	1	15 R. H. W. Total	170,808 141,440 312,248	333	۱ ۲
215	Servants' Qtrs. (W)	1	10 R. H. W. Total	80,256 141,440 221,696	239	19
220	Chapel (C)	l	22 R. Total	343,200 343,200	358	11
220	Chapel (P)	1	18 R. Total	338,400 338,400	353	19

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Division Training Area (Cont'd)

						Project	Building		BTU Requir
Contenting of the	· Martin			and the second second		No.	Dan z antib		Per Buil
alle .		and a second s					Type	No.	wordstart a grupt ut that the first
	and an and a second	and the contract of the second s	1	a a construction of the second se					
						221	Fire House #3	1	10 R.
dentra i			1		2001				4 U.H.
and the second		Martin and							H. W. 2
20 		· · · ·							Total 4
		ar anna an Arna an Arn Arna an Arna an				221-2	Add. Gas & Oil	1	Process 3,0
							Storage		Total 3,0
		and prove the second	1.2			221 /	Cato House	7 :	34 D 5
		300.00				661 ±	Gate nouse	1	H. V.
:									Total 3
				weath and the black of		003 5	Course & Dansin Chan		73 TT TT 7
			· ·	· · · · · · ·	•	221-0	Garage & Repair Snop	1	4 P.C.
17	8.0	a gine ga da							H. W. 6
					-124 3				Total 4,3
			1	a the transformer of the	· · ·	221-6	Reclamation Bldg.	. 1	9 U.H. 2
1.00	984	· · · · · · · · · · · · · · · · · · ·				201-0	HOOTANNA ATOM DIAP.	-	3 P.C.
									H. W.
					18	100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100			Total 4
1		1.0			-	221-7	Tailor & Cobbler	1	16 R. 2
									7 P.C. 2
					:				H. W.
									10004
	n filmennelsen n se					227-2	Balloon Storehouse	1	2-0.S.H.
		11 S. S.							Total
			1 R.	· · · · ·	***	228	Garage & Repair Shop	1	31 U.H. 3,4
						•			4 P.C. 2
and all	6.66								H, W. (
		10						•	10004 190
			1			400-3	Post Dispensary, Dent	t.1	144 R. 1,3
1 ⁻⁹⁰	.664	La seja en desentar seneral de la seja de					Clinic & Sick Bay		H. W. Process
									Total 2,1
		11 A. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.							
• 39	2.5.D	- 300 (1750 - Louise					HC	JSPIT	AL AREA
		Contraction in the second				400-1-4	Admin. & Mess Hall	1	285 R. 2,0
di di		0.0.5.6	2	A TWAN TO REAL					11 U.H. 6,5
1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	10	1 m		v					Process 2.8
		1 002 008							Total 12,8
* **	1000	and a finite and a set of a s		•					
						A DESCRIPTION OF A			

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No.	BTU Requirements Per Building	Lbs. of Steam Per Bdg.	Type of System	
1	10 R. 93.720		Central	
	4 U.H. 109,700		Station	
	H. W. 227,630		Steam	
	Total 431,050	418		
1	Process 3,050,000			
	Total 3,050,000	3557		
1	34 D 286 000		Forgod	
-	H TI 112 455		Hot Water	
	Total 398,455		100 11001	
	1000,100			
1	31 U.H. 3,453,772	·	Central	
	4 P.C. 249,840		Station	
	H. W. 651,950		Steam	
	Total 4,355,562	4778		
•	0 11 11 260 010			
T	3 P.C. 123 525			
	H. V. 45.580			
	Total 429.115	471-	· H	
1	16 R. 260,160			
	7 P.C. 234,990			
	H. W. 45,580			
	Total 540,730	566	34	
٦	2.0 9 4 100 000		Forgod	
1	T_{o} tal 100,000		Varm Air	
	10001 100,000		free in terr	
1	31 U.H. 3,453,772		Central	
	4 P.C. 249,840		Station	
	H, W. 651,950		Steam .	
	Total 4,355,562	4778		
+ 1	144 D 1 709 700			
10.1	144 R. 1,572,520			
	Process 293, 535			
	Total 2.134.375	2266	11	
	a state a state state of the			
OSPIT	FAL AREA			
1	285 R. 2.058.040			
-	11 U.H. 6.552.712			
	H. W. 1.371.958			
	Process 2,889,407		-	
	Total 12,872,117	13,946	19	
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Hospital Area (Cont'd)

Project No.	Building		BTU Requirements Per Building	Lbs. of	Type
-	Type	No.		Steam Per Bdg.	System
400-1-5	Wards & Corridors	1	1046 R. 9,763,200 H. W. 2,304,525 Process 647,236 Total 12,714,961	13,408	Central Station Steam
400-1-6	Corpsmen's Barracks	2	115 R. 890,400 H. W. 1,093,920 Total 1,984,320	2,128	
400 -1-7	Nurses' Home	1	165 R. 1,086,720 H. W. 519,350 Process 255,248 Total 1.861.318	1.982	11
400-1-8	Medical Storehouse	1	13 U.H. 514,300 H.W. 55,250 Total 569,550	625	n
400 -1-9	Garage	1	3 R. 39,840 1 U.H. 350,000 H. W. 55,250 Total 445,090	467	11
400 111	Nurses! Quarters	1	33 R. 196,944 H. W. 55,250 Total 252,194	266	u'
400-1-12	Laundry	1	11 U.H. 492,000 H. W. 1,855,424 Process 3,730,222 Total 6,077,646	6,902	n
400-1-13	Maintenance Shops	2	8 U.H. 285,350 H.W. 55,250 Total 340,600	374	u
400-1-14	Officers ' Quarters	3	16 R. 93,200 Total 93,200	×	Forced Hot Water
400-1-15	Warrant Officers Quarters	1	ll R. , 63,360 Total 63,360	66	Central Station Steam
402	B. O. Q.	1	67 R. 516,528 H. W. 472,940 Total 989,468	l.,056	Individual Steam Plant

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Hospital Area (Cont'd)

Project No.	<u>Building</u> <u>Type</u> <u>N</u>	10.	BTU Require Per Build	ements ling	Lbs. of Steam Per Bdg.	Type of System
403	Servants' Quarters (M)		21 R. H. W. Total	220,800 124,950 345,750		Forced Hot Water
403 -	Servants' Quarters (17)		29 R. H. W. Total	208,800 166,600 375,400		n
	Gas & Oil Storage		Process Total	52,785 52,785	61	Central Station Steam
	MUMFORD POIN	TT	ENT CAMP # 1	<u>i</u>		
500-4	Mess Hall	1	14 U.H. 5 H. W. 7 Process 1,7 Total 3,0	525,760 773,500 730,900 030,160	3324	11
500-5	R-2, Recreation	1	52 R. 5 4 U.H. 2 H. W. Total 7	511,440 292,000 92,083 395,523	938	n
500-6	Brig	1	27 R. I Total	197,360 197,360		Forced Hot Water
500-11	Dispensary	1	19 R. 2 H. W. 1 Total 3	215,376 110,500 525,876	345	Central Station Steam
500-12	Chapel	1	39 R. 3 Total 3	24,050 24,050		Forced Hot Water
500-13	P. X.	1	9 U.H. Total	500,000 500,000	548	Central Station Steam
500-14	Enlisted Men's Washrooms	7	1-0.S.H. H. W. 1 Total 2	50,000 66,600 16,600		Forced Warm Air
500-15	Administration Bldg.	1	18 R. 1 Total 1	.58,640 .58,640	165	Central Station Steam

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Project	Building		BTU Requi	rements	Lbs.	Type
<u></u>	Type	No.		141116	Steam Per Bdg.	System
142-1	Administration Bldg.	1	19 R. Total	155,280 155,280	162	Central Station Steam
	Utility Shop A	1	9 U.H. Total	526,693 526,693	578	IJ
	Carburetor Test Shop B	1	l P.C. Total	19,405 19,405	21	n
	Nose Hangar C	1	2 U.H. 2 P.C. Total	76,500 37,050 113,550	125	17
	Utility Shop D	1	2 U.H. 3 P.C. Total	37,200 68,050 105,250	115	11
115	Operations Bldgs.	1	23 R. Total	185,900 185,900		Hot Water Heat
	PETERFI	ELD .	POINT CAMP		· · ·	
250-4-9	Mess Hall (28 x 56 galley)	1	H. W. Total	133,280 133,280		Oil Fired Unit
250-4-7	Enlisted Men's Washrooms	6	H. W. 1-0.S.H. Total	166,600 50,000 216,600	 ā	Forced Warm Air
250-4-8	Officers! Washrooms	1	1-0.S.H. H. W. Total	50,000 166,600 216,600		u

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G-2. Steam Distribution System.

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G-2.01. General. Steam distribution systems in the following areas are covered by this report.

Area		Dwgs. No.	Speci	fication	No.
Industrial and Supply		627 and 630		604	
1st to 5th Regimental		631 - 645		604	
Post Troops		372 - 679		604	
Naval Hospital		3664 and 3665		604	
Rifle Range		680 and 681		607	
Balloon Barrage Battalion and Amphibian Base		3653 and 3654		60 7	
Balloon Barrage Battalion		4610		607	
Bachelor Officers Quarter	S	4611 and 4612		607	
Mumford Point Tent Camp (Overhead Distribution)		MP No. 15		107	
Glider Base		5626		168	1
Tent Camp No. 1		T. C. 37		107	
Tent Camp No. 2		T. C. 318		107	

Following is a report on each system covering (1) the estimated pressure drop of the steam system under peak load conditions, also the pressure at each branch connection, (2) the friction of the condensate return system, including the head against which each condensate pump operates, (3) the distribution losses, sometimes called "line losses", including the location of the trip traps and the amount of condensate at each drip point. Appropriate suggestions are made in each of the above reports to facilitate the economical maintenance and operation.

Details of design have not been considered in the body of this report as the drawings and specifications listed herein cover this phase of the work. Ample factors of safety have been used in computing stresses on anchors and other structural parts and the expansion joints as specified are adequate for maximum conditions. Care has been taken to run all lines with adequate grade to insure easy flow of condensate, and counter flows have been held to a minimum.

The pipe used throughout the underground steam distribution system is of standard weight and joints are of welded construction. The pipe is

encased in l_{Ξ}^{\pm} " thick insulation applied without longitudinal joints, treated to be moisture resistant. The entire assembly of pipe and insulation is enclosed by a holically corrugated ingot iron, zinc coated shell which in turn is wrapped with asphalt saturated asbestos felt to a thickness of 1/8". The entire assembly is further protected by a wrapping of heavy Kraft paper. Joints between sections of the casing are welded and the weld is protected by an outside covering sleeve welded to the conduit. The entire joint section is protected by wrapping as above described. The pipe, its insulation and protective casing was selected by the Officer-in-Charge and installed at his direction. The thickness of the protective conduit casing is 18 gauge for sizes up to and including 10" diameter and 16 gauge for larger sizes. This assembly of pipe insulation and casing is manufactured under the trade name "Hel-Cor" by the Ric-Wil Company.

The return lines are of steel pipe and therefore subject to rapid corrosion peculiar to steel under condensate return conditions, and we strongly recommend that chemical treatment be provided at suitable intervals along the system for the purpose of retarding corrosion. A full engineering report prepared by Mr. Sheppard T. Powell, Chemical Engineer, covering chemical treatment of the condensate return has been turned over to the Officer-in-Charge for record purposes.

The report includes detailed recommendations as to method of treatment and location of chemical equipment. Careful inspection of all manholes should made at frequent intervals to insure their being kept in a dry condition. Serious damage to the insulation and its surrounding "Hel-Cor" may occur if the manholes are allowed to become flooded. High pressure drip traps should be checked at frequent intervals, not only from the economy angle, which is discussed further in the report, but also because it is not a remote possibility that a leaky trap will overheat the returning condensate to the point where excessive flash might occur in the lines within the Central Heating Plant. This flashing if in large quantity might throw a heavy live load on the structural members and the pipe itself. Under normal conditions the returns should come back to the boiler house at about 180° F. A rise above this temperature should be investigated at once as it probably will give notice of either a leaky trap or an open by-pass.

It will be noted from the tabulations which follow that the maximum discharge head, within the Division Training Area, for condensate return is 168.0 feet equivalent to 72.6 p.s.i. The sequence of pump operation can not be predicted in advance and it is entirely possible that a large number of pumps may operate simultaneously and thus increase the rate of discharge and the friction losses above those indicated. Accordingly, all condensate return pumps for the Division Training Area have been specified to deliver their respective capacities against 100 p.s.i. In our opinion this should provide a safe margin but if in the future the friction losses increase above 100 p.s.i. because of natural incrustations or pipe deterioration, then a booster pump should be installed in the return at the Central Heating Plant.

Condensate return pumps for all of the detached areas have been specified with a liberal margin of safety to operate against the head act-ually found.

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The amount of condensate has been estimated throughout at 0.06 pounds per hour per square foot of external pipe surface, plus an allowance of 100% to cover possible leaks in traps, the operation of economizer coils, domestic water heaters, etc., making the total condensate 0.12 pounds per hour per square ft. of external pipe surface. Total distribution losses are generally assumed to be double the actual heat losses from the steam mains, because of steam syphon operation, valve stems, expansion point packing, drip traps, etc. and leaking steam.

G-2.02. Steam Distribution, Pressure Drop Study.

(a) Division Training Area. This area includes Regimental Areas 1, 2, 3, 4, and 5, Post Troops Area and the Industrial and Supply Area. The purpose of the study was to find the pressure drop throughout the steam distribution system.

The pressure leaving the station is taken at 175 p.s.i. gauge pressure. The boilers are good for 190 p.s.i, but maximum operating pressure is expected to be around 175-180 with a maximum of 175 lbs. leaving the plant under peak conditions. Buildings added after the system was designed are not listed in the tables.

(b) Industrial Area. This study shows that with 175 p.s.i. at the station the pressure at the Laundry will be 163.4, thus if the Laundry requires only 100 p.s.i., the pressure leaving the Central Heating Plant could be reduced to about 125 p.s.i. even under peak load conditions. This is based on existing loads plus 10,000 pounds per hour for future additions to the laundry.

It is recommended that the minimum allowable pressure be maintained. The purpose of maintaining the lowest possible pressure in the system is to reduce maintenance and heat losses to a minimum. Expansion joint packing glands, valve stems, drip traps, etc. all will function botter and waste less steam when pressures are maintained at a minimum. The steam pressure requirements can best be determined by installing a long distance recorder. In this instance, we recommend that the transmitter be installed in the Laundry, and the recorder be installed in the Central Heating Plant alongside of the control valve of the out-going feeder. If a long distance pressure recorder is not available, then a graph or chart should be prepared to show the desired balance between steam pressure leaving the plant and the minimum pressure required at the Laundry.

(c) Regimental Areas 1 -5, Inclusive, and Post Troops Area. The 14" North feeder from the Central Heating Plant was figured to feed one half of Area 3, Areas 1 and 2, the Post Troops area plus an allowance of 54,000 lbs. per hour at the end of the trunk line in Area 1 available for the Naval Hospital if a tie line should be installed to the Hospital. The bypass in manhole TL No. 6 at the Traffic Circle was considered to be closed.

The minimum pressure was computed to be 115.1 p.s.i. in Area No. 1 at the Fire House.

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The water heaters are sized for steam at 50 p.s.i. which plus 20 lbs. for the pressure reducing valve, indicates that 75 p.s.i. will furnish sufficient pressure at the far end of the system. Under present conditions a pressure of about 150 lbs. at the Central Heating Plant will maintain the stated minimum pressure including the Hospital load. Without the Hospital load, a pressure considerably under 150 lbs. should be sufficient even under peak load conditons. In the Spring, Fall and Summer a pressure of 100 lbs. at the Central Heating Plant should be sufficient. A procedure similar to that outlined for the Industrial Area is recommended for securing proper balance between plant pressure and steam flow either by long distance pressure recorder installed at the Fire House or by preparing a suitable chart based upon known facts.

The 14" South feeder from the Central Heating Plant was designed to supply the south half of Area No. 3, Areas 4 and 5 plus an allowance of 20.000 pounds per hour for a future Regimental Area. The minimum pressure was calculated to be 99.6 p.s.i. at the Regimental Administration Building in Area 5. Without the 20,000 pounds per hour, allowance for a future regimontal area, it would appear that a pressure between 125 and 150 lbs. leaving the Central Heating Plant should be sufficient to maintain 75 p.s.i. at the Area No. 5 Regimental Administration Building under peak load conditions. For less than peak load, a lower pressure will be sufficient. The same method of operating as outlined for the Industrial Area is recommended for this portion of the system.

G-2.02. (d) Industrial Area Steam. Dwg. 627.

	Pij Length	pe Size	_Bldg Load lbs.	Load lbs. por hr.	Pr.Drop lbs.	Resultant Pr. p.s.i
From C.H.P. to M.H.	• •			*	•	175
No. 131	168'	8 "		47,919	1.5	173.5
M.H. 131						:
to 133	954 *	8 **	39,751	47,919	8.7	164.8
Bakery and Fire Station						
to M.H. 135	281'	6 **	2,912	8,168	.4	164.4
To M.H. 136	645 '	6 **	4,500	5,256	.3	164.1
M.H. 138	339 t	4"	,756	756	-	164.1
		Bra	nch"C"			
C.H.P. to						1.00
Propane Gas M.H. 130	91'	8"	750	8,250	-	175.0
Garage Oil Tanks						
To N. H. 139	441'	4 **	7,500	7,500	5.1	169.9

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	to Laundry	2081	811	34 751	39 751	1 4	164.8
			U	01,101	00,101	1.1	100.4
	To Garage						
A state of the second	and Reclamation	467 *	4"	5,000	5,000	2.6	160.8
			Dece	101			
			Bra	nch "B"			
	M.H. 136 to						164.1
	Cold Storage	7.7 *	4"	200	4,500	.3	163.8
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States and the second second second second second							
	Post Shop	5731	1 11	7 500	4 700	0 4	101 4
	TOPA DUOD	010	T	5,500	4,300	6.4	101.4
manife , shire of an all all and							
	Future	350 *	4"	800	800	.1	161.3
		Entino Lond	mic	oll through	N IT 170		
		PUCTIC LOAD	VIC. (o unrough	M. H. 130,		
	From C.H.P.						175
	to M.H. 130	91 *	8"	8,250	56,169	1.1	173.9
	N TT 170 1						
	M.H. 130 to	1991	811	17 010	17 010	1 0	170 1
	MICILO IOL	100	0	-1,515	41,515	1,0	112.1
		Entire Load	via 8	" through N	I. H. 131		
i i a							
	From C.H.P.	1.00+	0.11	0.050	50 300		175
	- CO M.H. 151	100,	8.	8,250	56,169	2.1	172.9
the second se	G-2.02 (e)	Trunk Line .	-Stea	amContral	Heating F	lant To	Arose
	(1)	3, 2, and 1	Dwg	gs. 672, 6'	73, 674.	20110 10	
		an any diffe likely entropy and on an eligibility					
	From C.H.P. to-	10000					175.0
	TL #o Dispensary	1823 4"	14"	1,500e	178,598	16.4	158.6
	To TI. #6	520 10"	14"		177.098	4.8	153.8
			• •		111,000	1.0	100.0
	To Post HQ		>				
	and M.H. TL#7	450	14"	17,989	177,098	4.4	149.4
	Water Pumping						
1	Station	250"	14"	200	159.109	2.0	147.2
in the second		a construction of the second			,,		
	To MIH. TL#8	180 *	14"	17,757	158,909	1.4	145.8

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| | 2-16 B | 85 . | 12" | 3,888 | 108 271 | 0 | |
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| | Messhall 206 | | | | | - | |
| | 2-5M | 22011 | 101 | 1 1 | | | |
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| | TL #15 | 7001 | 100 | and the second second | | | |
| | | 360. | 12" | 1,958 | 91,581 | 1.8 | 127.8 |
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| | 11 #10 | 175 ' | 12" | 9,273 | 89.623 | .8 | 127 0 |
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| | | 020 | 10 | 0,040 | 67,050 | 2.3 | 120.5 |
| | TL #19 | | | | | | |
| | #124 | | - | 54,000e | | | |
| | 127 | | | Hospital | | | |
| | 1129 11205 | | | 4,761 | | | |
| | #120, #125 | 270 • | 10" | 58,761 | 58.761 | 1.5 | 117 7 |
| | | | | | | 1.0 | 111.1 |
| | G-2.02 (f) Nort | th Side Ma | ain he | cess Road. | Steam Aroa | -11-7 Dave | 070 |
| | | | | | o o count 111 Ga | #0, Dwg. | 000 |
| in the second | From M.H. TL#7 | | | | | | |
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| | | 000 | | 1,958 | 16,652 | 3.1 | 146.3 |
| | #302 PX | | | | | | |
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| | ILOUE DO | 470 | 5" | 981 | 14.694 | 5.7 | 140 6 |
| | -11204 24 | | · | | | • | 110.0 |
| 8.261 8.4 861 127 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | #504 BA | | | | | | |
| | #308 | 630 1 | 5" | 2.255 | 13 717 | 0 | |
| | | | | ., | 10,110 (| .8 | 133.8 |
| | #312 | | | | | | |
| | #314 | 211111 | C 99 | 0 | | | |
| | | CTT.T. | 0 | 6,345 | 11,458 1 | .6 | 132.2 |
| | #316 | 007* | 4.11 | | | | |
| 1975 N.Vat - 0.5 001,031 / . 0.1 Mil - 9 | | 28311" | 4" | 1,944 | 5,113 1 | .5 | 30.7 |
| | #318 | | | | / | | |
| 14. 17. 180. BUG 16. 18. 17. 180 180 1. 180 180 1. 180 180 1. 180 180 180 180 180 180 180 180 180 180 | 1010 | 217'1" | 3" | 1,944 | 3.169 2 | .0 | 28 7 |
| | | | | | -, | | |
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gend in the

(Attack in the second	G-2.02 (f) (Cont [•] d)	
A FRANKRY AND AND FRANK AND	Pipe Bldg. Load lbs. Pr.Drop Resultan Length Size Load lbs. per hr. 1bs. Pr.p.s.	nt .i.
BARDEL AND DEFINE STRATE MAR TANK A LITTER	#320 217'1" 3" 366 1,225 .3 128.4	
the formation of the second second second second second	#2 - Div. H.Q. 440' 3" 859 859 .3 128.1	
	G-2.02. (g) SteamPost Troops: Post Troops Dwg. 645	
fe de la companya de	From TL #8145.8to PT-11BA200' 5"31117,6573.6142.2	
	#12 100' 5" 1,944 17,346 1.7 140.5	
A.I.I. I.I. I.I. I.I. I.I.	#10 #9 217'1" 4" 6,345 15,402 10.4 130.1	
Butter - San Arean Him Him And	#8 424'2" 4" 1,944 9,057 7.4 122.7	
	#6 232'1" 4" 1,944 7,113 2.5 120.2	
	G-2.02 (h) Steam South SideE Street: Area #2 - Dwg. 634	
a.she ,	From TL #9140.4to #201170' 5" 1,95816,1942.5137.9	с. 7
	To #205 #203 210' 5" 2,363 14,236 2.5 135.4	
	#209 246'1" 5" 1,944 11,873 2.0 133.4	
The second se	#211	
and the state of the second	$\frac{213}{4225}$ 539'7" 4" 6,907 9,929 11.0 122.4	
Start	#217 223'1" 3" 1,944 3,022 1.9 120.5	
	AD #6 300' 3" - 1,078 .3 120.2	
Second and the second	$\frac{1}{219}$ 80' $2\frac{1}{2}$ " 311 1,078 .3 119.9	
	$\frac{163'7''}{22}$ 401 767 .3 119.6	
	#223 270' 2 ¹ / ₂ " 366 366 .1 119.5	
Sister that both is an anti-	G-2.02. (i) SteamNorth SideE Street: Area #2 - Dwg. 633	
	From M.H. TL#10 to #208 320' 5" 1,944 16.687 5.1 131.6	
	To #212 217'1" 5" 1,944 14,743 2.8 128.8	

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																A CONTRACTOR OF STREET, STREET	G=2.02.	(1) ((,on t. d)					
1. 1																			Pipe		Bldg.	Load 1bs.	Pr.Drop	Resultant
		1.1		101		1 1 1	1	1953 L.	in generation of the second se							1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			Length	Size	Load 1bs.	per hr.	lbs.	Pr.p.s.1.
				ε,	: -					•		14	• •				#216 #214		217'1"	5"	622	12,799	2.2	126.6
	4.	181				-33										1000	#220		247'	5"	1.944	12,177	2.3	124.3
								9 - T									1224							
=					2		Т			1					्म.		#226		211'1"	5"	6,345	10,233	1.4	122.9
																1000	#22 8		280'11"	3"	1,944	3,888	4.2	118.7
										(x.							#227		217'1"	3"	1,944	1,944	.8	117.9
•	· • •		•		1				10 ×								G-2.02. (j) St	samSouth	side	eB Street	Area #1	- Dwg. 6	32
										аз.,							From TL #16 to #117		164'	4"	419	1,497	.1	127.0 126.9
		0.11		÷.,							л. н. ^{су}						To #119		410'	4"	401	1,078	.1	126.8
							2 ¹¹ 1							U.			#121 #123		160'	4 "	677	677	-	126.8
										м							From TL #16 to #111		70 '	4"	1,944	7,776	.9	127.0 126.1
										•							To #109		217'1"	4"	1,944	5,832	1.6	124.5
	¥ .																#105		424'2"	4"	1,944	3,888	1.4	123.1
																	#101		217'1"	4"	1,944	1,944	.2	122.9
										*							G-2.02. (k) St	eamNorth	n Sid	eB Street	: Area #1	- Dwg. 6	331
-		085															From TL #17 to #114 and #11	2	15'	5"	2,255	13,300	.2	122.8 122.6
		113					, X .,			• •							To #108		246'1"	5"	1,944	11,045	2.0	120.6
	84	813	•									•					To M.H. B #1 and #104 B	4	474 · 9일	" 5."	1,944	9,101	2.6	118.0
	Gx -															1000	To #102		100'	4"	1,944	7,157	1.1	116.9
1			<u>so</u> .														Catholic Church		160'	4"	400	5,213	1.0	115.9
	5.	121	• •		: 4	1. (a.)			1								#106		150'	4*	4,401	4,813	.8	115.1
	8	135				c.T.											To Fire House #	18	530 *	4"	412	412	-	115.1
																The second se								

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The second state is a first for the second state of the second sta	.30.5.4
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Ladid P - Strat	
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G-2.02. (1)	#4 and 5: Dwg	scean	574, & 675			
	Pipe Length	e Size	Bldg. Load 1bs.	Load lbs. per hr.	Pr.Drop 1bs.	Resultant Pr.p.s.i.
From C.H.P. to MH TL#6 & Hostess House	234314 ⁿ	14"	350e	128,517	10.5	175 164.5
To TL #20	370 •	12"	25,066	128,167	2.9	161,6
TL #21, #315	250'	12"	311	103,101	1.3	160.3
#425	290'	12"	562	102,790	1.5	158.8
TL #23 and Prot. Church	460 *	12"	25,426	102,228	2.4	156.4
TL #24	400 *	10"	13,674	76,802	3.0	153.4
TL #25 & #401	200 *	8#	1,958	63,128	3.5	149.9
TL #26 to TL #27	730 1	84	14,865	61,170	12.6	137.3
To T1 #28 to end of TL	640' (Fu	8" ture	26,305)20,000	46,305	6.8	130.5
G-2.02. (m)	SteamSouth	Sid	e Main Acc	ess Road:	Area #3 -	Dwg 635.
From MH T1#20 To #301 and #305	200'	6"	3,888	25,066	2.3	161.6 159.3
To #309, #313 and #307	516'2"	6"	8,289	21,178	4.1	155.2
#321	561'	5"	1,944	12,889	4.7	150.5
# 323	217'1"	5"	1,944	10.945	1.4	149.1
#327	277'1"	5*	1,944	9,001	1.2	147.9
#325 and #326	211'1"	4"	6,345	7,057	1.9	146.0
MH MA #1	189'1"	2"	712	712	1.0	145.0
G-2.02. (n)	SteamNorth	Sid	leK Stree	et: Area 1/4	- Dwg. 63	37
From MH TL #23 to #400, & #404	220 *	6 "	2,255	24,976	2.6	156.4 153.8

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G 2 02 (1) Thurst Line Steam - Central Heating Plant to Areas

5.5 TEV. 22. 225.5 TE

a the part of small ages and fart all the states of the state of the state of the states of the	G-2.02. (n) (Cont'd)
A A A A A A A A A A A A A A A A A A A	Pipe Bldg. Load lbs. Pr.Drop Resultant Length Size Load Lbs. per hr. lbs. Pr.p.s.i
	To #406 and #408 211'1" 6" 6,345 22,721 2.1 151.7
Er all and a second	
remained that any state of the	
	#412 217'1" 5" 1,944 14,432 2.5 145.2
SARAT GAR AND A TOP AND AND A TOP AND A TOP AND A	$\frac{1}{2}$ and $\frac{1}{2}$
S BLOGIN STATE TO A STATE OF	#426 291'1" 4" 1,944 3,888 i9 139.9
	#427 217'1" 4" 1,944 1,944 .2 139.7
	G-2.02. (c) SteamSouth SideK Street: Area #4 - Dwg. 638
A REAL ON ROTATION AND AND AND AND AND AND AND AND AND AN	From MH TL 24 to 153.4 #403 and #407 485' 5" 2,363 13,674 4.9 148.5
	#409 241'1" 5" 1.944 11.311 1.6 146.9
CELESE ALLES ANTINE DAY IN ALL ALL ALL ALL SALES	#411 and #415 539*7" 5" 6,345 9,367 2.6 144.3
L B. BUT D.B. State C. State The State State	# 17 248'1" 4" 1,944 3.022 .4 143.9
	#419 and #421 355' 4" 712 1,078 .1 143.8
	#423 · 225 · 4" 366 366 - 143.8
A REAL SUCTION OF A REAL PROPERTY AND A REAL P	G-2.02. (p) SteamNorth SideN Street: Area #5, Dwg. 639
	From TL #27 to 137.3 #500 70' 5" 1,958 14,865 .9 136.4
BUSEL NUMBER OF THE PARTY OF TH	#502 310 ¹ 5" 1,944 12,907 2.9 13 3.5
findet that the second s	#506 and #508 217'1" 5" 6,345 10.963 1.5 132.0
Table a fine which the mark	#510 357'1" 3" 1,944 4,618 7.0 125.0
BUREL BUT DEGREE STOLES TO THE STOLES TO BE STOLES	₩514 217'1" 3" 1,944 2,674 1.5 123.5
the set of	$\frac{\#516 \text{ and}}{\#518}$ 180' $2\frac{1}{2}$ " 730 730 .3 123.2

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G-2.02.	(q)	SteamSouth	SideN	Sti
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		Pi Length	pe Size	Bldg. Load lbs.	Load lbs. per hr.	Pr.Drop 1bs.	Resultant Pr.p.s.i.
rom 501	TL to and #524	125'	6 [#]	873	26,305	1.9	130.5
503		420 '	6#	1,944	25,432	6.1	122.5
507		217'1"	6"	1,944	23,488	2.8	119.7
511	and #509	357'1"	6"	6,345	21,544	3.9	115.8
515		217'1"	5"	1,944	15,199	3.3	112.5
517		515 '	5"	1,944	13,255	6.4	106.1
519		217'1"	5#	1,944	11,311	2.0	104.1
521		277'1"	5"	6,345	9,367	1.8	102.3
527		217'1"	3"	1,944	3.022	2.2	100.1
526		30 '	311	311	1,078	.1	100.0
520	and #522	5801	3"	767	767	.39	99.6

G-2.03. Condensate Return Friction Loss Study:

(a) Purpose of Study: The purpose of this study is to

determine maximum pressure head against which the condensate pumps in the various buildings will operate. The receiver tank at the Central Heating Plant is 70' fect above elevation 28.0, which is grade, and accordingly all condensate returned to the Central Heating Plant must be discharged against this fixed head plus friction loss through the return system. Friction loss calculations are based on the condensate being returned uniformely at the same rate that the steam leaves the plant.

(b) The maximum head in the Industrial Area was found to be 99.0' (43 p.s.i.) in the return main at the Garage and Reclamation Buildings.

(c) The maximum head on the branch to Area #1 was found to be 167.1' (or 72 p.s.i.) in the return main at the Fire House.

G-2.03. (d) Industrial Area -- Condensate Return: Dwg. 627

	Pi Length	pe Size	Bldg. Load	Load lbs Per hr.	Load GPM	Friction loss in Feet	Total Head in Feet
From C.H.P. to M.H. 131	168'	4"	8,250	56.169	St 112.3	atic 2.6	70.0
			211 -		Static	5.	77.6

reet: Area #5, Dwg. 640.

A STATE AND A STATE AND AND A STATE AND AND A STATE	G-2.03	(d) (Cont'd)				
		Pipe Length Size	Bldg. I Load Pe	Load lbs Load or hr. GPM	Friction loss in Feet	Total Head in Fest
	То М.Н. 133	954 4"	39,751 4	7,919 95.8 Static	10.7	01 2
	To M.H. 135	281: 2 ¹ / ₂ "	2,912 8	8,168 16.3	1.2	91.5
				Static	3.2	94.5
	To M.H. 136	645° $2\frac{1}{2}^{\circ}$ 239' $2\frac{1}{2}^{\circ}$	4,500 5 756	756 1.5	1.2	95.7 95.7
			Branch C			
	M.H. 131 to M.H. 130	199' 2 ¹ ."	75 0 8	3,250 16.5	Static	77.6
	To M.H. 139	441' 2 ¹ / ₂ "	7,500	7,500 15.0 Static	1.5	20.0
			Branch A		3.5	82.0
	M.H. 133 to Laundry	2081 31	34,751 39	9,751 79.5 Static	Static 5.9 <u>1.0</u> 6.9	91.3
	To Garage and Reclamation Bdg	建建4671 2분 ^배	5,000 E	5,000 10.	.8	99.0
	M.H. 136 to Cold Storage	77' 2 ¹ /2"	$\frac{\text{Branch B}}{200}$.500 9.	Static .1	95.7
, forde , and the second se	To Post Shop Bldg.	5731 2 ¹ 2"	4,300 4	,300 8.1	. 6	96.4
	G-2.03.	(e) <u>Condensate</u> <u>Areas</u> ; Tru	ReturnCent unk LineDw	ral Heating Pl rgs. 672, 673 a	lant to Reand 674	gimental

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G-2.03. (e) (Cont'd)

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			22.1-	Load Lbs	F	riction	Total	
	Length S	Size	Load	Per hr.	GPM	Feet	Feet	
From C.H.P. to M.H. #5 and Dispensary	1,823'4" 100e in plant 1,923'4"	8"	1,500e	178,598 128,517 307,115	614.23 Static	23.4	Tank E1. 98.0 70.0 97.4	
To M.H. TL #6 & Hostess House	520 *	8"	350 128,167 128,517	30 5, 615	611. Static	6.2 1. 7.2	104.6	
To Post H.Q.								
and M.H. TL #7	450 "	6 "	17,989	177,098	354.2 Static	8.1 1.0 9.1	113.7	
To Water	2501	C11	200	150 100	710 0	7 6	117 0	
Pumping Sta.	200.	0	200	109,109	010.2	0.0	111.6	
To M.H. TL #8	180'	6 "	17,757	158,909	317.8 Static	2.5 1. 3.5	120.7	
To TL #9	490 1	6"	16,194	141,152	282.3 Static	5.6 1. 6.6	127.3	1
TL #10	420"	6"	16,687	124,958	249.9 Static	4.0 1. 5.0	132.3	
#204 and #202	851	6 ¹¹	3,888	108,271	216.5	.6	132.9	
#2 06	330 *	5"	4,401	104,383	208.8 Static	5.3	×	
						6.3	139.2	
To Post Theater and TL #13	400'	5"	4,000e	99,982	199.9 Static	6.0 <u>1.</u> 7.0	146.2	

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G-2.03. (e) (Cont'd)

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		Pip Length	Size	Bldg. Load	Loadlt Per hr.	os Loa.d GPM	Friction Loss In Feet	Total Head in Feet
	To #107 TL #14	400 '	5"	4,401	95,982	199.2	6.0	152.2
	To #115 TL #15	360'	5"	1,958	91,581	183.2	4.5	156.7
	TL #16	175'	5"	9,273	89,623	179.2	2.2	158.9
	TL #17	410'	5"	13,300	80,350	160.7	3.9	162.8
	TL #18	320'	5"	6,345	67,050	134.1	2.2	165.0
	1-9B	211'1"	5"	1,944	60,705	121,4	1.2	166.2
	TL #19 #127,#128 and #125	270' Hospital	5"	4,761 54,000e 58,761	58,761	117.5	1.5	167.7
	G-2.03. (f) Conde Main	ensate Access	Return Road: A	North Sid rea #3	eHolcomb	Boulevard	
	From TL #17 to #300	560*	3"	1,958	16,652	33.3 Static	Static 2.9 6. 8.9	113 .7 122.6
	To #302 and #322	470 *	3"	981	14,694	29.4 Static	2.0 1. 3.0	125.6
	To #304 and #308	630 '	3"	2,255	13,713	27.4 Static	2.4	
	#312 and 314	211'1"	2글"	6,345	11,458	22.9	4.4	130.0
	#316	283'1"	2 **	1,944	5,113	10.2	1.1	132.8
	# 318	217'1"	2"	1,944	3,169	6.3	•4	133.2
•	#320	217'1"	1코"	366	1,225	2.3	.2	133.4
	Div. H.Q.	440'	12"	859	859	1.7	.3	133.7
	G-2.03 (g) Conden	isate R	oturnP	ost Troop	Area:		
	From TL #8 to #13	200 '	212"	311	17,657	35.3	Static 3.6	120.7 124.3

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G-2.03 (g) (Cont'd)

Taket mick pri nikowa ci zuca (sona militani) (sona ci zuca nikowa ci zuca (sona ci zuca) nikowa (sona ci zuca) nikowa (sona ci zuca)		P	ipe Size	Bldg. Load	Load 1b Per hr.	s Load GPM	Friction Loss in Foot	Total Head In Ret
TANER . OLD STREET SEV. AN INST. MAL MOC IN FRANKLING	#12	100'	22"	1,944	17,346	34.7	1.8	126.1
The set of the second	#10 and #9	217'1"	22"	6,345	15,402	30.8	3.0	129.1
Finance that been seen that a trace that the	#8	424 ' 2"	211	1,944	9,057	18.1	2.3	131.4
and the second	# 6	232'1"	22"	1,944	7,113	14.2	.8	132.2
print for the first a bar to be a for the first a for the second se	1/2	449°0"	2 <u>1</u> "	419	5,169	10.3	.9	133.1
	#3 and #25	255'0"	221	4,750	4,750	9.5 Static	.4 1. 1.4	134.5
	G-2.03 (1	h) Conder	isate I	ReturnSc	outh Side-	-E Stree	t: Area #2	Dwg 634
Sature and sature for an interest of the second	From M.H. TL #9 to #201	170'	3"	1,958	16,194	32.4	Static	127.3 128.1
	To #205 and #203	3 210'	3"	2,363	14,236	28.5	.8	128.9
T.G.II STARL TO THE TOTAL STARLEY AND	# 2 09	246'1"	22"	1,944	11,873	23.7	2.2	131.1
a. 1981 - 1. T.T.	#211 and 213 and 225	53917"	2 <u>1</u> "	6,907	9,929	19.8 Static	3.4	
	#217	223'1"	2"	1,944	3,022	6.0	5.4	136.5 137.9
	#219	380 *	1일"	311	1,078	2.2	.3	138.2
and a second	#221	163'7"	1년"	401	767	1.5	.1	138.3
ALIEL S.T. LES CALLS AND THE ALIENDER AND	#2 23	2701	112"	366	366	1. Static	.1 1.0 1.1	139.4
A SAMPAGE AND BAD BELO TO BAS THE PARTIE AND	G-2.03. ((i) Conde	nsate	ReturnN	orth Side	E Stre	et: Area 7	2
	From M.H. TL #10 and #208	320'	3"	1,944	16,687	33.4	Static 1.7	132.3 134.0
	To 7/212	217'1"	3"	1,944	14,743	29.5	.9	134.9
the second se	#214 and #216	217'1"	3"	622	12,799	25.6	.7	135.6
teres and the recent and the man teres of the way	#220	247'	3"	1,944	12,177	24.3	. 7	136.3

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								G-2.03.	(i) (Cont	:'d)					
a di asari ya Asila da Maria dala	Belgitori est ani sub al Tese I anagana mar								Pipe Length	Size	Bldg. Load	Load lbs Per hr.	Loa d GPM	Friction Loss in Feet	Total Head in Feet
126.1- 1.011		7 48 S				i al. Net		#224 and #226	211'1"	2코"	6,345	10,233	20.5 Static	1.4 1. 2.4	138.7
								#2 28	280'11"	2"	1,944	3,888	7.8 Static	.7 2. 2.7	141.4
g Brank .							- 1	#227	217'1"	1코"	1,944	1,944	3.9	.6	142.0
			100	68 26				G-2.03.	(J) Conde	ensato	ReturnS	South Side	B Stre	et: Dwg. 6	32
4.+.1 	1							From TL #16 to #117	164'	2"	419	1,497	2.99	Static .1	c 158.9 159.0
								То 扰 119	410 '	2"	401	1,078	2.2	.1	159.1
I Lenst								#121 and #123	160'	2"	677	677	1.3	-	159.1
								From TL 7/16 to #111	70 '	2 <u>1</u> "	1,944	7,776	.15.6	Static .3	158.9
				4				To #109	217'1"	211	1,994	5,832	11.7	.5	159.7
					10.4			To #105	424 * 2"	211	1,944	3,888	7.8	.5	160.2
						A. A.		#101	217*1"	2"	1,944	1,944	3.9	.2	160.4
								G-2.03 (k) Conden	sate	ReturnNo	orth Side-	-B Stree	t: Dwg. 63	1
	"L.	. Cal						From TL #17 to #114 to #112	15'	3"	2,255	13,300	26.6	Static .1	162.8 162.9
					72			To 7/2108	246'1"	3"	1,944	11,045	22.1	.6	163.5
• *****								To M. H. B #14 and #104	474 · 9 ¹ / ₂ "	22	•1,944	9,101	18.2	2.6	166.1
100 - 100 -	a terreto							#102	100 :	221	1,944	7,157	14.3	• 4	166.5
0			11.4.1					Catholic Church	160'	2 <u>1</u> "	400	5,313	10.4	• 3	166.8
								<i>#</i> 106	150'	2 ¹ / ₂ "	4,401	4,813	9.6	.2	167.0
- E.277						11 °		Fire House #18	530'	2"	412	412	.82	.1	167.1

.

					- 2154 1			G-2.	.03 (1) <u>c</u>	ondensate	Return t	o Areas #4	and $\#5$:		
	an broart An anna An a'			4 (18) 1 1 <u>1</u> 1				N H MT JL	Leng	Pipe gth Size	Bldg. Load	Load 1bs Per hr.	Load GPM	Friction Loss in Feet	n Total Head in Feet
								to TL 7/20	370	6"	25,066	128,167	256.3	Stati 3.5	c 104.6 108.1
								1L 7/ 21 #315	250	5"	311	103,101	206.2 Static	3.8 <u>1.</u> 4.8	112.9
112.01			- 16,1					To 7/425	2901	5"	562	102,790	205.6 Static	4.4	
	19							TL]/ 23 and Prot.Churcl	h 460'	5"	25,426	102,228 S	205.5 tatic	7.0 2. 9.0	118.3
n kniek Krast Kast								From TL ;// 23 to TL ;// 24	3 400 •	5"	13,674	76,802	153.6 Static	Static 3.6 1. 4.6	127.3 131.9
								TL #25 #401	2001	5"	1,958	63,128	126.2	1.2	133.1
a destruction								To TL #27	730 :	5"	14,865	61,170	122.3	4.3	137.4
	5. 169. 'espei - es							To end of Trunk Line	640 '	4" Future	26,305 20,000 46,305	46,305	92.6	6.8	144.2
Sound .								G-2.0	3. (m) <u>Co</u>	ndensate in Access	Road: Dw	outh Side- g. 635	-Holcomb	Boulevar	d
2.025					• • • •			From TL #2 #301 to #30!	5 200 *	3"	•3,888	25,066 Sta	50.1 atic	Static 2.3 3.	104.6 109.9
					the state			To #309, #31 and #307	51612	" 3 ^{††}	8,289	21,178 St	42.4	4.3	
101.6		101						#321	561"	3"	1,944	12,889	25.8	5.3 2.1	115.2
1001					R.					-	217 -	Sta	tic.	<u>3.</u> 5.1	120.3

14

11 4

	· · · ·	1920/244			•											
							•									
		and an and a second		and the second second					G-2.03.	(m) (Co	int'd)					
		1	and is derived in which includes	anbiti Simf	1. 2111.	id <u>hices i</u>			•	Р	ipe	Bldg.	Load 1	lbs. Load	Frict: Loss	ion Total in Head
										Length	Size	Load	Per hi	GPM	Feet	infet
		5. 978.	nek'ant						#323	217'1"	22"	1,944	10.948	5 21.9	1.6	121.9
					81				-¦⊭32.7	277'1"	210	1,944	9,001	18	1.5	123.4
									- 4 225 and 4 226	211-1"	2"	6,345	7,057	14.1 Static	1.4	
				508					М.Н. МА#1	189"1"	1 <u>1</u> "	712.	712	1.4	2.4	125.8
									х. 1911 г.					Static	3.	128.9
									G-2.03	(n) Conde No. 6	ansate	ReturnN	orth Sid	eN Stree	et; Area	#5 dwg
nort a					1.5				From TL #27 to #500	70 '	3"	1,958	14,865	29.7	Stat:	ic 137.4 137.7
100.001								1000	#502	310'	3"	1,944	12,907	25.8	1.0	138.7
					i i				7#506 and 7#508	217'1"	2-2"	6,345	10.963	21.9 Static	1.6	
															2.6	141.3
and the second sec								1000	#510	35711"	2"	1,944	4,618	9.2	1.2	142.5
							· ·		#514	217'1"	2"	1,944	2,674	5.3	.3	142.8
									#516 and #518	180'	1 <u>1</u> "	730	730	1.3 Static	.1	
				the short of					C D D						1.1	143.9
				Same Same			i.		G-2.03.	(o) Conde Dwg.	640	ReturnS	bouth Sid	eN Stre	et: Area	#5
									From TL to #501 and #524	125 '	3" .	873	26,305	52.6	Stati	3 144.2
	and the											ŝ.		Static	3.6	147.8
and the									#503	420 *	3"	1,944	25,432	50.9	5.0	152.8
									₩507	217'1"	3"	1,944	23,488	47.0	2.3	155 1
									#511 and #509	35711"	3#	6,345	21.544	43.1	3.2	150 2
									#515	217'1"	3"	1,944	15,199	30.4	1.0	159.3

X

G-2.03. (o) (Cont'd)

								Pij Length	oe Size	Bldg. Load lbs.	Load 1 Per hr	bs. Load	Friction Loss in Feet	Total Head in Feet
							# 517	515 '1"	3"	1,944	13,255	26.5 Static	1.8	100 1
							# 519 #523	217'1"	22"	1,944	11,311	22.6	1.7	162.1
Se lit.							4 521	277*1"	211	6,345	9,367	18.7	1.6	165.4
14 . 14							<i>‡</i> ⊧527	217'1"	2"	1,944	3,022	6. Static	2. 2.4	167.8
					St. Str.		#526 #520	36'	2"	311	1,078	2.1	0.0	167.8
							#522	5801	2"	767	767	1.5	.1	167.9
							G-2.03.	(p) Condo	nsate 1	ReturnNo	rth Side	eK Stre	et: Arck'	#4
						- 10 March 1	D	nwg N	0. 637					
0.41 9.41				- 1			#23 to #404	2201	3"	2,255	24,976	49.9 Static	Static 2.6 2.0	127.3
a kind							×			•			4.6	131.9
1.2 1.2.4 Autor Ista	×						To 7/406 and 408	211'1"	3"	6,345	22,721	45.4 Static	2:1 1.0 3.1	135.0
						and the second	1/410	281'1"	311	1,944	16,376	32.8	1.4	136.4
							#4 12	217'1"	2글॥	1,944	14,432	28.9	2.7	139.1
							#420, #422		2					
							1424 and 7416	513'2"	2支"	8,600	12,488	25.0	4.7	143.8
Second in particular Data			5 V				#426	291:1"	2"	1,944	3,888	7.8 Static	.8	146.6
												н. Н	2.0	110.0
0.501 0.5 1.037 0.5		Salama -					# 427	217'2"	2"	1,944	1,944	3.9 Static	.2	148.0
2.121			1.2.										1.4	141.8
, Ee - 31	2.05													

- 219 -

						G-2.03 (6	a) Conder	isate R	eturnSo	uth Side	K Stroe	et:	
	and those draws		A ALL AND				Pipe)	Bldgs.	Load 1	bs Load	Friction Loss in	. Total Head in
And and the	A.27 10.	and the set	200				Length	Size	Load 1bs	. per hr	. GPM	Feet	Feet
						From MH TI ====24							
						to #403 and	1851	711	0 767	17 674	07 7	Stati	c 131.9
						11-201	400.	3	۵,000	10,014	Static	1.8	
1997) · · · · · · · ·												2.8	134.7
						<i>⋕</i> 409	241'1"	22"	1,944	11,311	22.6 Static	1.9	
			1 N									2.9	137.6
						#411 and #415	53917"	2글"	6.345	9.367	18.7	3.1	140.7
								2		,	1		
1						#417	24811"	211	1,944	3,022	6.	.2	140.9
						#421 and		r					
						#419	355 '	2"	712	1,078	2.2	.1	141.0
192962 (1927) 192962 (1927)		in the second				#423	2551	2"	366	366	.7 Static	0.0	145.0
			1.14-									4.0	
				P = 1									
									2				
		1	an a						N-				
		na ^k i kat											

G-2.04 (a) Division Training Area Total Distribution Losses.

	Lbs. pe
Industrial Area	976
14" North Feeder to half of Area 3, Areas 1 & 2 and	
Post Troops	6,336
14" South Feeder to half	
of Area 3 & Areas 4 & 5	4,858
Total	12,170

Allowing 35¢ per 1000 lbs. as the incremental cost of production at the Central Heating Plant, then line losses amount to 106,550 x \$.35 = \$ 37,300 per year. This is an important item of expense and should be watched carefully - for a variation of 10% amounts to \$ 3,700 per year. Every effort should be made by scheduled inspections, routine maintenance etc. to keep leaks, uninsulated pipe surface etc. reduced to a minimum.

The maximum amount of condensate normally handled by one trap is in Manhole TL No. 10, where one trap drains the 430' of 14" and 910' of 12" pipe extending back to Manhole TL No. 7, totaling 553 lbs. of condensate per hour.

There are a total of 137 drip traps in manholes and mechanical pits used for draining the steam distribution system. Some of the mechanical pits contain traps for dripping the inside high pressure piping, through the steam service. Drip traps, valves, expansion joints and strainers should have daily inspection when first put into service and as the system and equipment operates smoothly the inspection period may be gradually lengthened to monthly intervals which should be kept up for at least the first year. Records showing maintenance performed on each trap, mechanical pit, manhole, etc. should then be used as a guide for permanent routine inspection and maintenance.

Distribution Losses as used in the following tabulations are;

Steam Pipe Size	ж. 4 ж. 4	Cond	lensate pe 100º of p	r hr. ipe
1_1/2#	1			
1-1/6			6	
2.			7.5	
2-1/2"			9	
3"			11	
4 **			14	
5 *			17 5	
6"	\$		17.0	
0 11			21	
0			27	
10 "	1		34	
12"			40	
14"	·		44	

-221-

per hr.	Lbs. per yr,	
76	8,550,000	

336 55,500,000

42,500,000 106,550,000 -2-24 (a) Styleion Training Area Total Dratelbutton Lossen.

Lbs. per yr			
8,530,000	976		loc strial Area
		to the and	enheon strand "41 short i seas in
55,50C,000	023.0	÷	t lagra and
0.003.55	968 . £	9157 S. 6 5 6 5	terbuen tuck au un un de dieurse fore
1000,088,000	C.C. C. L.		· ·

av the detrial lies ing Flant, then line drages among to 100,880 x 9.88 * a Tratic and sease of the in ing strain them of expanse and should be warehow an analy a for a variation of 10, another a to \$ 3,700 per years. Brery's for the the set of selected in the set of the selected of the set of the selected of the set of the se . mininim a od benules and sor has and the start of a bound to a minimum.

The constant manual is and mast a sore ally handled by one tings is in Manholo if all of . where no transfrancia will will be 14" and 910" of 12" pipe extending. book to mahois Th the 9, totaling 562 the. of explendencete

house the set of last of the second an annual as and machanical pitta Lookandoom end to eroe enotice it store at the second of the mentalest the Contests of a firiging and the block of antip prospers bipland. Showing he stonteste has stale, noiscurges satise , and sind son ere coutants mediave add as for activity pool due for it while a interpret which and fired entries decompany of abbig one beau of and the star a claim and

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120 th	1 10 1001 100	12. o.11. room&	
		84 E / 1 - 7	
	G.+ 5 Q.	* St 1 - 5	
	1.5	林安 秋之	
	2.01	¥2	
	12		
		12 (34) 14 C T	
		11	

G-2.04. (b) Condensate Drips, Industrial Area.

	Location of Drippt.	Pi	Size	Cond hr.p	l.lbs.per per 100 'pipe	Cond.lbs. per hour	Cond.cumulative lbs. per hour
From C.H.P to MH No.131	MH 133	168'	8 11		27	45	
C.H.P. to MH No. 130		91'	8 "		27	25	
MH 130 to No. 131		199'	8 "		27	54	
Propane Gas		110 :	22"		9	10	• 3
MH 131 to No. 133		954.	8"	2	27	257 391	391
MH 133 to MH No. 135		281'	6"		21	59	
To MH 136	MH 135	645 '	6**		21	135	
Bakery		90 1	3 "		11	10	
Fire House		175'	211		9	16 220	611
MH 136 to No. 138	MH 136	339 '	4"		14	47	,
Commissary		140 *	22"		9	13	671
		Braz	nch C			x	
MH 130 to MH 139	MH 139	441'	4"		14	62	
Garage		90 1	3#	•	11	10 72	743
		Bran	ich A			-	
MH 133 Reclemention	177 3 74	000.		•			
accializer on	MH 134	467' 90'	4" 2 ¹ / ₂ "		27 14 9	56 65 8	
-						129	872
Garage	Garage	20 '	3 "		11	2	874

the Conduction And And State	Labardo - 184). Sel ana segera	adl. http: Standa II	i Marii (Location of Drippt.	Pi Length	pe Co Size h
								F	ranch B
			*851		All with the			-	
				1		MH 136 to			1
						Post Shop	MH 137	650 '	4 **
								100 .	3"
in Section of						G-2.04	t (c) Drips f Dwg. 6	from Ce 74.	ntral He
							Aurille Strangerscher ausse	- TEMPINE	
		1 -				C.H.P. to		0	
	· · ·		1.11			MH TL S	MH TL #2	908	14"
I spin and a second sec	en martella					To A.D.# 64			
						at 24.8'	TL No. 3	250 1	14"
		22	1.		· · · · · · · · · · · · · · · · · · ·	To A.D.# 6A			
						at 24.15	TL No. 5	9251	14"
						Dispensary	Dispenseru	1301	2 11
						Dispondary	Dispensary	400 *	0.
						From A.D.#6A			
						to MH TL#6	TL No. 6	260 '	14"
		1						New York Concerns	
						· ·	Drawing	No. 6'	73.
						From TL No.6			٠
						to MH TL # 7	Bldg.302	450 1	741
							0.		
A CONTRACTOR OF A CONTRACTOR O						From TL No.7			
1						to MA # 17	Bldg.302	560 1	6"
						To MA # 16	Plde 300	170 1	E 11
						10 112 11 10	DIUE OUC	410.	5.
						To Bldg.302	Bldg.302	80 1	2-11
			5	3			5	80 1	2"
						To D1 1. 500			1
						10 BIdg . 322	B1dg.302	300 1	2支"
						Bldg.300	Bldg.300	110 .	2"
					E84 199				
						From MA 16			
						to Bldg.308	Bldg. 308	630 '	5"
And the state of t	and the second					Bldg. 308	Bldg 700	00 *	0.11
							DIUE. 200	50.	2"
	18					Bldg. 304	Bldg. 304	90 '	1글"
						A CONTRACT OF			~

Pi	pe	Cond.lbs.per	Cond.lbs.	Cond.cumulative
1	5126	nr.per 100-pipe	per nr.	lbs. per hour
B	ranch	B		
1	4"	14	91	
1	3 "	11	11	
			102	976
ler	ntral	Heating Plant	to Areas 3	2. & 1.
alle sales	• • • • • • • • • • • • • • • • • • •	an na na an a	8-9-9-6- 41-0-8-	,
1	14"	44	400	400
	141	A A	110	53.0
	7.1	**	110	510
			•	
	14"	44	407	917
	3 "	11	47	964
	7411	44	114	10.50
	**	4.1	77.7	1078
67	3.			
	•			
	14"	44	198	
	6"	21	118	
			110	
	5"	17.5	82	
	2-11	9.	7.	
	2"	7.5	6.	
	211	0	0.7	
	62	9.	438	1516
				1010
	5 "	7.5	8	1524
	5"	17.5	110	
	211	7 5	Ċ	
	6	0.1	116	1640
	12"	6	5.	1645

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and the second

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		Location of Drippt.	Pipe Length	Size	Cond.1	bs.per 100'pipe	Con per	d.lbs hr.	Cond.cumulative lbs. per hour
	From Bldg.308 to Bldg.316	Bldg.316	211 '1" 283'1"	5" 4"		17.5 14.		37. 40.	
and seek	Bldg, 316	Bldg.316	90 *	2"		7.5	,	7. 84	1729
	MA # 13 to Bldg. 312	Bldg .312	80 ' 20 '	4" 1 <u>1</u> "		14 6		11 1	
e calle :		Drawing 6	36.					12	1741
	From Bldg.312 to Bldg.314	Bldg.314	400 *	4"		14		56	1797
and the second second	Bldg.318	Bldg.318	217:1" 90'	3# 2#		11 7.5		24 7 31	1828
C.D. Margare	Bldg.320	Bldg.320	21711# 20#	3 # 2 #		11 7.5		24 2	
	Div.H.Q.(2)	Bldg.2	440 '	3 "		11	-	48	1854
The second second second		Drawing 6	73.			:			
の構成した。	Post HQ (1)	Bldg.1	50 '	2"	2	7.5		4	1906
-1	MH TL # 7 to TL # 10	TL #10	430 ' 910 '	14" 12"		44 40		189 364	2450
Example of	Water Pumping Station (20)	Bldg.20	310 *	2 <u>1</u> #		9		28	2487
and a second	TL No. 8 to Bldg. 12	Bldg.12	300 *	5 **		17.5		52	2539
a sugar	Bldg.13	Bldg.13	130 '	2 ¹ / ₂ "	X	9		12	2551
	Bldg.10	Bldg.10	217:1" 320:	4# 4#		14			
	Bldg.8	Bldg.8	424 2"	4"		14		59	2626 2685

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en Lasen a Crimo	i Gildi shanli	Analyse and South					Location of Drip Pt.	Pipe Length	Size	Cond.1bs.per hr.per 100'pipe	Cond.lbs. per hr.	Cond. cumulative lbs. per hour
			Constant one	n dana ana ana a		Bldg. 6	Bldg.#8	232'1"	4"	14	32	2717
					to House	MH PT #1 Bldg.3	MH PT#1	704 ' 120 '	4" 3"	14	98 13	
and the second second	an a light				all again	Bldg • 25	045	220	3"	11	135	2852
						Drawi	ng 643.		7			
						Bldg.4	Bldg.4	120 '	1克"	6	7	2859
andra anna an ann an Eilean	na an a					Drawi	ng 634.					
					s for a second	TH #9 to E #16	Bldg.201	170 ' 210 '	5" 2"	17.5	30. 16	200E
											40	2900
						Bldg. 209	Bldg .209	456'.1" 100'	5" 2"	17.5 7.5	80 8 88	2993
					Z.C. yhi?	Bldg. 205	Bldg.205	110 '	12"	6	7.	3000
						Bldg • 203	Bl dg . 203	140 '	1코"	6	8	3008
1902					(E-3	Bldg.213	539 ' 7" 90 '	4 ** 4 **			1
			* ÷			Bldg.211		629 ' 7" 100 '	4"	14 14	88 14	i stati
						Bldg.213		20 '	2"	7.5	2 104	3112
						Bldg. 225	Bldg.225	210 '	22"	9	19	3131
ense Elsense mense a						Bldg. 217	Bldg.217	223 11" 90 '	3" 2 <u>1</u> "	11 9	24 8.	
								~			32	3163
						. ₽#1)	Bldg.221	300 ' 243 ' 7" 60 '	3" 3 <u>1</u> " 2"	11 9 9.5	33 22 4	
1.				Sas shall	14 × 17 19 19			00	2		59	3222
1888				Sixter and	51 - 2043 14 - 514 5	Bldg.219 Bldg.223	Bldg.219 Bldg.223	140 ** 270 *	2" 2 ¹ / ₂ "	7.5 9	10 24	
			(marine					2001	2"	7.5	15 39	3271
						Drawi	ng 633.					
				8106, 15 S		MH TL#10 to Bldg.212	Bldg.212	537'1" 90'	5 " 2"	17.5 7.5	94.	2120
											TOT	0404

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	and a special const													
	and an although a			distant.					Location	Pip	e Si zo	Cond.1bs.per	Cond.lbs.	Cond.cumulative
and the property of			.# p . 1						or map to.	Long on	0120	into bet too, brbe	per m.	105.per nour
								Draw	ing 633 (co	nt'd)				
							n] de	202	P1 da 200	001	110	7 5	7	2420
							BIOS	. 200	D108.200	90.	2	7.0	1	3439
							To H	#10	Bldg.220	464'1"	5#	17.5	81	
										90 *	2言"	9	8	
					19.52								89	3528
							Bldg	.216	Bldg.216	400 *	2"	7.5	30	3558
								-7.4			- 11			
		N L 7% -					BIdg	.214	B1dg.214	80 •	2"	7.5	6	3564
angenere and age a server	and a second second second second second second						MH B	# 8	Bldg .228	211'1"	5"	17.5	37	
										280 111	3"	11.	31	
							Bldg	.224		90 *	4"	14	13	
		1.5					2-81	, 228		90 •	3"	11	10	
											1.			3655
							Bldg	. 226	Bldg.224	385 1	4.11	14	54	
	2.1									20 *	1글"	6	1	
													55	3710
							Bldg	.227	Bldg . 227	217'1"	3 11			
•										90 '	3 11			
							· · · · · · · · · · · · · · · · · · ·			307'1"	311	11	34	3744
								mit //] 0			1			
							From	TH#10	די אין דים	951	101			
								1 7710	11 77 10	330 .	16			
										400 1				
										815 1	1211	40	326	
							Bldg	. 206		90 *	3"	11	10	
						• 455		3 to TI	ד בא זיח	100 1	1.0#	40	1.00	
							π		TEALIN	400.	10	20	496	1210
													100	1210
							P.Th	eater	P.T.#19	450 '				
							No.1	9		450 1	4"	14	63	4303
							ר	1 +0						
							TL#L	15	יד #ר 4	3601	10#	40	7 4 4	
							107	10	THT	220 1	411	14	31	
													174	4477
and the second														
							From	TL#15	to	100.	104	. 10		
								0.	112	1401	2#	40	70	
	······································	de 1 1	100				110			110.	6	1.0	80	4557
and a series of the series	a strain or in particular and the												00	1001

4500 NO 7000 (0) 40.040

A CONTRACTOR STATES		nganthan ti 19 78 to a mi	nosti il Maria differencia				Location of Drip Pt.	Pipe Length	Size	Cond.1bs.per hr.per 100'pipe	Cond.lbs. per hr.	Cond.cumulative lbs. per hour
					25	Drawi	ing 632.					
		-5			·····•	From TL #16 to 117	Bldg.117	164!	4"	14	23	
	a an adapte					117		100	12	0	8 31	4588
		×			1.00	To 123	Bldg.123	410 '	4"			-
				· * * * ~		and the second		160	4"	14	80	
and states and a		GeV .				Bldg.123		210 '	2"	7.5	16 96	4684
	18	* * * * # 1			8 112	Bldg.119	Bldg.119	50 '	2"	7.5	4	4688
					- 1940 - 1964	Bldg.121	Bldg.121	40 1	2"	7.5	3	4691
					a and a second	From Tl#16 to 111 111	Bldg.111	70 ' 90 '	4" * 2"	14 7.5	10 7	
and the second	and a second										17	4708
			9 - 19 19 19 19 1 - 19 19 19 1 - 19 19		7	MH B #5.	Bldg.lll	21 7 1 " 90 "	4" 2"	14 7.5	30 7 37	4745
						MH B #6	Bldg.105	424'2" 90'	4 11 2 11	14 7.5	59 7	1023
						Bldg.101	Bldg.101	217'1" 90'	4" 2 ¹ / ₂ "	14 9	30 8	4811
										-	38	4849
0234						TL#16 to TL#18	MHTL#18	730 *	10"			× * *
					1.			1111.1"	10"	34	376	5225
t						From TL #17 to Bldg 108	108	261'1" 90'	5" 2"	17.5 7.5	46 7	
A BANK AND A CONTRACT OF A DECK						11-1-			1		53	5278
					all an anna an a	Bldg.112	Bldg.112	90 ° 20 °	2 ¹ / ₂ " 2"	9 7.5	8 2	6700
Yes,						Bldg.114	Bldg.114	230 1	2"	7.5	17	5805

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	****************				pape	por m.	105. per	hou
Drawi	ing 632 Co	ntinued	•					
MH B#13								
to 102	Bldg.102	474 9	5 11	17.5		83		
		2751	4 11	14		30		
		90 1	3 #	11		10		
			U	**		131		070
Pire Has 19						101	i	1930
104	P.I.IO	1001	4.11					
Coth Church	(17)	100.	4"					
106		160	4"					
Fire Hee 19	19-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	150	4"					
los	,	530	4"			*		
100		901	4"					
Dine Use 10		1030	4"	14		142		
Fire Hse.18		50 *	2"	7.5		4		
						146	6	082
104	104	30 '	2"	7.5		2	6	084
Cath.Church	17 CC17	700 1	2111	9		67	-	
Bldg.118	Bldg . 118	90 1	111	14		00	6	147
	1746.110	00	T	14		14	6	161
Bldg.122	Bldg.122	450 *	4"	14		14	6	223
	•						0	550
B1dg .120	120	90 1	2"	7.5		• 7.	6	230
		no		no				
MH TL#19	MH TL19	pipe		cond.		0	6	230
		•						
MH TL#19	and a local strength of							
to MH B #8	Bldg.128	220 '	4"	14		31		
		150'	2点11	9		14		
						45	6	275
D11- 104								
B10g.124	B1dg.124	40 *	2"	7.5		3	6:	278
Bldg.127	Bldg.127	245 '	311	11		20		
	0	15 '	2"	7.5		1		
Bldg .125		210 '	2-111	9		28		
			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			58	6'	336
0.0.01	(1)					00	00	000
Drawin	g 674.	ps From	Centra	al Htg. Pl	lant t	to Areas 4	: & 5.	
C.H.P. to #3	MH TL#2	908 '	14"	44		400	4C	00
To AD +64 at	TT	1 .	1 117					
24.8	Trito	2501	7.4.11	4.4		7.7.0		
		600	7.7	44		110	51	.0
TO AD #64								
11 - 64								

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	Location of Drip Pt.	Pip Length	Size	Cond.lbs.per hr.per 100' pipe	Cond.1bs. per hr.	Cond.cumulative lbs.per hour
to TL #6	TL # 6	260 1	14"	44	114	10 78
Hostess Ha	se. (No.14)	500 *	2월"	9	45	1123
to TL#20	Bldg.301	370 *	12"	40	148	
Draw	ing 635.					
To MA #9 Bldg.301		200 ' 85 '	6" 2 ¹	21 9	42 8	
				1	198	1321
Bldg. 305	Bldg.305	30 1	2"	7.5	2	1323
MA #4 Bldg.321	Bldg.321	516'2" 561' 90' 90'	6" 5" 3" 2"	21 17.5 11 7.5	109 98 10 7	
					224	1547
Bl dg .307 to 313	Bldg.313	410 ' 20 '	3" 1 ¹ / ₂ "	11 7.5	<b>4</b> 4 <b>2</b>	
		r			46	1593
Bldg.309	Bldg.309	. 20 *	12"	6	l	1594
Bldg.323	Bldg.323	217 <b>11</b> 90 <b>1</b>	5" 1호"	17.5 6	38 5	
MA #3 Bldg.327	Bldg.327	277 * 1 ** 90 *	5 " 2"	17.5 7.5	43 48 7	1637
No. 11-					55	1692
Bldg.324	Bldg.324	211:1" 189:1" 60:	4" 2" 2"	14 7.5 7.5	27 14 4 45	1737
Bldg • 326	Bldg.326	90 ' 20 '	4" 1 ¹ / ₂ "	14	13 1	
Bldg Bos					14	1751
DIGE .325	Bldg.325	400 '	4"	14	56	1807
Bldg. 317	Bldg.317	220 '	2"	7.5	16	1823



	of Drip Pt.	Length	Size	hr.per 100'pipe	per hr.	lbs. per hour
Draw	ing 675.					
Fram MH TL 20 to 315	Bldg.315	250' 180'	12" 2"	40 7.5	100 14	x
					114	1937
TL# 21						
to TL # 23	TL #23	290 <b>!</b> 460 <b>!</b> 750 <b>!</b>	12" 12" 12"	40	300	2237
Bldg.425	Bldg.425	120'	2 **	7.5	9.	2246
TL #23 to						
Prot.Ch. Bldg.16	Bldg.16	330 ° 450 '	22"			
	×	780 '	2211	9	70	2316
Drawi	ng 637.					
MH TL #23 to 404 404 400	Bldg.404	220 ' 90 ' 120 '	6" 22" 2"	21 9 7.5	46 8 8	
1 112 -					02	2378
J-#13 to J#12	MH J#14	211'1" 480' 498'2"	6" 4" 5"	21 14 17.5	44 67 87	and a second state of the
					198	2576
bidg.406	Bldg.406	10 '	2"	7.5	1	2577
Bldg. 410	Bldg.410	90 *	2"	7.5	7	2584
Bldg.412	Bldg.412	251'7" 90'	5# 2#	17.5 7.5	44 7	
To 405					10	2635
*****	Bldg.427	261'7" 291'1" 217'1" 90'	5" 4" 4" 2 ¹ / ₂ "	17.5 14 14 9	46 41 30 8	х 
					125	2760

					· 11-11-11-11-11-11-11-11-11-11-11-11-11-		414-11
		allaine) An Tei	maps of Lands	• 100 011 12	art Birgind	1001250-1 100125	
			. 6				
				1 .			
	1. 10 - 10 - 10 - 10 - 10 - 10 - 10 - 10						
							<u></u>
			- 15 1				100 . 10 100 . 50 1
	1821						
17 .	14.24	12	$\mathbb{T}_{\mathbf{x}}(\mathbb{T})$				105 .50
			1. 1.7.1		131013 • * (N)		
					109		
	New York	and the second					
							N/08+301
			and a				814 0
	and the second sec	an a					
		• 1		$C = \int_{\mathbb{T}^n}$			
			$\mathbb{E}_{\mathbf{x}} \in \mathbb{F}$				
	where the second state of the second state $(M_{\rm eff})$ , the second state of the second state $(M_{\rm eff})^{-1}$ , the second state $(M_{\rm eff})^{-1}$ , the second state s						
			2,51			N Care O	1 2.5. 19
	- SHUT	and a real of the second se	here.				
	and a first free service and		uner i				
			- E-	Я., Marta	1 38 1 00	.5% # 3-	
	Dr.I.	an an the second s	***				
	incas 100						
	1625						

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-	Location of Drip Pt. I	Pipe Length S	Gize 1	ond.lbs nr.per 10	.per )0'pij
Bldg. 422	Bldg.422	20 '	2"	7.	5
Bldg. 420	Bldg.420	10 '	2"	7.	5
Bldg.416	Bldg.416	260 '	2고"	9	
Bldg.426	Bldg. 426	90 1	2"	7.	5
Draw	ing 675.				
From TH#23 to TL#27	MH TL#24	400 '	10"	34	
		930 '	8 "	27	
Draw	ing 638.				
From TL#24		539'1"	5"	17	.5
to 409	Bldg .409	485 '	5"	17	.5
	0	241:1"	5"	17	.5
		90 '	2"	7.	5
Dida 107	D1da' 107	901	211	0	
Brug. ±01	Drug, 401	30 .	62	5	c
		30.	2	1.	0
Bldg.403	Bldg.403	100'	2"	7.	5
MH J3 to	Bldg.411	248'1"	4 11		
MH 142	5-401	300 '	4 11		
Bldg. 411		548'1"	4"	14	
Bldg.415	Bldg.415	10'	112"	6	
Bldg.417	Bldg.417	90 '	2"	7.	5
From MH J2		580 '	4"	14	
to 423	Bldg.423	170 *	2"	7.	5
Bldg.419		140 '	2"	7.	5
		1			
Bldg.421	Bldg.421	40 '	2"	× 7.	5
Draw	ing 675.				
Bldg 401	Plde 401	140 1	211	7	5
	DINE . TOI	110.	2	1.	0

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•	Cond.1bs.	Cond. cumulative
pe	per hr.	lbs. per hour
	2	2832
	1	2833
	23	2856
	7	2863
	136 251	
	94	
	85	
	42	
	228	3478
	8	
		3488
	8	3492
	77	3569
	1	3670
	7	3677
	81	
	13	
	104	3781
	3	3784

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3794

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I	ocation of Drip Pt.	Pipe	Size 1	ond.lbs.per hr.per 100'pipe	Cond.lbs. per hr.	Cond.cumulative
Drawi	ng 639.	Ballander The office adards			-	
	Bang and " dive bre brought	4				
MH TL#27 to Bldg. 502	Bldg.502	380 1	5"	17.5	66	3860
Bldg.500	Bldg.500	201	2"	7.5	2.	3862
To MH M#4	M#4	217'1"	5 **	17.5	39	
		200	I	11	80	3942
	×					1
To Bldg.510	510	357'1"	3 "	11	39	3981
Bldg. 514	514	217'1"	3 **	11	24	4005
Bldg.516	516	180 *	22"	9	16	
		120 '	2"	7.5	9	18-19-10-10-10-10-10-10-10-10-10-10-10-10-10-
	•				25	4030
Bldg. 518	518	300 1	2"	7.5	22	4052
Drawi	ng 675			×		
TH #27 to e	nd					
of Trunk Li	ne 501	640 '	8 "	27	173	
Drawi	ng 640.			· ·		
To Bldg.501		125'	6"	21	26	
		30'	2"	7.5	2	
Bldg.503		420 '	6"	21	88	an a
To 507	Bldg.507	217'1"	6"	21	289 46	4341 4387
						1001
TO BIdg.511	511	35711	6"	21	75	
		290 '	4"	14	$\frac{41}{116}$	4503
Bldg.515	515	217'1"	5#	17.5	38	4541
Bldg.517	517	732'1"	5"	17.5	128	4669
Bldg. 519	519	none			0	4669
Bldg. 523	523	277 11	5 **	17.5	48	4717
Bldg. 521	521	290 *	4"	14	41	4758

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	Location of Drip Pt. 1	Pipe ength Siz	Cond.l e hr.per	bs.per 100'pipe	Cond.1bs. per hr.	Cond.cu lbs.per	mulative hour
Draw	ving 640 (Co	ntinued)					
Bldg.527	Bldg.527	217'1" 30' 580'	3 11 3 11 3 11				
		827'1"	311	11	91		4849
Bldg.526	626	40 '	2"	7.5	3.		4852
Bldg.522	522	10'	12"	6	1.		4853
Bldg. 520	520	90 '	12"	6	5.		4858

## G-2.05. Naval Hospital Steam Distribution.

(a) Pressure Drop Study. The purpose of this study is to determine the pressure drop throughout the steam distribution system at the Naval Hospital.

The lowest pressure was calculated to be 119.6 lbs. per sq. inch at the wards with 125 lbs. per sq. inch leaving the Hospital Power House, and 123.7 lbs. at the Hospital Laundry. This would indicate that the outgoing pressure under peak load conditions could be 105-110 lb. and at times other than peak load a pressure of 90 should be sufficient even with the Laundry operating, assuming the Laundry can operate with steam at 80 lbs. per sq. inch.

An operating schedule should be developed showing outgoing plant pressure required to maintain nimimum allowable working pressures for each hour of the day including a correct allowance for outdoor weather conditions.

If in the future a tie line is installed to connect the Hospital with Regimental Area No. 1, this main should be 10" diameter. An 8" line would give a pressure of 41.4 lbs. per sq. inch at the terminal point of the 6" main serving the Family Hospital. This is based on transmitting 54,000 lbs. per hour to the Hospital Area which is about 5,000 lbs (or 10%) in excess of the present load requirement. The excess is being reserved for two additional wards.

The pressure will be slightly higher if this additional 5,000 lbs. per hour is not transmitted.

Sound engineering practice indicates the need of a 10" connecting main to Area #1, with resulting pressure at the Family Hospital of 101.1 lbs. and 77.2 lbs. at the Laundry.

If the Hospital Area is served from the Central Heating Plant in the Division Training Area, the existing boiler plant should be maintained as an active emergency standby.

## G-2.05. (b) Steam--Naval Hospital: Dwg. 3644

	Pi Length	pe Size	Bldg. Load lbs.	Load lbs. per hour	Press. Drop 1bs.	Resultant Pr. p.s.i.
From Power House to M.H. #152	701	8"	5,860	49,044	.9	125.0 12 <b>4.1</b>
To Laundry H-21	401	8"	3,295	43,184	•4	123.7
To M.H. 153	1701	8**	4,250	39,889	1.4	122.3
To Nurses Home H-14	160'	8"	2,250	35,639	.1	121.3

G-2.05 (b) (Cont'd)

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	Pip Length	e Size	Bldg. Load 1bs.	Load 1bs. Per hour	Press. Drop lbs.	Resultant Pr. p.s.i
To M.H. 154 to Wards	300 *	8"	33,389	33,389	1.7	119.6
From M. H. 152 to Shops and			400 4,400			
Corpsmen Barracks	2401	4"	4,800	5,860	1.8	122.3
To Garage	180'	4"	460	1,060	-	122.3
To Medical Warehouse H-17	2801	4"	600 ~	600	· .	122.3
From Shops to M.H. 150 to Corpsmen Barracks H-23 & H-24	480 <b>'</b>	4"	4,400	4,400	.2	122.3 120.3
From M.H. 153 to AD#6 at Civilian Nurses Home H-16 & Family Hospital H-18	5 310*	6"	1,250 3,000 4,250	4,250	.1	122.3
From Power House to M.H. 156 Warrant Officers Home H-28	330 1	2코"	150	150	.1	125. 124.9
G-2.05. (c)	Tie Li	ne Fro	om Regiment	al Area:		
From Area #1 MH TL #19 to A.D. #6 at Family Hos-						117.7
pital H-15	3400 *	8"	54,000	54,000	76.3	41.4
MH TL 19 to A.D. #6 at Family Hos-						
pital H-15	3400*	10"	4,250	54,000	17.6	101.1
To MH 153	310:	6"	35,639	49,750	23.6	77.5
To Laundry H-21	170'	8"	3,295	14,111	.3	77.2
G-2.05. (d) Friction Loss Study. loss throughout the against which the co	Hospita The condens	al Are purpos sate r te pum	ea Steam Di e of this eturn syst ups must op	stribution study is to cem and to operate.	- Condensate determine t letermine the	Return he friction head

The maximum head in the return main was found to be 22.3' at the Wards

with no allowance for future loads. However, insofar as return line capacity back to the Power House is concerned, there is more than ample capacity.

If the tie line is installed to the Regimental Area connecting at M.H. TL #19, then the head at M.H. 153 in the Hospital Area would be 203.7' or 90 p.s.i. at peak loads.

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Condensate pumps have been specified to operate against 100 p.s.i.

G-2.05. (e	) Conde	ensate	e Return -	Hospital	Area.		
• *	Pipe Length	9 Size	Bldg. Load Lbs.	Load Lbs. Per Hour	Load GPM	Friction Loss in Feet	Total in Feet
From C.H.P. to M.H. #152	701	4 ^{tt}	5,860	Sta 49,044 Sta	tic - 98 tic -	12.0' 0.8 4.00 4.8	8.0 12.8
To Laundry H-21	40 *	4"	3,295	43,184	86	.38	13,2
To M.H. #153	170'	4"	4,250	<b>39,</b> 889 Sta	80 tic	$-\frac{1.4}{1.00}$	15.6
To Nurses' Home H-14	160'	4"	2,250	35,639 Sta	71. tic	1.0 - <u>4.00</u> 5.00	20.6
To M.H. #154 and Wards	3001	4"	33,389	33,389	67	1.7	22.3
From M.H. #152 To Shops H-19 & Corpsmen Barracks H-23 & H-24	240	21	400 4,400 4,800	5,860 Sta	12 tic	.60 - <u>1.00</u> 1.60	12.8 14.4
To Garage	180 1	$2\frac{1}{2}^{n}$	460	1,060	.2	.02	14.4
To Medical Ware- house H-17	280'	211	600	600	1.2	0	14.4 14.4
From Shops H-19 To Corpsmen H-23 & H-24 MH 150	480*	21"	4,400	4,400 Sta	8.8 tic	.77 - 2.00 2.77	17.2

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### G-2.05. (e) (Cont'd)

	Pipe Length	Size	Bldg. Load Lbs.	Load Lbs. Per Hour	Load GPM	Friction Loss in Feet	Total in Feet
rom MH 153					St	atic -	15.6
• AD#6	310*	3"	3,000	4,250	8.5	0.2	15.8
rom AD#6 to							
ome H-16	470	2 <u>1</u> "	1,250	1,250	2.5	0.1	15.9
rom Area #1					St	atic -	167.7
H TL #19 to							
ospital	3400 1	5"	4,250	54,000	108	13.6	
			•	Stati	c -	9.0	190.3
rom ADH6 to		1					
H #153	310:	3"	35,639	49,750	99	12.4	
			×	Stati	c -	$\frac{1.0}{13.4}$	203.7
G-2.05.	(f) Nav	ral Ho	spital To	tal Steam	Distri	bution Los	ses.
Losses -	Pounds 1	per Ho	ur - 562,	Pounds p	er Yea	r - 4,940,	000
Allowing a	35¢ per ting Pla	M. po ant, t	unds as t hen line	he increme losses amo	ntal c unt to	ost of pro	duction at
4940 x .3	5 =	\$1,7	30 per ye	ar.			
This is an or a variation ade by schedule minsulated pipe	n import of 10% ed inspect surface	tant i amoun ection se, et	tem of exits to \$17 is, routing c. reduce	pense and 3 per year 9 maintena d to a min	should Evence, e imum.	be watche ry effort tc. to kee	d carefully - should be p leaks,
The maxim	um amoun	nt of	condensat	e normally	handl	ed by one	trap, is in

Manhole #154 where one trap drains a section of main giving 307 lbs. per hour of condensate.

There are a total of 8 drip traps in manholes and mechanical pits used for draining the steam distribution system. Some of the mechanical pits have traps for dripping the inside high pressure piping, through the steam service.

Drip traps, valves, expansion joints and strainers should have daily inspection when first put linto service and as the system and equipment operates smoothly, the inspection period may be gradually lengthened to monthly intervals which should be kept up for at least the first year.

Records showing maintenance performed on each trap, mechanical pit, manhole, etc. should then be used as a guide for permanent routine inspection and maintenance.

Distribution Losses as used in the following tabulations are:

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	STEAN SI	I PIPE ZE			CONDE	OF F	#/HR/100 PIPE		
ę	2- 3" 4" 5" 6" 8"	-1/2"				9 11 14 17 21 27	• 5		
	G-	2.05. (8	g) Hor	spital	Distribu	tion	Losses:		
	Loc Drip	ation of Point	Pij Lengtl	pe h Size	Cond.1bs hr.per10	.per O'Pipe	Cond.1bs. per hr.	Cond. cu lbs. per	mulative hour
C.H.P. to	Wards		701	8"	27		19		
& Anchor	at								
H-15	spreat	MH#154	401	off	0.77				
11-10		1414-104	651	11	27		11		
			1701	811	14		9		
			3101	6"	21		40		
			1601	8"	27		43		
			3001	8"	27		80		
			501	3"	11		6		
			2001	4"	14		28	307	
							307		A war and a second and
AD#6 to C	ivilian								
Nurses Ho	me-H-16	MH#155	2001						
		n	2701						
		-	4701	21"	9		42		
	+						42	349	
From MH#1 Garage &	52 to Corps-		240 *	4"	14		34		
H-24	20 00	MUH-150	100.	4 11	24				
		MIG-100	501	311	14		68		
			1801	411	14		25		
			100	T	14		123	472	
Bronch +-	D1-1-								
Shope to	Brag.	11 10		0.7.					
ano ba		H-19	351	22	9	-	3		
	-t						3	475	

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ISATE #/HF	1/1001
OF PIPE	
9	
11	
14	
17.5	
21.	
27	

G-2.05. (g) (Cont'd)

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		Location of Drip Point	f Pij Length	pe Size	Cond. 1bs. hr. per 100'
E C H	eranch to orpsmen -24	Bldg.H-24	501	3"	11
F 1 M W H	rom MH # 51 to Medical Marehouse 4-17	Garage	2801 251	4" 2 <u>1</u> "	14 9
B	ranch to edical	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			
W	arehouse -17	Bldg.H-17	15'	211	9
		n			
C W O	.H.P. to arrant fficers				
H	ome H-28	MH #156	430	21	9

por	Cond. 1bs.	Cond	. cumu	lative
rpe	per hour	1bs.	per	hour
	0			
-	6		481	
			-02	
	39.0			
-	41.0		522	
	1.0			
	1.0		523	
	39.			
Autophindung of	39		562	
•				
	110			

### G-2.06. Rifle Range--Steam Distribution:

(1) ...

(a) Pressure Drop Study: The purpose of this study is to

determine the pressure drop throughout the steam distribution system under peak load conditions.

With an allowance of 4,000 lbs. per hour at Building RR 5 and 3,500 lbs. per hour at Building RR 8, the minimum pressure was computed to be 103.8 p.s.i. gauge at manhole RR #9, near the Officers Quarters. With the water heater requiring 50 p.s.i. plus an allowance of 25 lbs for pressure drop through the pressure reducing valve, a working pressure of of 75 p.s.i. would seem ample under peak load conditions. This would permit operating the boiler plant at 100 lbs. under peak load conditions and without the future load allowed for, an even lower pressure would be sufficient.

Under peak load conditions, a boiler pressure around 75 lbs. should be sufficient. For efficient operation a graph should be prepared showing necessary boiler pressure under different weather conitions required to maintain minimum effective pressure at the far end of the system. Boilers should be operated at the lowest possible pressure at all times for maximum economy in fuel and maintenance.

	(D) SteemRII	le Range:	Pressure	Drop Table,	Dwg. 680
*	Pipe Length Size	Bldg. Load	Load lbs per hr.	Press. Drop 1bs.	Resultant Pr.p.s.i.
From C.H.P. RR 15 to RR 1	210' 6"	1,944	24,735	3.2	125 121.8
To M.H. RR2	160 * 6"	14,233	22,791	2.0	119.8
To M.H. RR7, R ^a ll and RR10	395' 4"	1,219	8,558	6.6	113,2
RR9	325' 4"	980	7,339	4.1	109.1
M.H. RR8 and RR 12	210' 4"	401	6,359	2.0	107.1
To RR8	Future	1,958 3,500			
	350 * 4"	5,458	5,958	3.1	104.0
To M.H. RR9 Officers					
Quarters	$260' 2\frac{1}{2}"$	500	500	.2	103.8
	South Br	anch from	n M.H. RR 2	2	
From M.H. RR2 to					119 8
M.H. RR 3	57'1" 6"	1,944	14,233	.3	119.5

G-2.06. (b) (Cont'd)

	Pip	e	Bldg.	
	Length	Size	Load	
RR3	90 *	6 ¹¹	4,401	
To RR 4	267'1"	4"	1,944	
RR 5	217'1"	4"	1,944	
		Future	4,000	
			5,944	

G-2.06 (c) Condensate Return Friction Loss Study: The purpose of this study was to determine the friction loss throughout the condensate return system, and to determine the head against which the condensate pumps will have to operate.

The maximum head (32.3') was found to be at manhole RR #9 where a three valve lifting trap returns the condensate from the Officer's Quarters. With a head of 32.3' when allowing for 3,500 lbs. per hour future load at the theater and 4,000 lbs. per hour future at Building RR 5, then the return line has sufficient capacity.

### G-2.06 (d) Condensate Return--Rifle Range:

1) 10	Pi Length	pe Size	Bldg Load
From C.H.P.RR 15 to RR 1	210'	2 ¹ 2"	1,944
To MH RR 2	160'	2 <u>고</u> ॥	14,233
To MH RR 7	395 *	2 ¹ / ₂ "	1,219
B.O.Q. RR 9	325 '	22"	980
MH RR 8	210'	22#	401
To RR 8	350'	2 <u>1</u> n	5,458
To MH RR 9	260'	22#	500

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Load 1bs	Press.	Resultant	
per hr.	Drop 1bs.	Pr.p.s.i.	
12,289	.3	119.2	
7,888	3.7	115.5,	

5.	944	1.7	113.8

Load 1b per hr.	s Load GPM		Friction Loss in Feet	Total Headin Feet
				6.0
24 <b>,7</b> 35	49.5 Static	-	7.4 3.5 10.9	16.9
22,791	45.6 Static	1	4.8 2. 6.8	23.7
8,558	17.1 Static	-	2.0 <u>4.</u> 6.0	29.7
7,339	14.7		1.2	30.9
6,359	12.7		.6	31.5
5,958	11.9		.8	32.3
500	1.0		-	32.3
# CONTRACTOR CONTRACTOR

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G-2.06 (d) (Cont'd)

### South Branch From MH RR 2

		Pi	pe	Bldg.	Load lbs.	Load	Friction Loss in	Total Head in
		Length	Size	Load	per hr.	GPM	Feet	Feet
From to MH	MH RR 2 H RR 3	5711	2 <u>]</u> "	1,944	14,233	28.5	.7	24.4
To RI	R 3	90 •	211	4,401	12,289	24.6	.9	25.3
RR 4		267'1"	212"	1,944	1,888	15.8	1.1	26.4
RR 5		217'1"	2 코 "	5,944	5,944	11.9	.5	26.9

G-2.06. (e) Rifle Range--Total Steam Distribution Losses: Losses in pounds per hour, 501; pounds per year, 4,380,000. Allowing 35 cents per M. pounds as the incremental cost of production at the Central Heating Plant, then line losses ammount to

## 4,380 x .35¢ = \$1,536.00 per year.

While this is not a large expense it is an important one and should be watched carefully. Every effort should be made by scheduled inspections, routine maintenance etc. to keep leaks, uninsulated pipe surface etc. reduced to a minimum. The maximum amount of condensate normally handled by one trap is in Building RR 10 where the condensate amounts to 114 pounds per hour.

There are a total of 11 drip traps in manholes and mechanical pits used for draining the steam distribution system. Some of the mechanical pits have traps for dripping the inside high pressure piping, through the steam service. This system should have the same routine inspection and maintenance as recommended for the Division Training Area -Section G-2.04.

## Steam Distribution Losses

Lo cation	Pipe	Cond.lbs.per	Cond.1bs.	Cond. cumulative
of Drip Pt	Length Size	hr.per DO'pipe	per hr.	lbs.per hour.
15				
RR 1	210' 6"			
	160' 6"			
<i>*</i>	57'1" 6"			
	427'1" 6"	21	90	90
RR 2	901 6"	21	19	109
RR 2	285 4"	14	40	149
	Lo ceticn of Drip Pt 15 RR 1 RR 2 RR 2	Location Pipe of Drip Pt Length Size 15 RR 1 210' 6" 160' 6" 57'1" 6" 427'1" 6" RR 2 90' 6" RR 2 285' 4"	Location Pipe Cond.lbs.per of Drip Pt Length Size hr.per DO'pipe 15 RR 1 210' 6" 160' 6" <u>57'1" 6"</u> 21 RR 2 90' 6" 21 RR 2 285' 4" 14	Location       Pipe       Cond.lbs.per       Cond.lbs.         of Drip Pt       Length       Size       hr.per DO'pipe       per hr.         15       RR 1       210'       6"       160'.       6"         15       7'1"       6"       21       90         RR 2       90'       6"       21       19         RR 2       285'       4"       14       40

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G-2.06	(e)	(Cont'd)
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		Location of Drip Ft	Pipe Length S	ize	Cond.1bs.per hr.per 100'pipe	Cond.1bs. per hr.	Cond.cumulative lbs. per hour
To F	R 4	RR 4	267'1"	4"			
			217'1"	4"			
			484'2"	4"	14	68	217
From	MH	RR2					× :
to F	R 10	RR 10	395 '	4"	14	55	
			80'	2글"	9	7	
			70 .	22	9	6	
To E	.0.Q	. RR9	325 '	4"	14	46	
		*				114	331
RR -	11						
Armo	ry	RR#11	80 *	2글	9	7	338
B.O.	Q. RI	R9					
to R	R 8	·B.O.Q.	560 1	4"	14	78	
		RR 9	21 .	22"	9	2	
				2		80	, 418
RR 1	2	RR 12	50'	21	9	4	422
From	RR8	to					
MH R	R #9	RR 8	260	2글!			r. 1
			30 1	2글			
			2901	2=	9	26	448
From	MH	RR Low pr.	-500 t	2]	9	45	
#9 +	o en	d Trap MH	100'	20	7.5	8	
#•••		RR #9				53	501
		High Pr.	× .				
		Trap MH					
		RR #9	no main	dri	pped	0	501

(a) Pressure Drop Study: The purpose of this study is to

determine the pressure drop throughout the Steam Distribution System under peak load conditions and to recommend operating pressures. With an allowance of 2,00 lb. per hour at manhole BB #5 and an allowance of 12,488 lb. per hour at manhole BB #1 for a future group comprising 4 Barracks, one Mess Hall, and one Battalion Administration Building, the minimum computed pressure is 106.5 p.s.i. at Manhole BB #5. With a maximum of 75 p.s.i. required, the boilers could be operated at 100 p.s.i. during peak load conditions and during other than peak load conditions pressures between 75 and 100 should be sufficient. Without the future load connected, the pressure drop will be very small even under peak load conditions.

An operating schedule should be made up showing boiler pressure necessary to maintain minimum allowable pressure under varying weather conditions. Boilers and Steam Distribution System should be operated at the lowest possible pressure for maximum economy in fuel and maintenance.

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	- - -	Pi Length	pe Size	Bldg. Load	Load 1bs. per hour	Pressure Drop 1bs.	Resultant Pr.p.s.i.
-	From C.H.P. BB9 to M. H. BB #1	242*	6"	14,889	29,754	5.1	125 119.9
	To AD #6 at BB 3 D and BB 2 Future 4-B7776			419 1,958 2,377 12,488			
	1-M4401 1-BA311 12488	88 !	6"	14,865	14,865	.5	119.4
	From M.H.						
	BB #1 to						119.9
	BB 7	124"	6"	4,401	14,889	.7	119.2
2	To M.H. BB #2	266*	4"	3,888	10,488	6.6	112.6
	To M.H. BB #3	308 *	4 ¹¹	1,944	6,600	3.1	109.5
	To M.H. BB #4	252 '	4 "	1,944	6,456	2.6	106.9
	To M.H. BB <b>#5</b>			712			۵ د
		260 *	Future 4"	2,000	2,712	•4	106.5
	From M.H.						-
	B ^D #2 to M.H. BB #6	2381	4 ¹¹	1,944	1,944	.2	112.6

(c) Condensate Return Friction Loss Study: The purpose of this study was to determine the friction loss throughout the condensate return system and to determine the head against which the condensate pumps have to operate. The maximum head in the return main will be 28.2 feet (12 p.s.i.) at MH BB#5 including the future load of four Barracks, one Mess Hall and one Battalion Administration Building totaling 12,488 lbs. per hour at the branch to the Post Exchange plus 2,000 lbs. per hour at MH BB#5. Accordingly the return line has ample reserve capacity.

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G-2.07. (d) Condensate Return: Drawing No. 3653

						Friction	Total
	Pi Length	pe Size	Bldg. Load	Load 1b per hr.	GPM	Loss in Feet	Head in Ft.
From C.H.P. to M. H. BB #1	2421	2호"	14,889	29 <b>,7</b> 54	Static 59.5 Static	13.0 12.1 4. 16.1	6.0 22.1
To AD #6 at BB 3 D and BB 2	88 '	2 <u>눈</u> ॥	14,865	14,865	29.7 Static	1.1 2. 3.1	25.2
From M.H. BB #1 to BB 7	124'	2늘"	4,401	14,889	29.8	Static 1.6	22.1 23.7
To M. H. BB #2	266'	211	3,888	10.488	21.0	1.8	25.5
To M. H. BB #3	308 •	212"	1,944	6,600	13.2	•9	26.4
To M. H. BB <del>1/</del> 4	252'	211	1,944	6.,456	12.9	.7	27.1
To N. H. BB #5	2061	2코"	2,712	2,712	5.4 Static	.1 1.0	28.2
From M.H.		•••					
BB #2 to M. H. BB #6	238	22"	1,944	1,944	3.9 Static	Static - 1.0	25.5

G-2.07. (e) Barrage Balloon Battallion -- Total Steam Distribution Losses: Loss in pounds per hour, 327; pounds per year 2,860,000. Allowing 35 cents per M pounds as the incremental cost of production at the Central Heating Plant, then line losses amount to

2,860 x .35¢ = \$1,000 per year.

This item of expense should be watched carefully - for a variation of 10% amounts to \$100.00 per year. Every effort should be made by scheduled inspections, routine maintenance etc to keep leaks, uninsulated pipe surface etc. reduced to a minimum.

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The maximum amount of condensate normally handled by one trap, is in Building BB 2 amounting to 117 lbs.per hour. There are a total of seven drip traps in manholes and mechanical pits used for dripping the steam distribution system. Some of the mechanical pits have traps for dripping the inside high pressure piping, through the steam service. This system should have the same routine inspection and maintenance as recommended for the Division Training Area - Section G-2.04.

G-2.07. (f) Steam Distribution Losses;

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		Location of DripPt	Pip Length	e Size	Cond.lbs.per hr.per 100'pip	Cond.1bs.	Cond.cumu 1bs per	lative hour
	From C.H.P.							
	to MH BB #1	BB 2	242 '	6"	21	51		
			88 .	6"	21	18		
			125 .	3"	11	14		
			85 1	221	1 9	8		
			124 '	6"	21	26		
						117	117	
	BB 7	BB 7	15'	3"	11	2	119	)
	BB-7M to							
	BB #13	BB 13	266'	4 **				
	DD 1120		308 1	4"				
in a fi			5741	4 <b>n</b>	14	80	199	)
					· ·			
	From BB 13 t	BB 14	2381	4 **	14	33	232	2
	BB 14	DD 11	200	-				
	From BB 12		•			· · · · ·		
	to BB 11	BB 12	252'	4"	14	34	266	5
	BB 11 to						×	
	MH =#5	BB 10	206'	4"	14	29		
		•	190'	22		17		
		·	100'	212	.11 9	9		
						55	32	1
	BB 5	BB 5	70 '	22	. 9	6	32	7

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## G-2.08. Barrage Balloon Battalion School Area Steam Distribution:

(a) Pressure Drop Study: The purpose of this study is to determine the pressure drop throughout the steam distribution system under peak load conditions.

With an allowance of 700 pounds at the Balloon and the Transportation Buildings, the minimum pressure will be 5.8 pounds per square inch at the Transportation Building with 12 pounds initial pressure at the Central Heating Plant. This indicates that under peak load conditions a minimum of 12 pounds will have to be maintained at the boiler. During mild weather, the boiler should be operated to maintain, say three pounds at the far end of the system. Where no reducing valves are planned, it would be rather important for best heating results to vary the boiler pressure with heating requirements, maintaining the minimum pressure at which the fartherest building will operate.

For officient operation a graph or schedule should be prepared showing the necessary boiler pressures, under different weather conditions required to maintain minimum working pressure at the far end of the system.

Boilers should be operated at the lowest possible pressure at all times for maximum economy in fuel and maintenance.

	Pip	e	Bldg.	Load
200	Length	Size	Load	lbs. per hr.
From C.H.P. BB26 to Int.	130'	4 ¹¹	1400	<b>30</b> 00
Int. to Balloo Bldg. BB29	on 140 <b>'</b>	3"	800	1600
Balloon Bldg. BB29 to Anchor Point	2401	Futuro 2-1/2'	100 700 800	800
Int. to Adm. Bldg. BB27	60 1	3"	200	1400
Adm. Bldg.BB27 to Int.	7 235 <b>*</b>	3"	300	1100
Int. to Tr.Bld BB30 Anchor	lg. 220"	Future $2-1/2$	200 700	900

The maximum head in condensate return is 14.7 feet, indicating ample reserve capacity.

G-2.08 (b) Steam:

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Pressure	Resultant				
Drop 1bs.	Press. p.s.i.				
1.2	10.8				
1.7	9.1				
2.8	6.3				
. 55	10.8 10.3				
1.39	8.9				

P7 "1 (**	r 0
2 - 12	5-8
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G-2.08 (c)	Conder	sate R	eturn - Barra	ge Ball	oon Bat	ttalion S	chool Area:
Pipe Length	Size	Bldg. Load	Load 1bs. per hr.	Load G.P.M.	Frictin	ion Loss Feet	Total Head in Feet
From C.H.P. BB26 to Int. 130'	221	1400	3000	6.0	Static Static	15.5 .09 11.0 4.5 4.59	10.0
Int. to Balloon Bldg. BB29 140'	2111	800	1600	4.0		•06	14.7
Balloon Bldg. BB29 to Anchor Point 240'	2 ¹ / ₂ "	800	800	2.0		•02	14.7
Int. to Adm. Bldg. BB27 60'	212"	200	1400	3.0		.01	14.6 14.6
Adm. Bldg. BB27 to Int. 235'	2 <mark>2</mark> "	300	1200	2.5		.02	14.6
Int. to Tr. Bldg. BB30 Anchor 220'	22"	900	900	2.0		.02	14.7
G-2.08 (d)	Total	Steam	Distribution	Losses:			
	Loss :	in poun	ds per hour,	118; pc	er year	, 1,032,0	00
production at the	Allow: Centra	ing 35¢ al Hoat	per M. pound	s as th en lind	ne incr losse	emental c s amount	ost of to:
	1,032	x .35	= \$ 360.00 pe	r year			

3.13 March Structure, 1990 and 1990 and

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This expense is an important one and should be watched carefully. Every effort should be made by scheduled inspections, routine maintenance, etc. to keep leaks, uninsulated pipe surface, etc. reduced to a minimum.

All condensate drips to the one drip trap in the Administration Building normally totaling 118 pounds por hour. Routine inspection and maintenance should be carried out as specified for the Division Training Area. (Sec. G-2.04)

G-2.08 (	e)	Steam	Distr	ibution	Losses:
		And the second s		A set of the set of th	

	Location of	Pi	pe	Cond. 1bs. pe:	r Cond.lbs.	Cond. Cumul.
	Drip Point	Length	Size	hr per 100'pip	e per hr.	lbs / hr.
From C.H.P. BB26	Adm.	130 :	4"	14	8	
to entire system	Bldg. BB27	140	3"		• .	
	9	60	3"	-		
		235'	3"			
		435	3"	11	48	
		240'	2-1/2'	1		
		2201	2-1/2'	1		
		15'	2-1/2'	1		
		15'	2-1/2	1		
		15'	2-1/2	1		
		.100 '	2-1/2'	1		
		90 1	2-1/2'	1		
		695'	2-1/2	9	62	and the second se
					118	118

# G-2.09. Bachelor Officers' Quarters - Steam Distribution:

(a) Pressure Drop Study: The purpose of this study is to determine the pressure drop throughout the steam distribution system under peak load conditions.

With 125 pounds per square inch initial pressure at the boiler plant, the minimum pressure will be 115.7 pounds in the steam main at the Women's Servants Quarters. With the water heater requiring 50 p.s.i. plus an allowance of 35 pounds for transmission losses, pressure reducing valve operation, etc., then a boiler operating pressure of 85 pounds should prove satisfactory. Under other than peak load conditions, a lower pressure should be satisfactory.

A graph or schedule should be prepared showing necessary boiler pressure under different weather conditions to maintain minimum working pressure at the far end of the system.

Boilers should be operated at the lowest possible pressure at all times for maximum economy in fuel and maintenance.

# G-2.09 (b) Steam Pressure Drop Table:

	Pi	00	Bldg.	Load		
	Length	Size	Load	lbs per hr		
From Plant to MH 194	400 '	4"	1960	BRANCH C 4,882		
North to 2603	701	3"	980	2,922		
To 2602	400'	2-1/2."	980	1,942		

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Pressure Drop 1bs.	Resultant Press. p.s.i.
	125.
2.2	122.8
•6	122.2
5.	117.2

G-2.09 (b) (Cont'd)

	Pip Length	e Size	Bldg. Load	Load 1bs per hr	Press Drop	ure Results 1bs Press.	nt p.s.i.
Fire station 2600	400 *	2-1/2"	412	962	1.2	116.	0
To Men's Quarters 2624	1701	2-1/2"	350	550	•2	115.	8
To Women's Quarters 2625	2201	2-1/2"	200	200	1	115.	7
MH 194 to 2605	180 '	2-1/2"	980	1,960	2.2	122. 120.	8
To 2607	2601	2-1/2"	980	980	•8	119.	8
From Plant to MH 191	130'	3**	BR/ 1960	ANCH A 3,920	1.9	125. 123.	1
To 2611	210 '	2-1/2"	980	1,960	2.6	120.	5
To 2609	220 '	2-1/2"	980	980	. 6	119.	9
From MH 191 to 2613	201	2-1/2"	980	1,960	.2	123.	1 9
To 2604	4501	2-1/2"	980	980	1.4	121.	5
G-2.09 (d	c) Cond	lensate	Return				
	Pipe Longth	Size	Bldg. Load	Load lbs per hr.	Load G.P.M.	Friction Loss in ft.	Total Head in Feet
				BRANCH C		Static	12.0
From C.H.P. to MH #194	4001	2-1/2"	1960	4882	9.8 St	.72 atic5.80	10 59
North to 2603	701	2-1/2"	980	2022	6	0.52	10.54
To 2602	4001	2-1/2"	080	1042	A	.05	10.5/
Fire House 2600	4001	2 1/211	(12	19.20	·	.10	10.7
To Monta Otra		u=1/6	512	902		•04	18.74
2624	170'	2-1/2"	350	550	1	0	18.74

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G-2.09	(c)	(Cont'd)
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	Pipe	3	Bldg.	Load lbs	Load	Friction	Total Head in
	Length	Size	Load	per hr	G.P.M.	Loss in ft	feet
To Women's Qtrs. 2625	2201	2-1/2"	200	200	•4 St	0 catic 1.0	
						1.0	19.74
MH 194 to 260	5 180'	2-1/2"	980	1960	4.0	.07 \$	Static 18.52 18.6
To 2607	2601	2-1/2"	980	980	2.0	.03	18.63
			BF	RANCH A			
Plant to MH $\#$ 191	1301	2-1/2"	1960	3920	8.0 St	.2 catic 7.3	
						7.5	19.5
To 2611	210 *	2-1/2"	980	1960	4.0	.1	19.6
To 2609	2201	2-1/2"	980	980	2.0	.02	19.62
From MH #191 to 2613	201	2-1/2"	980	1960	4.0	.01	19.5 19.51
To 2604	4501	2-1/2"	980	980	2.0	.05	
					Sta	.55	20.1

The maximum head in the return main is 20.1 feet, as indicated above. An appreciable additional load can be added without our taxing its capacity.

G-2.09 (d) Bachelor Officers' Quarters Total Steam Distribution Losses:

Loss in pounds per hour, 356; per year 3,120,000

Allowing 35¢ per M. pounds as the incremental cost os production at the Central Heating Plant, then line losses amount to:

3120 x .35 = \$ 1,090.00

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This is an important item of expense which should be watched carefully. A variation of 10% amounts to \$173 per year. Every effort should be made by scheduled inspections, routine maintenance, etc., to keep leaks, uninsulated pipe surface, etc. reduced to a minimum.

The maximum amount of condensate normally handled by one trap, is in MH #194 where one trap drains a section of main giving 145 pounds per hour of condensate.

There is a total of four drip traps in manholes and mechanical pits used for dripping the steam distribution system. Some of the mechanical pits have traps for dripping the inside high pressure piping, through the steam service. Routine inspection and maintenance should be carried out as specified for the Divsion Training Area. (Sec. G-2.04)

# G-2.09.(e) Steam Distribution Losses:

1. Oak

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From Lo To Di	ncation of rip Point	Pij Length	Size	Cond. 1bs per hr. per 100 ft.	Cond.lbs per hr.	Cum. 1bs. per hour
			BRANC	H C		
Plant to						
MH 194	MH 194	400 '	4"	14	56	
		70 '	3"	11	8	
		400 '	2-1/2"	- <u> </u>		
		201	2-1/2"			
		180'	2-1/2"	-	4 	
		260 1	2-1/2"			
		401	2-1/2"			
		900 '	2-1/2"	9	81	
					145	145
2602	2602	190'	2-1/2"	9	17	162
MH 195 to Men's	Men's Servants				х	
Quarters	Quarters	400 '	2-1/2"			
		15 *	2-1/2"			
		170'	2-1/2"			
		15'	2-1/2"			
De Warrer	a Womens	600 "	2-1/2"	9	54	216
Quarters	Quarters	2201	2-1/2"			
2020	6202	2351	2-1/2"	9	21	237

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# G-2.09 (e) (Cont'd)

From To	Location of Drip Point	Pipe Length	e Size	Cond: hr per	lbs per 100 ft.	Cond. 1bs per hour	Cond. 1bs per hour
Plant to							
2604 & 2609	9 MH #190	130 ' 210 '	3"	11		14	
	X	25	×				
		20 ' 40 '					
		1901					
		7251 4501	2-1/2 2-1/2	" 9		65 40	

# G-2.10. Mumford Point Tent Camp Steam Distribution:

(a) Pressure Drop Study: With no allowance for future loads, the minimum pressure will be 114.5 pounds per square inch at the Administration Building. With the water heater requiring 50 p.s.i. an allowance of 25 pounds for pressure drop through the pressure reducing valve, a pressure of 75 p.s.i. should be ample under peak load conditions. This will permit operating the boiler plant at 90 pounds under peak load conditions. Without allowance for future loads a lower pressure will be sufficient.

For less than peak load conditions, a boiler pressure of 75 pounds should be sufficient.

A graph or schedule should be prepared showing necessary beiler pressures under different weather conditions required to maintain minimum working pressure at the far end of the system.

Boilers should be operated at the lowest possible pressure at all times for maximum economy in fuel and maintenance.

## G-2.10 (b) Steam Pressure Drop Table:

	Pip	е	Bldg.	Load 1bs
	Length	Size	Load	per hour
From C.H.P.				
M-103 to M-102	2 175'	3"	401	5052
M-102 to M-101	290 1	3"	4401	4651
M-101 to M-100 C.H.P. M-103	2751	2-1/2"	250	250
to M-104	235'	- 311-	987	1406
M-104 to M7105	5 2551	2-1/2"	419	419
			-	253 -

119 356

Pressure Drop 1bs.	Resultant Press. p.s.i.
	1.25
4.2	120.8
6.2	114.6
•1	114.5
4	125.0 124.6
.1	124.5

*

G-2.10 (c) Condensate Return:							
L	Pip ength	Size	Bldg. Load	Load 1bs per hour	. Load GPM	Friction Los in Feet	s Total Hd in feet
From C.H.P. M-103					Static	37.0	
to M-102	175'	22"	401	5,052	10.	0.3	
					Static	19	
						18.3	18.3
From M-102 to M-10	1 290'	27211	4,401	4,651	9.3	.5	18.8
From M-101 to M-100	0 275 1	2"	250	250	0.5	0	18.8
C.H.P. M-103toM-104	4 235'	2"	987	1,406	2.8	.1	×
					Static	19	A
						17.0	
						17.1	17.1
M-104 to M-105	255'	2"	419	419	0.8	0	
					Static	18.0	
						1.0	
						1.0	18.1

Loss in pounds per hour, 253; per year 2,220,000. Allowing 35¢ per M. pounds as the incremental cost of

(d) Mumford Point Tent Camp -- Steam Distribution Losses: production at the Central Heating Plant, then line losses amount to:

2,220 x .35 = \$775.00 per year.

This is an important item of expense which should be watched carefully. Every effort should be made by scheduled inspections, routine maintenance etc. to keep leaks, uninsulated pipe surface etc. reduced to a minimum. The maximum amount of condensate normally handled by one trap is in the Mess Hall where the condensate amounts to 155 lbs. per hour. There is is total of two drip traps in manholes and mechanical pits used for draining the steam distribution system. Some of the mechanical pits have traps for dripping the inside high pressure piping, through the steam service. Because of this piping being overhead the estimated losses were doubled.

	G-2.10.	(e) Steam ]	Distribu	tion	Losses:		
		Location of Drip Point	Pip Length	e Size	Cond 1bs.per per 100' Pipe	Cond.1bs. per hour	Cond. Cumul. 1bs per hour
C.H.H	M-103 to						
M-102	2 and 1-100	M-101	1751	3"	22	39	
			290 '	3"	22	66	
			2751	22"	18	50	
						155	155
C.H.F	. M-103 to						
M-105	5	M-105	2351	3"	22	52	
			255 '	22"	18	46	
						98	253

## G-2.11. Glider Base--Steam Distribution:

(a) This steam distribution system is too small in scope to warrant a lengthy discussion. The same general conditions applicable to other outlying systems apply hereto.

(b) A pressure drop study discloses that the final pressure on the branch line to the administration building is 124.8 p.s.i. with a drop along the line of .2 p.s.i. The drop in the branch line through the nose hanger and utility shops is .8 p.s.i. giving a final pressure of 49.2 pounds. The steam for this last mentioned line leaves the boiler plant at 50 pounds pressure. Pressures in this system should be modulated at the boiler plant to give the most economical results under actual operating conditions.

(c) A return line study discloses that the maximum head against which the condensate roturn pumps will operate is 40.1 feet or 17.32 p.s.i. -

(d) The steam distribution losses for the entire system amount to 154 pounds per hour.

### G-2.12. Tent Camp No. 1 -- Steam Distribution:

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(a) This study is compiled to show the basic design, the estimated pressure drop. the estimated friction head against which the condensate return pumps operate and the probable thermal or line loss of the system.

## (b) Pressure Drop Study:

R	un	Load 1bs	Load	Demand			Pr.Drop	Pressu	re Drop
From	To	per hour	Factor	Load	Length	Size	Total	Initial	Resultant
C.H.P.	330	37,886	61%	23,100	340	6"	4.4	125	120.1
330	321	33,254	64%	21,300	370	6"	4.2	120.1	115.9
321	Branch	28,542	67%	19,100	310	4"	26.7	115.9	89.2
Brancn	Branch	19,170	70%.	13,400	10	32	1.1	89.2	88.1
Branch	313	13,061	73%	9,530	10	32"	0.54	88.1	87.6
313	316	11,911	76%	9,060	100	32"	4.8	87.6	82.8
316	410	9,200	79%	7,260	320	32"	10.6	82.8	72.2
410	411	8,050	82%	6,600	25	32"	0.75	72.2	71.5
411	412	6,900	85%	5,860	90	32"	2.16	71.5	69.3
412	413	5,750	885	5,060	90	32"	1.50	69.3	67.8
413	510	4,600	91%	4,190	255	22"	24.2	67.8	43.6
510	511	3,450	94%	3,240	25	22"	2.0	43.6	41.6
511	512	2,300	97%	2,230	90	22"	3.5	41.6	38.1
512	513	1,150	100%	1,150	90	22"	0.99	38.1	37.1
Branch	315	6,109	67%	4,210	20	3211	0.21	89.2	89.0
315	311	3,398	832%	2,840	115	32"	.54	89.0	88.5
311	301	939	100%	939	515	22"	2.01	88.5	86.5

Note: First two columns refer to building numbers:

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G-2.12.	(b)	(Cont'd)
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Fron	Run	Load 1bs	Load	Demand			Pr.Drop	Press	ure Drop
I I OII	1 10	per nour	Factor	Load	Length	Size	Total	Initial	Resultant
Branch	314	9.372	6707	6 280	100	-11	0 70	00.0	
314	213	9,200	71 10	6 550	100	22	2.30	89.2	86.9
213	212	8:050	75 3%	6,060	1.10	2111	4.40	00.9	82.4
212	211	6,900	79.4%	5 480	90	211	1 60	81 8	0.10
211	210	5.750	83.5%	4 800	90	2111	1 31	80 1	70.1
210	113	4.600	87.6%	4 020	255	2111	10 90	78 8	50.0
113	112	3.450	91.8%	3 160	25	2111	1 5	58 9	57 A
112	111	2,300	95.9%	2 210	00	211	2 75	57 1	54 6
111	110	1,150	100%	1 150	90	2211	2.10	51 6	54.0
C. H. P	440	11,500	60%	6 900	350	62 711	16 2	195	100.7
440	441	10,350	64.4%	6,650	25	211	1 2	108 7	100.7
441	Branch	9,200	69.0%	6,350	30	211	1 35	107.5	107.0
Branch	442	8,050	73.5%	5 910	65	2111	8 78	106 1	07 7
442	443	6,900	77.9%	5,370	90	2211	10.80	97 3	86 5
443	540	5.750	82.3%	4 730	250	2211	24. 77	86 5	61 7
540	541	4.600	86.8%	3,950	25	2111	12 28	61 7	59.4
541 .	Branch	3.450	91.1%	3,140	30	211	1.77	59.4	57 6
Branch	542	2,300	95.6%	2.200	65	211	1.95	57.6	55.7
542	543	1,150	100%	1.150	90	2-11	.75	55.7	55.0
Branch	450	1,150	100%	1,150	325	251	1.62	106.1	104.5
Branch	550	1,150	100%	1,150	325	2-1"	2.66	57.6	55.0
C. H. P	. 243	11,500	60%	6,000	330	311	15.4	125	109.6
243	242	10,350	64.4%	6.650	25	3"	1.2	109.6	108.4
242	241	9,200	69.0%	6.350	90	3"	4.05	108.4	104.3
241	Branch	8,050	73.5%	5,910	30	3"	1.20	104.3	103.1
Branch	240	6,900	77.9%	5,370	65	21"	7.50	103.1	95.6
240	143	5,750	82.3%	4,730	250	21"	23.20	95.6	72.4
143	142	4,600	86.8%	3,950	25	25"	2.02	72.4	70.4
142	141	3,450	91.1%	3,140	90	25"	4.68	70.4	65.7
141	Branch	2,300	95.6%	2,200	30	22"	0.88	65.7	64.8
Branch	140	1,150	100%	1,150	65	21"	0.48	64.8	64.3
Branch	250	1,150 ,	100%	1,150	325	22"	1,69	103.1	101.4
Branch	150	1,150	100%	1,150	325	22"	2.40	64.8	62.4

(c) A review of the condensate return system discloses that the maximum head against which the return pumps will operate is 12.3 p.s.i. Pumps were specified to discharge against a head of 30 p.s.i.

(d) Steam loss computations disclose atotal loss of 945 pounds per hour throughout the system.

(e) The foregoing table and data includes the Tent Camp Hospital Groups and the Recreation Building which were after considerations not provided for in the original plan. It should be noted that in the sizing of the steam and condensate lines an accumulative load factor of 60% has been used; that is, the loads on the mains were accumulated from 100% full load at the end of the

main down to 60% at the boiler house in increments proportionate to the number of individual loads accumulated. This is common practice on steam distribution systems of this size and type. Experience since the system was built, has shown that a diversity of 40% does not at all times hold true, in that clock work rather than the human element controls the use of many of the utilities in this camp. We therefore recommend that, at the first opportunity, a study be made of the entire systems under actual operating conditions and, that the distribution system be reinforced should the study bring to light excessive pressure drops.

# G-2.13. Tent Camp No. 2--Steam Distribution:

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(a) This steam distribution system serves that portion of the original tent camp known as Tent Camp #2. It differs from Tent Camp No. 1 only in the scope of its service. The buildings served are two S-3 Mess Halls, one Officers Mess Hall and one Recreation Building.

(b) A pressure drop study shows a pressure of 3.6 p.s.i. throughout the system resulting in a final pressure of 121.4 p.s.i. at the end of the line. This shows that the boiler plant pressure may be modulated to a considerable degree thereby lowering maintenance and operating expense.

(c) A study of the condensate return system shows that the maximum head against which any pump will have to operate is 29.5 feet or 12.7 p.s.i.

(d) Condensate losses throughout the entire system total 162 pounds per hour.

G-3. Propane Gas System: Throughout the Division Training Area, a gas distribution system has been installed mainly for the purpose of furnishing gas to ovensand ranges in the mess halls. Other buildings which require gas and are within economical range of the mains have been connected thereto, but those buildings which require small amounts of gas and are not within economical range of the mains have their gas supplied by portable flasks.

The following table summarizes the buildings supplied, use of gas, and method of supply:

Building	USe
Mess Halls	Cooking
Brig	Cooking
Regimental Infirmaries	Dental Chair
Naval Hospital	Cooking & Labora
N.H. Boiler Plant	Boiler Ignition
N.H. B. O. Q.	Cooking
N.H. Nurses Home	Cooking
Family Hospital	Laboratory
Central Heating	Boiler Ignition
Rifle Range	Dental
Balloon Barrage	Dental
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Liquid propane is brought to the Industrial Area by tank car and pumped into three 17,000 gallon steel storage tanks designed for 200 p.s.i. working pressure, having a liquid propane storage capacity of 15,000 gallons each.

The liquid gas, at temperatures above 40 degrees F, vaporizes at a maximum pressure of 70 p.s.i. Below 40 degrees F. the liquid is taken from the storage tanks and passed through a steam jacketed evaporating kettle before being pumped into the distribution system.

Gas passes through a reducing valve with 22 p.s.i. leaving pressure, thence through a recording meter and into the distribution system.

Portable flasks for use in certain activities, as above listed, are filled and weighed at the propane plant.

Filling is accomplished by direct pressure if available or by means of a pump when pressure is low.

At the mess halls and points of use the distribution pressure is lowered by two reducing valves in parallel, to a pressure of 11 inches of water. Flask pressure is also reduced by a pressure reducing valve before the gas is distributed to the various appliances.

The gas mains are of scrowed or caulked cast iron pipe laid about three feet below ground. Complete record plans have been drawn showing the location of all mains, valves, etc. but no profile has been made as propañe is a dry gas and no drip points are required.

### Supplied By

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Main Main Flasks Main Flask Main Main Main Main Flask Flask

# G-4. Gasoline and Fuel Oil Storage and Distribution:

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G-4.01. General: It is the intent under this heading to enumerate and discuss the pertiment features of all bulk storage and day storage tank installations and to furnish such information as will be of value to those who will take over the operation and maintenance of the installations or systems.

- Pertiment information is given concerning all installations, with particular reference to mechanical equipment. Accurate plans have been prepared showing the location of all underground tanks, pipes, valves, fittings and appurtenances. Legends and notations are provided to give a clear understanding of the installations.

Bulk storage is provided in two locations, one in the Industrial Area of the permanent base, and one in the Tent Camp Area of the temporary base. Day storage is located in both permanent and temporary bases adjacent to the locations where it is to be used. All of the tanks in the bulk storage at the permanent base in the Industrial Area, with the exception of the 10,000 barrel tank for the storage of No. 6 fuel oil, are located underground, while all of the tanks at the temporary base at the Tent Camp Area are above ground. All day storage tanks, or service tanks, are located underground.

G-4.02. Industrial Area Gasoline, Kerosene, Diesel and No. 3 Fuel Oil Storage: At the Industrial Area Bulk Storage there are six 12,000 gallon tanks, each eight feet in diameter by 32 feet long and eight 15,000 gallon tanks, each 10 feet in diameter by 26' 6" long with a total of 192,000 gallons of storage capacity. These tanks are buried so that the bottom of each tank is set above the ground water level, which in this case was approximately 6', below the grade. Earth is mounded up over the tops of the tanks with the result that the finished grade is 8' above the surrounding grade. The slope of the mound is approximately four to onc.

Five Blackner Rotary Pumps, each having a capacity of 100 G.P.M. connected by reduction gears to five horse power explosion proof 208 volt, 3 phase, 60 cycle electric motors are provided to pump various products from the tank cars to the storage tanks, from the storage tanks to the truck loading platforms, and from the storage tanks to the day storage at the Main Service Station, which is adjacent to the bulk plant. The pumps and pipe lines are so connected and cross-connected that each pump has a standby unit except the aviation gasoline.

Three overhead tank car unloading racks, two double and one single, are provided at the track site adjacent to the storage tanks. Three tank cars may be unloaded simultaneously, the contents may be pumped direct from tank cars into the storage tanks, tank trunks, or day storage tanks.

Each tank in the battery of 14 is provided with a 2" pressure and vacuum vent and a 6" emergency pressure vent with a built-in fire screen.

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Tanks Nos. 1, 2, 3, 4 and 9 are connected at the bottom to their respective day tanks at the Main and PX Service Stations by a three inch line. The values on this line are lubricated plug type and are located in boxes at the ends of the tanks. For normal operation the valves always will be closed, but in the event of a power failure they may be opened and the day tanks can be filled by gravity from the storage tanks.

Provision also is made for loading three trucks simultaneously from three loading racks, two double and one single.

The number a	nd contents of No. of Tanks	each group of ta Capacity Each
Aviation Gasoline Regular " Motor Fuel "V" Kerosene Diesel Fuel No. 3 Fuel Oil	2 6 2 1 1 2	12,000 gallons 15,000 gallons 15,000 gallons 12,000 gallons 12,000 gallons 12,000 gallons
Total:	6 - 8 -	12,000 gallon tar 15,000 "

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The above sotrage represents 24-8,000 gallon tank cars or 19-10,000 gallon tank cars.

G-4.03. 10,000 Bbliff6 Fuel Oil Storage Tank: The 10,000 barrel or 420,000 gallon tank for No. 6 fuel oil is approximately one-half mile distant from the gaoline and light fuel oil storage . The tank 60 feet in diameter by 20 feet high is set above the grade and is surrounded by an earthen dike 5 feet 6 inches high, 30 feet wide with a 3 feet crown. The capacity of the dike enclosure is 1 1/4 times greater than the total capacity of the tank.

A railroad siding adjacent to the tank serves the tank for bil deliveries. On this siding are located four tank car unloading racks arranged for bottom unloading and steaming. :

Two electric motor driven rotary pumps manufactured by Blackner Pump Company of 100 G.P.M. each are grouped together outside the dike. These pumps are connected by means of reduction gears to 10 horsepower, 3 phase, 208 volt, 60 cycle explosion proof motors. Connections and cross-connections are provided for every possible operating condition. The No. 6 fuel oil is maintained in fluid condition for pumping by means of a suction line heater which consists of a bundle of steel tubing enclosed in a 15" pipe through which the oil is drawn to the pumps, is installed in the manhole near the bottom of the tank. Steam is passed through the tubing which in turn heats the oil drawn through the 15" pipe. At the end of the 15" pipe or shell in the tank, an 8" flanged gate valve has been installed, the handle of which is extended up through the roof of the tank.

inks is as follows: Total Capacity 24,000 gallons 90 000 mallong

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30,000	gallons
12,000	gallons
12,000	gallons
24,000	gallons

192,000 gallons

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If it becomes necessary to withdraw the steam tube bundle for cleaning or repairing, it is possible to withdraw same without emptying the tank by closing the 8" valve.

Steam is supplied to the tank at 175 pounds of pressure from the Central Heating Plant. The capacity of the oil heater is 3600 gallons of No. 6 fuel oil at 100 pounds steam pressure. Steam and oil lines are piped together in concrete pipe tranches. Where the pipe trench passes through the dike, the pipes are sealed with two concrete walls within the pipe trench itself. Condensate from oil heating coils and traps; is in all cases wasted in the nearest ditch.

The total capacity of the tank for No. 6 fuel oil is 420,000 gallons or 42-lo,000 gallon tank cars. Steam pipe was sized large enough to heat one tank of 10,000 gallons per hour from plus 10 degrees F to 100 degrees F.

G-4.04. Tent Camp No. 1 Bulk Storage: The bulk storage at Tent Camp No. 1 includes 2-15,000 gallon tanks for Regular Gasoline, 1-15,000 gallon tank for Kerosent, and 2-15,000 gallon tanks for No. 6 fuel oil. Because this storage was temporary, the tanks were placed approximately six feet above ground on brick piers and steel or concrete saddles. The storage is adjacent to the railroad siding where two overhead and one underneath tank car unloading racks are located.

Mechanical equipment consists of six driven Blackner Rotary Pumps with explosion proof motors, as follows: 2 - 3 H.P. for gasoline at 100 G.P.M. each, 2 - 7-1/2 H.P. for No. 6 fuel oil at 100 G.P.M. each, 2 - 3 H.P. for kerosene at 75 G.P.M. each. This equipment operated at 240 volts, 3 phase, 60 cycles and is provided for unloading tank cars, and also to pump gasoline to two (2) dispensers each equipped with meter and recording mechanism.

This equipment also pumps kerosene and No. 6 fuel oil to a double trunk loading rack and No. 6 oil to the 1300 gallon tank used for day storage at Tent Camp No. 1 Boiler Plant. Fuel oil is hauled to an 8000 gallon storage tank at the Tent Camp No. 2 Boiler Plant.

G-4.05. Central Heating Plant: One (1) 8,000 gallon tank is installed underground for the Central Heating Plant. No. 6 fuel oil is supplied to this tank by means of a 4" oil line connected to the pump manifold at the bulk plant. This line and a 4-inch steam line are jacketed together in a Hel-Cor casing, thus providing heat for the oil line which is approximately 520' long. A cross-connection at the bulk plant pump manifold and a crossconnection at the day storage tank makes it possible to pull directly from the 420,000 gallon tank to the oil pump serving the oil burners in the Central Heating Plant.

G-4.06. No. 6 Fuel Oil Day Storage Tanks: Day storage tanks for No. 6 fuel oil are equipped with spiral coils for heating the oil. These coils are constructed of 1-1/2" seamless steam tubing, 22" overall diameter. This permits them to be installed in a 24" inside diameter manhole with the supply and condensate stubs welded through the manhole cover.

The steam supply is connected to the coil, the steam being controlled by a globe value in the line, the condensate and is connected to a bucket trap on high pressure lines, and a float and thermostatic trap on low pressure lines. The discharge from traps is wasted to the nearest ditch. The suction line to each oil burner is inserted through the manhole cover and the suction stub is placed within the steam coil in the tank. The common return line from the oil burners discharges the return oil to the center of the coil in the tank in order to conserve heat. All values on oil suction and return lines are specially ground gate values with rising stems. They are placed in the lines at the tanks in the manhole pits. All fill pipes are three inches and all vent pipes are two inches on No. 6 fuel cil tanks.

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G-4.07. Naval Hospital Heating Plant: Two 15,000 gallon tanks are installed underground at the Naval Hospital Heating Plant for the storage of No. 6 fuel oil.

C-4.08. Rifle Range and Barrage Balloon Central Heating Plants: The Central Heating Plants at the Rifle Range and the Barrage Balloon are identical, the heating demand being approximately the same for both plants. The oil storage for both is the same.

Two 10,000 gallon tanks are installed underground at each of the above heating plants for the storage of No. 6 fuel oil.

G-4.09. Bachelor Officers' Mess Hall; Two 8,000 gallon tanks are installed underground at the Bachelor Officers' Mess Hall for the storage of No. 6 fuel oil.

C-4.10. Amphibian Base and Barrage Balloon Training School: The heating plants at the Amphibian Base Carpenter and Machine Shop and the Barrage Balloon Training School are identical and the heating load is approximately the same. One 5,000 gallon tank was placed underground for each plant.

G-4.11. Officers' Homes: There are 196 Officers' Homes, each provided with a 560 gallon underground tank for the storage of No. 3 fuel oil. The temperature range for heating was taken as plus 10 degrees F. outside and plus 70 degrees inside. Assuming that there are 2340 degrees days per year, the average amount of 140,000 gallons oil consumed per home will be 1300 gallons. At that rate it will be necessary to fill each tank three times per heating season.

Total estimated amount of oil to be consumed at 196 homes - 254,800 gallons.

The Guest Hous, Chapel at Tont Camp, Gate House, Mumford Point Brig, Mumford Point Chapel, Naval Hospital, Servants Quarters, Water Treatment Plant, Radio Transmitter Building and operations building were all figured in the same manner as the officers' homes. The table below shows the number and size of tanks and the amount of No. 3 fule oil consumed per heating season.

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## ESTIMATED ANNUAL CONSUMPTION OF NO. 3 FUEL OIL

Location B	o. of ldgs.	Size of Tanks	Unit Con- sumption	Total	
Officers Homes	196	560	1300	254,800	
Guest House	1	560	2531	2,531	
Chapel at Tent Camp	1	560	5180	5,180	
Mumford Point Brig	1	560	2566	2,566	
Mumford Point Chapel	1	560	4213	4,213	
Naval Hosp. Ser. Qts.	4	560	2344	9,375	
Water Treat. Plant	1	560	1998	1,998	
Radio Trans. Bldg.	1	1000	3250	3,250	
Operations Bldg.	1	560	2417	2,417	
Homasote Huts	936	110	665	622,440	
Wash Rooms	72	110	3257	234,504	
Mess Halls Tent Camp	4	2000	52,560	210,240	
Mess Halls Rifle Range	1	2000	18,280	18,280	
Mess Halls Barrage					
Balloon	1	2000	18,280	18,280	
Mess Halls Mumford Pt.	1	2000	18,280	18,280	
Officers Mess Tent Cam	p 1	2000	12,000	12,000	
Guard Houses	2	110	250	500	

G-4.12. Gasoline and Diesel Fuel Day Storage and Distribution: Gasoline and Diesel Fuel is stored at various locations as enumerated below and dispensed at these locations by means of electrically driven gasoline pumps of 15 and 25 G.P.M. respective capacities. These pumps take suction from the underground storage tanks and discharge through meters and recording devices into cars, trucks, boats, or other motor powered vehicles. The 15 G.P.M. pumps are powered by 1/3 H.P. electric explosion proof motors and the 25 G.P.M. pumps with 3/4 or 1/2 H.P. electric explosion proof motors. In case of a power failure these pumps can be operated by hand by attaching the hand crank furnished with each unit. All gasoline and diesel fuel suction lines have an extractible surtion stub by means of which the foot valve located at the bottom of the stub, can be removed. Special wrenches are furnished to perform this operation without unearthing the tank.

The following table shows the location, number and size of tanks, pumping capacity and products pumped:

## GASOLINE, KEROSENE & DIESEL FUEL - DAY STORAGE & DISTRIBUTION

Location	No. of Bldgs.	Size of Tanks	Capacity of Pump G.P.M.	Liquid Pumped
Industrial Area PX Service Station	1	1000	15	Motor Fuel "
Service Station	2	1000	25	Aviation Gase

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## Total:

1,425,067 gallons

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Gasoline, Kerosene & I	Diesel Fu No. of	el - Day Sto Size of	rage & Dist Capacity
Location	Blags.	Tanks	Pump G.P
Industrial Area Main			
Service Station	4	1000	25
Industrial Area Main			
Service Station	1	1000	25
Industrial Area Main			
Service Station	1	1000	25
Tent Camp Tank Batt.	1	2000	25
Tent Camp Tank Batt.	1	2000	25
Tent Camp Amphb. Bs.	1	2000	25
Tent Camp Amphb. Bs.	1	2000	25
B. B. Training School	1	1000	25
Riflo Range	1	10,000	25
Coast Guard Training			
Facilities	1	2000	25
Coast Guard Training		0000	
Facilities	1	2000	25
Naval Hospital Garage	T	10,000	15
Division Garage and	0	5.00	05
Repair Shop	6	200	20
Shop	2	560	25
Wallace Crk Boat Basir	2 1	1000	Gravity
Amphibian Base	1 .h.	1000	GLAVICY
Storage Shed	1	5000	15
Amphibian Base	*	0000	10
Carpenter Shop	1	10.000	100
Amphibian Base			
Carpenter Shop	1	10,000	100
Naval Hospital			
Boiler Plant	1	1000	Hand

G-4.13. Amphibian Base Gasoline and Diesel Fuel Storage & Distribution: At the Amphibian Base two 10,000 gallon tanks were installed, one for regular and one for diesel storage. Gasoline and diesel fuel are pumped by two separate electric rotary pumps to two hose racks located on the dock, A plugged extension has been provided for a future hose rack near the end of the pier. The pumping units are operated by remote control by means of push buttons located at each hose rack. Each pump is a 2-1/2" rotary pump of 100 G.P.M. capacity manufactured by the Blackner Pump Company with strainer and by-pass valves built into same. The pump motors are explosion proof, 5 H.P. each, 208 volts, 3 phase, 60 cycle, and are enclosed with the discharge and suction line manifolds in a concrete pump pit. The pumps are cross-connected so that in case of a motor failure, one can be used to pump both gasoline and diesel fuel alternately by opening and closing the manifold valves.

G-4.14. Landing Field Basoline System: At the landing field a water displacement gasoline delivery system was installed. The location of gasoline delivery pits and storage tanks were furnished to the manufacturers of the "Aqua System" who designed and installed all of the equipment for the handling and delivery of two different grades of gasoline.

### stribution (Cont'd) ty of Liquid Pumped P.M.

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Regular Gasoline

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The landing field warming up platforms are equipped with three double reel pits for servicing land planes. The distribution lines are sized for future additional installation. At the seaplane service pit, a single reel was placed in a double reel pit and though only one type of gasoline may be delivered at one time, a by-pass has been provided at the storage tanks between the two gasoline storage systems; so that a change over from one type of gas to the other may be made. Both systems may be independently controlled from the scaplane service pit. The piping to this pit has been sized for future additional installation.

## G-5. Refrigeration:

G-5.01. General: Refrigeration equipment installed in buildings or rooms requiring a temperature lower than atmospheric for the preservation of foods or other purposes, is of the mechanical type, using an electric motor driven reciprocating compressor as a heat engine. Dichloro-difluromethane (F-12) has been used as a refrigerant in all installations excepting the cold storage plant which utilizes ammonia. Evaporators are of various types as required by the project specifications.

G-5.02. Loads:

(a) Refrigeration loads are based on an ambient temperature of 95 degrees F.

(b) Transmission loads were figured on each wall of each refrigerator as follows:

Walls - Not exposed to radiant heat. Walls - Sun Exposed Floors - Above crawl space Floors on concrete on earth, or earth f Ceiling - Air space and roof above Ceiling - Sun Exposed

(c) The transmission load Ht was based on the use of a good commercial grade of vegetable cork board using a "C" factor of eight B.T.U. per square foot of cork per one (1) inch of thickness, per 24 hours, and an inverse ratio of the factor for walls of greater thickness.

(d) The product load (Hp) was based on loading the entire floor area with one hundred pounds of produce per square foot and removing the heat over a 24-hour period.

(e) The service load (Hs) was based on a total heat gain of from 3000 to 6000 B.T.U. per hour per door or from 15,000 to 30,000 B.T.U. per door per 24 hours total gain depending upon size and intensity of service.

(f) Equipment was in general selected to remove the total heat gained from all sources, during a 24 hour period, in 16 hours operating time.

Ht plus Hp plus Hs = Minimum capacity of the compressor and its evaporators in B.T.U. per hour.

(g) It is not to be presumed from paragraph (g) that compressor should operate exactly 16 hours in any 24-hour period when the given conditions exist, as this figure, while common practice in the industry is an arbritary figure and is intended to give a reserve capacity for abnormal conditions, such as pick up with hot regrigerators, defrosting time for boxes with temperatures above freezing, and idling time which tends to increase the life of the equipment.

	95	degrees	F	
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# G-5.03. Unit Coolers and Evaporators,

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(a) Fan type unit coolers, pipe and plate coils were selected for the various heat absorbation applications in accordance with latest data in common practice.

(b) Evaporators were selected with sufficient capacity to maintain relative humidities of from 80% in bulk meat storage rooms to 90% in vegetable storage rooms./

# G-5.04. Defrosting Equipment.

(a) In general, a manual type of electric defrosting was provided for each low temperature (below 32°F) room. In certain installations in the hospital, because of material scarcities a system of hot gas defrosting was installed.

(b) Units subjected to severe conditions (ie. high outside relative humidities and heavy duty) should be defrosted daily. Units subjected to normal operating conditions should be defrosted from two to four times per week.

(c) Failure to defrost regularly or thoroughly will result in an accumulation of ice on the coils. This is turn will increase the running time of the compressor and will cause high operational and service costs. A unit should never be partially defrosted but should have the entire frost accumulation removed at each and every defrosting operation.

# G-5.05. Compressors:

(a) Two compressors were installed in each of the Battallion type Mess Hall commissaries within the Division Training Area and also in Tent Camp No. 1 and No. 2 subsistance buildings, the Officers Mess Hall in Tent Camp No. 2 and Numford Point Camp No. 1 Mess Hall. With the exception of Tent Camp No. 1 subsistance buildings, all of the above installations have sufficient capacity to provide refrigeration for emergency periods with one compressor running continuously.

(b) Standby compressors were provided in each of the in stallations in the bakery and in the hospital group. Each standby unit is equal to one half the total load in the larger installations, and equal to the total load in the smaller installations.

(c) Equalizing lines are installed permitting two of the three condensers to operate when three compressors were installed. When two compressors only were installed provision was made for simultaneous operation with sequence controls when desired.

## G-5.06. Condensers.

(a) Evaporative condensers were furnished for each installation except for subsistance buildings in Tent Camp No. 1; the bakery in the Division Training Area, which is air cooled and in the Naval Hospital B. O. Q. in which shell and coil condensers were installed.

# G-5.07. The Cold Storage Plant:

(a) The cold storage plant was designed with storage space for 150,000 rations, ( 15,000 troops, 10 days) and with an ice making capacity of 25 tons in 24 hours with 15° F brine.

(b) Three ammonia compressors were installed each with a capacity equal to one half the total load.

(c) Four evaporative condensers were provided equal to one third the total load.

(d) Loads were computed as set forth in paragraph G-5.01.

(e) Brine from the ice tank is circulated to three brine circuits. Each circuit is complete with a standby brine pump. Room temperature is controlled by a thermostat and a motor operated valve.

G-5.08. Service.

idle.

(a) The service department should instruct stewards in the proper procedure and method of defrosting the units, and the proper procedure in case of an emergency shut down.

(b) All service, repair, and adjustment to any equipment, including the cutting in and out of standby equipment should be done by a qualified refrigeration service man.

(c) Standby equipment should have all valves closed, when

G-5.09. Type Building		Li	List of Compressors.						
		Location ·		No of Bldgs	f Spec. s. No.	No.Comp. Instld.			
Mess	Hall	Т	C		2	108	2		
Mess	Hall	T	C	#2	2	150	2	1	
Mess	Hall	T	C	#2	1	153	2		

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Typ Conder	pe T nsor I	Tonnage Installed			
Shell	&Coil	2.99			
Shell	&Tubo	6,15			
Evap.	Cond.	2.47			

G-5.09. (Cont'd)

Reg.Area 1 3

Reg.Area 2 3

Reg.Area 3 3

Reg.Area 4 3

Reg.Area 5 3

Post Troops 1

Bar.Balloon Amp. Base 1

Ind.& Supply

Ind. & Supply

Ind. & Supply

Family Hosp. 1

Naval Hosp. 1

Naval Hosp. 1

Naval Hosp. 1

Naval Hosp. 1

B.O. Q.

Nurses Home Naval Hosp. 1

Area

B. O. Q.

M. P. #1

Area

Area

Type

Building

Mess Hall

Mess Hall-

Mess Hall

Mess Hall

Mess Hall

Mess Hall

Mess Hall

Commissary

Cold Storage

Bakery

Mess

Mess

Moss

Mess

Mess

Mess

Storehouse

Morturay

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* Denotes: Extra Compressor Capacity or full standby compressor.

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	Туре	Tonnage
<u>.</u>	Condenser	Installed
	Evap.Cond.	4.3
	Evap.Cond.	9.82
	Evap. Cond.	90.4
	Water	0.5
	ALL COOLED	0.0
	Evap.Cond.	6.25
	Evap. Cond.	2.47
	Evap. Cond.	1.38
	Evap. Cond.	10.3
	Evap. Cond.	1.38
	Evapo. Cond	. 1.43
	Shell& Coil	0.91
	Shell &Tube	1.38
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Location No of Spec: No.Comp Instld.

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Bldgs. No.

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153

890

833

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## G-6. Air Conditioning.

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G-6.01. General. Comfort air conditioning equipment was installed in portions of certain buildings in the hospital group in which it was felt that temperature control would be an adjunct in the treatment of and contribute to the welfare of patients and to the efficiency of the attendants.

Air conditioning also was installed in the Waller Gunnery Trainer building.

G-6.02. Type: The type of system installed is the direct expansion central plenum type arranged for both summer and winter operation. A motor driven, multi cylinder reciprocating refrigerating unit installed for summer operation. Steam is provided for Winter heating and other applications as required.

The refrigerant used was dichloro-difluoro-Methane  $(F_{12})$ .

G-6.03. Design Data. The selection of cooling and heating equipment was based on the following conditions:

Outside	D	В	-	(summer)	9
Outside	W	В		11	7
Outside	D	В	-	(winter)	1
Inside (	lor	ndi	Lti	ons	
	D	B	-	(summer)	7
	D	В	-	(winter)	8
Relativo	·	Tur	nic	lity	5

The dirrect system was designed with reheat and re-humidifying coils so that proper manipulation of controls would provide entirely different conditions in different sections or zones of the air conditioned space.

### G-6.04. Methods.

(a) A central plenum chamber was provided in a convenient location in which were placed direct expansion coils, heating coils, humidifiers, reheaters, filters, and the necessary control, safety valves and instruments required for automatic operation. Air was taken from the plenum by a fan and forced through a system of ducts to the conditioned rooms. In the hospitals, re-heaters and re-humidifiers were installed in certain branch ducts with the proper valves and remote control instruments to give a wide choice in the conditions attained - namely, 70°F and 55% humidity in service rooms and a choice of temperature and humidity conditions (above these conditions) for operating rooms.

5°F

90F

5°F

OOF

30°F

5%

### G-6.05. Control.

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(a) The system's are controlled by a Johnson Service Company's pneumatic control system in connection with the usual electric safety devices.

### G-6.06: Capacity Reductions.

(a) With the exception of the Post Dispensary the capacity of the coils are controlled by modulating type thermostatic expansion valves connected into the pneumatic control system. The capacities of the compressors are controlled from full load to 25% load by progressive "cutting out" of compressor cylinders. The remaining capacity is modulated by a Kromer load balancer - (a patented device, manufactured by the Kramer Trenton Company, Trenton, N. J.) in conjunction with the pneumatic control system.

(b) The capacity of the compressor in the Post Dispensary is constant. Coil capacity is controlled by action of thermostatic expansion valves. The compressor is cycled by the suction pressure control, as required, to maintain temperatures.

### G-6.07. Operation.

(a) In the Post Dispensary one set of instruments controls the temperature.

(b) In the hospital a set of master controls govern the conditions of air leaving the conditioning units. Re-heaters and re-humidifiers with control instruments located in the air conditioned spaces as zoned, maintain any desired condition within reason in these zones above the temperature and humidity of the air leaving the units.

### G-6.08. Instructions.

(a) The control systems should be regularly inspected by a competent service man. Relative humidities and temperature should be checked periodically with standard instruments and control instruments should be calibrated.

(b) Refrigeration equipment should never be touched, except for starting and stopping, by any one other than a competent service man.

(c) Heating equipment in connection with the system should be regularly inspected. Pressure reducing valves, traps, and steam control valves should be kept in repair. The humidifiers must be kept clean.

(d) The filters must be kept clean as the success of the system depends upon a constant supply of air.

G-6.09. Waller Gunnery Trainer Building. The equipment in the Waller Gunnery Training Building was purchased by the Navy from plans provided by the Bureau of Yards and Docks.

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## G-7. Ventilation.

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G-7.01. General. This section covers the various designs which involve the handling of air by mechanical means.

Basic computations, design standards and formulae follow very closely the recommendations and data contained in the "Guide" (published by the American Society of Heating and Ventilating Engineers). The greatest departure from the above standards exists in the Mess Hall galley ventilation, where air quantities were held to a minimum, by direction. Thirty-two complete designs were turned out covering three hundred twenty-three separate buildings and providing for the mechanical handling of 1,615,809 cubic feet of air per minute. Of this total, 1,100,972 cubic feet per minute represents the volume of air exhausted from three hundred twenty five buildings as covered by twenty-one basic designs; 497,457 cubic feet of air per minute represents the volume of tempered air supplied to 31 buildings for heating as covered by 8 basic designs; and 17,400 cubic feet of air per minute is the volume of conditioned air supplied to three buildings under three basic designs.

G-7.02. Ventilation by Projects. A complete breakdown of ventilation is as follows:

(a) Seventy-two Barracks covered by project numbers 101-1, 200-1, 201-1, 202-8 and 203-1, have been provided with toilet and shower room exhaust in the amount of 2,600 cubic feet of air per minute each; -Total - 187,200 C.F.M.

(b) Eighteen Mess Halls covered by project numbers 101-2, 200-2, 201-2, 202-9 and 203-2, have been provided with galley and scullery exhaust in the amount of 23,500 cubic feet of air per minute each; and tempered air supply in the amount of 9,600 cubic feet per minute each; - Total 595,800 C.F.M.

(c) Eight Regimental Infirmaries covered by project numbers 101-4, 200-4, 202-20 and 203-19, have been provided with dark room ventilation in the amount of 350 cubic fect of air per minute each; - Total 2,800 C.F.M.

(d) One hundred ninety six Officers' Quarters covered by project numbers 105-1, 205-1 and 400-1-14, have been provided with kitchen ventilation in the amount of 250 cubic feet of air per minute each; - Total 49,000 C.F.M.

(c) The Post Shop building covered by project number 207 has been provided with spray-booth ventilation, and exhaust for removal of smoke and heat in the amount of 16,122 cubic feet of air per minute; a sawdust removal system has also been proposed to handle 19,080 cubic feet of air per minute. It is recommended that this installation be made as promptly as possible - Present Total 16,122 C.F.M.

(f) Seven Regimental Theaters covered by project numbers 200-15, 209 and 203-17 are provided with exhaust in the amount of 24,625

cubic feet of air per minute each, for general ventilation, including projection and toilet room exhaust and 30,000 cubic feet of tempered air per minute for heating - Total 382,375 C.F.M.

(g) The Post Troops Theater covered by project number 201-12 is provided with exhaust in the amount of 45,000 cubic feet of air por minute for general ventilation and for projection and toilet room exhaust and 50,000 cubic feet of tempered air per minute for heating - Total 95,000 C.F.M.

(h) The Brig, covered by project number 107-5, is provided with galley, scullery and toilet room ventilation in the amount of 7,390 cubic feet of air per minute and 357 cubic feet of air per minute for heating - Total 7,747 C.F.M.

(i) Post Headquarters, covered by project number 107-10-1, is provided with ventilation for the blue print room in the amount of 2,200 cubic feet of air per minute - Total 2,200 C.F.M.

(j) The Hostess House covered by project number 214 is provided with galley and scullery exhaust in the amount of 4,800 cubic feet of air per minute - Total 4,800 C.F.M.

(k) The Post Dispensary covered by project number 400-3 has been provided with exhaust for toilets and operating room in the amount of 3,225 cubic feet of air per minute and a supply of 600 cubic feet of conditioned air per minute for heating - Total 3,825 C.F.M.

(1) Two Garage & Repair Shops covered by project numbers 221-5 and 228 have been provided with exhaust in the amount of 12,478 cubic feet of air per minute for spray booth ventilation and the removal of exhaust funes from motors - Total 24,956 C.F.M.

(m) The Reclamation Building covered by project number 221-6 has been provided with exhaust in the amount of 4,000 cubic feet of air per minute for spray booth and general ventilation - Total 4,000 C.F.M.

(n) Naval Hospital Administration Building and Mess Hall, covered by project number 400-1-4 is provided with exhaust in the amount of 48,750 cubic feet of air per minute to ventilate the galley, the operating and treatment rooms and toilets, 9,000 cubic feet of conditioned and 52,000 cubic feet of tempered air per minute for heating - Total 109,750 C.F.M.

(o) The Wards & Corridors of the Naval Hospital covered by project number 400-1-5 are provided with 5,584 cubic feet of air per minute of exhaust to ventilate toilet rooms and solitary confinement rooms. - Total 5,584 C.F.M.

(p) The Nurses' Home at the Naval Hospital covered by project number 400-1-7 is provided with exhaust in the amount of 5,130 cubic feet of air per minute to provide galley and scullery ventilation. - Total 5,130 C.F.M.

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(q) The Medical Storehouse covered by project number 400-1-8 is provided with exhaust in the amount of 500 cubic feet of air per minute for general ventilation - Total 500 C.F.M.

(r) The Naval Hospital B.O.Q. covered by project number 402 is provided with exhaust in the amount of 6,330 cubic feet of air per minute for galley, scullery and toilet room ventilation. - Total 6,330 C.F.M.

(s) The Family Hospital covered by project number 134 is provided with 15,550 cubic feet of air per minute of exhaust to ventilate the galley, scullery and operating suite and 7,800 cubic feet of conditioned air for heating - Total 23,350 C.F.M.

(t) Tent Camp # 1 Hospital, covered by project number 1-19-1, is provided with exhaust in the amount of 2,790 cubic feet of air per minute for operating room and general ventilation - Total 2,790 C.F.M.

(u) Three Recreation Buildings covered by project number 7, 250-1-18 and 500-5 are provided with exhaust in the amount of 24,750 cubic feet of air per minute for general ventilation - Total 74,250 C.F.M.

(v) The Radio Transmitter Building covered by project number 120 is supplied with 3,600 cubic feet of tempered air per minute for heating - Total 3,600 C.F.M.

(w) The Parachute Building covered by project number 138 is provided with tempered air supply of 6,500 cubic feet of air per minute for heating - Total 6,500 C.F.M.

(x) The Utility Shop of the Glider Training Base, covered by project number 142-1 is provided with a tempered air supply of 2,200 cubic feet per minute for heating - Total 2,200 C.F.M.

G-8. Equipment.

G-8.01. General. Most of the collateral equipment on the base was furnished by either the Navy Department or the Marine Corps on specifications of their own. Some few notable exceptions wherein we specified the equipment are hereinafter listed. We are also listing the basis of design and source of design data.

G-8.02. Regimental Infirmaries. Seven in number; project numbers 101-4, 200-4, 202-20 and 203-19. In these buildings we covered by specification, the Instrument Sterilizers. Design was based on recommendation by a representative of the Bureau of Mcdicine & Surgery.

G-8.03. Amphibian Base Machine Shop and Carpenter Shop. Project numbers 202-6 and 202-5. In these buildings we covered by specification all of the shop equipment including small tools. Selection of type and size of the various items specified was made after consultation with the operating personnel of the Amphibian Base at the Naval Operating Base, Norfolk, Virginia.

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G-8.04. The Hostess House. Project number 214. We specified the galley equipment for this building. Design was based on the requirements of the building and materials readily available.

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G-8.05. Division Infirmary. Project number 400-3. In this building we covered by specification the Sterilizer Equipment and the X-Ray equipment in accordance with recommendations of representatives of the Bureau of Medicine & Surgery. We also specified the elevator, the design of which was based on the service requirements of the huilding.

G-8.06. Naval Hospital Administration Building and Mess Hall - Wards & Corridors. Project numbers 400-1-4 and 400-1-5. For these projects we specified the galley equipment, including small collateral equipment, in accordance with recommendations of representatives of the Navy Department -Bureau of Medicine and Surgery. We also specified the Sterilizer and Operating suite equipment as well as fixed laboratory equipment, X-Ray equipment, treatment equipment, and tailor shop equipment, after consultation between our engineers and representatives of the Bureau of Medicine & Surgery, the Bureau of Yards and Docks and a representative of the American Sterilizer Co. The elevator, design of which was based on building service requirements was also specified.

G-8.07. Nurses' Home. Project number 400-1-7. We specified the galley, collateral, and laundry equipment for this project based on estimated service requirements.

G-8.08. Medical Storehouse. Project number 400-1-8. We specified the Mortuary equipment for this project after consultation with representatives of the Bureau of Medicine & Surgery and the American Sterilizer Co.

G-8.09. Family Hospital - Nurses' Quarters. Project number 400-1-11. We covered by specification the kitchen equipment for this project based on estimated service requirements.

G-8.10. Naval Hospital - Laundry. Project number 400-1-12. We specified the complete equipment for this project. Design was based on recommendations of the Bureau of Yards and Docks and Bureau of Medicine & Surgery.

G-8.11. Family Hospital. Project number 134. We covered the Sterilizer Equipment, operating, X-Ray, recovery, nursery suite equipment and galley and Laundry equipment all after consultation with representatives of the Bureau of Yards and Docks, the Bureau of Medicine & Surgery and a representative of the American Sterilizer Co.

G-8.12. Glider Training Base. Project number 142-1. We specified all of the shop equipment for this project including small tools. Selection of type and size of equipment was made after consultation with a representative of the Marine Air Force.

## CHAPTER H - PART II

### ELECTRICAL DEPARTMENT

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H-1. Introduction.

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H-1.01. The purpose of this report is to describe the general scope. characteristics and essential details pertaining to the design and construction of the Outside Transmission and Distribution Systems as well as the Interior Wiring for lighting, power, and other requirements throughout the Division Training Area and associated activities. Description and recommendations concerning the operation and maintenance both outside and interior electrical systems are included where necessary.

### H-2. Power Source - Description of Existing Facilities.

H-2.01. Electricity for the Marine Barracks Project, including all temporary Tent Camp Areas, Outlying Areas, and the Midway Park Residential Area is purchased from the Jones-Onslow Electric Membership Corporation, a local unit of the National Rural Electrification Administration. An abstract of the electricity purchase contract and agreement is included in this report. (See Section H-10.)

H-2.02. The REA Corporation properties now include a diesel electric plant at the Marine Barracks and a steam-electric generating plant at Cherry Point Marine Air Base, and an interconnection with the Tide-Water Power Company, the local operating utility.

The diesel-electric generating plant consists of two 1300 Kw 6600 volt 3-phase units, which were removed from the original purchasers premises and installed at their present site in 1941-42. This plant is

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located on the Marine Barracks property five and one-half (5-1/2) miles east of Jacksonville. N. C. along the New River and adjacent to highway No. 24.

The steam electric plant at Cherry Point which is in the process of construction, is scheduled to deliver 5000 Kw to the system by October 15. 1942. This plant is designed for two 5000 Kw units ultimately; however, the War Production Board has ruled that only one 5000 Kw unit may be installed for the duration. The steam plant is interconnected with the diesel plant by a 33 Kv, overhead transmission line of recent construction. It is approximately thirty-five (35) miles in length and follows a straight line across country between the two points.

The interconnection with the local power company consists of a 5000 Kw sub-station located near Jacksonville, N. C. This sub-station is connected to the local system by a 33000 volt overhead transmission line. It is approximately five and one-half (5-1/2) miles in length and follows the north side of highway No. 24 from Jacksonville to the Marine Barracks' substation. The 5000 Kw sub-station at Jacksonville is fed by two 110,000 volt transmission lines; one, by way of Wilmington and Camp Davis from Abbottsburg, N. C., a distance of approximately one hundred (100) miles and the other. across country by way of Kinston from La Grange, N. C., a distance of about forty (40) miles.

The War Production Board has authorized an additional 110,000 volt line across country from the 5000 Kw generating plant at Cherry Point to the substation at Jacksonville.

The sub-station which is located at the diesel plant site is fed from the three sources mentioned above. This sub-station consists of two banks of transformers. One transformer bank of 3000 Kva capacity, connected to step the 6600 volt diesel supply to 7200/12470 volts, and the second transformer bank of 5000 Kva capacity connected to step the 33000 volt supply of both the steam plant and the interconnecting line to 7200/12470 volts, which makes a total of 8000 Kva of transformer capacity installed. This 8000 Kva is connected to a common bus to deliver 7200/12470 volt grounded neutral. 60 cycle, 3-phase, 3 or 4-wire power to the Marine Barracks' system. The direct feeder of the Jones-Onslow Electric Membership Corporation into the diesel plant is protected by G. E. Company type IAC relay set at 300 amp. to operate in 79 cycles.

The lines from the diesel plant to the inner loop #lare protected by G. E. Company type IAB relay set at 240 amp. to operate in 62 cycles.

H-3. Marine Barracks Main Supply Feeders and Protective Systems

H-3.01. The Marine Barracks project is supplied by two loop feeder transmission systems. These will be referred to as the inner loop No. 1 and the outer loop No. 2 in this report.

H-3.02. Loop No. 1 is connected to the central sub-station supply bus through two oil circuit breakers, one on each end of the loop. This loop feeder is of overhead construction using ASA class 3 creosoted poles with 175' span lengths. The conductors are 4/0 copper with 56" effective spacing supported on Douglass Fir standard 8 foot arms, with steel pins and Locke
### H-3.02. (continued)

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Cat. No. 88 insulators. The overall length of this loop is 12.5 miles.

This feeder is designed for National Electrical Safety Code grade "A" construction in a medium loading district to supply a maximum demand of 9500 Kw at 90% power factor with approximately 9-1/2% voltage drop. The anticipated maximum load on this feeder based on approximately 40% of the installed load will be around 7500 Kw which will produce 7-1/2 maximum voltage drop.

The loop is divided into sections and each section is protected by pilot wire connected current differential relays controlling unit type metal clad fault sectionalizing oil circuit breakers.

The relays used in connection with the pilot wire tripping are Westinghouse type HCB. These relays are capable of automatically disconnecting a faulty section of the loop in 1/30 of a second providing the fault current is of sufficient magnitude. The use of this type of protection prevents making branch feeder connections directly on the loop sections: therefore. from between each of the protected stations an underbuilt primary feeder is necessary. All branch taps should be made on the underbuilt feeder.

There are six of these sectionalizing stations as follows:

Station No. 1 is located at the beginning of the loop near the diesel station and feeds an underbuilt section of primary for the Gate House and the water pumping equipment. This station has two breakers: one for sectionalizing the loop feeder and one for feeding the underbuilt section.

Station No. 2 is located near the intersection of Holcomb Blwd. and Gum Street in the Industrial and Supply Area. This station consists of five breakers; two for sectionalizing the loop feeder, one for feeding the Industrial and Supply Area, and one for feeding the Central Heating Plant and one spare breaker for a future duplicate feeder to the Central Heating Plant. The Industrial and Supply Area breaker also feeds the Parachute Training Area underbuilt section and the second loop No. 2.

Station No. 3 is located near the Post Headquarters Building in the Post Troops Area and consists of 3 breakers; two for the loop feeder and one for the Division Training Area, Post Troops Area and for an emergency feeder through Regimental Area No. 1 to the Naval Hospital. The underbuilt sections from this stationare of No. 1/0 copper.

Station No. 4 is located at Cross Street and Main Service Road at the far end of Regimental Area No. 1 and consists of 3 breakers; two for the loop feeder and one for the Naval Hospital feeder. This station also serves the Radio Tower and the Wallace Creek Sewage Pumping Station, No. 3. The feeder to the Naval Hospital Area is of 1/0 copper and is located on the south side of Cross Street.

Station No. 5 is located at the sub-station at the Batchelors Officers! Quarters and consists of three breakers; two for sectionalizing the loop feeder. and one to feed the Residential Area sub-station. This breaker serves the entire Residential Area.

# H-3.02. (continued)

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Station No. 6 is similar to Station No. 1 and is located on the other end of Loop No. 1 near the diesel plant. This station has one sectionalizing breaker and one feeder breaker which supplies the C.C.C. Camp, Mumford Point Tent Camp, Tent Camps Nos. 1 and 2, Peterfield Point Tent Camp and the Glider Training Base. This system is four-wire overhead construction to Tent Camps Nos. 1 and 2, and underground from a sub-station located at the intersection of the Atlantic Coast Line Railroad and the Glider Training Base access road to Peterfield Point Tent Camp and the Glider Training Base. This sub-station is fed by an overhead line from the Tent Camps Nos. 1 and 2 transmission line. The voltage transformation at this sub-station is 7200/12470 to 2400/4160-volt.

Most of the transformers in Tent Camps Nos. 1 and 2, Mumford Point Tent Camp and the C.C.C. Camp are single phase, 7200 to 120/240 volts. All laterals that are fed in any of these areas from the underbuilt section are protected by open type fused cut-outs with fuse size depending upon the connected transformer loads.

H-3.03. Loop No. 2 begins at the rear of the Industrial and Supply Area at the end of Gum Street and is fed from Loop No. 1. This line is of overhead construction similar to Loop No. 1, except that it is of 1/0 copper conductors and has an average span length of two hundred (200') feet. This loop follows the Sneads Ferry Road to Dixon where it connects through a pole top disconnect as an emergency feed to a 1/0 line of the REA on Route 17. The length of this loop, including the REA sections is approximately forty (40) miles in length. This loop feeds the Mock-up, the Barrage Balloon Battalion, the Amphibian Base Area, the Amphibian Shop and the Rifle Range. Hurst Beach which is now fed from REA will be reconnected to Loop No. 2. This loop is designed on the basis of grade "A" construction and is capable of carrying approximately 6000 Kw at ninety (90%) percent power factor. However, due to the length, the voltage drop transmitting this amount of power would be prohibitive and regulators would be required. The present load on this loop will not exceed 2000 Kw with approximately 8.5% voltage drop. All lines taking off of Loop No. 2 are protected by means of open type fused cut-outs.

# H-4. Distribution Systems Including Primary Voltage Characteristics Sub-Station, etc. for the Entire Project

The various distribution systems connected to the inner loop feeder are as follows:

# H-4.01. Industrial and Supply Area System

This system is of overhead construction, 12,470 volts, 3-phase, 3-wire primary and in this Area generally 3-phase transformers giving a secondary service voltage of 120/208 connected wye are used. All primaries on 3-phase transformers are connected delta. Detail service for each building will be given in Section H-11 of this report.

# H-4.02. Division Training Area Distribution System

This system is of overhead construction, 12,470 volts, 3-phase, 3-wire primary and 3-phase transformers. These transformers are connected delta-wye

# H-4.02. (continued)

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and deliver 120/208 volts for building services. This Area, consisting of five Regiments, is essentially living quarters, subsistence and recreation, including various Administrative Office Buildings. These buildings will be discussed later in this report.

# H-4.03. Naval Hospital Area Distribution System

The Naval Hospital distribution system is a 2300 volt, 3-phase, 3-wire underground system consisting of underground ducts, concrete manholes, and brick transformer houses. The Area distribution system is fed by an overhead outdoor type transformer sub-station connected to a switching station located near the entrance to the Hospital Area by means of a three conductor 15000 volt 1/0 cable. Provisions, have been made in the duct system for the installation of a duplicate cable.

The Hospital sub-station consists of three 500 Kva 12470/2300 volt transformers connected delta/delta and four outgoing 2300 volt feeders, three of which are protected with automatic oil circuit breakers. Also provision for street lighting and X-Ray service is made in this sub-station. The main Hospital buildings, which include Wards, Corridors, and Administrative sections, are fed by two separate cables and are equipped with three unit type transformer sub-stations.for 120/208 volts, 3-phase, 4-wire service. A 147.5 Kw diesel driven generator supplies the emergency lighting in case of power failure from the main source. The operating room suite is further equipped with batteries for the operating room lights.

The Family Hospital is connected to the main source by two cables feeding an individual transformer sub-station installed within the building for 120/208 volts 3-phase, 4-wire service. This sub-station also serves the Family Hospital Nurses! Quarters. The transformers for service to the remainder of the buildings in this Area are installed in small brick transformer houses. Details of this are shown on M. B. Drawing No. 1796.

The Hospital switching-station is located at the entrance to the Hospital Area on the west side of the Hospital road at the entrance to the Bachelor Officers! Quarters Building. This station is fed from two overhead feeders; one passing through Regimental Area No. 1 is termed an emergency feeder and the other, which originates at Station No. 4 is termed the main Hospital feeder. The main feeder is equipped with a 3-shot, automatic, reclosing oil circuit breaker at the loop station No. 4. The emergency feeder is protected by means of power fuses at the tap-off in the Training Area. The entire Hospital Area is metered at the switching station location.

# H-4.04. Residential Area Distribution System

This distribution system is fed from loop No. 1, station No. 5 through a bank of three 750 Kva transformers. These transformers step the voltage from 12,470 to 2400 volts and are connected delta/delta. The primary distribution system in this Area was designed for 2400-volt due to the fact that the Marine Corps wished to preserve all possible trees in this area. The primary is located along the alley in the rear of the buildings. The distribution transformers are 3-phase, connected delta/wye, providing 120/208 volt service to each house.

H-5. Loop No. 2 feeds the following distribution systems:

H-5.01. The Mock-up is fed by an overhead line connected to Loop No. 2 through open type fused cut-outs.

H-5.02. The Barrage Balloon Battalion and Amphibian Troops Area Distribution System is fed by an overhead line connected to loop No. 2 through open type fused cut-outs serving a 750 Kva transformer sub-station located on the south side of the Sneads Ferry Road. The primary distribution feeder is a 2300-volt 3 conductor underground cable; however, the distribution in the Troops Area is by means of overhead construction.

H-5.03. The distribution system for the Barrage Balloon Area is by means of overhead construction connected to the primary underground cable feeder to the Troops Area.

H-5.04. The Amphibian Shop Area is fed by an overhead line directly from Loop No. 2 protected by open type fused cut-outs.

H-5.05. The Rifle Range distribution system is by overhead construction equipped with 3-phase 12470/120-208 volt transformers connected delta/wye, with the general design similar to that of the Regimental Areas.

Suggested Operation Procedure of Primary Distribution H-6. Transmission and Street Lighting

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H-6.01. The rules for the operation of electrical lines and equipment as set forth in the National Electric Safety Code and the National Electric Code of the National Board of Fire Underwriters should be secured and copies given to the personnel charged with the responsibility of maintenance and repair of the electrical systems.

The National Electric Safety Code may be obtained from the Government Printing Office, Washington, D. C. and is as follows:

Part 1 - Safety Rules for the Installation and Maintenance of Electric Supply Stations

- Part 2 Safety Rules for the Installation and Maintenance of
- Electric Supply and Communication Lines Part 3 - Safety Rules for the Installation and Maintenance of
- Electric Utilization Equipment Part 4 - Safety Rules for the Operation of Electric Equipment and Lines
- Part 5 Safety Rules for Radio Installation

The National Electric Code may be obtained from the National Board of Fire Underwriters, 85 John Street, New York, New York.

The above codes have been approved by the American Standards Association.

H-6.02. The supply for the Marine Barracks Project in the form of a loop means that under normal operations any tap is fed from two directions. Work on any section of the loop requires both ends of the section to be disconnected. In case of trouble on the loop, the loop feeder may be used

# H-6.02. (continued)

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to advantage in that the section in which the fault occurs may be entirely disconnected to permit repairs, and the load may be fed during this period of repair from the adjacent ends of the open loop.

Faulty circuits should be de-energized before linesmen are permitted to climb the poles to make repairs. Conventional hot line equipment should be used with extreme care to prevent accident. Rubber gloves inside suitable canvas protective gloves and an operating stick should be used when attempting to replace primary fuses in any of the open cut-outs. Attempting to open cut-outs with gloves or hot stick alone is a very dangerous practice. Ground the de-energized section of a circuit during the period of repair.

Overhead lines should be patrolled frequently and cleared of all over hanging branches or dangerous trees. Distribution and power transformers are provided with over-current indicators of the thermal type. Transformers are also provided with means for sampling oil.

H-6.03. Refer to the respective manufacturer's operating instructions and recommendations concerning operation and maintenance of such equipment as transformers, oil circuit breakers, protective relays, disconnecting type switches, lightning arresters, metering equipment, fusible cut-outs, motors and motor starting equipment, street lighting equipment, black-out control systems and carrier-frequency pump and water control system.

The equipment nameplates generally have the Instruction Bulletin identifying number stamped thereon.

H-6.04. Cracked or damaged insulators and lightning arresters may be detected by means of a portable radio set. Lines should be de-energized before an attempt is made to replace bad insulators or lightning arresters. Disconnect switches are not designed for interrupting load currents, therefore, remove the load by means of breakers before the disconnects are opened or closed. The same is true of power fuses which are designed to automatically interrupt faults, not to be used as manual disconnect devices. A creosoted pole is a fair conductor of current; therefore, when replacing poles, care should be taken that the pole does not touch a "hot" conductor.

H-6.05. Most of the street lighting systems are 6.6 ampere series circuits with 10 Kw. regulators which will deliver approximately 2000 volts on open circuit. This voltage will be present at a break in the line even though the ends of the line are on the ground. The danger of this condition has been minimized by the installation of open circuit protectors; however, great care should be exercised when repairing any part of these circuits. Series lamp socket clips are equipped with an insulating disc type cut-out. When a lamp burns out this disc is automatically broken down by the open voltage and thereby shunts the lamp out of circuit. When a series socket is removed from a fixture receptacle the receptacle automatically short circuits so that the series loop remains closed. All lighting circuits should be patrolled at least once each week at which time the linesman patrolling the line should note the condition of the insulators and the clearance between this circuit, tree linbs, etc., as well as to replace burned out bulbs. The regulator capacity is based on the number and size of lamps connected:

# H-6.05. (continued)

therefore, changing the number and size of lamps requires checking the regulator for suitable capacity. The oil switches which control the regulators are opened and closed by an astronomically corrected contact making clock. This oil switch can be operated manually be a control handle mounted on the back of the switch case. The open circuit protector is equipped with a reset button which must be depressed when an open circuit fault causes the protector to function.

## H-7. Street Lighting Systems

H-7.01. The Street Lighting Systems for the various Areas are designed to provide enough light for the movement of Troops or padestrians by night. Street lighting in the Industrial and Supply Area is provided from a 10 Kw constant current regulator serving an overhead 6.6 amp. series circuit connected to pole mounted brackets with globe and deflector type luminaires. The regulator is located on Gum Street near the Central Heating Plant. A 2500 lumen street light is located at most intersections. The regulator is supplied power by a single phase transformer which steps the voltage from 12,470 to 2400 volts. The constant current regulator is automatically controlled by an oil switch which in turn is controlled by an astronomical dial clock. This clock is spring driven and is wound electrically. The period of lighting for this system will be approximately from sun set to sunrise. The circuit is further provided with an open circuit protector which will automatically open the oil switch and disconnect the primary supply to the constant current regulator if the series circuit is broken.

H-7.02. The Division Training Area is lighted by a similar system utilizing the same type of brackets and luminaires. However, this system consists of two 10 Kw 6.6 amp. constant circuit regulators connected to separate circuits; one for all night lighting similar to the Industrial Area, and the other for part night lighting, which may be set to extingush the lights at midnight. The all-night lights are generally located at street intersections and other points where all night service is desired. In addition to the pole mounted brackets and luminaires in the area, a number of concrete standards with appropriate luminaires and underground wiring are located along the double lane of Holcomb Blvd. leading to the Division Headquarters. Approximately half of these luminaire standards are connected to the part night lighting circuit. The street lighting regulators supplying these Areas are identical in connection and in method of control to that in the Industrial and Supply Area. These regulators are located on the south side of Holcomb Bldv. across from the Post Headquarters Building.

H-7.03. The Naval Hospital street lighting system consists entirely of concrete standards supplied by underground cable similar to the lights on Holcomb Blvd. These lights are also provided with a part night and all night circuit. The system is supplied by a 10 Kw 6.6 amp. constant current regulator located at the Hospital sub-station. The control is similar to that of the Industrial Supply and Division Training Areas, except there is extra equipment installed in the circuit to cut out half of the lights at midnight.

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H-7.04. The Residential Area is lighted by pole mounted brackets with glass bowl luminaires mounted on creosoted poles similar to the Industrial Area, except that these lights are fed by an underground cable. These lights are spaced for Residential service and are generally located only at street intersections. These are supplied by a 10 Kw 6.6 amp. constant circuit regulator located at the Residential sub-station near the Fire Station for this Area. The control is identical to that in the Industrial and Supply Area, except that the regulator is connected directly to the distribution system without utilizing a step down transformer.

H-7.05. The Tent Camps Nos. 1 and 2 have 1000 lumen radial wave reflectors mounted on 10 foot mast arms fastened to the distribution poles with an overhead circuit supplied by a 5 Kw constant current 6.6 amp. regulator. The regulator is connected directly to the primary by means of a clock controlled oil switch.

H-7.06. The Mumford Point Tent Camp is similar in detail to Tent Camps Nos. 1 and 2.

H-7.07. The Rifle Range street lighting system is similar to that in the Division Training Area.

H-7.08. The Amphibian Shops, Barrage Balloon School and Amphibian Base are supplied by lights connected to allo/220 volt multiple system obtained from the distribution transformer and controlled from the Administrative Offices of these Areas.

Control Systems for Blackout and Water Pumping Equipment H-8.

H-8.01. Blackout of all Areas is accomplished by means of a pilot wire system which is normally energized to close a small relay installed in tha trip coil circuit of a larger contactor. The blackout system is designed so that the lights in all buildings would be automatically extinguished in case of a failure of the relay or the pilot wire system from natural causes or from sabotage. The Industrial and Supply and Division Training Areas are controlled from a control panel located in the Post Headquarters building. This panel is so designed that if a failure of power supply occurs, all relays will remain closed, thereby making it unnecessary to turn the lights on after power resumption. The panel has a master control black-out button and fiftean individual circuit controls. The sirens are connected to one of the fifteen circuits, therefore, if it is desired to blow the sirens in advance of a black-out, this may be accomplished by pressing the respective button. The master control black-out button controls all interior lighting as well as the street lighting and this button when depressed will automatically extinguish all normal lighting in the Industrial and Supply and the Division Training Areas. To restore service to the various Areas without causing a momentary overload on the power source, it is necessary to consecutively press each of the fifteen buttons on the control panel. All obstruction lighting on the water tanks. stacks and radio towers are connected to the street lighting circuit by means of transformers. Therefore. when the Areas are blacked-out, all obstruction lighting will also be blacked-out.

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The various buildings which are normally occupied at night, are equipped with a black-out lighting system. This system of lights is automatically energized when the normal lighting is blacked-out and it is for the purpose of leading the occupants to the nearest exit without confusion.

# H-8.02. Water Pumping Control Equipment

The Water Pumping equipment which will ultimately consist of approximately twenty-seven (27) wells located within the Marine Barracks Area, which pump water into the main treatment plant located at the intersection of the Service Road and "G" Street, will be controlled by a carrier current system as manufactured by the General Electric Company. This sytem consists of a high frequency generator driven by a squirrel-cage motor. This generator by means of coupling transformers imposes a 720 cycle control current impulse on the normal distribution system. This current is controlled by a selective group control panel controlling nine channels each of which serves with a predetermined impulse to the various channel responsive relays located at each well and connected to start and stop the pump motor. The wells are generally controlled in groups of three which may be varied as found necessary. Due to the length of time required for delivery of this equipment, it will be necessary to control these wells by hand until the equipment is installed. The carrier current control will also be used to control the incoming water lines from the various well locations by means of a carrier current responsive relay in the control circuit of a suitable valve. This control will be described under the operation of the water plant.

# H-9. General Notes on Interior Design

H-9.01. The permanent type buildings constructed in the main Areas as well as the outlying activities are designed using type RH wire and rigid conduit. However, due to the shortage of steel for strategic uses, some of the buildings utilized thin wall conduit. Inaccordance with the Bureau's practice the smallest size of wire used for lighting circuits and for convenient outlets is No. 12. The maximum allowable load for any branch circuit is 1500 watt. However, in the design the connected load is limited to 1000 watts maximum. The amount of illumination in any of the permanent buildings is generally ten (10) ft. candles except in the sleeping quarters and in some parts of the subsistence buildings, the illumination is around seven (7) to eight (8) ft. candles and in the Offices, Administration buildings, and other places where more illumination was desirable, approximately twelve (12) ft. candles were provided. Panels were provided with toggle switches and plug fuses with adequate spare circuits for the future installation of miscellaneous services. The type of fixture used generally conformed to the U. S. Bureau of Yards and Docks Specification 9Yc. In accordance with Navy direction, most of the buildings are supplied through four-wire services which permit 120 volt single phase for light and 208 volts 3-phase power for ventilation fans and condensate pumps. Due to the fact that instructions were issued to provide black-out facilities after a considerable number of buildings were under construction, an attempt was made to design a system which would necessitate the least amount of changes and revisions both to the interior and outside distribution system. As discussed under the black-out control, Section H-7, of this report, the black-out of each building is controlled from

## H-9.01. (continued)

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a pilot wire. The system used on the interior of the buildings as shown on M.B. Drawing No. 751 utilizes a low energy magnetic contactor normally open, which is inserted in the control circuit of a larger contactor rated in accordance with the installed amount of lighting. There is also a normally closed contactor, which automatically turns on the black-out lights when the normal lighting circuit is de-energized.

In the subsistence type of building, some 220 volt 3-phase kitchen equipment has been bought to conform to the 110/220 volt 3-phase 4-wire open delta system originally designed and later changed to 120/208 volt by Navy direction. An auto transformer to step the voltage from 208 to 220 volts was installed to provide the proper voltage.

H-9.02. All temporary types of buildings such as tents and the most recently. constructed frame buildings were wired with non-metallic sheathed cable and in some cases thin wall conduit. All electrical work of a temporary or a permanent nature has been designed and installed in accordance with the National Electric Safety Code and the Bureau of Yards and Docks design manual.

H-9.03. The various types of buildings, installed loads and voltage characteristics are listed in Section H-11.

# H-10. Electrical Features of the Central Heating Plant, Cold Storage Plant, Post Shops, and Naval Hospital

# H-10.01. Central Heating Plant

The Central Heating Plant located on Gum Street in the Industrial and Supply Area is designed to furnish steam heating facilities to the Industrial and Supply Area, five Regimental Areas and the Post Troops Area. This plant is served from Loop No. 1 through sectionalizing Station No. 2. Service, as originally designed, for this building was to be by means of two 3-conductor No. 0, 15,000 volt cables. However, due to a shortage in this type of cable, an overhead feeder has been installed from Loop Station No. 2 to the plant location. The service enters the building through two . underground 15,000 volt cables, which terminate in two 750 Kva unit type sub-stations. Each of the 750 Kva transformers serve two complete boiler installations through coordinated low voltage circuit breakers. The two unit-type sub-stations are interconnected by means of a 2000 ampere low tension tie. This enables any of the four heating plant boilers to be operated from either of the two sub-stations, however, each sub-station will carry only three boilers. All equipment, panels, etc., are designed for 120/208 volt, 3-phase service. The heating plant has a total of 1667 HP in various size motors and a total of approximately 43 Kw in lighting. This plant is the largest single electrical installation. Each of the four boiler installations are provided with:

- (1) 1 150HP induced draft fan
- (2) 1 75HP forced draft fan
- (3) 2 75HP pulverizers
- (4) 2 1HP feeder motors
- (5) 2 . 1/2HP scale motors

H-10.01 (continued)

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All of these motors are connected for sequence operation. It is necessary to start No. 1, and Nos. 2 and 3 follow in the order named. The feeder motors and scale motors, Items Nos. 4 and 5, are connected through the pulverizer breakers. Therefore, it is necessary for the pulverizers to be in operation before the feeder or scale motors can be started. Item No. 1, the induced draft fan, is provided with a selector switch. This allows the induced draft fan to stop and Items Nos. 2, 3 and 4 to continue operating in sequence on natural draft. The operation of boilers Nos. 2, 3 and 4 are the same as described for boiler No. 1. Refer to specification No. 810-12 and drawings 1725 and 1727 for further information concerning the electrical controls and the future provision for a turb-alternator.

The coal handling equipment is controlled from the coal handling panel, which in turn is fed from the auxiliary unit sub-station. This panel controls: -(1) Flight Conveyor - (2) Bucket Elevator - (3) Crusher - (4) Apron Feeder. These motors are started in the sequence noted. The coal handling equipment may be operated either at the control panel or from the various motor locations. The reserve coal handling is also operated from a control panel located near the reserve coal handling equipment. This panel is also fed from the auxiliary unit sub-station. This panel controls: - (1) A Vertical Elevator and (2) The Apron Feeder.

The ash handling equipment consists of an unloader and vibrator. There is also a 1/2HP sump and a 5HP fuel pump. There is a total of eight 1/4HP vibrators and four 1/2HP rotary valvos. Panel No. 5, as shown on M.B. Drawing No. 2745 supplies two softeners of 1/2HP each, two air compressors of 7-1/2HP each, two magnetic separator motor generator sets of 3HP each and two condensate pumps of 2HP each. There is also a 20HP air compressor installed in the plant. The purpose of the magnetic separators is to separate tramp iron from the coal before it enters the pulverizers. This separator is operated on direct current furnished by the motor generator sets.

The control panels are equipped with emergency lighting fed from batteries; also, a black-out system of lighting so that all gauges, meters, valves, etc. may be operated during a black-out or emergency.

The main boiler auxiliaries, including induced and forced draft fans and the two pulverizer motors, are provided with ammeters located in the combustion control assembly. These meters are intended to indicate the running or overload condition of each motor. These meters are operated from current transformers located in the switch gear compartments. The combustion panel for each boiler is also equipped with a watt-hour meter to register the kilowatt hour and the demand of the connected motor load. Provision has been made on the switchboard section for the installation of two ammeters and two volt meters on the incoming feeders. There is also one watt-hour meter to record the total load on the boiler combustion control panels, one watt-hour meter for auxiliary motor power, one watt-hour meter for indicating total power load and one watthour meter for indicating the total lighting load.

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# H-10.02. Cold Storage Plant

The Cold Storage Plant, which is located in the Industrial and Supply Area, is electrically operated and thermostatically controlled throughout. This plant is capable of making approximately twenty-five (25) tons of ice every twenty-four hours. In addition to the ice capacity, there is considerable storage space for fruits, vegetables, meats, dairy products, etc. The temperature in these various storage rooms varies in accordance with the type of product stored. The plant is connected to the overhead distribution lines in the Industrial Area by means of an underground cable. three conductor #1, type "H", paper insulated, 15,000 volt cable. This cable has primary disconnect switches mounted outside of the building on a pole. The cable supplies a 300 Kva oil filled transformer, which steps the voltage from 12,470 volts delta to 120/208 volts wve. All motors. panels, etc. in the building are designed for this voltage. The secondary of the transformer is connected through necessary buses to the secondary switch gear. This switch gear consists of several sections. The first section houses the metering equipment and the transfer control panel. The second section houses three 300-ampere circuit breakers for the compressors and one 225-ampere spare circuit breaker. The third section houses a 50-ampere breaker for the lighting and a 50-ampere. a 100-ampere and 225ampere breaker for the miscellaneous power. These breakers, like the Central Heating plant. are designed for sequence operation. The compressor will automatically stop in the event of excess pressure or a failure of the water supply. The brine circuit is controlled by motor driven valves. which are operated by thermostats in the various storage rooms.

Generally, all branch and subfeeder wiring is in concealed rigid conduit using type RH wire with RLM industrial type reflectors for lighting. The wiring in the refrigerated rooms is installed exposed and supported on porcelain cleats, having weatherproof cleat receptacles or fixtures. This method of wiring is used in all refrigerated rooms including the various mess halls or subsistence buildings in the Regimental Area and is in accordance with Yards and Docks Specification No. 9Ye.

### H-10.03. Post Shop Building

The Post Shop Building is designed for maintenance of equipment and furnighings in the Division Training Area. It houses the various carpentry, machine, electric, painting, refrigerating, blacksmith shops and storerooms in each of which there are machines operated by electric motors.

Service is brought into the building at 12,470 volts underground by separate feeders to the power unit sub-station, and the lighting unit substation. These unit sub-stations have primary disconnecting potheads, transformer sections and low tension switch gear sections.

The unit sub-stations main feeders are run to power and lighting panelboards. In the case of the power panelboards, there is one in each of the shops where there is electric powered machinery, either single or three phase, and in the case of the lighting panelboards, they are located in the corridors where they are easily accessible.

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# H-10.03. Continued.

Motors in all cases are provided with separate disconnecting switches within sight of the motor beside being provided with a disconnecting means at the power panelboard. All lights are controlled from wall mounted tumbler switches, except in the case of lights in the carpenters' shop, which are controlled from the panelboard.

The black-out control for the Post Shop Building differs in several respects from that in any of the other buildings. The black-out system provides for a signal horn to sound a few seconds prior to the lights being extinguished; the thought behind this being that there would be extreme hazard to the operator of such machines as rip and band saws, planers and other such machines having exposed cutting edges, should all lights be extinguished without warning.

# H-10.04. Naval Hospital - Administration, Wards, Corridors, etc.

The Naval Hospital, Wards and Corridors, and Administration Bldg. and Mess Hall are, in reality, one building, the units being contiguous to one another and formed by tunnels and connecting corridors at floor levels.

Electrically, with the exception of control and signal systems; they are treated as three separate units. The main unit is the Administration and Mess Hall building, three stories in height occupying the center; and the second unit is to the east and includes Wards Nos. 9,10,11,14,15 and 16 each of two stories, and the third unit is to the west and includes Wards Nos. 6,7,8,12 and 13. Provision has been made in all systems for a future addition of two wards at both the east and west wings.

Electrical equipment is served from a main transformer and switchboard room in the basement of the Administration Building for the center unit of Administration Building and Mess Hall. The east group of wards has a transformer and switchboard room located in the basement of Service Bay No. 20. The west group of wards has similar equipment located in the Service Bay No. 17.

Service is brought into all three transformer rooms underground at 2400 volts and transformed to 120/208 volts 3 phase. The ward load predominantly consists of lighting. The Mess Hall and Administration Building load is about evenly divided between light and power. A separate 2400 volt underground service is brought into the Administration Building vaults for X-Ray equipment, and another 2400 volt service is brought in to serve the emergency lighting transformer.

The three transformers and switchboard rooms distribute energy by means of 3-phase 4-wire 120/208 volt circuits for lighting and 3-phase 3-wire 208 volt circuits for power feeding distribution panelboards located at various load centers. Each ward is served from a single panel for each floor. The Administration Building has two panels per floor. The Mess Hall building has separate pahels for the Operating Suite, and the Theater, and two panels for the Recreation suite; also separate power, light, and cooking panels for the Mess Hall proper. A separate panel is located on

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# H-10.04. Continued.

the third floor of the Administration Building for the X-Ray equipment.

The Administration Building power consists of pumps, fans, compressor, elevators and electric cooking equipment such as griddle, ovens, frvers. etc.

The main part of the mechanical equipment for ventilation of various units and for air-conditioning of the Operating Suite is located in a fan room on the third floor and is served by means of two power feeders to the Fan room distribution panels. Motors in the fan room are remotely controlled from push buttons located at central points on floors served by the fan equipment.

# H-10.05. Hospital Auxiliary Systems

(a) Nurses' Call System. Each ward floor has an individual nurses' call system with a nurses' call annunciator at the nurses' station, and calling buttons at bed locations. Quiet rooms and Officers Quarters' rooms are also equipped with calling buttons. Operation of calling buttons causes visual and sound indication at the nurses' station annunciator and also at the diet kitchen annunciator; also in the case of rooms and wards a pilot lamp lights over the entrance door on the corridor side. The operation of the system is by means of 24 volt alternating current obtained by means of a transformer located in each ward.

(b) Doctors' Paging System. The doctors' paging annunciators are located on each floor of the various wards and on the first, second and third floors of the Administration Building, and they are operated by means of a master control, located in the telephone PBX room on the first floor of the Administration Building. A doctor can be paged anywhere throughout the building group by means of illuminated coded numbers which flash on these annunciators.

(c) Doctors' "IN" and "OUT" Register. A Doctors' "IN" and "OUT" Register control is located in the PBX room with a lamp illuminated annunciator installed in the information office. By means of this equipment the information clerk has at all times a visual and ready reference as to whether or not any particular doctor on the staff is in or out of the building. If he is in, he can be immediately brought to the nearest telephone by means of the Doctors' paging annunciator system previously described.

(d) Emergency Lighting. Service for the emergency light-ing system is supplied through a separate transformer in the transformer room of Administration Building. Feeders are provided to emergency lights in the Administration Building and Mess Hall, Corridors and stairways. A separate subfeeder serves for auxiliary supply for the Theater emergency light panel. Separate feeders distribute current from the same switchboard to the emergency light panels in Service Bays 17 and 20 for the wards, where again soparate branch circuits serve emergency lights on each floor of the ward buildings.

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# H-10.05. (d) Continued

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The emergency light transformer is served by a separate underground 2400 volt service supplied by an emergency engine driven generator set located in the Heating Plant of the Naval Hospital group of buildings.

Operating room lights are served by a normal 120 volt lighting circuit and an auxiliary emergency battery lighting system.

(e) Black-out Lights. Black-out lights are located in various corridors and stair walls. Master control of the Hospital Area black-out . lighting originates from the PBX office, where operation of a switch serves to operate relays in the Administration Building control room, which relays in turn, act to open operating coils of various lighting circuit breakers in Service Bays 17 and 20, and Administration Building switchboard groups. The pilot control line serving outside buildings of the area is also de-energized. With lighting breakers open, lighting is cut off, and another relay closes to furnish current to black-out light panels in various units.

(f) X-Ray Suite - Administration Building. A separate 2400 volt underground service supplies a 100 Kva single phase transformer in the Administration Building transformer . room. Through a secondary breaker 120/ 240 volt single phase current is brought to a distribution panel in the X-Ray Suite on the third floor. Separate branch feeders are run to switches in the superficial therapy. fluoroscopic, radiographic rooms 1 and 2, deep therapy and cystoscopic room. Connections and raceways are provided to the control panels and equipment from the room switches.

Polarized single phase 120 volt receptacles are provided in various rooms for possible use of portable equipment. The dark room in the X-Ray Suite has electrical provision for dryers, refrigeration and lighting.

(g) Temperature Control. At the eaves of each ward building and Administration Building outside thermostats are located which are connected to a panel located in the basement of the Administration Building for the control of sectionalizing steam valves in the wards. Influenced by outside weather conditions and relative building exposure, the supply of steam is accordingly regulated by means of thermostats and control panel with the individual electrically operated steam valve.

# H-10.06. Abstracts from the Electrical Service Supply Contract with the Jones-Onslow Electric Membership Corporation .- Schedule "N".

Availability. Available to the United States Navy Department for service to the Marine Training Base near Jacksonville, North Carolina and the Marine Air Base proposed to be constructed on the Neuse River. North Carolina.

Rate. Maximum demand charge:

First 1000 kw of maximum demand p Next 4000 kw of maximum demand per Over 5000 kw of maximum demand pe

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e	r month	Q	\$1.25	per	kw	
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# H-10.06. Continued.

Plus energy charge.

First 150 hours use of maximum demand per month @ \$0.008 per kwh Next 150 hours use of maximum demand per month @ 0.007 per kwh Over 3000 hours use of maximum demand per month @ 0.0065 per kwh

Determination of Maximum Demand. The maximum demand shall be determined by suitable instruments and shall be the highest average rate at which energy is used during any fifteen minute period of the month for which determination is made.

Application of Rate. The above rate shall be applied to the combined meter readings of the several delivery points specified in the attached invitation to bid. .

Power Factor Adjustment. The Navy shall at all times take and use power in such manner that the power factor shall be as near 100 percent as possible, but when the power factor at time of maximum monthly demand is less than eighty-five (85) percent lagging, the billing demand shall be determined by multiplying the maximum demand recorded by the meter during the month by eighty-five (85) percent and dividing the product thus obtained by the power factor at time of maximum monthly demand expressed in percent.

. Meter Readings and Payment of Bills. Seller shall read meters monthly. Electric energy furnished hereunder shall be paid for at the office of Seller in Jacksonville, State of North Carolina, monthly within fifteen (15) days after the bill therefor is mailed to Consumer. If Consumer shall fail to pay such bill within such fifteen (15) day period Seller may discontinue delivery of electric energy hereunder upon fifteen (15) days written notice to Consumer of his intention to do so.

Meter Testing and Billing Adjustments. Seller shall test and calibrate meters by comparison with accurate standards at intervals of twelve (12) months. Seller shall also make special meter tests at any time at Consumer's request. The costs of all tests shall be borne by --Seller, provided, however, that if any special meter test made at Consumer's request shall disclose that the meters are recording accurately, Consumer shall reimburse Seller for the cost of such test. Meters registering not more than two (2) percent above or below normal, shall be deemed to be accurate. The Readings of any meter which shall have been disclosed by test to be inaccurate shall be corrected for the ninety (90) days previous to such tests in accordance with the percentage of inaccuracy found by such tost. If any meter shall fail to register for any period, Consumer and Seller shall agree as to the amount of energy furnished during such period and Seller shall render a bill therefor.

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17x0806-(1) N.S.A. Fund Stores CURRENT ELECTRIC, FOR MARINE BARRACKS, NEW RIVER, N.C. AND MARINE AIR BASE, ON THE NEUSE RIVER, ARAPAHOE OR HAVELOCK, N.C., DURING THE FISCAL YEAR 1942.

# BPS: HEW/ISBI/MAG

Lot No.1, NSA Regin. No. 39 ( 1942).

Current, electric power, for locations and time specified below, account Public Works Dept. Serial #4796-41, dated 5/21/41.

Quan. Item No. Regd. Stock Classification 204 per mo. 1 Services for furnishing electric Power-Rates to be as 3 phase, 60 cycle, 12450/7200 volts at per scheduleN Marine Barracks, New River, North Caroattached. lina, in the vicinity of Jacksonville any quantity up to 3000 KW. Services for furnishing electric POWER-3 phase, 60 cycle, 12450/7200 volts at Marine Air Base on the Neuse River in the vicinity of Arapahoe. N.C., or Havelock. N.C., as may be determined by the PWO. Fifth Naval District - any quantity up to 3000 KW Services for furnishing, beginning July 1. 1941, electric POWER, 3 phase, 60 cycle. 12450/7200 volt at Marine Barracks, New River near Jacksonville, N.C. - any quantity up to 600 KW for construction purposes. Services for furnishing, beginning July 1, 1941, electric POWER, 3 phase, 60 cycle, 12450/7200 volts at Marine Air Base on the Neuse River in the vicinity of Arapahoe, N.C., or Havelock, N.C., as may be determined by the PWO, Fifth Naval District - any quantity up to 600 KW for construction purposes.

It is understood that power under items 1 and 2 will be taken as soon as construction of stations is completed and that adequate notice will be given by the Navy Department if power in excess of the quantities indicated is required. Power under items 1 and 2 shall be provided from a primary generating station consisting of two Diesel plants of approximately 1500 KW steam driven generators situated on the Neuse River in the vicinity of Arapahoe, N.C., or Havelock, N.C., as may be determined by the PWO. Fifth Naval District.

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### MAY 22, 1941.

Total

Lot No. 1. NSA REQN. NO. 39 (1942) - Continued.

It is mutually understood and agreed:

(a) That the agency supplying power under the contract will undertake at its own expense. the immediate construction of the two generating stations above-mentioned, and that the Diesel plant in the vicinity of Jacksonville will be ready for service by September 1, 1941.

(b) That the agency furnishing power under this contract will, at its own expense, provide an adequate tie-in service between the two primary generating stations, and will further arrange, at its own expense for a secondary source of power by tying in the generating station in the vicinity of Jacksonville, N.C., with the high tension lines at Jacksonville, N.C., or Holly Ridge. N.C.

(c) That the agency supplying this power will, by means of portable generating plants of adequate capacity, supply power under items 3 and 4 as required for construction purposes pending the completion of the primary generating stations.

(d) That the agency supplying power under this contract will provide stepdown transformer stations to deliver power to the distribution system to be constructed by the Navy Department; and that power furnished from the primary generating station shall be delivered to the Navy's distribution system at a voltage not varying more than three percent from voltage specified.

Service under this contract shall cover the Marine Barracks. New River. N.C. and the proposed Air Base on the Neuse River when authorized and constructed. Billing shall be made through separate meters at each station and on the basis of the consolidated meter readings.

Above services shall be rendered in a manner satisfactory to the Public Works Officer, Naval Operating Base, Norfolk, Va.

Bills shall be rendered and paid monthly.

- Item 1 Bills for services to be rendered to Quartermaster Dept., Headquarters Marine Corps, Washington, D.C.
- Item 2 Bills for services to be rendered to Officer-in-Charge. Naval Supply Depot. Norfolk. Va.
- Items 3 and 4 Bills for services to be rendered to Resident Officer.

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Cont. NOy-4750, Marine Barracks, New River, North Carolina.



1	Division Headquarters	41,440	-	2,552	43,992	120/208 3Ø
l	Laundry	28,200	-	67,639	95,839	120/240 1Ø Lighting 208 Power 3Ø
1	Post Exchange Gas Station	2,940	3,250	-	6,190	120/240 1Ø
l	Main Gas Station	9,672	3,250	-	12,922	120/240 1ø
5	Theaters	343,600	-	137,385	480,985	120/208 3Ø
1	Brig -	30,945	26,000	29,378	86,323	120/208 3Ø

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		H-11.01. Division Traini	ng, Post Tro	ops, Indust	rial & Supp	ly & Parachu	te Training Areas
	No. Unit	Type Building	Installed Lighting	Installed Heating	Installed Power	Watts Total Load	(Cont'd) Service Voltage
	2	Firshouse	12,900	-	12,230	25,130	120/208 3Ø
	l	Commissary	23,940	-	8,918	32,858	120/208 3Ø
	1	Cold Storage Plant	12,570	- 1	158,378	170,948	120/208 3Ø
	1	Post Headquarters	31,000	-	9,000	40,000	120/208 3Ø 120 1Ø radio
	1	Incinerator :	2,770	- 1	14,600	17,370	120/208 3Ø
ı.	1	Transmitter Building	7,870	-	66,560	74,380	120/240 10 Lighting
296	16	Battalion Headquarters	210,640	-	31,616	242,256	120/208 3Ø
8	5	Regimental Headquarters	78,100	-	31,616	109,716	120/208 3Ø
	1	Bakesy	21,220	-	146,432	167,652	120/240 10 Lighting 240 30 Power

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5	Regimental Service Clubs	180,400	-	25,000	205,400	120/208	3Ø
1	Hostess House	12,728	-	24,856	37,584	120/208	зø
2	Chapels	18,000	15,000	2,656	35,658	120/208	3ø
1	Gate House	12,715	-	-	12,715	120/240	ıø
1	Division Infirmary	97,000	15,000 X-Ray	20,007	132,007	120/208 240	3Ø 1Ø X-Ray
2	Garage and Repair Shop	113,800	-	272,064	385,864	120/208	3Ø

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	H-11.01.	Division Training,	Post Troops.	Industrial & Supply & Deneal	

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	No. Únit	Type Building	Installed Lighting	Installed Heating	Installed Power	Watts Total Load	Service Voltage	(Cont'd
	1	Reclamation Building	13,515	-	72,754	86,269	120/208 30	
e	1	Post Tailor & Cobbler Shop	11,420	-	33,280	44,700	120/208 3Ø	
	1	Liquefied Gas Storage Bldg.	300	-	6,614	6,914	120/240 30	
	1	Parachute Training Building	9,380	1 (a) (i)	12,480	21,860	120/208 30	
	1	Parachute Building	48,615	-	<u> </u>	48,615	120/208 30	
	1	Wallace Creek Boat Basin	2,460	-	-	2,460	120/240 1ø	
229	1	Balloon Storehouse & Shop	5,380	-	-	5,380	120/240 30	
1	1	Storehouse for Post Exchange	€,000	-	-	6,000	120/240 10	
	1	Waller Gunnery Trainer	11,323	-	20,365	31,688	120/208 30	
1	1	Regimental & Supply Area Central Heating Plant	39,220	3,000	893,581	935,801	120/208 3ø	
	1	Parachute Training Area Central Heating Plant	660	-	•	620	120/208 3Ø	
	1	Gas and Oil Storage	6,000	-	24,440	30,440	120/208 3ø	
1	1	Post Theater	255,730	62,400 Prot. Mach.	20,870	339,000	120/208 3Ø	
	3	Parachute Equipment Tower Building	11,760	-	58,152	69,912	120/240 3Ø	
	1	Main Pumping Plant	10,388	-	170,061	180,449	120/208 30	
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H-11.01. Division Training, Post Troops, Industrial & Supply & Parachute Training Areas

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No. Unit	Type Building	Installed Lighting	Installed Heating	Installed Power	Watts Total Load	(Cont'd) Service Voltage
1	Sewage Treatment Plant	11,240	-	10,774	22,014	126/218 3Ø
1	Sewage Pumping Station 1	3,420	-	15,800	19,280	126/218 3Ø
1	Sewage Pumping Station 3	3,420	-	15,800	19,280	120/208 30
7-	Street Lights	-	-	30,000	30,000	6.6 amperes
	Grand	Total			9,323,363	
	H-11.02. Naval Hospital	Area			~	
3	Officers: Quarters	9,765	27,000	-	36,765	120/208 3Ø
. 1	Well Pump House	-	-	4,846	4,846	120/208 3Ø .
l	Admin. Bldg. & Mess Hall	203,210	116,700	153,504	523,414	120/208 30 L & P

	Wanda and Compidance					
	wards and corridors	423,000	-	44,428	467,428	120/208 3Ø
2	Corpsmen Barracks	74,300		3,952	78,252	120/208 3Ø
1	Nurses * Home	58,490	19,600	5,949	63,439	120/208 3Ø
1	Garage	6,420	-	1,976	8,396	120/208 3Ø
1	Family Hospital Nurses: Quarters	7,415	12,000	1,976	21,391	120/208 3ø
1	Laundry	15,630	-	42,085	57,715	120/208 3Ø
l	Warehouse	6,240	-	-	6,240	120/240 1Ø

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	Nursee' House	108 ¹ 680		6*6*8		
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H-11.02. Naval Hospital Area (Continued)

Grand Total

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	No. Unit	Type Building	Installed Lighting	Installed Heating	Installed Power	Watts Total Load	Service
	l	Shop	9,960	- 1	12,750	22,710	120/208 30
	1	Warrant Officers' Quarters	2,705	7,500	-	10,205	120/208 30
		Family Hospital	39,990	7,000	41,888	88,878	120/208 3Ø
	1	Men Servant Quarters	5,660	-	- <u></u>	5,660	120/208 3ø
	1	Women Servant Quarters	7,965	-	-	7,965	120/208 3Ø
2 	1	B. O. Q.	24,490	16,500	14,473	55,463	120/208 30
299	1	Central Heating Plant	4,510	-	20,031	24,541	120/208 3Ø
	1	Sewage Pumping Station No.	2 1,920	-	3,307	5,227	120/208 30
	1	Medical Storehouse	14,490	13,000	2,080	29,570	120/208 3ø
		Street Lights	10,000	-	-	10,000	6.6 amperes

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	Grand To	otal			1,439.227	
	H-11.03. Residential Area					
8	Bachelor Officers' Quarters	173,200	-	21,920	, 195,120	120/208 30
l	B. O. Q. Guest House	3,065	-	1,976	5,041	120/208 3ø
180	Officers! Quarters	583,900	1,620,000	-	2,203,900	120/208 30
1	Well Pump House	-	-	11,440	11,440	120/208 3ø
1	Sewage Pumping Station No. 4 Sewage Pumping Station No. 5	1,920		3,307	5;227	120/208 3ø
	C	400	-	3,952	4,532	120/208 3Ø

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H-11.03. Residential Area (Continued)

No. Unit	Type Building	Installed Lighting	Installed Heating	Installed Power	Watts Total Load	Service Voltage
1	Firehouse	6,450		6,115	12,565	120/208 3ø
1	Officers' Recreation Buildin and B.O.Q. Mess Hall	^{1g} 43,285	178,000	70,523	311,808	120/208 3Ø
1	Men Servant Quarters	6,210	-	2,552	8,762	120/208 3ø
1	Women Servant Quarters	2,670		2,552	5,222	120/208 3ø
	Street Lights	10,000	-	-	10,000	6.6 amperes
	Grand	otal			2,773,437	
	H-11.04. Barrage Balloon H	attalion &	Amphibian B	ase Area		
ł	Barracks	143,760		14,368	158,128	120/208 3Ø
	Mess Hall	30,120	26,000	29,378	85,498	120/208 3Ø
L	Regimental Infirmaries	18,285	-	2,552	20,837	120/208 3Ø
	Post Exchange	14,770	-	6,248	21,018	120/208 3Ø
3	Officers' Quarters	26,040	72,000	-	98,040	120/208 3Ø
5	Well Pump House	-	-	20,384	20,384	120/208 3Ø
Ł	Battalion Warehouses	8,400		-	8,400	120/208 3Ø
	Theater	68,720	- 75	27,477	96,197	120/208 3Ø
	Battalion Headquarters	13,165	-	1,976	15,141	120/208 3Ø

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H-11.04. Barrage Balloon Battalion & Amphibian Base Area (Continued)

- 301 -

No. Unit	Type Building	Installed Lighting	Installed Heating	Installed Power	Watts Watts Load	Service Voltage
l	Barrage Balloon	0.170				
	Administration Building	9,130	-	-	9,130	120/240 1ø
1	Barr. Balloon School Bldg.	13,330	-		13,330	120/240 1ø
1	Barr. Balloon Balloon Bldg.	19,200	-	36,000	55,200	120/240 1Ø Light 240 3Ø Power
1	Barrage Balloon				19 A 19	
	Transportation Building	3,940	-	-	3,940	120/240 1Ø
1	Barr. Balloon Supply and Storage	11,060			11.000	200/010 01
h	3	11,000	-	-	11,060	120/240 1Ø
1	Barrage Balloon Operations					
	Bulluing	3,760	-	-	3,760	120/240 1ø
1	Amphibian Storehouse	25,900	-	-	25,900	120/240 1ø
1	Amphibian Machine Shop	24,400		19,842	44,242	120/240 10 Light
						0 10 10 10 10 10 I

1	Amphibian Carpenter Shop	24,400	-	19,842	44,242	120/240 1Ø Light 240 3Ø Power
1	Central Heating Plant	2,160		6,614	8,774	120/240 1Ø Light 240 3Ø Power
1	Central Heating Plant					
	at School Area	540	-	4,638	5,178	120/240 1Ø Light 240 3Ø Power
1	Sewage Pumping Station	1,760		2,952	4,712	120/208 30

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	Report Band Class Statistics	6*120 				78-AMP 78-1

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No. Unit	Type Building	Installed Lighting	Installed Heating	Installed Power	Watts Total Load	Service Voltage
-	Street Lights	4,600	- 1	-	4,600	120 V
	Grand	Total			757,711	
	Q-11.05. Rifle Range					
4	Barracks	143,760	-	14,368	158,128	120/208 30
1	Mess Hall	30,120	26,000	29,378	85,498	120/208 3Ø ·
4	Battalion Warehouse	8,400		-	8,400	120/208 3Ø
1	Regimental Infirmaries	18,285	-	2,552	20,837	120/208 3ø
1	Post Exchange	14,770	-	6,248	21,018	120/208 30
1 [.]	Bachelor Officers! Quarters	21,650	-	2,740	24,390	120/208 3Ø
5	Officers' Quarters	16,275	45,000		61,275	120/208 30
2	Well Pump House	-	-	16,972	16,972	120/208 30
1	Theater	68,720	-	27,477	96,197	120/208 3Ø
1	Central Heating Plant	2,160	-	6,614	8,774	120/240 1Ø Light 240 3Ø Power
1	Firing Line Shelter	-	-	19,842	19,842	120/240 3ø
4	Range Houses	7,120	-	-	7,120	120/240 1ø
1	Armory & Officers' Bldg.	31,060	-	2,552	33,612	120/208 3Ø

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H-11.04. Barrage Balloon Battalion & Amphibian Base Area (Continued)

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H-11.05.	Rifle	Range	(Continued)
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No. Unit	Type Building	Installed Lighting	Installed Heating	Installed Power	Watts Total Load	Service Voltage
1	Tunnel	1,000		-	1,000	120/240 1ø
	Street Lights	5,000		-	5,000	6.6 amperes
÷	Grand	l Total			568,063	
	H-11.06. Mock Up				a saling and	
1	Well Pump House	-	-	1,331	1,331	120/208 3Ø
	H-11.07. Ponton Bridge					
1	Ponton Bridge	2,560		-	2,560	
	H-11.08. Tent Camp No. 1					
1	Central Heating Plant	2,100	-	5,940	8,040	120/240 1Ø Light 240 3Ø Power
14	Well Houses	•	Ξ.	43,159	43,159	120/208 10 Light

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						120/208 3Ø
2	Mesa Halls	105,610	-11	146,400	252,010	120/240 1Ø Light 240 3Ø Power
34	(SH 9) Warehouses	30,940	- `	-	30,940	120/240 1Ø
6	(SH 13) Warehouses	10,860	-	-	10,860	120/240 1ø
41	Enlisted Men Washrooms	86,305	-	-	86,305	120/240 1ø
3	Officers' Washrooms	15,000	-	-	15,000	120/240 10

H-11.08.	Tent	Camp	No.	1	(Continued)
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No. Unit	Type Building	Installed Lighting	Installed Heating	Installed Power	Watts Total Load	Service Voltage
1	Ice House	640			640	120/240 1ø
2	Open House Warehouse	5,040	-		5,040	120/240 1Ø
l	Hospital	74,405	65,000 14,400 X	(-Ray 3,960	157,765	120/240 1Ø
1	Hospital Admin. Bldg.	8,360	-	-	8,360	120/240 1ø
l	R. 2 Building	27,595	-	7,680	35,275	120/240 1Ø
1	Gas & Oil Storage	-	-	13,640	13,640	120/240 1Ø Light 240 3Ø Power
1	Chapel	10,173	-	-	10,173	120/240 1Ø
1	Water Treatment Plant	230	-	49,280	49,580	120/240 1Ø Light 240 3Ø Power
1	T. C. Incinerator	660	-	-	660	120/240 1Ø
1	Boxing Ring	9,000		-	9,000	120/240 1Ø
l	Traffic Light	400	-	-	400	120/240 1Ø
1504	Tents	225,600	-	-	225,600	120/240 1Ø
	Street Lights	10,000	-	-	10,000	6.6 amperes
	Grand	Total		1	972,377	

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H-11.09.	Tent	Camp	No.	2
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No. Unit		Installed Lighting	Installed Heating	Installed Power	Watts Total Load	Service Voltage
2	Mess Halls	105,610	-	146,400	252,010	120/240 30
1	Officers: Mess Hall	22,200	-	22,996	45,196	120/240 3ø
38	(SH 9) Warehouse	34,580	-	-	34,580	120/240 1ø
5	(SH 13) Warehouse	9,050	-	-	9,050	120/240 1ø
32	Enlisted Men's Washrooms	67,360	-	-	67,360	120/240 1ø
8	Officers: Washrooms	15,000	-	-	15,000	120/240 1ø
1	Recreation Building	27,595	-	7,680	35,275	120/240 1ø
2	Open Shed Warehouse	5,040	-	-	5,040	120/240 1ø
1	Post Exchange	9,968	-	12,740	22,708	120/240 1Ø
1	Hostess House	13,000		15,000	28,000	120/240 1ø
l	Chapel	10,173	-	-	10,173	120/240 1ø
744	Huts	572,880	-	-	572,880	120/240 1Ø
1	Central Heating Plant	2,000	-	5,940	7,940	120/240 3Ø
1	Sewage Pumping Station	7,560	-	18,719	26,279	120/240 1Ø Light 240 3Ø Power
	Street Lights	10,000	-		10,000	6.6 amperes
	Grand	Total			1,127,991	

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H-11.10. Tank Battalion Tent Camp

- 306 -

No. Unit	Type Building	Installed Lighting	Installed Heating	Installed Power	Watts Total Load	Service Voltage
1	Mess Hall	4,080	-	-	4,080	120/240 10 Light
7	Enlisted Men's Washrooms (Huts)	5,390			5,390	120/240 1Ø
l	Officers' Washroom (Hut)	770		-	770	120/240 1ø
2	Open Shed Building	5,040	-	-	5,040	120/240 1ø
1	Well House	-	-	5,060	5,060	120/240 1ø
83	Huts	63,910	-		63,910	120/240 1ø
	Grand T	otal			84,250	
	H-11.11. Peterfield Point	Tent Camp			1	i e e e e
1	Mess Hall	4,080	-		4,080	120/240 1ø
6	Enlisted Men Washrooms (Hut	s) 4,620	-		4,620	120/240 1ø
1	Officers' Washroom (Hut)	770	-	-	770	120/240 1ø
3	Open Shed Warehouse	7,560	-	×	7,560	120/240 1Ø
84	Huts	64,680	-	-	64,680	120/240 1ø
	Grand T	otal			81,710	

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H-11.12. Glider Training Base

No. Unit	Type Building	Installed Lighting	Installed Heating	Installed Power	Watts Total Load	Service Voltage
l	Operation Building	7,430	-	-	7,430	120/240 L & P 240 1Ø Radio
l	Administration Building	12,390	-	-	12,390	120/208 3Ø
1	IItility Shop "A"					
1	Carburetor Test Shop "B"	9,160	42,000	32,166	83,326	120/208 3Ø 120/208 3Ø
l	Nose Hanger "C"	4,200	-	13,085	17,285	120/208 3Ø
1	Utility Shop "D"	5,420	. –	3,500	8,920	120/208 3Ø
	Central Heating Plant	540	-	4,638	5,178	120/208 1Ø Lighting 208 3Ø Power
	Grand	Total			134,529	
	TT 17 Manuface 1 Defect m					

Mumford Point Tent Camp H-11.13.

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		A				
1	Chapel	10,173	•		10,173	120/240 1ø
l	Infirmary	5,460	1,500 2,400 X-F	ay 1,976	11,336	120/240 1Ø
2	(SH 13) Warehouse	3,620	-	-	3,620	120/240 1ø
l	Brig	2,840	-	-	2,840	120/240 1Ø
1	Recreation Building	27,595	-	7,680	35,275	120/240 1ø
1	Mess Hall	22,200	-	22,990	#3,190	240 3Ø Power

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	H-11.13. Mumford Point Te	ent Camp (Con	ntinued)			
No. Unit	Type Building	Installed Lighting	Installed Heating	Installed Power	Watts Total Load	Service Voltage
1	Post Exchange	14,770	-	6,240	21,018	120/240 1Ø Light 240 3Ø Power
7	Enlisted Men's Washrooms	14,735	· -	-	14,735	120/240 1ø
1	Administration Building	7,420		1,976	9,396	120/240 1ø
150	Huts	115,500	-		115,500	120/240 1ø
1	Central Heating Plant	1,960	-	3,307	5,267	120/240 10 Light 240 30 Power
1	Well House	-	-	8,320	8,320	120/208 3ø
	Street Lights	5,000	-	-	5,000	
	Grand	Total			287,676	

H-11.14. Midway Park Residential Area

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700	Housing Units	861,000	6,300,000	- 7	,161,000	120/240 1ø
2	Wells	1. <b>.</b> .	-	44,440	44,440	120/208 3Ø
1	Sewage Pumping Plant	1,930		8,798	10,728	120/208 3Ø
	Street Lights	10,000	-		10,000	6.6 amperes
	Grand Total			7	,226,168	
	H-11.15. C.C. Camp				Sec. C.	
	Gr	and Total			57,600	

SUMMARY OF AREAS tor. ... H-11.15. .1: 11 0 AREA ...... ----Division Training, Post Troops, Industri Supply and Parachute Training Areas 1. States -.... . 0.11 Naval Hospital Area 2. 100 +3 Residential Area 3. Balloon Barrage Battalion and Amphibian 4. Rifle Range 5. Mock-Up 6. Ponton Bridge 7. Tent Camp #1 8. Tent Camp #2 9. 10. Tank Battalion Tent Camp 4 4 36. 0 11. Mumford Point Tent Camp . . C 0 1 --0--12. Glider Training Base in 13. Peterfield Point Tent Camp . . 14. Midway Park Residential Area 15. C.C.C. Camp 1.1.1 16. Hurst Beach 1 . - 309 -

	TOTAL LOAD WATTS
ial &	
	9,323,363
	1,439,227
	2,773,437
Base Area	757,711
	568,063
	1,331
	2,560
	972,377
	1,127,991
	84,250
	287,676
	134,529
	81,710
	7,226,168
	57,600
	19,386

GRAND TOTAL

24,857,379.

CHAPTER I - PART II

### PLUMBING

### CONTENTS

Section	
I-1	Drainage and V
I-2	Water Services
I-3	Fire Protection
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### I-1 Drainage and Vent Systems:

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I-1.01 The soil, waste and vent systems were generally designed in accordance with the U. S. Department of Commerce, National Bureau of Standards, Plumbing Manual Report No. BMS-66, dated November 22, 1940, issued by the Government Printing Office of Washington, D. C. The soil, waste and vent piping was specified to be extra heavy cast iron, the minimum size to be two inches. Where structural or architectural restrictions made the use of two inch cast iron pipe impossible, galvanized steel pipe was used, as authorized by the representative of the Officer in Charge to meet these special conditions.

I-1.02 The size of the soil, waste and vent pipes were estimated from the capacity data as tabulated in the Flumbing Manual Report with special reference to Tables 803, 805 and 807.

# I-2 Water Services:

I-2.01 Building water mains were specified to extend five (5) feet outside of the building for connection to the building service. Mains below ground were specified to be A.W.W.A. cast iron bell and spigot water pipe, terminating at or within the building with a flanged "T" in order to provide separate connections for the fire protection system and the domestic or process water systems, respectively.

The entire supply is controlled by one main gate value on the inlet side of the "T". A hose bib connection is provided so that the entire piping system can be drained.

### Title

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### I-3 Fire Protection Systems:

I-3.01 The fire protection systems specified for the interior of buildings provide fire hose racks equipped with standard 1-1/2" fire hose and nozzles. This equipment complies with Federal Specification WW-P-541a, which is classified and described by the National Bureau of Fire Underwriters as "First Aid Fire Protection", providing means for retarding a fire until the fire department reaches the building.

The water service pipes and building mains for the large warehouses and similar buildings that should be equipped with sprinkler systems, were made sufficiently large and provided with capped branches for the future installation of these fire protective systems.

Prior to the restrictions placed upon the use of strategic materials by the Bureau of Yards and Docks, the fire line piping was specified to be of galvanized steel. After these restrictions were issued, certain buildings for which pipe had not already been bought, were specified to be black genuine wrought iron if available or black steel if wrought iron was not available.

# I-4 Hot and Cold Water Piping:

I-4.01 The sizing of water piping for the various buildings was determined by deducting from the available pressure at the service entrance the friction losses resulting from the designed flows, so that a minimum pressure of 10 pounds per square inch would be available at the highest fixtures equipped with flush valves and five pounds per square inch for fixtures not equipped with flush valves.

I-4.02 The water pressure available for pipe friction losses was computed by means of equation:

$$\frac{P - (L + H)}{E \times .01} = F$$

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- P = The available pressure at the service entrance in pounds per square inch
- L = The desired pressure at the highest fixture in pounds por squaro inch
- H = The static head pressure required to lift water from the service entrance to the highest fixture in pounds
- E = The equilavent length of developed pipe in lineal feet from service entrance to the highest fixture with
  - allowance for fittings.
- F = The allowable friction loss per one hundred feet of pipe in pounds per square inch.

Allowable friction losses, thus computed, were used as a basis for

per square inch. (This was obtained from the difference in elevation in feet divided by 2.31).

selecting pipes of proper size for a given number of fixtures.

Interior systems with risers to high fixtures at different elevations were computed and sized separately.

I-4.03. The following table was used to estimate the maximum flow of water:

# TABLE "A"

# APPROXIMATE MAXIMUM WATER FLOW FROM FIXTURES IN GALLONS PER MINUTE

when children and the second and the description of the second state and the

Fixture	Cold Water
Water Closets, Flush Valve	25
Water Closets, Flush Tank	5
Urimals, Flush Valve	15
Trough Urinals, Perforated Pipe	5
Lavatories	1-1/2
Showers, Small Heads	1-1/2
Showers, Large Heads	3
Bath Tubs	3
Slop Sinks	3
Electric Water Coolers	1/2
Laundry Trays	3
Kitchen Sinks	3
Galley Sinks	4
Pot Sinks	5
Dish Washers	5
Wall Hydrants and Hose Bibs	5
Other Equipment	Actual Requir

The probable flow in the branches and mains serving a number of fixtures was computed from the percentage as tabulated below applied to the maximum flow obtained by means of "Table A";

# TABLE "B"

# PROBABLE PERCENTAGE OF MAXIMUM FLOW

Number of	System Predominantly	Sys	tem Predominantly
Fixtures	For Flush Valves		For Flush Tanks
1	100 percent		100 percent
2	100		100
3	80		90
4	70		82
5	63		76
6	56		72
7	50		68
8	46		65

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Hot	Wator
	0
	0
	0
	0
	1-1/2
	1-1/2
	3
	3
	3
	0
	3
	3
	4
	5
	5
	0

oments

TABLE "B" (CONT'D)	)
Number of	System Predominantly
Fixtures	For Flush Valves
9	43
10	40
12	36
15	31
20	26
25	22
30	20
35	18
40	16-1/2
45	15 '
50	14
55	13
60	12-1/2
70	11
80	10
90	10
100	9
120	8
150	7
200	e

I-4.04. The probable flow computed for each main or branch together with the allowable friction loss, by reference to the flow charts (Figure 7 for Copper Pipe or Figure 8 for Steel Pipe) on pages 36 and 37 of the Flumbing Manual BMS-66 determined the size of pipe required.

Where steel pipe was contemplated minimum size of 3/4" for 1 to 3 small fixtures, 1-1/4" for one flush valve and 1-1/2" for two flush valves were arbitrarily specified due to the unpredictable amount of incrustation to be expected in the pipe over a period of years.

I-4.05. Pressure reducing valves for the purpose of maintaining constant pressure on the domestic systems have been given careful consideration where the service pressure was materially in excess of the actual requirement for a given building and also to minimize flow variations and fluctuations in hot and cold water.

As a result of our studies, it appeared that good practical results could be secured, generally, without the use of reducing valves and that this equipment should be limited to those activities in which close regulation of pressure is required for the proper operation of mechanical equipment and special appliances.

Pressure regulating values are specified for installation at the main laundry and various buildings within the hospital group.

System	Predor	minantly
For	Flush	Tanks
	63	
+	61	
	58	
	55	
	50	
	45	
	41	
	38	
	35	
	32-1	/2
	31	
	29	
	27-1	/2
	25	
	23	
	21-1	/2
	20	
	18-1	/2
	16	
# I-5 Hot Water Storage Tanks and Generators:

I-5.01. The requirements for various types of fixtures in different buildings using hot water were taken from the following table:

#### TABLE "C"

# HOURLY DEMAND FOR HOT WATER IN GALLONS FOR VARIOUS FIXTURES

		<u>B. O. Q.</u>								
	Primto	Barracks	Garage	Hospital	Laundry	Residence	Mess Hall	Post Theater		
	Lavatories	3	3	2	3	3	-	-		
	Public Lavatories	10	12	6	20	-	8	10		
	Slop Sinks	15	-	20	20	-	15	15		
	Bath Tubs	30	-	20	-	15	-	-		
	lst. Shower	100	100	100	100	100	100	100		
	Additional Showers each	30	30	30	30	30	30	30		
	Kitchen Sink	-	•	20	-	10	30	-		
	Pantry Sink Utility		-	10		-	20	-		
	Wash Rack Pot Sinks	-	50	-	-	-	- 40	-		
							10	-		

1/2 gallon per hour per person to be served Dish Washer

The requirements for hot water heating and storage capacity were determined from the following table:

### TABLE "D"

## HOURLY HEATING CAPACITY AND STORAGE CAPACITY IN PERCENT OF TOTAL HOURLY DEMAND

	B. O. Q. And Barracks	Garage	Hospital	Laundry	Residence	Mess Hall	Post
Heating Dapacity Storage	75%	80%	35%	100%	50%	100%	75%
Capacity	50%	60%	75%	30%	100%	100%	50%

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I-5.02 After obtaining the total hourly demand the storage capacity percentage was applied to determine the size of the storage tank. In some instances due to physical restrictions or other influencing factors these percentages were modified. The coil heating capacity was calculated from the percentage factor shown above. Generally the hot water temperature rise was based on 50 degrees F. inlet water raised 100 to 150 degrees F and the coil sizes were selected from manufacturers heating rate tables for the steam pressure available to the coil. The steam pressure was ordinarily to be at 50 pounds per square inch except where low pressure boilers were to be installed.

Heating coil chambers were specified to have 1/2" vacuum breakers and all storage tanks were specified to be equipped with pressure relief valves, temperature relief valves, blow-off and drain valves and thermometers.

The steam supply to the heating coils specified to be controlled from a suitable regulating value to automatically maintain a constant storage water temperature. It was contemplated that these values would be adjusted to maintain 150 degrees F. storage water in all buildings without galleys and 180 degrees F. in buildings with galleys.

A number of the hot water storage tanks were provided with economizer coils to reduce the temperature of condensate from the high pressure steam traps. These coils and the piping arrangement are discussed more fully in Section G-1 paragraph 1.02 of this report.

### I-6. Hot Water Circulating Pump:

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I-6.01 Buildings in which long lines of hot water pipe occured and the probable usage warranted it, hot water circulating pumps were specified and shown on the drawings. The capacity of these pumps was generally determined by allowing one gallon per minute for each 20 fixtures which used hot water, except for buildings having an extremely long run such as the Post Theater, the actual heat loss in the line was caculated and the capacity determined to limit the temperature drop in the hot water circuit to within 10 degrees F.

These pumps were specified to be controlled by immersion aquastats installed in the hot water return circulating pipe together with a thermometer to check the setting of the aquastats at 140 degrees F.

### I-7 Plumbing Fixtures:

I-7.01 The plumbing fixtures were specified by reference to figure numbers in Federal Specifications WW-P-541a and WW-P-542 except where the required fixtures were not included in these publications. These instances, such as the Dispensary, Hospitals and Infirmaries, the manufacturers figure numbers were used with the following qualifying paragraph:

"The fixtures and trim designated by various manufacturer's names and figure numbers are mentioned only to indicate the style and quality of the materials desired and it is not intended to limit bidders to the manufacturers mentioned. Materials of other manufacturers which are similar in design and equal in quality will be acceptable".

#### I-8 Materials:

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I-8.01 Materials were specified to be in accordance with Navy and Federal Specifications and a list of these material specifications applicable to the requirements of each building was included as a part of the plumbing specifications.

The plumbing specifications as the progress of the work permitted, were modified to comply with the Directive for War-time Construction as promulgated by the War & Navy Departments and the War Production Board; and also, the Navy Department Circular Letters pertaining to the use of critical construction materials as they were issued.

#### I-9 Symbols:

I-9.01 Symbols for the various pipe and fixture designations are included in a legend which appears on the drawings. A standard "Plumbing Symbols" legend is included herewith in Figure I-9.02.

#### I-10 Drawings and Specifications:

I-10.01 Chapters Q and R of this report include complete lists of the drawings and specifications and reference thereto will furnish complete information as to the fixtures and materials specified and the method of installation of the plumbing systems.

KEY TO	PLUN
AW	AW
(HWC)	
IW	WI
IWR	IWI
FV	FV
Dw	DW
G	
A	A-
V	
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ID	-ID-
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Clean-out	
Medicine	Cabinet
Leader	
Roof Dra	in
Gas Outl	et
Hose Bib	b
Drinking	Fountair
Slop Sinl	د
Brade down	with arro
Electric Wa	ter Cook
	Martin Alter States and Alter
Drum Tra	p
Drum Tra Shower	p
	KEY TO AW- AW- AW- (HWC)

ABING SYMBOLS. Waste or Soil (Cast Iron). - Vitrified Terra Cotta. -Acid Waste. -Vent. Cold Water. -Hot Water. H.W. Return (Circulating) Chilled Water Chilled Water Return. Flush Valve Riser Distilled Water Gas Air - Vacuum Globe Valve (Control) Check Valve. Gate Valve (Shut-Off) Sprinkler (Standpipe) -- Refrigerant Liquid Line +- Refrigerant Return Line -Fire Line -Indirect Waste nt LT & Laundry Tray DP O Deck Plate RT-U- Running Trap FD & Floor Drain Ac.D - Access Door AD & Area Drain P.R.V. & Pressure Reducing Valve FT-S- Strainer on Fish Trap. FAL Fresh Air Inlet w S&W- Stop & Waste Valve TL. S- Lavatory W.C. D Water Closet UR.Q- Urinal (Wall) CARR AND J.E. GREINER COMPANY

ARCHITECT ~ ENGINEERS.

