3

# COMPLETION REPORT

## COVERING THE DESIGN OF

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

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
G. W. CARR, ARCHITECT
DURHAM, NORTH CAROLINA

ENGINEERS
J. E. GREINER COMPANY
BALTIMORE, MARYLAND

VOL. II

COPY № 24

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VOL. II

COPY No. 24

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# CHAPTER J PART II

# CENTRAL HEATING PLANTS

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### Division Training Area Central Heating Plant

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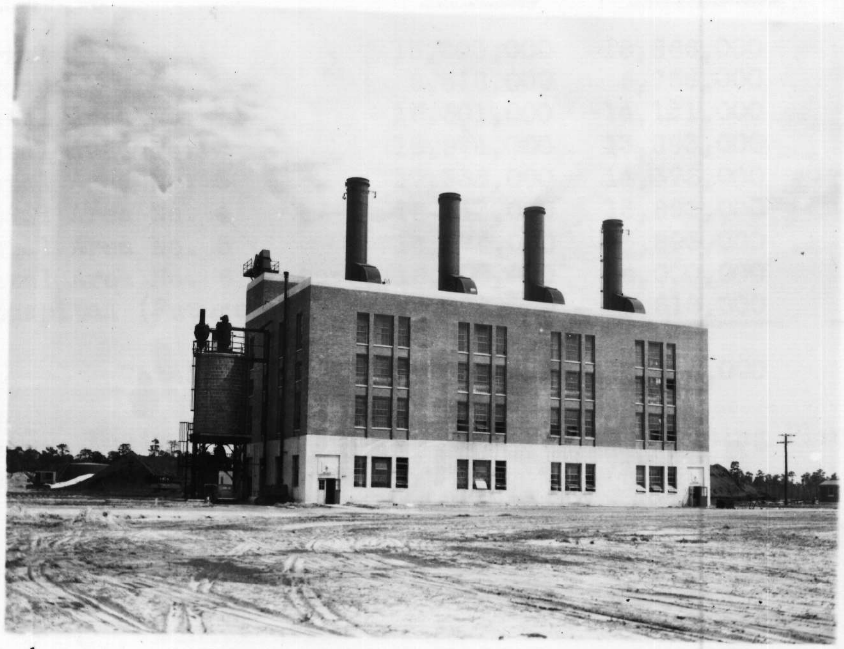


CENTRAL HEATING PLANT - DIVISION TRAINING AREA

J-1. Design and Performance Data.

J-1.01. Purpose of Central Heating Plant. The purpose of the Central Heating Plant is to furnish the steam required for process, hot water and heating in the various buildings in the Industrial, Post Troops and Regimental Areas and, eventually, the Naval Hospital.

J-1.02. Total Connected Load. A tabulation of the total heat requirements in B.T.U's per hour to the various areas is as follows:

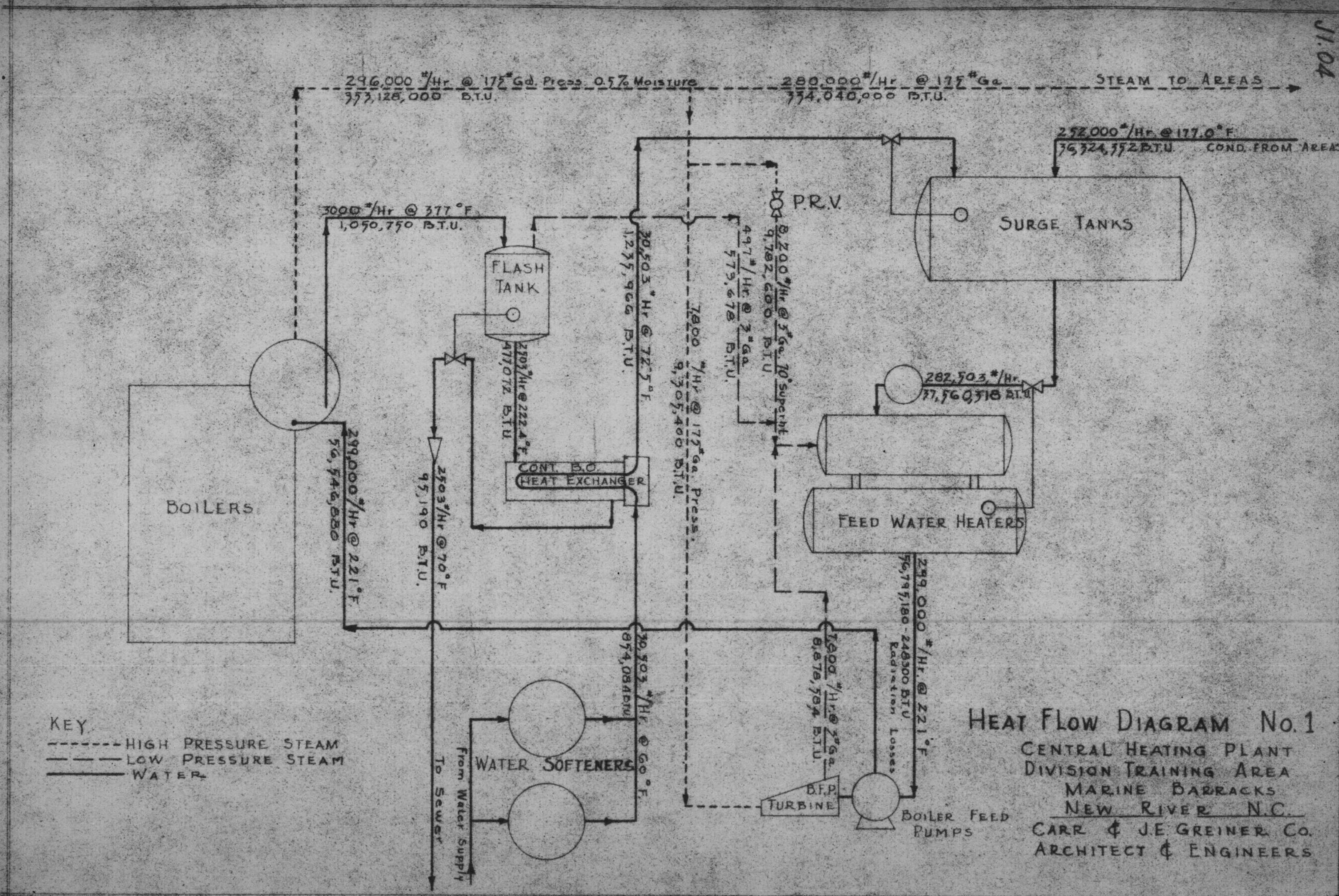
| Area | Heating | Hot Water | Process |
|---|---|---|---|
| Industrial | 15,203,000 | 18,866,000 | 10,358,000 |
| Post Troops | 8,618,000 | 6,756,000 | 2,994,000 |
| Regimental Area No. 1 | 16,501,000 | 14,121,000 | 8,140,000 |
| Regimental Area No. 2 | 15,974,000 | 13,893,000 | 8,140,000 |
| Regimental Area No. 3 | 17,338,000 | 14,376,000 | 8,250,000 |
| Regimental Area No. 4 | 16,312,000 | 13,893,000 | 8,140,000 |
| Regimental Area No. 5 | 15,974,000 | 13,893,000 | 8,140,000 |
| Regimental Area No. 6 (Future) | 16,000,000 | 14,000,000 | 8,140,000 |
| Naval Hospital (Future) | 23,878,000 | 8,818,000 | 8,976,000 |
| Total: | 145,798,000 | 118,616,000 | 71,278,000 |

J-1.03. Maximum Steam Demand. The Central Heating Plant maximum steam demand is estimated to be:

| | | |
|---|---|---|
| Heating | 132,785 | pounds per hour |
| Hot Water | 83,080 | " " " |
| Process | 48,065 | " " " |
| Distribution Losses | 16,070 | " " " |
| Boiler House Auxiliaries & Feedwater Heating | 15,800 | " " " |
| Total: | 295,800 | pounds per hour |

J-1.04. Heat Flow Diagram No. 1 indicates the heat distribution in the Central Heating Plant when operating at the estimated maximum steam demand condition.

J-1.05. Present Steam Demand. A separate heating plant was constructed for the Naval Hospital Area which was built primarily for stand-by purposes, but which, is now being used to supply steam for this area. At this writing, the 6th Regimental Area has not been built; therefore, deducting the estimated heating, hot water and process steam requirements for the Naval Hospital and the 6th Regimental Area from the original design figures, we have the following Central Heating Plant estimated maximum steam demand requirements, which are based on the present actual conditions:


J1.04
296,000 #/Hr @ 175 # Ga. Press. 0.5% Moisture
353,128,000 B.T.U.
280,000 #/Hr @ 175 # Ga.
334,040,000 B.T.U.
STEAM TO AREAS
252,000 #/Hr. @ 177.0° F
36,324,352 B.T.U.
COND. FROM AREAS
P.R.V.
SURGE TANKS
3000 #/Hr @ 377 °F
1,050,750 B.T.U.
FLASH TANK
20,503 #/Hr @ 72.5° F
1,235,966 B.T.U.
8,200 #/Hr @ 5# Ga. 70° Superht.
9,782,600 B.T.U.
497 #/Hr @ 3# Ga.
579,678 B.T.U.
7800 #/Hr @ 175# Ga. Press.
9,305,400 B.T.U.
2703 #/Hr @ 222.4° F
417,072 B.T.U.
282,503 #/Hr.
37,560,318 B.T.U.
BOILERS
299,000 #/Hr @ 221° F
56,546,880 B.T.U.
2703 #/Hr @ 70° F
95,190 B.T.U.
CONT. B.O.
HEAT EXCHANGER
FEED WATER HEATERS
299,000 #/Hr. @ 221° F
56,795,180 - 248300 B.T.U.
Radiation Losses
20,503 #/Hr @ 60° F
874,084 B.T.U.
7800 #/Hr @ 2# Ga.
8,878,784 B.T.U.
WATER SOFTENERS
From Water Supply
To Sewer
B.F.P.
TURBINE
BOILER FEED PUMPS
KEY
HIGH PRESSURE STEAM
LOW PRESSURE STEAM
WATER
HEAT FLOW DIAGRAM No. 1
CENTRAL HEATING PLANT
DIVISION TRAINING AREA
MARINE BARRACKS
NEW RIVER N.C.
CARR & J.E. GREINER CO.
ARCHITECT & ENGINEERS

| | |
|---|---|
| Heating | 97,659 pounds per hour |
| Hot Water | 65,677 pounds per hour |
| Process Heating | 32,841 pounds per hour |
| Distribution Losses | 13,823 pounds per hour |
| Boiler House Auxiliaries and Feedwater Heating | 12,800 pounds per hour |
| Total: | 222,800 pounds per hour |

J-1.06 Heat Flow Diagram No. 2 indicates the steam distribution in the central heating plant when operating at the present estimated maximum steam demand condition.

J-1.07 Selection of Equipment. The number and size of boilers, operating steam pressure, combustion equipment, method of handling coal and ash, and boiler house auxiliary equipment was selected to give continuity of service, long life, flexibility, and economy in operation, determined by studies of the steam load requirements of the various areas, pressure drop through the steam distribution system, types and grade of fuel that would be available for use in the plant.

Note: For heating, hot water and process steam requirements of the various buildings and pressure drop in steam distribution system, see Chapter G of this report.

A study was made of the source of water supply and the chemical impurities contained therin; to determine the most suitable method of treatment for boiler feedwater use.

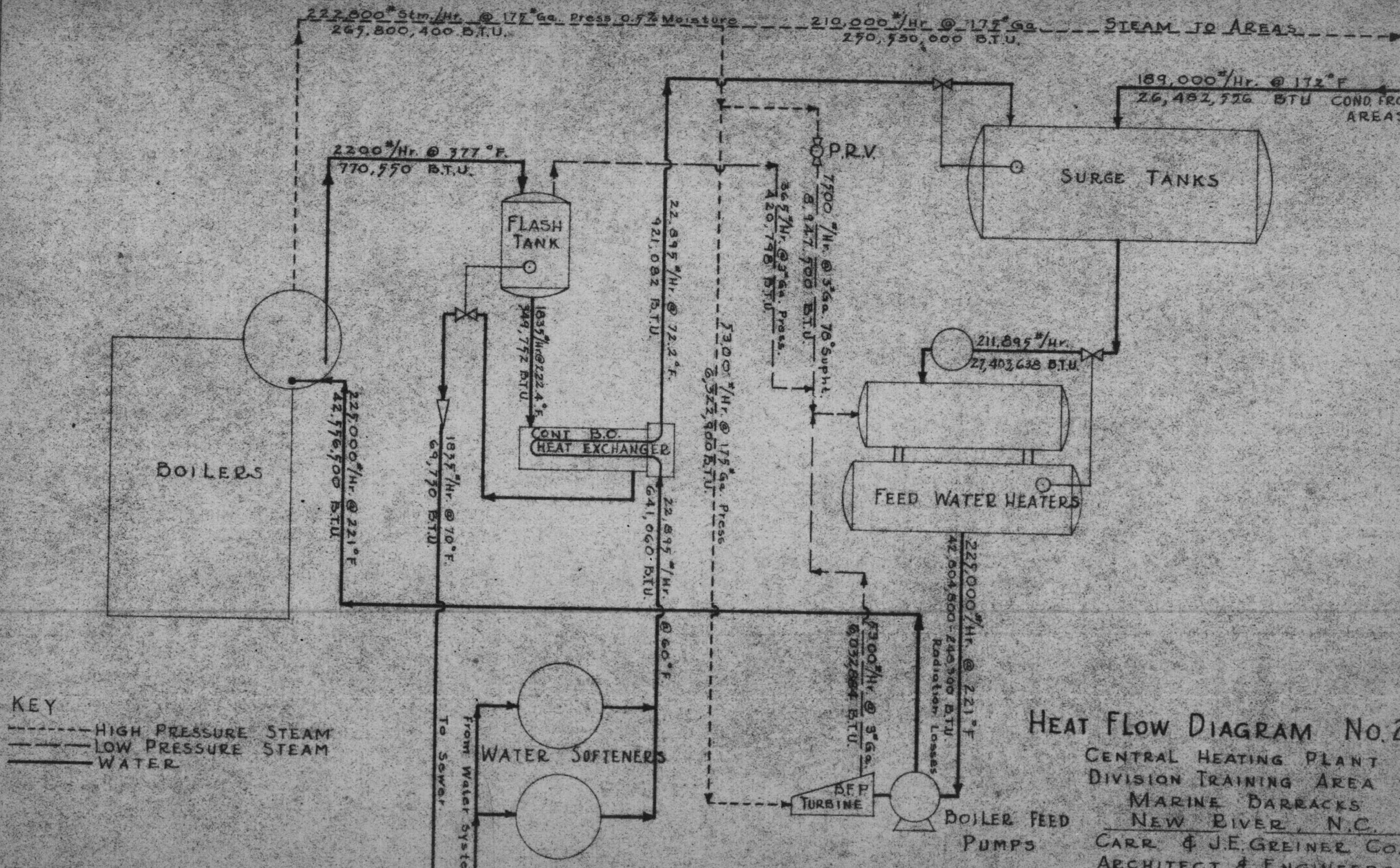
Note: See "Report on Feedwater Treatment for Various Heating Plants at U. S. Marine Barracks", written by Sheppard T. Powell. A copy of this report is in the files of the Public Works Office.

J-1.08 Provision for Future Expansion. The design layout of the building and equipment is arranged to permit additional boilers to be installed at a future date by extending the building on the west end, extending the coal bunkers, coal and ash handling equipment.

Space has been provided in the building for the future installation of a 1000 K.W. turbo generator to supply electricity for the motor driven auxiliary equipment. This turbo generator set will be operated at 3 pounds back pressure. All of the exhaust steam will be used for feedwater heating and heating hot water for the Laundry.

The turbo generator set was not installed at this time on account of the war-time restrictions placed on the procurement of this type of equipment. The Engineers recommend a turbo generator set be installed at some future date since it will make a better heat balance in the boiler plant, heat all of the hot water for the laundry that is now heated by live steam, and furnish uninterrupted power to the boiler house auxiliaries, preventing the shutdown of the plant due to the numerous power failure which now occur.

J1.06




# HEAT FLOW DIAGRAM No. 2

CENTRAL HEATING PLANT
DIVISION TRAINING AREA
MARINE BARRACKS
NEW RIVER, N.C.

CARR & J.E. GREINER CO.
ARCHITECT & ENGINEERS

J-1.09. Boiler Performance Data. The expected performance data for steam generating unit operating under different load conditions, is given in the following tabulation. The performance data is based on a 150-pound per square inch gauge steam pressure with the temperature of a feedwater at 218 degrees F. and pulverized fuel from bituminous coal of the following analysis:

| | | |
|---|---|---|
| Moisture | 2 per cent | |
| Volatile Matter | 17 " " | dry basis |
| Fixed Carbon | 78 " " | " " |
| Ash | 5 " " | " " |
| Heat Content | 14,900 b.t.u's per pound dry basis | |
| Fusion Temperature Ash | 2500 degrees F. | |

PERFORMANCE DATA - ONE STEAM GENERATING UNIT

| | | | | |
|---|---|---|---|---|
| 1. Pounds of steam per hour act. evaporation | 50,000 | 75,000 | 100,000 | 120,000 |
| 2. Thousand b.t.u. in steam above F.W. temperature | 50,475 | 75,712 | 100,950 | 121,000 |
| 3. Developed boiler H.P. | 1,500 | 2,250 | 3,000 | 3,600 |
| 4. Temperature of gases leaving furnace degrees F. | - | - | 1,980 | 2,090 |
| 5. $CO_2$ in boiler exit gases per cent | 14.5 | 15.0 | 15.0 | 15.0 |
| 6. Temperature of boiler exit gases degrees F. | 465 | 515 | 570 | 615 |
| 7. $CO_2$ in airheater exit gases per cent | 14.5 | 14.5 | 14.5 | 14.5 |
| 8. Temperature of airheater exit gases degrees F. | 275 | 280 | 320 | 355 |
| 9. Temperature of air entering air-heater (room temp.) degrees F. | 80 | 80 | 80 | 80 |
| 10. Temperature of air leaving air-heater degrees F. | 335 | 395 | 415 | 430 |
| 11. Draft loss through boiler (inches water gauge) | .24 | .53 | .95 | 1.40 |
| 12. Draft loss through airheater (in. water gauge) | .66 | 1.47 | 2.65 | 3.70 |
| 13. Furnace draft (in. water gauge) | .10 | .10 | .10 | .10 |
| 14. Total static suction of air heater gas exit (in. water gauge) | 1.00 | 2.10 | 3.70 | 5.20 |
| 15. Air pressure drop through air heater (in. water gauge) | .70 | 1.40 | 2.70 | 3.90 |
| 16. Air pressure drop through ducts & dampers (in. water gauge) | .20 | .30 | .30 | .40 |
| 17. Air pressure in burner boxes (in. water gauge) | .60 | 1.70 | 3.00 | 3.50 |
| 18. Total static pressure at forced draft fan (in. water gauge) | 1.50 | 3.40 | 6.00 | 7.60 |
| 19. Number of pulverizers in operation | 1 | 1 | 2 | 2 |
| 20. Pounds of fuel per hour | 3,880 | 3,813 | 7,840 | 9,530 |
| 21. Pounds of air per hour | 52,300 | 78,500 | 106,000 | 129,000 |

| | | | | |
|---|---|---|---|---|
| 22. Pounds of gas per hour leaving airheater | 56,000 | 86,500 | 117,000 | 142,000 |
| 23. Overall efficiency complete unit - percent | 89.0 | 89.2 | 89.2 | 86.8 |
| 24. Heat release in furnace B.T.U. per cu. ft. per hr. (not including airheater recovery) | 11,300 | 17,000 | 22,900 | 27,800 |

## HEAT BALANCE

| | | | | |
|---|---|---|---|---|
| 1. Dry flue gas loss at airheater exit - percent | 4.68 | 4.80 | 5.79 | 6.65 |
| 2. Loss due to hydrogen at airheater exit | 2.95 | 2.96 | 3.00 | 3.04 |
| 3. Loss due to mositure in fuel at airheater exit | .15 | .15 | .15 | .17 |
| 4. Loss due to radiation | 1.32 | .89 | .65 | .54 |
| 5. Loss due to unburned combustibles | .40 | .50 | .70 | 1.30 |
| 6. Unaccounted for and leeway | - | 1.50 | 1.50 | 1.50 |
| 7. Total losses | 11.00 | 10.80 | 11.80 | 13.20 |
| 8. Efficiencies of complete unit percent | 89.00 | 89.20 | 88.20 | 86.80 |

J-1.10. <u>Forced and Induced Draft Fan Performance Data</u>. The tabulation in paragraph J-1.13 gives the expected performance of the forced and induced draft fans under various boiler loads.

J-1.11. <u>Electric Power Requirements of Boiler Auxiliaries</u>. The graph in paragraph J-1.14 shows the kilowatt imput requirements for the motors on the forced draft fan, induced draft fan and one pulverizer when operating at various boiler loads.

J-1.12. <u>Steam Requirements of Boiler Feed Pump Turbines</u>. The curves in paragraph J-1.15 show the steam consumption of the boiler feed pump turbine with brake horsepower and efficiency of the pump when operating at various capacities and total head.

# FAN PERFORMANCE DATA

## Forced Draft Fan

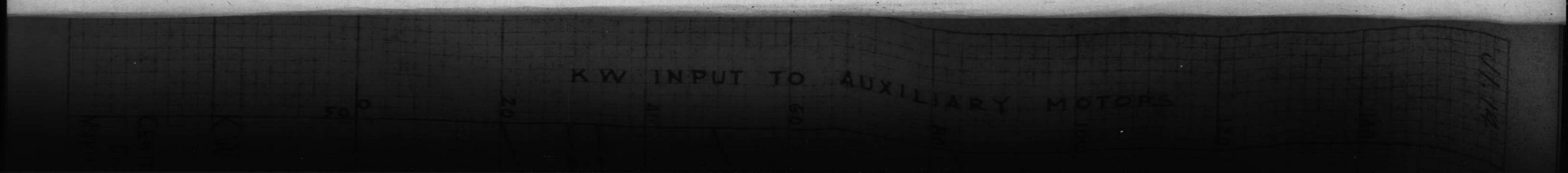
| | | | | | |
|---|---|---|---|---|---|
| | | | | | + 25% on Volume |
| Pounds of steam per hour | 50,000 | 75,000 | 100,000 | 120,000 | Max. + 25% on static |
| Pounds of air per hour | 52,000 | 78,500 | 106,000 | 129,000 | 148,000 |
| Cubic Feet per minute | 11,300 | 17,800 | 24,000 | 29,200 | 33,500 |
| Air temperature °F. | 80 | 80 | 80 | 80 | 80 |
| Static pressure at fan outlet (W.G.) | 1.5 | 3.4 | 6.0 | 7.6 | 9.6 |
| Fan R. P. M. | | 1770 R.P.M. Constant Speed | | | |
| H.P. imput to fan shaft | 35 | 38 | 47 | - | 69 |

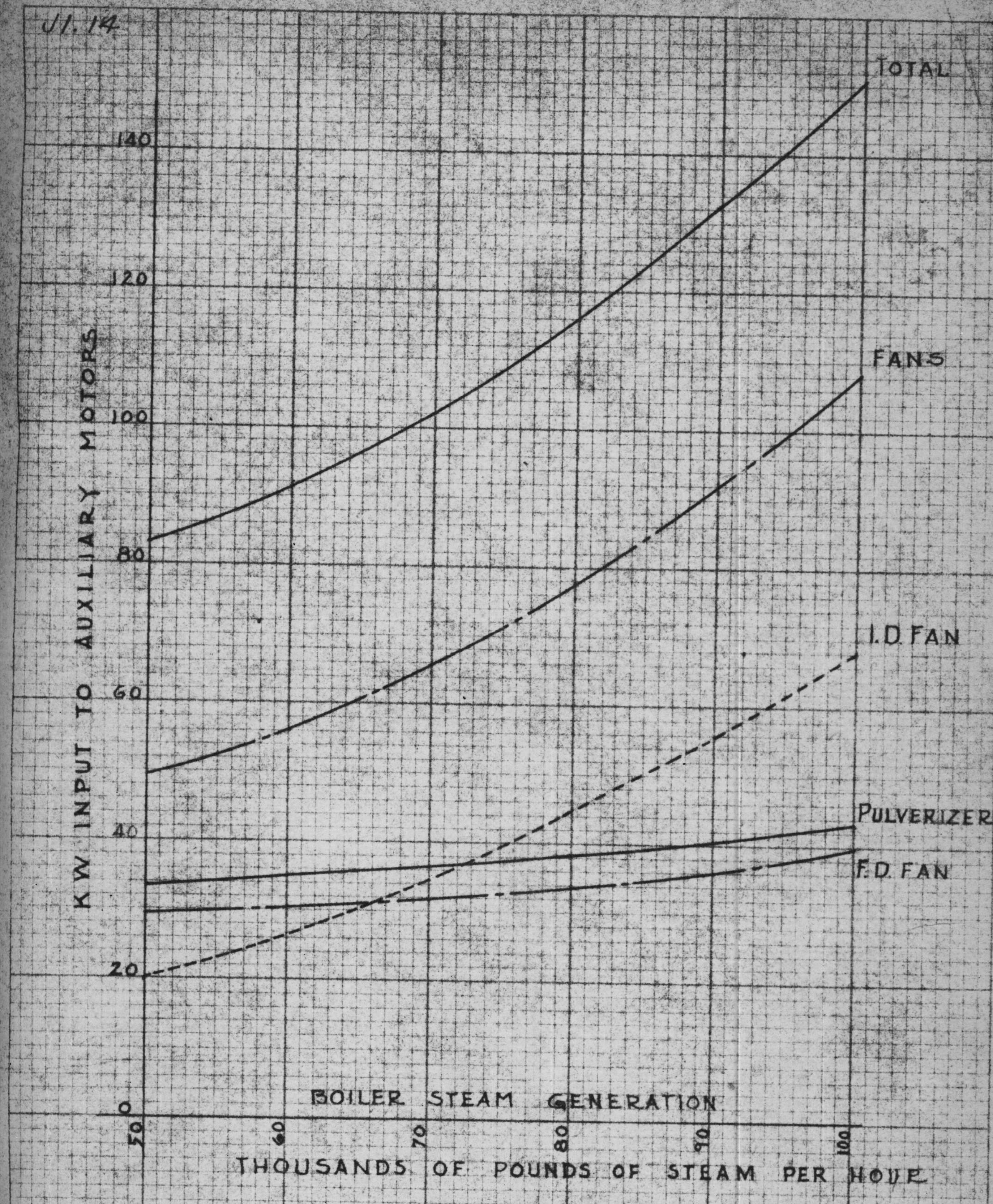
Clarage Fan Company #2-1/2 Type W Fan DWDI with inlet vane control and outlet damper. Fan driven by 75 H.P. 1800 R.P.M. constant speed motor.

## Induced Draft Fan

| | | | | | |
|---|---|---|---|---|---|
| Pounds of steam per hour | 50,000 | 75,000 | 100,000 | 120,000 | |
| Pounds of gas per hour | 56,000 | 86,500 | 117,000 | 142,000 | 161,000 |
| Gas temperature °F. | 275 | 280 | 320 | 355 | 425 |
| Cubic ft. per minute | 16,700 | 26,000 | 37,000 | - | 57,800 |
| Static suction at heater exit | 1.00 | 2.10 | 3.70 | 5.20 | - |
| Loss through dust collector | .50 | 1.15 | 2.20 | - | - |
| Loss through ducts and dampers | .30 | .55 | 1.20 | - | - |
| Static suction at fan inlet | 1.80 | 3.80 | 7.10 | - | 11.3 |
| Fan R.P.M. | 415 | 600 | 850 | - | 1140 |
| H.P. imput to fan shaft | 6.9 | 22.2 | 59.0 | - | 144.0 |
| H.P. imput to hydraulic coupling | 19.6 | 43.5 | 81.5 | - | 150.0 |

Clarage Fan Company #11 Type RT Fan DWDl, with rectangular inlet boxes and outlet damper. Fan driven by 150 H.P., 1200 R.P.M. constant speed motor through an American Blower #24 scoop control hydraulic coupling.


KW INPUT TO AUXILIARY MOTORS




K.W. INPUT LOAD CURVES TO PULVERIZER AND FAN MOTORS

CENTRAL HEATING PLANT
DIVISION TRAINING AREA
MARINE BARRACKS - NEW RIVER, N.C.

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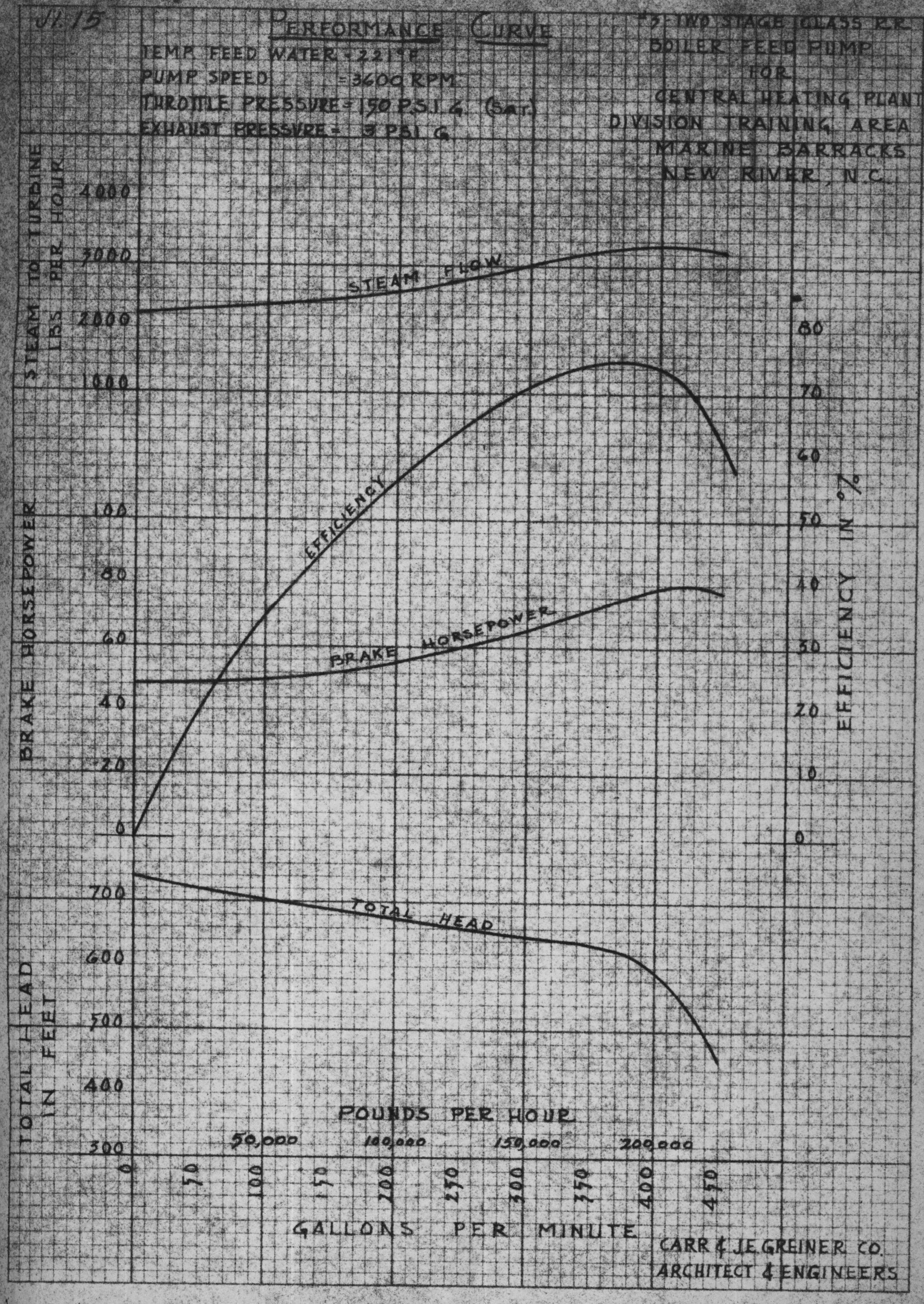


J.1.15
PERFORMANCE CURVE
TEMP. FEED WATER = 221°F
PUMP SPEED = 3600 RPM
THROTTLE PRESSURE = 150 P.S.I.G. (Sat.)
EXHAUST PRESSURE = 3 P.S.I.G.
#3 TWO STAGE CLASS R.R. BOILER FEED PUMP
FOR
CENTRAL HEATING PLANT
DIVISION TRAINING AREA
MARINE BARRACKS
NEW RIVER, N.C.
STEAM TO TURBINE LBS PER HOUR
4000
3000
2000
1000
STEAM FLOW
EFFICIENCY
BRAKE HORSEPOWER
100
80
60
40
20
0
80
70
60
50
40
30
20
10
0
EFFICIENCY IN %
TOTAL HEAD
TOTAL HEAD IN FEET
700
600
500
400
300
POUNDS PER HOUR
50,000
100,000
150,000
200,000
0
50
100
150
200
250
300
350
400
450
GALLONS PER MINUTE
CARR & J.E. GREINER CO.
ARCHITECT & ENGINEERS

J-2. Estimated Fuel Requirements.

J-2.01. Estimated Fuel Requirements: The annual fuel requirements have been estimated and approximately on a monthly consumption schedule as tabulated in paragraph J-2.10. The overall efficiency is estimated to be 70 per cent average with oil having a heating value of 6,300,000 B.T.U. per 42-gallons barrels or 80 per cent average efficiency with coal having a heating value of 13,500 B.T.U. per pound as fired.

J-2.02. Heating. The heating connected load at 105,920,000 B.T.U. per hour would require, on the basis of 70° F. inside and 10° F. outside design temperatures with a total of 2300 degree days, 4511 tons of coal per year, estimated as follows:

$$\frac{105{,}920{,}000 \times 24 \times 2300}{(70-10) \times 13{,}000 \times .80 \times 2{,}000} = 4511 \text{ tons of coal per year}$$

J-2.03. Hot Water. The hot water heating connected load at 95,798,000 B.T.U. per hour would require, on the basis of 6 hours average use per day, 7770 tons of coal per year, estimated as follows:

$$\frac{95{,}798{,}000 \times 6 \times 365}{13{,}500 \times .80 \times 2{,}000} = 7770 \text{ tons of coal per year}$$

J-2.04. Process. The process steam connected load at 54,162,000 B.T.U. per hour would require on the basis of 7 hours average use per day, 6407 tons of coal per year, estimated as follows:

$$\frac{54{,}162{,}000 \times 7 \times 365}{13{,}500 \times .80 \times 2{,}000} = 6407 \text{ tons of coal per year}$$

J-2.05. Tabulation Losses. The steam distribution losses at 13,823,000 B.T.U. per hour would require 5606 tons of coal per year estimated as follows:

$$\frac{13{,}823 \times 365 \times 1000}{13{,}500 \times .80 \times 2{,}000} = 5606 \text{ tons of coal per year}$$

J-2.06. Feed Water Heating. The feedwater heating would require on the basis entering temperature of water 143° F. approximately 1822 tons of coal per year estimated as follows:

| | |
|---|---|
| Heating | 4511 tons |
| Hot Water | 7770 " |
| Process | 6407 " |
| Losses | 5606 " |

Total - 24,294 tons coal

$$\frac{24{,}294 \times 2{,}000 \times 13{,}500 \times .80 \times 75 \text{ b. t. u's}}{13{,}500 \times 2{,}000 \times .80 \times 1{,}000} = 1822 \text{ tons of coal per year}$$

Note: Heating, hot water, process, losses = 24,290 tons
Total for heating hot water = 1,822 tons
Total annual fuel consumption = 26,116 tons

J-2.07. Summer Minimum Load. The minimum demand of steam required for process distribution losses feedwater heating and boiler house auxiliaries is estimated to be 25,000 pounds per hour average for at least 8 hours per day during the summer time which would require the operation of the oil burning equipment. A total amount of oil consumed is 1360 barrels of oil per month estimated as follows:

$$\frac{25,000 \times 1,000 \times 8 \times 30}{6,300,000 \times .70} = 1360 \text{ bbls. oil per month}$$

J-2.08. Winter Minimum Load. The handling of the winter minimum load by means of oil operation is similar to the summer, except the duration would not exceed an average of 3 hours per day and would require 540 bbls. of oil per month.

J-2.09. Oil Equivalent. The amount of oil equivalent to a ton of coal as fired and based on an average evaporation efficiencies is approximately 4.9 bbls, estimated as follows:

$$\frac{2,000 \times 13,500 \times .80}{6,300,000 \times .70} = 4.9 \text{ bbls. to a ton of coal}$$

J-2.10. Tabulation of Monthly Quantities. The total amount of coal is estimated for 12 months operation; has been divided into month by month requirements; and a reduction has been made for the equivalent amount of oil burned each month in lieu of coal.

The variation in the monthly amounts is caused by the seasonable heating changes and variations in hot water demand from winter to summer.

| | Oil | Coal |
|---|---|---|
| January | 540 bbls. | 3071 tons |
| February | 540 | 2598 |
| March | 540 | 2835 |
| April | 1360 | 1890 |
| May | 1360 | 1417 |
| June | 1360 | 1417 |
| July | 1360 | 1418 |
| August | 1360 | 1417 |
| September | 1360 | 1417 |
| October | 1360 | 1654 |
| November | 540 | 1890 |
| December | 540 | 2598 |
| Total - | 12,220 bbls. | 23,622 tons |

J-3. Procurement of Equipment.

J-3.01. Specifications. The boilers and all auxiliary equipment was purchased on the basis of competitive bids taken from contract specifications prepared by the Architect-Engineers.

A complete list of the specifications covering the mechanical equipment is as follows:

| Spec. No. | Title |
|---|---|
| 810-1 | Pulverized Coal Steam Generating Units and Appurtenant Equipment |
| 810-2 | Boiler Feed Pumps |
| 810-3 | Boiler Feed Water Regulators |
| 810-4 | Steel Stacks, Ducts and Brushings |
| 810-5 | Coal Handling Equipment |
| 810-6 | Fuel Oil Burning Equipment |
| 810-7 | Steam Pneumatic Ash Conveyer System |
| 810-8 | Deaerating Feed Water Heater |
| 810-9 | Water Softeners |
| 810-10 | Surge and Boiler Blow-off Tanks |
| 810-11 | Combustion Control Equipment |
| 810-12 | Unit Sub-station, Low Voltage Switch Gear and Control Panels |
| 810-13 | Sump Pumps |
| 810-14 | Air Compressor |
| 810-16 | Condensate Pumps and Receiver |
| 810-17 | Piping, Valves, Fitting and Accessories |
| 810-18 | Insulation, Painting of Pipes, Ducts, Brushing, Stacks |
| 810-19 | Continuous Blow-off System |
| 613 | Chemical Feed System |
| 824 | Electrical Work and Miscellaneous Equipment |

J-3.02. Tabulation of Bids and Contract Awards. The bids as received were tabulated by the Architect-Engineers and awards were made to the lowest bidder meeting all of the specified requirements.

J-3.03. Navy Specifications. The Navy Specification No. 21Yc for Installation of Power Plant, Heating, and Ventilating Apparatus and Piping was adhered to wherever possible; also, all the standard Navy Specifications including No. 66Pl mentioned in No. 21Yc were used for the purchase of materials and equipment with a few exceptions which were permitted due to scarcity of materials.

J-4. Central Heating Plant Building.

J-4.01. Location: The building is located six hundred feet southeast of Holcomb Boulevard on the southwest side of Gum Street in the Industrial Area.

J-4.02. Factors Governing the Design of Building. The principle factors governing the design of the building were the layout and arrangement of the mechanical equipment. Provisions were made for walkways, access platforms; clearances for removal of boiler tubes, repairing of equipment,

etc. Throughout the design, probable future expansion, convenience of maintenance and operation, and economy of space requirements were taken into consideration.

J-4.03. Description of Building. The building is 138 feet long by 89 feet wide by 72 feet high and is of structural steel frame construction, with reinforced concrete floors and roof, brick walls and industrial type windows.

Details of design and construction of the building, specification, drawings, etc., are given in Section E-4.19 of the Completion Report.

J-5. Coal Handling and Storage.

J-5.01. Transportation of Coal: Coal is delivered by rail. A single track railroad located on the south side of building serves the plant. The siding has a capacity of five coal cars.

J-5.02. Coal Handling Equipment. The equipment was manufactured and erected by the Fairfield Engineering Co. and consists of a track hopper for unloading coal from cars, an apron feeder to convey coal from track hoppers to crusher, a double roll crusher to reduce run of mine coal to the proper size, a bucket elevator to lift coal from crusher to conveyor over coal bunker, and a flight conveyor which distributes the coal and discharges same into a 600 ton overhead coal bunker in the building.

A separate track hopper with reciprocating feeder and bucket elevator is provided for unloading coal and piling out to yard storage.

J-5.03. Track Hoppers. Track hoppers are 14' wide by 18' long and are of sufficient size to unload a hopper bottom coal car at a single "spotting". The hoppers are constructed of 3/8" steel plate. Track girders, over hoppers are 24" wide flange 120# beams, an eight inch square mesh grating constructed of 4" x 1/2" bars and 7/8" diameter rods, is placed over the track hoppers. This steel grating keeps out foreign materials and lumps that are larger than the lumps the crushing and conveying equipment are designed to handle.

J-5.04. Apron Feeder. The apron feeder used to convey the coal from the track hopper to crusher consists of two strands of roller chains connected by double beaded steel pans. The large radius bead of each steel pan overlaps the smaller radius bead of its adjacent pan making a tight joint and preventing leakage of fine coal at all times. These beads also retard backward flow and prevents slippage of coal on the inclined feeder.

The apron feeder has 30" by 9" by 3/8" drip proof pans and is 51 feet long from head shaft to foot shaft. The pitch or rise of feeder is 4 3/8" per foot. The apron feeder is driven from the head shaft through sprockets and chain to a No. 150 D.H. Jones Speed Reducer #4 connected by flexible coupling to a 5 H.P. 900 R.P.M., 208 volt, 3 phase, 60 cycles General Electric Motor. The apron feeder operates at a lineal speed of 20 ft. per minute and at this speed, has the capacity to handle 75 tons of coal per hour.

J-5.05. Coal Crusher. The coal crusher is used to reduce run of mine coal to a suitable lump size for the Riley Atritas to handle efficiently in the final pulverization for burning. The crusher is a Marion No. 63 two roll spring relief type; driven by a 40 H.P., 900 R.P.M., 208 volt, 3 phase, 60 cycles General Electric motor through a V belt drive. Crusher rolls are adjustable and by spreading them apart slack coal can be by-passed through the crusher. The crusher has the capacity to reduce 75 tons per hour of run of mine coal to a maximum lump size of 1 1/4".

J-5.06. Bucket Elevator. The bucket elevator used to lift the coal from crusher to the flight conveyor over coal bunkers is of the double strand, heavy duty, continuous discharge type. The size of buckets are 20" x 10" x 11 5/8". The elevator is completely enclosed with a No. 10 gauge steel casing. The vertical height of elevator from foot shaft to head shaft is 90 feet 5 inches. Bucket elevator is driven from head shaft through sprockets and chain through a No. 150 D.H. Jones Speed Reducer No. 4 connected by flexible coupling to a 20 H.P., 900 R.P.M., 208 volt, 60 cycles, 3 phase General Electric Motor.

J-5.07. Flight Conveyor. The coal is discharged from a bucket elevator through a chute directly into the flight conveyor. The flight conveyor is supported by structural steel frame work carried on beams over the coal bunker. It is of the double strand roller chain type with reinforced flights 16" long x 8" wide x 3/8" thick. The conveyor trough is provided with eleven openings in the bottom for distribution of coal in bunker. Ten of these openings are fitted with rack and pinion operated gates. Flight conveyor is 116' 10" long from center of head shaft to center of foot shaft. Provisions have been made in the design to extend flight conveyor in case additional boilers are added to plant. The conveyor is driven from the head shaft by sprockets and chain to #150 D.H. Jones Speed Reducer No. 4 connected by a flexible coupling with 15 H.P., 900 R.P.M., 208 volts, 60 cycles, 3 phase, General Electric Motor. The capacity of flight conveyor at a lineal speed of 90 feet per minute is 75 tons of coal per hour.

J-5.08. Coal Handling System To Yard Storage. This system has a track hopper the same in size and construction as the track hopper described in the coal handling system to boiler house. A reciprocating plate feeder under track hopper feeds the coal to a vertical bucket elevator which lifts coal out of hopper and discharges same through a chute to an initial pile on ground. The bucket elevator is of the same size and constructed as the elevator described in the main coal handling system and parts are interchangeable. The capacity of the coal handling system to yard storage is 75 tons per hour. The coal is transported from the initial pile to yard storage and reclaimed by means of a caterpillar tractor equipped with bulldozer and 6-yard carryall scraper. The yard storage is 500 ft. long by 260 ft. average width and will hold 40,000 tons of coal. Space has been provided in the yard for the storing of 5,000 tons of stoker coal for use in the outlying heating plants.

J-5.09. Scales. A 20 ton Fairbanks platform scales with scale house is located adjacent to the coal storage area for weighing and keeping records of the amount of coal taken from storage and used by the outlying heating plants.

J-5.05. Coal Crusher. The coal crusher is used to reduce run of mine coal to a suitable size for the Riley Atritas to handle efficiently in the final pulverization for burning. The crusher is a Marion No. 64 two roll spring roller type, driven by a 40 H.P., 900 R.P.M., 208 volt, 3 phase, 60 cycles General Electric motor through a V belt drive. Crusher rolls are adjustable and by spreading them apart sized coal can be by-passed through the crusher. The crusher has the capacity to reduce 75 tons per hour of run of mine coal to a maximum lump size of 1 1/4".

J-5.06. Bucket Elevator. The bucket elevator used to lift the coal from crusher to the flight conveyor over coal bunkers is of the double strand, heavy duty, continuous discharge type. The size of buckets are 20" x 10" x 11 7/8". The elevator is completely enclosed with a No. 10 gauge steel casing. The vertical height of elevator from foot shaft to head shaft is 90 feet 6 inches. Bucket elevator is driven from head shaft through sprockets and chain through a No. 160 D.R. Jones Speed Reducer No. 4 connected by flexible coupling to a 20 H.P., 900 R.P.M., 208 volt, 60 cycles, 3 phase General Electric Motor.

J-5.07. Flight Conveyor. The coal is discharged from a bucket elevator through a chute directly into the flight conveyor. The flight conveyor is supported by structural steel frame work carried on beams over the coal bunker. It is of the double strand roller chain type with reinforced flights 16" long x 8" wide x 3/8" thick. The conveyor trough is provided with eleven openings in the bottom for distribution of coal in bunker. Ten of these openings are fitted with rack and pinion operated gates. Flight conveyor is 116' 10" long from center of head shaft to center of foot shaft. Provisions have been made in the design to extend flight conveyor in case additional boilers are added to plant. The conveyor is driven from the head shaft by sprockets and chain by a #150 D.R. Jones Speed Reducer No. 4 connected by a flexible coupling with 15 H.P., 900 R.P.M., 208 volts, 60 cycles, 3 phase, General Electric Motor. The capacity of flight conveyor at a lineal speed of 90 feet per minute is 75 tons of coal per hour.

J-5.08. Coal Handling System To Yard Storage. This system has a track hopper the same in size and construction as the track hopper described in the coal handling system to boiler house. A reciprocating plate feeder under track hopper feeds the coal to a vertical bucket elevator which lifts coal out of hopper and discharges same through a chute to an initial pile on ground. The bucket elevator is of the same size and constructed as the elevator described in the main coal handling system and parts are interchangeable. The capacity of the coal handling system to yard storage is 75 tons per hour. The coal is transported from the initial pile to yard storage and reclaimed by means of a caterpillar tractor equipped with bulldozer and 6-yard carryall scraper. The yard storage is 500 ft. long by 200 ft. average width and will hold 40,000 tons of coal. Space has been provided in the yard for the storing of 5,000 tons of stoker coal for use in the outlying heating plants.

J-5.09. Scales. A 20 ton Fairbanks platform scales with scale house is located adjacent to the coal storage area for weighing and keeping records of the amount of coal taken from storage and used by the outlying heating plants.

J-6. Coal Bunker. The coal bunker was furnished by the Southern Engineering Co. and was built integral with the building steel. It is of the suspension type of true catenary shape in cross section. The bunker is constructed of 3/8" and 5/16" steel plates. It is 116' long x 18' wide x 16' deep and has a capacity of 600 tons of coal. Eight concentrating chutes are provided in the bottom of the bunker. The chutes are fitted with 20" square dust and sift proof coal gates furnished by Fairfield Engineering Co. The interior surfaces of the coal bunker are coated with bitumastic enamel to prevent corrosion.

J-7. Coal Scales.

J-7.01. Purpose of Coal Scale. Coal scales are placed between the overhead coal bunker and the pulverizer feeders to weigh and record the quantity of coal burned by each boiler. There are two scales per boiler, one on each pulverizer.

J-7.02. Description. The coal scales are automatic, fully enclosed, dust proof, stationary floor mounted type "EE39" manufactured by the Richardson Scale Co. Each scale weighs 200 pounds of coal per dump and has an hourly capacity of 12 tons (based on 24-hour per day operation).

J-7.03. Operation. The scale weighs at each cycle 200 pounds of crushed coal drawn automatically from the overhead bunker, adds each preset draft on a dust proof, six figure, mechanical counter attached to the scale, and delivers the weighed coal into a hopper above the pulverizer feeder.

The scale embodies a motor driven rubberized conveying belt feeder for conveying the coal from its inlet to the weighing hopper, and directly the pre-set quantity has been delivered to the weighing hopper; the electrical control operates and stops the motor driving the feeder. At the same time it actuates a solenoid which trips the discharge mechanism, whereupon the door of the weighing hopper opens and releases the weighed load. When the discharged coal no longer holds open the door of the weighing hopper this closes automatically and the scale repeats the cycle.

J-8. Coal Feeders, Pulverizers and Burners.

J-8.01. Function of Coal Feeders. The purpose of the feeder is to control the rate of flow of coal from scales to the pulverizer. There are two feeders per boiler, one on each pulverizer.

J-8.02. Description of Feeder. The Riley table type coal feeder consists of a hopper above a circular, slowly rotating table, a knife which varies the rate of coal feed, a magnetic separator and a suitable driving arrangement. The feeder knife extends onto the rotating table, scraping off the desired amount of coal into the coal chute to the pulverizer. An electromagnet is located under the table and forms an apron over which all the coal passes on leaving the table. The arrangement is such that the apron is magnetized while passing under the coal stream so that removal of magnetic material is positive and certain. The apron is de-magnetized at a later point in its rotation and drops the magnetic material into a suitable tramp

iron pocket from which it can be removed at suitable intervals. Rate of coal feed is a function of relative speed and knife position. The feeder is driven through a gear assembly connected to a Reeves variable speed transmission by means of roller chains and sprockets. The Reeves transmission is driven by a 1 H.P., 1150 r.p.m. Allis Chalmers constant speed motor through a Texrope drive. By changing the position of a lever mechanism, connected to the Reeves transmission, the speed of feeder disc and agitator is varied to adjust the rate of coal flow to pulverizer operating under variable loads. The knife can be moved through 6 inches of travel across the table by an operating wheel outside of the housing, and, combined with the variable selective speeds of the drive, it controls the rate of coal feed to pulverizer.

J-8.03. Internal Construction of Feeder. The feeder table consists of a 20" diamter truncated cone. The top surface is covered with a renewable wearing plate, the edge apron contains provision for extending the magnetic field, and the bottom is open. The table is mounted on a vertical shaft extending both above and below the table. A renewable paddle agitator is attached to the shaft above the table to insure movement of wet coal out of the feeder hopper. The shaft below the table is connected to the feeder drive by a collar and replaceable shear pin arrangement. A magnet is fastened to the feeder housing under the truncated cone table, the face of the magnet faces the discharge chute. As the table rotates, the apron forming the edge of the table is magnetized while passing under the coal stream. When this portion of the apron reaches the other side of the housing it is out of the influence of the magnet and is de-magnetized so that material collected from the coal stream is deposited in the tramp iron pocket.

The feeder knife is mounted on a threaded shaft so that it can be moved across the table by the operating wheel outside the housing. The table, knife, magnet, etc. are fully enclosed in a housing equipped with adequate openings for observation and access.

J-8.04. Pulverizers. There are two Riley # 4 Atrita Unit Pulverizers per boiler. Each pulverizer has the capacity to pulverize from 6500 to 7500 pounds of Bituminous coal per hour, to such a fineness that 76 per cent will pass through a 200 mesh screen and 99 per cent through a 50 mesh screen.

J-8.05. Description of Pulverizer. The Riley Atrita unit pulverizer is built almost entirely of steel with the exception of grinding elements and certain fittings. It is necessary to make regular inspections of pulverizers to determine whether or not the bearings are properly lubricated and to make minor adjustments to control the air flow from the machine to the burners from time to time as major load changes occur. These adjustments can be made manually or automatically as best suits the individual requirements. The following detailed description should prove helpful in the matters of maintenance and of proper operation. Fuel is fed at a controlled rate to the pulverizer by a feeder as previously described under feeder instructions. The fuel enters the machine through a feed chute, being accompanied by primary air. The first effect in the pulverizer is to break down any lumps or particles to a granular size. The second effect is to pulverize this granular fuel to the required degree of fineness, separate over-sized coarse material, and deliver the desired product to the pulverizer fan, which in turn conveys the material to the burner. The fan serves the purpose of conveying fuel through the pulverizer, as well as of transporting it to the iron pocket from which it can be removed at suitable intervals. Rate of coal feed is a function of relative speed and knife position. The feeder is driven through a gear assembly connected to a Reeves variable speed transmission by means of roller chains and sprockets. The Reeves transmission is driven by a 1 H.P., 1150 r.p.m. Allis Chalmers constant speed motor through a Texrope drive. By changing the position of a lever mechanism, connected to the Reeves transmission, the speed of feeder disc and agitator is varied to adjust the rate of coal flow to pulverizer operating under variable loads. The knife can be moved through 6 inches of travel across the table by an operating wheel outside of the housing, and, combined with the variable relative speeds of the drive, it controls the rate of coal feed to pulverizer.

J-8.03. Internal Construction of Feeder. The feeder table consists of a 30" diameter truncated cone. The top surface is covered with a renewable wearing plate, the edge apron contains provision for extending the magnetic field, and the bottom is open. The table is mounted on a vertical shaft extending both above and below the table. A renewable paddle agitator is attached to the shaft above the table to insure movement of wet coal out of the feeder hopper. The shaft below the table is connected to the feeder drive by a collar and replaceable shear pin arrangement. A magnet is fastened to the feeder housing under the truncated cone table, the face of the magnet faces the discharge chute. As the table rotates, the apron forming the edge of the table is magnetized while passing under the coal stream. When this portion of the apron reaches the other side of the housing it is out of the influence of the magnet and is de-magnetized so that material collected from the coal stream is deposited in the tramp iron pocket.

The feeder knife is mounted on a threaded shaft so that it can be moved across the table by the operating wheel outside the housing. The table, knife, magnet, etc. are fully enclosed in a housing equipped with adequate openings for observation and access.

J-8.04. Pulverizers. There are two Riley # 4 Atrita Unit Pulverizers per boiler. Each pulverizer has the capacity to pulverize from 2800 to 7200 pounds of bituminous coal per hour, to such a fineness that 78 per cent will pass through a 200 mesh screen and 97 per cent through a 50 mesh screen.

J-8.05. Description of Pulverizer. The Riley Atrita unit pulverizer is built almost entirely of steel with the exception of grinding elements and certain fittings. It is necessary to make regular inspections of pulverizers to determine whether or not the bearings are properly lubricated and to make minor adjustments to control the air flow from the machine to the burners from time to time as major load changes occur. These adjustments can be made manually or automatically as best suits the individual requirements. The following detailed description should prove helpful in the matters of maintenance and of proper operation. Fuel is fed at a controlled rate to the pulverizer by a feeder as previously described under Feeder Instructions. The fuel enters the machine through a feed chute, being reduced by primary size. The first effect in the pulverizer is to break down the lumps or particles to a granular size. The second effect is to pulverize the granular fuel to the required degree of fineness, separate over-sized coarse material, and deliver the desired product to the pulverizer fan, which in turn conveys the material to the burner. The fan serves the purpose of drawing fuel through the pulverizer, as well as of transporting it to the burner by creating air flow, which is commonly known as primary air. The compartment in which grinding is accomplished is separated from the fan wheel compartment by a steel partition plate and both compartments are contained in a welded steel housing on either end of which are the bearing supports. The housing is split on the horizontal shaft center line and the top part readily can be removed to expose all interior parts for convenience of inspection and renewals as may be necessary. The housing is protected from wear by renewable liners throughout, including the fan chamber. The steel discs which carry the moving grinding elements and the fan blades are likewise protected by the design of the renewable parts. An internal inspection of the machine should be made before placing it in service and during such inspection the details of construction can be ascertained clearly.

J-8.06. Coupling. A Rawson Type A coupling is used between pulverizer and motor. This coupling allows the motor to be started under no load. Across-the-line starting is recommended. Before mounting the coupling be sure that all parts are washed with kerosene and are free from dirt and grease. Do NOT lubricate any part of this coupling. Correct alignment of drive and driven shafts is essential. The frictional lining of the shoes will wear a long time if aligned correctly.

J-8.07. Pulverizer Motor. The pulverizer is driven by an Allis Chalmers 75 H.P. 208 volt, 3 phase, 60 cycle, 1170 R.P.M. constant speed motor.

J-8.08. Burners. Each boiler is equipped with two Riley # 3-1/2 Flare Type Burners with # 4 heads. Each burner has the capacity to burn from 1000 to 5000 pounds of pulverized coal per hour. The burner tube is designed to accommodate a gun type oil burner.

J-8.09. Burner Piping. The interconnecting piping between the burners and pulverizers is so arranged that either pulverizer can be used to supply coal to either one or both burners at any one time by the proper manipulation of the two way plug valves located at the burners and pulverizers.

J-8.10. Description of Burner. The burner box or plenum chamber, of welded steel construction, is arranged for mounting against the furnace wall and contains a set of adjustable vanes for control of secondary air. Through the center of this box is a nozzle for primary air and fuel, with a fuel spreader located at its furnace end. A receiving head with adjustable vanes for equalizing the fuel distribution is attached to the outside of the box, the head supporting the burner nozzle. The pulverizer discharge pipe is attached to this receiving head. A pair of dampers for control of secondary air volume is built into one side of the box and control linkages are conveniently mounted on the ends of the damper shaft. The furnace side of the burner box has an opening which coincides with the opening in the furnace wall and a renewable refractory tile throat in the furnace wall is an integral part of the burner.

J-9. Oil Burning Equipment and Gas Ignition System.

J-9.01. Purpose of Oil Burning System. The intention in the design and selection of the equipment was that the oil burners should be used only when the boiler load requirements are below the safe operating range of the

pulverized coal burner; that is, when the boiler load is under 20,000 pounds of steam per hour. Therefore, the oil burners are designed to take care of loads from 1,000 to 30,000 pounds of steam per hour per boiler, and the oil pumping equipment was designed to supply four boilers all operating on oil at the maximum rating.

J-9.02. Burners. Oil burners are Enco No. 10 steam atomizing, gun type, designed to fit in ignition tube of Riley pulverized coal burners. The oil burners were manufactured and furnished by the Engineering Company and two were supplied for each boiler. Each burner will have the capacity to burn from 100 to 1100 pounds of No. 6 bunker C fuel oil per hour. The capacity of the burners can be increased by changing burner tips.

J-9.03. Oil Pumping Set. The oil pumping set was furnished by the Engineering Company and consists of one 20 G.P.M. Warren 7-1/2" x 5" x 6" duplex steam driven pump and one 20 G.P.M. De Laval 1 Mo rotary screw pump driven by a 7-1/2 H.P. motor. Both pumps are mounted on a common bed plate over two Whitlock straight tube oil heaters. Each heater has a total heating surface of 75 square feet.

The pumping set is a completely automatic unit with all necessary interconnecting piping, strainers, relief valves, automatic temperature control, pump governor, thermometers, pressure gauges, traps, etc.

J-9.04. Meters. Oil meters are furnished for installation in the oil supply line to burners and in the return line to fuel oil tank. By subtracting reading of oil return meter from supply meter, the oil consumption can be computed over any period of time.

Meters are the Bassler Models 1-EXD manufactured by S. F. Bowser Co., with thermostatic control, which automatically compensates for changes in oil temperature.

J-9.05. Gas Ignition System. Gas is piped to the heating plant from the Butane Gas System and is used for lighting the pulverized coal and oil burners.

## J-10. Oil Handling and Storage.

J-10.01. Oil Handling and Storage. Fuel oil for use in the Central Heating Plant is supplied from an 8000 gallon steel storage tank, 8 feet in diameter by 21 feet 6 inches long, buried outside of the building. The tank is connected to the 10,000 barrel fuel oil storage tank, located in the Industrial Area, by a four inch fill line. The arrangement of piping is that the fuel oil can be pumped from the 10,000 barrel storage tank into the 8000 gallon underground tank or directly to the oil pumping set in the heating plant. The underground storage tank also is provided with a connection for filling directly from a tank truck.

A complete description of the fuel oil storage and handling system is given in Section G-4 of this report.

[illegible] used burners when [illegible] the boiler load is under 20,000 pounds of steam per hour. Therefore, the oil burners are designed to take care of loads [illegible] 1,000 to 20,000 pounds of steam per hour per boiler, and the oil [illegible] equipment was designed to supply four boilers all operating at [illegible] of the maximum rating.

7-9.02. Burners. Oil burners are Coen No. 10 steam atomizing, [illegible] type, designed to fit in [illegible] type of Riley pulverized coal burners. The oil burners were manufactured and furnished by the [illegible] Engineering Company and two were supplied for each boiler. Each burner will have the capacity to burn from 100 to 1100 pounds of No. 6 bunker C fuel oil per hour. The capacity of the burners can be increased by changing burner tips.

7-9.03. Oil Pumping Set. The oil pumping set was furnished by the [illegible] Engineering Company and consists of one 20 G.P.M. Warren 7-1/2" x 5" x 6" duplex steam driven pump and one 20 G.P.M. De Laval I-Lo rotary screw pump driven by a 7-1/2 H.P. motor. Both pumps are mounted on a common bed plate over two Whitlock straight tube oil heaters. Each heater has a total heating surface of 71 square feet.

The pumping set is a completely automatic unit with all necessary interconnecting piping, strainers, relief valves, automatic temperature control, pump governor, thermometers, pressure gauges, traps, etc.

7-9.04. Meters. Oil meters are furnished for installation in the oil supply line to burners and in the return line to fuel oil tank. By subtracting reading of oil return meter from supply meter, the oil consumption can be computed over any period of time.

Meters are the Roessler Models 1-RKD manufactured by [illegible] Bowser Co., with thermostatic control, which automatically compensates for changes in oil temperature.

7-9.05. Gas Ignition System. Gas is piped to the heating plant from the Dynamo Gas System and is used for lighting the pulverized coal and oil burners.

## 7-10. Oil Handling and Storage

7-10.01. Oil Handling and Storage. Fuel oil for use in the Central Heating Plant is supplied from an 8000 gallon steel storage tank, 8 feet in diameter by 21 feet 6 inches long, buried outside of the building. The tank is connected to the 10,000 barrel fuel oil storage tank, located in the Industrial Area, by a four-inch fill line. The arrangement of piping is that the fuel oil can be pumped from the 10,000 barrel storage tank into the 8000-gallon underground tank or directly to the oil pumping set in the heating plant. The underground storage tank also is provided with a connection for filling directly from a tank truck.

A complete description of the fuel oil storage and handling system is given in Section C-4 of this report.

J-11. Boilers, Ash Hoppers, Air Heaters and Boiler Accessories.

J-11.01. Boilers. Four Riley Class P-25 # 25WW steam generators manufactured by the Riley Stoker Corp. are installed in the Central Heating Plant.

J-11.02. Capacity of Boilers. Each boiler will generate continuously 100,000 pounds of steam per hour at 175 p.s.i.g., no super-heat or 120,000 pounds of steam per hour for a three hour's maximum peak period.

J-11.03. Design Pressure. Boilers are designed for a maximum working pressure of 193 p.s.i.g.

J-11.04. Heating Surface. The heating surface in each boiler proper is 9000 sq. ft. and the projected heating surface in the water walls is 2900 sq. ft., making a total heating surface of 11,900 sq. ft.

J-11.05. Furnace Volume. The furnace volume is 500 cubic feet.

J-11.06. Heat Release. The heat release furnace not including air heater recovery, will be 27,800 b.t.u. per cu. foot per hour at maximum rating.

J-11.07. Boiler Construction Details. The boilers and air heaters are carried on structural steel supports and foundations independent from the building steel, assuring that no boiler expansion strains will be transmitted into the building steel, making it possible easily to remove or replace boilers without disturbing the steelwork of the building. All seams in steam and mud drums are fusion welded, and constructed according to the latest A.S.M.E. Code for Power Boilers. The steam drum is 60" in diameter with 13/16" shell and has a built-in steam separator, internal pipe distribution systems for chemical feed, continuous blow-off, and boiler feed. The mud drum is 36" in diameter with 1/2" shell. The boiler tubes are 3-1/4" O.D. in the front and middle banks and 2-1/2" O.D. in the last bank. The furnace water walls are made up of 3-1/4" O.D. tubes spaced in 4-1/2" centers expanded into 10-3/4" diameter upper water wall headers and 12-3/4" diameter lower water wall headers. Water wall tubes are backed up with a 3" ship lap refractory tile, 5" of insulation block, and 3/8" loose insulation. Boiler setting walls are 3" ship lap refractory tile, 4" insulation block, and 3/8" loose fill insulation.

Roof is 2" ship lap refractory tile, 2-1/2" Class C fire brick, 4" insulation block and 2" of felt. All furnaces, boiler setting walls, and roof are completely covered with a No. 10 gauge steel casing. Necessary access, observation, and tube lancing doors are provided in the boiler and furnace walls. Boiler baffles are 3" and 2" ship lap refractory tile and self locking baffle tile, supported on the tubes, and so placed as to obtain a cross flow of gases over the heating surface. Baffles are arranged to maintain a substantially constant velocity through all boiler passes.

Construction details of boilers are shown on Riley Stoker Corporation shop drawings on file in the Public Works Office.

[illegible]11. Boilers, Ash Hoppers, Air Heaters and Boiler Accessories.

J-11.01. Boilers. Four Riley Class P-26 & 26HV steam generators [illegible]ufactured by the Riley Stoker Corp. are installed in the Central Heating [illegible]nt.

J-11.02. Capacity of Boilers. Each boiler will generate continuously [illegible],000 pounds of steam per hour at 175 p.s.i.g., no super-heat or 120,000 [illegible]nds of steam per hour for a three hour's maximum peak period.

J-11.03. Design Pressure. Boilers are designed for a maximum working [illegible]ssure of 198 p.s.i.g.

J-11.04. Heating Surface. The heating surface in each boiler proper [illegible]000 sq. ft. and the projected heating surface in the water walls is 2900 [illegible]ft., making a total heating surface of 11,900 sq. ft.

J-11.05. Furnace Volume. The furnace volume is 600 cubic feet.

J-11.06. Heat Release. The heat release furnace not including air [illegible]ter recovery, will be 27,800 b.t.u. per cu. foot per hour at maximum [illegible]ing.

J-11.07. Boiler Construction Details. The boilers and air heaters [illegible] carried on structural steel supports and foundations independent from [illegible] building steel, assuring that no boiler expansion strains will be trans-[illegible]ted into the building steel, making it possible easily to remove or re-[illegible] boilers without disturbing the steelwork of the building. All [illegible] and mud drums are fusion welded, and constructed according to the [illegible] A.S.M.E. Code for Power Boilers. The steam drum is 60" in diameter [illegible] 15/16" shell and has a built-in steam separator, internal pipe distri-[illegible] systems for chemical feed, continuous blow-off, and boiler feed. The [illegible] drum is 36" in diameter with 1/2" shell. The boiler tubes are 3-1/4" [illegible] in the front and middle banks and 2-1/2" O.D. in the last bank. The [illegible] water walls are made up of 3-1/4" O.D. tubes spaced in 4-1/2" centers [illegible]nded into 10-3/4" diameter upper water wall headers and 12-3/4" diameter [illegible] water wall headers. Water wall tubes are backed up with a 3" ship lap [illegible]actory tile, 6" of insulation block, and 3/8" loose insulation. Boiler [illegible] walls are 3" ship lap refractory tile, 4" insulation block, and [illegible]" loose fill insulation.

[illegible] Roof is 2" ship lap refractory tile, 2-1/2" Class C fire brick, 4" [illegible]lation block and 2" of felt. All furnaces, boiler setting walls, and [illegible] are completely covered with a No. 10 gauge steel casing. Necessary [illegible], observation, and tube leaning doors are provided in the boiler and [illegible] walls. Boiler baffles are 3" and 2" ship lap refractory tile and [illegible] locking baffle tile, supported on the tubes, and so placed as to obtain [illegible] flow of gases over the heating surface. Baffles are arranged to [illegible]ain a substantially constant velocity through all boiler passes.

[illegible] Construction details of boilers are shown on Riley Stoker Corporation [illegible] drawings on file in the Public Works Office.

J-11.08. Ash Hopper. A water cooled ash pit hopper manufactured by the United Conveyor Corporation receives the ash from the furnace. The ash hopper is lined with 4-1/2" of first quality fire brick, backed up with 2-1/2 inches of insulating brick. The outside steel casing is two 1/4" steel plates spaced 2 inches apart. This space makes a water jacket through which cooling water is circulated. The ash hopper is provided with three (3) vertical lifting ash removal doors and necessary access doors in front and ends. The hopper is carried on spring supports to allow for movement of lower water wall headers.

J-11.09. Soot Hoppers. Soot hoppers are provided for the collection of soot and fly ash in the last pass of the boiler and first pass of air heater.

J-11.10. Air Heaters. Each boiler is equipped with a Riley two pass, tubular type air heater with 2-1/2" tubes. Total heating surface is 12,200 sq. feet. Air heater is arranged so that the flue gas flow is inside the tubes and the air flow is outside and around the tubes. Casing of air heater is constructed of 3/16" copper bearing steel plate.

J-11.11. Water Columns. One Reliance No. 7 water column with cast iron body fitted with high and low level alarm, and flat inclined prismatic gauge glass with Reliance gauge illuminator GL50 is furnished for each boiler.

J-11.12. Boiler Blow-off Valves. The boiler blow-off valves are manufactured by the Okadee Company and were furnished with the boilers.

Two 2-inch blow-off connections are provided on the mud drum and one 1-1/2" connection is provided on each of the three lower water wall headers. A tandem assembly of one Okadee Quick Action - Lever operating single seated Type "FSF" blow-off valve and one Okadee geared slow operating double seated Type "BWL" blow-off valve is furnished for each boiler and water wall blow-off connection.

J-11.13. Boiler Non-Return Valves. The non-return valves are 12-inch angle pattern, single acting, stop and check valves, built for a working pressure of 250 p.s.i.g. manufactured by the Golden-Anderson Valve Specialty Company.

J-11.14. Safety Valves. Two 3-inch and one 6-inch type 1411 cast iron "Consolidated" steam safety valves are furnished for each boiler. One 3-inch valve is set to pop at 185 pounds pressure and has a relieving capacity of 17,000 pounds of steam per hour. One 3-inch valve is set to pop at 187 pounds pressure and has a capacity of 17,560 pounds of steam per hour. The 6-inch safety valve is set to pop at 190 pounds pressure and has a relieving capacity of 104,600 pounds of steam per hour. The total relieving capacity of the three valves is 139,160 pounds of steam per hour.

J-11.15. Boiler Feed Stop and Check Valves. Two sets of stop and check valves are furnished with each boiler. The feed stop valves are Crane 4" angle Fig. 156XR with 300 # standard cast alloy steel body, Exalloy seat, nickle alloy disc flanged end bolted bonnet, outside screw, and yoke. The feed check valves are Crane 4" globe Fig. 39B 250# standard with cast iron body, brass trim, flanged ends, bolted bonnet.

J-11.16. Soot Blowers. Soot blowers are manufactured by the Diamond Power Specialty Company and consists of six Diamond Valve-in-Head units. Three of the units have "Dialoy" elements, "Dialoy" bearings, bolted type. One unit has colorized element, colorized bearings, bolted type, and three units have extra heavy steel elements, plain steel bearings, bolted type.

The soot blowers operate on saturated steam, a separate nozzle is provided on the steam drum for the soot blower piping connection. Soot blowers and piping were included in the boiler contract.

J-12. Fly Ash Collector.

J-12.01. Collector. A "Thermix" DES 6BH 4 #7-160 tubular dust collector manufactured by Prat-Daniel Corporation is furnished for each boiler.

The dust collector has 160 multiple cyclone tubes arranged in horizontal tube sheets. Four tube sections are provided. Fly ash storage hoppers are built integrally with the collector.

The dust collector is placed between the air heater outlet and the induced draft fan inlet and is located in the basement of the boiler house. The dust collector has an overall collection efficiency of 80 per cent. Draft loss through the dust collector at 100,000 pounds of steam per hour boiler rating is 2.20 inches of water, at 75,000 pounds rating 1.15 inches and at 50,000 pounds rating 0.50 inches of water.

J-12.02. Vibrator and Rotary Valves. The dust collector is equipped with a plate vibrator and motor driven rotary valve unloader furnished by the United Conveyor Corporation.

J-13. Forced and Induced Draft Fans.

J-13.01. Fans. Due to the draft loss through the boiler, air preheater, and fly ash collector it is necessary to install a forced and induced draft fan on each boiler to furnish the air required for conbustion and the necessary draft. These fans are located on the operating floor at the side and rear of boiler within easy access and under the constant observation of the operator.

The amount of air handled by the forced draft fan is controlled by a vortex damper on the inlet and a louvre type outlet damper.

The amount of gas handled by the induced draft fan is controlled by changing the speed of the fan by means of an American Blower Corporation No. 24 Scoop Type Hydraulic Coupling placed between the fan and driving motor. A louvre type outlet damper is also furnished. The fans and dampers are manufactured by the Clarage Fan Company and were furnished with the boiler contract.

J-13.02. Forced Draft Fan. Size 2-1/2, Type W, Class IV, double width, double inlet forced draft fan, driven by a 75 H.P. Allis Chalmers constant speed 1770 R.P.M., 208 volt, 3 phase, 60 cycle induction motor. Capacity of the forced draft fan is 33,500 cu. ft. of free air per minute at a temperature of 80° F. against a static pressure of 9.6" water gauge.

J-13.03. Induced Draft Fan. Size 11, Type RT, double width, double inlet, furnished with scroll liners, water cooled bearings and structural steel sub base. Fan is driven by a 150 H.P. Allis Chalmers, constant speed, 1140 r.p.m., 208 volt, 3 phase, 60 cycle induction motor. Capacity of the induced draft fan is 57,800 cu. ft. of flue gas per minute at a temperature of 425° F, against a static pressure of 11.3 inches water gauge.

J-14. Ducts, Flues and Stacks.

J-14.01. Stacks. Individual steel stacks, supported on the roof of the building, are provided for each boiler.

Each stack is 6 ft. 6 in. inside diameter and 37 ft. high from the base. The top of stack is 60 ft. above boiler outlet and 100 ft. above grade. Stacks are constructed of 5/16 in. and 1/4 in. steel plate. All seams are tack riveted and welded on the inside of stack. A clean-out door, painters trolley, and ladder are provided on each stack. A conical hopper inside the stack at the base, is used for the collection of fly ash and soot that accumulates at this point. Aviation obstruction lights are provided.

Stacks are lined with "Gunite" 2 inches in thickness which was sprayed on wire mesh reinforcing, fastened to inside of stack with metal clips welded on.

J-14.02. Ducts and Flues. The flue between the induced draft fan and stack is 4 ft. wide by 6 ft. deep and has a cross sectional area of 24 square feet. Flue was designed for a gas velocity of 2400 f.p.m. at maximum rating.

A by-pass duct is provided between boiler uptake and flue, with a shut off damper placed in the uptake. Opening this damper allows the flue gas to pass directly from the boiler to stack, bypassing the induced draft fan and air preheater.

The ducts and flues are constructed of 3/16 inch steel plates, reinforced with stiffener angles, and provided with necessary access doors, expansion joints, and dampers.

All outside surfaces of hot gas ducts and flues are insulated with 2 inches of 85 percent magnesia block over which is applied a hard finished asbestos cement troweled to a smooth surface.

The stacks, flues, and ducts were fabricated by Dewey Brothers, Inc. and erected by Contractors NOy 4750.

J-15. Ash Handling System.

J-15.01. Description of Ash Handling System. The ash removal and conveyor system is of the steam, pneumatic suction type manufactured by the United Conveyor Corporation. The capacity of conveyor system is 15 tons of ash per hour. Ash conveyor piping is 6 and 8 inches in diameter and made of abrasion resisting cast iron. Disc type inlet gates are furnished for the soot hopper and stack connections, and plug type gates are furnished for closing off the various branches of the system. All fittings and valves are made of abrasion resisting alloy cast iron. Fittings have renewable back

sections. Rotary vane feeders with adjustable buckets driven by 1/4 H.P. motors are mounted on the fly ash collector hopper outlet connections and motor driven vibrators are supplied for the hoppers. Self feeding ash intakes with 24" x 24" expanding type grids and grid feeding hopper, three per boiler, are provided for removal of ash from boiler ash hopper.

J-15.02. Principles of Operation. The Nuveyer Exhauster produces a vacuum which induces a strong flow of air through the conveyor. This air stream picks up any material delivered into the conveyor and transports it to the receiver where the material is separated from the air and accumulates in the bottom of the receiver. The air then passes through the exhauster and to an air washer. In order not to overfill the receiver with material, the time controlled remote control steam valve periodically cuts off the steam to the exhauster, breaking the vacuum and permitting the swing gate at the bottom of the receiver to open and discharge the material to the storage bin. At the end of the idle period the steam again is turned on automatically by the timer, the swing gate closes and more material is deposited in the receiver.

J-15.03. Ash Receiver. A four feet diameter cast iron receiver, built in sections and having renewable wear plates, is furnished and mounted above the ash storage bin.

J-15.04. Exhauster. An 8" multi-jet steam exhauster is placed between the receiver and air washer.

J-15.05. Air Washer. A four feet diameter sectional cast iron air washer is mounted above storage bin. Air washer is fitted with water sprays and a three bag vent filter for removal of dust.

J-15.06. Ash Storage Bin. The ash storage bin is 14' in diameter by 23' high and has a capacity of 50 tons of dry ash. Bin is constructed of 6 inch tile and is carried on structural steel supports 20 feet above the ground.

J-15.07. Hopper Under Storage Bin. The adapter hopper connecting the ash bin and dustless unloader is equipped with an electric motor driven vibrator to prevent the ash from clogging or arching over in hopper.

J-15.08. Ash Unloader. A rotary dustless unloader with rotary vane feeder under the storage bin discharges the ash directly into motor trucks. The unloader is driven by a 5 H.P., 208 volt, 3 phase, 60 cycle induction motor and has a capacity of 25 tons of ash per hour.

J-15.09. Electric Control. All electrical control equipment including motor operating steam valve, timer, flow contactor, motors, starters, and push button stations are furnished for 208 volts, 3 phase, 60 cycles service by the United Conveyors Corporation.

J-16. Combustion Control and Metering.

J-16.01. Combustion Control System. The boilers are controlled automatically to maintain constant steam pressure by means of fuel and air regulating equipment operated from individual boiler control panels. The com-

bustion control equipment is furnished by the Republic Flow Meters Company, and is the Smoot pneumatic type with provisions for manual-remote operation.

Separate boiler rating controls and fuel-air ratio controls are mounted on each boiler control panel together with a remote-manual control for the furnace pressure regulator operating the inlet vane control of the forced draft fan.

The fuel regulator varies the speed of the coal feeder and the air regulator varies the speed of the induced draft fan.

A master controller is provided with a steam pressure element for connection to the main steam header. The master controller maintains a constant steam pressure in the main steam header, and maintains the desired proportion between the fuel and air quantities used by all boilers in operation thereby making it possible to proportion the load carried by each boiler. The master controller is mounted on No. 2 Boiler Control Panel.

J-16.02. Motor Starting Equipment. The motor starting remote control switches for the pulverizers, coal feeders, automatic coal scales, forced and induced draft fans are centralized on the boiler control panels and are interlocked electrically to provide proper sequence of operation.

J-16.03. Instruments and Gauge. A Republic multi-pointer draft gauge for measuring furnace draft, pressure of air entering and leaving heater, pressure of gas entering and leaving heater, gas leaving fly ash collector, and pressure of air in burner windbox, Republic temperature recorders for measuring temperature of air and gas entering and leaving air heater, Ranerax $CO_2$ recorder, Bailey steam flow air flow meter, Reliance Eye-Hye boiler water level gauge, and a steam pressure gauge, are mounted on each boiler control panel.

J-16.04. Meter Panel. A separate meter panel is provided on which are mounted meters for measuring the flow of all steam from the main steam header to the various areas, for measuring flow of feedwater to the boilers, recording steam pressures in main and auxiliary steam headers, and temperature of condensate return and water from feedwater heaters.

J-16.05. Combustion Control Diagram. The combustion control system and the connections to the various controlled equipment are shown in the following diagram, J-16.05.

J-17. Boiler Feed Pumps. Four turbine driven 3 inch, two stage, class R.R. centrifugal boiler feed pumps manufactured by the Buffalo Pump Co. Inc. are installed for boiler feed purposes.

Each pump has a capacity of 275 g.p.m. of water at a temperature of 221°F against a total head of 650 ft.

The steam turbines driving the pumps are manufactured by the Elliott Company (Type BY) rated at 75 H.P. at 3600 r.p.m.

Turbines are equipped with overspeed trip and excess pressure governors and are connected directly with the feed pumps through flexible couplings.

control equipment is furnished by the Republic Flow Meters Company, [illegible] pressure type with provisions for manual-remote operation.

[illegible] boiler using controls the fuel-air ratio, [illegible] control panel together with a push-button control for the [illegible] regulator operating the inlet vane control of the forced [illegible]

[illegible] fuel regulator varies the speed of the coal feeder and the air [illegible] varies the speed of the induced draft fan.

[illegible] master controller is provided with a steam pressure element that [illegible] to the main steam header. The master controller maintains a [illegible] steam pressure in the main steam header, and maintains the [illegible] between the fuel and air quantities used by all boilers in [illegible] making it possible to proportion the load carried by each. The master controller is mounted on No. 2 Boiler Control Panel.

[illegible]. Motor Starting Equipment. The motor starting remote control [illegible] the pulverizers, coal feeders, automatic coal scales, forced [illegible] draft fans are centralized on the boiler control panels and are [illegible] electrically to provide proper sequence of operation.

[illegible]. Instruments and Gauges. A Republic multi-pointer draft [illegible] furnace draft, pressure of air entering and leaving heater, [illegible] gas entering and leaving heater, gas leaving fly ash collector, [illegible] of air in burner windbox. Republic temperature recorders for [illegible] temperature of air and gas entering and leaving the heater, a [illegible] boiler steam flow air flow meter, Bailey [illegible] boiler water [illegible], and a steam pressure gauge, are mounted on each boiler control [illegible]

[illegible]. Gauge Panel. A separate gauge panel is provided to [illegible] meters for measuring the flow of all steam from the main [illegible] the various users, for measuring flow of feedwater to the boilers, [illegible] pressure on main and auxiliary steam headers, and temperatures [illegible] steam and water from feedwater heaters.

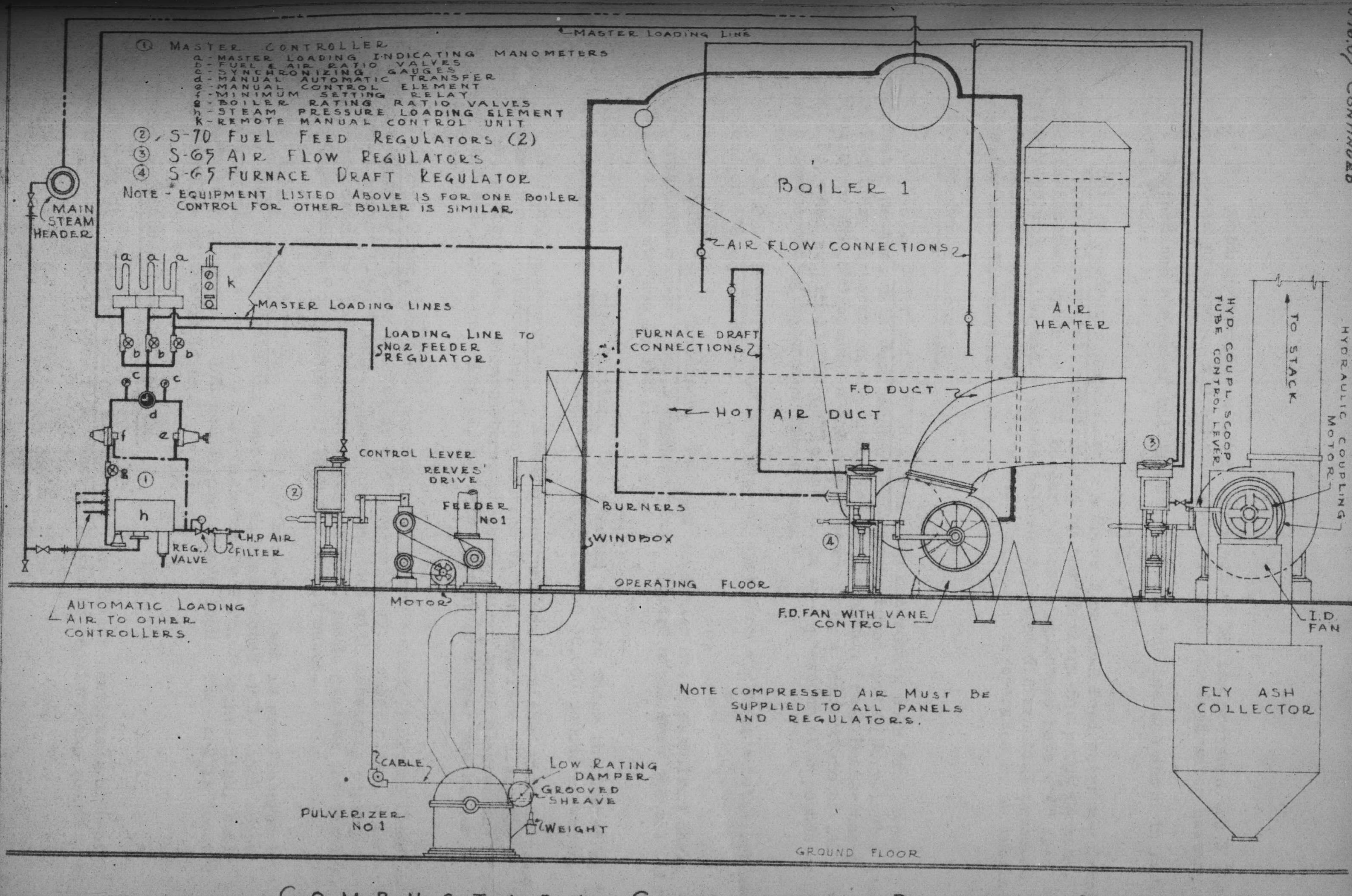
[illegible]. Combustion Control Diagram. The combustion control system [illegible] of the various controlled equipment, are shown in the [illegible] diagram, [illegible]

[illegible]. The building [illegible]

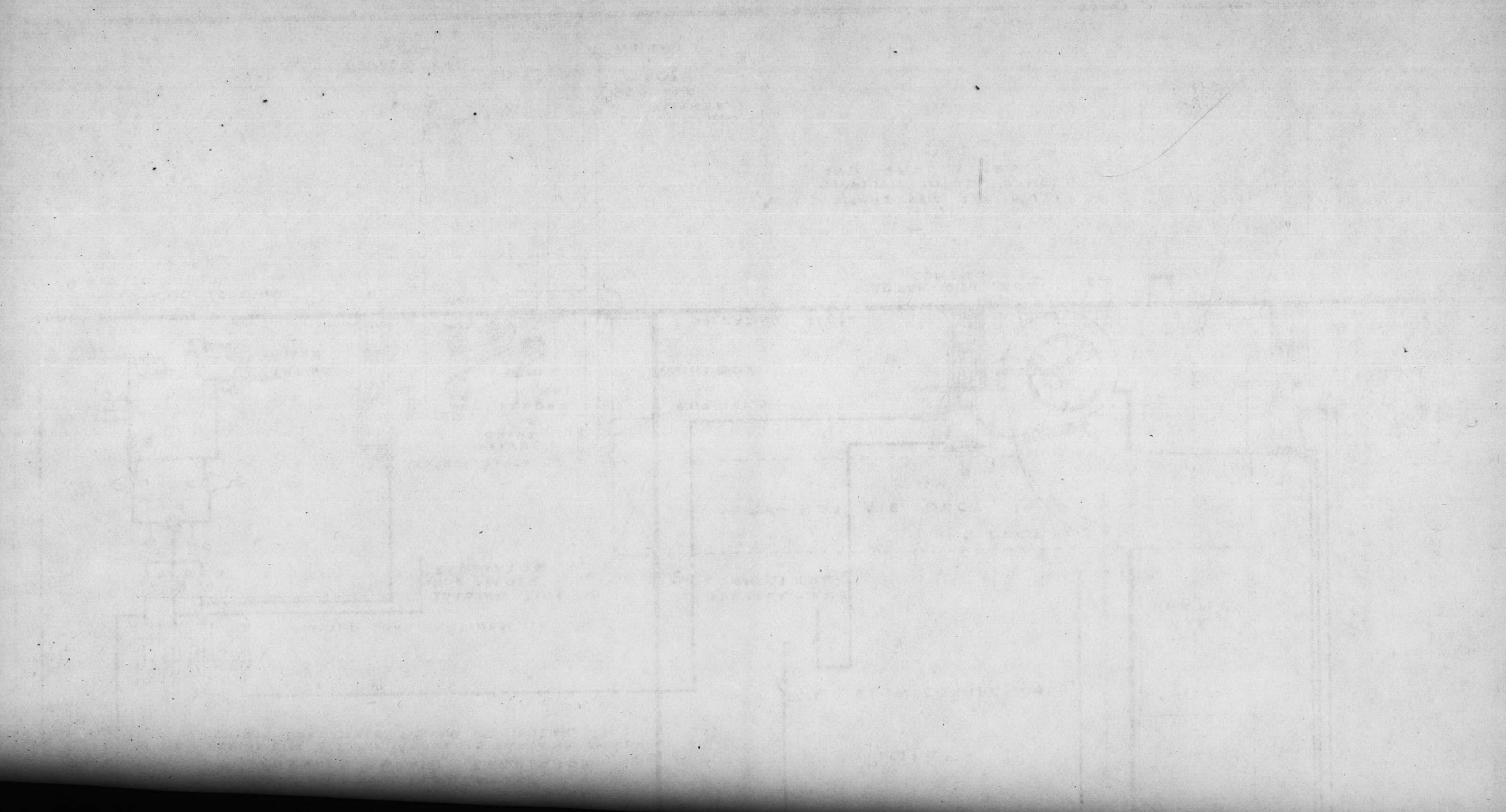
[illegible]

[illegible] manufactured by [illegible] at [illegible] rpm.

[illegible] and expansion trip and [illegible] pressure [illegible] with the [illegible] pumps through flexible couplings.




COMBUSTION CONTROL DIAGRAM



The turbines operate on saturated steam at boiler pressure and 3 lbs. exhaust steam pressure. All exhaust steam is used for feed water heating.

Performance curves of boiler feed pump and turbine are shown in Par. J-1.15 of this report.

J-18. Boiler Feedwater Regulators. A Copes Type RG-2 feed water regulator with a Type R Thermostat, manufactured by the Northern Equipment Company, controls the feed water to each boiler. These regulators have a 4" feed water regulator valve and a syphon bellows operated differential pressure valve combined in one body. The regulating valve is operated by an inclined expansion tube thermostat.

J-19. Feedwater Heaters.

J-19.01. Description of Heaters. Two deaerating open tray type, feedwater heaters with vent condensers, manufactured by the Worthington Pump and Machinery Corporation, are installed in the plant. Each heater has a capacity of 250,000 pounds of water per hour, from a temperature of 140° to 221° F., when supplied with sufficient steam at a pressure of 3 pounds gauge and a corresponding saturated temperature.

J-19.02. Trays. Trays are made of cast iron and have a total heating surface of 370 square feet.

J-19,03. Vent Condenser. The vent condenser has a cast iron shell with arsenical copper U tubes expanded into "Muntz" metal tube sheets. The total cooling surface is 134 square feet.

J-19.04. Storage Section. The storage section under the heater is 7 ft. diameter by 16 ft. long and has a capacity of 38,000 pounds of water.

J-19.05. Accessories. Feedwater heaters are furnished with necessary steam and water connections, float control valves, overflow valve, vacuum breaker, relief valve, thermometers, pressure gauge, water glasses and fittings and all interconnecting piping between vent condenser and heater section.

J-20. Surge Tanks. Two tanks manufactured by the Kennedy Tank and Manufacturing Company are constructed of 3/8" copper bearing steel plate, 9 feet diameter by 20' 9-3/8" long. Tanks are provided with necessary piping connections, overflow, manhole, supporting saddles, gauge glasses and fitting. Each surge tank has a capacity of 9000 gallons of water.

J-21. Boiler Blow-off Tank. The boiler blow-off tank is manufactured by the Kennedy Tank and Manufacturing Company, is constructed of 1/2 inch copper bearing steel plates and is 5 feet diameter by 9 ft. 3 inches high, built for a working pressure of 175 pounds per square inch. The tank is located in a pit outside of the building.

J-22. Continuous Blow-off System.

J-22.01. Description of Equipment. The boiler continuous blow-off system is comprised of four flow control valves to regulate the quantity of

The turbines operate on saturated steam at boiler pressure and 2 lbs.
exhaust steam pressure. All exhaust steam is used for feed water heating.

Performance curves of boiler feed pump and turbine are shown in Part
...13 of this report.

... Boiler Feedwater Regulators. A Copes Type RI-2 feed water regulator
... Type H thermostat, manufactured by the Northern Equipment Company,
...rols the feed water to each boiler. These regulators have a 4" feed
...regulator valve and a syphon bellows operated differential pressure
...combined in one body. The regulating valve is operated by an inclined
...sion tube thermostat.

... Feedwater Heaters.

...-19.01. Description of Heaters. Two deaerating open tray type,
...ater heaters with vent condensers, manufactured by the Worthington Pump
...achinery Corporation, are installed in the plant. Each heater has a
...ity of 250,000 pounds of water per hour, from a temperature of 140° to
..., when supplied with sufficient steam at a pressure of 2 pounds gauge
...corresponding saturated temperature.

...-19.02. Trays. Trays are made of cast iron and have a total heating
...ce of 570 square feet.

...-19.03. Vent Condenser. The vent condenser has a cast iron shell
...admiral copper tubes expanded into "Muntz" metal tube sheets. The
...cooling surface is 154 square feet.

...-19.04. Storage Section. The storage section under the heater is
...meter by 10 ft. long and has a capacity of 35,000 pounds of water.

...-19.05. Accessories. Feedwater heaters are furnished with noz...
...nd water connections, float control valves, overflow valve, vacuum
..., relief valve, thermometers, pressure gauge, water glasses and f...
...nd all interconnecting piping between vent condenser and heater
....

...rge Tanks. Two tanks manufactured by the Kennedy Tank and Manufac-
... Company are constructed of 3/8" copper bearing steel plate, 8 feet
... by 20' 9-3/8" long. Tanks are provided with necessary piping con-
..., interior, manhole, supporting saddles, gauge glasses and fitting
...ch tank has a capacity of 8000 gallons of water.

...oiler Blow-off Tank. The boiler blow-off tank is manufactured by
...ank and Manufacturing Company, is constructed of 1/2 inch copp...
...steel plates and is 5 feet diameter by 9 ft. 3 inches high, built
...orking pressure of 175 pounds per square inch. The tank is locate...
...tside of the building.

...ontinuous Blow-off System.

...1. Description of Equipment. The boiler continuous blow-off ...
...nsists of four FLOW control valves to regulate the quantity ...

blow-off from each boiler; a flash tank 24 inches diameter by 4 ft. high equipped with high level alarm, a float control valve, relief valve, and gauge glass; a heat exchanger 10 inches in diameter by 6 ft. long having 54 sq. ft. of cooling surface; a sample cooler; and necessary testing equipment for determining the density or concentration of solids in the boiler water. The continuous blow-off equipment was furnished by the Cochrane Corp.

J-23. Condensate Receiver and Pumps. Two motor driven single stage, double suction type centrifugal condensate pumps mounted on a common bed plate with a horizontal receiving tank 30 inches diameter by 42 inches long constructed of "Armco" rust resisting iron, manufactured by the Chicago Pump Company. Each pump has a capacity of twenty-five gallons of condensate per minute against a total head of 90 feet.

J-24. Water Softeners. Two Zeo-Dur automatic softeners manufactured by The Permutit Company are installed in the plant. The softener tanks are 5 ft. diameter by 8 ft. high and were furnished with multiport motor operated valves, salt storage tank, 2 brine measuring tanks, brine ejectors, meters, gauges, and all interconnecting piping.

Each softener has a capacity of 40,000 gallons of water of 5 grains hardness, per regeneration and has a maximum rate of delivery of 98 gallons of softened water per minute.

J-25. Piping, Valves and Fittings. In the design of the various piping systems and specifying of materials, the Bureau of Yards and Docks Specification No. 21Yc and Navy Department Specifications 66 Pla were followed closely.

The main steam boiler feed and high pressure drip piping was designed for 250 lbs. working pressure.

All low pressure steam and water piping was designed for 125 pounds working pressure.

Flanged joints were kept to a minimum and where necessary, butt welding flanges were used. Welding fitting and welded nozzles were used in lieu of pipe bends and flanged fittings.

Expansion loops were installed to provide the necessary flexibility required for expansion and contraction.

All stop valves over 2 inches are flanged, cast iron bodies, with outside screw and yoke and flanged bonnets. Globe valves are used on bypasses and wherever control of flow is necessary by throttling.

Check valves are swing type with bolted bonnet.

J-26. Heat Insulation. Insulation on main steam, high pressure drip, and continuous blow-off piping including valves and fittings is double standard thickness 85 per cent magnesia covering.

Boiler feed, exhaust steam, low pressure drip, fuel oil, condensate return, and hot water piping is insulated with 85 percent magnesia standard thickness. All pipe covering has an 8 oz. canvas jacket sewed on.

Feed water heaters, surge tanks, and continuous blow-off flask tank is insulated with 1-1/2" magnesia block and 1/2" hard finish asbestos cement troweled to a smooth surface.

All cold water lines are covered with standard thickness wool felt insulation to prevent condensation and sweating.

All hot air and gas ducts are covered with 2-inch 85 percent magnesia block and 3/4 inch hard finish asbestos cement troweled to a smooth surface.

J-27. Compressed Air System.

J-27.01. Description of System. Compressed air is used throughout the plant for cleaning of equipment, boiler tube cleaning and rolling, air tools, ash unloading, etc.

J-27.02. Air Compressor. Worthington 7" x 7" horizontal, heavy duty, water cooled, double acting type, air compressor. The compressor has a piston displacement of 122 c.f.m. of free air when operating at 400 r.p.m.

The compressor is furnished with a dual control system, permitting the compressor to be operated with automatic start or stop control, or continuously running with automatic loading and unloading at a predetermined pressure.

The compressor is driven through a V belt drive by a 20 H.P. Class K, 208 volt, 3 phase, 60 cycle, General Electric motor.

J-27.03. Air Receiver. Compressed air receiver is a vertical tank 30 inches in diameter by 7 ft. high, A.S.M.E. code construction, and is fitted with safety valve, pressure gauge and drain valve.

J-27.04. Aftercooler. A pipe line water cooled aftercooler equipped with condensate and oil separator is placed between the compressor and air receiver.

J-28. Electric Power.

J-28.01. Primary Service. Electric service to the Central Heating Plant is through one 12,470 volt three wire, three phase overhead feeder, carried on wood poles from Station No. 2 located near the Access Road in the Industrial Area to a manhole outside of the heating plant. A 15,000 volt 600 ampere oil circuit breaker connects this feeder with the Main Supply Feeder Loop. A space for an additional breaker is provided in Station No. 2 for a future feeder to the Central Heating Plant. The future feeder, when installed, will be laid underground from Station No. 2 to the heating plant. The overhead feeder also will be changed to underground at that time. These feeders will assure uninterrupted service to the plant which is dependent

entirely upon outside power for continuity of operation. The single feeder now serving the plant is split into two feeders before entering the manhole outside of building, and carried underground, one to each of the two substations located inside the building.

J-28.02. Unit Sub-Stations. The transformer section of each substation has a rating of 750 K.V.A., is filled with non-inflammable liquid, and is self cooled. High voltage windings are for 12,470 volts delta connected 3 phase, and the low voltage winding is for 120/208 volts, wye connected. Four 2-1/2% taps (below normal rated high voltage and for rated KVA) are in the high voltage windings. An externally operated manual tap changer, to be operated only when transformer is de-energized, is provided. The low voltage switch gear section is an indoor type metal enclosure, housing the main secondary air circuit breaker, the secondary "tie" air circuit breaker, and nine feeder air circuit breakers, as shown on Station Wiring Diagram, Paragraph J-28.07. The secondary main air circuit breaker and the secondary tie air circuit breaker are stationary type, manually operated with time over current protection and instantaneous short circuit trip. The secondary tie breaker also has an instantaneous under voltage release device. The nine feeder air circuit breakers are draw-out type, electrically operated, with time overcurrent protection, instantaneous short circuit trip, shunt trip coils, and clamp type cable terminals. The induced draft and forced draft fan breakers also are equipped with an instantaneous low voltage release device. The electrically operated feeder circuit breakers are operated from a 120 volt D.C. control bus, current being supplied by a storage battery.

Eight two stage pistol grip circuit breaker control switches for starting fans, pulverizers, feeders and coal scales are mounted on a switch panel on the Combustion Control Panel. Also located on this panel are red and green lamps and ammeters for indicating running and over load conditions of the motors, also a watt hour meter to register KWH and demand of the total motor load on each boiler. The air circuit breakers on feeders to the motor driven boiler auxiliaries are interlocked electrically for sequence operation. This is done to make sure the operator will start the equipment in proper order and also to protect the system in case of power failure or development of motor trouble in any one motor in the system. The starting sequence of motors is as follows:

1. Induced Draft Fan
2. Forced Draft Fan
3. Pulverizers
4. Feeders
5. Coal Scales

Stopping sequence is in reverse order to the starting sequence. In case of motor failure stopping induced draft fan, all of the interlocked motors will be stopped automatically. If the pulverizer motor fails, the feeder and coal scales will stop and fans will continue running.

A switch is provided for shunting the induced draft fan out of the system in case it is desired to operate with the forced draft fan only, which will be the case when operating under light loads with natural draft or when using the oil burners. Unit Substation "A" normally supplies power

to the motor driven auxiliaries for Boilers No. 1 and 2 and Unit Substation B supplies power to Boilers No. 3 and 4.

J-28.03. Secondary Tie Bus. A 2000 ampere tie bus connects Unit Substations "A" and "B", makes it possible to throw the load of all the boilers on either Unit Substation "A" or "B". This tie bus also connects the Auxiliary Panel with both Unit Substations.

J-28.04. Auxiliary Panel. There are eight feeder air circuit breakers in the auxiliary low voltage switch gear section. Each breaker is rated at 600 volts, 25,000 ampere interrupting capacity. Breakers are 3 pole, single throw, electrically operated, stationary type with time overcurrent protection and instantaneous short circuit trip mechanism. The current rating and service of each breaker is shown on Station Wiring Diagram Paragraph J-28.07.

Provisions are made in the auxiliary panel for the installation of a future generator control panel, and generator air circuit breaker.

All controls and starters for motors and equipment supplied from the auxiliary panel will be located at each piece of respective equipment.

J-28.05. Metering. The following meters are mounted on the Auxiliary Panel:

1 Watt meter to indicate the total load on both incoming high voltage feeders.

1 Ammeter for incoming line 1.

1 Voltmeter for incoming line 1.

1 Watt hour meter with an indicating demand register to measure total load.

1 Watt hour meter with indicating demand register to measure power supplied by the auxiliary low voltage switch gear section.

1 Watt meter for indicating the total load.

1 Ammeter for incoming line 2.

1 Voltmeter for incoming line 2.

1 Watt hour meter with indicating demand register to measure total power load.

1 Watt hour meter with indicating demand register to measure lighting load.

J-28.06. Motors. All motors, except the small fractional horsepower motors, are wound for three phase, 60 cycle, 208 volt current. Motors driving fans are open protected, constant speed, normal torque, low starting current, squirrel cage induction motors. Motors driving pulverizers and

motor driven auxiliaries for Boilers No. 1 and 2 and Unit Substation
power to Boilers Nos. 3 and 4.

J-28.03. Secondary Tie Bus. A 3000 ampere tie bus connects Unit
Substations "A" and "B", making it possible to throw the load of all the
on either Unit Substation "A" or "B". This tie bus also connects
auxiliary panel with both Unit Substations.

J-28.04. Auxiliary Panel. There are eight feeder air circuit breakers
auxiliary low voltage switch gear section. Each breaker is rated at
volts, 25,000 ampere interrupting capacity. Breakers are 3 pole, single
(electrically operated) stationary type with time overcurrent protect-
and instantaneous short circuit trip mechanism. The current rating and
of each breaker is shown on Station Wiring Diagram Paragraph J-28.07.

Provisions are made in the auxiliary panel for the installation of a
generator control panel, and generator air circuit breaker.

All controls and starters for motors and equipment supplied from the
auxiliary panel will be located at each piece of respective equipment.

J-28.05. Metering. The following meters are mounted on the auxiliary
panel:

Watt meter to indicate the total load on both incoming high voltage
feeders.

Ammeter for incoming line 1.

Voltmeter for incoming line 1.

Watt hour meter with an indicating demand register to measure total
load.

Watt hour meter with indicating demand register to measure power
supplied by the auxiliary low voltage switch gear section.

Watt meter for indicating the total load.

Ammeter for incoming line 2.

Voltmeter for incoming line 2.

Watt hour meter with indicating demand register to measure total
power load.

Watt hour meter with indicating demand register to measure lighting
load.

J-28.06. Motors. All motors, except the small fractional horsepower
are wound for three phase, 60 cycle, 208 volt current. Motors
are open protected, constant speed, normal torque, low starting
squirrel cage induction motors. Motors driving pulverizers and

# Over Size Form

☐ Too Large ☑ Bound Book

☐ Fragile ☐ Other ________

Sheet Number: J-28.07

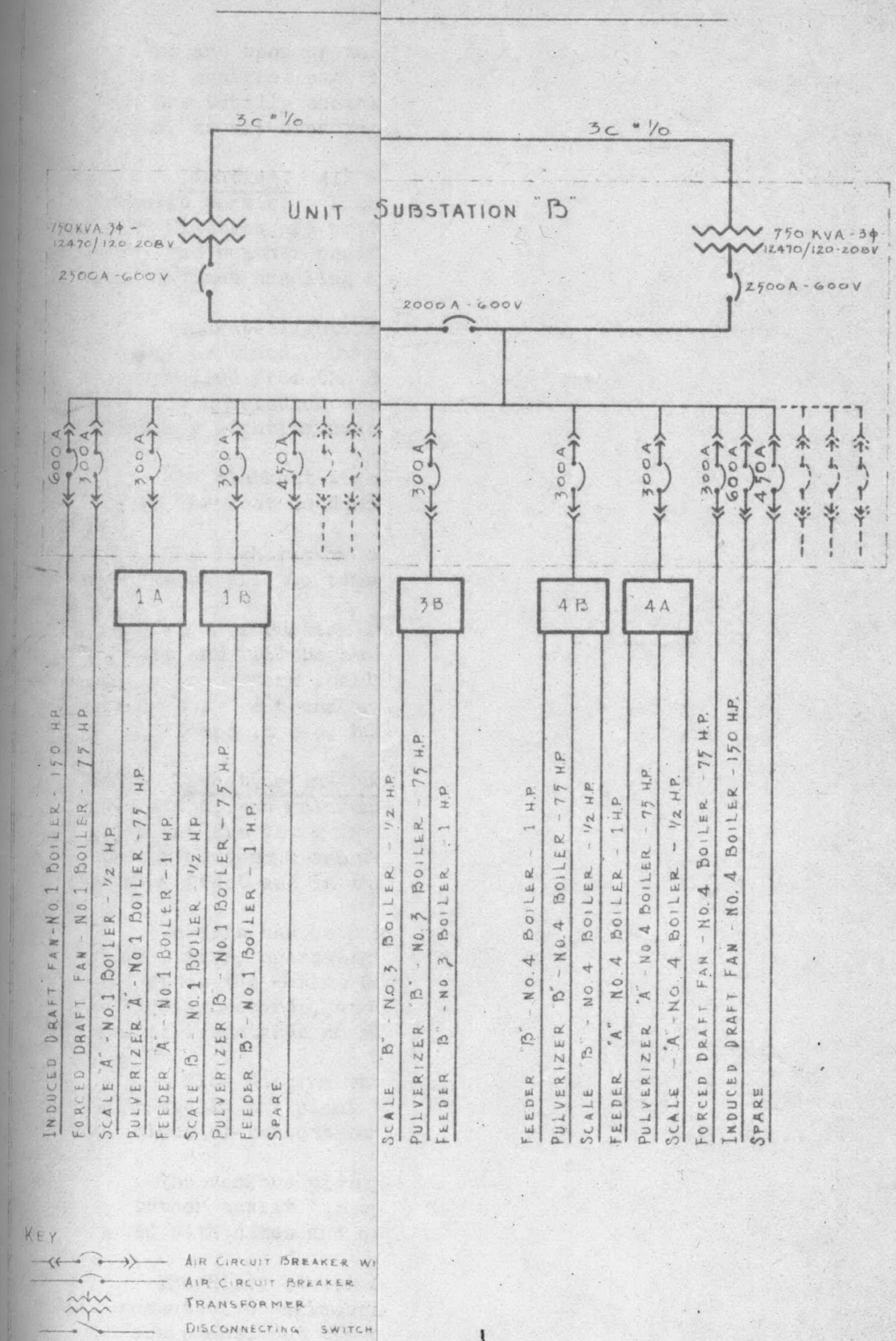
Drawing/NAVFAC Number: ________

# Title

Station Wiring Diagram

Central Heating Plant

J-28.07



3c #1/0
3c #1/0
UNIT SUBSTATION "B"
750 KVA 3φ - 12470/120-208V
750 KVA - 3φ 12470/120-208V
2500A - 600V
2500A - 600V
2000 A - 600V
600A
300A
300A
300A
450A
300A
300A
300A
300A
600A
450A
1A
1B
3B
4B
4A
INDUCED DRAFT FAN - NO 1 BOILER - 150 HP
FORCED DRAFT FAN - NO 1 BOILER - 75 HP
SCALE "A" - NO 1 BOILER - 1/2 HP
PULVERIZER "A" - NO 1 BOILER - 75 HP
FEEDER "A" - NO 1 BOILER - 1 HP
SCALE "B" - NO 1 BOILER - 1/2 HP
PULVERIZER "B" - NO 1 BOILER - 75 HP
FEEDER "B" - NO 1 BOILER - 1 HP
SPARE
SCALE "B" - NO 3 BOILER - 1/2 HP
PULVERIZER "B" - NO 3 BOILER - 75 HP
FEEDER "B" - NO 3 BOILER - 1 HP
FEEDER "B" - NO. 4 BOILER - 1 HP
PULVERIZER "B" - NO. 4 BOILER - 75 HP
SCALE "B" - NO. 4 BOILER - 1/2 HP
FEEDER "A" NO. 4 BOILER - 1 HP
PULVERIZER "A" - NO 4 BOILER - 75 HP
SCALE - "A" - NO. 4 BOILER - 1/2 HP
FORCED DRAFT FAN - NO. 4 BOILER - 75 HP
INDUCED DRAFT FAN - NO. 4 BOILER - 150 HP
SPARE
KEY
AIR CIRCUIT BREAKER WI
AIR CIRCUIT BREAKER
TRANSFORMER
DISCONNECTING SWITCH


J.T.H.

feeders are open protected, constant speed, normal starting current, normal torque, squirrel cage induction motors. Motor driving coal handling equipment are totally enclosed, fan cooled, 55° C. rise, constant speed, normal torque, normal starting current, squirrel cage induction motors.

J-29. Lighting. All regular lighting is on 120 volt, 3 phase four wire 60 cycle service. Lights are installed in R.L.M. dome type reflectors. Dust tight fixtures are provided in area over coal bunkers and in coal handling pits, and weather proof fixtures are provided outdoors on building, and on coal and ash handling systems.

Separate lighting circuits for blackout lighting and emergency lighting are provided. Current for the emergency lighting and blackout lights are supplied from the 60 cell 125 volt, storage battery, used for operating the Unit Substation air circuit breakers. In case of power failure, the emergency lighting automatically is thrown on by a magnetic contactor.

The blackout lights are controlled from the Main Control System located in the Post Headquarters.

The lighting on combustion control panels, and boiler water columns will be on all the time, regardless of what system is in operation.

The obstruction lights installed on stacks are on the normal lighting circuit and will be controlled by an automatic time switch with astronomical dial which automatically turns the obstruction lights on at sundown and off at sunrise. A transfer relay operates to throw in a spare lamp should one of the lamps in use, burn out.

J-30. Operating Instructions. Detailed instructions for the operation, inspection, and maintenance of the equipment installed in the Central Heating Plant are given in Instruction Books and Shop Drawings furnished by the various equipment manufacturers, copies of which are on file in the Central Heating Plant and in the Public Works Office.

No data has been included in this report regarding operating personnel, their duties, operating log sheets, monthly records, inspection schedules, etc. since the Marine Corps has standard forms and systems that will be used in keeping records, and the Engineer in Charge no doubt will have his preference as to methods of management.

A flow diagram showing the principal piping systems was prepared, and is posted in the plant to assist the operating personnel in learning the locations of various control valves and their functions.

The various piping systems are identified with code bands painted on, to further assist the operators in tracing out the lines. Equipment is also marked with names and number.

The Riley Stoker Corporation and the Architect-Engineers furnished representative engineers for a period of sixty days to make adjustments in the equipment, put the plant into operation, and train the Marine Corps personnel in the operation and maintenance of the plant.

In conclusion, the Central Heating Plant is designed for efficient, economical operation, and maintenance with a minimum amount of labor. Records obtained from the recording flow meters, gauges, and automatic coal scales should be used for operating guidance, performance calculations, cost accounting, and in attaining and maintaining peak plant efficiency.

The equipment and materials used in the construction of the plant is of the most modern design obtainable and was selected for ruggedness and durability, assuring long life, and low maintenance.

J-31. General Information on Outlying Heating Plants.

J-31.01. Design Conditions established by the directives were used by the Architect-Engineers to calculate overall boiler requirements and to establish types of plants to be provided.

As initially set forth, automatic oil firing was required. This was later amended due to oil shortage and conversion to coal firing was made as directed.

J-31.02. Procurement of Equipment was carried out by the Contractor. In order to expedite and insure deliveries, purchases by direction were made from quotations on manufacturers standard stock, using above preliminary design data.

J-31.03. Boiler Feed Water Treatment. Complete recommendations covering the treatment of make up water together with a detailed description of equipment and chemicals required for this purpose is contained in a report by Mr. Sheppard T. Powell, Chemical Engineer. Copies of this report have been filed with the Officer in Charge.

J-31.04. Supplementary Report. At the time of writing this report it appears that certain changes may take place to meet unexpected increases in population or other unforeseen conditions. Accordingly, reference should be made to any subsequent information which may be prepared to augment this report.

J-32. Tent Camp No. 1.

J-32.01. Central Heating Plant. The purpose of this plant is to furnish steam for heating, hot water, and process to the various buildings in this area. Installed in this boiler house are four mechanical fired boilers. The steam distribution and condensate return system is carried overhead on wood poles. A complete description of the steam distribution system is given in Section G-2 of this report.

The original installation consisted of three 179 H.P. horizontal, return tubular, Kewanee boilers, oil fired. Due to the oil shortage, two of these boilers were converted to stoker fired, in the summer of 1942, and an additional 214 H.P. Kewanee boiler, stoker fired, was added to take care of additional load requirements.

In conclusion, the Central Heating Plant is designed for efficient, economical operating, and maintenance, with a minimum amount of labor. Data obtained from the recording flow meters, gauging, and automatic [illegible] should be used for operating guidance, performance calculations, [illegible] and in attaining and maintaining peak plant efficiency.

The equipment and materials used in the construction of the plant is of the most modern design obtainable and was selected for ruggedness and durability, assuring long life, and low maintenance.

[illegible] General Information on Outlying Heating Plants.

[illegible]-51.01. Design conditions established by the directives were used by Architect-Engineers to calculate overall boiler requirements and to [illegible] types of plants to be provided.

As initially set forth, automatic oil firing was required. This was [illegible] due to oil shortage and conversion to coal firing was made [illegible].

[illegible]-51.02. Procurement of Equipment was carried out by the Contractor. [illegible] to expedite and insure deliveries, purchases by direction were made [illegible] on manufacturers standard stock, using above preliminary [illegible] data.

[illegible]-51.03. Boiler Feed Water Treatment. Complete recommendations covering the treatment of make up water together with a detailed description of [illegible] and chemicals required for this purpose is contained in a report [illegible] Sheppard T. Powell, Chemical Engineer. Copies of this report have [illegible] filed with the Officer in Charge.

[illegible]-51.04. Supplementary Report. At the time of writing this report [illegible] that certain changes may take place to meet unexpected increased [illegible] or other unforeseen conditions. Accordingly, reference should [illegible] to any subsequent information which may be prepared to augment this [illegible].

[illegible] Camp No. 1.

[illegible]-52.01. Central Heating Plant. The purpose of this plant is to [illegible] steam for heating, hot water, and process to the various buildings [illegible] area. Installed in this boiler house are four horizontal fired [illegible] The steam distribution and condensate return system is carried [illegible] on wood poles. A complete description of the steam distribution [illegible] is given in Section 3-4 of this report.

The original installation consisted of three 150 H.P. horizontal, [illegible] tubular, return tubular boilers, oil fired. Due to the oil shortage, the [illegible] boilers were converted to stoker fired, in the summer of 1943, and [illegible] additional 150 H.P. return tubular boiler, stoker fired, was added to take care of [illegible] additional load requirements.

J-32.02. Total Connected Load. A tabulation of the total heat requirements in Btu's per hour for the individual buildings is as follows:

| | Heating | Hot Water | Process | Total |
|---|---|---|---|---|
| Mess Halls | 3,686,400 | 1,547,000 | 3,461,800 | 8,695,200 |
| Enlisted men's wash rms. | 5,900,400 | 28,634,100 | - | 34,534,500 |
| Officers wash rooms | 403,200 | 4,186,000 | - | 4,589,200 |
| Hospital | 965,145 | 1,321,200 | 4,855 | 2,291,200 |
| Additions to Hospital | 1,406,305 | 1,117,060 | 19,144 | 2,542,519 |
| Hospital Administration | 165,420 | - | - | 165,420 |
| Recreation Building | 803,440 | 92,080 | - | 895,520 |
| Post Exchange | 500,000 | - | - | 500,000 |
| Total | 13,830,320 | 36,897,440 | 3,485,799 | 54,213,559 |

Distribution Losses = 832,000 Btu per hour

Peak Load = 55,045,559 Btu per hour

Peak Load $= \frac{55,045,559}{970 \times 30} =$ 1891 Boiler H.P.

Installed Boiler Capacity.

3- 179 H.P. boilers operating at 130% rating = 698 Boiler H.P.
1- 214 H.P. boiler operating at 130% rating = 278 Boiler H.P.
Total Installed Boiler Capacity = 976 Boiler H.P.

Since the peak load demand is 1891 boiler horsepower, there is a deficiency of 915 boiler H.P., based on the above calculations.

J-32.03. Estimated Fuel Requirements.

Heating $\frac{13,830,320 \times 24 \times 2,300}{60 \times 13,500 \times 0.6 \times 2,000} =$ 785 tons per year

Hot Water $\frac{36,897,440 \times 6 \times 365}{13,500 \times 0.6 \times 2,000} =$ 4,980 tons per yr.

Process $\frac{3,485,799 \times 7 \times 365}{13,500 \times 0.6 \times 2,000} =$ 550 tons per yr.

Distribution Losses $\frac{820,000 \times 24 \times 365}{13,500 \times 0.6 \times 2,000} =$ 443 tons per yr.

Total fuel required = 6,758 tons per yr.

Estimated Fuel Consumption of Present Plant.

Fuel $\frac{976 \times 6758}{1891} =$ 3487 tons per year.

Coal $\frac{3487}{0.76} =$ 2650 tons per year.

Fuel Oils $\frac{3487 \times 3.67}{0.24} =$ 3072 bbls. per year.

J-32.04. Boilers. These are portable, horizontal, return tubular, firebox boilers, manufactured by the Kewanee Boiler Corporation. The three 179 H.P. boilers are designated as No. 588, and the one 214 H.P. boiler is a No. 589. Boilers are fired as noted above. The three boilers rated at 179 H.P have a heating surface of 1786 sq. ft., the 214 H.P. rated boiler having a heating surface of 2143 sq. feet. All boilers are built for 125 lbs. working pressure. Standard trim including water column, pressure gauge, injector, and blowoff connections are provided for each boiler.

J-32.05. Breeching and Stacks. Boilers are connected to a common breeching constructed of No. 10 gauge steel plate. Breeching is connected to a steel stack 5'9" in diameter and 100' high.

J-32.06. Combustion Equipment. Three boilers are fired by worm feed mechanical stokers manufactured by the Conco Corporation, designated as Model H-7. Stoker is driven by a 5 H.P. motor, and is fed by 600 lb. hopper which is approximately one-half hour's supply when operating at full rating. Stoker is automatically started and is operated by a steam pressure actuated control. A low water safety cut-off switch is provided.

One boiler is fired by a horizontal rotary cup type motor driven oil-burner, manufactured by the Petroleum Heat and Power Company and is known as the Petrol "Model W-8-5A". A motor driven fuel oil pump and combustion controls are integral parts of the unit. The oil is preheated by a steam heater for normal operation and 5 kw electric oil heater is used for starting.

J-32.07. Fuel Oil Storage. Two fuel oil storage tanks, the total capacity -30,000 gallons, are provided.

J-33. Tent Camp No. 2.

J-33.01. Heating Plant. The purpose of this plant is to supply steam for heating, process and hot water to the Mess Halls and Recreation Building. A separate boiler house was constructed with space for two boilers and their necessary auxiliaries. Provisions for future expansion in boiler capacity were considered in building as well as piping design. It was decided to install a combination of oil and coal fired boilers to cover the present steam demand with capacities of 500 boiler H.P. and 250 boiler horsepower for oil and coal respectively.

J-33.02. Total Connected Load. In the following tabulation is the connected load given for each building, expressed in Btu per hour:

| | Heating | Hot Water | Process | Total |
|---|---|---|---|---|
| Mess Halls | 3,686,400 | 1,547,000 | 3,461,800 | 8,695,200 |
| Officers' Mess Hall | 1,263,150 | 519,350 | 519,600 | 2,302,100 |
| Recreation Building | 803,400 | 92,100 | - | 895,500 |
| Total | 5,752,950 | 2,158,450 | 3,981,400 | 11,892,800 |

Overhead Distb. System Losses = 162,000 Btu per hr.

Peak Load = 12,044,800 Btu per hr.

J-33.03. Estimated Fuel Consumption. The annual fuel consumption is based on coal with a heat value of 13,500 Btu per pound and an overall boiler efficiency of 60% and is estimates as follows:

Heating $\dfrac{5,752,950 \times 24 \times 2,300}{60 \times 13,500 \times 0.6 \times 2,000}$ = 326 tons coal per yr.

Hot Water $\dfrac{2,158,450 \times 6 \times 365}{13,500 \times 0.6 \times 2,000}$ = 291 tons coal per yr.

Process $\dfrac{3,981,400 \times 7 \times 365}{13,500 \times 0.6 \times 2,000}$ = 629 tons coal per yr.

Distr. Losses $\dfrac{162,000 \times 24 \times 365}{13,500 \times 0.6 \times 2,000}$ = 88 tons coal per yr.

Annual coal consumption= 1,334 tons coal per yr.

J-33.04. Boiler Operation on Coal at Peak Loads. Winter and summer peak loads may be carried by the coal or oil fired boiler, or in combination of both:

Winter $\dfrac{12,044,800}{970 \times 30}$ = 414 Boiler H.P. per hour

Coal fired boiler may carry this load at 165% of its normal rating; the oil fired boiler may be considered a "standby".

Summer $\dfrac{6,301,900}{970 \times 30}$ = 217 Boiler H.P. per hour

Coal fired boiler will operate at 87% of its normal rating, oil fired boiler is a "standby".

J-33.05. Combination Coal and Oil Firing at Peak Loads. Annual fuel requirements are as follows:

Winter Load

Coal fired boiler at normal rating - 250 B.H.P. or 60% of total coal per year, 1,344 tons = 800 tons

Oil fired boiler 40% of 1,334 tons = 534 tons

534 tons of coal are equivalent to oil of 18,500 Btu per pound heating value with an overall boiler efficiency of 70%:

$\dfrac{534 \times 2,000 \times 13,500 \times 0.6}{150,000 \times 42 \times 0.7}$ = 1,960 bbls. per year.

Total fuel: 800 tons of coal per year
and 1,960 bbls. of oil per year

J-33.06. Boiler Operation on Oil at Peak Loads. Winter and summer peak loads may be carried by the oil fired boiler with the coal fired boiler as a "standby".

Total steam load - 414 Boiler horsepower per hr.

Oil fired boiler - 500 Boiler horsepower per hr.

Winter Load carried at 83% of its usual rating.

Summer Load at 43.5 % of its usual rating.

Fuel Oil Consumption. 1,334 tons coal are equivalent to oil:

$$\frac{1,334 \times 2,000 \times 13,500 \times 0.6}{150,000 \times 42 \times 0.7} = 4,900 \text{ bbls. per year}$$

J-33.07. Boilers. Coal fired boiler, or Boiler No. 1, is a Fitzgibbon Boiler Company "Model P-250", stoker fired, with a heating surface of 2,500 sq. ft. and rated 250 B.H.P. at 125 p.s.i. working pressure. Emergency feed water injector, blow-off valves and standard trim were furnished by the manufacturer.

The oil fired boiler or Boiler No. 2, Cleaver-Brooks "Oil-built No. O.B.50", integral unit, is rated 500 B.H.P. at 125 p.s.i. working pressure with standard trim, feed water injector and blow-off valves.

J-33.08. Combustion Equipment.

Coal Stoker. Boiler No. 1 is equipped with an Iron Fireman, Model 5A, under-feed worm type stoker, driven by a 7.5 H.P. motor, 3 phase, 60 cycle, 209 volt current characteristic. Its hopper capacity is 1,200 lbs. of coal, or approximately one hour's supply operating at normal rating. The stoker operation is fully automatic and regulated by steam pressure actuated controls in conjunction with the McDonnell # 150 safety cut-off switch at low-water level.

Fuel Oil Burner. Boiler No. 2 has an integral rotary cup type fuel oil burner, driven by a 3 H.P. motor. It is designed to burn No. 6 fuel oil. The forced draft fan is mounted as a separate unit on the boiler support framing, with a 15 H.P. motor, ~~tex~~-rope driven.

Burner operation is automatically regulated by steam pressure actuated controls and the McDonnell No. 150 low-motor cut-off switch. A 3/4 H.P. motor driven fuel oil pump of 300 gallons per hour capacity, Viking Model ZH-1, is installed on the boiler support framing together with a steam fuel oil pre-heater. A 5 kw electric fuel oil heater is provided for starting and emergency operation.

J-33.09. Boiler Feed Water System.

The Condensate Receiver of 250 gallons capacity is provided with a submerged heating coil supplied with exhaust steam from the boiler

feed pump. Condensate from buildings and low pressure drips are returned to the receiver by individual pumps through a condensate return system. Raw water make-up is automatically regulated by float valves and the McDonnell No. 51 safety cut-off at the receiver.

Feed Water Pumps. The feed water pump for Boiler No. 1 is a Worthington "Model VC" reciprocating type, steam driven, of 24 gallons per minute capacity. Feed water flow is controlled by a steam pressure governor. Boiler water level is automatically maintained by the "Copes" feed water regulator, and in emergency by a manually operated feed water injector.

Boiler feed pump No. 2 is a turbine type, "Aurora" Model No. 58 G D, 37 gallons per minute capacity, and is driven by a 7.5 H.P. motor. Water level is automatically regulated by a McDonnell # 150 safety cut-off, and manually by a feed water injector.

J-33.10. Boiler House Piping. Valves, and all steam, water and oil piping are installed in accordance with Navy Specifications 66 Pla and 21Yc. Welding fittings are used wherever possible and practicable.

J-33.11. Coal Storage. A coal storage yard of approximately 300 tons capacity or 2.5 months' supply is adjacent to the boiler house. Coal is wheeled to the stoker hopper, and no provisions have been made for mechanical coal handling equipment.

J-33.12. Fuel Oil Storage. One 8,000 gallons fuel oil tank is installed underground about 50 feet from the plant. Its capacity represents about 14 days' supply when only oil is being fired. Steam is provided for preheating the fuel oil in the tank.

J-34. Barrage Balloon Battalion and Rifle Range.

J-34.01. Heating Plants. These two are similar installations. The purpose of these plants is to furnish steam for heating, hot water and process to their respective areas. Located in separate houses, each plant has identical boiler room equipment which includes two mechanically fired boilers, pumps, condensate tank, and auxiliaries.

J-34.02. Barrage Balloon Battalion Total Connected Load. A tabulation of the total heat requirements expressed in B.t.u. per hr. for various buildings is as follows;

| | Heating | Hot Water | Process | Total |
|---|---|---|---|---|
| 4 Barracks | 3,435,840 | 3,828,720 | - | 7,264,560 |
| Mess Hall | 849,600 | 506,840 | 2,691,955 | 4,048,395 |
| Infirmary | 219,461 | 187,790 | 63,812 | 471,063 |
| Post Exchange | 205,320 | 187,790 | - | 393,110 |
| Battalion Headquarters | 240,242 | 60,166 | - | 300,408 |
| Drill & Recreation Bldg. | 1,793,520 | 209,668 | - | 2,003,188 |
| Total | 6,743,983 | 4,980,974 | 2,755,767 | 14,480,724 |

Distribution Losses - 250,000 Btu per hour.

Peak Load - 14,730,724 Btu per hour.

J-34.03. Barrage Balloon Battalion Estimated Fuel Requirements.

Heating $\frac{6,743,983 \times 24 \times 2,300}{60 \times 13,500 \times 0.6 \times 2,000}$ = 383 tons per year.

Hot Water $\frac{4,980,974 \times 6 \times 365}{13,500 \times 0.6 \times 2,000}$ = 475 tons per year.

Process $\frac{2,755,767 \times 7 \times 365}{13,500 \times 0.6 \times 2,000}$ = 434 tons per year.

Distb. Losses $\frac{250,000 \times 24 \times 365}{13,500 \times 0.6 \times 2,000}$ = 135 tons per year.

Total amt. of fuel = 1,427 tons per yr.

Oil Equivalent. One ton of coal with a heating value of 13,500 Btu per pound burned at 60% overall efficiency is equivalent to 3.67 bbls. of oil with content of 6,300,000 Btu per bbl. of oil burned at 70% overall efficiency:

$$\frac{2,000 \times 13,500 \times 0.6}{6,300,000 \times 0.7} = 3.67$$

Percentage of Total Load Carried Per Boiler.

Peak Load (see above) $\frac{14,730,724}{970 \times 30}$ = 508 B.H.P. = 100% of total load

Boiler No. 1 (coal) carries 250 x 1.3 = 325 B.H.P. = 64% of total load

Boiler No. 2 (oil) carries 183 B.H.P. = 36% of total load.

Fuel Consumption Per Year Per Boiler.

Total fuel required expressed in coal = 1,427 tons per year

Boiler No. 1, Coal = 1427 x .64 = 913 tons per year

Boiler No. 2, Oil = 514 x 3.67 = 1,890 bbls. per year

J-34.04. Rifle Range Total Connected Load. A tabulation of the total heat requirements expressed in B.t.u. per hour for the various buildings is as follows:

| | Heating | Hot Water | Process | Total |
|---|---|---|---|---|
| 4 Barracks | 3,435,840 | 3,828,720 | - | 7,264,560 |
| Mess Hall | 849,600 | 506,840 | 2,691,955 | 4,048,395 |
| Infirmary | 219,461 | 187,790 | 63,812 | 471,063 |
| Post Exchange | 205,320 | 187,790 | - | 393,110 |

J-34.04. (Cont'd)

| | Heating | Hot Water | Process | Total |
|---|---|---|---|---|
| B. O. Q. | 513,600 | 580,125 | - | 1,093,725 |
| Armory & Office Building | 788,040 | 60,166 | - | 848,206 |
| Theater | 1,793,520 | 209,668 | - | 2,003,188 |
| Officers' Qtrs. (5 single buildings) | 485,000 | - | - | 485,000 |
| Total | 8,290,381 | 5,561,099 | 2,755,767 | 16,607,247 |

Distribution Losses = 260,000 Btu per hour

Peak Load = 16,867,247 Btu per hour

J-34.05. Rifle Range Estimated Fuel Requirements:

Heating $\frac{8,290,381 \times 24 \times 2,300}{60 \times 13,500 \times 0.6 \times 2,000}$ = 471 tons per year

Hot Water $\frac{5,561,099 \times 6 \times 365}{13,500 \times 0.6 \times 2,000}$ = 754 tons per year

Process $\frac{2,755,767 \times 7 \times 365}{13,500 \times 0.6 \times 2,000}$ = 434 tons per year

Distribution Losses $\frac{260,000 \times 24 \times 365}{13,500 \times 0.6 \times 2,000}$ = 141 tons per year

Total amount of fuel = 1,800 tons per year

Peak Load $\frac{16,867,247}{970 \times 30}$ = 580 Bhp = 100%. = 1800 tons per year

Actual Fuel Consumption — Coal Consumption $250 \times 1.3$ = 325 Bhp = 56% = 1008 tons per year

Oil Consumption — Balance of Fuel = $792 \times 3.67$ = 2907 bbls. per year

J-34.06. Boilers. Boiler No. 1 is a portable, horizontal, return tubular, "Model P-250" boiler manufactured by the Fitzgibbons Boiler Co., Inc. Boiler is rated at 250 H.P. and has a heating surface of 2500 sq. ft. built for 100 p.s.i. working pressure and is equipped with standard trim consisting of water column, gauge glass, pressure gauge and blow-off connections. Boiler No. 2 is a portable, horizontal, return tubular, "Oil-built" Model OB-35 boiler manufactured by Cleaver-Brooks Co. Boiler has 1640 sq. ft. of heating surface built for 125 lbs. working pressure and is rated 350 H.P. by the manufacturer. This unit has standard trim and blow-off connections.

J-34.07. Chimney and Breeching. Boiler No. 1 has a 2'-6" square breeching connecting into brick chimney 2'-6" square inside, by 40' high. Boiler No. 2 has a separate vent stack through roof.

J-34.08. Combustion Equipment: Boiler No. 1 is equipped with an Iron Fireman Model 5A worm feed mechanical stoker driven by a 7-1/2 H.P. electric motor. Stoker is automatically started and operated by a steam pressure control. A McDonnell No. 150 low water stoker cut-off is also provided. Hopper capacity is 1200 pounds of coal, which is approximately

one hour's supply operating at full load. Boiler No. 2 is equipped with a built-in rotary type oil burner, driven by a 2 H.P. electric motor. The forced draft fan is driven by a 15 H.P. motor. The oil burner and fan are manually started and automatically operated by steam pressure actuated controls. A separate "Viking Model ZH-1"oil pump having a capacity of 91 g.p.h. driven by a 1/3 H.P. electric motor is provided. Equipment is designed to handle No. 6 or lighter fuel oil. Oil is preheated by a steam heater for normal operation, and by a 5 kw electric heater for starting.

J-34.09. Fuel Oil Storage, of 20,000 gallons is provided by two tanks of 10,000 gallons each, located 50 feet from the boiler room underground.

J-34.10. Boiler Feedwater System. The condensate receiver tank has approximately 940 gallons capacity. Make-up water is supplied from wells and is controlled by an automatic electrically operated float valve on condensate tank. Water is pumped from the condensate tank directly to the boilers.

The boiler feedwater pump for No. 1 boiler is a Worthington, duplex reciprocating, steam driven pump having a capacity of 24 g.p.m. and controlled by a "Copes" pump governor. Water level is maintained in the boiler by a "Copes" feedwater regulator.

The boiler feedwater pump for No. 2 boiler is an Aurora Model 58 G-D turbine type pump having a capacity of 37 g.p.m., driven by a 7-1/2 H.P. motor. Water level in boiler is controlled by a McDonnell No. 150 regulator

J-34.11. Boiler House Piping, is installed in accordance with Navy Specification 66Pla and 21 Yc. Piping is welded wherever practicable in lieu of screwed and flanged joints. Piping is designed for 125 pounds working pressure.

J-34.12. Steam Distribution and Condensate Return System. The steam distribution and condensate returns are underground and are described in detail in Section G-2 of this report.

J-34.13. Coal Storage. Sufficient space is available at both plants for approximately one half the annual coal requirements.

J-35. Barrage Balloon School Area and Amphibian Base Shops Area.

J-35.01. Barrage Balloon School Heating Plant. One of two similar plants, the purpose of this plant is to furnish steam for heat and hot water to the various buildings and provide for future units in the school areas. Located in a separate boiler house, it consists of a low pressure stoker fired coal burning boiler with condensate receiver, boiler feed pump and accessories. Distribution and condensate return are underground and are described in Section G-2 of this report.

J-35.02. Barrage Balloon School Total Connected Load. A tabulation of the total heat requirements in Btu per hour for the individual buildings is as follows:

| | Heating | Hot Water | Total |
|---|---|---|---|
| Administration | 130,560 | 60,166 | 190,726 |
| School | 207,120 | 60,166 | 267,286 |
| Balloon | 468,000 | - | 468,000 |
| Transport | 56,000 | - | 56,000 |
| Storage and Supply | 147,000 | - | 147,000 |
| Total | 1,008,680 | 120,332 | 1,129,012 |

Distribution Losses = 115,000 Btu per hour.

Peak Load = 1,244,012 Btu per hour.

J-35.03. Barrage Balloon School Estimated Fuel Requirements. The annual fuel requirements have been estimated and tabulated below. The overall boiler efficiency is estimated to be 60 per cent average with coal having a heating value of 13,500 Btu per pound as fired.

Heating $\dfrac{1{,}008{,}680 \times 24 \times 2{,}300}{60 \times 13{,}500 \times 0.6 \times 2{,}000}$ = 57.3 tons per year.

Hot Water $\dfrac{120{,}332 \times 6 \times 365}{13{,}500 \times 0.6 \times 2{,}000}$ = 16.3 tons per year.

Distribution Losses $\dfrac{115{,}000 \times 24 \times 365}{13{,}500 \times 0.6 \times 2{,}000}$ = 62.4 tons per year.

Total Coal Required for Present System - 136 tons per year.

Available Boiler Capacity for Future Expansion.

Installed Capacity Present Boiler = 70 Boiler H.P.
Present Peak Load : $\dfrac{1{,}244{,}012}{970 \times 30}$ = 42 Boiler H.P.

Future Available Boiler Capacity = 28 Boiler H.P.

J-35.04. Amphibian Base Shops Heating Plant. The purpose of this plant is to provide steam for heat, hot water and process to the Machine Shop and Carpenter Shop. Located in the Carpenter Shop, it consists of a low pressure stoker fired, coal burning boiler and accessories. Distribution and condensate return are underground as described in Section G-2 of this report.

J-35.05. Amphibian Base Shops Total Connected Load. A tabulation of the total heat requirements in Btu per hour for the individual buildings is as follows:

| | Heating | Hot Water | Process | Total |
|---|---|---|---|---|
| Machine Shop | 917,764 | 63,360 | 78,431 | 1,059,555 |
| Carpenter Shop | 958,408 | 63,360 | - | 1,021,768 |
| Total | 1,876,172 | 126,720 | 78,431 | 2,081,323 |

Distribution Losses - 15,000 Btu per hour

Peak Load - 2,096,323 Btu per hour

J-35.06. Amphibian Base Shops Estimated Fuel Requirements. The annual fuel requirements have been estimated and tabulated below. The over-all boiler efficiency is estimated to be 60 per cent average with coal having a heating value of 13,500 Btu per pound as fired.

Heating $\frac{1,876,172 \times 24 \times 2,300}{60 \times 13,500 \times 0.6 \times 2,000}$ = 107 tons per year.

Hot Water $\frac{126,720 \times 6 \times 365}{13,500 \times 0.6 \times 2,000}$ = 17.3 tons per year.

Process $\frac{78,431 \times 7 \times 365}{13,500 \times 0.6 \times 2,000}$ = 12.5 tons per year.

Distribution Losses $\frac{15,000 \times 24 \times 365}{13,500 \times 0.6 \times 2,000}$ = 8.5 tons per year.

Total Coal Required thus = 145.3 tons per year

Installed Boiler Capacity

Installed capacity: present boiler = 71.5 boiler H.P.

Present peak Load $\frac{2,096,323}{970 \times 30}$ = 72.04 boiler H.P.

J-35.07. Boiler. This is a portable, horizontal, return tubular, fire box boiler, manufactured by Oil City Tank and Boiler Company, designated as Oil City "Model No. 5410H". Boiler is coal stoker fired., rated 71.5 H.P. with 715 sq. ft. of heating surface, built for 15 lbs. W.P, Standard trim including water column, gauge glass, pressure gauge, injector and blow-off connections is provided.

J-35.08. Breechings and Chimney. The boiler is connected with chimney by a 24-inch square breeching. The brick chimney is 24 inches square inside by 35 feet high.

J-35.09. Combustion Equipment. Boiler is fired by a worm feed mechanical stoker manufactured by the Conco Corporation designated as "Model No. H-4". Stoker is driven by a 2 H.P. motor, and is fed by a 600 pound hopper which is approximately 1-1/2 hour's coal supply when operating at full rating. Stoker is automatically started and is operated by a steam pressure actuated control. A low-water safety cut-off switch is provided.

J-35.10. Boiler Feedwater Systems. A condensate receiver tank of 50 gallons capacity is installed in the Amphibian Shops boiler plant. The condensate tank installed in the Barrage Balloon Schools boiler plant has a capacity of approximately 175 gallons. Make-up water from the local well supply is automatically controlled by a McDonnell No. 51 control valve mounted on the tank. The condensate is returned from the tank to the boiler by a 12 g.p.m. turbine type pump driven by a 3/4 H.P. motor.

J-35.11. Boiler House Piping, is installed in accordance with Navy Specification 66 Pla and 21 Yc. Piping is welded wherever practicable in lieu of screwed and flanged fittings. Piping is designed for 125 lbs. working pressure.

J-35.12. Coal Storage. Sufficient space is available for approximately a year's supply of coal at both plants.

J-36. Bachelor Officers' Quarters Group, Paradise Point.

J-36.01. Heating Plant. The purpose of this plant is to furnish steam required for process, hot water and heating in the various buildings of this group. Located in a wing of the mess hall, it consists of two boilers, one using coal and the other oil, and the necessary auxiliaries. Distribution to other buildings of the group is through underground piping systems as described under Section G-2.

J-36.02. Total Connected Load. A tabulation of the total heat requirements in Btu per hour to the various buildings is as follows:

| | Heating | Hot Water | Process | Total |
|---|---|---|---|---|
| B.O.Q. | 4,108,800 | 4,641,000 | - | 8,749,800 |
| Men's Quarters | 170,808 | 141,440 | - | 312,248 |
| Women's Quarters | 80,256 | 141,440 | - | 221,696 |
| Fire House | 203,420 | 227,630 | - | 431,050 |
| Mess Hall | 1,644,000 | 655,200 | 1,356,461 | 3,655,661 |
| Total | 6,207,284 | 5,806,710 | 1,356,461 | 13,370,455 |

Distribution System Losses - 295,000 Btu per hour

Peak Load - 13,665,455 Btu per hour

J-36.03. Estimated Fuel Requirements. The annual fuel requirements have been estimated and tabulated below. The overall boiler efficiency is estimated to be 70 per cent average with oil having a heating value of 6,300,000 Btu's per 42-gallon barrel and 60 per cent average with coal having a heating value of 13,500 Btu's per pound as fired.

Heating $$\frac{6,207,284 \times 24 \times 2,300}{(70-10) \times 13,500 \times 0.6 \times 2,000} = 353 \text{ tons per year}$$

Hot Water $\frac{5,806,710 \times 6 \times 365}{13,500 \times 0.6 \times 2,000}$ = 785 tons per year.

Process $\frac{1,356,461 \times 7 \times 365}{13,500 \times 0.6 \times 2,000}$ = 214 tons per year

Distribution Losses $\frac{295,000 \times 24 \times 365}{13,500 \times 0.6 \times 2,000}$ = 160 tons

Total Fuel Required = 1,512 tons coal per yr.

Oil Equivalent. The amount of oil equivalent to one ton of coal as fired and based on average evaporation efficiencies is approximately 3.67 barrels estimated as follows:

$$\frac{2,000 \times 13,500 \times .60}{6,300,000 \times .70} = 3.67 \text{ bbls. of oil per ton of coal}$$

Percentages of Total Load Carried by Coal and Oil Fired Boilers.

Peak Load $\frac{13,665,455}{970 \times 30}$ = 470 Boiler H.P. per hour

| | | | |
|---|---|---|---|
| Coal Fired Boiler Carries: 250 H.P. x 1.3 | = | 325 B.H.P./hr. | = 69% |
| Oil Fired Boiler Carries Balance: | = | 145 B.H.P./hr | = 31% |
| | | 470 B.H.P./hr | = 100% |

Fuel Consumption per year for each Boiler.

| | | |
|---|---|---|
| Coal consumption: | Total 1512 x .69 = | 1,045 tons per yr. |
| Oil consumption equivalent to coal | 1512 x .31 = | 467 tons per yr. |
| Total fuel required expressed in tons of coal | = | 1,512 tons per yr. |
| Oil consumption: | Total 467 x 3.67 = | 1,713 bbls. per year. |

J-36.04. Boilers. Boiler No. 1 is a Fitzgibbons Boiler Company Model "P-250", portable, firebox type boiler, stoker fired. Rated at 250 H.P. with heating surface of 2500 sq. feet, it has a furnace volume of 303.6 cubic feet when mechanically fired. Operating at a pressure of 125 pounds per square inch, this boiler is equipped with standard trim and blow-off valves.

Boiler No. 2 is a portable, integral oil burner type boiler, manufactured by Cleaver Brooks Company, "Oil-built" model "OB-15". Rated by the manufacturer at 150 H.P., it has a heating surface of 709 sq., feet operation is at 125 pounds per square inch pressure, Standard trim and blow-off valves are provided.

J-36.05. Breechings. Boiler No. 1 (coal fired) is provided with connections for future induced draft fan and a by-pass for natural draft operation. Boiler No. 2 (oil fired) has a separate steel stack through roof.

J-36.06. Stoker Equipment. Boiler No. 1 is equipped with an Iron [illegible] $\dfrac{[illegible] \times .9 \times 865}{[illegible] \times [illegible] \times 2,000}$ = [illegible] tons per year

[illegible] $\dfrac{1,[illegible],488 \times 7 \times 865}{[illegible] \times .[illegible] \times 2,000}$ = [illegible] tons per year

[illegible] $\dfrac{[illegible],000 \times 14 \times 865}{[illegible],800 \times 0.7 \times 2,000}$ = [illegible] tons

Total Fuel Required = 1,512 tons coal per year

[illegible]. The amount of oil equivalent to one ton of coal at [illegible] on average evaporation efficiencies is approximately [illegible] [illegible] as follows:

$\dfrac{[illegible],800 \times .[illegible]}{[illegible],[illegible]}$ = [illegible] bbls. of oil per ton of coal

[illegible] Total Load Carried by Coal and Oil Fired Boilers.

$\dfrac{11,[illegible]}{[illegible] \times [illegible]}$ = [illegible] Boiler H.P. per hour

[illegible] Boiler Carries, [illegible] H.P. x 1.[illegible] = [illegible] B.H.P./hr. = [illegible]
[illegible] Boiler Carries Balance; = [illegible] B.H.P./hr = [illegible]
[illegible] B.H.P./hr = [illegible]

[illegible] per year for each Boiler.

[illegible]: Total 1512 x .[illegible] = 1,0[illegible] tons per [illegible]
[illegible] equivalent to coal 1512 x .[illegible] = [illegible] tons per year.
[illegible] required expressed in tons of coal = 1,512 tons per [illegible]
[illegible]: Total [illegible] x [illegible] = [illegible] bbls. per year.

[illegible]. Boiler No. 1 is a Fitzgibbons Boiler Company [illegible], [illegible] type boiler, stoker fired. Rated at [illegible] [illegible] surface of [illegible] sq. feet, it has a furnace volume of [illegible] mechanically fired. Operating at a pressure of [illegible] [illegible], this boiler is equipped with standard trim and blow-[illegible]

[illegible] is a portable, integral oil burner type boiler, manufac-[illegible] Company, "[illegible]" model "[illegible]". Rated by the [illegible], it has a heating surface of [illegible] sq. feet operating [illegible] square inch pressure. Standard trim and blowoff valves [illegible]

[illegible]. Boiler No. 1 (coal fired) is provided with [illegible] induced draft fan and a by-pass for natural draft [illegible]. 2 (oil fired) has a separate steel stack through [illegible]

[illegible] Equipment. Boiler No. 1 is equipped with an Iron

Fireman Corporation Model No. 5A stoker of the worm feed type. It is driven by a 7.5 H.P. motor, 3 phase, 60 cycles, 208 volt current characteristic. The operation of the stoker is fully automatic, regulated by steam pressure actuated controls with a McDonnell No. 150 safety cut-off switch at low-water level.

Oil Firing Equipment. Boiler No. 2 is provided by a built in rotary type burner driven by a 2 H.P. electric motor. The forced draft fan equipped with a 10 H.P. motor is manually started and automatically operated by steam pressure actuated controls. A separate "Viking Model ZGx2" oil pump driven by a 1/3 H.P. electric motor is provided having a maximum capacity of 91 g.p.h, fuel oil demand at full load being approximately 48 g.p.h. Equipment is designed to use No. 6 or lighter oils. Automatic preheating of oil is provided by a steam heater for normal operation and a 5 kw electric heater for starting.

J-36.07. Boiler Feedwater System. The condensate receiver of approximately 940 gallons capacity has two submerged heaters. One unit is a heater coil supplied by exhaust steam from the boiler feed pump, the other unit consists of a perforated tube element discharging high pressure drip returns into the receiver water. Low pressure condensate is returned to the receiver through a distribution system from primary condensate return pumps located in various buildings. Raw-water make-up is automatically controlled by float valves on the receiver.

Boiler Feedwater Pumps. Feedwater Pump, Boiler No. 1, is a reciprocating steam driven type furnished by Worthington Pump and Machinery Corp., Model VC. Boiler feedwater level is maintained by a "Copes" regulator of 24 g.p.m. capacity against maximum boiler pressure. Feedwater Pump, Boiler No. 2, is an electric driven 7-1/2 H.P. turbine type of 37 g.p.m. capacity against maximum boiler pressure, furnished by Cleaver Brooks Company, Aurora Model S8-G-D. Boiler feedwater level is maintained by McDonnell #150 regulator.

J-36.08. Boiler House Piping is installed in accordance with Navy Specification 66Fla and 21Yc. Piping is welded wherever practicable in lieu of flanged and screwed fittings.

J-36.09. Coal Storage Yard, of approximately 280 tons, or three month's supply at full load, is provided.

J-36.10. Fuel Oil Storage of 20,000 gallons is provided, this is approximately 3-1/2 month's supply at full load. There are two tanks located underground about 50 feet from boiler room.

J-37. B.O.Q. Naval Hospital.

J-37.01. Heating Plant. The purpose of this plant is to furnish steam for heat and hot water to Bachelor Officers' Quarters Building in the Naval Hospital Group. This plant is located in the basement of the B.O.Q. and consists of a low pressure steam boiler, condensate receiver boiler feed pump and accessories.

...ated controls with ... automatic ... shut-off ...

...ing equipment: Boiler No. 2 is provided by ... driven by a ... electric motor. ... Fuel oil ... is normally ... heated ... is provided by a steam heater for normal operation and a ... heater for starting.

...Boiler Feedwater System. The condensate receiver of ... capacity ... the ... feed heater. The unit is ... supplied by exhaust steam from the boiler feed pump ... performed ... Low pressure condensate is returned ... distribution system from primary condensate return pumps ... various buildings. ... make-up is automatically controlled ... the receiver.

...Feedwater Pumps. Feedwater pump, Boiler No. 1, is a ... type, furnished by Worthington Pump and Machinery Corp. ... feedwater level is maintained by a "Copes" regulator ... against maximum boiler pressure. Feedwater pump, ... turbine type of 47 g.p.m. capacity ... boiler pressure, furnished by ... Pump Company. ... water level is maintained by ...

...Boiler House Piping is installed in accordance with Navy ... Piping is ... standard fittings.

...Coal ... of approximately 200 tons, for three ... Portable.

...Oil Storage of 20,000 gallons ... is provided ... about 50 feet from boiler room.

...Plant(s)

...General. The purpose of this plant is to furnish ... water to Bachelor Officers' Quarters Building ... This plant is located in the basement of the B.O.Q. ... low pressure steam boiler, condensate receiver, boiler feed ...

J-37.02. Total Connected Load. A tabulation of the Btu per hour for this building is as follows:

| | Heating | Hot Water | Total |
|---|---|---|---|
| Bachelor Officers' Quarters | 516,600 | 473,000 | 989,600 |
| | | Peak Load | 989,600 |

J-37.03. Estimated Fuel Requirements. The annual fuel requirements have been estimated and are tabulated below. The overall boiler efficiency is estimated to be 60 per cent average with coal having a heating value of 13,500 Btu per pound as fired.

Heating $\frac{516,600 \times 24 \times 2300}{60 \times 13,500 \times 0.6 \times 2,000}$ = 30 tons per year

Hot Water $\frac{473,000 \times 6 \times 365}{13,500 \times 0.6 \times 2,000}$ = 64 tons per year

Total Coal Required = 94 tons per year

J-37.04. Boiler. This is a portable horizontal return tubular fire-box boiler manufactured by Oil City Tank and Boiler Company designated as "Oil City Model 63". Boiler is coal stoker fired, rated at 42 H.P. having 420 sq. feet of heating surface, designed for 15 lbs. working pressure. Standard trim including water column, gauge glass, pressure gauge, injector and blow-off connections are provided.

J-37.05. Breechings and Chimney. An 18" square breeching connecting with a brick chimney 18" in diameter by 30 ft. high is provided.

J-37.06. Combustion Equipment. Boiler is fired by a worm feed mechanical stoker manufactured by Conco Corporation designated as "Model H-2". Stoker is driven by a 1-1/2 H.P. electric motor and is fed by a 600 lb. hopper which is approximately 3 hours' coal supply when operating at full rating. Stoker is automatically started and is operated by a steam pressure actuated control. A low water safety cut-off switch is provided.

J-37.07. Boiler Feedwater System. A condensate receiver tank 50 gallons capacity together with a 12 g.p.m. turbine type condensate pump is driven by a 3/4 H.P. motor and is used to return the water to the boiler Water level in boiler is maintained by a McDonnell No. 150 feedwater control valve.

J-37.08. Boiler Room Piping. Is installed in accordance with Navy Specification No. 66Pla and 21 Yc. Piping is designed for 125 lbs. working pressure.

J-38. Mumford Point, Tent Camp # 1.

J-38.01. Heating Plant. The purpose of this plant is to furnish steam for heating, hot water and process steam to the principal buildings of this area. A separate boiler house was constructed with provision for future expansion in boiler capacity. The present installation consists of a 179 B.H.P., stoker fired boiler designed for 125 p.s.i. working pressure and the necessary auxiliaries.

J-38.02. Total Connected Load. A tabulation of the total connected load, expressed in Btu's per hour, to individual buildings is as follows:

| | Heating | Hot Water | Process | Total |
|---|---|---|---|---|
| Administration Bldg. | 158,640 | - | - | 158,640 |
| Mess Hall | 525,760 | 773,500 | 1,730,900 | 3,030,160 |
| Infirmary | 215,376 | 110,500 | - | 325,876 |
| Recreation Building | 803,440 | 92,080 | - | 895,520 |
| Post Exchange | 500,000 | - | - | 500,000 |
| Total - | 2,203,216 | 976,080 | 1,730,900 | 4,910,196 |

Overhead distribution system losses: 246,000 Btu per hour
Peak load 5,156,196 Btu per hour

J-38.03. Estimated Fuel Requirements. The annual fuel consumption is estimated below, and was based on an overall boiler efficiency of 60% with coal of a heating value of 13,000 Btu per lb. as fired:

Heating $\dfrac{2,203,216 \times 24 \times 2,300}{60 \times 13,500 \times 0.6 \times 2,000}$ = 125 tons per year

Hot Water $\dfrac{976,080 \times 6 \times 365}{13,500 \times 0.6 \times 2,000}$ = 134 tons per year

Process $\dfrac{1,730,900 \times 7 \times 365}{13,500 \times 0.6 \times 2,000}$ = 273 tons per year

Losses $\dfrac{246,000 \times 24 \times 365}{13,500 \times 0.6 \times 2,000}$ = 133 tons per year

Total coal consumption = 665 tons per year

J-38.04. Peak Loads. The maximum steam generation of a 179 Btu boiler at 130% rating, expressed in Btu per hour is:

Winter Load - 130% rating: 6,780,000 Btu per hour

Peak Load 5,156,000 Btu per hour

Spare capacity 1,624,000 Btu per hour
or 43 b.h.p. at 130% rating are available.

Summer Load - 130% rating: 6,780,000 Btu per hour

Peak Load 2,707,000 Btu per hour

Spare capacity 4,073,000 Btu per hour

or 107 b.h.p. at 130% rating are available.

J-38.05. Boiler. The boiler is a Bison No. 582 manufactured by Farrar and Trefts, Inc. equipped with standard trim, boiler feed injector and blow-off valves. The heating surface of this unit is 1,786 square feet, and the normal rating is 179 b.h.p. at 125 p.s.i. working pressure. It is a portable firebox type boiler arranged for stoker firing.

J-38.06. Stoker Equipment. An underfeed, worm type stoker, manufactured by Conco Corporation, Model "Conco H-7" was installed. This is of the dead plate setting type, has 5-feed adjustments and is driven by 5 h.p., 3 phase, 60 cycles, 208 volt motor. The operation is fully automatic, regulated by steam pressure actuated controls with McDonnell No. 150, safety cut-off switch at low water level.

J-38.07. Breeching. The boiler breeching has been designed with the necessary connections for future induced draft fan installation and for a by-pass with damper for natural draft operation.

J-38.08. Boiler Feedwater System. The condensate receiver of approximately 370 gallons capacity is provided with a submerged, perforated tube element discharging high pressure drip returns into the receiver water. Low pressure condensate is returned to the receiver through a distribution system from primary condensate return pumps located in various buildings. Raw water make-up is automatically controlled by float valves on the receiver operating in conjunction with McDonald No. 51 safety cut-off.

J-38.09. Feedwater Pump. A steam driven, duplex piston type Worthington pump of 24 g.p.m. capacity against maximum boiler pressure has been installed. Pump operation is controlled by a differential steam pressure governor. An automatic Copes feedwater regulator has been installed in connection with an injector for manual operation to maintain a constant water level in the boiler.

J-38.10. Boiler House Piping. Steam and water piping has been designed in accordance with U. S. Navy Specifications 66Pla and 21Yc. Piping joints were welded wherever possible and fittings were used only on small piping. Provisions have been made in the main steam piping design for future boiler installation.

J-38.11. Coal Storage Yard. Approximately 250 tons of coal storage space is adjacent to the boiler house providing a supply for approximately 4-1/2 months.

[illegible]

Boilers. [illegible] cubic feet [illegible] 1,586 square feet [illegible] arranged for [illegible]

[illegible] Equipment. [illegible] stoker [illegible] has [illegible] adjustments and is driven [illegible] will not [illegible] The combustion is fully automatic, [illegible] pressure actuated controls [illegible] safety [illegible] water level.

[illegible]. The boiler breeching has been designed with [illegible] for future induced draft fan installation and for [illegible] natural draft operation.

Boiler Feedwater System. The equipment consists of [illegible] capacity [illegible] with a submerged, perforated tube [illegible] pressure [illegible] into the receiver [illegible] returned to the receiver through a distribution system [illegible] return pumps located in various buildings [illegible] controlled by float [illegible] in the receiver [illegible] safety cut-off.

Feedwater Pumps. [illegible] steam driven, duplex piston type [illegible] against maximum boiler pressure [illegible] controlled by a differential steam pressure governor. [illegible] regulator has been installed in connection with [illegible] to maintain a constant water level in the [illegible]

Boiler House Piping. Steam and water piping has been designed [illegible] Navy specifications [illegible] Flanged joints [illegible] possible and fittings were used only in small piping. [illegible] in the main steam piping design for future boiler [illegible]

Coal Storage Yards. Approximately 800 tons of coal storage [illegible] providing a supply for [illegible]

J-39. Parachute Tower Buildings.

J-39.01. Heating Plant. The purpose of this plant is to furnish heat for the Parachute Training Building and Parachute Building. Located in a separate boiler house., the plant consists of one coal fired steam boiler condensate receiver tank, boiler feedwater pump and accessories. Distribution is overhead on wood poles and is described in Section G-2 of this report.

J-39-02. Total Connected Load. A tabulation of the total heat requirements in Btu per hour for the individual buildings is as follows:

| Building | Heating |
|---|---|
| Parachute Training Building | 246,200 |
| Parachute Building | 1,158,400 |
| Total - | 1,404,600 |

| | |
|---|---|
| Distribution System Losses | 90,000 Btu per hour |
| Peak Load | 1,494,600 Btu per hour |

J-39.03. Estimated Fuel Requirements. The annual fuel requirements have been estimated and tabulated below. The overall boiler efficiency is estimated to be 60 per cent average with coal having a heating value of 13,500 Btu per pound as fired.

Heating $\frac{1,404,600 \times 24 \times 2300}{60 \times 13,500 \times 0.6 \times 2,000}$ = 80 tons per year

Distribution Losses $\frac{90,000 \times 24 \times 210}{13,500 \times 0.6 \times 2,000}$ = 28 tons per year

Total Coal Consumption = 108 tons per year

Installed Boiler H.P. = 143
Present Requirements = 52
Available for Future Use = 91 Boiler H.P.

J-39.04 Boiler. This is a portable, horizontal, return tubular, firebox boiler manufactured by Kewanee Boiler Corporation and designated as Model #587. Boiler is coal stoker fired rated at 143 H.P., has 1429 square feet of heating surface and is built for 125 lbs. working pressure.

J-39.05. Breeching and Chimney. Boiler is connected with chimney by a 33" square breeching. The brick chimney is 36" square inside and 36 feet high.

J-39.06. Combustion Equipment. Original layout was for hand firing but was later changed to stoker firing. This change will be covered in a supplementary report.

J-39.07. Boiler Feedwater System. The condensate receiver tank of approximately 175 gallons is installed in the plant. Make-up water from the

Division Training Area system is automatically controlled by a float valve mounted on the tank.

Condensate is pumped from the tank to the boiler by a Worthington, 21 g.p.m. duplex steam driven boiler feedwater pump, controlled by a "Copes" pump governor. Water level is controlled in the boiler by a "Copes" feedwater regulator.

J-39.08. Boiler House Piping is installed in accordance with Navy Specifications 66Pla and 21Yc. Piping is designed for 125 lbs. working pressure.

J-39.09. Coal Storage. A space 30' square enclosed by a 4' high bulkhead having a capacity of approximately 125 tons of coal is provided.

J-40. Naval Hospital Group.

J-40.01. Heating Plant. The purpose of the Naval Hospital Heating Plant is to provide a standby system to furnish steam for heating, hot water and process to the buildings of the main group. While this plant now supplies steam to the Hospital group, it is intended that ultimate service will be from the Central Heating Plant in the Division Training Area. The plant consists of three semi-automatic oil fired boilers together with necessary auxiliaries.

J-40.02. Total Connected Load. A tabulation of the total heat requirements in Btu per hour to the various buildings is as follows:

| | Heating | Hot Water | Process | Total |
|---|---|---|---|---|
| Administration | 8,610,752 | 1,371,958 | 2,889,407 | 12,872,117 |
| Wards | 9,763,200 | 2,304,525 | 647,236 | 12,714,961 |
| Barracks | 890,400 | 1,093,920 | - | 1,984,320 |
| Nurses Home | 1,086,720 | 519,350 | 255,248 | 1,861,318 |
| Med. STorehouse | 514,300 | 55,250 | - | 569,550 |
| Garage | 389,840 | 55,250 | - | 445,090 |
| Nurses Quarters for Family Hospital | 196,944 | 55,250 | - | 252,194 |
| Laundry | 492,000 | 1,855,424 | 3,730,222 | 6,077,646 |
| Hosp. Warehouse | 285,350 | 55,250 | - | 340,600 |
| Warrant Officers' Quarters | 63,360 | - | - | 63,360 |
| Family Hospital | 1,585,200 | 629,004 | 884,252 | 3,098,456 |
| Gas & Oil Storage | - | - | 52,785 | 52,785 |
| Total - | 23,878,066 | 7,995,181 | 8,459,150 | 40,332,397 |

Distribution System Losses - 550,000 Btu per hour

Peak Load -40,882,000 Btu per hour

J-40.03. Estimated Fuel Oil Requirements. The annual fuel requirements have been estimated and tabulated below. The overall boiler efficiency is estimated to be 70 per cent average with oil having a heating value of

6,300,000 Btu's per 42-gallon barrel.

| | | | |
|---|---|---|---|
| Heating | $\frac{23,878,066 \times 24 \times 2,300}{(70-10) \times 150,000 \times 0.7}$ | = | 209,400 gallons of oil per year |
| Hot Water | $\frac{7,995,181 \times 6 \times 365}{150,000 \times 0.7}$ | = | 166,800 gallons of oil per year |
| Process | $\frac{8,459,150 \times 7 \times 365}{150,000 \times 0.7}$ | = | 205,600 gallons of oil per year |
| Distribution Losses | $\frac{550,000 \times 24 \times 365}{150,000 \times 0.7}$ | = | 46,000 gallons of oil per year |

Total Fuel Oil Consumption = 627,800 gallons of fuel oil per year

J-40.04. Boilers. The plant consists of three boilers "Oilbuilt Model OB-50" manufactured by Cleaver Brooks Company having 2,500 square feet of heating surface and rated by the manufacturer at 500 h.p. when operating at 125 p.s.i. Each boiler is equipped with an integral rotary cup type oil burner. Yarway tandem blow-off valves and standard trim consisting of a water column, gauge glass, pressure gauge, and injector.

J-40.05. Vent Stacks. Each boiler has a separate vent stack through roof.

J-40.06. Oil Burner Equipment. The rotary cup type burner is driven by a 3 H.P. electric motor which is manually started and automatically operated by steam pressure. Each boiler is equipped with a "Viking Model ZH-1" oil pump of 300 gallons per hour capacity driven by a 3/4 H.P. electric motor. The equipment is designed to burn No. 6 or lighter fuel oils. The oil is preheated with steam heaters for normal operation and a 5 K.W. electric oil heater is used for starting.

J-40.07. Fuel Oil Storage of 30,000 gallons is provided by two tanks located underground about 50 feet from boiler room. This is approximately 2-1/2 week's supply of oil required by the three boilers operating at full load.

J-40.08. Boiler Feedwater System. The condensate receiver tank has approximately 1130 gallons capacity. Make-up water is supplied from Zeolite Water Softeners, and is controlled automatically by a McDonnell #51 feeder control valve in connection with a float valve in the condensate tank. Water is pumped from condensate tank to feed water heater by the feedwater heater pump and is discharged from heater by gravity to the boiler feedwater pumps. Three feedwater pumps, turbine type, "Aurora-Model 510 - G.D." rated 60 g.p.m., electrically driven by $7\frac{1}{2}$ h.p. motors are installed in the plant. Water level in the boilers is maintained by McDonnell No. 150 boiler feedwater regulators.

J-40.09. Water Treatment Equipment. Boiler feedwater makeup is taken from the Zeolite water softening system which also supplies the hospital laundry. Two softening units are provided, each with a rated flow of

300 g.p.m. and 100,000 gallons between regenerations.

Each unit is equipped with brine storage and measuring tanks and accessories for complete automatic operation, in which the cycles of softening and regeneration take place at predetermined intervals based upon the total amount of water softened. This equipment was furnished by the Permutit Company.

J-40.10. Boiler House Piping is installed in accordance with Navy Specification 66Pla and 21Yc. Piping is welded wherever practicable in lieu of screwed and flanged joints. Piping is designed for 125 pounds working pressure.

J-40.11. Steam Distribution and Condensate Return System. The steam distribution and condensate return system is run underground and is described in detail in Section G-2 of this report.

J-40.12. Standby Electric Power for Naval Hospital Group. The original design included a 50 K.W. gasoline driven generator set which was never installed. See Electrical report Section H.

A 140 K.W. Diesel engine driven generator was later installed and will be covered in a supplementary report.

J-41. The Hostess House in Tent Camp #1, the Chapel in Tent Camp #1, the Servants Quarters at the Naval Hospital, the Operation Building at the Landing Field and the Mumford Point Chapel are heated by forced hot water systems. The boilers are of the sectional cast iron type, each fired by worm type, underfeed, single retort stoker designed to burn bituminous coal. The closed type of piping system has been employed utilizing properly sized air cushion tanks to absorb the expansion. Water is admitted to each system through a pressure reducing valve and each is protected by a pressure relief valve. Even though these protective devices have been installed care should be taken to place the operation of the system in qualified hands as over firing over long periods may cause serious trouble. Circulating pumps properly controlled are provided to circulate the hot water through the heating systems and flow control valves have been installed to prevent circulation when no heat is required.

J-42. Gate House and Mumford Point Brig. Hot water systems similar to those described in J-41 but hand fired have been installed in the Gate House, and the Mumford Point Brig. Precautions against over firing as set forth in paragraph J-41 should be taken even more seriously in case of these hand fired installations, over firing may easily prove disasterous.

J-43. Officers' Quarters and Guest House. Hot water systems similar to those described in J-41 but oil fired have been installed in 196 Officers' Quarters and the Guest House in the Residential Area.

J-44. Radio Transmitter Building. The Radio Transmitter Building has been supplied with oil fired all steel warm air furnace. The furnace is equipped with a squirrel cage type fan which takes 100% fresh air in through a bank of "throw away" type filters and forces it through the furnace to the distributing ducts.

...nd 100,000 gallons between regenerations.

...s is equipped with brine storage and measuring tanks and ...or complete automatic operation, in which the cycles of ...d regeneration take place at predetermined intervals based upon ...unt of water softened. This equipment was furnished by the ...

...Boiler House Piping is installed in accordance with Navy ...tandard practice. Piping is welded wherever practical in ...ere are flanged joints. Piping is designed for 125 pound ...

...1. Steam Distribution and Condensate Return System. The ...e of the condensate return system is for underground and is ...etail in Section 4-5 of this report.

...4. Standby Electric Power for Naval Hospital Group. The ...g consists of a 30 KW. gasoline driven generator and switchboard ...

...r. See electrical report Section 5.

...A diesel engine driven generator was later installed and ... in a supplementary report.

...ting Systems in the Camp #1, the Chapel in Tent Camp #1, the ...e and Naval Hospital, the Operations Building at the ... and the First Chapel are heated by forced hot water ...ystems by ... one additional cast iron type, each fired by ...oiled, with return water designed to burn bituminous coal. ... piping system has been replaced utilizing properly sized ... through the economizer. Water is admitted to each ... reducing valve and each is protected by a pressure ... Although these protective devices have been installed ...ssure, since the operation of the systems by qualified ...rsonnel has ... caused various troubles. Circula- ... properly are ... provided to circulate, the hot water ... heating systems and flow control valves have been installed to ...vice when no heat is required.

...om and Repaired Nurse Quarters. Hot water systems similar to ... -fired have been installed in the Bake... ... Pneumatic control over firing is not ... should be made, even more carefully in case of ... , that firing may easily prove disastrous.

...buildings and Dental Houses. Hot water systems similar to ... have been installed in the Officers' ... in the Residential Area.

...itter Building. The Radio Transmitter Building has been ... with warm air furnace. The furnace is equipped ... fan which takes 100% fresh air in through a bank ... filters and forces it through the furnace to the dis-

J-45. The Homasote Huts at Tent Camp # 2, the Range Houses and Toilets at the Rifle Range and the Toilets and Guard Houses at Mumford Point Camp # 1 are heated by oil burning units equipped with fans to provide circulation of air.

J-46. Glider Training Base.

J-46.01. Heating Plant. The purpose of this plant is to furnish steam for heating the various buildings in this area. The equipment is located in a separate boiler house and consists of a coal burning boiler, condensate receiver, boiler feedwater pump and accessories. Distribution and condensate return system is overhead, carried on wood poles and is described in Section G-2 of this report.

J-46.02. Total Connected Load. A tabulation of the total heat requirements in Btu per hour for the individual buildings is as follows:

| Building | | Heating |
|---|---|---|
| Administration | | 155,300 |
| Utility Shop | | 526,700 |
| Carburetor Test Shop | | 19,400 |
| Hangar "C" | | 113,600 |
| Total | - | 815,000 |
| Distribution Losses | = | 154,000 Btu per hour |
| Peak Load | = | 969,000 Btu per hour |

J-46.03. Estimated Fuel Requirements. The annual fuel requirements have been estimated and tabulated below. The overall boiler efficiency is estimated to be 60 per cent average with coal having a heating value of 13,500 Btu per pound as fired.

Heating $\frac{815,000 \times 24 \times 2,300}{60 \times 13,500 \times 0.6 \times 2,000}$ = 46.5 tons per year

Distribution Losses $\frac{154,000 \times 24 \times 210}{13,500 \times 0.6 \times 2,000}$ = 48 tons per year

Total Coal Required = 94.5 tons per year

With 89 boiler h.p. installed only 34 boiler h.p. are required for the present peak load making available for future use 55 boiler h.p.

J-46.04. Boiler. This is a portable, horizontal, return tubular, firebox boiler manufactured by the Kewanee Boiler Corporation designated as "Kewanee # 584". Boiler is coal stoker fired rated 89 h.p. with 893 square feet of heating surface and built for 125 pounds working pressure. Standard trim including water column, gauge glass, pressure gauge, injector and

blowoff connections are provided.

J-46.05. Breeching and Chimney. Boiler is connected with chimney by a 28" square breeching. The brick chimney is 36" square inside and is 36' high.

J-46.06. Combustion Equipment. Boiler was originally designed for hand firing but was later changed to stoker firing. This installation will be covered in a supplementary report.

J-46.07. Boiler Feedwater System. The condensate receiver tank is approximately 175 gallons capacity. Make-up water from the local well supply is automatically controlled by a float valve mounted on the tank.

Condensate is pumped from the tank to boiler by a Worthington 21 g.p.m. duplex steam driven boiler feedwater pump, controlled by a "Copes" pump governor. Water level in the boiler is maintained by a "Copes" feedwater regulator.

J-46.08. Boiler House Piping is installed in accordance with Navy Specification 66Pla and 21Yc. Piping is designed for 125 pounds working pressure.

J-46.09. Coal Storage. Space is provided outside of the building for storage of approximately 125 tons of coal.

J-39. Parachute Tower Buildings.

J-39.01. Heating Plant. The purpose of this plant is to furnish heat for the Parachute Training Building and Parachute Building. Located in a separate boiler house, the plant consists of one coal fired steam boiler condensate receiver tank, boiler feedwater pump and accessories. Distribution is overhead on wood poles and is described in Section G-2 of this report.

J-39-02. Total Connected Load. A tabulation of the total heat requirements in Btu per hour for the individual buildings is as follows:

| Building | Heating |
|---|---|
| Parachute Training Building | 246,200 |
| Parachute Building | 1,158,400 |
| Total - | 1,404,600 |

| | |
|---|---|
| Distribution System Losses | 90,000 Btu per hour |
| Peak Load | 1,494,600 Btu per hour |

J-39.03. Estimated Fuel Requirements. The annual fuel requirements have been estimated and tabulated below. The overall boiler efficiency is estimated to be 60 per cent average with coal having a heating value of 13,500 Btu per pound as fired.

$$\text{Heating} \quad \frac{1,404,600 \times 24 \times 2300}{60 \times 13,500 \times 0.6 \times 2,000} = 80 \text{ tons per year}$$

$$\text{Distribution Losses} \quad \frac{90,000 \times 24 \times 210}{13,500 \times 0.6 \times 2,000} = 28 \text{ tons per year}$$

Total Coal Consumption = 108 tons per year

Installed Boiler H.P. = 143
Present Requirements = 52
Available for Future Use = 91 Boiler H.P.

J-39.04 Boiler. This is a portable, horizontal, return tubular, firebox boiler manufactured by Kewanee Boiler Corporation and designated as Model #587. Boiler is coal stoker fired rated at 143 H.P., has 1429 square feet of heating surface and is built for 125 lbs. working pressure.

J-39.05. Breeching and Chimney. Boiler is connected with chimney by a 33" square breeching. The brick chimney is 36" square inside and 36 feet high.

J-39.06. Combustion Equipment. Original layout was for hand firing but was later changed to stoker firing. This change will be covered in a supplementary report.

J-39.07. Boiler Feedwater System. The condensate receiver tank of approximately 175 gallons is installed in the plant. Make-up water from the

Division Training Area system is automatically controlled by a float valve mounted on the tank.

Condensate is pumped from the tank to the boiler by a Worthington, 21 g.p.m. duplex steam driven boiler feedwater pump, controlled by a "Copes" pump governor. Water level is controlled in the boiler by a "Copes" feedwater regulator.

J-39.08. Boiler House Piping is installed in accordance with Navy Specifications 66P1a and 21Yc. Piping is designed for 125 lbs. working pressure.

J-39.09. Coal Storage. A space 30' square enclosed by a 4' high bulkhead having a capacity of approximately 125 tons of coal is provided.

J-40. Naval Hospital Group.

J-40.01. Heating Plant. The purpose of the Naval Hospital Heating Plant is to provide a standby system to furnish steam for heating, hot water and process to the buildings of the main group. While this plant now supplies steam to the Hospital group, it is intended that ultimate service will be from the Central Heating Plant in the Division Training Area. The plant consists of three semi-automatic oil fired boilers together with necessary auxiliaries.

J-40.02. Total Connected Load. A tabulation of the total heat requirements in Btu per hour to the various buildings is as follows:

| | Heating | Hot Water | Process | Total |
|---|---|---|---|---|
| Administration | 8,610,752 | 1,371,958 | 2,889,407 | 12,872,117 |
| Wards | 9,763,200 | 2,304,525 | 647,236 | 12,714,961 |
| Barracks | 890,400 | 1,093,920 | - | 1,984,320 |
| Nurses Home | 1,086,720 | 519,350 | 255,248 | 1,861,318 |
| Med. STorehouse | 514,300 | 55,250 | - | 569,550 |
| Garage | 389,840 | 55,250 | - | 445,090 |
| Nurses Quarters for Family Hospital | 196,944 | 55,250 | - | 252,194 |
| Laundry | 492,000 | 1,855,424 | 3,730,222 | 6,077,646 |
| Hosp. Warehouse | 285,350 | 55,250 | - | 340,600 |
| Warrant Officers' Quarters | 63,360 | - | - | 63,360 |
| Family Hospital | 1,585,200 | 629,004 | 884,252 | 3,098,456 |
| Gas & Oil Storage | - | - | 52,785 | 52,785 |
| Total - | 23,878,066 | 7,995,181 | 8,459,150 | 40,332,397 |

Distribution System Losses - 550,000 Btu per hour

Peak Load -40,882,000 Btu per hour

J-40.03. Estimated Fuel Oil Requirements. The annual fuel requirements have been estimated and tabulated below. The overall boiler efficiency is estimated to be 70 per cent average with oil having a heating value of

6,300,000 Btu's per 42-gallon barrel.

| | | | |
|---|---|---|---|
| Heating | $\frac{23,878,066 \times 24 \times 2,300}{(70-10) \times 150,000 \times 0.7}$ | = | 209,400 gallons of oil per year |
| Hot Water | $\frac{7,995,181 \times 6 \times 365}{150,000 \times 0.7}$ | = | 166,800 gallons of oil per year |
| Process | $\frac{8,459,150 \times 7 \times 365}{150,000 \times 0.7}$ | = | 205,600 gallons of oil per year |
| Distribution Losses | $\frac{550,000 \times 24 \times 365}{150,000 \times 0.7}$ | = | 46,000 gallons of oil per year |

Total Fuel Oil Consumption = 627,800 gallons of fuel oil per year

J-40.04. Boilers. The plant consists of three boilers "Oilbuilt Model OB-50" manufactured by Cleaver Brooks Company having 2,500 square feet of heating surface and rated by the manufacturer at 500 h.p. when operating at 125 p.s.i. Each boiler is equipped with an integral rotary cup type oil burner. Yarway tandem blow-off valves and standard trim consisting of a water column, gauge glass, pressure gauge, and injector.

J-40.05. Vent Stacks. Each boiler has a separate vent stack through roof.

J-40.06. Oil Burner Equipment. The rotary cup type burner is driven by a 3 H.P. electric motor which is manually started and automatically operated by steam pressure. Each boiler is equipped with a "Viking Model ZH-1" oil pump of 300 gallons per hour capacity driven by a 3/4 H.P. electric motor. The equipment is designed to burn No. 6 or lighter fuel oils. The oil is preheated with steam heaters for normal operation and a 5 K.W. electric oil heater is used for starting.

J-40.07. Fuel Oil Storage of 30,000 gallons is provided by two tanks located underground about 50 feet from boiler room. This is approximately 2-1/2 week's supply of oil required by the three boilers operating at full load.

J-40.08. Boiler Feedwater System. The condensate receiver tank has approximately 1130 gallons capacity. Make-up water is supplied from Zeolite Water Softeners, and is controlled automatically by a McDonnell #51 feeder control valve in connection with a float valve in the condensate tank. Water is pumped from condensate tank to feed water heater by the feedwater heater pump and is discharged from heater by gravity to the boiler feedwater pumps. Three feedwater pumps, turbine type, "Aurora-Model 510 - G.D." rated 60 g.p.m., electrically driven by $7\frac{1}{2}$ h.p. motors are installed in the plant. Water level in the boilers is maintained by McDonnell No. 150 boiler feedwater regulators.

J-40.09. Water Treatment Equipment. Boiler feedwater makeup is taken from the Zeolite water softening system which also supplies the hospital laundry. Two softening units are provided, each with a rated flow of

300 g.p.m. and 100,000 gallons between regenerations.

Each unit is equipped with brine storage and measuring tanks and accessories for complete automatic operation, in which the cycles of softening and regeneration take place at predetermined intervals based upon the total amount of water softened. This equipment was furnished by the Permutit Company.

J-40.10. Boiler House Piping, is installed in accordance with Navy Specification 66Pla and 21Yc. Piping is welded wherever practicable in lieu of screwed and flanged joints. Piping is designed for 125 pounds working pressure.

J-40.11. Steam Distribution and Condensate Return System. The steam distribution and condensate return system is run underground and is described in detail in Section G-2 of this report.

J-40.12. Standby Electric Power for Naval Hospital Group. The original design included a 50 K.W. gasoline driven generator set which was never installed. See Electrical report Section H.

A 140 K.W. Diesel engine driven generator was later installed and will be covered in a supplementary report.

J-41. The Hostess House in Tent Camp #1, the Chapel in Tent Camp #1, the Servants Quarters at the Naval Hospital, the Operation Building at the Landing Field and the Mumford Point Chapel are heated by forced hot water systems. The boilers are of the sectional cast iron type, each fired by worm type, underfeed, single retort stoker designed to burn bituminous coal. The closed type of piping system has been employed utilizing properly sized air cushion tanks to absorb the expansion. Water is admitted to each system through a pressure reducing valve and each is protected by a pressure relief valve. Even though these protective devices have been installed care should be taken to place the operation of the system in qualified hands as over firing over long periods may cause serious trouble. Circulating pumps properly controlled are provided to circulate the hot water through the heating systems and flow control valves have been installed to prevent circulation when no heat is required.

J-42. Gate House and Mumford Point Brig. Hot water systems similar to those described in J-41 but hand fired have been installed in the Gate House, and the Mumford Point Brig. Precautions against over firing as set forth in paragraph J-41 should be taken even more seriously in case of these hand fired installations, over firing may easily prove disasterous.

J-43. Officers' Quarters and Guest House. Hot water systems similar to those described in J-41 but oil fired have been installed in 196 Officers' Quarters and the Guest House in the Residential Area.

J-44. Radio Transmitter Building. The Radio Transmitter Building has been supplied with oil fired all steel warm air furnace. The furnace is equipped with a squirrel cage type fan which takes 100% fresh air in through a bank of "throw away" type filters and forces it through the furnace to the distributing ducts.

...ut 100,000 gallons between regenerations.

...unit is equipped with brine storage and measuring tanks and ...for complete automatic operation, in which the cycles of ...and regeneration take place at predetermined intervals based on ...ount of water softened. This equipment was furnished by the ...pany.

...10. Water Tanks Piping is installed in accordance with Navy ...ice practice. Piping is welded wherever practicable in ...size and flanged joints. Piping is designed for 125 pounds ...ssure.

...11. Steam Distribution and Condensate Return System. The ...ibution and condensate return system is run underground and is ...bed in Section G-2 of this report.

...12. Standby Electric Power for Naval Hospital Group. The ...ation includes a 150 KVA gasoline driven generator set which was ...led. See Electrical Report Section H.

...ATE: Diesel engine driven generator was later installed and ...bed in a supplementary report.

...Nurses Quarters in Tent Camp #1, the Chapel in Tent Camp #1, ...House at the Naval Hospital, the Operation Building at the ...tal and the Hanford Point Chapel are heated by forced hot water. ...boiler is one of the sectional cast iron type, each fired by ...oil burner, and is rated at ... designed to burn kerosene oil. ...type of piping system has been employed utilizing properly sized ...ion tank to absorb the expansion. Water is admitted to each ...m by a pressure reducing valve and each is protected by a pressure ...ef valve. Even though these protective devices have been installed ...care taken to place the operation of the system in qualified ...ds. Overfiring over long periods may cause serious trouble. Circulating ...pumps properly controlled are provided to circulate the hot water ...heating systems and flow control valves have been installed to ...circulation when no heat is required.

...House and Hanford Point Drug. Hot water systems similar to ...ed and oil burner fired have been installed in the ...Hanford Point Drug. Precautions against over firing as set ...e which fuel should be taken even more seriously in case of ...ild... ...over firing may easily prove disastrous.

...Quarters and Guest House. Hot water systems similar to ...ve and oil fired have been installed in 100 Officers' ...Guest House in the Residential Area.

...Transmitter Building. The Radio Transmitter Building has been ...oil fired ... cast iron air furnace. The furnace is equipped ...ever type fan which takes 100% fresh air in through a bank ...type filters and forces it through the furnace to the dis...

J-45. The Homasote Huts at Tent Camp # 2, the Range Houses and Toilets at the Rifle Range and the Toilets and Guard Houses at Mumford Point Camp # 1 are heated by oil burning units equipped with fans to provide circulation of air.

J-46. Glider Training Base.

J-46.01. Heating Plant. The purpose of this plant is to furnish steam for heating the various buildings in this area. The equipment is located in a separate boiler house and consists of a coal burning boiler, condensate receiver, boiler feedwater pump and accessories. Distribution and condensate return system is overhead, carried on wood poles and is described in Section G-2 of this report.

J-46.02. Total Connected Load. A tabulation of the total heat requirements in Btu per hour for the individual buildings is as follows:

| Building | | Heating |
|---|---|---|
| Administration | | 155,300 |
| Utility Shop | | 526,700 |
| Carburetor Test Shop | | 19,400 |
| Hangar "C" | | 113,600 |
| Total | - | 815,000 |
| Distribution Losses | = | 154,000 Btu per hour |
| Peak Load | = | 969,000 Btu per hour |

J-46.03. Estimated Fuel Requirements. The annual fuel requirements have been estimated and tabulated below. The overall boiler efficiency is estimated to be 60 per cent average with coal having a heating value of 13,500 Btu per pound as fired.

Heating $\dfrac{815{,}000 \times 24 \times 2{,}300}{60 \times 13{,}500 \times 0.6 \times 2{,}000}$ = 46.5 tons per year

Distribution Losses $\dfrac{154{,}000 \times 24 \times 210}{13{,}500 \times 0.6 \times 2{,}000}$ = 48 tons per year

Total Coal Required = 94.5 tons per year

With 89 boiler h.p. installed only 34 boiler h.p. are required for the present peak load making available for future use 55 boiler h.p.

J-46.04. Boiler. This is a portable, horizontal, return tubular, firebox boiler manufactured by the Kewanee Boiler Corporation designated as "Kewanee # 584." Boiler is coal stoker fired rated 89 h.p. with 893 square feet of heating surface and built for 125 pounds working pressure. Standard trim including water column, gauge glass, pressure gauge, injector and

blowoff connections are provided.

J-46.05. Breeching and Chimney. Boiler is connected with chimney by a 28" square breeching. The brick chimney is 36" square inside and is 36' high.

J-46.06. Combustion Equipment. Boiler was originally designed for hand firing but was later changed to stoker firing. This installation will be covered in a supplementary report.

J-46.07. Boiler Feedwater System. The condensate receiver tank is approximately 175 gallons capacity. Make-up water from the local well supply is automatically controlled by a float valve mounted on the tank.

Condensate is pumped from the tank to boiler by a Worthington 21 g.p.m. duplex steam driven boiler feedwater pump, controlled by a "Copes" pump governor. Water level in the boiler is maintained by a "Copes" feedwater regulator.

J-46.08. Boiler House Piping is installed in accordance with Navy Specification 66Pla and 21Yc. Piping is designed for 125 pounds working pressure.

J-46.09. Coal Storage. Space is provided outside of the building for storage of approximately 125 tons of coal.

CHAPTER K - PART II

COMMUNICATIONS

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K-1 Introduction. The following report is for the purpose of describing the Communication System as provided for the Division Training and other associated areas and covers the essential details incorporated in the design of central office equipment and outside plants.

It also includes a development study which was used as a basis for the engineering design and details regarding transmission, trunking, and the outside plant feeder and distribution system.

K-2 Connecting Company and Description Facilities. The Carolina Telephone and Telegraph owns and operates the telephone system at Jacksonville, North Carolina, which handles all local and toll calls originating and terminating at Camp Lejeune. Trunk circuits are provided between the Jacksonville Exchange and the switchboards, located on the base, for the completion of these calls.

CHAPTER X - PART II

COMMUNICATIONS

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Title



. The following report is for the purpose of describing ... system as provided for the Division Training and other ... covers the essential details incorporated in the ... the equipment and outside plants.

... a development study which was used as a basis for the ... details regarding transmission, trunking, and the ... distribution system.

... and Description Facilities. The Carolina Telephone ... operates the telephone system at Jacksonville, ... handles all local and toll calls originating and ... Trunk circuits are provided between the Jack- ... switchboards, located on the base, for the ...

The Carolina Company Exchange consists of automatic step by step switching equipment employing a three digit numbering system. Toll equipment consists of an eight position toll board with direct circuits connecting with the Southern Bell Telephone Company and the Chesapeake and Potomac Telephone Company.

K-3 Toll Facilities. In order to facilitate handling toll traffic, the Carolina Telephone and Telegraph Company established a toll center at Jacksonville in the early part of 1941.

The Jacksonville Exchange, in addition to caring for all toll calls at Camp Lejeune, also handles practically all toll traffic originating and terminating at Camp Davis which is located approximately 22 miles south on Highway No. 17. Following is the present number of toll circuits owned and operated by the Carolina Company with the description and connecting companies shown.

| Description | No. Circuits | Connecting Company |
|---|---|---|
| Jacksonville - Norfolk | 4 | Chesapeake and Potomac Tel. Co. |
| Jacksonville - Raleigh | 3 | Southern Bell Telephone Co. |
| Jacksonville - Wilmington | 9 | Southern Bell Telephone Co. |
| Jacksonville - Kinston | 1 | Carolina Telephone Company |
| Jacksonville - New Bern | 4 | Carolina Telephone Company |
| New Bern - Norfolk | 4 | Carolina Telephone Company |
| New Bern - Raleigh | 4 | Carolina Telephone Company |

In the event that all direct northbound circuits are busy, alternate routing through New Bern can be utilized.

K-4 Development Study. Before the preparation of any preliminary design it was necessary that an estimate of main station requirements be made in order that proper sizing of feeder and distribution cables could be determined, and adequate switching quantities be arrived at. This original study was prepared with the collaboration of the camp communication officer, submitted to the Officer in Charge and approved after revisions had been made based on suggestions by the Quartermaster General, U. S. M. C.

The estimated total number of stations required was 1896 of which 1005 were located in the Division Training Area and 891 in outlying areas.

Following is a tabulation of the development study showing estimated main station requirements by buildings which was used as a basis for designing the entire communication system.

## TABULATION OF DEVELOPMENT STUDY

## DIVISION TRAINING AREA MAX CENTRAL OFFICE

### REGIMENTAL AREAS

| Type Bldg. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| Division Headquarters | 1 | 56 | 56 |
| Regimental Adm. | 5 | 20 | 100 |
| Battalion Adm. | 15 | 13 | 195 |
| Barracks | 60 | 4 | 240 |
| Mess Hall | 15 | 1 | 15 |
| Post Exchange | 5 | 3 | 15 |
| Infirmary | 5 | 5 | 25 |
| Battalion Warehouse | 60 | 1/2 | 30 |
| Service Club | 5 | 3 | 15 |
| Theater | 5 | 3 | 15 |
| Church | 2 | 1 | 2 |
| Fire House | 1 | 23 | 23 |
| Radio Transmitter | 1 | 15 | 15 |
| Incinerator | 1 | 1 | 1 |
| Hostess House | 1 | 3 | 3 |
| Sewage Treatment Plant | 1 | 1 | 1 |
| Sewage Pumping Station | 1 | 1 | 1 |
| Water Pumping Station | 1 | 1 | 1 |
| | | | 753 |

### POST TROOPS AREA

| Type Bldg. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| Post Headquarters | 1 | 88 | 88 |
| Dispensary | 1 | 32 | 32 |
| Battalion Administration | 1 | 13 | 13 |
| Barracks | 4 | 4 | 16 |
| Mess Hall | 1 | 1 | 1 |
| Post Exchange | 1 | 3 | 3 |
| Brig | 1 | 8 | 8 |
| Cobbler Shop | 1 | 5 | 5 |
| Theatre | 1 | 3 | 3 |
| Battalion Warehouse | 4 | 1 | 4 |
| | | | 173 |

## TABULATION OF DEVELOPMENT STUDY

## DIVISION TRAINING AREA MAX CENTRAL OFFICE (CONT'D.)

### INDUSTRIAL AREA

| Type of Bldg. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| Commissary | 1 | 10 | 10 |
| Cold Storage | 1 | 2 | 2 |
| Fire House | 1 | 3 | 3 |
| Bakery | 1 | 2 | 2 |
| Laundry | 1 | 3 | 3 |
| Propane Gas | 1 | 1 | 1 |
| Power House | 1 | 3 | 3 |
| Gas Station | 1 | 1 | 1 |
| Post Shop | 1 | 15 | 15 |
| P.X. Warehouse | 1 | 4 | 4 |
| Reclamation Bldg. | 1 | 3 | 3 |
| Garage | 2 | 3 | 6 |
| Balloon Bldg. | 1 | 2 | 2 |
| Warehouse | 5 | 2 | 10 |
| Equipment Shed | 24 | | 6 |
| | | | 71 |

### MISCELLANEOUS BLDGS.

| Type Bldg. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| Waller Gunnery | 1 | 1 | 1 |
| Parachute Training B. | 1 | 1 | 1 |
| Parachute Bldg. | 1 | 1 | 1 |
| Gate House | 1 | 5 | 5 |
| | | | 8 |

Total for Division Training Area 1005

TABULATION OF DEVELOPMENT STUDY

DIVISION TRAINING AREA MAX CENTRAL OFFICE (CONT'D.)

INDUSTRIAL AREA

| Bldg. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| | 1 | 10 | 10 |
| | 1 | 2 | 2 |
| | 1 | 3 | 3 |
| | 1 | 2 | 2 |
| | 1 | 3 | 3 |
| | 1 | 1 | 1 |
| | 1 | 3 | 3 |
| | 1 | 1 | 1 |
| | 1 | 15 | 15 |
| | 1 | 4 | 4 |
| | 1 | 3 | 3 |
| | 2 | 3 | 6 |
| | 1 | 2 | 2 |
| | 5 | 2 | 10 |
| | 24 | | 6 |
| | | | 71 |

MISCELLANEOUS BLDGS.

| Bldg. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| | 1 | 1 | 1 |
| | 1 | 1 | 1 |
| | 1 | 1 | 1 |
| | 1 | 5 | 5 |
| | | | 6 |

Total for Division Training Area 1906

# TABULATION OF DEVELOPMENT STUDY

## SUBSIDIARY AND OUTLYING CENTRAL OFFICES

### BARRAGE BALLOON AND AMPHIBIAN BASE

| Type Bldgs. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| Administration Bldg. | 1 | 8 | 8 |
| School Bldg. | 1 | 6 | 6 |
| Balloon Bldg. | 1 | 2 | 2 |
| Transportation Bldg. | 1 | 1 | 1 |
| Supply and Storage | 1 | 1 | 1 |
| Operations Bldg. | 1 | 2 | 2 |
| Battalion Adm. | 1 | 13 | 10 |
| Officers Quarters | 9 | 1 | 9 |
| Post Exchange | 1 | 2 | 2 |
| Infirmary | 1 | 5 | 5 |
| Barracks | 4 | 3 | 12 |
| Mess Hall | 1 | 1 | 1 |
| Warehouses | 4 | .5 | 2 |
| Amphibian Machine Shop | 1 | 3 | 3 |
| Amphibian Carpenter Shop | 1 | 3 | 3 |
| Amphibian Storehouse | 1 | 2 | 2 |
| | | | 69 |

### RIFLE RANGE AREA

| Type Bldgs. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| Armory Bldg. | 1 | 12 | 12 |
| B.O.Q. | 1 | 18 | 10 |
| Officers' Quarters | 5 | 1 | 5 |
| Post Exchange | 1 | 3 | 2 |
| Infirmary | 1 | 5 | 5 |
| Theater | 1 | 3 | 3 |
| Range Houses | 4 | 1 | 4 |
| Rifle Ranges | 3 | 2 | 6 |
| Pistol Range | 1 | 1 | 1 |
| Barracks | 4 | 3 | 12 |
| Mess Hall | 1 | 1 | 1 |
| Heating Plant | 1 | 1 | 1 |
| Warehouses | 4 | .5 | 2 |
| | | | 64 |

## TABULATION OF DEVELOPMENT STUDY

## SUBSIDIARY AND OUTLYING CENTRAL OFFICES

### BARRAGE BALLOON AND AMPHIBIAN BASE

| Bldg. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| ...n Bldg. | 1 | 8 | 8 |
| | | 6 | 6 |
| | 1 | 2 | 2 |
| ...n Bldg. | 1 | 1 | 1 |
| ...rage | 1 | 1 | 1 |
| ...lg. | 1 | 2 | 2 |
| | 1 | 13 | 10 |
| ...ters | 9 | 1 | 9 |
| | 1 | 2 | 2 |
| | 1 | 5 | 5 |
| | 4 | 3 | 12 |
| | 1 | 1 | 1 |
| | 4 | .5 | 2 |
| ...in Shop | 1 | 3 | 3 |
| ...nter Shop | 1 | 3 | 3 |
| ...house | 1 | 2 | 2 |
| | | | 69 |

### RIFLE RANGE AREA

| Bldg. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| | 1 | 12 | 12 |
| | 1 | 18 | 10 |
| ...ters | 5 | 1 | 5 |
| | 1 | 3 | 2 |
| | 1 | 5 | 5 |
| | 1 | 3 | 3 |
| | 4 | 1 | 4 |
| | 3 | 2 | 6 |
| | 1 | 1 | 1 |
| | 4 | 3 | 12 |
| | 1 | 1 | 1 |
| | 1 | 1 | 1 |
| | 4 | .5 | 2 |
| | | | 64 |

## TABULATION OF DEVELOPMENT STUDY

## SUBSIDIARY AND OUTLYING CENTRAL OFFICES (Cont'd.)

### HOSPITAL AREA

| Type Bldgs. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| Administration Bldg. | 1 | 43 | 43 |
| Mess Hall - Recreation | 1 | 5 | 5 |
| Nurses Home | 1 | 7 | 7 |
| Ward Bldgs. | 11 | 4 | 44 |
| Family Hospital | 1 | 18 | 18 |
| Civilian Nurses Home | 1 | 4 | 4 |
| Medical Storehouse | 1 | 2 | 2 |
| Warehouse | 1 | 1 | 1 |
| Garage | 1 | 1 | 1 |
| Shop | 1 | 2 | 2 |
| Power House | 1 | 1 | 1 |
| Laundry | 1 | 2 | 2 |
| Corpsmen Barracks | 2 | 6 | 12 |
| Medical Officer's Home | 3 | 2 | 6 |
| Warrant Officer's Home | 1 | 1 | 1 |
| B. O. Q. | 1 | 10 | 10 |
| | | | 159 |

### PARADISE POINT

| Type Bldgs. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| B.O.Q. | 8 | 25 | 200 |
| Guest House | 1 | 4 | 4 |
| Fire House | 1 | 3 | 3 |
| Officers Quarters | 180 | 1 | 180 |
| | | | 387 |

### MAIN TENT CAMP

Estimated Station Requirements 180

### MUMFORD PT. TENT CAMP

Estimated Station Requirements 32

Total for Subsidiary and Outlying Central Offices 891

TABULATION OF DEVELOPMENT STUDY

...LIARY AND OUTLYING CENTRAL OFFICES (Cont'd.)

HOSPITAL AREA

| ...ldgs. | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| ...n Bldg. | 1 | 45 | 45 |
| ...creation | 1 | 8 | 8 |
| | ½ | 7 | 7 |
| | 11 | 4 | 44 |
| ...l | 1 | 18 | 18 |
| ...s Home | 1 | 4 | 4 |
| ...uses | 1 | 2 | 2 |
| | 1 | 1 | 1 |
| | 1 | 1 | 1 |
| | 1 | 2 | 2 |
| | 1 | 1 | 1 |
| | 1 | 2 | 2 |
| ...ks | 2 | 6 | 12 |
| ...'s Home | 3 | 2 | 6 |
| ...'s Home | 1 | 1 | 1 |
| | 1 | 10 | 10 |
| | | | 169 |

PARADISE POINT

| ... | No. Bldgs. | Est. Sta. Req. per Bldg. | Total Stations Required |
|---|---|---|---|
| | 8 | 25 | 200 |
| | 1 | 4 | 4 |
| | 1 | 3 | 3 |
| ... | 180 | 1 | 180 |
| | | | 387 |

MAIN TENT CAMP

...stimated Station Requirements 180

HUMFORD PT. TENT CAMP

...stimated Station Requirements 32

...ry and Outlying Central Offices 891

K-5. General Design. The telephone system at Camp Lejeune consists of three service areas.

1. A main automatic exchange in the Division Training Area and four subsidiary central offices at the Naval Hospital, Paradise Point residential area, Barrage Balloon and Amphibian Base, and the Rifle Range.

2. A smaller main automatic exchange provided at the Main Tent Camp and serves directly, without subsidiary exchanges, the Airport, Peterfield Point and Tank Battalion Areas.

3. The Mumford Point Tent Camp which is served directly by the Caroline Telephone and Telegraph Exchange at Jacksonville.

The connection between the three service areas is through the Jacksonville Exchange.

Several central offices were used. The distances involved made it more economical than to connect all stations through one exchange.

The outside plant consists chiefly of lead covered cable. Aerial construction is used locally for distribution to individual units and groups of building, underground entrances are made at all important buildings. Trunks to the Barrage Balloon and Rifle Range Areas are by open wiring to minimize line losses due to the excessive distance and to conserve critical material.

K-6. Transmission and Protection. In the preparation of detail construction plans, due to the segregated areas to be served and the distances involved, transmission studies were made of all trunk circuits and subscribers. In accordance with the Bureau of Yards and Docks Specification 9Ye, 19 gauge cable was used throughout the entire communication system for both trunk cables and distribution plant.

All transmission schematics, through the cooperation of the Chief Engineer of the Southern Bell Telephone Company, were submitted to the General Transmission Engineer, and all cable loading and transposition layouts were checked by his staff.

Throughout the entire system joint construction with the power lines was employed wherever possible. To meet standard requirements the electrical distribution, which is 7200 volts to ground, was equipped with Westinghouse H.C.B. pilot wire relays. These relays are of the quick acting type and are designed to operate on two cycles. At all sectionalizing stations the relays are interconnected by means of a pilot wire. In the event that there is any unbalanced load or voltage, due to short circuit or fault in the electrical system, the relays instantaneously will disconnect the section of line which is affected.

: The telephone system at Camp Lejeune consists of

phone exchange in the Division Training Area and four
officeat the Naval Hospital, Paradise Point residen-
Hadnot and Amphibian Base, and the Rifle Range.

-unit automatic exchange, provided at the Tent Camp
, without subsidiary exchanges, the Airport, Montford
ation area.

Paradise Point Tent Camp which is served directly by the
and Telegraph Exchange at Jacksonville.

on between the three complete areas is through the
ge.

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ble to connect all stations through one exchange.

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nd locally for distribution to individual units and
underground entrances are made at all important build-
he Barrage Balloon and Rifle Range Areas are by open
line losses due to the excessive distance and to eco-
rial.

ical Protection. In the preparation of details structural
the separated areas to be served and the distances
ssion studies were made of all trunk circuits and data
ference with the Bureau of Yards and Docks Specification
was used throughout the entire communication system
se and distribution plant.

ations schedules, through the cooperation of the Chief
uthern Bell Telephone Company, were submitted to the
ion Engineer, and all cable loading and transmission
by his staff.

the entire system joint construction with the power lines
ever possible. To meet standard requirements the distri-
which is 7200 volts to ground, was equipped with Western
ecting relays. These relays guard the cable cutting tower
uits on the system. At all semi-mounting stations
are connected by means of a pilot wire. In the event lines
damaged load or voltage, due to short circuit or fault in
ystem the relays instantaneously will disconnect the
circuit affected.

Throughout the entire telephone plant standard protection, as covered by the A.T. & T. Company's specifications, was employed.

1. At all central offices, zero readings were obtained on all grounds which in some cases involved driving connecting ground rods to a depth of eighty feet.

2. Fuse cables were used at all points where the underground plant connected to the aerial plant.

3. All underground services from aerial feeders were terminated in fuse protected terminals with adequate grounds not exceeding 5 ohms.

4. Fuse terminals and grounds were provided at all points of connection between aerial cable and open wire plant.

5. All telephone installations exposed to power or lightning were provided with standard substation protectors.

K-7 Trunking. In accordance with the request of the Carolina Telephone Company, two-way trunking with associated repeater equipment was installed between the Division Training Area Main Exchange and Jacksonville over 19 Gauge, B-88, loaded cable. Non-loaded, two-way trunks were also stipulated by the Connecting Company between the Tent Camp Exchange and Jacksonville.

However, within the base, one way trunk groups were set up, by direction, between the Division Training Area Exchange and the Paradise Point Exchange, and also between the Division Training Area Exchange and the Hospital area switchboard.

The Barrage Balloon Area and the Rifle Range are connected to the Division Training Area Exchange by .104 copper circuits terminating on the tactical common battery lines on the attendants cabinets. In addition, two tie lines are provided between the Barrage Balloon and Rifle Range switchboards.

Table of Trunk Line Quantities in Lineal Feet of Cable or Pole Line

| EXCHANGE | Number of Pairs - Gauge | | | | .104 Copper (Open) | |
|---|---|---|---|---|---|---|
| | 26-19 | 51-19 | 1-19 | 1-22 | 2 Circuits | 3 Circuits |
| Division Training MAX to | | | | | | |
| Carolina Tel. & Tel Co.* | | | 27,492 | 43 | | |
| Paradise Point | | | 16,752 | 2,055 | | |
| Naval Hospital | | 8650 | | | | |
| Bar. Balloon & Amph. Bs. | | | | | 63,500 | |
| Rifle Range | | | | | | 107,500 |
| Rifle Range PBX to | | | | | | |
| Bar. Balloon & Amph. Bs. | | | | | 44,000 | |
| Tent Camp MAX to | | | | | | |
| Carolina Tel & Tel. Co.* | 3220 | | | | | |
| Total Trunk Line Cable or Pole Line 273,212 Lineal Ft. or 51.74 Miles | | | | | | |

* Distance given is to point of connection with existing lines of Telephone Company.

K-8 Division Training Area.

K-8.01. The Central Office located in Post Headquarters Building handles all calls originating in the Regimental, Post Troops and Industrial Areas. It also handles all toll calls originating and terminating at several Camp Lejeune Exchanges, as noted hereafter, and the Naval Hospital through trunk circuits to the Carolina Telephone and Telegraph Company. Calls between certain exchanges within the camp are also handled through this office.

This exchange of MAX type consists of automatic step by step switching equipment of the sectional mounting, distributing terminal assembly type, permitting additional units to be added as required, without disturbing original lines and equipment, and without change in call numbers. A four digit numbering system is provided, of 1200 line initial capacity so designed that it may be readily expanded to 2000 lines. Provision is made for three attendants positions to handle information, intercept and handle calls between the automatic system and the Carolina Telephone and Telegraph Exchange.

A twenty station fire and crash alarm conference service is provided whereby nineteen telephones can be connected simultaneously to receive instructions by depressing a key at the preferred station.

K-8.02. Distribution is by underground conduit (combined with trunk circuits) following Main Service Road thence by aerial construction to the individual Regimental Areas and Post Troops Area. The Industrial Area is served by underground conduit (combined with trunk circuits) to Holcomb Boulevard and by buried cable parallel with the boulevard to Dogwood Street, thence by aerial construction throughout area. Drawings prepared for this area are shown in the following table:

TABLE OF DISTRIBUTION LINE QUANTITIES IN LINEAL FEET OF CABLE

| Plan No. M.B. | Number of pairs - Gauge | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 11-19 | 16-19 | 26-19 | 50-19 | 51-19 | 1-19 | 2-19 | 3-19 | 4-19 | 6-22 | 9-22 |
| 778 | | | | | | 973 | 260 | | | 1,628 | 2,681 |
| 779 | 460 | | 430 | | 500 | 1,341 | 2,964 | | | | |
| 780 | 530 | | 320 | | 1,630 | 2,180 | | | | | |
| 781 | 320 | | 230 | | 683 | 1,631 | 2,352 | | | | |
| 782 | 490 | | 405 | | 1,493 | 2,305 | | | | | |
| 783 | 245 | | 445 | | 1,589 | 3,233 | | | 1,350 | | |
| 784 | 485 | | 90 | | 895 | 1,776 | 119 | | | | |
| 785 | | 1,265 | 1,970 | 1,410 | 940 | 1,370 | | | | | |
| 799 | 140 | | | 1,770 | | 210 | 155 | 756 | 1,024 | | |
| Total Distribution Cable 47,043 Lineal Feet or 8.91 Miles | | | | | | | | | | | |
| Total stations provided 1,005 | | | | | | | | | | | |

K-9 Paradise Point.

K-9.01. The Central Office is located in the upper story of the Officers' Mess and switches all calls originating or terminating in the B. O. Q. Areas and the Officers' Mess. The exchange, of PAX type, consists of automatic step by step switching equipment of the sectional mounting, distributing terminal assembly type, permitting additional units to be added, as required, without disturbing original lines and equipment, and without change in call numbers. There is provided a four digit numbering system of 600 line initial capacity. This is an entirely automatic unattended exchange providing intercommunication within the area. Connection with the Carolina Telephone Exchange and certain exchanges within the camp is through the Division Training Area MAX central office.

A twenty station Fire and Crash alarm conference service is provided whereby nineteen telephones can be connected simultaneously to receive instructions by depressing a key at the preferred station.

K-9.02. Distribution is by buried conduit (combined with trunk circuits) following River Drive thence by aerial construction to individual residences. Service to the B.O.Q. and Officers' Mess group is via buried cable.

K-9.03. Drawings prepared for this area are shown in the following table:

TABLE OF DISTRIBUTION LINE QUANTITIES IN LINEAL FEET OF CABLE

| Drawing M.B. No. | Number of Pairs - Gauge | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 16-19 | 26-19 | 50-19 | 51-19 | 1-19 | 150-19 | 3-19 | 6-22 |
| 1751 | | | 1735 | | 535 | | | |
| 1752 | | 1285 | 1760 | 1095 | 2595 | 695 | | |
| 1753 | | | 470 | 850 | 3165 | 2990 | 575 | 300 |
| 1754 | | 430 | | 3490 | 2610 | | | |
| 1755 | 450 | 850 | | | | | | |
| Total Distribution Cable 25,880 Lineal Feet or 4.90 Miles | | | | | | | | |
| Total Stations Provided 387 | | | | | | | | |

K-10. Hospital Area.

K-10.01. The Central Office equipment is located in Administration Building and consists of a two position 320 line manual PBX with a floor type main distributing frame and standard associated battery and power equipment.

All intercommunicating calls are handled manually, with outgoing calls throughout the base completed by the operator over outdialing trunks. A three digit numbering system is used.

K-10.02. Distribution is by buried cable between the various buildings of the Hospital group.

| TABLE OF DISTRIBUTION LINE QUANTITIES IN LINEAL FEET OF CABLE | | | | | |
|---|---|---|---|---|---|
| Drawing No. | Number of Pairs - Gauge | | | | |
| | 11-19 | 26-19 | 50-19 | 1-19 | 150-19 |
| M.B. 2750 | 830 | 335 | 1,885 | 1,135 | 265 |
| Total Distribution Cable 4,450 Lineal Feet or .84 Miles | | | | | |
| Total Stations Provided 159 | | | | | |

## K-11 Barrage Balloon and Amphibian Base.

K-11.01. The Central Office is located in the Barrage Balloon Administration Building and handles all calls originating or terminating in these areas. Connection with terminal stations throughout the base and with the Carolina Telephone and Telegraph Company is via Division Training Area MAX Central Office with the exception of the exchange at the Rifle Range which is tied direct. This exchange consists of a single position floor type manual PBX, common battery switchboard having a two digit numbering system of 80 line capacity.

K-11.02. Distribution is by aerial construction with the exception of the line along Marines Road and the line to the Operations Building which are underground.

K-11.03. Drawings prepared for this area are shown in the table below:

| TABLE OF DISTRIBUTION LINE QUANTITIES IN LINEAL FEET OF CABLE | | | | | | | |
|---|---|---|---|---|---|---|---|
| Drawing No. M.B. | Number of Pairs - Gauge | | | | | | |
| | 4(prs)-20 | 11-19 | 16-19 | 26-19 | 50-19 | 51-19 | 1-19 |
| 2752 | | 1635 | | | | | |
| 2753 | 1100 | | 1400 | 1190 | 560 | 100 | |
| 2754 | | | 139 | 2356 | 1335 | 660 | 670 |
| Total Distribution Cable 11,145 Lineal Feet or 2.11 Miles | | | | | | | |
| Total Stations Provided 69 | | | | | | | |

K-12 Rifle Range.

K-12.01 The Central Office is located in the Armory and handles all routine calls originating or terminating in this area. However, direct connection between the Commanding Officer and all points on the firing ranges and intercommunication between the general firing lines and butts is provided; these calls do not pass through the Rifle Range switchboard. Connection with terminal station throughout the base and with the Carolina Telephone and Telegraph Company is via the Division Training Area MAX Central Office, with the exception of the exchange at the Barrage Balloon Area which is tied direct. This exchange consists of a single position, floor type, manual PBX, common battery switch-board having a two digit numbering system of 80 line capacity.

K-12.02 Distribution is by aerial construction except for the firing ranges which is via buried cable, terminating in jacks mounted on pedestals.

K-12.03 Drawings prepared for this area are MB 2755, MB 2756.

TABLE OF DISTRIBUTION LINE QUANTITIES IN LINEAL FEET OF CABLE

| Drawing No. M.B. | Number of Pairs - Gauge | | | | | | |
|---|---|---|---|---|---|---|---|
| | 2 (pr.) | 7 (pr.) | 16-19 | 26-19 | 50-19 | 1-19 | 150-19 |
| 2755 | | | 2642 | 2205 | 755 | 390 | 125 |
| 2756 | 4460 | 10,806 | | | | | |
| Total Distribution Cable 21,383 Lineal Feet or 4.05 Miles | | | | | | | |
| Total Stations Provided 64 | | | | | | | |

K-13 Main Tent Camp

K-13.01. The Central Office is located in the C.O. Building at 5th and "C" Streets and handles all calls originating and terminating at the Airport, Peterfield Point, Tank Battalion and the Main Tent Camps. Toll calls and calls to other areas of Camp Lejeune are through trunk circuits to the Carolina Telephone and Telegraph Exchange. The Exchange of MAX type consists of automatic step by step switching equipment employing a three digit numbering system, of 180 line initial capacity, so designed that it may be readily expanded in 390 lines. Provision is made for one attendant position to handle information, intercept and handle calls between the automatic system and the Carolina Telephone and Telegraph Exchange.

K-13.02. Distribution to the Main Tent Camp and to the Tank Battalion Tent Camp is via aerial cable, distribution to the Airport and Amphibian Base Tent Camp is by buried cable throughout with the exception of a few stations which are extended beyond the cable area by open wiring.

K-13.03. Drawings prepared for this area are shown in the following table:

| TABLE OF DISTRIBUTION LINE QUANTITIES IN LINEAL FEET OF CABLE | | | | | | | |
|---|---|---|---|---|---|---|---|
| Drawing No. | Number of Pairs - Gauge | | | | | | |
| | 16-19 | 26-19 | 50-19 | 51-19 | 1-19 | 150-19 | 3-19 |
| TC 399 | | 1,550 | 2,370 | | 700 | 1,350 | 100 |
| TC 400 | 1,511 | 200 | 1,937 | 1,100 | 1,078 | 1,326 | |
| TC 401 | 2,085 | | | | | | |
| TC 402 | 5,808 | | | | | | |
| MB 1756 | | 4,725 | | | | | |
| MB 1757 | | 7,385 | | | | | |
| Total Distribution Cable 33,225 Lineal Feet or 6.29 Miles | | | | | | | |
| Total Stations Provided 180 | | | | | | | |

K-14 Mumford Point.

K-14.01. No Central Office was provided. Direct service is provided to Jacksonville over Government owned aerial cable. This cable plant was constructed to connect with the Carolina Telephone Company at the limit of their exchange rate area.

K-14.02. Distribution. With the exception of the outside services, all instruments, inside wiring, and protectors are the property of the Carolina Telephone and Telegraph Company.

K-14.03. Drawings prepared for this area are shown in the following Table:

| TABLE OF DISTRIBUTION LINE QUANTITIES IN LINEAL FEET OF CABLE | | | | | |
|---|---|---|---|---|---|
| Drawing No. | Number of Pairs - Gauge | | | | |
| | 16-19 | | 26-19 | | 51-19 |
| MB 1758 | | | | | 5,600 |
| MB 1759 | 974 | | 996 | | 1,202 |
| | Total Distribution Cable 8,772 Lineal Feet or 1.66 Miles | | | | |
| | Total Stations Provided 32 | | | | |

K-15. Operating Practices and Maintenance. For the proper operation and maintenance of the automatic central office equipment in the various offices it is recommended that records, routine reports, inspections, lubrication, and tests as outlined in detail by Bullentins 502, 505, 506, 543A and 656, issued by the American Automatic Electric Sales Company be followed.

These bulletins are based on years of observations, study and experience with the same type of equipment as specified at Camp Lejeune, in all parts of the world under all operating conditions.

The suggestions as outlined in these bulletins will provide a systematic method of maintaining the equipment, and furnish an index of its performance which will produce records and results comparable with these of similar installations.

# CHAPTER L - PART II

# ROADS, RAILROADS AND AIRPORTS

L-1. Roads.

Contents



L-1.01. Introduction. The location and construction of the Highway and Street system for Marine Barracks, New River, N. C. presented problems of a peculiar nature. In ordinary highway construction, the problem of location is largely a problem of fitting the alignment and grades to the terrain. In the construction of this Post, however, it was necessary to select the most suitable terrain for the building sites and then locate the roads so as to adequately serve the various building areas. The adoption of the battalion pattern to the site selected and the adjustment of the various units to insure stable foundations tended to complicate the design of the road system. Figure L-1.01 shows the final layout for all roads adopted.

L-1.02. Proposed Road System. In planning the Highway System, three main objectives were given consideration:

(a) To provide a series of primary arterial routes designed

# Over Size Form

☐ Too Large ☑ Bound Book

☐ Fragile ☐ Other ________

Sheet Number: Figure L1.01

Drawing/NAVFAC Number: ________

Title

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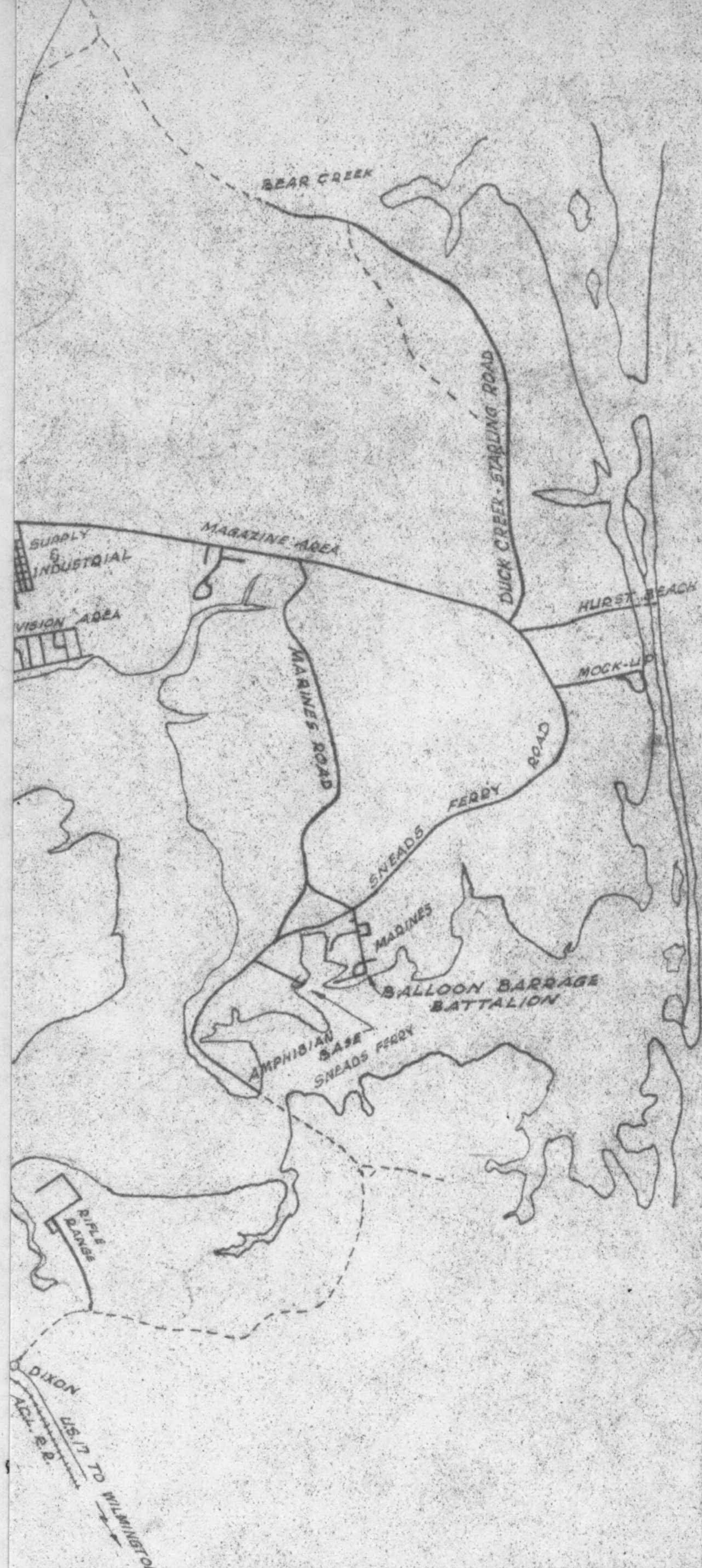
BEAR CREEK
DUCK CREEK - STARLING ROAD
SUPPLY & INDUSTRIAL
MAGAZINE AREA
VISION AREA
HURST BEACH
MOCK-UP
MARINES ROAD
SNEADS FERRY ROAD
MARINES
BALLOON BARRAGE BATTALION
AMPHIBIAN BASE
SNEADS FERRY
RIFLE RANGE
DIXON
A.C.L. R.R.
U.S. 17 TO WILMINGTON

FIGURE L1.01

for heavy duty and capable of carrying all kinds of motor vehicles and equipment to each and every section and unit of the Post.

(b) To project a secondary network of medium duty service roads around and through each developed area providing required access to each building unit, and

(c) To coordinate and combine these two classes of roads with additional access and intercommunication routes to provide a system capable of facilitating the movement of troops, equipment and materials with a minimum of delay and inconvenience.

The linking of this highway system with other transportation facilities, air, rail and water, was an essential requirement.

L-1.03. <u>Construction Roads.</u> Before undertaking building construction, it was necessary to provide transportation facilities for the delivery of building material and the ingress and egress of employees. As it was impossible to construct the permanent road layout before building commenced, the existing roads in the area were utilized for these purposes. This was accomplished by the contractor shaping these roads and placing stone whenever additional strength was needed. No engineering problems were involved in this operation.

Construction began on the permanent roads as soon as the site plan and the necessary highway plans and profiles were completed and approved, and the Contractor made use of sections of these roads for the hauling of building materials as soon as the grading was completed.

L-1.04 <u>General Design.</u> After analyzing the anticipated volume, speed and weight of the traffic to which the road system would be subjected, three general types of highways were adopted, and the typical cross sections shown in Figure L-1.04 give the characteristics of each type. These sections were modified, particularly in the Industrial and Supply Area, to conform to the facilities which they were required to serve.

For access to the Division Training Area, it was felt that peak traffic movement would require more than two lanes of surfacing. Some consideration was given to a three-lane roadway, but it was felt that the increased safety of a divided highway would more than offset the increased cost of construction, and the four-lane, divided type was selected. One half of this artery was graded, drained, surfaced and opened to traffic in 1941; the construction of the second half being deferred until the more urgent primary, secondary and service roads had been completed.

The width of 30 feet adopted for the center parkway permitted surface drainage, landscaping and safe turning and crossover operations.

The primary roads in the Regimental, Residential and other Areas were designed for two lanes of traffic, each lane of surfacing having the generally accepted width of eleven feet. Unpaved shoulders eight feet in width were provided along each side of this type of road as well as on

# Over Size Form

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Sheet Number: Figure L1.04

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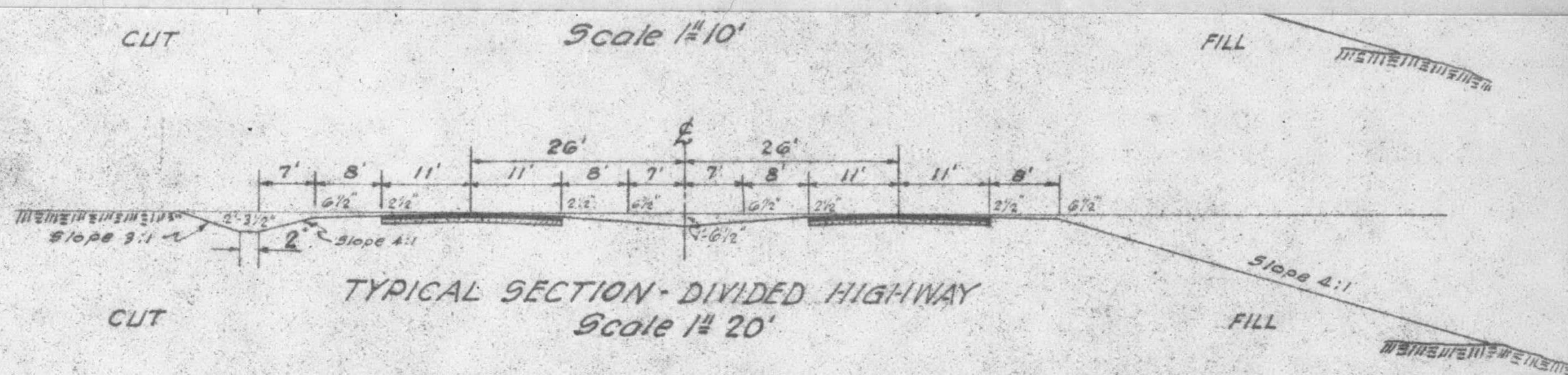
Title

Marine Barracks - New River, NC




TYPICAL SECTION - DIVIDED HIGHWAY
Scale 1" = 20'

# TYPICAL ROAD & STREET SECTIONS
## FIGURE L1.04

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BALTIMORE, MD.

MARINE BARRACKS - NEW RIVER, N.C.

A.E.E.

the divided highway, permitting vehicles to park off the traveled way.

The surfacing of the service roads was limited to 18 feet in width, and where necessary the shoulder width was increased to give greater parking facility.

The slopes adjacent to the shoulders were graded on a ratio of 4 to 1, the drainage ditches were two feet in width and the back slopes were cut on a 3 to 1 grade. This so-called "Boulevard Section" permitted machine construction operations and minimized soil erosion. After the slopes have been grassed, their maintenance can also be effected by machine methods.

Longitudinal grades were limited to a maximum of 3 per cent and a minimum of 0.3 per cent wherever possible on the entire road system. However, primary consideration was given to the design of the grades on the drainage ditches due to the flat terrain and high water table, and these drainage requirements, combined with the necessity for conforming to the elevations fixed for buildings and other permanent structures, were the controlling factors in establishing the highway grades.

L-1.05. Drainage. The general topography is the type that might be expected in the lower coastal plains of the Atlantic Seaboard. The difficulty in draining this Area arises from the usual lack of available outlets for drainage ditches and structures where such facilities are installed at a sufficient depth to drain the subgrade. Free water has little or no lateral flow on account of long flat slopes. All drainage was carried in open streams and ditches and pipe culverts and low or medium cost bridges were installed to convey this surface water under the roads and other facilities. The widely accepted Talbot's formula was used in determining the sizes of culverts installed, and for the larger areas these sizes were checked by the Rational and other well known methods.

Organic acids present in swamp and marsh lands or wherever vegetable matter is decaying in quantities, as was the case in about ninety (90%) per cent of the land where drainage structures were installed, were found to be severe in their chemical disintegration of most drainage materials. In Tent Camp No. 1 where corrugated metal pipe was used, bituminous coating was specified to protect the metal from chemical action.

On the remaining projects, due to restrictions on the use of metal, reinforced concrete pipe of "standard" and "extra strength" classes was used. The "standard" class represents pipe designed to withstand an ultimate load of 2,000 D under the three edge bearing test, and pipe of the "extra strength" type will withstand an ultimate load of 3,000 D under the same test. In this formula, "D" equals the diamter of pipe in feet. All pipe culverts in the Division Training Area were provided with a class D-1 concrete headwall, Navy Bureau of Yards and Docks Specification.

Several bridges were designed for crossing streams with large drainage areas. After much study it was decided to use a composite concrete and treated timber deck on treated timber piles over the larger streams, mainly Wallace Creek, and a laminated deck of treated timber on treated timber

WALLACE CREEK BOAT BASIN

WALLACE CREEK BRIDGE

piles over the small runs. The composite bridge was chosen not only for economy of construction, but for the conservation of strategic materials that would be necessary in a steel bridge. All bridges were designed in accordance with the standards of the American Association of State Highway Officials, and H-20 loading was used.

On the bridge across Wallace Creek on the Service Road and the bridge on River Drive just east of the B. O. Q., two 3" conduits were provided in the sidewalks for the telephone cables.

A Ponton Bridge was built across an Intra-coastal Waterway at Hurst Beach for traffic going to maneuvering operations on the beach. The approaches of this bridge were the same design as the treated timber bridges with laminated decks. The barge was designed by the Structural Department. Adequate mechanical equipment was provided to insure quick opening and closing and a minimum delay to traffic. The design is described in detail in Chapter F, Part II. The fender system to protect the bridge approaches consists of steel H-piling with treated timber batter piles for support.

L-1.06. Clearing and Grubbing. The clearing and grubbing for the areas designated involved the removal of trees, underbrush and coarse grass. In all clearing operations, the actual cutting of trees was controlled by landscape requirements as well as by the road construction. In the Magazine Area, the clearing consisted of cutting only the trees that were absolutely necessary to permit the actual construction of the fills and cuts, allowing the remaining trees to be left for purposes of concealment and camouflage. It was designated in the specifications that all timber of value should be cut into merchantable lengths and stockpiled for future use. All perishable materials were burned in small piles within the clearing so that timber and other valuable property would not be damaged. It was also specified that the grubbing would be carried to a depth of not less than one foot below sub-grade and roadway elevations.

L-1.07 Grade Establishment and Subgrade Design. The grades on the roads were designed to reduce to a minimum the moving of excavated material and to conform to the elevations of the adjacent buildings. Overhaul was eliminated by borrowing material outside of the right-of-way where necessary, and by wasting excess material in a sightly manner along the right-of-way itself.

The design and construction of the sub-grade involved merely the true finishing of the road bed surface and mucking and backfilling the marshes, bogs and swamps. The much was removed by a drag-line to a depth sufficient to insure a good foundation and the excavated areas backfilled with selected material. Borings were taken in most cases and the depth of the muck to be removed was indicated in the specification. In some locations gumbo (blue clay) was found underlying a sandy soil, and in all such cases, this clay was entirely removed and the roadway backfilled to the desired grade with a suitable material.

On sections of the Sneads Ferry Road, the sub-grade was made up entirely of a fine sand, and to prevent capillarity (the capacity to transmit finely divided moisture even against gravity) clay was added and mixed

with the sand before the base course was laid.

L-1.08. Types of Surfacing. In selecting the type of surface to be employed, it was necessary to weigh several important factors. The time involved in constructing the surface, with the resulting inconvenience caused to traffic by construction, played an important part in selecting the type of road finally adopted. The problem of securing materials made it desirable to use all local materials available. Several types of road were discussed with the leading Highway Engineers of the North Carolina State Highway and Public Works Commission. Cement concrete pavements were eliminated, principally due to the fact that concrete materials would have to be imported, and the Bureau of Yards and Docks issued a directive urging the conservation of cement. It was estimated that a seven-inch (7") cement concrete pavement would cost approximately fifty thousand ($50,000) dollars per mile.

Various types of bituminous roads were considered, including a surface treatment of limestone with asphalt and a sand asphalt, hot plant mixed surface on a stabilized sand-clay or traffic bound macadam base. It was finally decided to use a sand asphalt surfacing with a traffic bound macadam base due to the following factors:

(1) Superior Stone Company of Raleigh, N. C. had located and installed a rock-crushing plant at Belgrade, N. C., about fifteen (15) miles north of Jacksonville, N. C. The stone found in this vicinity was a shell rock (limestone) formation and could be used as the base course. This plant was also located on the Atlantic Coast Line Railroad, making shipment by rail an important factor.

(2) Pits containing a grade of sand suitable for sand asphalt construction were discovered and opened near the center of the Post. This permitted the erection of the paving plant at a location adjacent to the access road and the railroad, with a short haul for the sand as well as for the delivery of the paving mixture to all points on the road system.

(3) No seal coat or metal cover was deemed necessary for this type of pavement.

(4) Time of construction and delay of traffic was reduced to a minimum.

L-1.09. Traffic Bound Macadam Base. The base course, consisting of crushed shell rock with an added binder material where necessary, was constructed with adequate and suitable equipment of approved design in the following manner:

The subgrade was shaped with motor graders weighing not less than twelve thousand (12,000) pounds. The base course material was transported to the job with trucks equipped with dual-pneumatic rear tires to help in the compaction of the material in place. The spreading of the stone began at the point nearest to the source of supply. Traffic was permitted on the road to secure the additional compaction accomplished by vehicular movement. The hauling was distributed over the entire surface in order to

produce a uniform and true compaction of the base material. After the base course was placed upon the sub-grade, it was continually machined with the motor grader and further compaction was secured with ring rollers and other suitable compacting equipment.

L-1.10. Sand Asphalt Surfacing. The sand asphalt surfacing consisted of a hot, plant mixed material, base course having a minimum thickness of 1-3/4" and the top course of 3/4". The base course of this sand asphalt surfacing was a thorough mixture of mineral aggregate and bituminous material prepared to conform to the following composition limits by weights:

| | Grading A | Grading B | Grading C |
|---|---|---|---|
| Retained on No. 10 Sieve | 0 - 10% | 0-10% | 0-15% |
| Retained on No. 40 Sieve | 9 - 48% | 4-57% | 0-58% |
| Retained on No. 80 Sieve | 27- 57% | 20-72% | 16-77% |
| Retained on No. 200 Sieve | 9 - 38% | 4-48% | 0-48% |
| Passing No. 200 Sieve | 0 - 7% | 0-10% | 0-12% |
| Bitumen | 5 - 7% | 4-6.5% | 4-7% |

A tolerance of 10% for each sieve graduation within the above master ranges for the designed job mix was permitted.

The bituminous material was asphalt made from petroleum and met the following requirements:

| | Min. | Max. |
|---|---|---|
| Specific Gravity at 77° F. | 1.000 | 0 |
| Flash Point (Cleveland Open Cup)° F. | 347 | 0 |
| Penetration at 77° F. (100 g. 5 sec.) | 85 | 100 |
| Ductility at 77° F. (CMS) | 100 | 0 |
| Loss of Heating (50 g. 5 hrs. at 325° F.) % | 0 | 1.0 |
| Penetration Residue at 77° F.(110 g. 5 sec.) 60% original | | |
| Proportion of Bitumen Soluble in $CCl_4$, % | 99.5 | 0 |
| Total Bitumen Soluble in $CS_2$, % | 99.5 | 0 |

The plant was of standard design equipped with separate chambers for heating and mixing the ingredients as specified. The hot mixed sand asphalt was hauled to the job by trucks and placed with a Barber-Greene paving machine. The base course mixture, upon arrival on the work, was dumped into the hopper of the paving machine, and spread and struck off to the given cross section.

The depth of this base course layer was gauged by means of a template cut to proper crown and section of the roadway. While still hot the mixture was thoroughly and uniformly compressed with ten (10) ton tandem rollers that weighed two hundred (200) pounds per inch width of tread. The rolling was done parallel to the center line, beginning at the outer edge and proceeding towards the center of the pavement, overlapping on successive trips by one-half (1/2) of the width of the roller.

The surface course of sand asphalt was constructed on the finished base course in the same manner as the above. Prior to laying the surface course, the base course was given an application of hot asphalt cement at a uniform rate of one-tenth (1/10) gallon per square yard as a prime coat. The mineral aggregate for the surface course was graded to meet the following composition limits:

| | Grading A | Grading B | Grading C. |
|---|---|---|---|
| Passing No. 4 Sieve | 100% | 100% | 100% |
| Retained on No. 10 Sieve | 0-10% | 0-10% | 0-15% |
| Retained on No. 40 Sieve | 10-50% | 5-60%. | 0-60% |
| Retained on No. 80 Sieve | 36-60% | 25-75% | 20-80% |
| Retained on No. 200 Sieve | 10-40% | 5-50% | 0-50% |
| Passing No. 200 Sieve | 0-7% | 0-10% | 0-12% |
| Clay by Elutriation, Max. | 6% | 8% | 10% |

The mineral aggregate and bituminous material are combined in the following proportions to produce a mixture conforming to the following compositions limits:

| | Grading A | Grading B | Grading C |
|---|---|---|---|
| Retained on No. 10 Sieve | 0-9% | 0-10% | 0-15% |
| Retained on No. 40 Sieve | 7-47% | 4-56% | 0-57% |
| Retained on No. 80 Sieve | 23-53% | 20-70% | 12-76% |
| Retained on No. 200 Sieve | 7-37% | 4-47% | 0-48% |
| Passing No. 200 Sieve | 4-12% | 0-10% | 0-12% |
| Bitumen | 7.5 -10% | 6-10% | 5-10% |

A tolerance of 10% for each sieve graduation within the above master ranges for the designed job mix was permitted.

L-1.11. Motor Parking Areas. Motor parking areas were installed in convenient places over the Division Training Area and Tent Camp Areas. In the Division Training Area, particularly in the Industrial and Supply Area, parking areas were set up not only for trucks and other regimental auto equipment, but for heavy mobile war equipment. In the Tent Camps Nos. 1 and 2, the motor parking areas were located along the railroad, thus supplying a team track for the loading and unloading of supplies as well as for the movement of troops.

The same type surfacing with a traffic bound macadam base was used in these instances. Tests for stability were made by Froehing-Robertson Company of Richmond, Virginia, and the result was approximately four hundred (400) pounds per square foot. As this was not sufficient stability, a bituminous concrete surfacing was designed using 35% Belgrade stone, graded from one-half (1/2) inch down, 50% Goldsboro sand (concrete sand), 7% bitumen and 8% mineral filler (limestone dust). The construction method for placing this surfacing on the motor parking areas was the same method used in the paving of the roads.

L-1.12. Tent Camps Nos. 1 and 2. The first construction on roads on the Base was the building of the streets in Tent Camp No. 1. This layout was made up by the Site Planning Department giving a right-of-way

of sixty (60) feet for the main streets and forty (40) feet for the secondary streets. It was decided by the Resident Officer in Charge that the main streets were to be paved with a twenty-two (22) foot section of sand asphalt on a sand clay base. The right-of-way, being only sixty (60) feet, necessitated a shallow ditch section, thus complicating the entire drainage system. To secure a minimum cover of one (1) foot over pipe culverts, an arch type corrugated metal pipe, treated with a bituminous coating, was used. Experiments were made using Belgrade stone for the base course and was found to be very satisfactory.

Tent Camp No. 2 was constructed according to the same designs as specified for the Division Training Area. The rights-of-way for the main streets were made eighty (80) feet, and for the secondary streets, sixty (60) feet, allowing ample width for the typical intersection. "A" Street was continued through to the Access Road to the Glider Training Base to facilitate the movement of traffic from the Tent Camps to the Base and Peterfield Point Tent Camp.

L-1.13. Peterfield Point, Tank Battalion and Mumford Point Camp No. 1. Standard 22-foot road sections were used in these areas with traffic-bound macadam surfacing in the Peterfield Point Tent Camp and the Tank Battalion Tent Camp and asphalt surfacing in the Mumford Point Camp No. 1.

L-1.14. Camp Knox. The only road constructed in this area was an access road which led from North Carolina Highway # 24, at point just east of the Marine Base Railroad grade crossing, to Northeast Creek and is a standard 18-foot asphalt section.

L-1.15. Paradise Point Road. The Paradise Point road was constructed primarily for access to the Residential Area on Paradise Point. It was thought at the time that a bridge across Wallace Creek between the Residential Area and Division Training Area would be too expensive for construction. At a later date the bridge and road connecting these two Areas was built.

L-1.15. Division Training Area. In this Area there were two types of road constructed; roads with a twenty-two (22) foot paved surface, and roads with an eighteen (18) foot paved surface. The road with twenty-two (22) foot paved surface traversed the center of each Regimental Area, and the roads with the eighteen (18) foot paved surface are used as service roads for access to the Battalion Warehouses, Mess Halls, etc.

L-1.17. Industrial and Supply Area. In the Industrial and Supply Area, the standard road sections of twenty-two (22) foot paved surfaces were used throughout with two exceptions. Center Road was paved the full distance between the warehouses and railroad track No. 3 with a storm drain with concrete drop inlets and cast iron gratings for drainage purposes placed down the center of the street. Gibb Road was paved with a width of 45' - 6" adjacent to railroad track No. 1 for its entire length. These two streets were paved in this manner to facilitate troop movement and loading and unloading supplies.

L-1.18. Approach Road to the Glider Training Base Area. An approach road to this Area was constructed with a standard twenty-two (22) foot paved surface from U. S. Highway No. 17. This road is connected with Tent Camps Nos. 1 and 2 by a junction with "A" Street, approximately one and one-quarter (1-1/4) miles from U. S. Highway No. 17.

L-1.19. Holcomb Boulevard. Holcomb Boulevard, the main access road to the Division Training Area, is a four-lane, divided highway, leading from N. C. Highway No. 24 to the Division Headquarters in the Division Training Area. The details of this road are explained in Paragraph L-1.04.

L-1.20. Rifle Range, Balloon Barrage Battalion, Mock-up and Amphibian Base Areas. In these outlying areas, a road system similar to the one developed in the Division Training Area was used to satisfy the needs for service and troop movement. A standard section with a seventy (70) foot right-of-way and a twenty-two (22) foot paved surface was used in all cases except a fire road that was built in the Balloon Barrage Battalion Area. The purpose of this road was primarily for pedestrians and would be subject to traffic only in case of fire. It is made up of a cement concrete pavement similar to the pavement used for sidewalks.

L-1.21. Sneads Ferry Road and Verona Loop. The Sneads Ferry Road begins on Holcomb Boulevard about one-half (1/2) mile north of the Industrial and Supply Area. It traverses the Base by the Magazine Area to Duck Creek, and continues thence via the Mock-Up and Balloon Barrage Battalion and Amphibian Base Area to the existing Sneads Ferry bridge which connects to the road under construction at the present time by the North Carolina Highway and Public Works Commission, from Sneads Ferry to Folkstone, N.C. This road was constructed to give access to the outlying areas from the Division Training Area. It is a standard road section with a seventy (70) foot right-of-way and twenty-two (22) foot paved section.

The Verona Loop Road begins in the town of Verona, N. C. and makes a loop in a southeasterly direction, thence in a southerly direction and finally in a westerly direction back into N. C. Highway No. 17. This road was constructed to facilitate the maneuvering of troops and equipment in this territory.

L-1.22. Beach Road. The Beach Road begins on the Sneads Ferry Road at Duck Creek, continuing across the Inland Waterway to Hurst Beach. The purpose of this road was to give Marine Troops practicing amphibian tactics access to the coast.

L-1.23. Magazine Area. The Magazine Area lies in a section of the Post west of the Sneads Ferry Road, approximately two and one-half (2-1/2) miles south of Holcomb Boulevard. The roads in this Area were constructed as nearly as possible on the existing ground to aid in the camouflage of the magazines themselves. Ditches were eliminated in the typical section wherever possible, and the water was allowed to drain across the road. In the few cases where water was concentrated in existing ditches, concrete pipe culverts were installed.

L-1.24. Residential Area. The roads in the Residential Area were of the same standard twenty-two (22) foot paved section used in the Division Training Area.

L-1.25. Naval Hospital Area. Roads in the Naval Hospital Area are a continuation of the road and street system of the Division Training Area. The main road has a seventy (70) foot right-of-way with a twenty-two (22) foot paved surface; and the service roads have a seventy (70) foot right-of-way with an eighteen (18) foot paved surface.

L-1.26. Midway Park Residential Area. This area is on the north side of North Carolina Highway No. 24 between Northeast Creek and Piney Green, and in the vicinity of the main entrance to the Base. Several plans were submitted for the layout of this Park. The adopted plan follows a curvilinear pattern. The main streets are of the same section as that for 22-foot roads. The layout of the houses in this area presented drainage difficulties not encountered in any others, and a 9-foot asphalt-paved service drive with inverted crown was provided in the rear of the houses, for both access and surface drainage. Large parking areas were also provided so that no family had to walk over 200 feet from car to home.

L-1.27. Summary. To summarize briefly there were provided:

| | |
|---|---|
| 5.52 | miles of divided highways |
| 85.64 | miles of 22-foot roads |
| 1.48 | miles of 20-foot roads |
| 16.05 | miles of 18-foot roads |
| 2.00 | miles of 16-foot roads |
| 0.88 | miles of 10-foot roads |
| 5.22 | miles of 9 -foot service lanes |

Total 116.79 miles

Seventeen (17) bridges were provided for the crossings of various streams and creeks.

The design, location and grades of these roads required the preparation of 178 construction drawings which were approved by and issued through the Resident Officer in Charge. Three sets of specifications, supplemented by 32 addenda were also prepared by this division and issued through the Officer in Charge embracing detailed requirements for the construction of the pavements and structures throughout the Area.

L-1.28. Miscellaneous Drawings. It was necessary to secure a permit from the War Department when any construction in navigable streams was contemplated. The following drawings were made and sent to the War Department:

| | | |
|---|---|---|
| MB 287 | Trestle for Water and Sewer Line over Wallace Creek | Issued Sept. 11, 1941 |
| MB 288 | Trestle for Water and Sewer Line over Wallace Creek | Issued Sept. 11, 1941 |
| MB 1210 | Wallace Creek Bridge | Issued Dec. 23, 1941 |
| MB 1211 | Wallace Creek Bridge | Issued Dec. 23, 1941 |
| MB 1240 | Details of Mock-Up | Issued March 20, 1942 |
| MB 1242 | Details of Mock-Up | Issued March 20, 1942 |
| MB 1261 | Map for Dredging Courthouse Bay | Issued April 10, 1942 |
| MB 1276 | Ponton Bridge | Issued May 19, 1942 |
| MB 1277 | Ponton Bridge | Issued May 19, 1942 |

## L-2. Airports.

L-2.01. Location. Three (3) considerations governed the selection of the final site of the Glider Training Base: Proximity to New River, feasibility of large scale improvements, and a minimum of surrounding obstructions. The site selected lies approximately three (3) miles southwest of Jacksonville, N. C., and one (1) mile from Tent Camps Nos. 1 and 2. In addition to the above advantages, the river at this point is approximately one and one-half (1-1/2) miles wide, making it possible to develop seaplane landing facilities.

The site selected was low land with an average elevation of fifteen (15) feet above mean sealevel, ranging from zero at the river to twenty-five (25) feet on some of the ridges. The land is rolling and was traversed by several sloughs and drainage ditches. It was practically covered with woods and underbrush, necessitating clearing and grubbing on approximately ninety (90) per cent of the Area used for construction. The only obstructions within the glide angle proposed for the field were trees that grew on the Area. All buildings, towers, etc. were outside of a mile radius projected from the center of the field. All electrical and telephone lines were placed in underground cables.

L-2.02. General Design. Much consideration was given the design of typical sections, drainage, meteorological conditions, type of surfacing, soil conditions and clearing. The typical section adopted, shown in Figure L-2.02, was a crowned asphalt surfaced runway one hundred and fifty (150) feet wide with fifty (50) feet shoulders, and 8% grades on the slopes of the drainage ditches. The flat slopes on the ditches eliminate all hazards to moving planes, it being possible to land on these slopes should it be necessary.

Meteorological conditions, such as barometric pressures, temperature and wind velocities, were studied and determined the layout and alignment of the runway. A wind rose for this section was secured from the Bureau of Aeronautics, and it was decided to construct three (3) runways, each five thousand (5,000) feet long, lying northeast and southwest (runway #1), northwest and southeast (runway # 2) and north and south (runway # 3). The prevailing wind was from the Southwest and for this reason No. 1 was the first runway constructed.

The Area was cleared and grubbed for a distance of five hundred (500) feet from the center line of each runway, and a glide angle at the ends of each runway was provided with a fifty (50) foot clearance for any object at the end of a 20 to 1 slope. An additional area twenty-seven hundred (2700) feet by thirty-six hundred (3600) feet at the north end of the field was cleared for the Parachute Troops to use in jumping maneuvers.

The runways were joined by a seventy-five (75) foot paved taxiway, the typical section of which is shown on Figure L-2.02.

The bulk of the soil in this Area was classified as a sand loam suited for a dry, firm surface, consequently, no selected material was required for the sub-grade of the runways. Stability and bearing capacity tests were made and the soil was found to be adaptable to the requirements.

# Over Size Form

☐ Too Large ☑ Bound Book

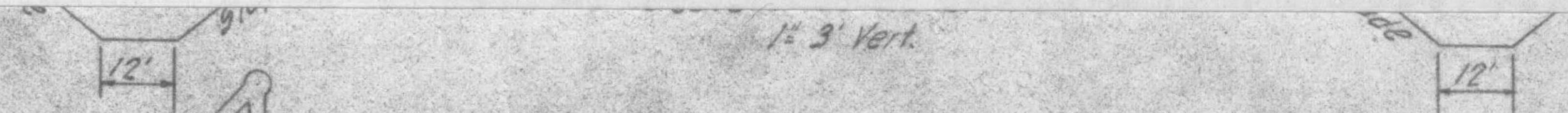
☐ Fragile ☐ Other ________

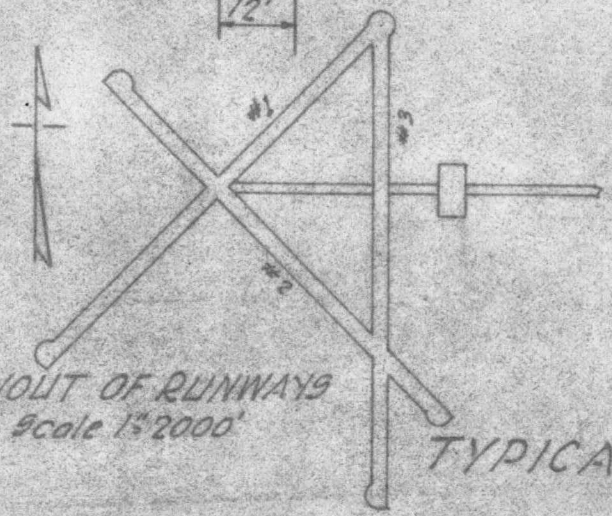
Sheet Number: Figure 2.02

Drawing/NAVFAC Number: ________

# Title

Marine Barracks - New River, NC




LAYOUT OF RUNWAYS
Scale 1" 2000'

SURFACING
2½" Sand Asphalt Surface Course
6" Compacted & Primed Macadam Base Course.

TYPICAL AIRPORT SECTIONS
FIGURE L 2.02

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DURHAM, N.C.

ARCHITECT-ENGINEERS
BALTIMORE, MD.

MARINE BARRACKS - NEW RIVER, N.C.

A.E.E.

The type of surfacing employed was an eight (8) inch compacted, traffic bound macadam base course, consisting of crusher run Belgrade stone with a binder added, if necessary, a prime coat of cutback asphalt and a surface course of sand asphalt pavement. The prime coat was used after the base course had been thoroughly compacted and brought to the grades and cross section designed on the plans. The surface course was composed of sand asphalt, a mixture of fine mineral aggregate and bituminous material, which was explained in Section I of this report. It was also specified that a light seal coat or armor coat be used, if requested by the Officer in Charge. This coat was to consist of a coarse mineral aggregate embedded in a bituminous material, the aggregate being of a color to present a light grey mosaic to the runway. The aggregate was to be placed at a rate of fifteen (15) to twenty-five (25) pounds per square yard, and then rolled with a ten ton power roller.

L-2.03. Drainage. The drainage system of the Glider Training Base Area was set up with two primary purposes: one, to lower the ground water level to improve the subsoil stability, and two, to carry surface run-off after storms. In making computations of run-off, the Rational formula was based on maximum of rainfall of 4" per hour, and the results checked by the application of other standard formulas.

In all cases natural drainage was used, supplemented with artificial drainage when necessary. Open ditches were cut along each runway and carried across the runways by means of a drop inlet and a reinforced concrete pipe culvert, "extra strength" class. The nature or composition of the soil made it unnecessary to cut any ditches in the surrounding areas except for outlets to the coast. The soil, being uniform and pervious, did not require any artificial sub-drainage.

L-2.04. Warming-up Apron. A concrete warming-up apron was provided adjacent and parallel to the North-South runway. This pavement was a class E-2 concrete, Navy Bureau of Yards and Docks Specification, having a compressive strength of three thousand pounds per square inch. The apron was provided with two pits for the distribution of fuel and water. Cast iron mooring eyes, of the dimensions and design shown on the Navy Department, Yards and Docks Drawing No. 140640, were placed in the slab for tying planes to the apron. The apron was constructed in eleven (11) foot sections with a transverse expansion joint every eighty (80) feet. The pavement was seven inches thick, reinforced with a wire mesh.

L-2.05. Seaplane Glider Base. Soon after the construction was completed for the landing field, a directive from the Officer in Charge was issued requesting that a Seaplane Glider Base be constructed in New River, opposite the runways with adequate facilities for glider training in this vicinity.

A sand asphalt taxi-way, seventy-five (75) feet wide and approximately two thousand (2,000) feet long, was constructed from the landing field to a Warming-up Apron, concrete sea wall, and ramp at the River edge. The taxi-way and warming-up apron were of the same construction as the runways and warming-up apron at the landing field. The drainage system was tied into the system already in operation.

[illegible] surfacing employed was an eight (8) inch compacted [illegible] macadam base course, consisting of crusher run aggregate [illegible] binder added if necessary, a prime coat of liquid asphalt [illegible] course of hot asphaltic pavement. The prime coat was used [illegible] base course had been thoroughly compacted and brought to its [illegible] contour as specified on the plans. The surface course was [illegible] sand asphalt, a mixture of fine mineral aggregate and bitu[illegible] [illegible] as specified in Section 1 of the ... It was [illegible] that a ... seal coat or armor coat be used, if required [illegible] in the ... This coat was to consist of a coarse mineral [illegible] in a bituminous material, the aggregate being of a [illegible] a light grey mosaic to the runway. This aggregate was to [illegible] rate of fifteen (15) to twenty-five (25) pounds per square [illegible] rolled with a ten ton power roller.

Drainage. The drainage system of the Glider Training Base [illegible] with two primary purposes: one, to lower the ground water [illegible] the subsoil stability, and two, to carry surface run-off [illegible] in making computations of run-off, the Rational Method [illegible] maximum of rainfall of 4" per hour, and the results checked [illegible] of other standard formulas.

[illegible] natural drainage was used, supplemented with artificial [illegible] necessary. Open ditches were cut along each runway and [illegible] the runways by means of a drop inlet and a reinforced con[illegible] culvert, "extra strength" class. The extreme porosity of [illegible] it unnecessary to cut any ditches in the surrounding areas [illegible] complete the study. The soil, being uniform and pervious, [illegible] and artificial sub-drainage.

[illegible] Warming-up Apron. A concrete warming-up apron was provided [illegible] of the north-south runway. This pavement was a [illegible] Navy Bureau of Yards and Docks specification, having [illegible] strength of three thousand pounds per square inch. The [illegible] with two pipe for the distribution of fuel and water, [illegible] eyes, and dimensions and design shown on the Navy [illegible] and Docks Drawing No. 160360, were placed in the [illegible] to the apron. The apron was constructed in eleven (11) [illegible] with a transverse expansion joint every eighty (80) feet, [illegible] was seven inches thick, reinforced with a wire mesh.

[illegible] Glider Base. Soon after the construction was com[illegible] Landing Field, a directive from the Officer in Charge was [illegible] that a ... Glider Base be constructed ... River, [illegible] with adequate facilities for glider training in this [illegible]

[illegible] taxiway, seventy-five (75) feet wide and ... [illegible] (12,000) feet long, was constructed from the landing [illegible] apron, concrete sea wall, and ramp at the River [illegible] and warming-up apron were of the same construction as [illegible] warming-up apron at the landing field. The drainage [illegible] the system was ready in operation.

The preliminary plans for dredging were for three runways, approximately in the same direction as runways for the landing field, to a depth of 8 feet. Later it developed that this area was to be used by gliders and seaplanes, so the entire river between the Base and Hadnot Point was dredged to a minimum depth of 7 feet. After dredging operations were completed, the river was swept to a depth of seven feet. This operation was carried out using two sweeps and pulling across New River on a course S. 45° W until the entire area had been covered. A few obstructions such as stumps and shoals were removed.

The plans for sweeping and survey control which will be useful for future sweeping are shown on drawing No. 2156.

L-2.06. Drawings. Detail and design for construction purposes at the Landing Field are shown on the following drawings:

| | | |
|---|---|---|
| MB 1200 | Structural Details | Issued Dec. 31, 1941 |
| MB 1201 | Drainage Layout and Typical Sections | Issued Dec. 18, 1941 |
| MB 1202 | Details of Spill-way and Sections of Taxi-way | Issued Dec. 5, 1941 |
| MB 1203 | Northeast - Southwest Runway | Issued Dec. 5, 1941 |
| MB 1204 | North-South Runway | Issued Dec. 19, 1941 |
| MB 1205 | Northwest - Southeast Runway | Issued Jan. 27, 1942 |
| MB 2208 | Taxi-way and Warming-up Apron, Glider Base | Issued Aug. 21, 1942 |

Construction requirements were contained in specifications prepared and issued to accompany these drawings.

L-3. Railroads.

L-3.01. Introduction. The Industrial and Supply Area lies approximately ten miles southeast of the Atlantic Coast Line Railroad in Jacksonville, N. C.

To adequately provide car storage and unloading facilities for the Marine Barracks, a railroad was built from Jacksonville to the Industrial and Supply Area, and general supplies for the base are transported on this railroad. Troop movements by railroad can also begin at a central distribution point lying in this area.

Approximately six thousand (6,000) feet of track in this Area were constructed as teamtrack; that is, the streets were paved to the edge of the track to permit loading and unloading between cars and trucks. At this writing, it is proposed to construct fifteen hundred (1500) additional feet of teamtrack just north of Center Road.

To serve all buildings in the Industrial and Supply Area, a system of sidings was located to conform with the buildings as shown on the Site Plans, and the three sidings were joined together by crossovers to facilitate switching and unloading.

A railroad turn around wye was provided at the northeastern end of the Industrial and Supply Area to facilitate movements of trains and cars.

Along track No. 3 from Ash Street northeasterly a troop loading road was provided 1500 feet in length and 50 feet in width with a surfacing of 4-inch compacted stone.

A spur was built in to Tent Camps Nos. 1 and 2 to serve warehouses and other facilities.

L-3.02. Drainage. The drainage conditions existing in this area have been explained in Section I of this report. Drainage structures on the railroad consists of two (2) treated timber trestles, designed in accordance with the Atlantic Coast Line's specifications and numerous corrugated iron, cast iron and reinforced concrete pipe culverts.

L-3.03. Design and Construction. The typical section for railroads was designed by the Atlantic Coast Line Railroad Company. The sub-grade is thirteen (13) inches below the base of the rail. Ballast consisting of crusher run Belgrade stone was installed on the subgrade to a depth of six (6) inches, filled to the top of the ties and sloped on a 20 to 1 slope to meet the sub-grade.

In the Tent Camps 1 and 2 Area, the ballast was of a select local material (sand clay). First grade, 85 pounds relay rails were used in the construction of these railroad facilities. The turnouts, angle bars and tie plates, bolts, spikes and washers were of new material. The cross-ties were new No. 1, 2, and 3 mixed pine and cypress, the pine being creosote treated, both for cross and switch ties.

L-3.04. Summary. The total trackage and facilities installed at the expense of the Navy Department is as follows:

| | | |
|---|---|---|
| 1. | Miles of track, including sidings | 13.6 miles |
| 2. | Trestles | 890 lineal feet |
| 3. | Pipe culvert | 2040 lineal feet |
| 4. | Electric Warning Signals for Highway crossing | 4 |

In addition to the above trackage, the Atlantic Coast Line Railroad Company without expense to the Government, laid a siding approximately two thousand (2,000) feet along their right-of-way, for the use of the Marine Corps in Tent Camp No. 2. Another siding about 600 feet in length was also installed at the location of the turnout of the track to the Industrial and Supply Area. Details are shown on the following drawings:

| | | |
|---|---|---|
| MB 202 | Railroad Grade Revisions- Wallace Creek | Issued June 13, 1941 |
| MB 241 | Railroad Tracks #1 and # 2, Supply & Industrial Area | Issued July 24, 1941 |
| MB 242 | Railroad Tracks #1 and # 2, Supply & Industrial Area | Issued July 24, 1941 |
| MB 243 | Railroad Track No. 3, Supply and Industrial Area | Issued Aug. 7, 1941 |
| MB 1223 | Switching Tracks for Railroads, Supply and Industrial Area | Issued Feb. 11, 1942 |

MB 1236 Railroad Crossing at Highway # 24 Issued Feb. 6, 1942

Construction requirements were contained in one set of specifications and seven addenda issued concurrently with the drawings above listed.

## CHAPTER M - PART II

## WATER SUPPLY AND DISTRIBUTION

CONTENTS



M-1. Introduction. The design of water utilities, at the outset presented major problems as to the source of supply and the treatment of same. There were no contour maps available to indicate the various surface streams and their respective catchment areas nor were there any conclusive data available covering local geological and underground water formations upon which to draw accurate conclusions as a basis for design.

Information of this character had to be obtained with all possible speed and final decisions were based upon the actual findings rather than upon theoretical assumptions.

The natural resources for water supply have been thoroughly investigated and studied as is fully described elsewhere in this report.

The designs of the various distribution systems are in accordance with standard practice except that additional precautions have been taken to keep them in operation under all circumstances.

The treatment and pumping plant for the Division Training Area has been designed for easy and economical operation.

Water systems in the outlying areas have been designed along exactly the same lines except that treatment has been eliminated.

WATER TREATMENT PLANT - DIVISION TRAINING AREA

M-2. Tent Camps 1 and 2 Water Supply. The original estimate for water requirements for Camp No. 1 as per preliminary report of May 3, 1941, addressed to Resident Officer in Charge, was based upon a total population of 6,000.

The estimated consumption for all ordinary purposes is 120 gallons per capita, per day, or a total of 720,000 gallons.

Fire demand was estimated at 1000 gallons per minute from the elevated tank alone and 2000 g.p.m. total with elevated tank and pumping plant both in operation.

The recommendations contained in this report were briefly as follows:

That an elevated storage tank 100,000 gallons be provided on a tower not less than 100 feet high. (A standard steel tank of this description was later purchased by the Navy).

That a ground storage tank to hold 300,000 gallons be provided for supplying the high lift service pumps.

That the entire water supply be derived from wells, the construction details of which should be determined from the character of the formations disclosed by test drilling.

That water treatment may or may not be required depending entirely upon the physical characteristics of the supply obtained.

M-2.01. Investigation of Well Supply. Well drilling for this area was begun May 10, 1941, under a specification prepared in Washington, wherein percussion tools were used to sink a 10-inch casing and cement the lower end of same into the shell rock formation. Drilling was then continued into the shell rock for a sufficient depth to develop the required quantity of water per well. Pumpage from a given well was limited to a safe drawdown wherein the fresh water level was not to be lowered to such extent as would permit the underlying salt water to rise or to flow in from nearby tidewater stream.

The first well, located at "A" and "1st" Streets, designated as "A" was drilled to 107 feet and cased with 10-inch O.D. steel pipe. The water-bearing rock formation was drilled to a depth of 75 feet below the casing (total depth 182 ft.) and then developed by pumping with air lift. The production was 450 gallons per minute with 12 ft. of drawdown from static level, which stood 4 ft. below elevation 18.4 at ground surface.

A supply of such magnitude from an open bottom well indicated a huge underground reservoir but unfortunately the quality was extremely poor due to high mineral content. As a matter of record the chemical analysis is stated below:

Total Hardness as $CaCO_2$, 86 p.p.m; Calcium Hardness, 40 p.p.m; Magnesium Hardness, 46 p.p.m; Methyl Orange Alkalinity, 424 p.p.m; Phenolphthalein Alkalinity, 0; Caustic Alkalinity, 0; Free Carbon Dioxide, 1 p.p.m; Chlorides, 372 p.p.m; Sulphates, 134 p.p.m; Iron, 0.1 p.p.m; Manganese, 0.

A second well of this type designated as "D" was drilled at "A" and "6th" Streets in which a 10-inch casing was set 110 feet below the surface with open bottom hole drilled through water bearing shell rock for 74 feet, making the total depth 184 feet. This well produced 400 gallons per minute with 26.5 ft. of drawdown, the static level being 3.5 ft. below El. 20.3 at ground surface. The analysis of this water was almost identical with Well "A".

A ruling was made by the Bureau of Medicine and Surgery that this water was unfit for human consumption, due to its high mineral content, and accordingly, it was later used only in combination with shallow wells drilled subsequently.

While the first wells were being drilled, investigations were being made to determine the quality of water obtainable from shallower depths. A general discussion of this matter is contained in Section M-3.03 of this report. Findings were to the effect that water of good quality was obtainable at depths ranging from 70 to 138 feet (perhaps deeper in untried locations) and that there was a heavy layer of impervious clay between the shallow and deeper water bearing formations which prevented flow from one to the other. These findings made it necessary to eliminate the methods used thus far and to employ drillers and equipment capable of drilling by rotary process and installing gravel packed screens where water had to be developed from fine sand formations.

In the original set up, Wells "A" and "D" were drilled producing 850 gallons per minute of highly mineralized water and wells "B", "C", "E", "F", and "G" producing 505 gallons per minute of good quality water. It will be noted that 505 g.p.m. equal about 720,000 gallons per day or just sufficient supply for a population of 6,000 troops. This was apparently sufficient with a partial mixture of the deep well water. Wells "B", "C", and "F" were constructed by setting 18-inch O.D. steel casing to the first shell rock formation and grouting the same in from bottom to ground surface and then drilling through the full depth of rock below the casing. No gravel or screens were used in these three wells. Wells "E" and "G" produce from shell rock and sand. Accordingly, they were constructed with gravel packed screens, as described in Section M-3.07 of this report.

Because of the expansion of this activity to 12,000 troops when Tent Camp No. 2 was authorized in December, 1941, it was decided to drill additional wells to produce 950 g.p.m. or 1.37 million gallons per day. Accordingly, Wells "H", "J", "L" and "M" were constructed with gravel packed screens and wells "F", "I" and "k" were drilled into shell rock formation and finished without gravel enveloped screens.

An additional ground storage tank of 272,000 gallons capacity and identical with one already provided, with all necessary piping, cross connections and auxiliary equipment, together with an additional pump of same capacity and characteristics as specified for original installations under Section M-2.04 in this report, were constructed and installed subsequent to the authorization of Tent Camp No. 2. An 8-inch feeder main for the purpose of supplying water to Peterfield Point and the Glider Base was authorized later. The take-off for this 8-inch feeder main was at point where an 8-inch cross was installed at "11th" and "F" Streets.

The total supply for Tent Camps 1 and 2 is now 2 M.G.D. of reasonably good water from eleven shallow wells and 1.2 M.G.D. of highly mineralized water from deep wells.

M-2.02. Transmission Mains. Transmission mains from all of the wells to the main pumping plant are of Class 100 cement-asbestos pipe with A.W.W.A. gate valves and cast iron fittings.

M-2.03. Well Pumping Equipment. All of the pumps are of the deep well vertical shaft turbine type. Wells "A", "B", "C", "E", "G", "H", "K", and "L" are electric motor driven only. Wells "D", "J", and "M" have dual electric and gasoline engine drive with a combined capacity of 850 G.P.M. or 1.2 M.G. All of the wells are comparatively close to the main pumping plant and are operated manually.

All data pertaining to manufacture, operating characteristics, maintenance and repair of well pumps has been turned over to the Public Works Officer. Construction details, underground formations, yield, drawdown and other information for each well is shown on P.W. Drawing No. 23.

M-2.04. Main Pumping Plant. The main pumping plant, for high lift service, was originally designed for Tent Camp No. 1, housing 6,000 troops. With the addition of Tent Camp No. 2 provision was made for a total of 12,000 troops and an additional ground storage tank and one additional high lift pump were installed at the Main Pumping Plant. The principal structures equipment, and sequence of operation are as follows:

Well water is pumped over coke tray aerators located on the roof of two ground water storage tanks 50 x 50 ft. inside by 15 ft. deep, each holding 272,000 gallons below the overflow line. Each aerator consists of 5 trays 7 x 7 ft. effective surface area, placed one above the other with 9 inches clearance between each tray, and has a safe working capacity of 1 M.G.D.

Aeration was installed to remove hydrogen sulphide gas which is present in objectionable quantities in several of the wells.

Sand traps are provided at the base of the aerators to prevent this material from entering the storage tank and distribution system.

From the ground storage tanks a suction header conveys the water to three identical high lift centrifugal pumps two electric driven and the other with dual electric and gasoline engine drive. Each pump is designed to deliver 700 g.p.m. against 160 feet total discharge head, requiring 40 horsepower. The gasoline engine is rated at not less than 55 H.P. and includes underground storage tank, hand priming apparatus and all usual accessories. The original equipment was furnished under Specification No.104 by Worthington Pump and Machinery Corp. The additional pumping equipment was furnished under same specifications by DeLaval Steam Turbine Company.

A cross connection is provided between the well supply and pumps so that when either or both of the ground storage tanks are out of service the high lift pumps can take suction directly from the wells.

...Pumps 1 and 2 is now 5 M.G.D. of capacity
...wells and 4.2 M.G.D. of highly mineralized

...mains. Transmission mains from all of the
...plant are of Class 200 cement-asbestos pipe with
...cast iron fittings.

...All of the pumps are of the deep
...wells "A", "B", "C", "D", "E", "F", "G", "H",
...driven units. Wells "B", "C", and "H" have dual
...gasoline drive with a combined capacity of 300 G.P.M.
...wells are comparatively close to the main pumping
...chemically.

...to temperature, operating characteristics, main-
...well pumps has been turned over to the Public Works
...details, underground formations, yield, drawdown
...for each well is shown on P.W. Drawing No. 24.

...Plant. The main pumping plant, for high lift
...designed for Tent Camp No. 1, housing 6,000 troops.
...Camp No. 2 provision was made for a total of
...additional ground storage tank and one additional high
...at the Main Pumping Plant. The principal structures
...operation are as follows:

...over coke tray aerators located on the roof of
...tanks 30 x 30 ft. inside by 15 ft. deep, each
...below the overflow line. Each aerator consists of
...and ... area, placed one above the other with
...coke tray, and has a safe working capacity of

...to remove hydrogen sulphide gas which is
...in several of the wells.

...at the base of the aerators to prevent this
...storage tank and distribution system.

...storage tanks a suction header conveys the water to
...centrifugal pumps two electric driven and two
...gasoline engine driven. Each pump is designed
...feet total discharge head, requiring 80
...engine is rated at not less than 80 H.P. and is
...tank, hand priming apparatus and all usual ac-
...equipment was furnished under Specification No. ...
...auxiliary pump. The additional pumping equipment
...specifications by DeLaval Steam Turbine Company.

...provided between the well supply and pressure
...the ground storage tanks are out of service the
...directly from the wells.

M-2.05. Meters. Both the raw water supply from the wells and the discharge from the service pumps into the distribution system are measured by velocity type meters with indicating-totalizing instruments mounted on the main panel. This equipment is manufactured by R. W. Sparling.

M-2.06. Automatic Controls. An automatic water level control has been furnished to start and stop the electrically driven pump so that storage in the elevated tank can be maintained between any predetermined limits of fill and draw. A float type water level control has been furnished to operate in conjunction with the ground storage tank in which contactors and circuits are provided for (a) starting one or more well pumps automatically; (b) stop all service pumps when the water level in the storage tank reaches low level and (c) to stop the gasoline engine driven pump at low water level. This equipment was furnished under Specification 104 by Automatic Control Company, St. Paul, Minn.

M-2.07. Chlorinator. Chlorination is effected by a solution feed manually adjusted chlorinator with maximum capacity of 40 lbs. per 24 hrs. This machine is semi-automatic, designed to start and stop when either of the service pumps is operated. This feature is accomplished through solenoid valves placed in the water supply line to the chlorinator with one solenoid in each pump circuit. This equipment was furnished by Wallace and Tiernan Company and is designated as Type S.A.S.V.M.

M-2.08. Distribution System. The entire distribution system is constructed of Class 150 cast iron pipe with A.W.W.A. specification gate valves and fittings. Fire hydrants are compression type conforming with A.W.W.A. specifications and Fire Underwriters requirements. In general the pipe sizes were held to a minimum because of the temporary nature of the project. Feeder Mains are 8-inch diameter with 6-inch grid system in Camp No. 1 and the same design was carried out for Camp No. 2 except for a short stretch of 10-inch pipe extending southerly in "A" Street from the main pumping plant and easterly in "7th" Street to "C" Street to connect with the distribution system in Camp No. 2.

This was done in order to effect proper hydraulic balance between the two activities and their respective elevated storage tanks.

The systems in Camps 1 and 2 are designed to provide ample domestic flow and 1000 g.p.m. fire flow in both camps simultaneously.

In addition to the above an 8-inch cast iron feeder main with takeoff at 8" x 8" cross at corner of "11th" Street and "F" Street, was authorized subsequent to authorization for Tent Camp No. 2. This main was constructed for the purpose of furnishing water to Peterfield Point and Glider Base Areas.

M-2.09. Elevated Storage. Two identical elevated steel water tanks of 100,000 gallons each on 132.5 ft. towers provide about 60 lbs. working pressure. One tank for Camp No. 1 is located south of "6th" Street back of the Supply Area. The second tank for Camp No. 2 is located south of "F" Street between "10th" and "11th" Streets. The elevation of the overflows on both tanks was specified to be 168.00. Both tanks were furnished and erected by R. D. Cole Manufacturing Company, Newnan, Ga.

M-2.10. Future Water Treatment. Considerable discussion has been had between the Navy Department, Marine Corps and Architect-Engineers relative to iron removal and softening of the water supply for Tent Camps 1 and 2. The Navy Department has expressed opinion to the effect that the quality of the water should be satisfactory for the purposes intended, while the Marine Corps states that the high mineral content is objectionable and is causing costly maintenance because of deposits in hot water heaters and other mechanical equipment.

At the time of writing this report decision as to whether or not treatment is to be provided depends upon the chemical analysis of wells drilled but not yet in operation.

In the meantime, experiments are being performed in which "Micromet" is being introduced into a water heater to determine whether or not such treatment will satisfactorily prevent the coating of hot water coils and other difficulties with mechanical equipment. As directed by the Officer in Charge complete construction drawings Nos. T. C. 126 to 135, inclusive, dated October 7, 1942, together with Specification No. 170 covering all structures, equipment and appurtenances have been turned over to the Officer in Charge in the event that a treatment plant is authorized for Tent Camps 1 and 2.

M-2.11. Summary. In order to give a clear picture of the final structures and equipment after Tent Camp No. 2 was added, the following summary is given:

Shallow Wells constructed by Layne Atlantic Company of Norfolk, Va. Are B, C, E, F, G, H, I, J, K, L, and M with a total capacity of 2 M.G.D.

Deep Wells A and D with a total capacity of 1.2 M.G.D. were drilled by Virginia Machinery and Well Company.

There are two concrete ground water storage tanks complete with aerators and sand traps, each with a capacity of 272,000 gallons or 544,000 gallons total.

Three high lift pumps are each rated at 700 G.P.M. against 160 ft. head.

Two units, one single electric drive and one dual drive were manufactured by Worthington. The third unit is single electric drive manufactured by De Laval.

The interconnecting piping between the storage tanks, wells and pumps is so arranged that either one or both tanks may be put out of service without shutting down the plant.

No additional chlorinators or automatic equipment have been added.

M-3. Division Training Area.

M-3.01. Design Basis. The original estimate for water requirements for the Division Training Area, as per preliminary report of June 16, 1941, is based upon a total population of 12,500 including four Regimental Areas.

Hospital and Residential Areas. The normal consumption of water was estimated at 120 gallons per capita per day for all ordinary requirements including boiler plants, laundries, refrigeration and other uses. Based upon this figure, the total normal demand was 1.5 million gallons per day.

M-3.02. Investigation of Surface Supplies. Investigations for adequate sources of water supply were begun promptly after the arrival of the engineering force. These investigations included thorough field inspection and flow gaugings of numerous surface streams, also laboratory examination of water samples to determine the chemical content and other characteristics.

All stream gaugings were made by the U. S. Geological Survey who were most cooperative in rendering this valuable service.

The first gaugings were made between April 27 and May 21, 1941, of the following streams:

Cypress Creek, at Chinquapin, Duplin County.
New River, near Gum Branch.
Chapel Run, near Catherine Lake.
New River near Richlands.
N. E. Cape Fear River at Chinquapin, Duplin County.
Muddy Creek, at Chinquapin, Duplin County.

During the period of these gaugings there was little precipitation and as a result the flows decreased to such extent that, of the local streams, only New River, near Gum Branch, remained as a possibility, the minimum flow as of May 21, 1941, being 11.7 C.F.S. or 7.55 million gallons per day. N. E. Cape Fear River had adequate flow but was too far distant for immediate consideration.

These gaugings, although they were taken over a short period of time, gave valuable preliminary information when correlated with the official rainfall records. It was at once apparent that under moderate drought conditions, all of the streams in question show marked decrease in flow within a very short period after deficiency in rainfall occurs.

In view of the unsatisfactory findings regarding the flow of surface streams and because of the urgent necessity for immediate water supply for construction purposes, our efforts were directed to a study of underground water supply from wells. This topic is fully discussed elsewhere in this report.

The gauging of surface streams was continued in accordance with the summary tabulated below. These data are presented for such use as may be warranted in the future and with the full knowledge that the final selection of wells for permanent water supply, as against surface streams, may be questioned by interested persons.

| Date | Stream & Location | Disch. CFS | Disch M.G.D. |
|---|---|---|---|
| 4-29-41 | Cypress Creek near Chinquapin | 323. | 208.0 |
| 5-21-41 | | 1.26 | 0.81 |

| Date | Stream & Location | Disch. CFS | Disch. M.G.D |
|---|---|---|---|
| 4-29-41 | Muddy Cr. at Chinquapin | 59.8 | 38.60 |
| 5-21-41 | | .5 | 0.32 |
| 4-30-41 | Chapel Run near Catherine Lake | 6.00 | 3.88 |
| 5-21-41 | | 2.84 | 1.83 |
| 6-24-41 | | 3.02 | 1.95 |
| 9-23-41 | | 1.84 | 1.19 |
| 4-30-41 | New River near Richlands | 25.7 | 16.60 |
| 5-21-41 | | 1.19 | 0.77 |
| 5-24-41 | | 2.40 | 1.55 |
| 4-29-41 | N.E. Cape Fear River at Chinquapin | 523.0 | 338.00 |
| 5-21-41 | | 41.4 | 26.80 |
| 9-24-41 | Trent River above Trenton | 10.6 | 6.85 |
| 4-30-41 | New River near Gum Branch | 95.6 | 61.80 |
| 5-21-41 | | 11.7 | 7.55 |
| 7-31-41 | | 14.8 | 9.55 |
| 8-14-41 | | 10.6 | 6.85 |
| 9-16-41 | | 6.48 | 4.18 |
| 9-23-41 | | 4.44 | 2.86 |
| 8-14-41 | Northeast Creek near Kellum | 5.74 | 3.71 |
| 9-23-41 | | .84 | 0.54 |
| 8-14-41 | Little N.E. Creek near Piney Green | 2.96 | 1.91 |
| 8-14-41 | Wallace Creek at Mumford's Mill | 3.66 | 2.36 |
| 9-23-41 | | Tide | |
| 8-14-41 | Southwest Creek at Mortons' Mill | 1.85 | 1.20 |
| 9-23-41 | | .82 | 0.53 |
| 3-31-41 | Bryces Creek near Riverdale | 97.1 | 62.70 |
| 9-24-41 | White Oak River, 1 mi. N.E. of Belgrade (above Stone Quarry) | 1.58 | 1.02 |
| 9-24-41 | White Oak River, S.E. of Rt. 17 below Belgrade including discharge from Stone Quarry | 4.43 | 2.86 |

By preliminary report of June 16th, directed to Resident Officer in Charge, we evaluated the cost and merits of securing water supply from New River.

The point selected for the intake was about 3-1/2 miles south of the county road leading from Gum Branch to U. S. Highway 258.

The development of this source of supply included intake structures, pumping plant and 13 miles of 24-inch transmission main at a cost of

Tent Camp Area were finished in accordance therewith. All main supply wells drilled later are of gravel wall construction, drilled by rotary process.

The change in drilling methods and in the construction of individual wells together with estimated yield, drawdown, analyses, and other pertinent facts is fully described in a report from the Architect-Engineers to the Officer in Charge, dated Oct. 3, 1941.

This report is repeated, below, to such extent as is necessary to give a clear understanding of the subject:

October 3, 1941

To: Resident Officer in Charge, Marine Barracks, New River, N.C

From: Carr and J. E. Greiner Co.

Subject: Water Supply, Main Area.

"In connection with the development of water supply for the Division Training Area, the following operations have been carried out to date:

Four test wells, drilled by cable-tool or percussion methods have been installed within the general area to be occupied by the Marine Barracks and associated activities. This work was begun in February, 1941, and terminated in May. Information covering these wells is contained in our Preliminary Report dated June 16, 1941."

"A brief summation of the results is again stated for convenience -

Test Well No. 1. Location one half mile south of Jacksonville Cemetery near Montford Landing, depth 227½ ft; Coquina rock penetrated for depth of 30.5 ft; yield 150 G.P.M. with 15 ft. draw-down. Chlorides 28.3 p.p.m.

Test Well No. 2. Location on Paradise Point Road 0.4 mile east of New River. Depth 265 ft; Coquina rock penetrated for depth of 35 ft; yield 420 G.P.M.(questionable) with 19 ft. drawdown. Analysis shows Chlorides 126 p.p.m.

Test Well No. 3. 8,000 ft. inland from Hadnot Point. Depth 325 ft. Well finished in "granite rock with sand and water pockets". Analysis showed Chlorides 580 p.p.m. "

"An attempt was recently made to obtain water from this well for construction purposes. When put into operation it sanded up immediately. The equipment was removed and the well bailed and drilled out to a point below the bottom of the casing. The well terminated in gray and black sand commonly known as "salt and pepper". No traces of "granite rock" were found. This well now yields about 100 G.P.M. of highly mineralized water."

$ 655,000. This report evaluated the merits and cost of securing water supply from the only local stream which at that time appeared to have sufficient flow to warrant consideration.

These calculations were upset by subsequent gaugings which, from Sept. 14, 1941, to Sept. 23, 1941, showed a decrease in flow from 6.85 M.G.D. to 2.86 M.G.D. At that time the cumulative deficiency in rainfall since Jan. 1, 1941, was over 4.56 inches. On Sept. 29th, a second report was submitted to the Officer in Charge covering all streams gaugings made subsequent to June 16th, as listed above and in addition, we made a thorough inspection of White Oak River and Hunters' Run catchment areas to determine whether or not these streams were worthy of consideration. It was found that neither stream had sufficient flow to warrant further study.

Investigations were also made of Trent River above the town of Trenton. This stream was gauged Sept. 24, 1941, and showed a flow of 6.85 M.G.D. The air line distance from this source of supply to the Marine Base is about 24 miles.

N. E. Cape Fear River is known to have sufficient run-off for adequate supply but is 35 miles distant from the Marine Base.

These two sources of supply were given careful consideration but were discarded as the estimated cost greatly exceeded the funds available; also the length of time required to plan and construct facilities for using either source would have extended far beyond the time allowed for obtaining water for construction purposes and troops.

The taking of water supply from a point 24 to 35 miles distant has obvious strategiv faults, from the standpoint of vulnerability and maintenance.

Regardless of the merits or faults of surface supply as against well supply, the available funds and time limit were the controlling factors. Accordingly, wells were selected to meet present requirements and surface supply was left for future consideration.

M-3.03. Wells-General. On April 16, 1941, and prior to coming to the Marine Base we visited the office of the Senior Geologist, Washington, D.C. and obtained such information as was readily available on underground water supplies within the Coastal Plain of North Carolina.

On June 9, 1941, we received from the Officer in Charge a 26-page report prepared by the U. S. Geological Survey, dated May 20, 1941, entitled "Memorandum in Regard to Ground-water Supplies in Vicinity of Jacksonville, N. C." by David Thompson. This report mentions four test wells which had been drilled or were being drilled on the Marine Base Reservation between March and May 20 and discusses very thoroughly the geological formations, occurrence of water, quality of water, safe rate of drawdown, need for additional information, ground water levels and general considerations. The report also contained chemical analyses of water taken from the test wells drilled on the Reservation and from wells in the test wells drilled on the Reservation and from wells in the general vicinity of the Marine Base.

The original specification for the drilling and construction of wells was prepared by the U. S. Geological Survey and the first two wells for the

"The second rotary drilled well is located on northwest side of Main Access Road near Cedar Street, in the Supply Area. Depth 195 ft; yield 250 g.p.m. with 32 ft. draw-down. This well penetrated one consolidated layer of Coquina rock from 90 to 100 ft. below the surface. The other water-bearing material is sand or shell rock and sand in unconsolidated layers. Analysis shows water of good quality, with Chlorides 16 p.p.m. Iron 0.7; soap hardness 180."

"This well and the one in the Housing Area will be used immediately for construction purposes."

"Review of the foregoing data shows several interesting points.

1. The so-called Coquina rock formation is by no means continuous as a consolidated formation. Apparently there are areas of appreciable extent where this formation does not occur, except in loose and comparatively shallow layers mixed with sand.

2. Of the wells drilled, the chloride content has increased with the depth. This holds good for the Tent Camp Area where the 70 ft. wells average 16 p.p.m. as against 400 p.p.m. for wells drilled to 180 ft. depth.

3. There is in the Tent Camp Area an impervious layer of clay between the upper and lower water-bearing formations. Pumpage tests conducted to date show no evidence of exchange of water between the two.

4. High chloride content has not been obtained within the Division Training Area from wells finished above the 250 ft. level. Fairly high concentration appears below the 300 ft. level. Data is now being collected for the purpose of establishing, if possible, the relationship between depth below normal water table and chloride content.

5. From information obtained to date covering underground formations within this area, it is not believed possible to develop adequate water supply from consolidated Coquina rock formations alone, as recommended by other authorities and in accordance with usual practice within the Coastal Plain region. This method may be used where conditions are favorable, but it has been clearly demonstrated that for local development, waterbearing sands must be largely depended upon for adequate yield.

6. In order to accomplish the desired results, gravel-packed wells must be used as the formations are generally of fine sand which will not permit open bottom construction and which will either clog or enter screens without gravel packing."

Recommended Design

"For the Division Training Area, including Residential, Industrial, Hospital and associated activities, with a population of 12,500 and an average estimated water consumption of 120 gallons per capita per day, the demand will be 1.5 M.G. The average will be exceeded by periodic peaks caused by hot weather, fires, increase in population or other reasons, which will approximate 50% above normal average of 2.25 M.G.D."

"Test Well No. 4. Location southwest side Piney Green Road about 8,000 ft. southwest of Supply Area. Depth 567 ft. No waterbearing rock formation was penetrated. The well produced 50 G.P.M. with 125 to 150 ft. drawdown. Analysis was not made. None of the above wells will be considered for permanent use."

"Since the original test wells were drilled, two additional "cable-tool wells" have been sunk, one 520 feet deep, located on the southeast side of the main access road near the northmost corner of the Supply Area. The so-called Coquina rock was encountered in shallow layers with alternate layers of sand, clay, loose shell beds and conglomerate. The underground formations were generally saturated with water, which, for cable-tool drilling, necessitated driving the well casing 10 feet or more in advance of drilling and bailing. This well did not penetrate any consolidated shell rock or other formation suitable for the development of an "open bottom well". Visual inspection of the drillings indicated that worth while yield could not have been developed, at this location, by other than gravel packed screen construction."

"Drilling at this site was abandoned September 25, 1941. Analysis of the water shows 5,000 p.p.m. of Chlorides, making the well unfit for use."

"A sixth cable-tool well was drilled at the location of the R.E.A. Power Plant southwest side of Route 24, about 1400 feet southeast of Northeast Branch of New River. The underground formations are understood to be comparable with those described above. At a depth of 588 feet the well was pumped at 4 gallons per minute for 1½ hours and a water sample was then collected. The analysis September 4, 1941, showed total alkalinity, 520; Chlorides 2450; Sulphates 786; Bicarbonates 440; Sodium 2118; all results being expressed in parts per million. Obviously this water was unfit for use and the well was abandoned."

"A gravel-packed well is being constructed at this location, but no information has been received covering further details."

"A seventh cable-tool well was drilled to a depth of 103 feet for the C.C.C. Camp located on the north side of Northeast Branch, about two miles upstream from Mumford Point. This well penetrated Coquina rock from 46 to 75 feet depth. The hole below 75 feet was filled with gravel. The yield was 108 G.P.M. with 9 ft. drawdown. Analysis shows water of good quality: Chlorides 13 p.p.m; pH 7.8; Iron 0.20."

"Two rotary drilled wells with gravel-packed screens have recently been constructed as follows:

One well located on the northeast side of Route 24, about 6,000 feet southwest of Northeast Branch, to serve the 700 Unit Housing Development. This well penetrated shell rock from 99 feet to 132 feet. Drilling was continued below the rock, through sand and clay to 153 ft. The hole below the rock was plugged as the lower formation appeared questionable. Ground level at this well is 33.0 ft.; static water level 16 ft. below surface, yield 200 G.P.M. with 14 ft. draw-down. Quality of water good: Chlorides 13 p.p.m.; Iron 0.7 and pH 7.8."

[illegible] 4. Location southeast side Perry Branch Road about 5,000 ft. [illegible] of supply area. Depth 567 ft. No water-bearing rock formation [illegible] encountered. The well produced 30 G.P.M. with 125 to 190 ft. drawdown. [illegible] were not made. None of the above wells will be considered for permanent use."

"Since the original test wells were drilled, two additional "cable-tool wells" have been sunk, one 520 feet deep, located on the southeast side of the main access road near the northernmost corner of the supply area. The [illegible] Coquina rock was encountered in shallow layers with alternate layers of sand, silt, loose shell beds and conglomerate. The underground formations were generally saturated with water, which, for cable-tool drilling, necessitated driving the well casing 10 feet or more in advance of drilling and bailing. This well did not penetrate any consolidated shell rock or other formation suitable for the development of an "open hole well". Visual inspection of the drillings indicated that worth while yield could not have been developed, at this location, by other than gravel packed screen construction."

"Drilling at this site was abandoned September 29, 1941. Analysis of the water shows 5,000 p.p.m. of Chlorides, making the well unfit for use."

"A sixth cable-tool well was drilled at the location of the R.E.A. Power Plant southwest side of Route 24, about 1400 feet southeast of Northeast Branch of New River. The underground formations are understood to be comparable with those described above. At a depth of 502 feet the well was pumped at 4 gallons per minute for 1½ hours and a water sample was then collected. The analysis September 6, 1941, showed total alkalinity, [illegible], Chlorides 2480; Sulphates 780; Bicarbonates 590; Sodium 2115; all results being expressed in parts per million. Obviously this water was unfit for use and the well was abandoned."

"A gravel-packed well is being constructed at this location, but no information has been received covering further details."

"A seventh cable-tool well was drilled to a depth of 105 feet for the C.C.C. Camp located on the north side of Northeast Branch, about two miles upstream from Hadnot Point. This well penetrated Coquina rock from 46 to [illegible] feet depth. The hole below 75 feet was filled with gravel. The yield is 100 G.P.M. with 9 ft. drawdown. Analysis shows water of good quality; Chlorides 15 p.p.m; pH 7.4; iron 0.2."

"Two rotary drilled wells with gravel-packed screens have recently been constructed as follows:

"One well located on the northeast side of Route 24, about 5,000 feet southwest of Northeast Branch, to serve the 400 Unit Housing Development. This well penetrated shell rock from 90 feet to 142 feet. Drilling was continued below the rock, through sand and clay to 182 ft. The hole below [illegible] was plugged as the lower formation appeared poorly water. [illegible] at this well is [illegible] ft.; static water level 16 ft. below surface. Yield 200 G.P.M. with 14 ft. draw-down. Quality of water good. Chlorides [illegible] p.p.m.; iron 0.7 and pH 7.5."

"Under any conditions a reasonable amount of reserve should be available, in excess of the expected peaks, so that certain units may be out of service for maintenance or repair. Under these conditions the total development of water from wells should be made on the basis of 3 M.G.D."

"Development of the supply from underground sources is predicted upon the following:

Average annual precipitation, 50 inches, equivalent to 870 million gallons per sq. mile. Of the total rainfall, it is assumed that 25% remains within the depth limits of the proposed wells, after deducting run-off, evaporation, and transpiration. This figure is believed to be very conservative as in actual practice this type of terrain should yield 40% or more of the average annual precipitation. In view of the danger of salting from beneath, it is unqestionably wise to keep the draw-off within safe limits."

"On the basis of taking 25% of the annual precipitation, the daily yield will be 600,000 gallons per square mile. We have previously indicated an average required pumpage of 1.50 M.G.D. with a maximum of 3.00 M.G.D. To meet the 1.5 M.G.D. demand (1042 G.P.M.) five wells will be required at 208 G.P.M. each, spread over an area of 2.5 square miles. To meet the 3.00 M.G.D. demand (2080 G.P.M.), ten wells will be required, with an area of 3.84 square miles. The above figures are all on a 24 hour operating basis for the total respective outputs. If development is made on the basis of 3.00 M.G.D. maximum, then for 1.5 M.G.D. average daily consumption, the pumps would operate 12.0 hours."

"It is recommended that 10 wells be constructed for immediate use and that the yield per square mile be limited as closely as possible to 600,000 gallons per day."

"It is further recommended that all future wells be constructed by rotary drilling methods and that gravel enveloped screens be used throughout, unless special underground conditions warrant some other type of construction."

"If this project is carried out on the basis of our recommendations, we believe that an ample and dependable supply of water can be developed. The cost by this method will be appreciably less than for obtaining an equivalent amount of water from surface sources."

M-3.04. Wells Constructed for Division Training Area. The recommendations contained in this report were accepted and the work proceeded accordingly, except for minor changes to suit local conditions. The total number of wells was later increased to 16 and finally to 21 as mentioned later in this report. The proposed location and spacing of wells for immediate and future construction, together with the transmission mains, is shown on M. B. Drawing 521, approved October 2, 1941. This plan was carried out as to its general intent for ten wells in Group "A" and six wells in Group "B". Well Group "C" was relocated as mentioned later. The drilling of permanent wells within the Division Training Area was started about the middle of September, 1941, and the first 10 wells, Nos. 1 to 10, inclusive, in Group "A" were finished about the middle of April, 1942.

The wells in this group run from 150 ft. to 210 ft. deep and have a combined yield of 3.096 M.G.D. Complete data covering location, spacing, transmission mains, yield, and other details are shown on M. B. Drawing No. 1500.

The total elapsed time does not represent actual working time on the first ten wells, as the drilling equipment was moved to other locations and back again as required to cover all of the activities where water was most urgently required for construction purposes.

The drilling of five wells, Nos. 11 to 16, inclusive, in Group "B" was started the middle of April 1942 and was completed the latter part of July 1942. The wells in this group range from 150 ft. to 190 ft. in depth and have a combined normal yield of 2.088 M.G.D.

Data showing location, spacing, transmission mains, yield and other details is shown on M. B. Drawing 1500.

With the completion of the ten wells in Group "A" and six wells in Group "B", the total supply will be 5.17 M.G.D. Under normal conditions this will be sufficient supply for the Division Training Area, with a population of 20,000 including the Hospital and all associated activities connected with this source.

However, at a conference between representatives of the Navy, Marine Corps, and Architect-Engineers held in July, 1942, the sufficiency of the water supply to meet demands of greatly increased personnel, fires and other abnormal conditions was discussed and it was decided that additional reserve should be provided at this time.

On July 27, 1942, we prepared an estimate for five additional wells in Group "C", including pumps, houses, transmission mains, electrical service, roads and miscellaneous, in the amount of $ 125,000.

Authority to proceed with the five wells in Group "C" was given on August 12, 1942, and the drilling was started at once. The location, spacing, and transmission mains are shown on M. B. Drawing 1500. Well Group "C" consisting of Nos. 17, 18, 19, 20, and 21 were constructed as previously described except Well 20, which was constructed by setting and cementing in place on top of rock formation an 18-inch casing, and drilling to water-bearing formation. This well has no 8-inch casing, no screen and no gravel. The total quantity of water derived from these five wells is 1.58 G.P.D. making the grand total of 6.77 G.P.D. for the Division Training Area exclusive of high lift emergency wells described later in this report.

M-3.05. Emergency High Head Wells. In order to insure adequate water supply for the Officers' Quarters Area, in the event that the long single line of transmission main serving that area should fail or be shut down for repairs, Well No. "R" was drilled near the site of the elevated tank. This well is equipped with both electric and gasoline engine drive for 250 G.P.M. delivery into the distribution system, against full tank pressure. No treatment is provided other than chlorination.

In order to insure a supply of water at all times for the Hospital Area, Well "E-1" was drilled. This well is equipped with both electric and gasoline engine drive, for delivery of 100 G.P.M. into the distribution

system against full tank pressure. No treatment is provided other than chlorination.

M-3.06. <u>Well Construction.</u> All of the wells within the Division Training Area, with the exception of Well No. 20, Group "C", which was constructed as above noted, are of the gravel wall type and all wells in this Area were constructed by the Layne-Atlantic Company of Norfolk, Va. The construction details are as follows:

A test well 2 inches diameter was drilled near each permanent well location and all strata penetrated were carefully examined and logged. Water samples were obtained and analyzed for mineral content. If sufficient water bearing material was found at a given location, the permanent well was drilled there. If not, a new site was selected. Rotary drills were used with clay slurry circulated through the drill rods into the well to seal the side walls and prevent caving. The slurry continuously overflowed the top of the well and was circulated through a ditch at ground level, the ditch following a circular path of sufficient length, from the well and back to a sump pump, to permit all drillings to settle out of the slurry. The slurry was repumped into the well to maintain an interrupted flow. A hole about 24 inches diameter was drilled to the first hard clay or rock stratum and an 18-inch standard weight steel casing was centered therein and grouted in place from bottom to top. This operation was carried out by welding a steel plate over the top of the casing through which a 4-inch grout pipe was extended to bottom of the hole. The casing was first pumped full of clay slurry, the air being released at the top, and pure cement grout was then pumped through the 4-inch pipe to the bottom of the hole.

Sufficient pressure was maintained to force the grout up between the earth and casing from bottom to ground level so as to provide a solid and uniform cement encasement around the 18-inch casing. After the cement had set, drilling was continued for the full depth of the well, as previously determined by the test well. All strata penetrated during permanent drilling were examined and logged.

The hole below the 18-inch casing was drilled with a 17-1/2 inch rock bit to the full depth of the well. A tube consisting of 8-inch standard weight steel pipe with 8-inch shutter type silicon bronze screen sections (iron screens were used in the last wells drilled) spaced to coincide with the main water bearing strata was centered in the hole and completely enveloped with gravel. The gravel used was of 1/8 to 1/4 inch size, expecially selected and graded. The gravel was pumped into the well, with water, under 40 to 50 lbs. pressure until the space between earth and well tube (pipe and screen sections) was completely filled from bottom to ground surface. After gravelling had been completed, each well was pumped at a high rate to flush out fine sand and the clay slurry used in drilling. In many instances wells were of necessity put into operation before being fully developed, and consequently, they were not free from sand and turbidity. This type of well invariably requires a considerable amount of development before reaching its maximum rate of production and efficiency. Development consists of pumping to waste with frequent starting and stopping, the pumpage rate to be somewhat in excess of that selected for normal operation. Any well on the project which shows sand and /or turbidity should be put out of service and be properly developed before being turned into the distribution system.

M-3.07. Well Pumping Equipment. All of the wells are equipped with deep well turbine pumps of conventional type manufactured by Layne-Bowler, Inc., Memphis, Tenn., Peerless Pump Division, Food Machinery Corporation, Canton, Ohio, and Worthington Pump and Machinery Corporation. Certain of the wells are equipped with gasoline engine auxiliary drive as follows: Nos. 1, 3, 8, 10, 13, 17, and 21. The combined capacity of these dual driven wells is 1750 G.P.M. or 2.52 M.G.D.

All of this equipment is designed for low head duty to pump the rated capacity of each well through the softening equipment at the water treatment plant. As an actual example, Well No. 1 is rated at 250 G.P.M. against a total discharge head of 75 feet. The total head is the result of fixed conditions as follows: Pump base, El. 26.40; water level in well, at 250 G.P.M. discharge rate, El. - 16.60; friction loss in transmission main at 5 M.G.D. maximum flow, 13 ft. Elevation at point of discharge (including friction loss through softeners) is 46.0. The total head is obviously the difference between the water elevation in the well and the elevation at the point of discharge, plus the total friction loss in pipe lines or - 16.0 to + 46 = 62 ft. plus 13 ft. friction = 75 feet. In some instances the heads called for in the specifications are slightly more or less than the computations actually show. This was done to allow for ground water recession in instances where the well will stand additional pumping.

In other instances, figures were altered slightly in order to meet known conditions of stock pumps. In all cases the pumps were specified to meet maximum head conditions which will occur only when 5 M.G.D. are being pumped to the treatment plant. When less than 5 M.G.D. is being pumped the friction loss in the transmission mains will decrease proportionately and the pumps will increase in their respective discharge rates and draw-down. In some instances the over-pumpage may become dangerous because the lowering of water levels in the wells, to a point in excess of that recommended, if carried on for any appreciable length of time will invite contamination by the underlying salt water. This difficulty was foreseen at the outset and numerous manufacturers of regulating valves were contacted in an effort to obtain a satisfactory rate-of-flow controller, by means of which the rate of discharge of each individual well could be exactly maintained, regardless of the variation in discharge head. The apparatus offered is expensive, costing about $ 400.00 per unit, exclusive of labor and materials for installation.

The manufacturers questioned the operation of their respective equipment for this service because of the likelihood of air binding, freezing, and damage from sand or minerals contained in the raw water supply. In order to overcome the tendency of the respective wells to overpump, during periods of less than peak operation, each of the three water softening units at the treatment plant is equipped with a rate-of-flow controller which will limit the water received to 1 M.G.D. with optional plus or minus variation.

These controllers will act as a brake to throttle delivery from the wells and should cause sufficient back pressure in the transmission mains to prevent overpumping of the respective well groups, provided the required number of wells are always put into operation to provide for surplus. If

there is a deficiency from the wells, for a given rate of plant operation, the controllers will remain wide open and there will be no throttling action. Recommendations for the operation of the system are described in detail under "Operation of Well System", Section M-3.11.

M-3.08. Well Transmission Mains. The entire system of wells discharge by groups into branch collecting systems leading by the shortest routes to the transmission main located along the west side of the Main Access Road. Cement-asbestos pipe has been used throughout for conveying well water, excepting the individual pump connections which are cast iron. Non-metallic pipe was selected for several reasons. It was more readily obtainable, more economical, was not a strategic material, has high initial carrying capacity and will maintain this capacity due to its non-corrosive quality. Valves and fittings in well transmission mains are cast iron, American Water Works Specification.

In general, the transmission main to the plant is capable of delivering 5 M.G.D. with a friction loss of 4.09 feet per 1000 feet of pipe, based upon C = 120, as applied to Hazen & Williams formula and hydraulic tables. This applies to the 18,825 ft. of 18-inch main from Well 13 to the treatment plant. The smaller branch mains are sized for head losses of 4 ft. or less per 1000 feet of pipe with the obvious result that the head and power to operate increases with the distance from treatment plant to a given well.

Complete details of Well Groups "A", "B", and "C", showing pipe sizes and distance between wells, together with valves and fittings, are shown on M. B. Drawings Nos. 503, 566, 567, 568, 577, and 599, respectively. Transmission of Groups "A", "B", and "C", together with all outlying areas, is shown on M. B. Drawing No. 1500.

M-3.09. Air Valves. It is the intent and recommendation to install automatic air release valves at all summits along the transmission and branch mains serving the well system as covered under Water Distribution Specification No. 501, Paragraph 31. This equipment is absolutely essential in order to maintain proper carrying capacity in the mains and branch lines. If the pipes are permitted to become air bound the friction head will increase to the point where the flow will be greatly curtailed.

M-3.10. Remote Control of Wells. The individual wells, for the purpose of efficient operation, are sub-grouped to produce water in increments of 1 M.G.D. Each sub-group is controlled by an electric carrier wave circuit operated from the main treatment plant. The carrier wave circuits are specified to operate as follows: Well Group "A" consisting of ten wells is sub-grouped to operate on four independent circuits, namely -

| | | | |
|---|---|---|---|
| Circuit No. 1 | Wells 3, 2, and 10 | to produce | 0.936 M.G.D. |
| Circuit No. 2 | Wells 1, 7, and 6 | to produce | 0.936 M.G.D. |
| Circuit No. 3 | Wells 8, 5, and 9 | to produce | 1.008 M.G.D. |
| Circuit No. 4 | Well No. 4 | to produce | 0.216 M.G.D. |

Well Group "B" consisting of six wells is sub-grouped to operate on three independent circuits, namely -

| | | | |
|---|---|---|---|
| Circuit No. 5 | Wells 11, 13, and 15 | to produce | 1.08 M.G.D. |
| Circuit No. 6 | Wells 12, 14, and 16 | to produce | 1.00 M.G.D. |

This schedule was prepared before the wells in Group "C" were drilled, and developed, therefore the manner of remote control grouping cannot be determined at this time. Final development of wells in Groups "A" and "B" has not been completed. For these reasons it is probable that the schedule for these groups as shown will be subject to revision as to grouping, etc.

Attention is called to the fact that the wells are sub-grouped in such manner as will provide for the widest consistent spacing between individual units. This for the purpose of avoiding concentrated pumping over any given area and to spread the draw-off to as large an area as practicable.

Technical data covering the carrier wave circuits is contained in Specification No. 509.

The location of wells and schedules of remote control are also shown on M. B. Drawing No. 1500.

M-3.11. Operation of Well System. The exact operation of the well system, which will eventually include 21 units in Well Groups "A", "B", and "C" can be established only after the system has been in operation for a sufficient length of time to determine the actual characteristics of the various well groups, sub-groups, and individual wells. The chemical characteristics of any given sub-group, main group or combination of groups is very important and must be carefully determined and recorded at the beginning of the operation. The chemical characteristics must be checked carefully thereafter at frequent intervals for proper control of the softening plant and treatment process.

The following suggestions and recommendations are offered to assist those who will have charge of the well supply.

Before going into specific details, it is appropriate to point out that the water system is an extremely important utility and accordingly, it deserves the most careful and painstaking operation and maintenance. Only men who are thoroughly qualified by prior experience to obtain the best possible operating results and efficiency should be assigned to operate this utility, as by no other meanscan the desired results be obtained.

M-3.12. Adjustment of Pumpage Rate and Drawdown. The first important adjustment to be made is the regulation of each well in any particular group or sub-group to discharge its rated capacity at the recommended drawdown. The drawdown should be held to safe limits, meaning that where the well log shows, say —33.0 as the drawdown elevation for Well No. 3 when pumping 250 G.P.M., the water level should in this case not be drawn down to a lower level as this particular well is situated near New River where contamination by salt water is much more likely to occur than in some other well which is located further away from salt water. Accordingly, the final adjustment of each well in a given group should be based upon common sense practice with regard to the physical conditions as existing at the time the adjustment is made. It is entirely possible that recession of ground water level, caused by drought or pumping, may necessitate periodic changes in rates of pumpage wherein some of the wells may be throttled to less discharge while others may be increased.

As a basis for final adjustment of the individual wells, it should be noted that the water softeners and filters at the main plant are in 1 M.G.D. units with a total capacity of 3 M.G.D. Accordingly, the remote control circuits, previously described, are arranged to supply water to the plant in 1 M.G. increments.

The operation of the wells and treatment plant should be at 1, 2 or 3 million gallons per day and no attempt should be made to split the operation into fractions of the stated increments.

The regulation of wells for maximum drawdown and rates of discharge is closely correlated with the operation of the treatment plant from several important standpoints; namely, the friction loss within the pipe lines at various rates of flow will vary considerably depending upon how the three-well sub-groups, each furnishing 1 M.G.D., are combined in order to supply 1 M.G.D., 2 M.G.D. or 3 M.G.D. The friction loss, in turn, will be an appreciable part of the total discharge head of a given pump and will greatly influence its adjustment. Therefore, all pump adjustments must be made in accordance with a definite prearranged program of plant operation. For example, in Well Group "A" there are 3 sub-groups each capable of delivering 1 M.G.D. and one well by itself which will deliver 0.216 M.G.D. The first step in well regulation will be to select a sub-group to deliver 1 M.G.D. through the treatment plant.

Select Circuit No. 1, Wells 2, 3, and 10 and regulate each discharge valve so that the maximum recommended drawdown is exceeded by, say, 3 feet. This is necessary as the friction loss will increase when 2 or 3 M.G.D. are being delivered. Next turn on Circuit No. 2, Wells 1, 7, and 6 to deliver 2 M.G.D. to the plant, and adjust each discharge valve to exceed the recommended drawdown by, say, 2 feet. Check wells 2, 3, and 10, Circuit No. 1, and note carefully the drawdown which occurs with 2 M.G.D. rate of discharge, plus or minus, as indicated by the plant meter. Repeat the entire operation for Well Circuit No. 3 and note the drawdown produced in all of wells with a discharge rate of 3 M.G.D. Any deficiency in flow, regardless of whether 1, 2, or 3 M.G.D. is being pumped, can be augmented by Well No. 4 on Circuit No. 4.

The above routine must be carried out in substance for Well Group "B" and also for Group "C" when the same is completed.

The example above cited, for Group "A", is given for the purpose of explaining the general procedure for the regulation of wells, in order to secure proper operating results. At the date of writing this report the treatment plant is incomplete as is Well Group "C", and the transmission main thereto. It is probable that final development of wells in Groups "A" and "B" will require readjustment of grouping in those groups. Accordingly, it is impossible at this time to give explicit directions for well regulation. The procedure given is for general guidance only and it may be entirely possible after the system is put into operation to improve upon the yield and drawdown conditions as above stated.

The other important correlation between the well system and treatment plant is the determination, by chemical analyses, of the quality of water discharged from each circuited sub-group of wells and the combining of these

groups to give water of the most uniform quality regardless of whether 1 M.G.D., 2 M.G.D or 3 M.G.D. is being pumped. This procedure may involve departure from the example cited for the regulation of wells in Group "A", but regardless of how the combinations are finally made, it is of great importance that the plant operation be definitely scheduled so that the the chemical characteristics of the water will remain as nearly uniform as possible. It is obvious that if the plant operator knows beforehand the chemical characteristics of the water produced by the various combinations of well sub-groups that he can immediately set his chemical feed equipment to deliver proper dosage to the softeners for any given rate of flow from 1 to 3 million gallons per day. It is always anticipated that slight changes in chemical dosage will have to be made from time to time due to variation in the characteristics of the well water and in the quality of the chemicals purchased. However, such manipulation is a part of daily routine control common to every treatment plant of this type.

M-3.13. Water Storage, Treatment and Pumping Plant. The water treatment plant for the Division Training Area is designed to produce a total of 3 million gallons per day of softened filtered water.

An evaluation of the types of softening equipment considered for this application together with conclusions and recommendations, is fully contained in report dated October 3, 1941, to the Resident Officer in Charge. This report is repeated below to such extent as is necessary to give a clear description of the basic facts which governed the plant design and the selection of equipment.

"The characteristics of the well supply have not been known prior to analysis made October 2, 1941, from Well No. 1 located on the northwest side of the Main Access Road near Cedar Street. Analysis from prior wells, in this area, showed widely varying mineral content and, inasmuch as the water-bearing formations and depths were also materially different from the formations and depths selected for the new permanent wells, the old analyses were discarded as being too uncertain. Analyses, as above indicated, secured from the two new permanent wells, one located within the Low Cost Housing Area and the other near the Supply Area, show objectionable features as follows: Iron, 0.70 p.p.m; soap hardness, 180 p.p.m. "

"Observations of other wells within this vicinity indicate that the iron content will vary with drawdown and rainfall. We are of the opinion that an average of 2 to 3 p.p.m. of iron will be prevalent and that provision for its removal will be absolutely necessary. Iron content in excess of 0.20 p.p.m. is generally objectionable. The soap hardness is due almost entirely to 190 p.p.m. of bicarbonates in which calcium greatly predominates."

"For general domestic use a hardness of 5 grains (86 p.p.m.) is considered satisfactory. For the various activities connected with the Marine Barracks such as boiler plant, ice making, laundry, and perhaps the hospital, it is definitely certain that treated water will be required. It is believed that treatment to remove iron to 0.2 p.p.m., or lower, and to remove hardness to a remaining value of 4 to 5 grains per gallon, will be satisfactory for laundry and ice making. If additional treatment is required for these activities, it can be installed and operated at very much lower cost than would be the case with water of original hardness."

"The boiler plant will unquestionably require water with less mineral content than that contemplated for general use. Again the cost of installing and operating equipment for final de-mineralization will be very much cheaper and more satisfactory with pre-treated water containing 4 to 5 grains of hardness."

"As a gauge for determining the saving effected by softening, Faulk's formula is generally used, wherein the amount of soap required to reduce the hardness of 1000 gallons of water one part per million is 0.2 lbs. In actual practice it has been found that the amount of water softened by soap amounts to 1.2 gallons per capita per day. Water softened from 180 to 80 p.p.m., or 100 g.p.m. removed, would represent a saving of 300 pounds of soap per day, or $ 30.00 at 10 cents per pound. This is equivalent to $ 11,000.00 annually."

"As previously stated, it will unquestionably be necessary to remove the iron content regardless of what additional treatment is provided for general or special purposes."

"In order to draw comparison between the various treatment processes and their respective construction and operating costs, the following figures are given. These figures represent the cost of bare equipment and structures of 3 M.G.D. capacity applicable to the respective processes and do not represent final cost of completed plants.

1. Iron Removal Alone.

Aeration, chemical flocculation, sedimentation, and filtration.

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|---|---|
| Estimated cost of structures & equipment | $ 26,000.00 |
| Operating cost per M.G. (chemicals only) | 4.00 |

2. Combined Softening & Iron Removal

Lime-Soda Process

Aeration, chemical precipitation, filtration, sludge drying beds.

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|---|---|
| Estimated cost of structures & equipment | $ 38,100.00 |
| Operating cost per M.G. (chemicals only) | 9.00 |

3. Combined Softening & Iron Removal

Catalytic Process

Aeration, chemical conditioning, catalytic contact chamber, filtration, removal of inert waste material.

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| Estimated cost of structures & equipment | 25,600.00 |
| Operating cost per M.G. (chemicals only) | 7.10 |

4. Combined Softening & Iron Removal

Zeolite Process

This process would mix completely softened water with unsoftened water in a ratio of about 3 to 1 in order to obtain 80 p.p.m. final hardness.

Aeration, chemical flocculation, sedimentation & filtration for 1/3 of supply (1 M.G.D.). Zeolite for 2/3 of supply (2 M.G.D.)

| | |
|---|---|
| Estimated cost of structures & equipment | \$ 37,000.00 |
| Operating cost per M.G. (chemicals only) | 23.50 |

All of the treatment processes are based upon analyses of water samples which are as representative as can be secured at this time. It is entirely possible that the mineral content may vary somewhat in the wells which are drilled for permanent use, but it is obviously impossible to postpone construction of the main plant while more wells are being drilled.

The following data shows mineral content of raw well water and estimated values after softening; results in parts per million.

| | Well Water | Lime-Soda Process No.2 | Catalytic Process No. 3 | Zeolite Process No. 4 |
|---|---|---|---|---|
| Total Hardness as $CaCo_3$ | 180 | 68 | 68 | 68 |
| Calcium | 172 | 61 | 61 | 57 |
| Magnesium | 8 | 7 | 7 | 3 |
| Methyl Orange Alk. | 194 | 74 | 66 | 214 |
| Phenolpthalein " | 0 | 15 | 15 | 5 |
| Caustic " | 0 | 0 | 0 | 0 |
| Free $CO_2$ | 20 to 30 | 0 | 0 | 0 |
| pH | 7.2 to 7.7 | 9.4 | 9.4 | 8.4 |
| Iron | 0.7 to 3.0 | 0.1 | 0.1 | 0.1 |

The iron removal process is not shown as no added results will be accomplished.

## Conclusions and Recommendations

Water served without treatment, other than aeration, will be very objectionable because of the iron content and will be well below accepted standards. A water treatment plant for iron removal alone will cost just about the same as a combined softening and iron removal plant of the catalytic type, namely, \$ 26,000. The standard lime-soda process will accomplish softening and iron removal at considerably higher installation cost, namely, \$ 38,000. This process has a decided disadvantage in that 10,000 gallons of lime sludge must be disposed of daily. This material cannot be flushed into the sewage system nor into New River. Disposal is generally accomplished by wasting into a lagoon, a flowing stream, or upon barren land. There is no such space available near this plant and the waste material would have to be hauled by tank truck to a suitable dumping ground.

Softening and iron removal by Zeolite is the most compact and the cleanest method to operate. The initial cost will be about \$ 37,000 or the same as for the lime-soda. The operating cost of this method is very high as shown below.

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The catalytic process will soften the supply to the required degree and remove the iron at the same time. The construction cost will be about $ 26,000.00.

This process while comparatively new in this country has been used in Europe over a period of years, with great success. It is compact, the initial cost is low and it is believed that its worth has been sufficiently well established for acceptance wherever applicable. The operating cost is lower than for other comparable processes. The daily sludge output will amount to approximately 70 cu. ft. of coated catalyst which readily drains and can be hauled by dump truck to the point of disposal.

The estimated operating cost of the various processes for chemicals alone, per million gallons and annually, based upon an average consumption of 1.5 M.G.D., is as follows:

Iron Removal $ 4.00 per million gallons; $ 2200.00 annually.

Lime-Soda Softening plus Iron Removal $9.30 per million gallons; $ 5000.00 annually.

Zeolite Softening plus Iron Removal $ 23.00 per million gallons; $ 12,600 annually.

Catalytic Softening plus Iron Removal, $ 7.10 per million gallons; $ 3900.00 annually.

It is recommended that combined softening and iron removal be provided for the general water supply and that the specifications be prepared to permit bids on both Lime-Soda Softening and Catalytic Softening.

This recommendation carries with it a complete filtration plant of the rapid sand gravity type, this equipment being a necessary part of any of the processes specified."

The Water Treatment Plant and Main High Lift Pumping Station includes water softening units, filters, main high lift pumping station, and a concrete ground storage tank of 800,000 gallons capacity, and is so designed that under normal operation, raw water entering the plant will pass successively through softening units, thence to filters, with filtered water effluent discharging into the 800,000 gallon clear water storage tank, from which point it will be discharge through high lift pumps into the main distribution system. If necessary, raw well water may be by-passed directly to the 800,000 gallon storage tank without passing through the building proper, and from that point discharged into main distribution system by high lift pumps as above noted. It will also be possible to by-pass the 800,000 gallon tank and furnish either raw water, treated water, or filtered water directly to the high lift pump for distribution, thereby permitting the storage basin to be put out of operation without shutdown of plant.

Raw water pumped from the wells passes through a 16-inch venturi meter located adjacent to the southwest wall of the Spiractor pit. The register-indicator-recorder is located on the balcony of the main pump room adjacent to the space selected for the remote control panel from which the

wells will be operated. This equipment was furnished by the International Filter Company under Specification 502, Advance Specification "D", dated January 16, 1942. From the venturi meter the flow passes through a header and is distributed to the bottom inlets of each of the three Spiractor softening units. Each unit is equipped with rate-of-flow controller and a manometer type flow indicator. The incoming water is dosed with lime slurry at the inlet to each softener, through plunger type pumps especially designed for positive regulation of discharge whereby the dosage can be varied over a wide range by adjusting the length of stroke. Four pumps are provided, one for each softening unit and one standby. The suction and discharge piping are arranged to give various combinations of operation between the lime slurry tanks and softeners. Also to provide for taking units out of service without interrupting the plant operation. The lime slurry is prepared in steel tanks equipped with agitators, dust evacuators, steam lines for heating, gauges, and meters. Two complete mixing and agitating units are provided, each unit consisting of two tanks, one placed above the other. This arrangement permits the use of either stone lime or hydrated lime and also provides for ample peak capacity and standby. For normal operation the high level tanks are charged with either stone or hydrated lime and water to produce approximately a 5% slurry. This mixture is fed by gravity into the lower tanks and thence to the chemical feed pumps.

Each tank has a capacity of 1364 gallons, containing about 568 pounds of lime, sufficient to treat one-half million gallons, or two million gallons total for the four tanks.

Each Spiractor is to be charged with from 385 to 400 cubic feet of finely granulated calcite which forms the catalytic medium through which the well water passes upward with decreasing velocity and flows to the recarbonation tank and thence to the filters.

A concrete recarbonation tank with a total capacity of 2550 cubic feet has been provided because it was not known in advance whether or not this treatment would be required to reduce excess calcium brought over from the softening process. This question was fully discussed by letter of June 23, 1942, addressed to the Officer in Charge and it was decided to construct the tank but not to purchase recarbonation equipment until found necessary. The tank will provide for alternate chemical treatment and has otherwise proven indispensible in trapping material carried over from the softening units, thus eliminating undesirable material from the filter beds.

The softening process by this method is accomplished through the catalystic medium upon which the calcium and magnesium compounds build up as hard crystalline shells thus gradually enlarging each grain of calcite to the point where they gravitate to the bottom of the container and are drawn off periodically as waste material. Fresh calcite is added at intervals to the top of the bed to maintain proper depth and volume.

The equipment above described was furnished by The Permutit Company of New York City under Specification No. 502, Advance Specification "C".

After softening, the water passes through three typical rapid sand filters, each of 1 M.G.D. nominal capacity. These filters are orthodox in construction and are equipped in the usual manner with operating tables, rate of flow controllers, and gauges to indicate loss of head and rate of

flow. The equipment was furnished by International Filter Company under Specification 502, Advance Specification "E".

Filters are back-washed by means of a pump which is designed to deliver 6300 gallons per minute against 40 ft. total discharge head, equivalent to 2.4 ft. vertical rise per minute. This equipment was furnished by American Well Works, Aurora, Illinois, under Specification 502, Advance Specification "F". An auxiliary 12-inch wash water line is provided for emergency use. This line takes off of the post distribution system at standard pressure of about 60 lbs.

Filtered water is conveyed by an effluent header valved so that it will flow into the 800,000 gallon storage tank or directly to the pump suction header.

The piping in the gallery is so arranged that the softening units can be by-passed or both the filters and the softeners can be by-passed should an emergency make this necessary.

An overflow is provided on the main which conveys softened water to the filters so that any excess caused by clogged filters, faulty valves or controllers will automatically be wasted to the sewer and will not flood the building.

Two fully automatic identical chlorinators each capable of delivering a maximum of 100 lbs. per 24 hours are mounted on the balcony of the main pump room. One chlorinator is automatically controlled by the raw water venturi tube and the other by the venturi tube which measures the supply going into the system from the service pumps. This arrangement insures accurate prechlorination of the filtered water before being stored in the 800,000 gallon tank and also accurate post-chlorination of water leaving the service pumps. These different points have been provided for the introduction of chlorine into the system and the entire operation can be carried out with either one or both chlorine machines in service. Distribution of chlorine solution to the various points of application is regulated by means of a hard rubber valved manifold furnished with the equipment. This equipment was furnished by Wallace & Tiernan Company under Specification No. 502, Advance Specification "B".

The main pumping plant is equipped with three identical centrifugal pumps each designed to discharge 1500 gallons per minute against 160 feet total head. Two pumps are combination electric and gasoline engine drive and one unit is electrically driven only. The assembly includes outside fuel tank, hand gasoline priming system, pressure recording gauge and automatic water level controls. This equipment was furnished under Specification No. 502, Advance Specification "A", by DeLaval Steam Turbine Company, Trenton, N. J.

The venturi meter tubes on the raw water and high pressure service lines, respectively, were furnished under Specification No. 502, Advance Specification "D" by International Filter Company. The register-indicator-recorder instruments are manufactured by Republic Flow Meter Company.

M-3.14. Plant Control. The control of a plant of this kind must invariably be based upon carefully made laboratory determinations, together with a complete daily record of operating procedure. The daily log should show the wells pumped, the total quantity of water treated, the chemical characteristics of the raw water, the kind and quantity of chemicals used and the results obtained in softening and filtering. This record should also cover the daily operation of the pumping plant, chlorination, filter operation, clear water storage and all other details whether normal or abnormal. It is of particular importance that this record be passed on from one operator to the next, when changing shifts or when new men take over.

As previously stated the comprehensive scheduling of plant operation, based upon knowledge gained each day, is the surest method of securing good results. It is not anticipated that the operation of this plant will not prove difficult as the quality of the well water should remain fairly constant and accordingly, when once correctly established a given routine can be closely followed thereafter.

M-3.15. Distribution System. The water distribution system is carefully designed to give adequate domestic and fire flow up to 2,000 gallons per minute at any one location.

The main feeders are 12-inch extending northeasterly along Holcomb Boulevard and Service Road from the water treatment and pumping plant to the elevated tank in the Supply Area, northwesterly and southeasterly in the River Road and Service Road throughout the entire length of the Regimental Area, with 12-inch cross connections between River Road and Service Road at "A" Street, Holcomb Boulevard and "N" Street. The grid system connecting the 12-inch feeders is of 8-inch pipe with 6- and 8-inch crossovers at critical points. The entire system is completely looped and valves are placed so as to isolate breaks or other faults to small areas. The Supply Area is served by a 12-inch feeder with completely looped grid system of 8-inch pipe.

The area northwest of Wallace Creek, including all sections of the Commissioned Officers Quarters Area, is served by a 12-inch cast iron feeder main along the Main Service Road and by trestle across Wallace Creek, thence following the northeast side of River Road to Charles Street where it is reduced to 10-inch. The main feeder system beyond this point consists of 10-inch cast iron lines on River Road, Autumn Circle, St. Mary's Drive, and Charles Street and is completely looped with adequate cross connections of 6-inch and 8-inch at frequent intervals.

At a point on St. Mary's Drive between Carroll and Cecil Streets, a 12-inch feeder from the 200,000 gallon capacity elevated steel tank, lying about 600 ft. northeast of this point, connects to the distribution system.

Isolated sections of Commissioned Officers Area, lying between Wallace Creek crossing and Charles Street are serviced by 6 and 8-inch cast iron lines, looped to 12-inch feeder main along River Road.

For the purpose of providing a temporary source of supply to the distribution system in case of an emergency, and using either auxiliary or electric driven, or both, well pump discharge, a crossover connection,

properly valved, has been made at the intersection of Holcomb Boulevard and Cypress Street. Of 12-inch cast iron, this connection permits discharge from the 18-inch asbestos-cement well water transmission main along Holcomb Boulevard into the main 12-inch feeder line on the distribution system at that point. Since the head against which the well pumps are designed to discharge is considerably lower than that against which the high lift pumps feeding the elevated tanks on distribution system are designed to discharge, the use of this crossover would result in a definite pressure loss over the entire distribution system, and should be used only in an emergency and for a very short period.

A second cross-over connection of 12-inch cast iron properly valved, is installed between the 12-inch asbestos-cement well water transmission main and the 12-inch cast iron main in the distribution system at the corner of Cypress Street and Michael Street and for the same purpose and limitations as noted above.

Elevated storage and working pressure is supplied by three identical steel tanks each of 300,000 gallons capacity, one located in the Supply Area, the second to the east of Regimental Area 1 and the third to the east of Regimental Area 5, and a 200,000 gallons capacity tank in the Officers Quarters Area. The overflows of all four tanks are approximately at Elevation 160.00.

With tanks so spaced and the main pumping plant in the center of the entire activity, an ideal arrangement is secured for the most efficient and effective operation under all circumstances.

All distribution pipe lines are of Class 150, cast iron with A.W.W.A. standard valves and fittings. Fire hydrants are of the compression type, and meet all requirements of A.W.W.A. and the National Board of Fire Underwriters. The distribution system is covered under Specification No. 501.

M-3.16. Emergency High-lift Pumping Station. As an emergency means for furnishing water to the main distribution system, an emergency high lift pumping station utilizing raw water from the wells, has been provided. This unit located at the intersection of Holcomb Boulevard and Post Lane consists of a concrete ground storage tank of 60,000 gallons capacity and a pumping station equipped with a gasoline engine driven centrifugal pump of 2100 G.P.M. capacity, capable of pumping slightly more than 3 M.G.D. against a maximum discharge head of 160 feet.

As designed, the concrete storage tank will act as a receiving basin for raw water from the wells and will be equipped with a float operated shut off valve on the influent line from wells. By means of a cable operating from a second float within the storage tank, the gasoline engine driven high lift pump will be regulated so that while the unit is in operation, the water level in the tank will not fall below a predetermined safe level. It is the intent to empty the concrete ground storage tank after each operation, and this can be accomplished manually by drawing down with the high lift pump to the point desired. Final draining of tank is to be accomplished by use of an automatic sump pump. This sump pump is installed primarily for the purpose of draining the pump room and areaway outside of building as well as draining the manhole containing equipment installed for measuring the discharge from the high lift pump.

M-4. Midway Park Resid

M-4.01. Design. based upon 700 housing water consumption was gallons with a peak flow maximum. For fire, 750 pumps in operation and

M-4.02. Supply. drilled by rotary process packed screens.

Well No. 1 is located Luray Courts. This well at elevation 16.8, ground elevation -8.0. Pumping tric driven turbine pump head.

Well No. 2 is located Brevity Courts. This elevation 17.50, ground -8.5. Pumping equipment Peerless vertical head.

M-4.03. Treatment Tiernan water operated cally regulate dosage charge main.

M-4.04. water level control Minn., which starts ated tank. Well

M-4.05. bution system ing for the full grids, all complete

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M-4.0 gallons of Polk working Cole

M-4. Midway Park Residential Area.

M-4.01. Design. The design of water utilities for Midway Park was based upon 700 housing units with a total population of 3,000. The normal water consumption was estimated at 60 gallons per capita per day or 180,000 gallons with a peak flow of 100 gallons per capita per day or 300,000 gallons maximum. For fire, 750 gallons per minute will be available without the pumps in operation and 1000 gallons per minute or more with pumps running.

M-4.02. Supply. Two wells designated as L.C.H. Nos. 1 and 2 were drilled by rotary process by Layne-Atlantic Company and finished with gravel packed screens.

Well No. 1 is located just north of Highway # 24 between Swiss and Luray Courts. This well has a total depth of 125 feet, static water level at elevation 16.8, ground surface elevation 32.8 and drawdown at 300 g.p.m. elevation -8.0. Pumping equipment consists of Layne-Bowler deep well electric driven turbine pump rated 300 g.p.m. against 170 ft. total discharge head.

Well No. 2 is located just north of Highway # 24 between Yard and Brevity Courts. This well has a total depth of 145 feet, static water level elevation 17.50, ground elevation 41.21, drawdown at 300 g.p.m. elevation -8.5. Pumping equipment consists of dual electric and gasoline engine drive Peerless vertical turbine pump rated 300 g.p.m. against 183 feet discharge head.

M-4.03. Treatment. No treatment is provided except by Wallace and Tiernan water operated hypochlorinators, one on each well, which automatically regulate dosage of hypochlorite solution and injects same into discharge main.

M-4.04. Automatic Controls. Well No. 1 is equipped with an automatic water level controller furnished by Automatic Control Company, St. Paul, Minn., which starts and stops the pump at predetermined levels in the elevated tank. Well No. 2 is operated manually.

M-4.05. Well Transmission Mains and Distribution System. The distribution system consists essentially of two parallel 8-inch pipe lines extending for the full length of the development, one on either side, with 6-inch grids, all completely looped.

The gate house at the main entrance to the Division Training Area is supplied from this system by a 6-inch main crossing State Highway No. 24. Both wells discharge directly into the distribution system and no authorization was given to consider treatment. Pipe is Class 150 cast iron with A.W.W.A. specification gate valves and fittings. Fire hydrants are compression type fully approved by Fire Underwriters.

M-4.06. Elevated Storage. An elevated steel water tank of 200,000 gallons capacity on 100 ft. tower located north of Butler Drive just east of Polk Court, with capacity line at elevation 161.16 furnishes storage and working pressure of 50 lbs. The tank was furnished and erected by R. D. Cole Company.

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M-4.07. Future Water Treatment. Chemical analyses from these wells show an average hardness of 220 p.p.m. and Iron about 2 p.p.m. Well No. 2 contains Hydrogen Sulphide gas to a noticeable degree, while in Well No. 1 it is barely perceptible. The supply is potable and is typical of this area. The hardness and Iron content both exceed accepted standards for most municipalities, but as compared with many public water supplies within the Coastal Plain, this one is better than the average.

If treatment is considered at a later date, it must include aeration, softening and iron removal, both by the same process, and filtration followed by chlorination.

Two schemes are possible, one to provide a separate treatment plant, of the pressure type, at each well and the other to lay separate transmission mains from each well to a central treatment and pumping plant. In the latter case the existing pumps would be changed from high to low left and in general the cost would be appreciably more than for two separate pressure plants. The central plant idea is more desirable and has greater possibilities for more efficient and economical operation.

M-5. Mumford Point Camp No. 1.

M-5.01. Design. The original design of water utilities for this area was based upon a total population of 1500 men, with normal consumption 100 gallons per capita per day or a total of 150,000 gallons per day. Fire demand was figured at 500 gallons per minute.

This camp was of temporary nature and the design was made with due consideration toward economy.

M-5.02. Supply. The supply is derived from two wells drilled by the Layne-Atlantic Company by rotary process.

Well "Z" located on the west side of the access road opposite the gate house, is equipped with gravel packed screen as described for wells in the Division Training Area. The total depth is 100 feet, the yield was originally 150 gallons per minute with drawdown at Elevation - 20.67. The ground elevation is 20.94 and the static water level, elevation + 2.44.

Pumping equipment consists of a Layne-Bowler deep well turbine, rated 150 gallons per minute against 139 feet total discharge head. This unit is equipped with both electric motor and gasoline engine drive. The well was greatly overpumped and excessive drawdown was maintained for several weeks throughout the period of camp construction. As a consequence, it produced sand in appreciable amounts and probably suffered permanent damage to the gravel envelope. However, at the present time it is discharging at the rate of 120 gallons per minute, equivalent to 173,000 gallons per day without sand or other difficulty.

Well "Z-1" is located on the southwest side of Mumford Landing Road about 600 feet west of the elevated water tank. The total depth is 65 feet, the yield 100 gallons per minute at drawdown elevation — 26.00, the ground elevation is 18.50 and static water level elevation 7.00.

This well differs in construction from the gravel packed type in that no 18-inch pit casing or screen was used. Departure from standard construction was made because the underground waterbearing stratum consisted of pervious shell rock without the usual layers of sand. Accordingly, an 18-inch hole was drilled to the full depth of the well and an 8-inch steel tube was set and cemented in to top of the shell rock at elevation - 33.50, leaving 31.5 feet of open 18-inch hole from which the supply is derived. Pumping equipment consists of a Layne-Bowler deep well turbine pump, rated 100 gallons per minute against 141.0 feet total discharge head.

M-503. Treatment. No treatment is provided other than sterilization with chlorine by electrically driven- manually controlled hypochlorinator, furnished by Wallace and Tiernan Company for Well "Z" only. It is understood that a chlorinator will be authorized for installation on Well "Z-1".

M-5.04. Automatic Controls. One automatic water level controller has been installed on Well "Z" to maintain predetermined levels in the elevated tank. This instrument was furnished by Automatic Control Company of St. Paul, Minn.

M-5.05. Well Transmission Mains and Distribution System. The distribution system consists essentially of a 6-inch feeder main from Well "Z" along the Access Road, through Camp No. 1 to the elevated tank and thence to the original tent camp located on the River. Both wells discharge directly into the distribution system. Pipe lines are of Class 150 cast iron pipe with A.W.W.A. valves and special castings. Fire hydrants are of the compression type as described for the other areas except that four 4-inch hydrants were installed where the branch lines are of this diameter.

M-5.06. Elevated Storage. One elevated wood stave tank of 40,000 gallons capacity on a steel tower with overflow at elevation 109.30 is located 150 feet south of intersection of Neuse and Roanoke Roads. This tank is 89 feet above average ground elevation, 20.0, and provides 35 pounds working pressure.

M-5.07. Future Treatment. The supply derived from Wells "Z" and "Z-1" according to the original analysis, is very hard and has objectionable Iron content. This water while potable may be discolored at times due to the precipitation of Iron. Due to the temporary nature of the camp, no further treatment is recommended at this time.

M-6. Barrage Balloon Area.

M-6.01. Design. The original design of water utilities for this area was based upon a population of 1500 men with normal consumption of 120 gallons per capita per day equivalent to 180,000 gallons per day. Demand for fire fighting purposes was estimated at 1000 gallons per minute. The source of supply from wells is based upon Report of October 3, 1941.

M-6.02. Development of Supply. Two wells, designated as "V" and "W" drilled by rotary process by Layne-Atlantic Company, are of the gravel packed type, as specified for the Division Training Area. Well "V", located on the east side of Marine Road about 1450 feet south of Sneads Ferry Road, has a total depth of 62 feet and produces 200 G.P.M. with drawdown at elevation -12.20. Ground surface is at elevation 17.8 and static water level + 7.8.

Pumping equipment
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equipped for both
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M-6.07.
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Pumping equipment consists of a Peerless deep well turbine pump rated at 200 G.P.M. against 160 ft. total discharge head, with a pump head equipped for both electric and gasoline engine drive. As installed, an electric drive only is provided.

Well "W", located on the east side of Marine Road about 2450 feet south of Sneads Ferry Road, is of the same type of construction as Well "V" and has a total depth of 60 feet. It produces 150 G.P.M. with drawdown at Elevation - 23.00. The ground elevation is 13.00 and static water level + 7.0. Pumping equipment consists of a Layne-Bowler deep well turbine provided with both electric and gasoline engine drive, rated at 150 G.P.M. against 170 ft. total discharge head.

Both wells produce potable water which however may become objectionable because of high mineral content. This matter is more fully discussed under "Future Water Treatment", paragraph 6.07.

M-6.03. Present Treatment. No treatment is provided except chlorination at both wells by means of Wallace & Tiernan water driven automatically controlled hypochlorinators.

M-6.04. Automatic Controls. One automatic water level controller has been installed to start and stop Well "V" at predetermined high and low water levels. This equipment was furnished by Automatic Control Company, St. Paul, Minn. It is the intent to operate Well "W" manually.

M-6.05. Well Transmission Mains and Distribution System. In preparing the design, the pipe lines were arranged so that the system could later be economically changed over to provide separate transmission of well water to a treatment plant should the quality of the water require iron removal and softening. This arrangement was needed because at the time of issuing construction drawings, the wells had not been completed and the quality of the supply was not known. At the present time both wells discharge directly into the distribution system through an 8-inch main. The site for a future treatment, concrete ground storage tank and high lift pumping plant has been selected adjacent to Well "W" and all necessary valves, fittings, and well water transmission mains for future use are indicated on the construction drawings.

The distribution system, as constructed, consists essentially of a 10-inch feeder main from the site of the treatment plant to the junction of Marine Road and Trout Street. The main is fed by a 12-inch line from the elevated storage tank. A complete loop of 8-inch main serves Peach Street, Clinton Street, and Ellen Drive, also the residential area on Front Street is served by an 8-inch main. This system is constructed of Class 150 cast iron pipe with A.W.W.A. specification gate valves and fittings. Fire hydrants are of the compression type conforming with A.W.W.A. specifications and Fire Underwriters' requirements.

M-6.06. Elevated Storage. An elevated steel tank of 100,000 gallons capacity is located near the junction of Marine Road and Clinton Street. The capacity line is at Elevation 138.5, tops of foundation piers, elevation 13.50 and overall height 125.0. This structure was furnished and erected by R. D. Cole Company.

M-6.07. Future Water Treatment. Chemical analyses of Wells "V" and "W" show an average hardness of 170 p.p.m. and Iron as Fe about 2 p.p.m. At this time there is no objectionable taste or odor from Hydrogen Sulphide, but inasmuch as the mineral content is generally high and includes sulphates there is always a possibility that objectionable taste and odor will occur in the future. Aside from this possibility, the hardness is some 100 p.p.m. in excess of usual standards and the Iron content 1.8 p.p.m. in excess. The latter may prove particularly objectionable. It has been definitely determined that the mineral content of local well water is subject to change after pumping for several months and accordingly, the analysis should be checked at frequent intervals.

In the event that treatment of this supply is authorized, at a future date, the process should be essentially as follows: Aeration, followed by Iron removal and softening, filtration and sterilization with chlorine. A treated-water tank of about 100,000 gallons should be provided together with two service pumps of 500 G.P.M. capacity each, one unit to be equipped with dual electric and gasoline engine drive and both units to have automatic water level controls.

M-7. Amphibian Base.

M-7.01. Design. The design of water utilities for this area was based upon a possible day-time population of 100, the supply being primarily for toilets, lavatories and drinking purposes. No provision was made for fire protection.

M-7.02. Supply. The entire supply is derived from Well "U" located about 200 feet southwest of Courthouse Road, and 350 feet southeast of Sneads Ferry Road. This well was drilled by rotary process by Layne-Atlantic Company and is of the gravel packed type. The total depth is 116 feet, production is 250 G.P.M. with drawdown at Elevation -17.6. Ground level is elevation 12.70 and static water level + 3.45. Pumping equipment consists of Peerless deep well turbine with dual electric and gasoline engine drive, rated 250 G.P.M. against 165.0 feet total discharge head.

M-7.03. Well Transmission Main and Distribution System. Well water is pumped directly into two underground 1000 gallon steel pressure tanks which are operated on hydropneumatic basis and hold about 1500 gallons when fully charged and about 1000 gallons at the point where the pump starts.

From storage tanks water is conveyed through 6-inch asbestos-cement pipe to a point near the Carpenter Shop and Machine Shop. From this point, individual branch lines serve the shops, tractor storage and dock.

M-7.04. Automatic Control. Pressure controls are provided to start and stop the pump within predetermined pressure ranges. This equipment, together with operating valves, drains, and electrical gear, is housed in a vault constructed over one end of the tanks.

M-7.05. Treatment. Sterilization is effected by means of a Wallace and Tiernan automatic hypochlorinator connected directly with the well pump.

M-7.06. Future Treatment. Water derived from this well is of good quality and it is not anticipated that treatment will be required for the general use of this activity.

M-8. Rifle Range.

M-8.01. Design. The original design of water utilities for the Rifle Range was based upon a population of 1500 troops with normal consumption 120 gallons per capita per day, or a total demand of 180,000 gallons per day. In addition to the normal consumption it was necessary to provide water for the lawn sprinkler systems installed on each of the firing lines. Each of the three ranges has four firing lines with 34 fixed sprinkler heads on each line. Each head requires 3.8 gallons of water per minute at 18 pounds pressure for proper operation.

Taking for granted that this system will be operated at off-peak loads and that each firing line will be sprinkled 30 minutes per day, during dry weather, the total requirement is 3876 gallons per line or 19,480 gallons per range, and 58,440 gallons per day for the three ranges. This with the domestic consumption, makes a grand total of 238,440 gallons per day equivalent to 166 gallons per minute. For fire fighting purposes, the demand was estimated at 1000 gallons per minute. Elevated storage requirement was estimated at 100,000 gallons at sufficient height to provide 45 pounds working pressure.

The above recommendations together with those pertaining to underground water supplies, as set forth in Report of October 3, 1941, were accepted by the Officer in Charge and plans were prepared accordingly. At the time the original recommendations were made, the quality of well water was unknown and inasmuch as this was to be a permanent activity, the design of the system included the possibility of installing a treatment plant for the removal of objectionable minerals, should this be found necessary.

M-8.02. Development of Supply. Two wells were authorized and drilling was begun about April 1st, 1942. Test borings at the first site selected at intersection of East-West section of Range Road and Powder Lane about 500 ft. east of elevated steel water tank showed dry formations with poor prospects of obtaining water. A second location on the southeast side of the Access Road about 3300 feet southwest of intersection of East-West Range Road and Powder Lane was selected and Well "T" was drilled at this site by rotary process to a total depth of 452. This well is of the gravel packed type, the details being the same as specified for the Division Training Area.

Production is 200 G.P.M. with drawdown at Elevation -13.00. The ground elevation is 54.7 and the static water level + 17.0. Pumping equipment consists of Layne-Bowler deep well turbine pump rated 200 G.P.M. against 195 feet total discharge head, electrically driven only. Water obtained from this well contains an appreciable amount of mineral and while potable is objectionable because of hydrogen sulphide gas and hardness.

The second well, designated as "S", is located on west side of Range Road about 1800 feet south of intersection of East-West Range Road and Powder Lane. It was drilled to a total depth of 138 feet by rotary process

and finished with gravel packed screen as previously specified. This well produced 150 gallons per minute with drawdown at Elevation -21.30. The ground elevation is 54.70 and the static water level + 0.70. The quality of water is very good except for high iron content which may prove objectionable for permanent use. The pumping equipment consists of a Layne-Bowler deep well turbine pump rated 150 G.P.M. against 205 feet total discharge head. This unit has both electric and gasoline engine drive.

As noted, the total production of both wells is 350 G.P.M. against an estimated 166 G.P.M. required for all purposes. With Well "T" out of service, Well "S" at 150 G.P.M. will not meet all requirements, including the sprinkler systems and it has therefore been recommended that one additional well with dual driven pumping equipment be provided.

M-8.03. Treatment. No treatment is provided, at this time, except sterilization by means of water powered, automatically controlled hypochlorinators furnished by Wallace and Tiernan Company.

M-8.04. Automatic Controls. Automatic water level controllers, mounted in each pump house, serve to start and stop the individual well pumps in order to maintain predetermined high and low water levels in the elevated tank. This equipment was furnished by the Automatic Control Company, St. Paul, Minn.

M-8.05. Well Transmission Mains and Distribution System. In preparing the design particular attention was given to making a layout which would be economical and at the same time provide for the separate transmission of well water to a treatment plant should one be required in the future. In order to accomplish this a treatment plant site was selected and well sites were chosen so that the present distribution system will receive the discharge from both wells for present requirements and if a treatment plant is provided in the future, the proper control valves and connections have been provided for separation of raw and treated water supplies. The proposed arrangement is shown in detail on M.B. Drawing 562.

The entire distribution system is constructed of Class 150 cast iron pipe with A.W.W.A. specification gate valves and fittings. Fire hydrants are of compression type conforming with A.W.W.A. specifications and Fire Underwriters requirements. In general the system is composed of 10- and 8-inch feeder mains with 6-inch branches, laid out so that the draft required to operate the sprinklers can be obtained without reducing the working pressure required for other activites.

M-8.06. Elevated Storage. A steel storage tank of 100,000 gallons capacity on a 109 ft. tower located near the northwest corner of Powder Lane maintains 45 to 50 pounds working pressure. The capacity line is at Elevation 176.6, the tops of foundations piers are at Elevation 51.6 and overall height is 125 feet. The tank was furnished and erected by R. D. Cole Company.

M-8.07. Sprinkler Systems and Service to Butts. Sprinkler systems are provided on each firing line, are identical for all three ranges and consist essentially of the following: A 6-inch feeder main taking off the distribution system runs longitudinally through the center of each range

past the 600, 500, and 300 yard firing lines and a 4-inch main from the 300 to the 200 yard lines.

From the feeder main, sprinkler lines run at right angles in both directions each carrying 17 sprinkler heads spaced 16 feet on centers and set to grade. Each head is designed to deliver 3.8 gallons per minute at 18 pounds pressure with a throw of 16 feet. A control valve is installed in each feeder main and in each branch sprinkler line so that watering may be closely confined to actual requirements.

Drinking fountains are provided on separate supply pipes, two to each ready line except the 600 yard line which is accessible to the range house where adequate drinking fountains are provided.

Water supply is carried to the target sheds by 4-inch extension through Range No. 3 and in the rear of the Butts to serve the toilets and target sheds. The sprinkler system which is laid at shallow depth is provided with valves so that the pipe lines can be drained to prevent freezing.

M-8.08. Future Water Treatment. The water supply for this area was more difficult to obtain than for any of the other areas and apparently it is impossible to obtain a supply from wells which will be free from objectionable minerals. If treatment is provided at a future date, it should consist of aeration, Iron removal and softening by the same process, filtration and chlorination. Treated water storage should be provided for about 100,000 gallons with a high lift pumping plant consisting of two units of about 500 G.P.M. each, one to have dual electric and gasoline engine drive and both to have automatic water level controls.

## M-9. Glider Training Base.

M-9.01. Design. The design of water utilities for this area was based primarily upon the demand required for operating the gasoline fueling system and for fire protection. The supply is taken directly from the system serving Tent Camps 1 and 2 through approximately 11,400 feet of 8-inch cast iron pipe which follows the north side of Curtis Road to the Glider Base.

The initial pressure on the Tent Camp system is about 60 lbs. equivalent to 140 ft. head. The friction loss through 11,400 feet of 8-inch pipe with 500 g.p.m. flowing is approximately 100 feet, leaving 40 feet or 17 pounds residual pressure. At 400 G.P.M. flow the residual pressure would be about 40 pounds. These figures assume that normal head conditions prevail within the Tent Camp Area, however, heavy draft in that area with accompanying drop in initial pressure will affect the residual pressure at the Glider Base by a like amount.

By report of April 6, 1942, to the Officer in Charge, the gasoline fueling system was discussed and recommendations were made for a 50,000 gallon underground storage tank and booster pump to furnish emergency water supply for the Glider Base. Verbal recommendations were also made for the installation of one well equipped with gasoline engine to maintain the supply in case of failure in the 8-inch supply line or the Tent Camp facilities. Apparently lack of funds prevented acceptance of these recommendations. As now set up about 450 g.p.m. can be obtained at fair working pressure.

600, and 500 yard firing range and a 4-inch main from the 600 yard lines.

the feeder main, sprinkler lines run at right angles in bays each carrying 17 sprinkler heads spaced 12 feet on centers and each head is designed to deliver 3.3 gallons per minute at pressure with a throw of 16 feet. A control valve is installed the main and in each branch sprinkler line so that watering may confined to actual requirements.

fountains are provided on separate supply lines, one to each except the 600 yard line which is accessible to the range house drinking fountains are provided.

supply is carried to the target sheds by 4-inch extension 10.3 and 4, the rear of the butts to serve the toilets and the sprinkler system which is laid at shallow depth in are so that the pipe lines can be drained to prevent freezing.

Future Water Treatment. The water supply for this area was to obtain than for any of the other areas and apparently able to obtain a supply from wells which will be free from objectionals. If treatment is provided at a future date, it should ration, iron removal and softening by the same process, filtration. Treated water storage should be provided for gallons with a high-lift pumping plant consisting of two units each, or to have dual electric and gasoline engine to have automatic water level controls.

Glider Base

The design of water utilities for this area was upon the demand required for operating the gasoline fueling fire protection. The supply is taken directly from the Camps 1 and 2 through approximately 11,400 feet of 8-which follows the north side of Curtis Road to the

pressure on the Tent Camp system is about 80 lbs. equivalent head. The friction loss through 11,400 feet of 8-inch flowing is approximately 100 feet, leaving 40 feet or pressure. At 400 G.P.M. flow the residual pressure pounds. These figures assume that normal head conditions Tent Camp Area. However, heavy draft in that area with initial pressure will affect the residual pressure at like amount.

April 6, 1942, to the Officer in Charge, the gasoline discussed and recommendations were made for a 50,000 storage tank and booster pump to furnish emergency water date. Verbal recommendations were also made for the equipped with gasoline engine to maintain the in the 8-inch supply line of the Tent Camp facilities of funds prevented acceptance of these recommendations about 400 g.p.m. can be obtained at fair working pres-

M-9.02. Transmission Main and Distribution System. The 11,400 feet of transmission main is Class 150 cast iron pipe with A.W.W.A. specification gate valves and fittings. The distribution system consists of an 8-inch main passing through the westmost limit of the area, with 6-inch, 4-inch and 3-inch cast iron pipe serving the various buildings, pitts, and dock. One fire hydrant of the compression type furnishes fire protection.

M-10. Peterfield Point Tent Camp.

M-10.01. Design. The design of water utilities was based upon a population of 600 men with normal water consumption at 100 gallons per capita per day, equivalent to 42 gallons per minute or 60,000 gallons per day. For fire protection about 130 g.p.m. can be obtained.

M-10.02. Transmission Mains and Distribution System. The supply is furnished from Tent Camps 1 and 2 via 4850 feet of 8-inch main to the Glider Base and 2550 feet of 4-inch main which takes off of the 8-inch and extends to the Camp. The distribution system is mainly of 4-inch cast iron pipe with five 4-inch compression type fire hydrants. Pipe is Class 150 cast iron with A.W.W.A. specification gate valves and fittings. No storage facilities or emergency supply have been provided.

M-11. Tank Battalion Tent Camp.

M-11.01. Design. The design of water utilities for this area was based upon a population of 700 men with normal average consumption 60 gallons per capita per day, equivalent to 29 gallons per minute or 42,000 gallons per day. No fire protection was authorized.

M-11.02. Development of Supply. One well designated as "O", located 65 feet north of Lancaster Road and 140 feet east of Route No. 17 was drilled by rotary process and finished with gravel packed screen. This well has a total depth of 84 feet and produces 60 G.P.M. with drawdown elevation -12.90. Ground elevation is 25.70 with static water level at elevation 20.2. Pumping equipment consists of a Layne-Bowler deep well turbine pump rated 60 G.P.M. against 150 ft. total discharge head.

M-11.03. Treatment. Sterilization is effected by means of a Wallace and Tiernan water powered automatically controlled hypochlorinator.

M-11.04. Automatic Controls. The well pump discharges into an underground hydropneumatic pressure tank. Controls are provided to start and stop the pump between predetermined pressure ranges.

M-11.05. Well Transmission Mains and Distribution System. The well and hydropneumatic tank are located adjacent to one another and no transmission main is required. The distribution system consists of 4-inch cast iron pipe Class 150 with A.W.W.A. specification gate valves and fittings. Five 4-inch compression type fire hydrants are provided for fire flow which is limited to the output of the well pump.

M-11.06. Storage. An underground steel pressure storage tank of 2500 gallons nominal capacity, will operate under hydropneumatic conditions

at about 1800 gallons fully charged to 900 gallons, at which point the pump starts. One end of the tank is housed over and contains controls, valves and electrical gear.

M-11.07. Future Treatment. The supply derived from this well is hard and contains an excess of Iron. However, no special treatment has been considered because of the temporary nature of the camp.

M-12. C.C.C. Camp (now Camp Knox).

M-12.01. Design. The original design of water utilities was based upon a total population of 500 at average consumption of 40 gallons per capita per day or a total demand of 20,000 gallons. No fire protection was authorized and no provisions were made in supply or storage facilities for fire fighting.

The Architect-Engineers handled certain details only, in connection with the design of this system and complete information pertaining to various features are lacking, as noted.

M-12.02. Development of Supply. Well No. 1 was drilled by Virginia Machinery and Well Company by percussion tool method to a depth of 103 feet, then filled with gravel and finished to a depth of 75 feet below ground level. A 10-inch steel casing was set and cemented into shell rock formation at about Elevation -28.5, leaving 23 feet of open hole between the bottom of casing and top of gravel fill. When tested, production was 108 G.P.M. with drawdown elevation at -6.50. Ground elevation is 23.50 and static water level elevation + 2.50.

Pumping equipment consists of A. D. Cook, Inc. deep well turbine rated 50 G.P.M. against 88 ft. discharge head. The reason for limiting pumpage to 50 G.P.M. instead of taking the full capacity of the well is not definitely known but it is assumed that 50 G.P.M. was considered sufficient at that time. This well was completed in September, 1941.

Due to increase in population, a second well, designated as No. 2, was drilled in June 1942. Rotary process was used by Layne-Atlantic Company and the well was finished to a total depth of 90 feet with gravel packed screen, as described for the Division Training Area. Production, when tested, was 150 G.P.M. with drawdown at elevation -21.30. Ground elevation is 20.70 and static water level elevation 5.20. Pumping equipment consists of a Layne-Bowler deep well turbine rated 150 G.P.M. against 120 ft. total discharge head.

M-12.03. Treatment. No treatment whatever has been provided.

M-12.04. Automatic Controls. No automatic controls have been provided.

M-12.05. Well Transmission Mains and Distribution System. Both wells discharge directly into the distribution system and no provision is made for altering this arrangement in the future. The distribution system was designed in accordance with CCC Drawing No. 3, dated October 14, 1941. The pipe lines and other facilities were installed by C.C.C. labor under direction of C.C.C. officials. Pipe sizes and the general arrangement of the system differ

somewhat from the plans, but in general 4-inch cast iron pipe was used for distribution with various sizes of smaller threaded pipe for secondary supply lines and services. No records of actual installation have been obtained by the Architect-Engineers.

M-12.06. Elevated Storage. Two steel tanks on wooden towers located in Camp No. A, each of 10,500 gallons capacity with overflows at elevation 77.30 furnish about 24 pounds working pressure. A small tank of 2600 gallons capacity was installed in Camp No. E with top elevation 49.81, but this is obviously of little or no use, due to limited capacity and height.

M-13. White Cemetery.

M-13.01. Design. The design of the water supply for this area was based entirely upon sprinkling requirements for lawn and shrubs. The maximum flow was fixed at 50 G.P.M.

M-13.02. Development of Supply. One well designated as "White Cemetery No. 1" was drilled by rotary process by Layne-Atlantic Company and finished with gravel packed screen. The total depth is 65 feet and production 50 G.P.M. at drawdown elevation -9.50. The ground elevation is 21.42 and static water level -9.50.

Pumping equipment consists of Layne-Bowler deep well turbine, rated 50 G.P.M. against 155 ft. total discharge head. The pump is manually controlled and discharges directly into a closed distribution system.

M-13.03. Distribution System. The distribution system consists of a 4-inch header with 2-inch laterals, all completely looped. Outlet connections are provided at frequent intervals so that the entire planted area can be watered without using excessive lengths of hose.

M-14. Mock-Up.

M-14.01. Design. The design of water utilities for this area was based upon furnishing a centrally located source of supply to be distributed by tank trucks, or other means of transportation, to local activities.

M-14.02. Development of Supply. A rotary drilled well, designated as "X" was constructed by Layne-Atlantic Company at the junction of Sneads Ferry Road and the road leading to the Mock-up. This well has an 18-inch casing cemented into shell rock without screens or gravel envelope. The underground formation yields sufficient water for the purposes intended, without pumping sand and construction costs were thus kept to a minimum. The total depth of the well is 40 feet, the yield 50 gallons per minute with drawdown at elevation +5.0. Ground elevation is 25.0 and static water level +16.0.

Pumping equipment consists of a Layne-Bowler deep well turbine rated 50 G.P.M. against 60 feet total discharge head, driven by electric motor only.

M-14.03. Treatment. Sterilization is given by means of a manually regulated Wallace and Tiernan hypochlorinator which starts and stops with the pump.

M-14.04. Elevated Storage. The pump discharges directly into a 50,000 gallon wood stave tank on wooden tower located adjacent to the well, with capacity line at elevation 60.67. This tank is 22 ft. diameter by 20 ft. high and was furnished by the Challenger Company, Batavia, Ill.

M-14.05. Distribution Facilities. Three 3-inch riser pipes equipped with valves and hose outlets are provided for filling tank trucks.

M-15. Maintenance and Operation. Pipe lines should be thoroughly flushed at such intervals as is necessary to keep them free from deposits which may accumulate during normal consumption but which will not become apparent until the velocity of flow is increased, as in case of fire or other unusual demand. At such times the sediment, if permitted to accumulate,,will start moving and in most cases is extremely objectionable and will cause various difficulties and stoppage in plumbing and mechanical apparatus.

Flushing should always be carried out in accordance with a pre-arranged program wherein certain valves are closed in order to confine the operation to a given pipe line and thus build up maximum velocity and flow therein. Effective results cannot be secured by merely opening fire hydrants at random.

Gate valves should be operated at least once a year, the customary practice being to close the gate tight and record the number of turns required, then open the valve fully for regular service.

Before operating it is good practice to oil the valve stem by means of a small diameter copper tube with funnel jointed to upper end. The tube should be bent to pass the operating nut and follower so that oil will reach the stem.

The inspection of valves is very important as they are frequently found to be closed, particularly in a new system, and if not operated for long periods the working parts become corroded or incrustated and bind.

Fire hydrants should be oiled internally as specified by the manufacturer and the nozzles should be greased with a non-fluid dope to insure easy coupling of hoses. Every hydrant in the system should be inspected before cold weather to make certain that the barrel is free of water and will not freeze. Where the barrel can not be drained because of high ground water an anti-freeze compound should be introduced in quantity consistent with the lowest expected temperature.

M-16. Summary. A summary of the pipe quantities of various sizes used in the distribution systems and also for services, together with the number of fire hydrants installed, is shown in the following tabulation (as of September 30, 1942):

Regimental Areas 1 to 5, Inclusive

Cast Iron Pipe

| | |
|---|---|
| 16" | 380' |
| 12" | 27,550' |
| 8" | 28,905' |
| 6" | 12,281' |
| 4" | 16,910' |
| 3" | 3,050' |
| $2\frac{1}{2}$" | 2,545 |
| 2" | 180 |
| $1\frac{1}{4}$" | 500 |

Total: 92,301'

Fire Hydrants - 131

Hospital Area

Cast Iron Pipe

| | |
|---|---|
| 12" | 4,385' |
| 10" | 4,930' |
| 8" | 1,510' |
| 6" | 3,010' |
| 4" | 270' |
| 3" | 1,420' |
| $2\frac{1}{2}$" | 100' |

Total: 15,625'

Fire Hydrants - 20

Balloon Barrage Battalion Area

Cast Iron Pipe

| | |
|---|---|
| 12" | 100' |
| 10" | 1,325' |
| 8" | 5,070' |
| 6" | 2,310' |
| 4" | 1,795' |
| 3" | 470' |
| $2\frac{1}{2}$" | 430' |
| 2" | 510' |
| $1\frac{1}{2}$" | 110' |
| $1\frac{1}{4}$" | 130' |
| 3/4" | 30' |

Total: 12,280'

Fire Hydrants - 21

Industrial & Supply Area

Cast Iron Pipe

| | |
|---|---|
| 12" | 7,075' |
| 8" | 10,710' |
| 6" | 6,170' |
| 4" | 4,200' |
| 3" | 270' |
| $2\frac{1}{2}$" | 120' |
| $1\frac{1}{2}$" | 290' |

Total: 28,835'

Fire Hydrants - 43

Officers Quarters Area

Cast Iron Pipe

| | | |
|---|---|---|
| 12" | 2,800' | (Feeder Main from Reg. Areas) |
| 12" | 9,960' | |
| 10" | 5,280' | |
| 8" | 9,340' | |
| 6" | 6,930' | |
| 4" | 960' | |
| 3" | 420' | |
| 2" | 7,530' | |
| $1\frac{1}{4}$" | 10,500' | (Services) |
| 3/4" | 30' | |

Total: 53,750'

Fire Hydrants - 59

Amphibian Base Area

Cast Iron Pipe

| | |
|---|---|
| 6" | 50' |
| 4" | 650' |
| 3" | 250' |
| $2\frac{1}{2}$" | 50' |
| 2" | 240' |
| $1\frac{1}{4}$" | 260' |
| 1" | 100' |

Total: 1,600'

Asbestos Cement Pipe

| | |
|---|---|
| 6" | 1,670' |

Total: 1,670'

Landing Field

Cast Iron Pipe

| | |
|---|---|
| 8" | 11,450' |
| 6" | 525' |
| 4" | 900' |
| 3" | 1,780' |
| 2" | 990' |
| $1\frac{1}{4}$" | 10' |
| 1" | 40' |

Total: 15,695'

Mock-Up

Cast Iron Pipe

| | |
|---|---|
| 6" | 45' |
| 4" | 70' |
| 3" | 50' |
| 2" | 12" |

Total: 177'

White Cemetery

Cast Iron Pipe

| | |
|---|---|
| 4" | 1,500' |
| 2" | 3,430' |
| $1\frac{1}{4}$" | 390' |

Total: 5,320'

Peterfield Point Camp

Cast Iron Pipe

| | |
|---|---|
| 4" | 1,690' |
| 2" | 925' |
| 3/4" | 75' |

Total: 2,690

Fire Hydrants - 5

Rifle Range Area

Cast Iron Pipe

| | |
|---|---|
| 10" | 1,100' |
| 8" | 4,895' |
| 6" | 5,425' |
| 4" | 4,830' |
| 3" | 570' |
| $2\frac{1}{2}$" | 780' |
| 2" | 3,190' |
| $1\frac{1}{2}$" | 1,820' |
| $1\frac{1}{4}$" | 1,080' |
| 1" | 5,325' |
| 3/4" | 630' |

Total: 29,645'

Fire Hydrants - 16

Camp Knox (C. C. C. Camp)

Cast Iron Pipe

| | |
|---|---|
| 4" | 1,460' |

Total: 1,460'

Montford Point Camp No. 1

Cast Iron Pipe

| | |
|---|---|
| 8" | 50' |
| 6" | 3,510' |
| 4" | 1,550' |
| 3" | 240' |
| $2\frac{1}{2}$" | 40' |
| 2" | 170' |

Total: 5,560'

Fire Hydrants - 9

Tent Camp Tank Battalion

Cast Iron Pipe

| | |
|---|---|
| 4" | 1,750' |
| 2" | 1,350' |
| Total: | 3,100' |

Fire Hydrants - 5

Low Cost Defense Housing Area

Cast Iron Pipe

| | | |
|---|---|---|
| 10" | 1,680' | |
| 8" | 19,650' | |
| 6" | 13,410' | |
| 2" | 5,290' | |
| 3/4" | 2,000' | (Galvanized) |
| 3/4" | 18,700' | (Copper) |
| Total: | 60,730' | |

Fire Hydrants - 73

Tent Camp Areas No. 1 & No. 2

Cast Iron Pipe

| | |
|---|---|
| 12" | 665' |
| 10" | 1,805' |
| 8" | 14,845' |
| 6" | 16,550' |
| 4" | 4,932' |
| 3" | 470' |
| $2\frac{1}{2}$" | 10' |
| 2" | 1,220' |
| $1\frac{1}{2}$" | 170' |
| $1\frac{1}{4}$" | 330' |
| Total: | 40,997' |

Fire Hydrants - 65

A summary of the pipe quantities of various sizes used in the Well Water Supply Transmission Systems is shown in the following tabulation:

Division Training Area

Asbestos Cement Pipe

| | |
|---|---|
| 18" | 18,975' |
| 16" | 2,525' |
| 14" | 5,513' |
| 12" | 6,520' |
| 10" | 7,965' |
| 8" | 15,007' |
| Total: | 56,505' |

Tent Camp Areas No. 1 & No. 2

Asbestos Cement Pipe

| | |
|---|---|
| 12" | 3,525' |
| 10" | 4,785' |
| 8" | 2,202' |
| 6" | 2,120' |
| 4" | 1,220' |
| Total: | 13,852' |

## SUMMARY OF PIPE INSTALLED IN ALL AREAS

| Areas | Cast Iron | | Asbestos Cement |
|---|---|---|---|
| Regimental Areas 1-5, Inclusive | 92,301 | | 56,505 |
| Industrial & Supply Area | 28,835 | | |
| Hospital | 15,625 | | |
| Officers' Quarters | 53,750 | | |
| Balloon Barrage Battalion | 12,280 | | |
| Amphibian Base | 1,600 | | 1,670 |
| Rifle Range | 29,645 | | |
| Landing Field | 15,695 | | |
| Mock-Up | 177 | | |
| Camp Knox | 1,460 | | |
| White Cemetery | 5,320 | | |
| Montford Point Camp No. 1 | 5,560 | | |
| Peterfield Point Camp | 2,690 | | |
| Tent Camp Tank Battalion | 3,100 | | |
| Tent Camps Nos. 1 and 2 | 40,997 | | 13,852 |
| Low Cost Defense Housing | 60,730 | | |
| Totals: | 369,765 | | 72,027 |
| | 369,765 | = | 70.032 Miles |
| | 72,027 | = | 13,641 Miles |
| Grand Total: | 441,792 | = | 83.673 Miles |

Total Fire Hydrants - 447

CHAPTER N PART 11

## SEWAGE COLLECTION AND TREATMENT

CONTENTS



N-1. Introduction. Due to widely scattered activities, the flatness of the terrain, the constricted outlet of New River and the rush nature of the project, the design of sewerage facilities was a complex and interesting problem. The department started work on April 19, 1941.

N-2. General Design.

N-2.01. The first few days were spent in establishing a temporary field office in a farm house near the proposed tent camp, in inspecting the reservation lying on both sides of New River, between Jacksonville and the Atlantic Ocean, interviewing prospective employees and working up a tentative general plan for the tent camp.

No. topographic maps ever had been made of the area and it was found that the land was generally heavily wooded and cut up by many small streams, marshes and pocosins, making it absolutely necessary to have contour maps before attempting the selection of exact sites for large military activities. It soon became apparent that very flat slopes would be required for sewers and that numerous pumping stations would be necessary. Test borings were made at various points in the areas considered for development, revealing the underlying strata to consist generally of fine sand and plastic clay with the ground water level very close to the surface in most instances. During this time, work also was progressing on the selection of the site for Tent

SSWAGE TREATMENT PLANT - DIVISION TRAINING AREA

Camp No. 1 and

of the State Departm

N-2.03.

J. A. Nelson, Head of

Mr. E. L. Dudley

Department.

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the main plant

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event this becomes

N-3. Tent Camps No.

N-3.01.

and about 15 feet

Creek, a tidal

Camp No. 1 and the location of an outfall sewer for same. From the information derived from test borings, it was decided that trenches should be kept as shallow as possible to minimize ground water difficulties, and that the bottom widths of trenches should be kept just wide enough to allow proper joining of pipe and to prevent excessive loads on pipe from back-fill material.

N-2.02. For the purpose of design a per capita use of water of 100 gallons per day was assumed, with a peak wet weather sewage flow of 300 gallons per capita per day. This was in line with previous municipal experience and with actual flow tests made at Fort George G. Meade. The sewers were designed for a minimum velocity of two feet per second according to Kutter's formula, and using N= .013. Check measurements of flow from the tent camps, taken in May, 1942, with a population of 10,000, averaged 100 gallons per capita per day.

No provision was made for rain water in the sanitary sewers.

In order to permit greater salvage, it was decided that grease should be intercepted by means of traps at the sources rather than of at the treatment plants.

The usual construction materials, brick, terra cotta pipe, reinforced concrete pipe, etc., were found to be available readily and of good quality. Due to sulphates in the water supply, with the probability of hydrogen sulphide production, it was recommended that concrete pipe not be used except in very large sizes, and then should be coated with bituminous material.

Typical detailed drawings for manholes, drop connections, trench sections, special foundations, etc., were prepared for use on the entire job. These drawings were M.B. No. 402, M.B. No. 403 and M.B. No. 404.

General design features were discussed frequently with representatives of the State Department of Health and met with their approval.

N-2.03. On august 1, 1941, a conference was held with Captain J. A. Nelson, Head of the North Carolina Fisheries Commission, together with Mr. E. L. Dudley and Mr. Edward Willis of the North Carolina State Health Department. The scheme for the disposal of sewage was discussed thoroughly with regard to possible pollution of New River. Capt. Nelson stated that there were no existing oyster beds north of Sneads Ferry, and inasmuch as the main plant effluent would be discharged at a point more than seven miles from the oyster beds, it was generally agreed that contamination would not occur. Recommended methods of treatment were considered by the Health Department officials to be sufficient, it being agreed that the main plant would be designed for future enlargement and additional treatment in the event this becomes necessary.

N-3. Tent Camps No. 1 and No. 2.

N-3.01. These camps cover an area 5400 feet long and 2000 feet wide and about 15 feet above sea level. Most of the area is drained by Brinson Creek, a tidal estuary of New River. It was apparent that the outfall

sewer from the Tent
planned to discharge
Strawhorn Creeks.

As soon as
it became evident
and we were instructed
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tion of 6,000.
the conditions of
for discharging
No. TC-4 was approved
work was started

N-3.02.
of 3.6 million
population of
out for a possible
On May 15, 1941,
for Tent Camp No.
"Construction
and forwarded
pletion of plans
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cooperation

were forwarded
diately.

sewer from the Tent Camp should follow Brinson Creek and at first it was planned to discharge into New River beyond the concfluence of Brinson and Strawhorn Creeks.

As soon as a tentative layout was made for trunk and lateral sewers, it became evident that sewage could not be conveyed to New River by gravity and we were instructed by the Officer in Charge to consider the camp a temporary one and to furnish primary treatment only at a point on Brinson Creek just east of the Atlantic Coast Line Railroad and to keep the cost at an absolute minimum. By direction, the general scheme for sewage collection was based upon a population of 6,000 with a possible future expansion to a population of 12,000. The treatment plant was designed for a population of 6,000. In a report to the Officer in Charge, dated May 3, 1941, the conditions of design are more fully set forth. No provision was made for discharging rain water into the sewer system. On May 10, 1941, drawing No. TC-4 was approved showing plan and profile of the outfall sewer, and work was started on May 12, 1941.

N-3.02. The 21" outfall sewer is designed for a total peak discharge of 3.6 million gallons per day, the estimated wet weather peak flow for a population of 12,000. It will be seen later that Tent Camp No. 2 was laid out for a possible population of 10,000 making a total population of 16,000. On May 15, 1941, drawing No. TC-5, covering the trunk and lateral sewers for Tent Camp No. 1 was completed. On May 10, 1941, Specification No. 102, "Construction and Material Specifications, Sanitary Sewers" was completed and forwarded to the Officer in Charge. During the period between the completion of plans and the completion of the specifications, work had been carried forward rapidly, by using temporary specifications and personal cooperation with the contractor.

On June 5, 1941, drawings for the tent camp sewage treatment plant were forwarded to the Officer in Charge and construction was started immediately. Specification No. 103 covers the treatment plant.

The trunk and lateral sewers in most cases were just a few inches above ground water and the work was completed rapidly, well points having to be used only in a few wet stretches. At the treatment plant, however, the depth of the hoppers was such that the entire work had to be dewatered with well point equipment.

N-3.03. Original Plant Facilities. The Tent Camp treatment plant, as originally designed and constructed, consisted of preliminary treatment with separate sludge digestion including the following features:

(a) Inclined bar screen with 1 1/4" clear spacing. Due to the large quantity of newspapers, clothing and other debris coming down the outfall sewer, a great deal of raking was necessary and at a later date, the bar spacing was increased to 1 1/2" to reduce the amount of digestible matter being caught in the screen.

(b) Grit Chamber. A grit chamber with two rectangular channels 19 feet long, designed for mean velocity of one foot per second, each channel having a capacity of 0.6 million gallons daily.

(c) Diversion Manhole to divide the flow between settling tank No. 1 and a future settling tank.

(d) Primary Settling Tank No. 1. The bottom of the tank is formed by a series of three hoppers. The tank is 20 feet wide and 60 feet long; provides a three-hour detention period at average flow for a population of 6,000 (at 100 gals. per capita per day). The influent is distributed across the basin by a channel with slotted openings. The effluent flows over a steel weir into the effluent channel. The tank is constructed of reinforced concrete with concrete walk ways and steel pipe hand rails. Sludge is transferred to a separate digestion tank, constructed integrally with the settling tank, by means of three valved 6" pipes extending into the hoppers.

(e) Chlorine Contact Chamber. From the settling tank the sewage flows through a baffled chlorine contact chamber where chlorine gas is admitted to the compartment and absorbed by the flowing sewage. By direction, no water or power service was provided, hence, solution chlorinators could not be used at that time.

(f) Effluent Pipe. From the chlorine contact chamber the sewage flows through a 21" effluent pipe for a distance of about 225 feet into Brinson Creek.

(g) Chlorinator House. This building is of frame construction with concrete floor and houses a Wallace and Tiernan chlorinator and a Fairbanks-Morse platform scale. The chlorinator was capable of feeding 40 pounds of chlorine gas per day (chlorinator and scale later were transferred to Mumford Point Camp No. 1 and a larger solution type chlorinator installed in a new building.) This change was made to take care of greatly increased population over the original design figure.

(h) Sludge Digestion Tanks. Two sludge digestion tanks, identified as tanks A and B, were provided. These tanks were designed to provide 2 1/4 cu. ft. of sludge capacity per capita, or approximately 7500 cubic feet in each of the two tanks. These tanks have hopper bottoms with sludge withdrawal pipes connected to sludge drying beds 1, 2, 3, and 4. Due to the fact that the top of the settling and digestion tanks was only five feet above mean sea level, very little head was available to transfer digested sludge to the sludge drying beds, and a portable Marlow Diaphragm force pump complete with gasoline engine, suction and discharge hose and other accessories, was provided to draw digested sludge and to pump supernatant liquor.

(i) Four Sludge Drying Beds. Nos. 1, 2, 3 and 4; These beds were thirty by fifty feet each, giving a total capacity of 6,000 square feet or one square foot per capita based on the population of Tent Camp No. 1.

(j) By-pass Sewer. A 21" by-pass sewer extending from the screen chamber to the chlorine contact chamber.

N-3.04. All of the work was completed rapidly and the system was ready to receive sewage when the first troops arrived in September, 1941. In the initial operation of this plant, skilled operators were not available

and alkaline digestion was not obtained. Consequently, in the early months a great deal of acid sludge accumulated in the digestion tank. This trouble was aggravated by great quantities of grease dumped into the sewers at the messhalls, and it was not until a large amount of lime was used that proper digestion began to take place. A complete report, including recommendations, was submitted to the Officer in Charge on November 14, 1941. A further report was submitted on December 1, 1941. Although at first digestion was not satisfactory, the effluent from the settling tank was good, even though at one time this tank was receiving the flow from a population over twice as large as that for which it was designed.

N-3.05. The design of the sewage treatment plant and sewer system was concurred in by the North Carolina State Department of Health by letter dated August 4, 1941.

N-3.06. In December 1941, the construction of sewers for Tent Camp No. 2 was authorized. Construction was started before completion of plans, the contractor proceeding with the aid of sketches prepared by this department. The first plan was approved on December 17, 1941, and the collection system was completed a few days later. At this time, we were instructed by the Officer in Charge to plan for an eventual 10,000 population or 4000 more than had been contemplated in the original design. Tent Camp No. 2 discharges through an 18" trunk sewer connecting to the outfall sewer from Tent Camp No. 1 at Manhole #6. At the time of the construction of Tent Camp No. 2, the treatment plant was enlarged by the addition of settling tank No. 2 and digestion tanks C and D, which were duplicates of the original installation except that the influent and effluent channels had to be modified to fit in with those of the original tanks which were not constructed exactly according to the drawings.

After the second settling tank was placed in operation, the effluent from the combined tanks improved somewhat, due to a longer detention period, and the performance of the plant seemed to be satisfactory in spite of the lack of careful operation. On March 16, 1942, Mr. Warren H. Booker, Director of Division of Sanitary Engineering, North Carolina State Board of Health, inspected the Tent Camp sewerage system and the following are extracts from his report:

"Commander Charles L. Pool called me on the telephone last week and requested that I accompany him to the Tent Camp at the Marine Barracks, a mile or two southwest of Jacksonville, on Monday, March 16, 1942.

This is to advise that we have made this trip and inspected the water supply and sewage treatment facilities for the Tent Camp.

The sewage treatment plant was designed for a Tent Camp, and I infer from the name that this is probably intended to be more or less temporary. As such, it seems to me that a very good primary sewage treatment plant has been installed, although unfortunately, it seems to be working up to capacity or perhaps even more. It is my information that it was intended originally to accommodate some 6,000 Marines, but there are probably in the neighborhood of 15,000 in the Tent Camp at this time. It should be added that another

flow through compartment
which would probably brin
neighborhood of 12,000.
treatment given seems to
this plant. The effluent
discharged into Brinson

No evidence of foul
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swamp adjacent to the st
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and downstream to a somew
of view, I could not see
sewage effluent being di

If I might be perm
mention the following:

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ed off and saved in the
give a higher grade of
traps are installed,
mixed with these fats

(2)
and greases at the source,
aside from the possibility
some form of floating
through compartments
engineers could
all the grease and
permitted to flow

(3)
of this plant

flow through compartment in the sewage treatment plant is now being used, which would probably bring the capacity of the plant up to within the neighborhood of 12,000. But even with this slight overload, the primary treatment given seems to be making a marked improvement in the effluent from this plant. The effluent is chlorinated by means of dry chlorine gas, and discharged into Brinson Creek, perhaps a hundred yards distant.

No evidence of fouling of this creek was noted, and no evidence of odor was noted in the occasion of this visit. The only odor was a slight musty odor due, in my opinion, to the decomposition of organic matter in the swamp adjacent to the stream. There is a slight tidal action of perhaps not over six inches which causes this material to surge up-stream slightly, and downstream to a somewhat greater extent, but from a public health point of view, I could not see any possible danger from this amount of settled sewage effluent being discharged into this stream.

If I might be permitted to make a few suggestions, I would like to mention the **following**:

1. A bar screen was used, and, as a result, a lot of unsightly rags and rubbish is raked from the bar screen which was probably either buried or incinerated. It is believed, however, that if this unsightly vile smelling mess, which may a little later be exposed to flies, could be supplemented by means of a comminutor, all of this unsightliness and odor around the screen chamber, and the possibility of flies returning to the mess halls could be obviated. If the Tent Camp is to be used much longer, it is suggested that consideration be given to installing a communitor paralleling the present screen chamber, and permitting the screen chamber to be used in an emergency when the comminutor is out of use.

2. Another suggestion is that a considerable amount of fats and greases were noted on the surface of the settling chambers. Several suggestions in regard to handling this situation occur at this time.

(1) Inasmuch as fats, oils, and greases are so badly needed to aid in our war effort, it seems to be that appropriate orders might be issued provided that all excess fats and oils resulting from cooking be poured off and saved in the kitchens during cooking operations. This should give a higher grade of fats, oils and greases than will result if grease traps are installed, where soaps and other material are allowed to become mixed with these fats and greases resulting from cooking operations.

(2) Besides saving a very large portion of the fats, oils and greases at the source, that is at the ranges in the cook shacks, and aside from the possibility of installing grease traps, it is suggested that some form of floating squeegee be installed on the surface of the two flow through compartments of the sewage treatment plant. In my opinion, your engineers could readily design such a floating device which would collect all the grease and floating scum to one end where it could be dipped, or permitted to flow over into the sludge compartments very rapidly.

(3) A still further suggestion in regard to the operation of this plant is that should the population and resulting sewage flow be

still further increased, it may be necessary to still further increase the chlorine dosage now being applied.

The possibility of installing secondary treatment, or piping the effluent over to New River was mentioned, but, under the circumstances, I see no immediate need for either alternative from a public health point of view. In my opinion, the investment of an amount of money sufficient to secure secondary treatment would be far better made in some other line of war effort, certainly at this time."

N-3.07. Additional Facilities. In April 1942, at the request of the Officer in Charge, estimates were prepared for the addition of certain features to the sewage treatment plant. On April 9, 1942, a report was submitted to the Officer in Charge, comparing the cost of chemical precipitation with the cost of high rate trickling filters and secondary settling, and recommending that the latter be considered. This report also discussed the operation of the plant to date. On April 11, 1942, the Officer in Charge requested us to proceed with detailed plans and specifications for the following additional sewage treatment facilities, using chemical precipitation, as shown on drawing T.C. No. 355, the cost not to exceed $125,000:

(a) A Parshall Flume and Flow Meter for measuring and recording the flow of sewage, and proportioning the feed of chemicals.

(b) An automatic control solution type chlorinator of 400 lbs. capacity per day. The small dry feed chlorinator originally installed was transferred to Mumford Point Camp No. 1.

(c) Chemical precipitation, including chemical feed machines, a flash mixing tank and two flocculation tanks with mechanical agitators.

(d) Six new sludge drying beds, Nos. 5-10, inclusive, having a total area of 8400 square feet, with provision for future glass covers.

(e) A sludge pumping station and complete piping to eliminate the necessity for using the Marlow portable pump for handling raw sludge, digested sludge, and supernatant liquor. Two pumps were to be provided, each with a capacity of 8400 G.P.H.

(f) A sewage pumping station (No.8) to pump settled sewage and upon occasion, to pump by-passed raw sewage. This station consisted of a receiving or wet well with screen, a pump room containing two pumps: No. 1, with a capacity of 1500 gallons per minute against a 10 foot head, No. 2, with a capacity of 2250 gallons per minute against an 11 foot head, a motor room containing one electric and one dual electric gasoline engine drive unit (for pump No. 2) with automatic controls and provision for a future pumping unit.

(g) A 16" force main on piles across Brinson Creek and an 18" outfall sewer discharging into New River, just south of Jacksonville.

(h) A new circular digester, similar to the ones constructed at

the Division Training Area Plant, without gas utilization. Heating coils were installed and blanked off.

(i) A four inch water main from the Tent Camp.

(j) A power line extension from the main transmission line now serving the Tent Camps.

Work on these features was well underway on October 1, 1942.

N-3.08. Recommendations - Tent Camps No. 1 and No. 2 Sewage Treatment Plant. Chemical machines provided are for the use of dry chemicals and are arranged so that lime, ferric sulphate and alum can be used. Solution flumes and chemical lines should be cleaned often. Water supply has been provided for flushing flumes and lines. When chemical treatment is not being used, the Flash Mixing Chamber should be cleaned periodically. This may be accomplished by running the Flash Mixer.

Float wells in the Chemical Building should be cleaned monthly and connecting lines to Parshall Flume flushed with the water supply provided.

Existing settling tanks have been provided with revolving scum troughs that discharge into adjoining sludge tanks. Scum should be removed daily.

After each period of sludge pumping, sludge lines should be flushed by pumping settled sewage from the wet well of the pumping station.

In the control chamber of sludge digestion tank "E", two vents with valves have been provided. These should be left open when digested sludge and raw sludge lines are out of operation for longer than a day. The supernatant sampling sink in this chamber should be thoroughly flushed with the water supply provided after each period of sampling.

Recommendations and suggestions set forth in previous reports should also be adhered to as before.

N-3.09. The sewerage drawings prepared for Tent Camps Nos. 1 and 2 were as follows: TC Nos. 4, 5, 6, 63, 64, 65, 66, 76, 217, 246, 355, 356, 357, 358, 359, 360, 361, 363, 364, 365, 367, 368, 371, 372, 375, 376, 377, 378, 379, 383, 392, 393, 227, 366, and 398.

Table N-3.10

TENT CAMPS 1 AND 2

SEWER QUANTITIES
(Lineal Feet)

| Dwg. No. | 4" | 6" | 8" | 10" | 12" | 14" | 15" | 16" | 18" | 20" | 21" | No. of M.H. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 355 & 356 | | | | | | | | 890 | 1881 | 35 | | 6 |
| 218 | | 1635 | 1697 | 337 | 708 | | 1795 | | 320 | | | 16 |
| 217 | 16 | 476 | 2436 | 615 | 886 | | 188 | | 3369 | | | 25 |
| 4 | | | | | | 108 | 798 | | | | 1165 | 8 |
| 5 | 245 | 2599 | 6741 | 1312 | 698 | | 913 | | | | | 34 |
| Totals | 261 | 4,710 | 10,874 | 2264 | 2292 | 108 | 3694 | 890 | 5570 | 35 | 1165 | 89 |

Grand Total: 31,863 lin. ft. or 6.03 miles

N-4. Division Training Area

N-4.01. This area lies on the east side of New River and includes the following:

(a) A Residential Area between Northeast Creek and Wallace Creek;

(b) A Naval Hospital on Hadnot Point, five Regimental Areas, a Post Troops Area, and a Parachute Training Area.

(c) Industrial and Supply Area

N-4.02. The General Site Plan for this area was approved on July 23, 1941. Sewer surveys had been in progress since May 30, 1941. A preliminary report on the collection of sewage was submitted on June 16, 1941. The design for the collection and treatment of sewage is based on conveying sewage southeasterly along the bank of New River to Wallace Creek, pumping across Wallace Creek, into an interceptor sewer flowing southeasterly approximately parallel to New River to a pumping station (No. 1) and sewage treatment plant located on the north side of Cogdels Creek. The Industrial and Supply Area is served by a trunk sewer connecting to the New River interceptor. No provision was made for discharging rain water into the sewers. Several routes were investigated for the interceptor sewer, the one finally adopted being shorter, cheaper, and involved less deep cut than any others.

N-4.03. Two sites were considered for the location of a sewage treatment plant. (1), the low lying area directly south of Division Headquarters and (2), a site on the north side of Cogdels Creek. The first site had the advantage of being near the center of population which would enable the collecting of sewage from two directions rather than transporting the entire flow the full length of the Area. The disadvantage of this site was its close proximity to Division Headquarters and Regimental Areas Nos. 3 and 4. The Cogdels Creek site was densely wooded, dry and located on land partly surrounded by swamps which made it improbable that the site would be required for any other purpose. In addition, it was the only suitable site located to the north of French Creek. We, therefore, recommended that this site be chosen, which recommendation was approved by the Officer in Charge. Final design of the New River Interceptor was made on the basis of the flow computations shown in Table N-4.04.

# FLOW SHEET – NEW RIVER INTERCEPTING SEWER FROM NORTHEAST CREEK TO COGDELS CREEK (TREATMENT PLANT)

N-4.04

| M.H. to M.H. | AREA | POPULATION | TOTAL POPULATION | PEAK FLOW M.G.D. | CUMULATIVE FLOW-M.G.D. | SIZE | % GRADE |
|---|---|---|---|---|---|---|---|
| 228 to S.P.S. 5<br>10.22 4.80 | AREA NORTH OF AUTUMN OVAL<br>FUTURE DEVELOPMENT | 300<br>700 | 1000 | .210 | .300 | 8" | .42 |
| S.P.S. 5 to 201<br>4.80 15.16 | | | 1000 | .210 | .300 | 6" | FORCE MAIN |
| 201 to 197<br>15.06 10.00 | RESIDENTIAL | 400 | 1400 | .120 | .420 | 8" | .42 |
| 197 to 194<br>8.18 5.07 | RESIDENTIAL | 450 | 1850 | .135 | .555 | 10" | .28 |
| 194 to S.P.S. 4<br>4.90 -2.15 | RESIDENTIAL | 1000 | 2850 | .300 | .855 | 12" | .20 |
| S.P.S. 4 to 183<br>-2.15 15.00 | | | | | .855 | 8" | FORCE MAIN |
| 183 to 182<br>14.77 14.00 | | | | | .855 | 12" | .22 |
| 182 to 153<br>13.61 -2.06 | MIDWAY PARK<br>RESIDENTIAL AREA | 3000<br>500 | 6350 | 1.050 | 1.905 | 15" | .15, .17 |
| 153 to S.P.S. 3<br>-2.06 -2.15 | FUTURE DEVELOPMENT | 500 | 6850 | .150 | 2.055 | 16" | .60 |
| S.P.S. 3 to 100<br>-2.15 15.31 | | | 6850 | | 2.055 | 12" | FORCE MAIN |
| 100 to 97<br>15.19 12.55 | | | 6850 | | 2.055 | 15" | .26 |
| 97 to 67<br>12.30 9.37 | FUTURE DEVELOPMENT SOUTH SIDE WALLACE CREEK. | 1000 | 7850 | .300 | 2.355 | 18" | .12 |
| 67 to 65<br>9.13 8.26 | NAVAL HOSPITAL<br>2/3 OF REGIMENTAL AREA № 1 | 1000<br>1900 | 10750 | .87 | 3.23 | 21" | .11 |
| 65 to 61<br>8.01 6.94 | 1/3 OF REGIMENTAL AREA № 1 | 950 | 11700 | .28 | 3.51 | 24" | .08 |
| 61 to 58<br>6.69 6.04 | 2/3 OF REGIMENTAL AREA № 2 | 1900 | 13600 | .57 | 4.08 | 27" | .07 |
| 58 to 55<br>6.03 5.10 | 1/3 REG. AREA 2<br>POST TROOPS & FUT. DEV. N. OF HOLCOMB BLV | 950<br>2850 | 17400 | 1.14 | 5.22 | 27" | .08 |
| 55 to 54<br>4.85 4.60 | 1/3 OF REGIMENTAL AREA № 3,<br>ADDITIONAL DEVELOPMENT | 950<br>300 | 18650 | .37 | 5.59 | 30" | .062 |
| 54 to 53<br>4.59 4.34 | DIVISION HEADQUARTERS | 400 | 19050 | .12 | 5.71 | 30" | .064 |
| 53 to 49<br>4.33 3.64 | 2/3 OF REGIMENTAL AREA № 3 | 1900 | 20950 | .57 | 6.28 | 30" | .066 |
| 49 to 47<br>3.14 2.75 | 2/3 OF REGIMENTAL AREA № 4 | 1900 | 22850 | .57 | 6.85 | 36" | .046 |
| 47 to 45<br>2.74 2.40 | INDUSTRIAL AND SUPPLY AREA -<br>1/3 OF REGIMENTAL AREA № 4 | 6000<br>950 | 29800 | 2.09 | 8.94 | 36" | .048 |
| 45 to 43<br>2.39 2.16 | 1/3 OF REGIMENTAL AREA № 5 | 950 | 30750 | .28 | 9.23 | 36" | .048 |
| 43 to 41<br>2.15 1.75 | 2/3 OF REGIMENTAL AREA № 5 | 1900 | 32650 | .57 | 9.80 | 36" | .050 |
| 41 to S.P.S. 1<br>1.74 -0.44 | | | | | | 36" | .060 |
| S.P.S. 1 to S.T.P.<br>-0.44 21.68 | | | | | | 16" | FORCE MAIN |

The column headed "Peak Flow (M.G.D.)" gives the expected flow, in million gallons per day, from the various units listed. Column headed "Cumul. Peak Flow" gives the cumulative flow of sewage, as estimated, in progressive steps throughout the entire length of the intercepting sewer from its upper limit to the treatment plant. SPS is an abbreviation for Sewage Pumping Station.

The figure in parenthesis immediately below the manhole or sewage pumping station number give the invert elevation of the sewer at that point.

N-4.05. During the construction period temporary general sewer plans Nos. M.B. 415 and 434 were used to coordinate the work. These data now are shown on the 1"= 500' record drawings.

Typical sewer details are shown on M.B. Drawings Nos. 402, 403 and 404.

Construction drawings prepared for the New River Interceptor Sewer were M.B. Nos. 410, 405, 401, 408, 418, 419, 420, 421, 422, 463, 471 and 472.

N-4.06. As is seen on the flow sheet (Table N-4.04) three small pumping stations were needed along the interceptor for conveying sewage across Wallace Creek, and to avoid excessive depths. A brief description of them follows:

Wallace Creek Sewage Pumping Station No. 3

Plans for this station are shown on M.B. Drawings Nos. 435, 436, 437, 438, 439 and 736. This station receives sewage from the entire Residential Area, Midway Park Residential Area and Gate House Area. Pump No. 1 has a capacity of 500 G.P.M. against a 22 foot head. Pump No. 3 has a capacity of 800 G.P.M. against a 22 foot head. This unit may be driven by gasoline or electric motor. Space has been provided for a future pump No. 2.

River Road Sewage Pumping Station No. 4

Plans for this station are shown on M.B. Drawing Nos. 441, 442, 443, 444, 445 and 737. This station receives sewage from the Residential Area lying north of Whiteside Branch. Pump No. 1 has a capacity of 200 G.P.M. against a 21 foot head. Pump No. 2 has a capacity of 200 G.P.M. against a 23 foot head. This unit may be driven either by gasoline or electric motor.

Autumn Oval Sewage Pumping Station No. 5

Plans for this station are shown on M.B. Drawing Nos. 473, 474, and 1701. This station receives sewage from a small area in the vicinity of Autumn Oval. Pumps Nos. 1 and 2 have a capacity of 50 G.P.M. each against a 14 foot head. This station is built entirely underground and should be ventilated thoroughly before any employees are permitted to enter the same.

N-4.07. A brief description of the sewer systems for the various parts of the Division Training Area are given below:

Regimental Area No. 1 Sewers for this area are shown on Drawings M.B. Nos. 414, 405, 410 and 408. Many of the buildings in this area connect directly to the New River Interceptor Sewer and the Hospital Area Trunk Sewer. The 10" sewer between Manholes 65 and 150 was designed to serve the Brig and a few other buildings in a low lying part of the Post Troops Area.

Regimental Area No. 2 Sewers for this area are shown on Drawings Nos. M.B. 405 and 406. The 15" and 12" sewer between manholes 58 and 279 are designed for extension into the Post Troops Area.

Regimental Area No. 3 Sewers in this area are shown on drawings M.B. 407 and 401. None of the sewers in this area were designed for future extension.

Regimental Area No. 4 Sewers in this area are shown on Drawings Nos. M.B. 409 and 401. The 15" sewer between manholes 45 and 117 was designed for and serves as the trunk sewer from the Industrial and Supply Area.

Regimental Area No. 5 Sewers for this area are shown on Drawings Nos. M.B. 458 and 400. None of the sewers in this area were designed for future extension.

Naval Hospital Area Sewers in this area are shown on Drawings Nos. M.B. 410, 456, and 457 and 737. Due to the distance to the intercepting sewer and the elevation of some of the buildings, a sewage pumping station (No. 2) was required for this area. The station discharges through 1075 feet of 8" Force Main into Manhole No. 133. Pump No. 1 has a capacity of 200 G.P.M. against a 23.5 foot head. Pump No. 2 has a capacity of 300 G.P.M. against a 25 foot head. This unit may be driven by either gasoline or electric motor.

Industrial and Supply Area Sewers in this area are shown on the following drawings: M.B. 412 and 413. The 15" trunk sewer leading to this area has a capacity for a peak flow of 1.8 M.G.D. The sewer was designed to take sanitary sewage from the various buildings, including the laundry with the usual wastes and the parachute training area. This sewer was not designed to receive large quantities of water from the Central Heating Plant, etc., as no such need was anticipated.

The gas and oil station, which was added after all sewers had been constructed, was built on ground too low to be served by these sewers and a septic tank and disposal field were provided. The tank is 3'6" x 9'0" in plan, with a settling capacity of 668 gallons and a disposal field of 350 feet of 4" tile drain.

Gate House Area Sewers for this area are shown on M.B. Drawing No. 1402. Sewage from this area discharges into Manhole No. 628 on the Midway Park Residential Area sewerage system and eventually is pumped back into the main collecting system.

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Post Troops Area Sewers for this area are shown on M.B. Drawing No. 460.

Parachute Training Area Sewers for this area are shown on M.B. Drawings Nos. 462 and 1408. The sewage from the main buildings around the first two towers is pumped into the Industrial and Supply Area sewers by sewage pumping station No. 9. This station is shown on M.B. Drawings Nos. 1404, 1405, 1406, 1407 and 737. Pump No. 1 has a capacity of 100 gallons per minute against a nine foot head, and is electrically driven. Pump No. 2 has a capacity of 200 gallons per minute against an eleven foot head and has dual gasoline-electric drive.

It was necessary to install a septic tank and disposal field for the third parachute tower which was located on ground too low to be served by the sewers in the area around the first two towers. A septic tank 5'8" x 16'0" in plan, with a settling capacity of 3170 gallons, was provided just outside the landing area of the tower. Disposal field consists of 500' of four-inch tile drains.

# DIVISION TRAINING AREA

INCLUDING

NAVAL HOSPITAL, INDUSTRIAL & SUPPLY, RESIDENTIAL, PARACHUTE TRAINING AND GATEHOUSE AREAS.

## TABLE OF SEWER QUANTITIES

(LINEAL FEET - AS OF SEPT. 4, 1942)

N-4.08

| DWG. № | 4" | 6" | 8" | 10" | 12" | 15" | 16" | 18" | 20" | 21" | 24" | 27" | 30" | 36" | M.H. № |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 400 | | | | | | | | | | | | | | 2471 | 9 |
| 401 | | | | | | | | | | | | | 1750 | 1158 | 9 |
| 405 | | | | | | | | | | 769 | 1303 | 2003 | | | 14 |
| 406 | | 2234 | 1927 | 350 | 515 | 936 | | | | | | | | | 11 |
| 407 | | 2172 | 2429 | 2100 | | | | | | | | | | | 13 |
| 408 | | 1090 | 302 | | | 1004 | | 2265 | | | | | | | 10 |
| 409 | | 2621 | 1325 | 1045 | | 1930 | | | | | | | | | 14 |
| 410 | | 747 | 804 | | 3387 | | | | | | | | | | 13 |
| 412 | | 657 | 1439 | | | 2734 | | | | | | | | | 11 |
| 413 | 398 | 1075 | 1818 | 1676 | 1450 | | | | | | | | | | 16 |
| 414 | | 1160 | 1598 | 1223 | | | | | | | | | | | 9 |
| 416 | | | 13 | | | | | 1572 | | | | | | | |
| 418 | | | | | 1819 | 1736 | | | | | | | | | 6 |
| 419 | | | | | | 5907 | | | | | | | | | 17 |
| 420 | | | 544 | 70 | 568 | 2110 | 231 | | | | | | | | 10 |
| 421 | | 5000 | 6033 | 523 | 2891 | | | | | | | | | | 28 |
| 422 | | 4262 | 5450 | 618 | | | | | | | | | | | 19 |
| 446 | | | | 11 | 78 | | 233 | 115 | 12 | | 510 | | | | 5 |
| 456 | | 3215 | 7007 | 1040 | 764 | | | | | | | | | | 28 |
| 458 | | 1767 | 4408 | 375 | | | | | | | | | | | 15 |
| 460 | | 1727 | 2394 | 1386 | 654 | | | | | | | | | | 16 |
| 462 | | 870 | 1468 | 2384 | | | | | | | | | | | 12 |
| 463 | | 1188 | 746 | | | | | | | | | | | | 3 |
| 471 | | 3110 | 1832 | | | | | | | | | | | | 6 |
| 472 | | 1020 | 2129 | | | | | | | | | | | | 7 |
| 1402 | | 65 | 760 | | | | | | | | | | | | 2 |
| 1408 | 548 | 624 | | | | | | | | | | | | | 2 |
| TOTALS | 946 | 34604 | 44426 | 12801 | 12126 | 16357 | 464 | 3952 | 12 | 769 | 1813 | 2003 | 1750 | 3629 | 305 |

GRAND TOTAL: 135,652 LIN. FT. OR 25.69 MILES.

N-4.09. Sewage Pumping Station No. 1, Sewage Treatment Plant and Outfall Sewer The factors determining the site for the sewage treatment plant have already been discussed. Careful study was given to the problem of determining the degree of purification which would be required prior to discharging sewage into New River. Final decision was not made until all the information which was readily available had been collected and discussed with the Officer in Charge, Mr. Warren H. Booker, Sanitary Engineer, State Health Department, the North Carolina State Fisheries Commission, and with an independent consulting engineer, who was retained to assist in this matter.

The oxygen content of the river water, tide and wind currents, the location of shell fish beds, rainfall records, present pollution, soundings, proposed use for bathing and recreational purposes, and other matters pertaining to the problem were investigated as thoroughly as the limited time would allow.

N-4.10. On August 28, 1941, the following report was submitted covering the disposal of sewage:

"REPORT COVERING THE DISPOSAL OF SEWAGE FROM MARINE BARRACKS

NEW RIVER, N. C."

August 28, 1941

"In order to determine the degree of treatment necessary for the disposal of sewage from the Division Training Area, we have made studies and determinations in New River, upon which to base final conclusions. These studies include soundings, tide gauge readings, float observations to determine tide and wind currents, chemical analysis to determine salinity and available oxygen, run-off from average annual precipitation and volumetric computations for available dilution. Other investigations have been carried out to ascertain the location, extent and value of oyster beds, and the extent to which New River will be used for bathing and recreational purposes.

Ordinarily, studies of this character are carried out over a period of several months in order to include seasonal and unusual weather and tidal conditions. Obviously, it has been impossible to spread our investigations over a period of time ordinarily alloted to studies of this character and our conclusions are based upon the best evidence obtainable and as summarized later in this report. In order to give a clear picture of the areas which will contribute sewage to New River and the characteristics of the River itself, the following facts are given as a general gauge for estimating the ratio between sewage contributed and river water available for dilution.

The Marine Barracks is located on the east side of New River, between Northeast Creek and French Creek. The town of Jacksonville is situated on the east side of the river about 20 miles above the inlet from the Atlantic Ocean. The Marine Corps Tent Camp, now constructed to house 6,000 men, is situated about a mile and one-half southwest of Jacksonville on Brinson Creek, a tributary of New River, N. C. A C.C.C. Camp, housing 400 men temp-

rarily, is located on the north side of Northeast Creek, due north of Paradise Point. The proposed 700 family housing project with an estimated population of 3,000 will be located on the south side of Northeast Creek and east of State Highway No. 24. (Mumford Point Tent Camp was projected later.)

At Jacksonville, the river is comparatively narrow, but widens rapidly to an average of 8,000 feet, between Paradise Point and Cogdels Creek. New River inlet consists of a dredged channel and numerous small channels through the river delta. The Intracoastal Waterway crosses New River near the inlet. The area of the river above a line drawn between Rhodes Point and Cogdels Creek is 8660 acres, or 135 square miles. The channel to Jacksonville is dredged to a depth of 11 feet below mean sea level, or 9 1/4 feet below mean low water. The average depth between Paradise Point and Cogdels Creek is nine feet below mean sea level.

Soundings shown on the Coast and Geodetic Survey Charts are referred to mean low water, which is 1.5 feet lower than mean sea level. During the summer of 1941, the level of water in the river above Sneads Ferry stood at or above sea level. Therefore, the depth of water in New River is about 1.5 feet greater than the charts indicate with a correspondingly greater volume of water.

From tidal observations on four gauges, it is estimated that the periodic tide in New River above Cogdels Creek is 0.3 feet. Gauges were located as follows:

No. 1 Sneads Ferry Bridge
No. 2 New River near Cogdels Creek
No. 3 Northeast Creek at railroad bridge
No. 4 Brinson Creek at railroad bridge

The zero points of these gauges are set at mean sea level, as determined by leveling from Bench Marks of the U. S. Coast and Geodetic Survey.

Assuming 1.92 tidal cycles each day, the daily tidal prism equals .576 feet. This would indicate a daily change in the water of New River above Cogdels Creek of 217,000,000 cubic feet or 1,630,000,000 gallons.

The drainage areas of New River above Cogdels Creek, at the point where the effluent from the sewage treatment plant will be discharged, is in excess of 340 square miles. The annual rainfall is estimated at 48 inches, or 280,000,000,000 gallons. It seems reasonable to assume that 20% of the precipitation reaches New River, which is equivalent to a run-off of 56,000,000,000 gallons annually, or an average of 153,000,000 gallons daily. In time of lowest flow probably six per cent of the average, or 9,000,000 gallons of fresh water enter the river daily above Cogdels Creek.

Samples of water from New River at the proposed outfall sewer were analyzed on July 3, 1941, with the following results:

<u>Samples No. 1 - 1000 feet from shore</u>

...ort 7/25/41 Cont'd)

...t, is located on the north side of Northeast Creek, due north of ...Point. The proposed 750 family housing project with an estimated ...tion of 3,000 will be located on the south side of Northeast Creek ...t of State Highway No. 24. (Bunford Point Tent Camp was projected ...)

...t Jacksonville, the river is comparatively narrow, but widens rapidly ...verage of 8,000 feet, between Paradise Point and Cogdels Creek. ...er inlet consists of a dredged channel and numerous small channels ...th the river delta. The Intracoastal Waterway crosses New River near ...inlet. The area of the river above a line drawn between Rhodes Point ...gdels Creek is 6660 acres, or 10.5 square miles. The channel to ...nville is dredged to a depth of 11 feet below mean sea level; or 9 1/4 ...below mean low water. The average depth between Paradise Point and ...els Creek is nine feet below mean sea level.

...oundings shown on the Coast and Geodetic Survey charts are referred ...low water, which is 1.5 feet lower than mean sea level. During the ...r of 1941, the level of water in the river above Snead's Ferry stood ...above sea level. Therefore, the depth of water in New River is about ...t greater than the charts indicate with a correspondingly greater ...of water.

...rom tidal observations on four gauges, it is estimated that the ...tide in New River above Cogdels Creek is 0.3 feet. Gauges were ...as follows:

...o. 1 Sneads Ferry Bridge
...o. 2 New River near Cogdels Creek
...No. 3 Northeast Creek at railroad bridge
...o. 4 Edwards Creek at railroad bridge

...he zero points of these gauges are set at mean sea level, as deter-...leveling from bench marks of the U. S. Coast and Geodetic Survey.

...ssuming 1.93 tidal cycles each day, the daily tidal prism equals ... This would indicate a daily change in the water of New River ...gdels Creek of 217,000,000 cubic feet or 1,650,000,000 gallons.

...he drainage area of New River above Cogdels Creek, at the point ...effluent from the sewage treatment plant will be discharged, is ...e of 540 square miles. The annual rainfall is estimated at 48 ...or 450,000,000,000 gallons. It seems reasonable to assume that 20% ...cipitation reaches New River, which is equivalent to a run-off of ...,000 gallons annually, or an average of 182,000,000 gallons daily. ...lowest flow probably six per cent of the average, or 9,000,000 ...of fresh water enter the river daily above Cogdels Creek.

...mples of water from New River at the proposed outfall sewer were ...n July 3, 1941, with the following results:

...Sample No. 1 - 1000 feet from shore

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*Using* an ave... *million gallons* of... tidal changes is... ed that some of th... succeeding revers... content entering ... measurements of cur... deficiency will be... tion and oxygen gi...

To determine... posed outfall, ext... Creek, a number of... July 15, 18, and 21... river, the floats ... two feet with four... upon by water curre... slow: consequently... are of value chief... ment of water tak... it is believed, ... to assume that the... the line from Rhod... able location of ... rently caused by a...

The estimat... sewage, together ... Oxygen demand, ... pounds of B.O.D. ... B.O.D. will be ... treatment at any ... entire cycle of ...

(Report of 8/28/41 Cont'd)

| | |
|---|---|
| Available Oxygen, Top | 6.3 P.P.M. |
| Available Oxygen, Bottom | 6.0 P.P.M. |
| Chlorides 13,350 P.P.M. | |
| PH 8.2 | |

<u>Sample No. 2 - 2000 feet from Shore</u>

| | |
|---|---|
| Available Oxygen, Top | 5.9 P.P.M. |
| Available Oxygen, Bottom | 5.8 P.P.M. |

<u>Sample No. 3 - 200 feet from Shore</u>

| | |
|---|---|
| Available Oxygen, Top | 6.2 P.P.M. |
| Available Oxygen, Bottom | 6.2 P.P.M. |
| PH and Chlorides same on all samples | |

Using an average of six parts per million or 50 pounds of oxygen per million gallons of water, the daily in-put of oxygen into New River, due to tidal changes is 1,630 M.G.D. x 50 or 81,500 pounds of oxygen. It is realized that some of the water carried out by one tide may be drawn in by the succeeding reversal of flow, resulting in water of less than 6 P.P.M. oxygen content entering the river, but in the lack of any long time, comprehensive measurements of currents in New River, it is felt safe to assume that this deficiency will be more than off-set by rainfall run-off, natural wind aeration and oxygen given off by aquatic and marsh plants.

To determine the dispersal of treated sewage discharged from the proposed outfall, extending approximately 1600 feet into New River near Cogdels Creek, a number of wooden floats were released and their courses observed on July 15, 18, and 21. Due to the presence of sand bars extending into the river, the floats were constructed so as to be submerged only a little over two feet with four sheet metal fins at the bottom to increase the area acted upon by water currents. The currents in New River were found to be quite slow: consequently, the floats were influenced greatly by wind action and are of value chiefly as the indication of the fact that a very definite movement of water takes place in the vicinity of the proposed outfall, sufficient it is believed, to provide adequate dispersal. Certainly it is conservative to assume that the effluent will be mixed with one-fifth of the water passing the line from Rhodes Point to Cogdels Creek, especially in view of the favorable location of the outlet, which is in a deep section of the river, apparently caused by a decided current at this point.

The estimated population which will use the New River for dilution of sewage, together with the estimated sewage flows and daily Biochenical Oxygen demand, are shown in the table below, computed on a basis of 0.17 pounds of B.O.D. per capita per day, and assuming that a reduction of 30% B.O.D. will be accomplished by primary treatment alone, a higher degree of treatment at any point will obviously react more favorably throughout the entire cycle of purification.

| AREA | POPU-LATION | DAILY AVERAGE SEWAGE FLOW | DAILY B.O.D. Raw | Treated (30% Reduction) |
|---|---|---|---|---|
| Division Training & Residential | 15,000 | 1,500,000 | 2550# | 1785# |
| Tent Camp | 6,000 | 600,000 | 1020# | 714# |
| C. C. C. Camp | 400 | 40,000 | 68# | 48# |
| Housing Project | 3,000 | 300,000 | 510# | 357# |
| City of Jacksonville | 6,000 | 600,000 | 1020# | 714# |
| Totals: | 30,400 | 3,040,000 | 5,168# | 3,618# |

Due to the fact that the Tent Camp, the city of Jacksonville, the C. C. C. Camp and the Housing Project will discharge sewage into widely separated parts of the river and at some distance from the proposed outfall sewer serving the Division Training Area, it may be safely assumed that the sewage from these contributors will be throughly mixed with and will be oxydized by the waters of New River before reaching the area surrounding the outfall sewer near Cogdels Creek. Starting off with a total of 81,500 pounds daily imput of oxygen into New River, neglecting the in-put due to rainfall and deducting 1833 pounds for the four sewage contributors above mentioned, a remainder of 79,667 pounds of oxygen is available for dilution of treated sewage from the Division Training Area. It is estimated that the effluent from the proposed treatment plant will have a daily B.O.D. of 1785 pounds which will result in the daily use of a little more than two per cent of the daily oxygen in-put available from tides.

Investigations covering oyster beds show that none exist to the north of Sneads Ferry, which is more than seven land miles below the proposed sewage outlet. Furthermore, the location of the oyster beds is in close proximity to the ocean inlet where tidal changes are more pronounced and correspondingly greater dilution is afforded. Insofar as pollution to oyster beds is concerned, it is believed that no effect whatever will be felt because of the treated sewage discharged at Cogdels Creek.

The use of the river for bathing and recreation purposes has been given careful consideration. From the studies made to date covering prevailing wind, currents and other factors, it appears that, with the degree of purification recommended, that bathing should be restricted in the near vicinity of the outlet. The shore line at this point is alternately swampy and rugged for a distance of 1300 feet upstream and approximately the same distance downstream from the outlet. After the treatment plant has been in operation for a period of months the extent of restriction on bathing can be determined within close limits by appraising the results of bacteriological examinations from water samples taken at representative points along the shore.

It is assumed that this procedure will be carried out as a precautionary measure regardless of the degree of sewage treatment given, this practice being generally accepted as a necessary one.

Conclusions and Recommendations

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From the foregoing data the following conclusions are reached:

1. New River under the conditions as covered by our observations, will afford ample dilution for the sewage contributed from the Division Training Area for a population in excess of 15,000 persons, with primary treatment consisting of two hours minimum sedimentation in well designed and properly operated tanks.

2. Chlorination of the effluent will probably be required during certain seasons of the year, more particularly during the summer months.

3. The plant should be designed for flexibility of operation to meet wide fluctuation in population. The design should include all necessary provisions for future expansion, including blank pipe connections and space for future structures. All future structures should be indicated at this time on the general plan which will be used for current construction.

4. Provision should be made at this time in the plant design for complete biological treatment should additional purification be required in the future.

## Plant Design

A general plan has been prepared covering the treatment of sewage on the following basis:

| | |
|---|---|
| Authorized Population | 12,500 |
| Average daily flow at 100 gallons per capita | 1.25 M.G.D. |
| Maximum hourly peak flow at 200 gallons per capita | 2.50 M.G.D. |

A general plant layout showing units proposed for immediate and future construction is attached hereto.

## Comminutors

In order to prevent the nuisance and operating costs incident to raking and disposing of screenings, comminutors are recommended for installation ahead of grit chambers and sewage pumping plant. This equipment will continuously grind or cut the coarse matter into small settleable particles within the raw sewage channel and will thus eliminate the difficulties encountered with sewage pumps where clogging frequently occurs from the solids ordinarily contained in sewage.

It is proposed to install two units for immediate use, each designed for an average flow of 1.75 M.G.D. and peak flow of 2.5 M.G.D. Space and pipe connections will be provided for two future units.

## Grit Chambers

In order to prevent undue wear on sewage pumps and to eliminate operating difficulties due to sand settling in tanks, pipe lines, etc., throughout the treatment plant, it is considered essential that grit removal

be provided. This feature is considered very necessary in view of the soil conditions. For immediate and future requirements it is proposed to construct a three channel hand-cleaned grit chamber to include a coarse bar rack for removing large obstructions. The channels will provide for a velocity of one foot per second and will be arranged to take minimum expected flows and maximum future flows up to 7 M.G.D. Mechanically cleaned grit chambers are preferable to hand cleaned units but the former have been eliminated as being too costly.

## Sewage Pumping Plant

As stated in prior reports, the trunk line sewer serving the Division Training Area, Hospital Area and Supply Area will terminate just north of Cogdels Creek at elevation -0.43. A pumping plant will be required to lift the sewage to elevation 19.5, (later raised to 21.5 to fit the site). From this point flow will be by gravity through the treatment plant and outfall sewer which will extend into New River about 1600 feet. The average lift will be 25 feet, for which the following pumping units have been selected:

1- Unit 1000 G.P.M. requiring 10 Horsepower
1- Unit 1500 G.P.M. requiring 15 Horsepower
1- Unit 2600 G.P.M. requiring 23 Horsepower

The average daily running cost for pumping will be equivalent to 8.5 continuous horsepower per 1.25 million gallons pumped, or 152 K.W. hours per day, at 0.0065 = 99 cents. This with a demand charge based upon 16.5 K.W. at 1.00 per K.W. per month = 55 cents per day, making the total cost for power 1.24 P.M.G., or 1.54 per day for normal flow.

## Primary Tanks

Two primary tanks will be provided each 16 feet wide x 65 feet long x 10 feet average depth, 10,540 cubic feet each: total retention period three hours at average rate of flow for 12,500 population: 2 1/2 hours for 15,000 population. 1.87 hours for 20,000 population. Accepted practice indicates a retention period of one to three hours with an average of two hours being generally adopted. On this basis, it is obvious that the two tanks when operating together will handle a total population of 20,000 before additional settling tanks need be added. For minimum requirements it is possible to operate one tank only.

It is proposed to equip both tanks with mechanical sludge and scum collecting equipment. Sludge removal will be accomplished by means of sludge pumps which will take suction directly from the tank hoppers and discharge into the sludge digesters.

## Sludge Digesters

Heated sludge digestion tanks will be provided together with gas collecting and utilization equipment. Two tanks 35 feet diameter x 19.5 feet average depth, 18,750 cubic feet capacity each, should be provided for immediate use. The total capacity is based upon three cubic feet per

capita for 12,500 population or 2.5 cubic feet, for 15,000 population. If the population is materially increased beyond 15,000, or if activated sludge is added later, a third unit will be required. The sludge digesters are to be equipped with floating covers, or equally effective means for collecting sludge gas, gas burning and heating equipment for maintaining proper temperatures within the tanks and means for burning waste gas.

Sludge Pumping Equipment

Two identical duplex plunger type sludge pumps, of orthodox type, will be provided to transfer fresh sludge from the settling tanks to the digesters; also to transfer sludge from one digester to the other. It is proposed to house this equipment in a small building which will also contanin a laboratory, office and tool room.

Sludge Drying Beds

Beds for drying sludge will be provided on the basis of 2/3 square feet per capita, if covered and 1 square foot per capita if open. The area for a population of 12,500 will be 8330 square feet in six units, each 70 feet long by 20 feet wide. It is strongly recommended that the beds be roofed over to prevent direct wetting from rainfall but that side enclosures be omitted. It is believed that roofing will prove economical in the end by cutting down the area of drying beds and by permitting greater economy in handling sludge. (covers were ruled out by our charge, due to lack of funds) It is proposed to remove sludge by means of small industrial push cars to a central point accessible to trucks. (concrete runways were submitted later.)

Sterilization

Chlorinators will be provided, together with ducts and manifold arrangement for application as required to effect pre or post chlorination. The use of one ton chlorine containers will probably be required in the interest of economy. The design will be made to permit the installation of proper handling equipment for immediate and future requirements."

N-4.11. After careful study of the above report and of hydrologic data pertaining to North Carolina stream and rainfall, an independent expert consultant decided that the following values probably would apply to the New River drainage basin:

| | |
|---|---|
| Mean discharge | 0.61 M.G.D. per sq. mile |
| Minimum daily discharge | 0.03 M.G.D. per sq. mile |
| Minimum weekly discharge | 0.04 M.G.D. per sq. mile |
| Minimum monthly discharge | 0.06 M.G.D. per sq. mile |

The records show the rainfall in Onslow County to average between 50 and 55 inches annually. It was considered that very little progressive and steady movement of the effluent toward the sea would occur and considered the principal value of the tides to be their dispersing effects upon the sewage effluent, and their resulting acceleration effect upon the rate of surface re-aeration due to the oscillations of the water. However, basing calculations upon an estimated minimum discharge of 20

million gallons daily,
dissolved oxygen content
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stituted a border line
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installation of the
diate need for higher
future. He, therefore,
tions of the report
ulation not exceeding
cussed the problem
tion.

N-4.12. Design
in agreement with
N. B. 416, 417,
446, 447, 448,
469, 470, 478,
426, 429 and

N-4.13.
the area would
estimated.
Digester No.
Two beds
N.B. 456,

N-4.14.
specification
20,000 with
the rate of
of the

million gallons daily, the consultant estimated that the minimum residual dissolved oxygen content of the river would be three parts per million for a contribution population of 15,000. He considered that this result constituted a border line base and indicated the need of future secondary treatment to serve any increase in the contributing population. He pointed out that this study was theoretical and that observed conditions after the installation of the primary treatment plant may either indicate the immediate need for higher treatment, or no need for such treatment in the near future. He, therefore, concurred with the conclusions and the recommendations of the report of August 22, 1941, as applied for a contributing population not exceeding 15,000. A report submitted December 1, 1941, discussed the problem further and stressed the necessity for competent operation.

N-4.12. Design of the treatment plant was carried out substantially in agreement with the report of August 28, 1941. Drawings were as follows: M. B. 416, 417, 424, 425, 427, 428, 430, 431, 432, 433, 734, 735, 812, 961, 446, 447, 448, 449, 450, 451, 452, 453, 454, 459, 461, 465, 466, 467, 468, 469, 470, 475, 476, 477, 478, 480, 481, 488, 1730, 1731, 1891, 1892, 7851, 426, 429 and 440.

N-4.13. In February 1942, it became apparent that the population of the area would be in the excess of 20,000 instead of the 12,500 originally estimated. We were directed by the Officer in Charge to prepare plans for Digester No. 3, Primary Settling Tank No. 3, and Sludge Beds 7-14, inclusive. Two beds were added to M.B. drawing No. 453. Other sewer drawings were: M.B. 455, 482, 483, 484, 486, and 487.

N-4.14. As constructed according to the above listed drawings and specifications 400, 401 and 402, the plant is designed for a population of 20,000 with an average daily flow of 2,000,000 gallons with a peak flow at the rate of 4.0 M.G.D. A brief resume' of the capacity and characteristics of the structures is given below:

Coarse Bar Screen An inclined coarse screen fabricated from 1/2 x 2 1/2 inch steel bars with 3 inch clear openings has been constructed in a concrete channel preceeding the comminutors. This screen is arranged for manual raking.

Comminutors Two Chicago Pump Company comminutors, driven by three-fourths horsepower weather proof Star electric motors, Serial Nos. 239817 and 239826, have been provided. The machines continuously and automatically cut and screen the coarse material in the raw sewage. Each machine is designed to pass an average flow of 1.75 M.G.D. at a head loss not to exceed eight inches. The mechanisms are fitted with one complete set of extra cutting teeth and one extra comb together with all special tools, lubricating equipment and instructions required for maintenance and repair. Each comminutor is controlled by an off-and-on maintained contact push-button station with an across-the-line type starter, with overload, low voltage and phase failure protection. The two comminutors are capable of passing a peak flow of 5.0 M.G.D.

Fine Bar Screen ... it becomes necessary ... fabricated of 1/2" ... is arranged for manual ...

Grit Channels ... channel, have been ... at the influent ... and by steel proportional ... channels there ... to the receiving ... together provide ...

Sewage Pumping ...

Pump No. 1 ...
Pump No. 2 ...
Pump No. 3 ...

Total installed ...

The capacity ... it is obvious ... not be operated ... ing the 24" ... to cause the ...

Specifications ... station No. 1 ...

Pump No. ... 54135, Serial ... 400518, ... See pump ...

Pump No. ... Serial No. ... 15-horsepower ... characteristic ...

54135 ... right ... through ... a 300 ... Horse ... 650 ...

Pump ...

Fine Bar Screen A fine bar screen has been provided for service when it becomes necessary to by-pass the comminutors. The fine bar screen is fabricated of 1/2" x 2 1/2" flat bars with 1 1/4" clear spacing. The screen is arranged for manual raking.

Grit Channels Two grit channels, one on either side of an overflow channel, have been provided. Flow through the grit channels is regulated at the influent end by means of removable stop gate weirs and at the effluent and by steel proportional weirs. For the purpose of draining the grit channels there have been provided four inch plug valves with a drain leading to the receiving well of sewage pumping station No. 1. The two channels together provide for a peak flow of 7.0 M.G.D.



Sewage Pumping Station No. 1

| | |
|---|---|
| Pump No. 1 | 1.44 M.G.D. or 1000 G.P.M. |
| Pump No. 2 | 2.16 " " 1500 " |
| Pump No. 3 | 3.75 " " 2600 " |

Total installed capacity: 7.35 M.G.D. or 5100 G.P.M.

The capacity of the outfall sewer is 5.0 M.G.D. or 3470 G.P.M., so it is obvious that all three units of the pumping station ordinarily may not be operated at the same time. However, in case of emergency, by flooding the 24" by-pass sewer, the hydraulic gradient may be increased enough to cause the outfall to take the flow of all three pumps.

Specification No. 401 covers the construction of the sewage pumping station No. 1 and the equipment listed below:

Pump No. 1 Fairbanks Morse vertical five-inch sewage pump, Type 5413E, Serial No. 442982, with vertical Fairbanks Morse Type QSZU, Motor No. 400518, ten-horsepower, three-phase, 60 cycles, 1170 R.P.M., 220 volts: See pump characteristic curves (Diagram N-4.15)

Pump No. 2 Fairbanks Morse six-inch vertical sewage pump, Type 5414E, Serial No. 442983, with Fairbanks Morse vertical motor, Type QSZU No. 404226, 15-horsepower, three-phase, 60-cycles, 680 R.P.M., 220 volts. See pump characteristic curves (Diagram N-4.16)

Pump No. 3 Fairbanks Morse eight-inch vertical sewage pump, Type 5415EGS, No. 442984, equipped for dual drive, including Fairbanks Morse right angle pump drive, Serial No. 14416, Style FW-2, ratio 1:2, connected through a twin disc clutch to Continental gasoline motor No. E-61182, with a 300 gallon underground gasoline tank. The electric motor is Fairbanks Morse vertical Type QSZy, No. 403093, 25-horsepower, three-phase, 60-cycles, 690 R.P.M., 220 volts. See pump characteristic curves (Diagram N-4.17)

Future Pump Space and connections have been provided for a future Pump (No. 4)

Air Compressor Worthington 1 7/8" x 2", Serial No. 7638: driven by

PUMP NO.

TESTED

PLOTTED W.C.

LIMIT TOTAL ...

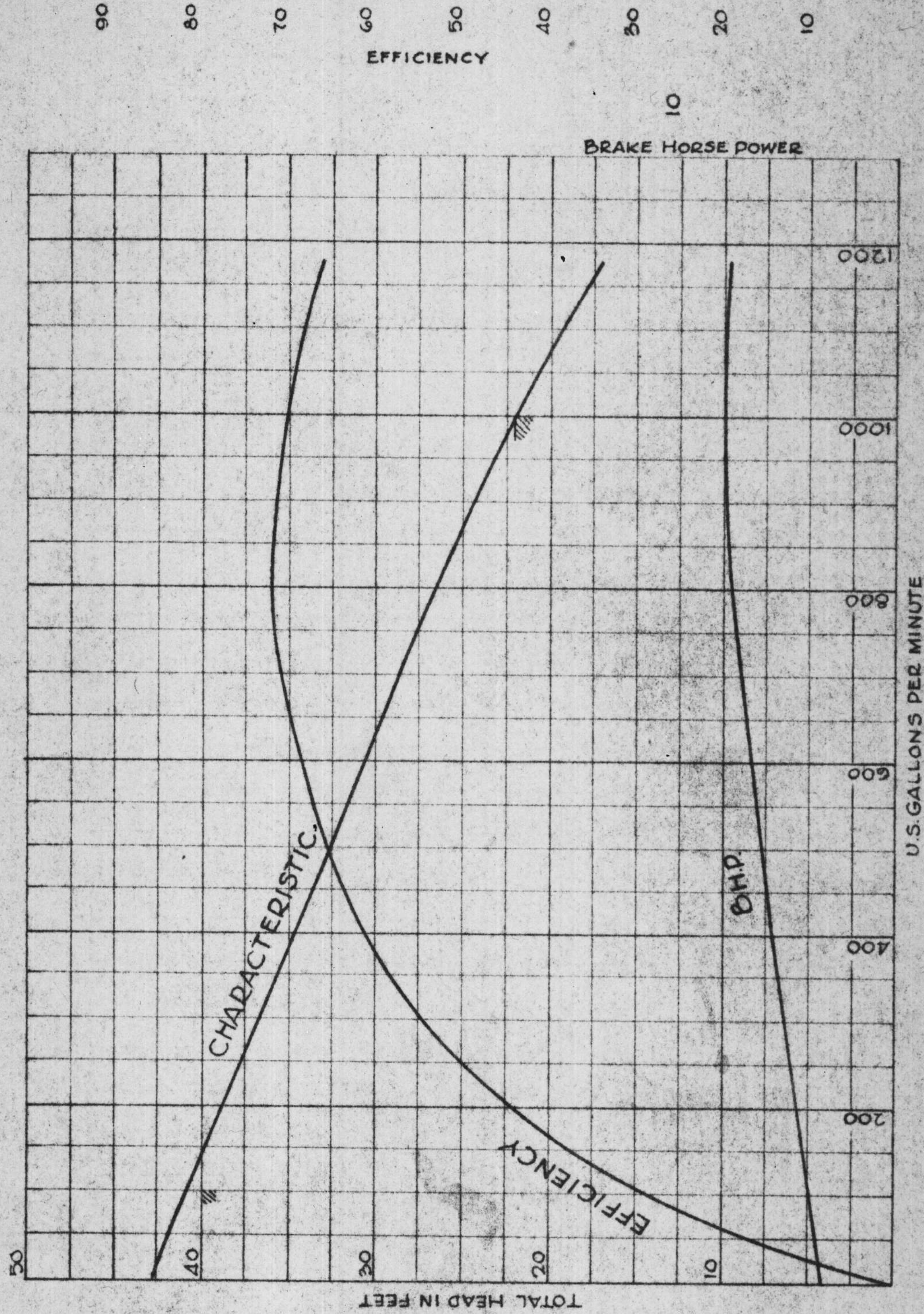
PUMP PERFORMANCE CURVE

FAIRBANKS, MORSE & CO.

| | | | | | |
|---|---|---|---|---|---|
| PUMP NO. | | REFERENCE | TP743K | SIZE-FIGURE | 5" - 5413 |
| TESTED | | DRIVER | | IMPELLER | T5C1A |
| PLOTTED | W.C. DODDS 4-23-40 | | | IMP. DIA. | 10" |
| LIMIT TOTAL SUCTION TO | | FT. | | R.P.M. | 1150 |

TP751Z

PUMP PERFORMANCE CURVE




MARINE BARRACKS

NEW RIVER, N. CAROLINA

SEWAGE PUMPING STATION NO. 1

PUMP NO. 1

PUMP NO............

TESTED

PLOTTED H.C.W.

LIMIT TOTAL SUCTION

PUMP PERFORMANCE CURVE

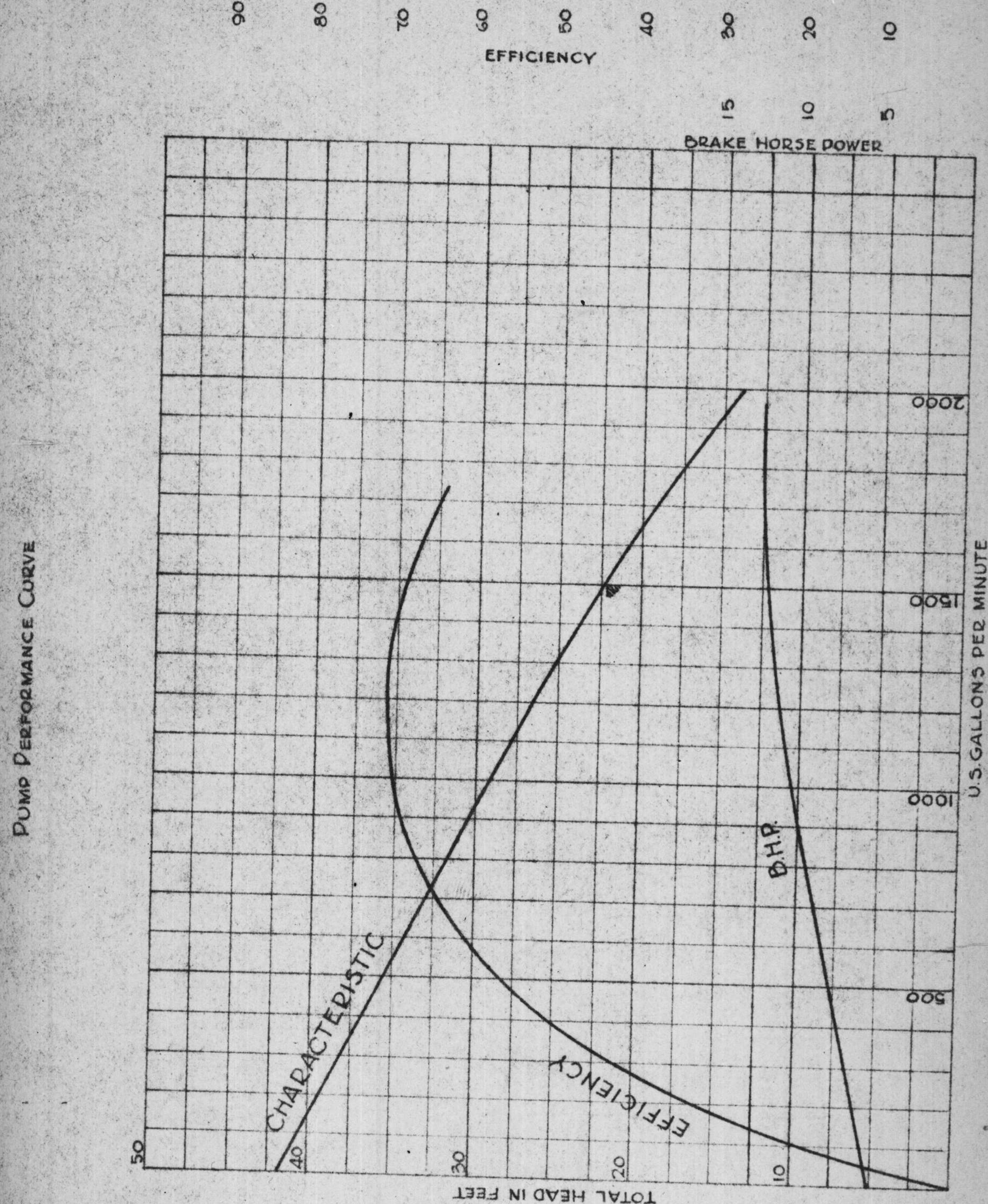
FAIRBANKS, MORSE & CO.

PUMP NO. ...............
REFERENCE TP 792 D
SIZE-FIGURE 6" - 5414

TESTED
DRIVER
IMPELLER TAJC5BJ

PLOTTED H.C.W. 8-18-41
IMP. DIA. 12 7/8"

LIMIT TOTAL SUCTION TO ........ FT.
R.P.M. 860




TP 814 C

MARINE BARRACKS

NEW RIVER, N. CAROLINA

SEWAGE PUMPING STATION NO. 1

PUMP NO. 2

PUMP No.

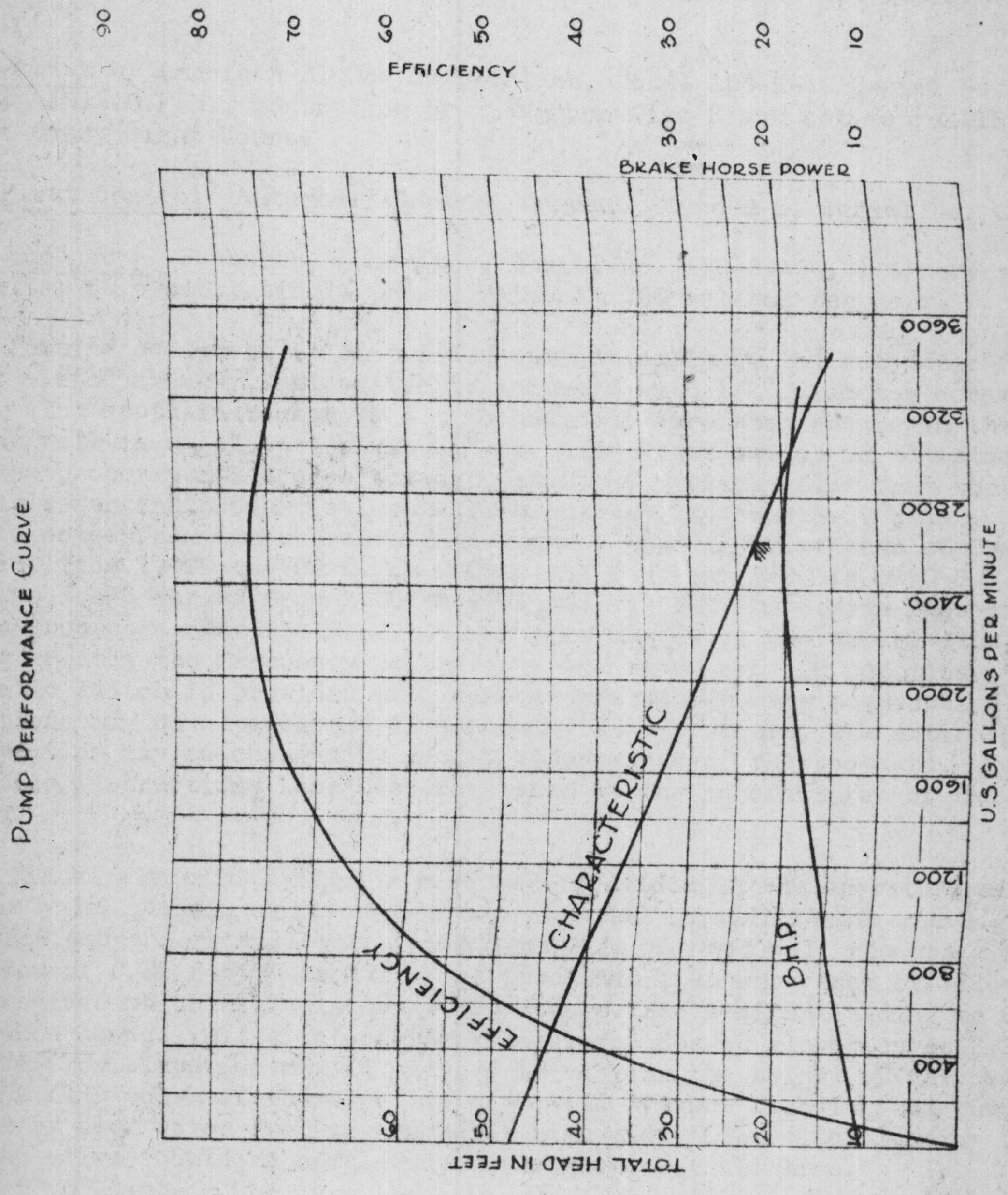
TESTED

PLOTTED RWP 8-8-13

LIMIT TOTAL SUCTION

FAIRBANKS, MORSE & CO.

PUMP No. ..................... REFERENCE ..................... SIZE-FIGURE 8" - 5415
TESTED DRIVER IMPELLER
PLOTTED R.W.F. 8-8-35 IMP. DIA. 17"
LIMIT TOTAL SUCTION TO ............ FT. R.P.M. 690




MARINE BARRACKS

NEW RIVER, N. CAROLINA

SEWAGE PUMPING STATION NO. 1

PUMP NO. 3

a 1/4 horsepower

Myers Auxiliary
a 3/4 horsepower
Serial No. R-1,
water system.

Blower by
capacity 1015 C.F.
minutes every

Float Control

Sump Pump
110 volts,

Pumping
switch listed
float. The
ceiving well
that the proper
cepting sewer
will be noted
1 varies from
and Pump No.
should produce
ducing greater
automatic
operations
of operation
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a 1/4 horsepower Delco Motor, Type M, 110 volts, 60 cycles, 1750 R.P.M.

Myers Auxiliary Water Pump rated at 750 gallons per hour, driven by a 3/4 horsepower Century Motor, 3-phase, 60 cycles, 220 volts, 1770 R.P.M., Serial No. R-1, pumping from a float controlled tank into the auxiliary water system.

Blower by American Blower Corporation, Model 150-A-1, Serial No. 79068, capacity 1015 C.F.M., controlled by a Sangamo Time Clock set to run 15 minutes every eight hours.

Float Control Automatic Control Company, Type M-5, Serial No. 4281;

Sump Pump Penberthy Automatic, Serial No. X80-94104, 1/4 horsepower, 110 volts, 60 cycles, single phase, rated at 750 gallons per hour.

Pumping equipment is controlled automatically by the automatic float switch listed above. This switch is actuated by 6 1/2" diameter ceramic float. The depth indicator is set to indicate zero when sewage in the receiving well is at elevation minus 7.42. The float switch is adjusted so that the proper pumps are selected to take the variable flow from the intercepting sewer and produce a smooth flow through the treatment plant. It will be noted from the characteristic curves that the discharge of Pump No. 1 varies from 1,000 to 700 G.P.M., Pump No. 2 varies 1500 to 1070 G.P.M. and Pump No. 3 varies from 2500 to 2050 G.P.M. For the design flow this should produce a close balance between pump discharge and sewage flow, reducing greatly the frequency of starting and stopping. In addition, the automatic switch is provided with connections whereby the sequence of operations may be altered and if necessary in the future, the entire program of operation may be changed by simply adjustments of the contacts. Full operating instructions have been furnished by the manafacturer of the float switch.

Visual electrical signals have been provided in the operators office to show which pumping units are in service, and in addition, a red light will show and a horn will sound when sewage in the wet well reaches a high elevation of 0.85 feet. As a further precaution, an emergency overflow has been provided which will discharge raw sewage into a ditch leading to Cogdels Creek when sewage in the intercepting sewer reaches an elevation of 2.25. This overflow elevation may be changed by varying the height of the overflow weir. A flap valve of the overflow pipe will prevent flooding the pumping station by back water from an unusually high tide. The ditch leading from the flap valve should be completely unobstructed at all time.

Tests should be made frequently to check pump efficiences. It should be noted that motors are 220 volts, requiring a different transformer tap than for the 208 volts used elsewhere in the area.

The Venturi meter described below, provides a convenient method of measuring pump discharges.

The proper lubrication of sewage pumps is esssential to efficient

Delco Motor, Type K, 110 volts, 60 cycles, 1750 R.P.M.

...iliary Water Pump, rated at 750 gallons per hour, driven by ...Century Motor, 3-phase, 60 cycles, 220 volts, 1750 R.P.M., ...ing from a float controlled tank into the auxiliary

...American Blower Corporation, Model 150-4-1, Serial No. 78068, ...controlled by a Sangamo Time Clock set to run 18 ...hours.

...Automatic Control Company, Type M-5, Serial No. 4281;

...Jonburthy Automatic, Serial No. 230-36109, 1/4 horsepower, ...cycles, single phase, rated at 750 gallons per hour.

...is controlled automatically by the automatic float ...This switch is actuated by 8 1/2" diameter ceramic ...indicator is set to indicate zero when sewage in the ...elevation minus 9.42. The float switch is adjusted so ...pumps are selected to take the variable flow from the inter... ...produce a smooth flow through the treatment plant. It ...the characteristic curves that the discharge of Pump No. ... to 700 G.P.M., Pump No. 2 varies 1500 to 1070 G.P.M. ...from 2800 to 2000 G.P.M. For the design flow this ...close balance between pump discharge and sewage flow, re... ...frequency of starting and stopping. In addition, the ...provided with connections whereby the sequence of ...altered and if necessary in the future, the entire program ...be changed by simply adjustments of the contacts. ... ...have been furnished by the manufacturer of the float...

...electrical signals have been provided in the operators office ...pumping units are in service, and in addition, a red light ...will come when sewage in the wet well reaches a high ... As a further precaution, an emergency overflow has ...will discharge raw sewage into a ditch leading to ...in the intercepting sewer reaches an elevation of 2.25. ...elevation may be changed by varying the height of the overflow ...of the overflow pipe will prevent flooding the pumping ...water from an unusually high tide. The ditch leading from ...completely constructed at all times.

...should be made frequently to check pump efficiencies. It should ...are 220 volts, requiring a different transformer tap ...volts used elsewhere in the area.

...meter described below, provides a convenient method of ...charges.

...lubrication of sewage pumps is essential to efficient...

operation and the life of the equipment. The stuffing boxes on the pumps are water sealed, the supply being furnished by auxiliary water system which precludes the possibility of contaminating the potable water supply. Sealing water is turned on and cut off automatically by solenoid valves connected to the pump circuit. It should be noted that it is necessary to supply water to the stuffing box of Pump No. 3 by a manually operated valve at such times as the gasoline engine is in operation. The governor on the gasoline engine should be set so that the unit will deliver 2600 G.P.M. with the wet well full. The lubrication of the ball bearings in pumps and motors should be checked at intervals of six months. Care should be exercised in greasing this type of bearing as a surplus will cause excessive heating. Extreme care must be taken to secure a perfect ball bearing grease which is non-acid and non-alkali.

Sewage in the wet well should be pumped down and all grit and other settled solids removed at such intervals as may be determined upon by trial.

Venturi Meter. The Venturi Meter was furnished by the Builders Iron Foundry. It is a type M, Model D-2, register, indicator, recorder, Tube No. 19636, diameter 16", throat diameter 6 1/2", register No. 8683. The meter will register a maximum flow of 4000 G.P.M. Full operating instructions have been furnished by the Manufacturer. The entire installation is valved so as to permit by-passing the Venturi Meter for necessary repairs.

The register, which is located on the ground floor of the Sewage Pumping Station, is actuated by two air diaphragm relays set close to the Venturi tube in a vault just outside of the building. The relays convert the liquid pressure to air pressure as a means of actuating the register-indicating-recorder mounted in the pumping station. A constant air supply under pressure is furnished by a small compressor, also located in the station. The converting diaphragms are equipped with clear pressure water inlets for flushing out matter which would in time clog the convertors and connecting pipes. This method of transmission between the venturi tube and register was selected in lieu of fluid transmission by sewage in order to avoid the difficulties which are known to exist, by the latter method, because of clogged pipe lines and erroneous readings caused thereby. Separate air relays are provided for actuating this automatic controls on the two chlorinators located in the Sludge Pumping and Chlorinating Station.

Influent Chamber. The influent chamber receives the sewage from the 16" force main which is enlarged 20" diameter to reduce entrance velocity. Pre-chlorination may be effected in this chamber. The supernatant line may be flushed by opening the shear gate provided. Flow to either primary settling tank may be adjusted or shut off altogether by inserting 14" pipe nipples of the proper length in the bells of the discharge elbows. An adjustable overflow weir has been provided leading to the by-pass sewer, also a sluice gate has been provided to drain the influent chamber or to by-pass raw sewage to the river if it should become necessary.

Primary Settling Tank. From the influent chamber the sewage flows through 14" cast iron pipes to the primary settling tank, welling up through a flared opening into a tapered distribution channel, thence through a number of ports into the tank. The three tanks now installed have a capacity

of 10540
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Scum

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valve on

of 10540 cubic feet, each giving a detention period of 2.85 hours with an average flow of 2 M.G.D. Link Belt Company sludge and scum collecting equipment have been installed in three tanks. Tanks 1 and 2 are equipped with a common unit, Link Belt No. W7931-G, input R.P.M. 1750, output 2.7, driven by a 1/2 horsepower G. E. Motor. Settling Tank No. 3 is equipped with a single Link Belt Company unit No. W55G of the same general characteristics, and driven by a 1/2 horsepower G. E. Motor. The driving motors are controlled by push button starting switches. The manufacturer has furnished a complete set of tools, lubricating devices and instructions for the maintenance and operation of this equipment. The collectors operate in a straight line sweeping scum to troughs near the effluent end of the tanks and on the return trip scraping the settled sludge into hoppers near the influent ends of the tanks. The settled sewage passes over an adjustable weir into a discharge channel leading to the effluent chamber. Each tank is equipped with a drain leading to the by-pass sewer.

Effluent Chamber. The effluent chamber is arranged so that the effluent of the settling tank may be routed to future activated sludge tanks, or to the by-pass sewer by means of sluice and stop gates.

Chlorinating Equipment. Two chlorinators have been provided, each with a maximum capacity of 400 pounds per day, with piping for pre- and post-chlorination. On the southwest side of the chlorinator room there are installed Wallace and Tiernan Company vacum chlorinator L-2095, differential converter L-1564, with Fairbanks springless scale F-741472. On the northeast side there are installed Wallace and Tiernan vacum chlorinator L-2098, differential converters L-1565 with Fairbanks springless scale F-741473. A monorail hoist is provided and either 150 pound, or 2,000 pound drums of chlorine may be used. The differential converters are actuated by impulses transmitted by compressed air through copper tubes connecting to relays on the Venturi meter at sewage pumping station No. 1, thus proportioning the amount of chlorine to the flow of sewage. Temporarily, chlorine is applied at a manhole on the by-pass sewer when post-chlorination is desired. For pre-chlorination the solution is discharged into the influent chamber.

Outfall Sewer. The 18" outfall sewer has a hydraulic gradient of 0.57 per cent with a capacity of 5.0 M.G.D. Five 8" outlets were installed at the end of this line with caps screwed tightly on each of them. Sufficient outlets have been installed to take the ultimate flow of 5 M.G.D. Caps should be removed or replaced on the outlets to meet conditions wherein marked increase or decrease in flow will prevail over a period of months, the idea being to maintain high exit velocities and thus prevent silting of the submerged pipe line. A 20" blank connection has been left in Manhole No. 152 for the construction of a second outfall sewer if the same ever should become necessary.

Scum Removal. The primary settling tanks are equipped with revolving scum removal troughs and scum chambers which may be emptied by opening a valve on a 6" line connecting to the primary sludge suction pipe.

[illegible] cubic feet, each giving a detention period of 2.53 hours with an [illegible] flow of 2 M.G.D. Link-Belt Company sludge and scum collecting [illegible] have been installed in three tanks. Tanks 1 and 2 are equipped [illegible] common unit, Link-Belt No. 57941-G, Eqpt. 21P73, 1750, equipped [illegible] 1/2 horsepower G. E. Motor. Settling Tank No. 3 is equipped [illegible] single Link-Belt Company unit No. 5950 of the same general charac[illegible], and driven by a 1/2 horsepower G. E. Motor. The driving motors [illegible] controlled by push button starting switches. The manufacturer has [illegible] complete set of tools, lubricating devices and instructions [illegible] maintenance and operation of this equipment. The collectors operate [illegible] flights scum sweeping into troughs near the effluent end of the [illegible] the return trip scraping the settled sludge into hoppers near [illegible] end of the tanks. The settled sewage passes over an adjust[illegible] into a discharge channel leading to the effluent chamber. Each [illegible] equipped with a drain leading to the by-pass sewer.

[illegible] Chamber. The effluent chamber is arranged so that the [illegible] the settling tank may be routed to future activated sludge tanks, [illegible] by-pass sewer by means of sluice and stop gates.

Chlorinating Equipment. Two chlorinators have been provided, each [illegible] capacity of 400 pounds per day, with piping for pre- and [illegible]ation. On the southeast side of the chlorinator room there are [illegible] Wallace and Tiernan Company vacuum chlorinator B-2095, differential [illegible] L-1104, with Fairbanks springless scale F-211472. On the north[illegible] there are installed Wallace and Tiernan vacuum chlorinator L-2098, [illegible] converters L-1103 with Fairbanks springless scale F-211475. [illegible] hoist is provided and either 150 pound, or 2,000 pound drums [illegible] may be used. The differential converters are actuated by im[illegible] transmitted by compressed air through copper tubes connecting to [illegible] the Venturi meter at sewage pumping station No. 1, thus propor[illegible] amount of chlorine to the flow of sewage. Temporarily, chlorine [illegible] manhole on the by-pass sewer when post-chlorination is [illegible] for pre-chlorination the solution is discharged into the influent [illegible]

[illegible] Sewer. The 18" outfall sewer has a hydraulic gradient of [illegible] a capacity of 2.3 M.G.D. Five 8" outlets were installed [illegible] line with caps screwed tightly on each of them. [illegible] outlets have been installed to take the ultimate flow of 5 M.G.D. [illegible] removed or replaced on the outlets to meet conditions there[illegible] increase or decrease in flow will prevail over a period of months, [illegible] to maintain high velocities and thus prevent silting [illegible] pipe line. A 24" block connection has been left in manhole [illegible] construction of a second outfall sewer if the same ever [illegible] necessary.

[illegible]. The primary settling tanks are equipped with revolving [illegible] and scum chambers which may be emptied by opening a [illegible] connecting to the primary sludge suction pipe.

Primary Sludge Pumping Station. Two Chicago Pump Co. Vari-drive sludge pumps have been installed with a capacity of 8400 G.P.H. each. The pipe is arranged so that primary sludge may be pumped from the sludge hoppers into any digester, digested sludge may be pumped on to the sludge drying beds in case it is desired to empty a digester or the contents of any digester may be transferred to any other digester. Lubricated plug valves have been installed for ease of operation. These pumps are controlled manually.

Sludge Control Stations. The Sludge Control Station contains the valves for admitting and withdrawing sludge from the digesters, supernatant sampling and withdrawal pipes, gas collecting and metering equipment, a gas fired hot water boiler, circulating pumps for forcing hot water through the coils in the digesters, thermostatic control and manometers. By experiment, the optimun temperature for complete digestion should be determined and the thermostatic control set to maintain that temperature. It is expected that this temperature will be in the neighborhood of 90° F. It should be noted that pipe lines or valves containing sludge may not be closed tightly for any appreciable length of time, because the accumulation of gas will rupture the same. Valved vent pipes leading to the atmosphere have been provided in the places where observation of this safety precaution is most difficult. Flame traps have been provided together with a combination pressure relief valve and flame trap on the line leading to the waste gas burner.

Digesters. Three heated sludge digesters have been provided of 18,750 cubic feet capacity each, or 56,250 cubic feet total. On the basis of 20,000 population, this amounts to an allowance of 2.81 cubic feet per capita, slightly under the original design figure of three cubic feet per capita. This allowance is considered to be liberal. In starting the new digesters a large volume of well digested sludge should be used for seeding purposes. The digesters are equipped with Downes floating steel covers with wood deck and composition roofing. The covers are provided with sampling wells, a gas dome and a pressure and vacum relief. The tanks should be filled with sewage before sludge is discharged into them. This will prevent the accumulation of an explosive mixture of gas. Precautions should be taken in withdrawing digested sludge and in emptying digesters to avoid forming explosive gas mixtures.

Sludge Drying Beds. Fourteen beds have been provided with an area of 1400 square feet each or 19,600 square feet total. This amounts to 0.98 square feet per capita, which compares with the usual practice of one square foot per capita. Due to the high rainfall in North Carolina and the slight deficiency in digester capacity, it may be necessary to increase sludge drying capacity in the future. If so, this may readily be done by adding glass covers to the present beds, the walls of which are designed to receive standard sludge bed covers. Standard glazed covers were recommended in our design but were rulled out due to lack of funds. The sludge liquor is collected by a series of underdrains and flows to the wet well of sewage pump station No. 1 where it mingles with the raw sewage and is passed through the plant for treatment.

H-5. [illegible]

[illegible]
the [illegible]
and [illegible]
Doop [illegible]
three [illegible]
cost [illegible]
scheme [illegible]
Manhole [illegible]
10,981 [illegible]
a cap[illegible]
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10" [illegible]
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and a [illegible]
northe[illegible]
gallons [illegible]

three [illegible]
The wat[illegible]
and has [illegible]

N-5. Midway Park Residential Area

N-5.01. Two schemes were considered for the disposal of sewage from the Midway Park Residential Area. (1) Contemplated collecting the sewage and constructing an activated sludge plant discharging into Lamott's Creek Deep Run; (2) Collecting the sewage and pumping the same approximately three miles into the New River Interceptor. Scheme (1) was estimated to cost $9,000 more than scheme(2), with much higher operating costs; scheme (2) therefore, was adopted. A 15" trunk sewer was constructed from Manhole 182 on the New River Interceptor northeasterly for a distance of 10,981 feet. The 15" sewer is laid on a grade of 0.13 per cent and has a capacity of 1,500,000 G.P.D. Sewage Pumping Station No. 6 was installed on Butler Drive, North near First Street, discharging through 3,820' of 10" asbestos cement force main into the aforementioned trunk sewer. The sewers in this area, the pumping station and the force main, were designed for a population of 3,000 with an average daily flow of 300,000 gallons and a peak flow, daily, of 900,000 gallons. The main trunk sewer flowing northwesterly through the Residential Area has a peak capacity of 1,100,000 gallons per day.

N-5.02. The following drawings were prepared for this area:

| Dwg. No. | Title |
|---|---|
| L.C.H. 7 | Low Cost Defense Housing, Trunk Sewer |
| L.C.H. 8 | " " " " " " |
| L.C.H. 9 | " " " " " " |
| L.C.H. 10 | " " " " Sewers |
| L.C.H. 11 | " " " " " |
| L.C.H. 12 | " " " " " |
| L.C.H. 73 | Temporary Sewage Treatment and Permanent Emergency Overflow |
| L.C.H. 62 | Onslow Drive, Sewage Pumping Station No. 6 Structural and Piping Details, location & grading plan. |
| L.C.H. 63 | Sewage Pumping Station No. 6 Details Manhole No. 600 Steel Stairs, Stair Well, Hook, Float Tube |
| L.C.H. 64 | Sewage Pumping Station No. 6, Details, Gasoline Engine Piping, Sump, Screen Trough, Overflow Head Wall |
| L.C.H. 65 | Sewage Pumping Station No. 6 Reinforcing Details |
| L.C.H. 66 | Sewage Pumping Station No. 6, Reinforcing Details |
| L.C.H. 74 | Sewage Pumping Station No. 6, Electrical Distribution |

N-5.03. Sewage Pumping Station No. 6. This pumping station contains three vertical shaft centrifugal sewage pumps, automatically controlled. The wet well is 19 1/2' x 12' in plan, with one side sloping to the sump and has a capacity of approximately 8,000 gallons. Before entering the wet

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Plant were ...
this overf...
on Lamott's ...
tanks built ...
operation ...
No. 626 to ...

Table N-5.0...

| Dwg. No. |
|---|
| 73 |
| 12 |
| 11 |
| 10 |
| 9 |
| 8 |
| 7 |
| Totals: |

N-6. ...

Post Tro...
roads, ...
quarters ...

well the sewage passes through a hand-raked bar screen, with 1 1/2" openings.

Pump No. 1. This pump has a capacity of 300 gallons per minute against 22' total head.

Pump No. 2. This pump has a capacity of 300 gallons per minute against 22' total head.

Pump No. 3. This pump has dual electric gasoline engine drive and has a capacity of 600 gallons per minute against 29' total head.

The pumps are controlled automatically by a float switch. A 10" emergency overflow pipe extends from Manhole No. 500, just outside of the station, approximately 920' northeasterly to Lamott's Creek. This overflow is designed to operate automatically when sewage in the wet well reaches elevation at 17.00 feet. As the station and structures between the Midway Park Residential Area and the Division Training Area Sewage Treatment Plant were not completed at the time of the first occupation of the area, this overflow was used as an outfall to a temporary sewage treatment plant, on Lamott's Creek. The plant consisted of two 14'6" x 30'0" settling tanks built of timber with no bottom or top. These tanks are now out-of-operation and should be filled with earth. Branch connections from Manhole No. 626 to the temporary tank should be closed also.

Table N-5.04 MIDWAY PARK RESIDENTIAL AREA

Sewer Quantities
(lineal ft.)

| Dwg. No. | 6" | 8" | 10" | 12" | 14" | 15" | 16" | No. of M.H. |
|---|---|---|---|---|---|---|---|---|
| 73 | | | 920 | | | | | 2 |
| 12 | 8367 | 8915 | 2500 | 560 | | | | 45 |
| 11 | 6500 | 7872 | | 2831 | | | | 49 |
| 10 | 4763 | 6268 | | 1003 | | | | 18 |
| 9 | | | 3778 | | | | | |
| 8 | | | | | 251 | 4312 | 124 | 14 |
| 7 | | | | | | 6111 | 184 | 17 |
| Totals: | 19,630 | 23,055 | 7,198 | 4,394 | 251 | 10,423 | 308 | 145 |

Grand Total: 65,259 lin. ft. or 12.36 miles

N-6. Mumford Point Camp No. 1

N-6.01. This area was originally occupied by a small tent camp for Post Troops. Early in 1942, plans were prepared providing for additional roads, wash rooms, messhalls, warehouses and sufficient huts to provide quarters for approximately 1,500 men. About 5,300 feet of sewer was re-

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N-6.
and 37.

| Dwg. No. |
|---|
| 36<br>7 |
| Totals: |

N-7. Dorm

N-7.

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to the sh

quired. The sewer system, which did not require a pumping station, was designed for a population of 1,800. Due to the scarcity of steel and cement, an Imhoff tank of timber construction was selected for primary treatment of the sewage. The settling compartment of this tank has a capacity of approximately 23,000 gallons, giving a detention period of three hours for an average flow of 180,000 gallons per day.

N-6.02. The sewage enters the plant through a bar screen with 1 1/2" clear openings, passes through a grit chamber into a pre-chlorination manhole, and thence into the Imhoff tank. After flowing through the Imhoff tank the effluent flows through a post-chlorination manhole into an 8" cast iron outfall sewer, extending southeasterly 600' into Northeast Creek.

Two sludge drying beds have been provided, arranged to permit future extension. These beds have a total area of 1,580 square feet. The water line in the Imhoff tank is at elevation 8.6' and the top of the sludge bed is at elevation 4.5'; hence, sludge may be removed from the Imhoff tank and placed upon the beds by gravity.

Chlorination is provided by a Wallace and Tiernan Company manually controlled chlorinator. This chlorinator, originally installed as a direct feed machine for Tent Camp No. 1, was converted to a solution type chlorinator with a capacity of from 5 to 40 pounds of chlorine per 24 hours. A by-pass sewer was provided to permit by-passing the sewage for necessary repairs to the plant.

N-6.03. Sewerage drawings for this area were M.P. Nos. 7, 35, 36 and 37.

MUMFORD POINT CAMP NO.1

SEWER QUANTITIES
(lineal feet)

| Dwg. No. | 6" | 8" | 10" | No. of M.H. |
|---|---|---|---|---|
| 36 | | 673 | 538 | 3 |
| 7 | 1156 | 1440 | 1492 | 10 |
| Totals: | 1,156 | 2,113 | 2,030 | 13 |

Grand Total: 5,299 lin. ft. or 1.00 mile

N-7. Barrage Balloon Battalion and Amphibian Base

N-7.01. This area is divided into two parts:

(1) The Amphibian Base sewage, derived chiefly from lavatories and toilets in the carpentry and machine shops on Northwest shore of Courthouse Bay, flows through approximately 1,000 feet of sewer into a septic tank 15' long and 6' wide, with a settling capacity of 4,050 gallons. Five hundred feet of 6" open joint disposal field, running parallel to the shore of Courthouse Bay, was provided. A parallel underdrain was

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N-7.0

Amphibian
499, 1400

provided to lower the ground water level. At the time the system was installed, no accurate estimate of the population could be secured, and it is possible that the disposal field will have to be enlarged or other means provided to take care of future increases in population. Drawing No. M.B. 494 covers this section of the work.

(2) The Barrage Balloon Battalion Area at Marines consists of four barracks, messhall and other Battalion buildings: Officers Quarters and a Balloon School. The Sewerage system, Sewage Pumping Station No. 7 and the Sewage Treatment Plant are designed for a population of 1,800.

N-7.02. Sewage Pumping Station No. 7 was installed at the southeast edge of the developed area, pumping the sewage through approximately 1,000 feet of 8" force main, running in a southeasterly direction to the Sewage Treatment Plant. The sewage enters the wet well through a bar screen with 1 1/2" clear openings. The wet well is 15'0" x 11'10" in plan with the bottom sloping steeply to the sump and has a capacity of approximately 7,000 gallons. Pump No. 1 is electrically driven only and has a capacity of 140 gallons per minute against 19 foot total head.

Pump No. 2 has dual electric-gasoline engine drive and a capacity of 200 gallons per minute against 19.5 feet total head.

N-7.03. The sewage treatment plant consists of an Imhoff tank with an integral grit chamber, sludge drying beds and chlorination. The settling compartment of this tank has a capacity of approximately 23,000 gallons giving a detention period of three hours for an average flow of 180,000 gallons per day. Water level in Imhoff tank is elevation 16.0. The sludge drying beds have an area of 1,550 square feet, with top of sand at elevation 9.0 feet. A manually controlled chlorinator, solution type with a capacity of 4 to 40 pounds per day, was provided together with a float switch to cut off the chlorinator during the periods when the pumping station was not operating.

Sludge may be withdrawn from the Imhoff tank to the sludge drying beds by gravity. From the plant the effluent passes through a 10" cast iron outfall sewer, entending southwesterly about 730 feet into New River.

N-7.04. Drawings prepared for the Barrage Balloon Battalion and Amphibian Base area were: M.B. Drawings Nos. 485, 494, 495, 496, 497, 498, 499, 1400 and 2790.

Table N-7.0

| Dwg. N |
|---|
| 1400 |
| 498 |
| 494 |
| 495 |
| Totals |

N-8. Rifle R

N-8.01.
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to New River

## BARRAGE BALLOON BATTALION AND AMPHIBIAN BASE AREA

### SEWER QUANTITIES
### (lineal feet)

Table N-7.05

| Dwg. No. | 6" | 8" | 10" | 12" | M.H.No. |
|---|---|---|---|---|---|
| 1400 | | 1050 | 230 | | |
| 495 | | 100 | 1481 | | 5 |
| 494 | 700 | 863 | | | 5 |
| 485 | 3435 | 2253 | 3293 | 20 | 17 |
| Totals: | 4,135 | 4,266 | 5,004 | 20 | 27 |

Grand Total: 13,425 lineal feet or 2.54 miles

N-8. Rifle Range Sewers

N-8.01. The Rifle Range Area lies on the west side of New River and is entirely separated from any other activities. Quarters are provided for one battalion together with Bachelor Officer's Quarters, five Married Officers' Quarters, Armory, Post Exchange, Infirmary, Theater, Range Houses, and other smaller buildings. The trunk sewer has a capacity of 650,000 gallons per day corresponding to a population of approximately 2100. Sewage from three toilet buildings located on the 300 yard line and from six toilet buildings located back of the butts is discharged into separate septic tanks. Sewage from the main part of the area flows by gravity into a treatment plant located near the shore of New River on an extension of Range Road. The treatment plant consists of an Imhoff tank, providing a settling capacity of approximately 23,000 gallons, giving a detention period of three hours for an average flow of 180,000 gallons per day. The sewage enters the plant through a bar screen with 1 1/2" clear openings. It passes through a grit channel into the Imhoff tank. From the Imhoff tank the sewage flows through a post-chlorination manhole into an eight-inch cast iron outfall sewer extending easterly 528' into New River. Two sludge drying beds have been provided, arranged to permit future extension. These beds have a total area of 1,580 square feet. The flow line in the Imhoff tank is at elevation 19.5' and the top of the sludge bed is at elevation 14.0'. Hence, sludge may be removed from the Imhoff tank and placed upon the beds by gravity. Chlorination is provided by a Wallace and Tiernan Company manually controlled solution type chlorinator with a capacity of from 5 to 40 pounds of chlorine per 24 hours.

A by-pass sewer was provided to permit by-passing the incoming sewage to New River in case of repairs to the plant.

N-8.02. Drawings
491, 492 and 1403.

Table N-8.03

| Dwg. No. |
|---|
| 1403 |
| 490 |
| 464 |
| Totals: |

N-9. Glider Trai

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direction, a sep
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to install addi

N-9.02.
and 1401.

Table

| Dwg. |
|---|
| 49 |
| Total |

N-8.02. Drawings prepared for this area were M.B. Nos. 464, 489, 490, 491, 492 and 1403.

Table N-8.03

RIFLE RANGE

SEWER QUANTITIES
(lineal feet)

| Dwg. No. | 4" | 6" | 8" | 10" | M.H. No. |
|---|---|---|---|---|---|
| 1403 | 3546 | 643 | | | |
| 490 | | | 640 | 233 | 4 |
| 464 | | 1463 | 3739 | 1911 | 17 |
| Totals: | 3,546 | 2,106 | 4,379 | 2,144 | 21 |

Grand Total: 12,175 lineal feet or 2.31 miles

N-9. Glider Training Base Area

N-9.01. This area is located on the west side of New River and consists of the Landing Field, Operations Building, Administration Building and other facilities for parachute troops training and glider training. By direction, a septic tank, designed for a population of 50 was installed on the 8" sewer leading toward New River. Inasmuch as the initial population probably was to be considerably less than 50, only 500 lineal feet of disposal field was installed. As the population grows, it may become necessary to install additional disposal field and an emergency overflow.

N-9.02. Sewerage drawings prepared for this area were M.B. Nos. 493 and 1401.

Table N-9.03

GLIDER TRAINING BASE

SEWER QUANTITIES
(lineal feet)

| Dwg. No. | 6" | 8" | No. of M.H. |
|---|---|---|---|
| 493 | 1586 | 1167 | 6 |
| Totals: | 1,586 | 1,167 | 6 |

Grand Total: 2,753 lin. ft. or .52 mile

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## N-10. Peterfield Point Tent Camp

N-10.01. This area lies on the west side of New River at Peterfield Point. The area was developed as a temporary hut camp for approximately 600 men. By direction, no provision was made for treatment of sewage. Lavatories and urinals were connected to the sewers and chemical toilets were installed. Approximately 2,000 feet of sewer was constructed. The greater portion of the camp is served by an 8" outfall sewer, extending 400 feet easterly into New River. By direction, the sewage from the small area located south of the access road was discharged into a mosquito control ditch leading southeasterly about 600 feet to New River. Sewers are shown on drawing No. TC 303.

Table N-10.02

PETERFIELD POINT TENT CAMP SEWER QUANTITIES

SEWER QUANTITIES
(lineal feet)

| Dwg. No. | 6" | 8" | No. of M.H. |
|---|---|---|---|
| 303 | 525 | 1541 | 7 |

Grand Total: 2,066 lin. ft. or 0.39 mile

## N-11. Tank Battalion Tent Camp

N-11.01. This area is located on U. S. Route #17, between Jacksonville and Verona. The area included huts for approximately 600 men. By direction, no treatment was provided, the effluent discharging directly into a small stream. Lavatories and urinals were connected to the sewers. Chemical toilets were installed.

Table N-11.02

TANK BATTALION TENT CAMP

SEWER QUANTITIES
(lineal feet)

| Dwg. No. | 6" | 8" | No. of M.H. |
|---|---|---|---|
| 2 | 160 | 1723 | 7 |

Grand Total: 1,883 lin. ft. or 0.36 mile

N-12. <u>Recommendations for Maintenance and Operation of Sanitary Sewers, Pumping Stations and Treatment Plants</u>

N-12.01. It is recommended that sewer rods, winches, cable and necessary cleaning tools be secured for use on the reservation.

N-12.02. That the maintenance of the sewerage system be a continuous operation, preferably under the supervision of a permanent employee. Thorough inspection should be made of the entire system twice yearly and a written report prepared covering the results of the inspection. Special care should be taken to prevent ponding and consequent production of hydrogen sulphide in view of the large amount of concrete pipe installed.

N-12.03. That strict wash room discipline be enforced to prevent newspapers, clothing, bottles, cans, and other debris from being thrown into the sewers; that every effort be made to remove sand from clothing before laundering to prevent large quantities of grit from reaching the treatment plant; that all possible grease be salvaged and collected regularly from the mess halls rather than dumping the same into the sewers.

N-12.04. That gasoline, oil and rain water be excluded from the sanitary sewers.

N-12.05. That trees with a decided tendency to send their roots into sewers with consequent stoppage of the same be planted not closer than 100 feet to any sewer or building connection.

N-12.06. That all small pumping stations (Nos. 2 through 9, inclusive) be visited once a day. Each motor and pump should be checked to see that it is operating properly and the bar screen in the wet well should be cleaned. Screenings should be placed in a closed receptacle and burned at an incinerator.

Once a month the following should be checked:

(1) Overflow lines in connection with each station to see that lines are clean and that flap valves are operating. (2) Stand-by engines to see that they start and operate easily. (3) Gasoline supplies (more often if stand-by engine is operated frequently.)

Pump and motors should be lubricated every six months. Care should be exercised in greasing ball bearings as a surplus will cause excessive heat. Extreme care must be taken to secure a perfect ball bearing grease which is non-acid and non-alkali.

Once a year, the operation of all pumps should be checked thoroughly and their capacity determined to ascertain their efficiency. This can best be done by determining the time to dewater a section of the wet well. Flow can be stopped temporarily with stop gate provided in manhole just outside of the wet well.

At certain other intervals, depending on operations, the wet well should be pumped out and cleaned, and sequence of pump operation should be changed as

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Recommendations for Maintenance and Operation of Sanitary Sewers, Pumping Stations and Treatment Plants.

N-12.01. It is recommended that sewer rods, winches, cable and other cleaning tools be secured for use on the reservation.

N-12.02. That the maintenance of the sewerage system be a continuous operation, preferably under the supervision of a permanent employee. An inspection should be made of the entire system twice yearly and a report prepared covering the results of the inspection. Special care should be taken to prevent ponding and consequent production of hydrogen sulphide gas in view of the large amount of concrete pipe installed.

N-12.03. That strict wash room discipline be enforced to prevent rags, clothing, bottles, cans, and other debris from being thrown into sewers; that every effort be made to remove sand from clothing before washing to prevent large quantities of grit from reaching the treatment plant; that all possible grease be salvaged and collected regularly from kitchens rather than flushing the same into the sewers.

N-12.04. That gasoline, oil and rain water be excluded from the sewers.

N-12.05. That trees with a decided tendency to send their roots into sewers with consequent stoppage of the same be planted not closer than 100 ft. to a sewer or building connection.

N-12.06. That all small pumping stations (Nos. 2 through 9, inclusive) be inspected once a day. Each motor and pump should be checked to see that they operate properly and the bar screen in the wet well should be cleaned. Screenings should be placed in a closed receptacle and burned at an incinerator.

At each inspection the following should be checked:

(1) Discharge lines in connection with each station to see that line valves and check valves are operating. (2) Stand-by engines to see that they will operate readily. (3) Gasoline supplies (most often if stand-by engine is operated frequently.)

Motors should be lubricated every six months. Care should be taken in greasing ball bearings as a surplus will cause excessive heating. Care must be taken to secure a perfect ball bearing grease which is acid and non-alkaline.

Once a year, the operation of all pumps should be checked thoroughly and capacity determined to ascertain their efficiency. This can best be done by determining the time to dewater a section of the wet well. Flow may be held temporarily with stop gate provided in manhole just outside the station.

At other intervals, depending on operations, the wet well should be pumped out and cleaned, and sequence of pump operation should be changed as necessary.

Recommendations for pumping station No. 1 were set forth in section N-4 of this report.

N-12.07. All small treatment plants (Barrage Balloon Area, Mumford Point Tent Camp, and Rifle Range) be visited daily. At this time, the bar screen should be cleaned and the screenings put in a closed receptacle for incineration.

Settling chamber of Imhoff tank should be skimmed if any scum has collected. Some should be broken up in the sludge compartment if relief of gas is being impeded.

Complete sewage analyses should be made once a week or at times of great changes in population to regulate the chlorine dosage. At times when pH of sludge is below 7.0 hydrated lime should be added in sludge chamber to obtain pH 7.0 to 7.3.

Once a month, settling chamber walls and bottom should be squeegeed to remove all material that has remained in this chamber. Sediment and grit should be removed also from pre-chlorination and post-chlorination manholes.

At other intervals depending on operation, flow and character of sewage, the following is recommended: (1) Clean grit channels when grit has reached a depth of 6". (2) Ascertain sludge level and keep the sludge level at least 2 ft. below the bottom of the settling chamber. (3) Draw off small amounts of sludge at frequent intervals rather than large amounts at infrequent intervals. (4) Flush sludge lines.

N-12.08. That during continuous operation septic tanks be visited monthly and the depth of sludge determined. If the depth is over 25% of the tank's depth, the tank should be cleaned. The effluent should also be examined and if solids are being carried through, the tank should be cleaned.

N-13. Summary.

N-13.01. To summarize briefly, there was completed, or well on the way to completion as of October 1, 1942, the following sewerage construction:

1. 270,375 lineal feet or 51.2 miles of sewers. (See table N-13.02)

2. Nine sewage pumping stations: (See table N-13.03)

3. Five sewage treatment plants. (See table N-13.04)

4. Thirteen septic tanks. (See table N-13.05)

# Over Size Form

☐ Too Large ☑ Bound Book

☐ Fragile ☐ Other ____________

Sheet Number: N-13.02

Drawing/NAVFAC Number: ____________

Title

Total Sewer Quantities

| | | | TOTAL NUMBER OF, | | |
|---|---|---|---|---|---|
| 27" | 30" | 36" | LIN. FT. | MILES | M.H's. |
| | | | 31,863 | 6.03 | 89 |
| 2003 | 1,750 | 3,629 | 135,652 | 25.69 | 305 |
| | | | 65,259 | 12.36 | 145 |
| | | | 5,299 | 1.00 | 13 |
| | | | 13,425 | 2.54 | 27 |
| | | | 12,175 | 2.31 | 21 |
| | | | 2,753 | 0.52 | 6 |
| | | | 2,066 | 0.39 | 7 |
| | | | 1,883 | 0.36 | 7 |
| 2003 | 1,750 | 3,629 | 270,375 | | 620 |
| 0.38 | 0.33 | 0.69 | | 51.20 | |

# LIST OF SEWAGE PUMPING STATIONS



| STATION Nº | LOCATION | AREA | PUMP SIZES | | | |
|---|---|---|---|---|---|---|
| | | | Nº 1 | Nº 2 | Nº 3 | Nº 4 |
| 1. | SEWAGE TREATMENT PLANT. | DIVISION TRAINING. | 1000 G.P.M. | 1500 G.P.M. | (D) 2600 G.P.M. | FUTURE |
| 2. | RIVER ROAD | NAVAL HOSPITAL | 200 G.P.M. | (D) 300 G.P.M. | — | — |
| 3. | WALLACE CREEK | RESIDENTIAL. | 500 G.P.M. | FUTURE | (D) 800 G.P.M. | — |
| 4. | NEAR BACHELOR OFFICERS' QUARTERS | RESIDENTIAL. | 200 G.P.M. | (D) 200 G.P.M. | — | — |
| 5. | AUTUMN OVAL | RESIDENTIAL. | 50 G.P.M. | 50 G.P.M. | — | — |
| 6. | BUTLER DRIVE, NORTH NEAR FIRST STREET. | MIDWAY PARK RESIDENTIAL. | 300 G.P.M. | 300 G.P.M. | (D) 600 G.P.M. | — |
| 7. | ELLEN PATH | BARRAGE BALLOON BATTALION AND AMPHIBIAN BASE. | 140 G.P.M. | (D) 200 G.P.M. | — | — |
| 8. | SEWAGE TREATMENT PLANT. | TENT CAMPS Nos. 1 and 2. | 1500 G.P.M. | (D) 2250 G.P.M. | FUTURE | — |
| 9. | HOLCOMB BOULEVARD AT BIRCH STREET. | PARACHUTE TRAINING | 100 G.P.M. | (D) 200 G.P.M. | — | — |

NOTE: (D) ALONGSIDE SIZE OF PUMP INDICATES THE UNIT IS DUAL GASOLINE-ELECTRIC DRIVE FOR STANDBY AS WELL AS REGULAR SERVICE.

LIST OF

| AREA |
| --- |
| TENT CAMPS Nº 1&2 |
| DIVISION TRAINING |
| MUMFORD CAMP |
| BARRAGE BALLOON BATTALION AND AMPHIBIAN BASE |
| RIFLE RANGE |

NOTE:

# LIST OF SEWAGE TREATMENT PLANTS

N-13.04

| AREA | CAPACITY-(Aver. Flow)(1) MILLION GALLONS PER DAY | | POPULATION CAN SERVE | | TYPES OF TREATMENT (2.) |
|---|---|---|---|---|---|
| | PRESENT | BY FUTURE EXPANSION | PRESENT | BY FUTURE EXPANSION | |
| TENT CAMPS Nº 1 and 2 | 1.2 | EXPANDED TO LIMIT. | 12,000 | | PRE-CHLORINATION, POST-CHLORINATION, CHEMICAL PRECIPITATION, SEPARATE SLUDGE DIGESTION. |
| DIVISION TRAINING | 2.0 | 2.67 | 20,000 | 26,700 | PRE-CHLORINATION, POST-CHLORINATION, PRIMARY SETTLING, SEPARATE HEATED SLUDGE DIGESTION. |
| MUMFORD CAMP Nº 1. | 0.18 | 0.36 | 1,800 | 3,600 | PRE-CHLORINATION, POST-CHLORINATION, IMHOFF TANK. |
| BARRAGE BALLOON BATTALION AND AMPHIBIAN BASE. | 0.18 | 0.36 | 1,800 | 3,600 | PRE-CHLORINATION, POST-CHLORINATION, IMHOFF TANK. |
| RIFLE RANGE. | 0.18 | 0.36 | 1,800 | 3,600 | PRE-CHLORINATION, POST-CHLORINATION, IMHOFF TANK. |

**NOTE:** (1) CAPACITIES ARE COMPUTED ON BASIS OF AVERAGE FLOW OF 100 GALLONS PER CAPITA PER DAY.

(2) BAR SCREENS AND GRIT CHAMBERS PRECEDE ALL TREATMENT AND AT DIVISION TRAINING AREA TWO COMMINUTERS ARE PROVIDED.

| |
|---|
| |
| PARACH |
| INDUSTR |
| BARR<br>#4 AR |
| GUID |
| DIFF |
| DIF |

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# Over Size Form

☐ Too Large ☑ Bound Book

☐ Fragile ☐ Other

Sheet Number: N-13,05

Drawing/NAVFAC Number:

Title

List of Septic Tanks

| AREA | POSAL FIELD |
|---|---|
| PARACHUTE TRAININ | ith vertical blind drains at 25' ctrs. |
| INDUSTRIAL and SUPPL | |
| BARRAGE BALLOON BA and AMPHIBIAN BASE | |
| GLIDER TRAINING BA | ith vertical blind drains at 25' ctrs. |
| RIFLE RANGE. | th vertical blind drains at 25' ctrs. |
| RIFLE RANGE. | th vertical blind drains at 25' ctrs. |

NOTE: (1.) THREE IDENTICAL
(2.) SIX IDENTICAL T

# PART II - CHAPTER O

## SURVEY DEPARTMENT

TABLE OF CONTENTS



O-1. Introduction. The first survey party left Baltimore on April 17, 1941, and work was started on April 18, 1941. Upon arrival, it was found that survey parties furnished by the Atlantic Coast Line Railroad had surveyed the Marine Barracks railroad from a point near U. S. Route No. 17 to a point near the Industrial and Supply Area, and had started taking topography on the site later approved for the Tent Camps No. 1 and No. 2. As field parties arrived they were assigned to this work and additional parties were organized as fast as possible. Great difficulties were encountered in securing competent men, and work was seriously handicapped by the lack of suitable headquarters and computing and drafting equipment. However, within one month the number of field parties had been expanded to twenty and a peak of twenty-three parties was reached on June 3, 1941.

The work of the department generally covered many phases of surveying, Horizontal and Vertical Control, Hydrographic and Topographic Surveys, Alignment and Construction Stakeouts, and certain final measurements for the preparation of Record Drawings. The various phases of the survey work will be discussed more fully in the ensuing sections.

O-2. Existing Data.

O-2.01. It was found that no topographic maps ever had been made of the area included within the reservation. The maps and other data which were secured from various Government Agencies are as follows:

O-2.02. Triangulation and Traverse in North Carolina. (1927 datum) U. S. Coast and Geodetic Survey. This volume gives description and geodetic coordinates of numerous triangulation stations on and near the Res-

ervation. It [illegible]
true Meridian [illegible]
System without [illegible]
from Table [illegible]

O-2.03. [illegible]
Carolina, [illegible]
volume contains [illegible]
Grid System [illegible]
contains [illegible]
essary in [illegible]
a table [illegible]
North and [illegible]
table is [illegible]
of observation [illegible]

O-2.04. [illegible]
U. S. Coast [illegible]
above mean [illegible]
vicinity [illegible]

O-2.0[illegible]
showing [illegible]

O-2.0[illegible]
graphs. [illegible]
sheet show[illegible]
the roads, [illegible]

O-2.0[illegible]
graphs, [illegible]
sheet [illegible]
Inlet and [illegible]

O-[illegible]
dated [illegible]

O-[illegible]
crop [illegible]

O-[illegible]
by the [illegible]

O-3. [illegible]

O-[illegible]
were [illegible]
nate[illegible]
near [illegible]
list[illegible]
of [illegible]
show[illegible]
hav[illegible]

ervation. It should be noted that the azimuths given are referred to the true Meridian and may not be used in connection with the Plane Coordinate System without making the necessary corrections which may be obtained from Table 2 of the publication described in 0-2.03.

0-2.03. First and Second Order Triangulation and Traverse in North Carolina, (1927 datum) Volume 2, U. S. Coast and Geodetic Survey. This volume contains the Plane Rectangular Coordinates on the North Carolina Grid System of numerous triangulation stations and other points. It also contains description of some points but reference to item 0-2.02 is necessary in most cases for complete descriptions. This volume also contains a table (table 2) giving the mapping angle or the deviation between grid North and astronomical North for even minutes of longitude. Use of this table is necessary when it is desired to obtain a grid azimuth by means of observations of the sun or stars.

0-2.04. Leveling in North Carolina, Special Publication No. 10, U. S. Coast and Geodetic Survey. This publication gives the elevation above mean sea level and descriptions of a number of bench marks in the vicinity of the reservation.

0-2.05. U. S. Coast and Geodetic Chart No. 777, scale 1; 40,000, showing soundings and navigation aids in New River.

0-2.06. U. S. Coast and Geodetic Survey Compilation of Aerial Photographs . Scale 1; 20,000, sheet No. 5050, dated January 29, 1933. This sheet shows New River and the immediately adjoining land including some of the roads, wooded areas, and streams.

0-2.07. U. S. Coast and Geodetic Survey, Compilation of Aerial Photographs, Scale 1; 20,000, sheet No. 5049, dated January 14, 1941. This sheet shows parts of New River and the Atlantic Ocean between New River Inlet and Bear Inlet.

0-2.08. Aerial Mosaic Map of New River and Vicinity, Scale 1: 20,000 dated February 12, 1941.

0-2.09. A good many aerial photographs used by the County Agent for crop control were borrowed in order to expedite the work.

0-2.10. Highway Map of Onslow County, Scale 1" = 4 miles, prepared by the North Carolina State Highway and Public Works Commission, 1938.

0-3. Horizontal Control.

0-3.01. By direction of the Officer-in-Charge, horizontal surveys were coordinated on the North Carolina System of Plane Rectangular Coordinates. Basic control was obtained from triangulation stations along and near New River the positions of which were obtained from publications listed above. Unfortunately, the triangulation stations on the east side of New River had suffered more from erosion than those on the western shore. Stations Hadnot (U.S.E.) 1931, and Bluff (U.S.E.) 1931, which would have furnished ideal control for the Division Training Area, had been washed away, and it became necessary to execute precise triangulation at a time

when the progress of the entire job depended upon prompt conclusions of surveys. In addition, the published position of station Little Ragged (U.S.E.) 1932 was found not to fit the actual location of a monument recovered on Little Ragged point and answering the description of the triangulation station. This made it necessary to extend the triangulation system both north and south of the Division Training Area in order to obtain quadrilaterals of the proper shape to furnish accurate positions for the new stations established in the Division Training Area.

0-3.02. The principal stations used in the various areas are as follows:

| Area | Stations |
|---|---|
| Division Training Area ............ | Hadnot 1941, Bluff 1941, Sime 1941, Truesdale 1932, High 1932, Swamp 1933, Paradise (U.S.E.) 1933, Paradise ecc. 1933. |
| Midway Park Residential ............ | Truesdale 1932. |
| Mumford Point Camp No. 1 ........... | Northeast 1933 |
| Camp Knox (CCC Camp)................ | Camp 1941 |
| Amphibian Base and Barrage Balloon Battalion........... | Poverty 1932, Court 1932, Marines 1941. |
| Rifle Range Area .................. | Stone ecc. 1932, Gin 1932. |
| Landing Field and Glider Training Base ............... | Southwest 1941 |
| Tent Camps Nos. 1 and 2 ............ | Positions in this area depend upon coordinates furnished by the Corps of Engineers of Third Order Traverse between stations Verona 1932 and Northeast 1933. |
| Tank Battalion Tent Camp ........... | Verona 1932. |
| Dixon Area......................... | Verona 1932. |
| Bear Creek Area.................... | Russell 1932. |
| Jacksonville ....................... | Walton |

0-3.03. Positions of the above points and many others are given in Section 0-9 herein. Locations are shown on the 1"=500' and 1"=50' scale Record Drawings. The extent and arrangement of the grid system are shown on M.B. drawings Nos. 1174 and 2157. Specification No. 1000 describes in detail the entire record mapping and coordinate program. The State coordinate system is based on a Lambert conformal conic projection, with two standard parallels at which the scale is exact, one at Latitude north 34° 20' and one at Latitude north 36° 10'. The central Meridian of the coordinate system is at Longitude 79° 00' West, with an assigned easting value of 2,000,000 ft.

0-3.04. In order to furnish local control at frequent intervals, a network of careful traverse was established connecting various triangulation stations. This traverse served as a base for topographic mapping and as local control for the stakeout of construction.

0-3.05. Military Grid. The relation between North Carolina grid coordinates and the Military grid system is as follows:

ZONE "A"

| Military Grid Coordinates | N. C. Grid Coordinates |
|---|---|
| N. 1,301,000 yds. | N. 336,910.47 ft. |
| E. 566,000 yds. | E 2,501,896.58 ft. |

The Military Grid North is 3° 25' 30".6 west of the North Carolina grid North.

0-4. Vertical Control.

0-4.01. Approximately 700 temporary bench marks were established in various parts of the reservation in order to provide vertical control for the project. Basic bench marks were recovered along the Atlantic Coast Line, the elevations of which were obtained from publications listed herein. The elevations of 236 selected permanent bench marks are given in Section 0-10 herein. Elevations are referred to mean sea level. Leveling was run in loops generally with 18" Dumpy levels, and adjusted without regard to the curvature of the earth.

0-4.02. In order to control hydrographic work, tide gauges were established at various locations along New River. It was found that there are practically no periodic tides in New River above Hatch Point, the surface of the water ordinarily ranging from mean sea level to + 0.4 feet except when affected by Meteorological conditions.

0-5. Topographic Surveys. Most of the topographic surveys were made with the view of preparing contour maps to the scale 1" = 100'. Transit and stadia methods, profiling along parallel base lines and plane table surveys were used depending upon the topography of the area to be covered and the density of the wooded areas. The contour intervals varied from 1 to 2 feet, depending upon the slope of the ground and the purpose for which the topographic map was prepared. In many places the trees and underbrush were so dense that lanes had to be hacked through at 50' intervals, and quite often it was impossible to see from one lane to the next. The contour maps resulting are in work sheet form only, except where site plans actually were prepared and the contours traced thereon.

0-6. Hydrographic Surveys. Hydrographic surveys were made by triangulation, transit and stadia and sextant. The work included soundings and test borings for bridges, bulkheads, dredging operations, and sweeping for obstructions which would prohibit the use of the river as a sea plane base. After dredging operations were completed, new contours were taken to verify the depth of dredging.

0-7. Construction Surveys. As soon as drawings were approved, buildings, roads, water, steam, pole lines and other utilities were staked out in the field and marked plainly. In many cases tentative locations were surveyed for the purpose of preparing proper design and re-established in the field after approval of working drawings. Sewer locations and profiles were done by the Sanitary Department, the Survey Department furnishing parties for the field work. Most of the construction was staked out according to sketches prepared in the office and the actual stakeout verified by the submittal of complete field notes showing the points established. Most of the structures have been coordinated on the N. C. system. The presence of

Grid Coordinates

N. [illegible] ft.
E. 2,0[illegible] ft.

...ine, true north is 0° 38' 20".4 east of the North Carolina grid.

Vertical Control.

... Approximately 700 temporary bench marks were established ... parts of the reservation in order to provide vertical control ... projects. Basic bench marks were recovered along the adjacent ..., the elevations of which were obtained from publications listed ..., the elevations of the selected permanent bench marks are given in ... herein. Elevations are referred to mean sea level. Leveling ... loops generally with 18" Dumpy levels, and adjusted without ... the curvature of the earth.

...10. In order to control hydrographic work, tide gauges were ... at various locations along New River. It was found that there ... ally no periodic ... in New River above Hadnot Point, the sur- ... water ordinarily ranging from mean sea level to + 0.4 feet ... affected by meteorological conditions.

...aphic Surveys. Most of the topographic surveys were made with ... preparing contour maps to the scale 1" = 100'. Transit and ... ds, profiling along parallel base lines and plane table surveys ... depending upon the topography of the area to be covered and the ... the wooded areas. The contour intervals varied from 1 to 5 feet ... on the slope of the ground and the purpose for which the map ... was prepared. In many places the trees and undergrowth were so ... lines had to be hacked through at 50' intervals, and quite often ... possible to see from one lane to the next. The contour maps ... work stood true only, except where site plans actually were ... the contours traced thereon.

...graphic Surveys. Hydrographic surveys were made by triangula- ... ing stadia and sextant. The work included soundings and ... for bridges, bulkheads, dredging operations, and sweeping for ... which would prohibit the use of the river as a sea plane base. ... operations were completed, new contours were taken to deter- ... of dredging.

...uction Surveys. As soon as drawings were approved, buildings, ..., sewer, pole lines and other utilities were staked out in the ... ined quickly. In many cases tentative locations were surveyed ... prior to preparing proper design and re-established in the field ... of working drawings. Sewer locations and profiles were done ... Department, the Survey Department furnishing parties for ... Most of the construction was staked out according to ... prepared in the office and the actual stakeout verified by the ... sketch-field notes showing the points established. Most of ... have been coordinated on the N. C. system. The presence of



numerous curved road...
required for constr...

0-8. Final Survey...
for the preparation ...
spectors of the U. ...
mapping of culvert...
Officer-in-Charge ...
parts of the reserv...
on 1" = 600' scale ...

0-9. Permanent ...

| Quad-rangle | |
|---|---|
| 82 | Hubert ... |
| 97 | Picture ... tion ... Picture ... 77° 23' ... # 8, ... #258 ... to ... of Jack... |
| 98 | U.S.G. ... U.S.G. ... Halton ... ... |

numerous curved roads in all areas increased greatly the amount of work required for construction stakeout for the roads, utilities, and buildings.

0-8. Final Surveys. Most of the final surveys to provide as-built data for the preparation of Record Drawings were made by field parties and inspectors of the U. S. Navy. Our parties secured some information for the mapping of culverts and buildings. In addition, we were requested by the Officer-in-Charge to survey accurately and set monuments along certain parts of the reservation boundary. This was done and the results shown on 1" = 500' scale record drawings.

0-9. Permanent Coordinate Stations.

| Quadrangle | Station | Coordinates: North | East |
|---|---|---|---|
| 82 | Hubert 1932 | 370,177.15 | 2,530,733.61 |
| 97 | Picture Point, centerline of intersection. Church & 2nd. Sts. Tent Camp No.1 | 364,022 | 2,462,978 |
| | Picture Pt. Lat. 34° 45' 24".607; Long. 77° 28' 49."912 (30th. Engrs) Picture Pt. # 8, Sta. # 27 -S. edge of U. S. Highway #258 at centerline of junction with rd. to Burgaw, N.C., approx. 3.0 miles south of Jacksonville, N. C. | 369,915 | 2,456,376 |
| 98 | U.S.E. Monument No. 18 | 367,574.88 | 2,464,075.78 |
| | U.S.E. Monument No. 19 | 368,322.00 | 2,465,420.06 |
| | Walton 1933 | 368,293.33 | 2,465,215.88 |
| | Beacon U.S.E. 1933 | 364,365.00 | 2,469,582.00 |
| | Mill U.S.E. 1933 | 364,102.82 | 2,470,630.30 |
| | Marsh U.S.E. 1933 | 363,258.93 | 2,470,694.47 |
| | Wilson U.S.E. 1933 | 362,253.84 | 2,471,479.32 |
| | Pine U.S.E. 1933 | 361,424.97 | 2,471,508.60 |
| | Brier U.S.E. 1933 | 360,328.05 | 2,472,660.01 |
| | Monument USMC 26 | 367,139.14 | 2,475,379.97 |
| | Monument USMC 27 | 366,691.78 | 2,474,934.54 |
| | Monument USMC 28 | 366,332.34 | 2,474,576.56 |
| | Monument USMC 29 | 365,860.04 | 2,474,118.95 |
| | Monument USMC 30 | 365,351.18 | 2,473,793.04 |
| | Monument USMC 40 | 368,016.37 | 2,471,176.92 |
| | Monument USMC 41 | 367,909.97 | 2,471,135.83 |
| | Reference Monument USMC 31 | 364,521.87 | 2,473,263.83 |
| | Center Line Hemby Branch at Wilson Bay | 364,535.50 | 2,473,219.00 |
| | Center Line 1st. & F sts. | 364,566.70 | 2,464,992.42 |
| | 100,000 gal. elev. water tank (Tent Camp No. 1) | 361,948.98 | 2,465,532.87 |
| | Manhole No. 235 | 360,888.57 | 2,465,424.46 |
| | Monument "B" near 3rd & A Sts. | 363,617.88 | 2,463,134.07 |
| | Center Line 6th. & A Sts. | 362,197.95 | 2,463,400.21 |
| | Monument "A" near 1st. and Church Sts. | 364,417.17 | 2,463,100.46 |
| | Center Line 9th. & A Sts. | 360,456.48 | 2,463,473.20 |

Quad.

98

99

100

117

118

| Quad. | Station | Coordinates North | Coordinates East |
|---|---|---|---|
| 98 | Manhole # 6 | 362,802.60 | 2,466,138.80 |
| | Monument | 361,903.75 | 2,477,918.45 |
| | Pipe in Hemby Branch | 365,290.76 | 2,473,755.77 |
| | Picture Point, centerline of intersection "C" & 1st. Sts., Tent Camp No. 1 | 364,525 | 2,464,003 |
| | Picture Point, centerline of intersection N.C. Hwy. #24 & Mumford Landing Road at White Cemetery | 367,135 | 2,475,707 |
| 99 | Northeast 1933 | 360,462.81 | 2,480,360.37 |
| | Monument USMC 97 | 360,843.41 | 2,483,519.98 |
| | Monument USMC 98 | 361,091.95 | 2,482,926.11 |
| | Monument USMC 99 | 361,790.93 | 2,483,215.78 |
| | Monument USMC 100 | 362,313.70 | 2,483,362.23 |
| | Monument USMC 89 | 360,678.95 | 2,480,316.76 |
| | Monument USMC 90 | 360,774.32 | 2,481,091.73 |
| | Picture Point, centerline of intersection Chowan & Neuse Rds., Mumford Pt. Camp No. 1 | 360,714 | 2,478,858 |
| 100 | 200,000 Gal. Water Tank, LCH | 360,808.98 | 2,499,051.52 |
| | Monument Boundary of REA | 361,559.57 | 2,495,186.39 |
| | Monument | 361,841.04 | 2,497,145.31 |
| | Monument | 362,565.99 | 2,496,226.97 |
| | Monument | 361,781.50 | 2,495,550.34 |
| | Monument | 361,788.94 | 2,495,613.54 |
| | Monument | 360,106.67 | 2,497,744.54 |
| | Monument | 360,601.16 | 2,498,134.90 |
| | Monument | 362,000.86 | 2,495,780.84 |
| | Monument | 360,267.16 | 2,499,138.95 |
| | Monument | 360,090.86 | 2,499,362.84 |
| | Picture Point, center line of intersection N.C. Hwy.# 24 and westmost entrance rd. to Midway Park, approx. 1600' s.e. of eastern bank Northeast Creek | 361,196 | 2,495,966 |
| 117 | Monument USMC 60 | 358,005.45 | 2,457,912.23 |
| | Monument USMC 61 | 358,041.63 | 2,459,411.80 |
| | Corps of Engineers Monument 10 | 352,840.25 | 2,456,205.65 |
| | Picture Point, east edge of U.S. Hwy #17 at centerline of junction with Lancaster rd.-Tank Battalion Tent Camp | 356,858 | 2,457,278 |
| 118 | Moss U.S.E. 1933 | 357,634.13 | 2,472,151.40 |
| | Montford U.S.E. 1932 | 355,680.83 | 2,475,903.36 |
| | Solomons 1942 | 355,705.45 | 2,475,915.62 |
| | Southwest 1941 | 352,728.76 | 2,472,322.02 |
| | Tulagi USMC 48 1942 | 352,709.68 | 2,472,298.87 |
| | Center Line "A" St. & Curtis Road | 358,147.39 | 2,463,569.98 |
| | Center Line "A" St. & 10th St. | 359,976.90 | 2,463,493.30 |

Quad.

118

119

120

| Quad. | Station | Coordinates North | Coordinates East |
|---|---|---|---|
| 118 | Center Line "F" St. & 11th St. | 359,370.27 | 2,465,210.22 |
| | 100,000 gal. elevated Water Tank (Tent Camp No. 2) | 359,672.05 | 2,465,532.87 |
| | Monument USMC 91 | 358,591.70 | 2,476,754.66 |
| | Monument USMC 92 | 359,298.68 | 2,477,521.27 |
| | Picture Point, centerline of intersection Church & 11th St., Tent Camp No. 2. | 359,284 | 2,463,177 |
| | Picture Point, centerline of intersection "C" & 11th Sts., Tent Camp # 2 | 359,328 | 2,464,221 |
| | Picture Point, centerline of intersection Flounder & Salmon Rds. Peterfield Point Tent Camp | 357,371 | 2,471,305 |
| | Picture Point, centerline of intersection Flounder & Curtis Rds, Peterfield Point Tent Camp | 357,225 | 2,470,146 |
| | Picture Point, centerline of intersection Curtis Rd. & Taxiway, Landing Field for Paratroops | 352,913 | 2,470,217 |
| 119 | Monument | 359,915.88 | 2,479,585.44 |
| | Monument | 359,910.84 | 2,478,827.26 |
| | Camp 1941 | 359,943.04 | 2,483,195.66 |
| | Camp 1941 Ref. Monument | 359,931.14 | 2,483,260.58 |
| | Swamp 1933 | 356,978.40 | 2,481,530.58 |
| | Paradise U.S.E. 1933 | 353,098.38 | 2,482,230.36 |
| | Paradise Ecc. 1933 | 353,245.57 | 2,482,316.57 |
| | Monument USMC 65 | 355,999.56 | 2,481,326.95 |
| | Monument USMC 66 | 355,531.92 | 2,481,353.03 |
| | Monument USMC 69 | 357,544.80 | 2,483,450.60 |
| | Monument USMC 70 | 356,984.37 | 2,483,870.02 |
| | Monument USMC 71 | 354,424.06 | 2,485,786.00 |
| | Monument USMC 72 | 353,307.11 | 2,486,621.84 |
| | Monument | 352,541.81 | 2,484,252.49 |
| | Monument | 352,680.70 | 2,483,566.41 |
| | Monument USMC 73 | 351,461.56 | 2,488,002.73 |
| | Monument USMC 74 | 351,141.29 | 2,488,242.37 |
| | Picture Point, centerline of intersection River Drive & Charles St., B.O.Q. Area | 352,523 | 2,486,974 |
| 120 | Truesdale 1932 | 356,181.01 | 2,499,102.26 |
| | Truesdale Reference Monument # 3 | 356,657.76 | 2,498,809.77 |
| | Monument USMC 38 | 356,179.82 | 2,501,617.09 |
| | Monument USMC 39 | 355,972.85 | 2,503,238.16 |
| | Monument USMC 93 | 356,365.48 | 2,497,986.14 |
| | Monument USMC 94 | 356,087.54 | 2,497,264.72 |
| | Monument USMC 95 | 355,992.53 | 2,496,470.51 |
| | Monument USMC 96 | 356,055.60 | 2,495,314.05 |
| | Monument USMC 82 | 357,977.03 | 2,500,369.62 |
| | Monument USMC 83 | 358,878.58 | 2,499,227.59 |
| | Monument | 356,214.02 | 2,502,282.41 |
| | Monument | 359,679.13 | 2,498,286.12 |

| Quad | Station | Coordinates North | East |
|---|---|---|---|
| 120 | Picture Point, at Piney Green, center line of intersection N. C. Hwy. # 24 and earth road to Snead's Ferry | 355,786 | 2,504,639 |
| 121 | Monument USMC 42 | 353,878.45 | 2,512,119.67 |
| | Monument USMC 43 | 353,162.44 | 2,514,629.84 |
| | Monument USMC 49 | 353,919.95 | 2,522,661.30 |
| | Picture Point, centerline N.C. Hwy. 24 (Approx. Sta. 509 + 36) at box culvert draining upper reaches of Wallace Creek | 352,931 | 2,518,598 |
| 122 | Monument USMC 50 (Forest Fire Observation Tower) | 354,697.49 | 2,524,603.62 |
| | Monument USMC 51 | 354,294.79 | 2,528,713.43 |
| | Monument USMC 52 | 353,372.29 | 2,530,892.98 |
| | Monument, 30th. Corps of Engrs.. N. C. 1-TT-1/22 | 353,404.98 | 2,531,419.21 |
| | Picture Point, center line of intersection earth roads 2760' ± N. W. of Starling, between Starling and N. C. Hwy. # 24. | 354,344 | 2,528,866 |
| 137 | Corps of Engineers Monument # 9 | 349,771.46 | 2,457,011.96 |
| 138 | Jarman 1933 | 348,526.23 | 2,472,581.67 |
| | Stump 1933 | 344,437.47 | 2,472,656.46 |
| | Bog 1933 | 344,716.64 | 2,470,964.43 |
| 139 | Monument | 340,988.34 | 2,492,923.60 |
| | Monument | 340,980.20 | 2,490,167.31 |
| | Little Ragged 1941 | 342,082.92 | 2,480,909.31 |
| | High 1932 | 349,323.47 | 2,488,657.35 |
| | Hadnot 1941 | 340,331.27 | 2,487,613.08 |
| | Monument USMC 67 | 345,087.36 | 2,489,689.07 |
| | Monument USMC 68 | 344,648.06 | 2,490,020.03 |
| | Monument | 340,987.33 | 2,492,529.05 |
| | Monument | 340,986.74 | 2,492,297.47 |
| | Monument | 340,985.73 | 2,491,967.13 |
| | Monument | 341,182.45 | 2,492,141.79 |
| | Monument | 340,582.48 | 2,491,966.86 |
| | Monument | 340,530.92 | 2,492,630.22 |
| | Monument | 340,975.34 | 2,488,376.56 |
| | Monument | 340,782.10 | 2,488,141.53 |
| | Hadnot 1941 Ref. Monument # 2 | 340,690.92 | 2,487,738.02 |
| | Hadnot 1941 Ref. Monument # 1 | 340,381.00 | 2,488,009.93 |
| | Monument | 340,331.27 | 2,487,613.08 |
| | Monument | 345,616.95 | 2,492,375.86 |
| | Monument | 344,856.38 | 2,492,944.94 |
| | Picture Point, center line of intersection River Road and Cutler Avenue, Naval Hospital | 341,550 | 2,490,790 |

| Quad | Station | Coordinates North | Coordinates East |
|---|---|---|---|
| 140 | Monument | 342,486.57 | 2,504,081.11 |
| | Parachute Tower 1 | 342,351.69 | 2,500,127.88 |
| | Parachute Tower 2 | 342,140.06 | 2,499,151.13 |
| | Parachute Tower 3 | 343,549.50 | 2,497,137.24 |
| | Monument | 340,775.59 | 2,494,699.41 |
| | Monument | 342,825.74 | 2,500,989.26 |
| | Monument | 341,686.04 | 2,499,928.60 |
| | Monument | 340,369.41 | 2,500,095.51 |
| | Monument | 340,486.30 | 2,501,531.31 |
| | Monument | 340,991.23 | 2,494,051.56 |
| | Monument | 340,989.95 | 2,493,552.87 |
| | Monument | 341,149.72 | 2,493,711.83 |
| | Monument | 341,670.71 | 2,494,230.17 |
| | Monument | 340,996.07 | 2,495,948.63 |
| | Monument | 340,994.73 | 2,495,423.64 |
| | Monument | 340,993.57 | 2,494,968.30 |
| | Monument | 340,992.47 | 2,494,541.20 |
| | Monument | 342,198.49 | 2,499,764.82 |
| | Monument | 342,552.46 | 2,500,062.72 |
| | Monument | 340,426.74 | 2,494,953.89 |
| | Monument | 340,071.08 | 2,495,213.33 |
| | Monument | 342,309.18 | 2,494,228.54 |
| | Monument | 342,510.69 | 2,494,228.03 |
| | Monument | 343,023.40 | 2,494,226.72 |
| | Monument | 342,881.85 | 2,497,777.11 |
| | Picture Point, center line of intersection Service Road & "A" St. Regimental Area No. 1. | 340,577 | 2,495,204 |
| | Picture Point, center line of intersection W. Lane Holcomb Blvd. and Approach Rd. to Parachute Training Towers | 343,062 | 2,501,830 |
| | Picture Point, center line of intersection Ash St. and West Road, Supply and Industrial Area | 340,162 | 2,500,834 |
| 142 | Monument USMC 53 | 348,514.29 | 2,529,667.89 |
| | Monument USMC 54 | 346,988.60 | 2,529,094.34 |
| | Monument USMC 55 | 342,194.56 | 2,529,092.37 |
| | Picture Point center line of intersection Starling-Duck Creek Rd. and earth road to Piney Green, approx. 2.5 miles south of Starling | 340,025 | 2,529,554 |
| 157 | Intersection Verona Loop Rd. U.S. Hwy.17 | 338,666.23 | 2,459,643.52 |
| | Monument USMC 32 | 339,032.72 | 2,459,841.23 |
| | Monument USMC 33 | 338,885.94 | 2,460,213.68 |
| | Monument USMC 34 | 337,415.50 | 2,459,634.19 |
| | Monument USMC 35 | 337,354.44 | 2,459,486.46 |
| | Monument USMC 36 | 337,328.28 | 2,459,341.78 |
| | Verona Ref. Monument # 1 | 332,497.53 | 2,458,346.97 |
| | Monument USMC 37 | 337,335.68 | 2,459,265.09 |
| | Picture Point, center line of intersection U.S. Hwy. # 17 & Verona Road | 338,666 | 2,459,644 |

Quad

157

158

159

160

| Quad | Station | Coordinates North | East |
|---|---|---|---|
| 157 | Picture Point, Lat. 34° 40' 18".106 Long. 77° 28' 15."130 (30th. Engrs.) Picture Pt. # 1, + Sta. # 2. north edge of U. S. Hwy. # 17 in line with centerline of drive to east to home of M. Davis, approx. 0.2 miles north of Verona P. O. | 338,979 | 2,459,757 |
| | Picture Point Lat. 34°39' 18".604, Long. 77°28' 28".434 (30th. Engrs)Picture Point # 5, side shot. Junction pt. of path running N. & S, and two field edges. 1.0 mile south of Verona P.O. along U. S. Hwy.#17, 140' E. along drainage ditch, thence 150' south along path. | 332,971 | 2,458,799 |
| 158 | Monument USMC 44 | 336,968.08 | 2,470,208.30 |
| | Monument USMC 45 | 333,738.96 | 2,471,257.42 |
| | Picture Point, centerline of intersection Verona Road and 14' earth road to town point approx. 2.6 miles along Verona Road, east of intersection at U.S. Hwy. # 17 | 334,777 | 2,470,920 |
| | Picture Point, centerline of intersectiom Verona Rd. (approx. Sta. 66 + 00) and 8' wide track rd. leading southeast 1.25 miles N.E. of junction at U.S. Hwy. #17, 0.1 mile N. of Verona P.O. | 339,271 | 2,466,080 |
| | Picture Point, Lat. 34° 39' 13."647, Long. 77° 27' 14".677, (30th. Engrs) P.Pt. No. 3, Sta. #A-14 from Verona P.O. proceed south 2.3 miles via U.S. Hwy.#17 to junction with sand rd. leading East, thence E. via sand rd.(now Grey Pt. Rd.) 1.0 mile to int. with sand road running N.E. & S.W., thence N.E. 1.6 miles via, taking main route and left road of all sharply inclined forks to a driveway leading west on W. edge of rd. and in centerline of driveway. | 332,542 | 2,464,906 |
| 159 | Town Point, Ecc. 1933 | 336,527.37 | 2,486,660.05 |
| | Town Point USE 1933 | 336,549.66 | 2,486,768.37 |
| | Monument Hospital Boundary | 339,893.05 | 2,491,765.84 |
| | Picture Point, centerline of intersection "A" & River Road, Regimental Area No. 1. | 339,702 | 2,492,710 |
| 160 | Bluff 1941 | 335,040.29 | 2,494,350.11 |
| | Ref. Monument | 335,587.20 | 2,494,372.63 |
| | Ref. Monument | 335,336.49 | 2,494,555.48 |

| Quad. | Station | Coordinates North | East |
|---|---|---|---|
| 160 | Monument near Bldg. 213 | 337,461.81 | 2,494,872.79 |
| | Monument near Bldg. 330 | 336,907.77 | 2,495,275.28 |
| | Monument near Bldg. 304 | 336,483.47 | 2,495,584.48 |
| | Monument near Bldg. 513 | 334,140.56 | 2,497,292.51 |
| | Monument N. East of Protestant Chapel | 336,486.61 | 2,497,828.07 |
| | Monument near Holcomb Blvd. | 337,623.57 | 2,497,606.18 |
| | Monument near Holcomb Blvd. | 337,991.40 | 2,498,110.91 |
| | Monument near Central Htg. Plant | 337,969.72 | 2,498,552.30 |
| | Monument South of Central Htg. Plant | 337,646.67 | 2,498,786.94 |
| | Monument Northeast of Holcomb Blvd. | 338,603.12 | 2,498,090.93 |
| | Monument Southeast of Holcomb Blvd. | 338,194.27 | 2,498,389.20 |
| | Monument near West Road | 338,535.21 | 2,498,856.58 |
| | Monument near Bldg. 319 | 335,917.32 | 2,495,997.22 |
| | Monument near Cedar and East Streets | 338,835.52 | 2,500,887.86 |
| | Monument Northeast of Ash Street | 339,771.52 | 2,501,942.37 |
| | Monument near Michael Road | 336,969.00 | 2,499,279.17 |
| | Monument Southeast of Michael Road | 336,569.27 | 2,499,569.31 |
| | Monument | 336,105.92 | 2,499,906.06 |
| | Monument near Center Road | 338,363.31 | 2,499,154.25 |
| | Monument near West and Elm Streets | 338,864.48 | 2,499,307.98 |
| | Monument near Dogwood & West Streets | 339,084.78 | 2,499,770.74 |
| | Monument near Dogwood & West Streets | 339,310.49 | 2,499,919.41 |
| | Monument near Dogwood & East Streets | 338,390.75 | 2,500,386.78 |
| | Monument near "O" Street | 334,473.87 | 2,499,296.26 |
| | Monument Southeast of "O" Street | 333,942.99 | 2,499,683.51 |
| | Monument near Service Road | 335,933.23 | 2,498,231.73 |
| | Monument near Service Road | 335,734.61 | 2,498,376.61 |
| | Monument near Service Road | 335,495.24 | 2,498,551.22 |
| | Monument near Service Road | 335,206.23 | 2,498,762.04 |
| | Monument near Bldg. 121 | 339,228.69 | 2,493,580.86 |
| | Monument near Bldg. 123 | 338,901.70 | 2,493,819.69 |
| | Monument near River Road | 338,530.81 | 2,494,090.70 |
| | Monument near Bldg. 229 | 338,139.13 | 2,494,376.75 |
| | Monument near Bldg. 1 | 337,645.68 | 2,496,982.59 |
| | Monument near No. 6 | 338,763.67 | 2,496,167.05 |
| | Monument near Bldg. 9 | 338,354.61 | 2,496,465.45 |
| | Monument near Bldg. 11 | 338,010.96 | 2,496,716.13 |
| | Monument | 339,929.56 | 2,497,129.08 |
| | Monument | 339,684.34 | 2,497,307.74 |
| | End of Outfall Sewer | 330,698.3 | 2,497,239.5 |
| | Point on Outfall Sewer at Shore | 331,910.6 | 2,498,240.0 |
| | Monument near 517 | 333,454.00 | 2,497,793.03 |
| | Brass Bolt, Primary Settling Tank | 332,272.00 | 2,498,585.00 |
| | Monument, Sewage Treatment Plant | 332,308.65 | 2,498,678.04 |
| | Monument, Sewage Treatment Plant | 332,162.05 | 2,498,305.87 |
| | Monument, Sewage Treatment Plant | 332,085.92 | 2,498,658.30 |
| | Monument near Bldg. 101 | 339,656.16 | 2,495,516.05 |
| | 300,000 Gal. Water Tank Area 1 | 339,791.76 | 2,495,857.00 |
| | Picture Point, centerline of intersection West Road & Gum Street, Supply & Industrial Area | 338,290 | 2,498,725 |

Quad.

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| Quad. | Station | Coordinates North | Coordinates East |
|---|---|---|---|
| 162 | Monument USMC 57 | 334,573.88 | 2,532,187.11 |
| | Monument USMC 58 | 334,267.34 | 2,532,403.51 |
| | Monument USMC 59 | 334,713.09 | 2,533,313.47 |
| | Monument USMC 56 | 338,837.43 | 2,529,889.56 |
| | Picture Point, centerline of Wood Bridge on old Starling-Duck Creek earth road at intersection with S. edge of Bear Creek approx. 700' west of new Starling-Duck Creek road. | 337,511 | 2,530,082 |
| | Picture Point, centerline of wood bridge on earth road leading N.E. from Y junction near intersection with new Starling-Duck Creek rd, at intersection with S.W. edge of Bear Creek, approx. 2500' E. of new Starling-Duck Creek Road. | 335,964 | 2,533,998 |
| 163 | Russell 1932 | 335,278.66 | 2,542,692.02 |
| | Russell Ref. Monument # 2 | 335,134.32 | 2,542,723.93 |
| | Russell Ref. Monument # 1 | 336,191.71 | 2,544,954.36 |
| | Picture Point, center line of intersection- T - junction of Sneads Ferry-Swansboro road and earth road to Starling's Store near triangulation station "Russell 1932". | 335,130 | 2,542,752 |
| 177 | Verona 1932 | 328,763.30 | 2,457,596.51 |
| | Center Line U.S. Hwy.#17 & Grey Pt. Rd. | 325,987.18 | 2,457,122.01 |
| | Verona Ref. Monument 2 | 328,889.80 | 2,457,684.34 |
| | Verona Ref. Monument 3 | 328,604.19 | 2,457,580.38 |
| | Picture Point, centerline of intersection U.S. Hwy.17 & Grey Pt. Rd., approx. 2.3 miles south of Verona P.O. | 325,987 | 2,457,122 |
| | Picture Point, Lat. $34^{\circ}$ 38' 09."060, Long. $77^{\circ}$ 28' 36".872(30th. Engrs.)- Picture Pt. # 1, Sta. # A-2 on south edge of sand road (now Grey Pt. road) in center of drainage ditch leading S.W. approx. 0.2 miles E. of junction at U.S. Hwy. #17, 2.3 miles south of Verona Road. | 325,909 | 2,458,134 |
| 178 | Camp 1932 | 320,294.87 | 2,472,002.26 |
| | Monument USMC 46 | 329,226.76 | 2,476,815.60 |
| | Monument USMC 47 | 326,998.16 | 2,476,585.81 |
| | Picture Point, centerline of intersection at Y-fork of earth roads near P.I. 240 + 59.25 on Grey Pt. Road | 326,995 | 2,476,731 |

Quad

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| Quad. | Station | Coordinates North | Coordinates East |
| --- | --- | --- | --- |
| 178 | Picture Point, center line of intersection Grey Point Road and 8' wide sand road leading S.W. at Grey Point Rd. Sta. 358 + 66 ± approx. 1.45 miles east of junction at U.S. Hwy. # 17, 2.3 miles south of Verona P.O. | 325,450 | 2,464,777 |
| 179 | Rhodes U.S.E. 193[illegible] | 327,529.66 | 2,490,108.86 |
| | Grey USE 1932 | 323,035.95 | 2,489,652.49 |
| 180 | French U.S.E. 1931 | 326,128.68 | 2,498,523.47 |
| | Fish U.S.E. 1932 | 320,523.30 | 2,493,335.10 |
| | Monument USMC 63 | 328,330.48 | 2,507,772.97 |
| | Sime 1941 | 328,778.03 | 2,499,295.86 |
| | Sime Ref. Monument | 328,864.53 | 2,499,358.32 |
| 181 | Monument USMC 62 | 328,572.38 | 2,508,210.56 |
| | Picture Point, center line of intersection Sneads Ferry Road & Hope Rd. Magazine Area | 329,140 | 2,509,725 |
| 182 | Monument USMC 77 | 320,362.92 | 2,529,211.03 |
| | Monument USMC 78 | 320,976.60 | 2,530,272.80 |
| | Monument USMC 79 | 325,770.32 | 2,531,996.28 |
| 197 | Monument USMC 1 | 319,878.08 | 2,456,100.07 |
| | Monument USMC 2 | 318,013.73 | 2,456,068.46 |
| | Forest Fire Observation Tower | 316,883.71 | 2,456,269.92 |
| | Picture Point, center of N. C. State Forest Fire Obsv. Tower on U. S. Hwy. # 17, approx. 4.1 miles south of Verona P. O. | 316,884 | 2,456,270 |
| | Picture Point, Lat. 34°36' 51."570 Long. 77° 29' 04."460 (30th. Engrs). Picture Pt.# 2, Sta. # 4. West edge of U. S. Hwy.#17 & centerline of small sand road leading west 5.8 miles N. of Folkstone P. O. | | |
| | Picture Point, Lat. 34°36' 46."843, Long. 77° 28' 21" 028 (30th. Engrs.) Picture Pt. # 4, Sta. # C-31, proceed N. 1.7 miles via U.S. Hwy.#17 from Dixon school to jct. with sand rd. crossing to W.-S.W. and to S.E., thence S.E. 0.3 miles via sand road to junction with sand road leading to N.E. thence N.E. 0.2 miles via sand road to jct. with track road leading to S.E., thence S.E. 0.2 miles via track road to a faint road leading to S. on south edge of track road & in center of faint rd. to S. | 317,620 | 2,459,593 |

| Quad. | Station | Coordinates North | East |
|---|---|---|---|
| 197 | Picture Point, Lat. 34°36' 15".858 Long. 77° 27' 49."325 (30th. Engrs.) P.Pt. # 3, Sta. # C-15 from Dixon School proceed N. 1.7 miles via U.S. Hwy. # 17 to int. with sand road crossing to W.-S.W. and to S.E., thence S.E. 1.6 miles via sand road taking main route to a fork in roads 35' ± E. of fork, on N. edge of right forking rd. & centerline of faint trail to South. | 314,526 | 2,462,288 |
| 198 | Gin Ecc. 1932 | 312,335.95 | 2,469,908.26 |
| | Gin USE 1932 | 312,354.25 | 2,469,982.58 |
| | Picture Point, centerline of intersection Range & Powder Roads, Rifle Range Area | 310,706 | 2,466,716 |
| 199 | Hines 1932 | 317,702.75 | 2,483,499.72 |
| | Gillette USE 1932 | 313,989.64 | 2,483,929.11 |
| | Hines Ref. Mon. # 2 | 317,875.83 | 2,483,475.26 |
| | Water 1932 | 311,429.88 | 2,480,330.09 |
| | Monument USMC 87 | 310,979.61 | 2,489,770.12 |
| | Monument USMC 88 | 310,769.47 | 2,487,225.00 |
| | Picture Point, center line of intersection Sneads Ferry & Courthouse Roads, Amphibian Base | 310,899 | 2,488,796 |
| 200 | Monument USMC 80 | 314,452.72 | 2,496,497.32 |
| | Monument USMC 81 | 313,633.20 | 2,500,173.56 |
| 201 | Monument USMC 64 | 314,429.58 | 2,515,482.07 |
| | Monument USMC 75 | 311,741.16 | 2,517,199.87 |
| | Picture Point, centerline Sneads Ferry Road at intersection with tangent of Starling-Duck Creek Road produced at jct. | 312,163 | 2,516,853 |
| | Picture Point, Lat. 34° 35' 26".560, Long. 77° 16' 56" 245 (30th. Engrs.) P. Pt. # 2, Sta. # 6 at point of Northeast angle formed by junction of Swansboro-Sneads Ferry & Piney Green-Hurst Beach roads, approx. 9.5 miles south of Piney Green. (Military N. 1,291,874.5 yds. E. 570,484.4 yds.) | 310,441 | 2,516,959 |
| | Picture Point, Lat. 34°36' 20."997, Long. 77° 16' 03."462 (30th. Engrs.) P. Pt. # 3, Sta. # 14. Proceed S. along Starling-Bear Crk. road 4.15 miles from Starling to jct. with Swansboro-Sneads Ferry Road, thence S.W. along Swansboro-Sneads Ferry Road 4.8 miles to jct. with sand rd. to North, about 20' N.W. of | | |

Quad.

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218

| Quad. | Station | Coordinates North | Coordinates East |
|---|---|---|---|
| 201 | centerline Swansboro-Sneads Ferry Rd., 8' E. of centerline of sand rd. approx. 8.95 miles S. of Starling. (Military N. 1,293,648.2 Yds, E. 572,031.8 yds.) | 316,018 | 2,521,275 |
| 202 | Free 1914 | 313,517.45 | 2,526,585.19 |
| | Monument #18, Corps of Engrs. Sta.#18 | 317,038.92 | 2,524,267.37 |
| | Monument USMC 76 | 319,400.84 | 2,527,868.57 |
| | Monument USMC 118 | 317,999.68 | 2,528,093.95 |
| | Monument USMC 119 | 318,724.70 | 2,527,873.59 |
| | Monument USMC 120 | 318,474.44 | 2,529,968.89 |
| 217 | Monument USMC 3 | 308,905.46 | 2,457,757.69 |
| | Monument USMC 4 | 308,576.63 | 2,460,508.33 |
| | Picture Point, centerline of intersection U.S. Hwy. 17 & Dixon-Sneads Ferry Road. | 308,820 | 2,457,661 |
| 218 | Stone Ecc. 1932 | 303,869.43 | 2,475,453.89 |
| | Stone USE 1932 | 303,672.55 | 2,475,724.97 |
| | Monument USMC 5 | 306,668.08 | 2,463,316.69 |
| | Monument USMC 6 | 305,457.30 | 2,463,739.88 |
| | Monument USMC 7 | 304,370.43 | 2,464,422.51 |
| | Monument USMC 8 | 303,522.88 | 2,464,686.30 |
| | Monument USMC 9 | 302,075.93 | 2,465,164.46 |
| | Monument USMC 10 | 301,201.02 | 2,465,953.25 |
| | Monument USMC 11 | 300,483.38 | 2,466,359.86 |
| | Monument USMC 14 | 300,368.95 | 2,467,409.10 |
| | Monument USMC 15 | 302,202.51 | 2,468,882.70 |
| | Monument USMC 16 | 302,408.84 | 2,469,161.29 |
| | Monument USMC 17 | 303,329.37 | 2,470,185.00 |
| | Monument USMC 18 | 303,349.44 | 2,470,695.85 |
| | Monument USMC 19 | 303,390.42 | 2,471,581.83 |
| | Monument USMC 20 | 303,456.00 | 2,472,975.96 |
| | Monument USMC 21 | 303,496.21 | 2,473,761.70 |
| | Monument USMC 22 | 302,730.82 | 2,474,527.19 |
| | Monument USMC 23 | 303,227.96 | 2,474,988.15 |
| | Monument USMC 24 | 301,402.28 | 2,467,204.87 |
| | Monument USMC 25 | 302,082.58 | 2,467,738.20 |
| | Picture Point, centerline of intersection, Dixon-Sneads Ferry rd. & approach road to Rifle Range | 304,394 | 2,464,357 |
| | Picture Point, angle point of Power Pole Line 4000' N.W. of mouth of Everetts Crk. | 303,496 | 2,473,762 |
| | Picture Point, Lat. 34° 34' 42".558, Long. 77° 27' 32".815 (30th. Engrs.) | | |
| | P. Pt. # 1, Sta. # A-7 from Dixon School proceed E. 1.6 miles via sand rd. to jct. with sand rd. to E. on E. edge of sand rd. running N. & S. and on centerline of rd. to East. | 305,117 | 2,463,815 |

| Quad. | |
|---|---|
| 219 | Covil |
| | Ferry |
| | Ferry |
| | Poverty |
| | Court |
| | Marines |
| | Monument |
| | Monument |
| | Forest |
| | 100,000 |
| | Ball |
| | Buna |
| | Picture |
| | tion |
| | Balloon |
| 220 | Picture |
| | section |
| 221 | Duck |
| | Picture |
| | section |
| | to |
| | Picture |
| | 77° |
| | Sta. |
| | along |
| | to |
| | thence |
| | 0.50 |
| | roads |
| | center |
| | N. of |
| | (Milit |
| | yds.) |
| 238 | Monum |
| | Monum |
| 239 | Hall |
| 240 | Hatch |
| | Cedar |
| | Crag |
| 241 | Passt |
| | Vim |
| | Sea |
| 258 | Grant |

| Quad. | Station | Coordinates North | Coordinates East |
|---|---|---|---|
| 219 | Covil 1932 | 307,599.58 | 2,480,924.35 |
| | Ferry U.S.E. 1932 | 305,143.33 | 2,482,580.76 |
| | Ferry Ecc. 1932 | 305,110.21 | 2,482,583.89 |
| | Poverty 1932 | 301,854.98 | 2,486,235.71 |
| | Court 1932 | 305,379.23 | 2,487,410.02 |
| | Marines 1941 | 305,267.91 | 2,491,782.86 |
| | Monument USMC 85 | 307,936.37 | 2,491,112.85 |
| | Monument USMC 86 | 308,307.99 | 2,491,338.95 |
| | Forest Fire Observation Tower # 2 | 307,619.54 | 2,481,774.23 |
| | 100,000 Gal. Water Tank, Barrage Balloon Battalion | 306,221.00 | 2,492,388.00 |
| | Buna 1942 | 301,836.01 | 2,486,229.39 |
| | Picture Point, centerline of intersection Marines Rd. & Clinton St., Barrage Balloon Battalion Area | 306,151 | 2,492,189 |
| 220 | Picture Point, centerline of intersection Sneads Ferry Road & Marines Rd. | 309,017 | 2,493,551 |
| 221 | Duck Creek 1932 | 307,798.89 | 2,512,004.00 |
| | Picture Point, centerline of intersection, Sneads Ferry Rd. & Access Rd. to Mock-up. | 307,767 | 2,514,892 |
| | Picture Point, Lat. 34°35' 05."607, Long. 77° 17' 18".012 (30th. Engrs.) P. Pt. # 1 Sta. # 3. Proceed south from Piney Green along Piney Green-Hurst Beach Rd. 9.5 mi. to jct. with Swansboro-Sneads Ferry Rd. thence S. along Swansboro-Sneads Ferry Rd. 0.50 miles to triangle formed by two sand roads leading to West. Point is 12' west of centerline Swansboro-Sneads Ferry Rd. & 5' N. of centerline of northermost sand road. (Military N. 1,291,193.5 yds. E. 569,848.2 yds.) | 308,290 | 2,515,175 |
| 238 | Monument USMC 12 | 299,241.58 | 2,466,601.64 |
| | Monument USMC 13 | 299,835.48 | 2,467,077.77 |
| 239 | Hall U.S.E. 1932 | 299,367.43 | 2,489,590.84 |
| 240 | Hatch U.S.E. 1932 | 295,926.51 | 2,493,249.72 |
| | Cedar Point 1914 | 296,011.58 | 2,500,477.32 |
| | Crag 1914 | 296,420.00 | 2,506,327.54 |
| 241 | Passet 1932 | 293,173.64 | 2,509,046.21 |
| | Vim 1932 | 295,635.24 | 2,511,600.67 |
| | Sea 1914 | 297,114.52 | 2,513,782.46 |
| 258 | Grant 1932 | 287,730.01 | 2,477,818.91 |

Quad.

277 Pictu
Long.
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278 Hobb

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| Quad. | Station | Coordinates North | East |
|---|---|---|---|
| 277 | Picture Point, Lat. 34° 29' 13".531 Long. 77° 28' 36".195 (30th. Engrs.) P. Pt. # 5, Sta. # 16, at Thomas Landing on E. side of road, 50' N.E. from corner of house. | 271,782 | 2,459,027 |
| 278 | Hobbs | 274,158.80 | 2,464,925.34 |

Total Stations - 360

In addition to the above listed stations, Geographic Positions of the following Horizontal Control along the Intracoastal Waterway have been filed in the Public Works Office. Plane coordinates of these stations, on the North Carolina State Grid System, are not available at this time.

| | | |
|---|---|---|
| Still 1914 | High 1914 | Goose Bay 1914 |
| Pig 1914 | Henderson 1914 | Crab 1914 |
| Brown 1914 | Tie 1914 | Hobbs 1914 |
| Eagle 1914 | Brier 1914 | Roger 1914 |
| Cedar 1914 | Shell 1914 | Wright's Island (USE 1914) |
| River 1914 | Gap 1914 | Swan Point Z, 1888 |
| Hurst 1914 | Pavilion 1914 | Lighter 1855 |
| Point 1914 | Tile 1914 | Smith's House, Cupola 1914 |
| Windy 1914 | Horsehead 1855 | Beacon No. 5, 1933 |
| Week 1914 | Gilletts Creek 1855 | Beacon No. 7, 1933 |
| Sandy 1914 | Northeast Base 1914 | 3-3-151 (USE) 1933 |
| Pine 1914 | Southwest Base 1914 | 3-3-216+ (USE) 1933 |
| Low 1914 | Fullard 1914 | 3-3-182 (USE) 1933 |
| Pass 1914 | Wreck 1914 | 3-3-247 + (USE) 1933 |
| Baker 1914 | Grant 1914 | 3-(3-4) (USE) 1933 |
| Swamp 1914 | Log 1914 | 3-4-8 + (USE) 1933 |
| Snag 1914 | Grove 1914 | Beacon No. 13, 1933 |
| Cross 1914 | Mush 1914 | |

O-10.

Quadrangl

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[illegible]

O-10. Permanent Bench Marks

| Quadrangle | Description | Elevation |
|---|---|---|
| 40 | About 1/4 mile northeast along the A.C.L. RR. from Kellum, Onslow Co., at the highway bridge over N. E. Creek, in the top of the E. wing wall of the N. abutment, and about 2' lower than the highway. A standard disk, stamped "E 27 1932". | 32.264 |
| 79 | About 2 miles northeast along the A.C.L. RR. from the station at Jacksonville, Onslow Co., about 265 yards N. of milepost W 51, W. of the track, at a box culvert under U. S. Highway 17, and in the top of the south end of the east head wall. A standard disk, stamped "K 27 1932". | 26.473 |
| | About 4.2 miles northeast along the A.C.L. RR. from the station at Jacksonville, Onslow Co., about 0.3 mile northeast of milepost W 53, about 300 yds. N. of the crossing of the Swansboro Rd., about 55' W. of the west rail, and 24' E. of the center line of U. S. Highway #17. A standard disk, stamped "J 27 1932" and set in the top of a concrete post. | 44.393 |
| 98 | Cross mark on top of S. concrete walk on center line of middle walk, Settling Tank #1, Tent Camp Sewage Treatment Plant. 430' S. of Brinson Crk. | 5.03 |
| | About 1.2 miles S. along the A.C.L. RR. from the station at Jacksonville, Onslow Co., about 275' south of the center of a RR. trestle, about 33 yards northwest of milepost W 48, 41.5' W. of the rail, at the center of a 1-foot triangular blaze on the E. side of 34-inch pine tree, and about 4' higher than the ground. A standard disk, stamped "W 147 1935" and set vertically. | 8.317 |
| | Monument - N. 362,341.58; E. 2,466,827.20. | 12.07 |
| | Spike on 20" gum tree 50' N. of Tent Camp Outfall Sewer at station 15+96. | 13.02 |
| | At Jacksonville, Onslow Co., at the Northwest corner of Main St. and Mills Ave., at the A.C.L. RR. station 94' W. of the west rail, and 34' N. of the center line of Mills Ave. A standard disk stamped "L 27 1932" and set in the top of a concrete post. | 13.884 |
| | At Jacksonville, Onslow Co., E. of the A.C.L. RR. track, at the city water tank, and in the top of the footing of the southwest leg. A standard disk, stamped "M 27 1932" top of east rail opposite A.C.L. RR. milepost W 49 (12.4') | 14.970 |

Quadrangle

98

Spike
Manhol

Tent
betw

Tent
betw

On
167'

On
167'

Spike
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E.

| Quadrangle | Description | Elevation |
|---|---|---|
| 98 | Spike on root of 24" oak 95' southwest of Sewer Manhole #7, Tent Camp. | 16.67 |
| | Tent Camp #2 - Middle porch floor N. end Mess Hall between C & D Sts. and Ninth & Tenth Sts. | 17.29 |
| | Tent Camp #2 - Middle porch floor S. end Mess Hall between C & D Sts. and Ninth & Tenth Sts. | 17.33 |
| | On south edge of concrete porch floor, Mess Hall 167' W. of C. St., 105' N. of 10th St. | 17.83 |
| | On north edge of concrete porch floor, Mess Hall 167' W. of C. St. 106' S. of 9th St. | 17.91 |
| | Spike on root of 12" pine 51' E. of D. St. and 54' S. of 6th St., Tent Camp. | 18.47 |
| | Mess Hall 330 Tent Camp #1 Porch floor center N. end. | 18.48 |
| | Mess Hall 330 Tent Camp #1 Porch floor center S. end. | 18.49 |
| | Spike on base of 18" persimmon tree 58' W. of E St. and 165' south of 2nd St., Tent Camp. | 18.73 |
| | Monument - N. 361,903.75; E. 2,477,918.45 | 19.16 |
| | U. S. Engineers Monument No. 18, on U. S. route #17. Coordinates: N. 367,575; E. 2,464,076 | 19.6 |
| | Monument 40' N. of 2nd St. 30' W. of C. St. | 19.10 |
| | Mess Hall 321 Tent Camp #1 Porch floor at center N. end. | 19.37 |
| | Mess Hall 321 Tent Camp #1 Porch floor at center S. end. | 19.38 |
| | Monument 30' W. of C. St. 41' S. of 1st St. Tent Camp | 19.72 |
| | Spike in base of 20" chinaberry tree 93' N. of 1st St. between A and B Sts., Tent Camp. | 19.75 |
| | U. S. Engineers Monument #19, U. S. route #17. Coordinates: N. 368,322; E. 2,465,420. | 19.8 |
| | Monument Tent Camp - Coordinates: N. 363,617.88; E. 2,463,134.07. | 19.81 |

Quadrangle

98

| Quadrangle | Description | Elevation |
|---|---|---|
| 98 | Top bolt northmost pier Elevated Water Tank, Tent Camp #1 | 19.87 |
| | Monument near 1st and Church Sts. Coordinates: N. 364,417.17; E. 2,463,100.46 | 19.97 |
| | Spike in base of 6" pine. 79' W. of A St., 85' S. of 9th St. | 20.85 |
| | About 0.9 mile W. along U. S. Highway #17 from Jacksonville, Onslow Co., at the junction of U. S. Highway 258, about 8 yds. S. of the center line of U. S. Highway 258, about 6 yds. N. of the center line of U. S. Highway #17, and about 1' higher than the highway, a standard disk, stamped "T 68 1934" and set in the top of a concrete post. | 20.341 |
| | North Meridain at Jacksonville, Onslow Co., at the northwest corner of the high school grounds, about 100' east of the A.C.L. RR. track, and 24' S. of the center line of a road leading to the school entrance. The top of a granite post, chiseled, "N.C.G.S.U.S. 1898". | 20.784 |
| | About 0.7 mile W. along U. S. Highway #17 from Jacksonville, Onslow Co., about 1,500' E. of the junction of U. S. Highway #258, opposite a dirt Rd. leading to a state prison camp, about 11 yds. N. of the center line of the highway, and about 1' higher than the highway. A standard disk, stamped "S 68 1934" and set in the top of a concrete post. | 20.902 |
| | Northeast corner, top of concrete slab, valve vault easterly water storage tank, Tent Camp #1 | 20.93 |
| | 3 nails in base of 8" red oak, 38' N. of center line 5th St., 38' E. of center line of A. St., Tent Camp No. 1 | 21.60 |
| | Southeast corner, top concrete slab, valve vault, westerly water storage tank, Tent Camp #1 | 21.92 |
| | Spike in base of oak tree 72' W. of A St., 20' S. of 8th St. | 22.48 |
| | Magnetic station, at Jacksonville, Onslow Co., about 150 yds. E. of the A.C.L. RR. track, about 125' S. of a flagpole in front of the high school and 67' W. of the southwest corner of the building. A standard magnetic-station disk, stamped "1931", and set in the top of a granite post. | 23.058 |

Quadrangle

99

100

| Quadrangle | Description | Elevation |
|---|---|---|
| 99 | Triangulation Station "Northeast 1933" - Coordinates: N. 360,462.81; E. 2,480,360.37 | 3.195 |
| | USMC Monument 89. Coordinates: N. 360,678.95; E. 2,480,316.76 | 8.305 |
| | USMC Monument 98. Coordinates: N. 361,091.95; E. 2,482,926.11 | 15.61 |
| | Spike in base of pine 45' W. of Marine Barracks Railroad, station 79+00 | 15.88 |
| | USMC Monument 90. Coordinates: N. 360,774.32; E. 2,481,091.73 | 20.105 |
| | USMC Monument 100. Coordinates: N. 362,313.70; E. 2,483,362.23 | 21.72 |
| | USMC Monument 97. Coordinates: N. 360,843.41; E. 2,483,519.98 | 22.65 |
| | USMC Monument 99. Coordinates: N. 361,790.93; E. 2,483,215.78 | 23.365 |
| | Spike in base of 14" pine, 56' W. of Marine Barracks Railroad, station 30+40 | 23.38 |
| | Spike in base of 12" gum 55' W. of Marine Barracks Railroad, station 101+00 | 25.12 |
| | Spike in base of 8" gum 140' E. of Marine Barracks Railroad, station 120+00 | 25.84 |
| | Spike in base of 12" pine 60' W. of Marine Barracks Railroad, station 50+00 | 26.19 |
| | Spike in base of 18" pine 50' W. of Marine Barracks Railroad, station 60+00 | 26.94 |
| | Spike in base of 12" pine 55' E. of Marine Barracks Railroad, station 150+00 | 27.56 |
| 100 | On southwest curb at northwest end of highway bridge, N. C. route #24, over Northeast Creek | 7.42 |
| | On southwest curb at southeast end of highway bridge, N. C. route #24, over Northeast Creek | 7.43 |
| | Northeast corner, top of concrete slab, Sewage Pumping Station #6, L.C.D.H. | 19.03 |
| | Monument - N. 361,841.04; E. 2,497,145.31 | 19.715 |
| | Monument - N. 362,565.99; E. 2,496,226.97 | 21.31 |

| Quadrangle |
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| 100 |
| 117 |
| 118 |

| Quadrangle | Description | Elevation |
|---|---|---|
| 100 | Monument - N. 361,781.50; E. 2,495,550.34 | 22.565 |
| | Monument - N. 361,788.94; E. 2,495,613.54 | 25.645 |
| | Spike in base of 24" pine near station 249+25 on Marine Barracks Railroad | 26.19 |
| | Monument - N. 360,106.67; E. 2,497,744.54 | 28.68 |
| | Monument - N. 360,601.16; E. 2,498,134.90 | 30.25 |
| | Northmost bolt on northeast pier, L.C.D.H. Water tank | 31.84 |
| | Monument - N. 362,000.86; E. 2,495,780.84 | 31.97 |
| | Monument - N. 360,267.16; E. 2,499.138.95 | 32.07 |
| | Monument - N. 360,090.86; E. 2,499,362.84 | 33.49 |
| | Spike in base of 24" pine 75' W. of Marine Barracks Railroad, station 179+00 | 33.74 |
| 117 | USMC Monument 61. Coordinates: N. 358,041.63; E. 2,459,411.80 | 27.05 |
| | USMC Monument 60. Coordinates: N. 358,005.45; E. 2,457,912.23 | 28.66 |
| | U. S. Engineers Monument No. 10, U. S. route #17. Coordinates: N. 352,840; E. 2,456,206 | 12.0 |
| 118 | Spike on 6" poplar about 225' E. of corner of Turtle and Trout Sts. Peterfield Point | 5.27 |
| | On southeast corner of concrete bulkhead, facing Morgan Bay at Airport | 6.00 |
| | Spike in root 7" oak about 90' W. of corner of Salmon and Turtle Roads, Peterfield Point | 8.54 |
| | About 400' due east of Operations Building at Airport, and about 25' N. of Manhole #373 on sewer line, spike on root of 10" pine | 9.135 |
| | About 15' E. of end of Parking space at Operations Building, Airport, spike in base of 12" gum | 9.74 |
| | Triangulation station, "Solomons 1942". Coordinates: N. 355,705.45: E. 2,475,915.62 | 11.89 |
| | Spike in base of 12" cedar 76' E. of D St. 60' S. of Manhole #295, Tent Camp #2 | 11.92 |

| Quadrangle | Description | Elevation |
|---|---|---|
| 118 | On front concrete porch landings at main floor level, Operations Building, Landing Field, center line of N. doorway | 12.60 |
| | On front concrete porch landings at main floor level, Operations Building, Landing Field, center line of S. doorway | 12.59 |
| | Nail in root of 12" pine, 50' W. of C St., 200' N. of 11th St., Tent Camp #2 | 16.68 |
| | USMC Monument 91. Coordinates: N. 358,591.70; E. 2,476,754.66 | 18.00 |
| | About 2.1 miles S. along the A.C.L. RR. from the station at Jacksonville, Onslow Co., about 2 poles N. of milepost W 47, at Phillips Crossing, about 55' south of the center line of the road, 28' E. of the east rail, and 4' N. of a pole. A standard disk stamped "N 27 1932", and set in the top of a concrete post | 19.006 |
| | Northmost anchor bolt water tank Tent Camp #1 | 19.87 |
| | On top of Northmost anchor bolt, northeast pier of 100,000 gal. water tank, Tent Camp #2 | 19.94 |
| | USMC Monument 92. Coordinates: N. 359,298.68; E. 2,477,521.27 | 20.92 |
| | About 3.2 miles south along the A.C.L. RR. from the station at Jacksonville, Onslow Co., about 260' N. of milepost W 46, 51' E. of the east rail, at the center of a 1-foot triangular blaze on the W. side of a 38-inch sweet gum tree, and about $3\frac{1}{2}$' higher than the ground; a standard disk, stamped "X 147 1935" and set vertically. Top of east rail opposite A.C.L. RR. milepost W. 46, 23.5' | 26.030 |
| 119 | Northeast corner, top of concrete stairway slab, Sewage Pumping Station #4 | 6.45 |
| | USMC Monument 69. Coordinates N. 357,544.80; E. 2,483,450.60 | 9.35 |
| | USMC Monument 70. Coordinates N. 356,984.37; E. 2,483,870.02 | 11.33 |
| | Concrete Monument. Coordinates: N. 352,541.81; E. 2,484,252.49 | 15.18 |
| | Concrete Monument. Coordinates: N. 352,680.70; E. 2,483,566.41 | 16.70 |

Quadrangle

119

120

| Quadrangle | Description | Elevation |
|---|---|---|
| 119 | Monument - Coordinates: N. 359,915.88; E. 2,479,585.44 | 17.19 |
| | Triangulation station, "Camp 1941" at Camp Knox in Northeast Creek | 17.21 |
| | Monument - Coordinates: N. 359,910.84; E. 2,478,827.26 | 18.48 |
| | USMC Monument 65. Coordinates: N. 355,999.56; E. 2,481,326.95 | 18.503 |
| | USMC Monument 66. Coordinates: N. 355,531.92; E. 2,481,353.03 | 20.723 |
| | Spike in 12" Pine about 150' W. of Howard St., behind and between Officers' Homes, 2402 and 2404 | 20.78 |
| | Northeast corner of concrete slab of porch, Officers' Quarters, northeast corner Wavell Rd. and River Drive | 21.45 |
| | Spike in 12" walnut tree in back of garage of Officers' Quarters at intersection of Montgomery St. and River Drive - house 2117 | 22.31 |
| | Spike on white oak tree, 15' E. of road near U. S. Coast and Geodetic Monument, Paradise Ecc. Ref. #1 | 23.26 |
| | Northeast corner on concrete slab of porch, Officers' Quarters, southeast corner Winston Rd. and River Drive | 23.97 |
| | USMC Monument 72. Coordinates: N. 353,307.11; E. 2,486,621.84 | 24.43 |
| | USMC Monument 71. Coordinates: N. 354,424.06; E. 2,485,786.10 | 25.747 |
| 120 | USMC Monument 95. Coordinates: N. 355,992.53; E. 2,496,470.51 | 25.84 |
| | Monument - N. 359,679.13; E. 2,498,286.12 | 30.07 |
| | USMC Monument 94. Coordinates: N. 356,087.54; E. 2,497,264.72 | 30.28 |
| | USMC Monument 96. Coordinates: N. 356,055.60; E. 2,495,314.05 | 30.50 |
| | USMC Monument 93. Coordinates: N. 356,365.48; E. 2,497,986.14 | 30.88 |
| | Truesdale Ref. Monument #3 | 32.05 |

Quadrangle

120

137

139

| Quadrangle | Description | Elevation |
|---|---|---|
| 120 | USMC Monument 83. Coordinates: N. 358,878.58; E. 2,499,227.59 | 32.375 |
| | Truesdale 1932 - N. 356,181.01; E. 2,499,102.26 | 32.55 |
| | Truesdale Ref. Monument #1 | 32.56 |
| | Truesdale Ref. Monument #2 | 32.73 |
| | Well No. 16, center line of doorway | 33.26 |
| | USMC Monument 82. Coordinates: N. 357,977.03; E. 2,500,369.62 | 35.315 |
| | Monument - N. 356,214.02; E. 2,502,282.41 | 41.76 |
| 137 | About 1.8 miles north along the A.C.L. RR. from the station at Verona, Onslow Co., about 250' S. of milepost W 45 x 51' W. of the W. rail, at the center of a 1-foot triangular blaze on the E. side of a 34-inch pine tree, and about 3' higher than the ground. A standard disk, stamped "Y 147 1935" and set vertically. Top of E. rail opposite A.C.L. RR. milepost W 45, 20.2'. Top of E. rail opposite A.C.L. RR. milepost W 44, 41.5'. About 0.5 mile north along the A.C.L. RR. from the station at Verona, at the crossing of U. S. Highway 17, top of E. rail at the center line of the highway, 48.3' | 24.649 |
| | U. S. Engineers Monument No. 9, U. S. route #17. Coordinates: N. 349,771; E. 2,457,012 | 25.5 |
| | About 0.5 mile north along the A.C.L. RR. from the station at Verona, Onslow Co., about 0.3 mile S. of milepost W 44, at the crossing of U. S. highway #17, about 30' S. of the center line of the highway, 29' E. of the east rail, and about 50' N. of a pole. A standard disk, stamped "P 27 1932" and set in the top of a concrete post. | 46.972 |
| 139 | Monument (concrete), Hadnot Point triangulation Sta. "Hadnot 1941" | 2.19 |
| | Nail in root of 20" live oak at end of Hadnot Point | 2.81 |
| | USMC Monument 73. Coordinates: N. 351,461.56; E. 2,488,002.73 | 4.565 |
| | Spike in root of 6" gum, 65' southwest, Manhole #158 | 5.42 |
| | Outside Northwest corner landing, Sewage Pumping Station No. 2 | 6.517 |

Quadrangle

139

140

| Quadrangle | Description | Elevation |
|---|---|---|
| 139 | N.E. corner of concrete slab, Sewage Pumping Station #3 | 6.97 |
| | USMC Monument 67. Coordinates: N. 345,087.36; E. 2,489,689.07 | 7.56 |
| | Monument Naval Hospital Area, 1000' Northeast of Hadnot Point | 8.51 |
| | Spike in base of 8" pine 85' northeast, Manhole #156 | 9.66 |
| | Monument - Naval Hospital Area, 22' northwest of Nurses' Quarters | 10.00 |
| | USMC Monument 68. Coordinates: N. 344,648.06; E. 2,490,020.03 | 10.88 |
| | Tree 30' northwest of Manhole #164 | 11.19 |
| | Spike in root of 30" twin oak, about 100' southwest of Manhole #168, South end of Officers' Quarters | 11.24 |
| | Monument - Naval Hospital Area, 190' northeast of River Road, 114' W. of Hospital Boundary line. Coordinates: N. 340,985.73; E. 2,491,967.13 | 11.40 |
| | Monument - Naval Hospital Area, 700' northeast of Hadnot Point | 11.89 |
| | Spike in root 12" maple tree, 30' southwest of Manhole # 160 | 12.232 |
| | On iron pin in concrete monument, triangulation station "High 1932" | 17.15 |
| | Monument - Coordinates: N. 340,986.74; E. 2,492,297.47 | 18.25 |
| | USMC Monument 74. Coordinates: N. 351,141.29; E. 2,488.242.37 | 18.55 |
| | Monument - Coordinates: N. 340,987.33; E. 2,492,529.05 | 19.11 |
| | Monument - Coordinates: N. 340,988.34; E. 2,492,923.60 | 22.04 |
| | Monument - Coordinates: N. 344,856.38; E. 2,492,944.94 | 23.883 |
| | Monument - Coordinates: N. 345,616.95; E. 2,492,375.86 | 24.61 |
| | Monument - 162' northwest of Cross St., 375' northeast of River Road | 25.26 |
| 140 | Monument - Coordinates: N. 343,023.40; E. 2,494,226.72 | 10.03 |

| Quadrangle | Description | Elevation |
|---|---|---|
| 140 | Monument - Coordinates: N. 342,309.18; E. 2,494,228.54 | 12.81 |
| | Monument - Coordinates: N. 342,510.69; E. 2,494,228.03 | 17.67 |
| | Monument - Coordinates: N. 340,989.95; E. 2,493,552.87 | 19.89 |
| | Monument - Coordinates: N. 340,992.47; E. 2,494,541.20 | 20.57 |
| | Monument - 10' northwest of building 100. Coordinates: N. 340,426.74; E. 2,494,953.89 | 21.17 |
| | Monument - Coordinates: N. 340,775.59; E. 2,494,699.41 | 21.29 |
| | Monument east of Radio Towers - Coordinates: N. 341,670.71; E. 2,494,230.17 | 22.69 |
| | Monument - Coordinates: N. 340,996.07; E. 2,495,948.63 | 22.79 |
| | Monument 90' E. of Manhole #478. Coordinates: N. 341,686.04; E. 2,499,928.60 | 22.81 |
| | Monument - Coordinates: N. 340,994.73; E. 2,495,423.64 | 23.24 |
| | Monument - Coordinates: N. 340,991.23; E. 2,494,051.56 | 23.41 |
| | Monument south of Radio Towers - Coordinates: N. 341,149.72; E. 2,493,711.83 | 24.27 |
| | Monument - 42' northeast of Service Road. Coordinates: N. 340,993.57; E. 2,494,968.30 | 24.33 |
| | Monument - Parachute Tower Area - Coordinates: N. 342,198.49; E. 2,499,764.82 | 25.00 |
| | Monument - near Sewage Pumping Station #9. Coordinates: N. 340,369.41; E. 2,500,095.51 | 25.67 |
| | East and West front door Mess Hall in Area #1, Building #106 center of doorways | 27.11 |
| | Top bolt northern most pier, elevated water tank - Supply and Industrial Area | 28.657 |
| | Monument - Parachute Tower Area. Coordinates: N. 342,552.5; E. 2,500,062.7 | 28.56 |
| | Monument - Supply and Industrial Area. Coordinates: N. 340,486.30; E. 2,501,531.31 | 29.39 |
| | Monument - Coordinates: N. 342,825.74; E. 2,500,989.26 | 35.13 |

| Quadrangle |
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| 157 |
| 158 |
| 159 |
| 160 |

| Quadrangle | Description | Elevation |
|---|---|---|
| 157 | 1,720' east of Verona on Loop Road - 100' right of center line - spike in root of 18" pine | 47.38 |
| | At Verona, Onslow Co., about 25 yards northwest of the northwest corner of the A.C.L. RR. station about 16 yds. E. of the southeast corner of the G. W. Humphrey store, about 45' northwest of a road crossing, and 19.4' west of the west rail. A standard disk, stamped "Z 147 1935" and set in the top of a concrete post | 48.924 |
| | About 1.1 miles S. along the A.C.L. RR. from the station at Verona, Onslow Co., directly E. of milepost W 42, southwest of the intersection of U. S. highway #17, and a T road leading E., 105' E. of the east rail, and 18' E. of the east edge of U. S. Highway #17. A standard ref. mark disk, stamped "Verona No. 1, 1932" and set in the top of a concrete post. | 70.827 |
| 158 | USMC Monument 45. Coordinates: N. 333,738.96; E. 2,471,257.42 | 67.50 |
| | USMC Monument 44. Coordinates: N. 336,968.08; E. 2,470,208.30 | 63.195 |
| | Spike in base of 18" pine, 90' left of station 136+54 on Verona - 11th Marines Loop Rd., and 40' S. of intersection of said road and Town Point Rd. | 65.82 |
| 159 | Monument - boundary of Naval Hospital, 60' N. of New River | 15.67 |
| 160 | Monument near building #518. Coordinates: N. 334,140.56; E. 2,497,292.51 | 7.22 |
| | Brass bolt in pump room floor, Sewage Pumping Station #1 | 8.66 |
| | Monument - Coordinates: N. 335,917.32; E. 2,495,997.22 | 10.03 |
| | Spike on 12" white oak tree on edge of bank 125' from triangulation station "Bluff 1941" | 13.88 |
| | Monument Triangulation Station "Bluff 1941" | 16.34 |
| | Monument east of building 304. Coordinates: N. 336,483.47; E. 2,495,584.48 | 17.44 |
| | Monument 53' northeast of building #517. Coordinates: N. 333,454.00; E. 2,497,793.03 | 18.44 |
| | Monument - Coordinates: N. 333,942.99; E. 2,499,683.51 | 18.50 |
| | Monument north of building #213. Coordinates: N. 337,461.81; E. 2,494,872.79 | 18.79 |

| Quadrangle | Description | Elevation |
|---|---|---|
| 160 | Monument east of building #123, Coordinates: N. 338,901.70; E. 2,493,819.69 | 19.38 |
| | Monument - Coordinates: N. 338,530.81; E. 2,494,090.70 | 19.72 |
| | Center of main doorways, Mess Hall #521 | 20.0 |
| | Center of main doorways, Mess Hall #408 | 20.60 |
| | Monument north of G St. Coordinates: N. 336,907.77; E. 2,495,275.28 | 21.16 |
| | Center of main doorways, Mess Hall #325, east doorway | 21.47 |
| | Monument - Coordinates: N. 332,308.65; E. 2,498,678.04 | 8.75 |
| | Center of main doorways, Mess Hall #325, West doorway | 21.47 |
| | Center of main doorways, Mess Hall #314 | 21.50 |
| | Center of main doorways, Mess Hall #424 | 21.50 |
| | Monument - Coordinates: N. 338,603.12; E. 2,498,090.93 | 21.64 |
| | Monument - Coordinates: N. 334,473.87; E. 2,499,296.26 | 21.74 |
| | Center of main doorways, Mess Hall #411 | 22.55 |
| | Monument west of cold storage building, Coordinates: N. 339,310.49; E. 2,499,919.41 | 22.57 |
| | Brass bolt in center of dividing wall, Settling Tanks Nos. 1 and 2, Sewage Treatment Plant near Cogdels Crk. | 22.89 |
| | Monument north of building #121, Coordinates: N. 339,228.69; E. 2,493,580.86 | 23.01 |
| | Monument - Coordinates: N. 339,929.56; E. 2,497,129.08 | 23.36 |
| | Monument west of building #6, Coordinates: N. 338,763.67; E. 2,496,167.05 | 23.82 |
| | Center of main doorways, Mess Hall #307 | 23.98 |
| | Center of main doorways, Mess Hall #508 | 24.22 |
| | Monument, 173' northwest of Laundry, Coordinates: N. 338,864.48; E. 2,499,307.98 | 24.37 |
| | Center of main doorways, Mess Hall #509 | 24.50 |
| | Center of main doorways, Mess Hall #226 | 24.53 |

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160

| Quadrangle | Description | Elevation |
|---|---|---|
| 160 | Monument - Coordinates: N. 339,984.34; E. 2,497,307.74 | 24.64 |
| | Top of pin in 8" concrete monument, Cedar St. and W. Road | 24.88 |
| | Center of East main doorway, Mess Hall #211 | 25.00 |
| | Center of West main doorway, Mess Hall #211 | 25.02 |
| | Monument 15' southwest of building #29, Coordinates: N. 338,139.13; E. 2,494,376.75 | 25.11 |
| | Monument - Coordinates: N. 332,085.92; E. 2,498,658.30 | 8.78 |
| | Monument 45' east of building #101, Coordinates: N. 339,656.16; E. 2,495,516.05 | 25.22 |
| | Center of main doorways, Mess Hall #122 | 25.58 |
| | Spike in root of 350-year-old oak tree at opposite end of open field and 3000' from station Bluff. | 25.78 |
| | Monument - Coordinates N. 338,535.21; E. 2,498,856.58 | 26.06 |
| | Monument - Coordinates N. 335,495.24; E. 2,498,551.22 | 26.40 |
| | Center of main doorways, Mess Hall #206 | 26.49 |
| | Monument 23' west of building #11. Coordinates: N. 338,010.96; E. 2,496,716.13 | 26.57 |
| | Monument - Coordinates: N. 335,933.23; E. 2,498,231.73 | 26.60 |
| | Monument - Coordinates: N. 335,734.61; E. 2,498,376.61 | 26.60 |
| | Monument - Coordinates: N. 335,206.23; E. 2,498,762.04 | 27.08 |
| | Monument south of intersection of Dogwood and East Rds. Coordinates: N. 338,390.75; E. 2,500,386.78 | 27.16 |
| | Monument - Coordinates: N. 338,194.27; E. 2,498,389.20 | 27.24 |
| | Monument 52' west of building #9, Coordinates: N. 338,354.61; E. 2,496,465.45 | 27.59 |
| | Monument - Holcomb Blvd. Coordinates: N. 337,991.40; E. 2,498,110.91 | 27.77 |
| | Monument 250' northeast of Protestant Church, Coordinates: N. 336,486.61; E. 2,497,828.07 | 28.13 |

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| 162 |
| 177 |

| Quadrangle | Description | Elevation |
| --- | --- | --- |
| 160 | Monument south of Central Heating Plant - Coordinates: N. 337,646.67; E. 2,498,786.94 | 28.21 |
| | Monument - Coordinates N. 336,569.27; E. 2,499,569.31 | 28.37 |
| | Monument west of Central Heating Plant, Coordinates: N. 337,969.72; E. 2,498,552.30 | 28.39 |
| | Monument 160' northeast of Post Headquarters, Coordinates: N. 337,645.68; E. 2,496,982.59 | 28.53 |
| | Monument - Coordinates: N. 338,835.52; E. 2,500,887.86 | 28.629 |
| | Monument - Coordinates: N. 336,105.92; E. 2,499,906.06 | 28.64 |
| | Top bolt on northeast pier of Water Tank opposite Regimental Area #1 | 28.80 |
| | Top bolt on northmost pier on water tank opposite Regimental Area #5 | 28.85 |
| | Center of main doorways, Mess Hall #107 | 28.86 |
| | Monument - Holcomb Blvd. Coordinates: N. 337,623.57; E. 2,497,606.18 | 28.97 |
| | Center of main doorways, Mess Hall #9 north doorway | 29.53 |
| | Center of main doorways, Mess Hall #9 south doorway | 29.55 |
| | Monument - Coordinates: N. 336,969.00; E. 2,499,279.17 | 29.87 |
| | Monument - Industrial Area - Coordinates: N. 339,771.52; E. 2,501,942.37 | 30.83 |
| 161 | Spike on root of 18" pine at intersection of Sneads Ferry Road and road to mouth of French Creek | 25.79 |
| 162 | USMC Monument 59. Coordinates: N. 334,713.09; E. 2,533,313.47 | 22.42 |
| | USMC Monument 57. Coordinates: N. 334,573.88 E. 2,532,187.11 | 30.95 |
| | USMC Monument 58. Coordinates: N. 334,267.34; E. 2,532,403.51 | 37.49 |
| 177 | About 2.9 miles south along the A.C.L. RR. from the station at Verona, Onslow Co., about 0.2 mile north of milepost W 40, 50' east of the east rail, 22' north-east of a twin tree, at a concrete culvert under U.S. Highway #17, in the top of the west head wall, 2' N. | |

| Quadrangle |
| --- |
| 177 |
| 178 |
| 180 |
| 181 |
| 182 |

| Quadrangle | Description | Elevation |
|---|---|---|
| 177 | of the S. end 17' W. of the center line of the highway, and about 1' lower than the highway. A standard disk, stamped "A 148 1935" | 60.725 |
| | About 1.8 miles S. along the A.C.L. RR. from the station at Verona, Onslow Co., about 1/4 mile N. of milepost W 41, about 160' S. of triangulation station Verona, described above, 57' E. of the rail, and 24' W. of the center line of U.S. Highway #17. A standard ref-mark disk, stamped "Verona No. 3 1932" and set in the top of a concrete post. Top of E. rail opposite A.C.L. RR. milepost W 41, 64.3' | 70.581 |
| | About 1.8 miles S. along the A.C.L. RR. from the station at Verona, Onslow Co., about 0.3 mile N. of milepost W 41, 44' E. of the east rail, 36' W. of the center line of U.S. Highway #17, and 24' N. of a pole. A standard disk (triangulation station) stamped "Verona 1932" and set in the top of a concrete post. | 70.610 |
| | About 1.8 miles S. along the A.C.L. RR from the station at Verona, Onslow Co., about 0.3 mile N. of milepost W 41, 154' northeast of triangulation station Verona, described above, about 110' E. of the track, and 28' E. of the center line of U.S. Highway #17. A standard ref-mark disk, stamped "Verona No. 2 1932" and set in the top of a concrete post. | 71.158 |
| 178 | USMC Monument 47. Coordinates: N. 326,998.16; E. 2,476,585.81 | 32.35 |
| | USMC Monument 46. Coordinates: N. 329,262.76; E. 2,476,815.60 | 34.52 |
| 180 | USMC Monument 63. Coordinates: N. 328,330.48; E. 2,507,772.97 | 35.04 |
| | Triangulation Station, "Sime", N. 328,778.03; E. 2,499,295.86 | 21.32 |
| 181 | Nail in root of 5" oak tree, 55' E. of center line, Sneads Ferry Rd., and 1100' N. of intersection of said Road and old Gillette Rd. | 22.97 |
| | USMC Monument 62. Coordinates: N. 328,572.38; E. 2,508,210.56 | 30.39 |
| 182 | USMC Monument 78. Coordinates: N. 320,976.60; E. 2,530,272.80 | 15.05 |
| | USMC Monument 77. Coordinates: N. 320,362.92; E. 2,529,211.03 | 24.98 |

Description

[illegible] and [illegible] of the center line of the highway, and [illegible] lower than the highway. A standard disk stamped "[illegible] 1935"

About 1.8 miles S. along the A.C.L. RR. from the station at Vernon, Onslow Co., about 1/4 mile N. of milepost [illegible], [illegible] of triangulation station Vernon, described above, [illegible] the [illegible], and [illegible] W. of the center line of U.S. Highway 17. A standard [illegible] disk, stamped "Vernon [illegible] 1932" and set in the top of a concrete post. [illegible] 75.641

[illegible] 1.4 miles S. along the A.C.L. RR. from the station at Vernon, Onslow Co., [illegible] milepost [illegible], [illegible] of the center line of U.S. highway 17, and [illegible] below [illegible] standard disk (triangulation station) stamped "Vernon 1932", and set in the top of a concrete post. 72.612

About 1.5 miles S. along the A.C.L. RR. from the station at Vernon, Onslow Co., about 0.4 mile N. of milepost [illegible], [illegible] of triangulation station Vernon, described above, about 110 ft. [illegible] of the track, and [illegible] of the center line of U.S. highway 17. A standard [illegible] disk, stamped "Vernon [illegible] 1932" and set in the top of a concrete post. 73.106

[illegible] Monument 62. Coordinates: [illegible] 329,098.[illegible]; [illegible] 2,476,578.31 [illegible]

[illegible] Monument [illegible]. Coordinates: N. 329,[illegible]; [illegible] 76,[illegible] [illegible]

[illegible] Monument [illegible]. Coordinates: [illegible] 329,[illegible]; [illegible] 2,[illegible] [illegible]

Triangulation Station, "[illegible]", N. 328,778.[illegible]; [illegible] [illegible]

[illegible] [illegible] center line, [illegible] intersection [illegible] 22.[illegible]

[illegible]

[illegible] Coordinates: N. 329,[illegible]; [illegible]

[illegible] Coordinates: N. 330,305.[illegible]; [illegible] [illegible]

Quadrangle

200

201

202

217

218

| Quadrangle | Description | Elevation |
|---|---|---|
| 200 | USMC Monument 81. Coordinates: N. 313,633.20; E. 2,500,173.56 | 31.21 |
| | USMC Monument 80. Coordinates: N. 314,452.72; E. 2,496,497.32 | 34.19 |
| 201 | USMC Monument 75. Coordinates: N. 311,741.16; E. 2,517,199.87 | 27.05 |
| | USMC Monument 64. Coordinates: N. 314,429.58; E. 2,515,482.07 | 41.45 |
| 202 | USMC Monument 120. Coordinates: N. 318,474.44; E. 2,529,968.89 | 15.155 |
| | USMC Monument 118. Coordinates: N. 317,999.68; E. 2,528,093.95 | 24.27 |
| | USMC Monument 76. Coordinates: N. 319,400.84; E. 2,527,868.57 | 25.16 |
| | USMC Monument 119. Coordinates: N. 318,724.70; E. 2,527,873.59 | 26.54 |
| | Monument - N. 317,038.92; E. 2,524,267.37 | 29.23 |
| 217 | About 1.1 miles S. along the A.C.L. RR. from the station at Dixon, Onslow Co., about 0.5 mile north of milepost W 36, at a water tank east of the track, and in the top of the southwest pier. A standard disk, stamped "R 27 1932". Top of east rail opposite A.C.L. RR. milepost W 36. 70.0' | 66.302 |
| | About 0.6 mile south along the A.C.L. RR. from the station at Dixon, Onslow Co., about 47 yds. S. of milepost W 37, 26.5' E. of the E. rail, about 55 yds. W. of the center line of U.S. Highway #17, 45' south west of a pole, and about 2' higher than the top of the rail. A standard disk, stamped "C 148 1935" and set in the top of the concrete post. | 67.339 |
| 219 | Top iron pin in concrete monument known as Triangulation Station, "Marines" | 3.58 |
| | Northeast Corner concrete slab on Sewerage Pumping Station #7, Barrage Balloon Base | 7.501 |
| | Center line south door Machine Shop - Amphibian Base | 11.46 |
| | Center line north door of Machine Shop - Amphibian Base | 11.47 |

Quadrang

200

201

202

217

219

| Quadrangle | Description | Elevation |
|---|---|---|
| 200 | USMC Monument 81. Coordinates: N. 313,633.20; E. 2,500,173.56 | 31.21 |
| | USMC Monument 80. Coordinates: N. 314,452.72; E. 2,496,497.32 | 34.19 |
| 201 | USMC Monument 75. Coordinates: N. 311,741.16; E. 2,517,199.87 | 27.05 |
| | USMC Monument 64. Coordinates: N. 314,429.58; E. 2,515,482.07 | 41.45 |
| 202 | USMC Monument 120. Coordinates: N. 318,474.44; E. 2,529,968.89 | 15.155 |
| | USMC Monument 118. Coordinates: N. 317,999.68; E. 2,528,093.95 | 24.27 |
| | USMC Monument 76. Coordinates: N. 319,400.84; E. 2,527,868.57 | 25.16 |
| | USMC Monument 119. Coordinates: N. 318,724.70; E. 2,527,873.59 | 26.54 |
| | Monument - N. 317,038.92; E. 2,524,267.37 | 29.23 |
| 217 | About 1.1 miles S. along the A.C.L. RR. from the station at Dixon, Onslow Co., about 0.5 mile north of milepost W 36, at a water tank east of the track, and in the top of the southwest pier. A standard disk, stamped "R 27 1932". Top of east rail opposite A.C.L. RR. milepost W 36. 70.0' | 66.302 |
| | About 0.6 mile south along the A.C.L. RR. from the station at Dixon, Onslow Co., about 47 yds. S. of milepost W 37, 26.5' E. of the E. rail, about 55 yds. W. of the center line of U.S. Highway #17, 45' south west of a pole, and about 2' higher than the top of the rail. A standard disk, stamped "C 148 1935" and set in the top of the concrete post. | 67.339 |
| 219 | Top iron pin in concrete monument known as Triangulation Station, "Marines" | 3.58 |
| | Northeast Corner concrete slab on Sewerage Pumping Station #7, Barrage Balloon Base | 7.501 |
| | Center line south door Machine Shop - Amphibian Base | 11.46 |
| | Center line north door of Machine Shop - Amphibian Base | 11.47 |

| Quadrangle | Description | Elevation |
|---|---|---|
| 219 | Center line south door of Carpenter Shop - Amphibian Base | 12.98 |
| | Center line north door of Carpenter Shop - Amphibian Base | 13.03 |
| | Center line southwest front door Mess Hall, Barrage Balloon Base | 15.541 |
| | USMC Monument - Coordinates: N. 307,936.37; E. 2,491,112.85 | 3.41 |
| | USMC Monument - Coordinates: N. 308,307.99; E. 2,491,338.95 | 4.35 |
| | Center line southeast front door of Mess Hall - Barrage Balloon Base | 15.561 |
| | Top northmost bolt on northmost pier - Barrage Balloon Elevated Water Tank | 14.11 |
| 220 | Top corner (s.e.) concrete wall, Sewage Treatment Plant, Barrage Balloon Base. | 17.487 |
| 221 | Spike in root of 12" water oak 35' E. of station 61 25 - on Mockup Road, and being only 430' north of Mockup | 4.14 |

Note: Elevations are given for top of iron pins in monuments, except where bronze tablets were used.

O-11. Soil Borings.

Approximately 800 soil borings were taken in the various developed areas on the reservation, to provide a basis for study of the load bearing capacity of the soil; also for studies in connection with various phases of sewage disposal.

The logs of these borings may be found in the following note books on file with the Public Works Office, (See Section O-12); Notebook Nos. 114, 117, 124, 125, 127, 131 to 140, inclusive, and 164 to 168, inclusive. Other borings and all load bearing tests were made by the U. S. Navy

O-12. Records Filed With Public Works Officer.

O-12.01. 14 loose-leaf, $8\frac{1}{2}$ x 13" computation books.

O-12.02. 169 original topographic work sheets.

O-12.03. Working drawings, Government publications, charts and compilations of aerial photographs, used in mapping the project.

O-12.04. 171 field notebooks, loose-leaf and bound.

0-12.05. 1 metal filing cabinet containing 298 folders of loose-leaf notes, computations and marked prints, arranged approximately by quadrangles.

0-12.06. Soil boring data (See Section 0-11)

Letters of transmittal cover the above data in detail, and are too voluminous to be reproduced here.

CHAPTER P - PART II

RECORD MAPPING

CONTENTS

## CHAPTER P - PART II

## RECORD MAPPING

P-1. Introduction.

P-1.01. At various times the Project Manager requested instructions from the Officer in Charge concerning preparation of record drawings. Notice was received that it would be necessary to prepare record drawings and it was advised that sample drawings and specifications be prepared and submitted. A preliminary scheme and approximate scope of the work was submitted by use of a sample 1" = 50'scale map, Quadrangle 160 G-3, G-4 and an index map M. B. Drawing No. 1174.

These were approved by the Officer in Charge, April 12, 1942, deleting the outlying areas.

P-1.02. The approved system was based on the following considerations and was essentially as follows:

All horizontal surveys for the New River Reservation are based on the North Carolina System of Plane Coordinates. The entire area has been divided into rectangles 10,000 feet north and south, and 15,000 feet east and west. For the purpose of basic mapping at 500' to the inch, these rectangles fit a standard Navy drawing with just sufficient room outside the limits of the rectangle for legend, notes, etc. This layout is shown on two 1: 20,000 scale maps, M. B. Drawings Nos. 1174 and 2157. These rectangles are numbered in such a manner that the system may be extended in all directions in order that the 500' scale maps, and their numbering system, may also serve as a perpetual index of larger scale maps and other survey data.

For the purpose of Record Mapping of utilities, the quadrangles were sub-divided further into four rectangles, to scale of 1" = 50', covering an area of 1000 ft. north and south, by 1500 feet east and west, and fitting a standard Navy sheet. These rectangles are identified in each next larger rectangle by a system of numbering, starting with No. 1 in the upper right hand corner and running clock-wise up to and including No. 4. This method furnished an easy access to maps filed by quadrangle number.

Elevations shown are referred to mean sea level.

P-1.03. To carry out this plan, a record mapping department was created. From a letter of March 28, 1942, to Engineers, Contract NOy-4751, Subject: Record Drawings. "It is not intended that an additional force of workmen be employed for this purpose, but that a portion of your present force will be used, as available", signed, Madison Nichols, Officer in Charge. These instructions were carried out and men were transferred either permanently or temporarily from other departments. The average force in this department was three men.

P-2. Sources of Information.

CHAPTER 7 - PART II

RECORD MAPPING

7-1. Introduction.

7-1.01. At various times the Project Manager requested instructions from the Officer in Charge concerning preparation of record drawings. Notice was received that it would be necessary to prepare record drawings and it was advised that sample drawings and specifications be prepared and submitted. A preliminary scheme and approximate scope of the work was submitted by use of a sample 1" = 50' scale map, Quadrangle 160-3, 6-4 and index map on N. Drawing No. 1194.

These were approved by the Officer in Charge, April 12, 1942, deleting the outlying areas.

7-1.02. The approved system was based on the following considerations and was substantially as follows:

All horizontal surveys for the New River Reservation are based on the North Carolina System of Plane Coordinates. The entire area has been divided into rectangles 10,000 feet north and south, and 15,000 feet east and west. For the purpose of basic mapping at 500' to the inch, these rectangles fit a standard Navy drawing with just sufficient room outside the limits of the rectangle for legend, notes, etc. This layout is shown on the 1:20,000 scale maps, N. D. Drawings Nos. 1174 and 2157. These rectangles are numbered in such a manner that the system may be extended in all directions in order that the 500' scale maps, and their numbering system, may also serve as a perpetual index of larger scale maps and other survey data.

For the purpose of Record Mapping of utilities, the quadrangles were subdivided further into four rectangles, to scale of 1" = 50', covering an area of 1000 ft. north and south, by 1500 feet east and west, and fitting a standard Navy sheet. These rectangles are identified in each next larger rectangle by a system of numbering, starting with No. 1 in the upper right hand corner and running clock-wise up to and including No. 4. This method furnished an easy access to maps filed by quadrangle number.

Elevations shown are referred to mean sea level.

7-1.03. To carry out this plan, a record mapping department was established. From a letter of March 30, 1942, to Engineers, Contract NOy-4751, subject: Record Drawings: "It is not intended that an additional force of engineers be employed for this purpose, but that a portion of your present force will be used, as available", signed, Madison Nichols, Officer in Charge. These instructions were carried out and men were transferred either permanently or temporarily from other departments. The average force in this department was three men.

7-2. Sources of Information.

P-2.01. In view of the fact that all construction inspection was under the supervision of the Navy, we were entirely dependent upon their records for "as-built" data. This method is not the most desirable and caused considerable delay before a steady flow of information could be established. Wherever possible, the Navy notes were used as a check as well as a source of information. They served also to show where construction differed from plan, and in all cases the work was mapped according to the as-built information furnished. Our own survey field notes furnished a large amount of the control for the maps, but the field work done by this organization solely for the purpose of record mapping was kept to a minimum. Where as-built field notes were not available, the work was plotted as shown on the plan and verified as far as possible by a field inspection before the map was inked. Where actual locations were not available, shore lines were transferred from U. S. Coast and Geodetic Survey Compilation of Aerial Photographs, Sheets 5049 and 5050, time and date of photographs: 10:30 A.M., 1:30 P.M. January 29, 1933. Scale 1: 20,000 1" = 1666.67'.

Frequent reference also was made to U.S.C. and G.S. Chart # 777, particularly during sweeping and dredging operations in New River and Courthouse Bay. All channels, markers and lights located have been shown on 1" = 500' maps.

A valuable source of information during the entire job was the aerial mosaic entitled:

Jacksonville, North Carolina
Pilot Mears, H.P. - W. A. P.
Photo Edgett, M.M. - P 1/c
Baran, A. - P 1/c
Date: February 12, 1941 F. L. 8 1/4 F. 56

Property maps, scale 1" = 660', by Boney and Broadfoot, Architects and Engineers at Wilmington, N. C. also were used. These maps were drawn under Contract NOy-4717 prior to the Carr and J. E. Greiner Co., contract, and were not coordinated.

P-3. General Area Map.

P-3.01. The General Area Map, M. B. Drawing No. 138, was begun August 15, 1941 with the intent of furnishing a unified picture of all projects on the reservation. Natural features were pantographed from Coast and Geodetic Quadrangle 777 and aerial photographic compilations previously referred to. Site plans frequently were reduced in scale by the same method prior to tracing on this 1" = 2000' map. In many cases buildings and roads were shown on this map before construction had begun. Naturally, there are inaccuracies in scale in a map so constructed and this fact was recorded on the map. However, its cost was more than repaid by its usefulness to all departments.

P-3.02. The Record Mapping Department was charged with keeping the general area map up to date. A considerable amount of information was furnished by the Liaison Officer of the U. S. Marine Corps and as various units of the Marine Corps began training on the base this map was very

F-2.01. In view of the fact that all construction inspection was under the supervision of the Navy, we were entirely dependent upon their [illegible] for "as-built" data. This method is not the most desirable and caused considerable delay before a steady flow of information could be obtained. Wherever possible, the Navy notes were used as a check as well as a source of information. They served also to show where construction differed from plan, and in all cases the work was mapped according to the as-built information obtained. Our own survey field notes furnished a large amount of the control for the maps, but the field work done [illegible] of construction solely for the purpose of record mapping was kept to a minimum. Where as-built field notes were not available, the work was plotted as shown on the plan and verified as far as possible by a field inspection before the map was inked. Where actual locations were not available, shore lines were transferred from U. S. Coast and Geodetic Survey Compilation of Aerial Photographs, Sheets 5049 and 5050, time and date of photographs: 10:30 A.M., 1:30 P.M. January 29, 1935. Scale 1:20,000. 1" = 1666.67'.

Frequent reference also was made to U.S.C. and G.S. Chart # 472, particularly during sweeping and dredging operations in New River and Bogue Bay. All channels, markers and lights located have been shown on 1" = 500' maps.

A valuable source of information during the entire job was the aerial mosaic entitled:

Jacksonville, North Carolina
Pilot Hours, H.T. - H. A. F.
Photo, Dignity, R.H. - F 1/c
Brown, A. - P 1/c
Date, February 12, 1941 F. L. 8 1/4 V. 24

Property maps, scale 1" = 500', by Boney and Broadfoot, Architects and Engineers at Wilmington, N. C. also were used. These maps were drawn under Contract NOy-4717 prior to the Carr and J. E. Greiner Co. contract, and were not coordinated.

## F-3. General Area Map.

F-3.01. The General Area Map, W. E. Drawing No. 158, was begun August 16, 1941 with the intent of furnishing a unified picture of all projects on the reservation. Natural features were pantographed from Coast and Geodetic Quadrangle 477 and aerial photographic compilations previously referred to. Site plans frequently were reduced in scale by the same method prior to tracing on this 1" = 2000' map. In many cases buildings and roads were shown on this map before construction had begun. Naturally, there are inaccuracies in scale in a map so constructed and this is so recorded on the map. However, its cost was more than repaid by its usefulness to all departments.

F-3.02. The Record Mapping Department was charged with keeping the General Area map up to date. A considerable amount of information was furnished by the Liaison Officer of the U. S. Marine Corps and as various units of the Marine Corps began training on the base this map was very valuable from a military standpoint. Machine gun ranges, fire observation towers, impact areas, roads, etc. were plotted with sufficient accuracy to guide troops on maneuvers and quickly orient officers and men, thus saving valuable time and avoiding needless confusion.

The quadrangle numbering system also is shown on this map, thus tying it in with all subsequent mapping work and furnishing a key to the system for the entire reservation.

P-4. Extracts from Specification No. 1000., "Specifications for the Preparation of Record Drawings", Marine Barracks, New River, N. C.

P-4.01. Preparation and General Style of Drawings. Drawings generally will be divided into two groups as follows:

(a) Original Drawings. Original drawings shall be made on the best quality of white paper with muslin backing.

(b) Linen Tracings. Linen tracings shall be made on the best quality linen tracing cloth.

Unnecessary work shall be avoided. Simplicity shall be practiced in every detail in inking tracings; lines shall never be shaded; lettering shall be plain and simple, and shall be limited to the amount required for clarity in reading the drawings. Ornateness in rendering borders or other figures will not be permitted; standard north points, symbol, and title blocks shall be used.

P-4.02. Sizes of Drawings.

(a) Original drawings on muslin backed paper shall be $33\frac{1}{2}$" x $45\frac{1}{2}$" overall.

(b) Linen tracings shall be 29" x 35" overall.

P-5. 1" = 500' Scale Maps.

P-5.01. Tabulation of 1" = 500' Maps

| Original Drawing Quadrangle No. | Tracings Y. & D. No. | P. W. No. |
|---|---|---|
| 98 | 228,331 | 1 |
| 118 | 228,334 | 4 |
| 99 | 228,332 | 2 |
| 119 | 228,335 | 5 |
| 100 | 228,333 | 3 |
| 120 | 228,336 | 6 |
| 101 | 228,412 | 76 |
| 121 | | |

P-5.01. (Cont'd)

| Original Drawing Quadrangle No. | Tracings Y. & D. No. | P. W. No. |
|---|---|---|
| 102 | 228,413 | 77 |
| 122 | | |
| 137 | 228,408 | 72 |
| 157 | 228,350 | 20 |
| 138 | 228,419 | 81 |
| 158 | | |
| 139 | 228,337 | 7 |
| 159 | 228,339 | 9 |
| 140 | 228,338 | 8 |
| 160 | 228,340 | 10 |
| 142 | 228,409 | 73 |
| 162 | 228,410 | 74 |
| 177 | 228,400 | 70 |
| 197 | 228,401 | 71 |
| 178 | 228,344 | 14 |
| 198 | | |
| 179 | 228,341 | 11 |
| 199 | 228,345 | 15 |
| 180 | 228,342 | 12 |
| 200 | 228,411 | 75 |
| 181 | 228,343 | 13 |
| 201 | 228,355 | 25 |
| 182 | 228,414 | 78 |
| 202 | 228,415 | 79 |
| 217 | 228,346 | 16 |
| 237 | | |
| 218 | 228,347 | 17 |
| 238 | | |
| 219 | 228,348 | 18 |
| 239 | | |
| 220 | 228,349 | 19 |
| 240 | | |
| 221 | 228,416 | 80 |
| 241 | | |
| Total 42 | | Total 33 |

P-5.02. The original drawing of 1" = 500 ' covers an area 20,000 north and south by 15,000 east and west, and contains the following data:

- Building outline.
- Building numbering plan.
- Road right-of-way lines and approved names.
- Railroads.
- Natural features.
- Triangulation net.
- New River channel, markers and lights.

Accurate control was established for all 1" = 500' maps by means of triangulation and by coordinated traverses. Monuments set on the Reservation Boundary or in areas not covered by 1" = 50' maps were plotted accurately and coordinates tabulated. Certain boundary line courses and distances also were shown.

P-5.03. After the basic 500' scale maps were completed several tracing-cloth reproductions were made on which the various departments will plot their main utility layouts, resulting in small scale planning and operating maps, showing respectively the various utilities. The utilities to be mapped and P. W. Nos. assigned were as follows:

| Utility | Suffix to P. W. No. |
|---|---|
| Electrical Distribution | E |
| Heating, Mains and Plants | H |
| Street lighting, circuits | L |
| Sewerage Systems | S |
| Communications lines | T |
| Water Collection and Distb. | W |
| Propane Gas | G |

(Thus, a sewerage map drawn on a reproduction of P. W. Dwg. No. 10 would be numbered P. W. 10-S)

Planning and operating maps to be prepared are as follows:

| P. W. No. | Quadrangle No. | Utilities to be Mapped |
|---|---|---|
| 1 | 98 | E, H, L, S, T, W. |
| 3 | 100 | W |
| 4 | 118 | E, T, W. |
| 5 | 119 | E, L, S, T, W. |
| 6 | 120 | E, S, W. |
| 7 | 139 | E, L, S, T, W. |
| 8 | 140 | E, H, S, T, W. |
| 9 | 159 | W. |
| 10 | 160 | E, G, H, L, S, T, W. |
| 17 | 218 | E, T. |
| 18 | 159 | W. |

P-6. 1" = 50' Scale Maps.

P-6.01. This phase of the work by far was the most extensive. The original authorization of this project, as instructed by the Officer in Charge on M. B. Drawing No. 1174, April 1942, included only the Main Division Area, Industrial Area, and Tent Camps. This was expanded August 25, 1942, by the Officer in Charge, to twice the original assignment thus including the following areas: Amphibian Base, Tent Camp, Rifle Range, Mumford Point Camp No. 1, and Officers' Quarters Area.

P-6.02. The 50' scale maps constitute the basic final record of utilities and show the following data:

Outlines of buildings and other structures.
Culverts and invert elevations.
Bridges.
Water Mains, including valves, fire hydrants, tanks, etc.
As-built elevations where such information was available.
Sewers.
Gas lines.
Steam lines.
Pole lines.
Underground electric and communications lines.
Gasoline and fuel oil lines and pumps.
Permanent coordinated monuments and triangulation stations.
Bench marks.
Areaways and pits.
Wells.
Storm drains.
Railroad tracks, roads and sidewalks.

P-6.03. A color scheme was selected to comply as closely as possible with Bureau of Yards and Docks standards for operating maps, diverging only where it was apparent that the standard color would not furnish satisfactory photostatic reproduction. The final scheme as set forth in Specification No. 1000, Addendum No. 1, is as follows:

| | |
|---|---|
| Fresh Water | Blue |
| Salt Water | Green |
| Steam Mains | Orange |
| Sewers | Black |
| Propane Gas | Carmine |
| Fuel Oil | Carmine |
| Gasoline | Violet |
| Electrical Lines | Scarlet |
| Communications | Brown |
| Paved Roads and Sidewalks | Gray |

P-6.04. Tabulation of 1" = 50' Scale Maps.

| Area | | Quadrangle |
|---|---|---|
| Mumford Point Tent Camp | 99 | U-1, U-2, U-3, & U-4 |
| | 119 | A-3 & A-4 |
| Amphibian Base Tent Camp | 118 | H-1 & H-2 |

F-6.01. This phase of the work by far was the most extensive. The original authorization for this project, as instructed by the Officer in Charge on U.S. Drawing No. 1174, April 1942, included only the Main Division area, Industrial area, and Tent Camps. This was expanded August 29, 1942, by the Officer in Charge, to cover the original assignment plus the following areas: Amphibian Base, Tent Camps, Rifle Range, Harford Point Camps No. 1, and Officers' Quarters Area.

F-6.02. The 50' scale maps constitute the main final record of utilities and show the following data:

- Outlines of buildings and other structures.
- Culverts and invert elevations.
- Bridges.
- Water lines, including valves, fire hydrants, meters, etc.
- Asphalt elevations where such information was available.
- Sewers.
- Gas lines.
- Steam lines.
- Fuel lines.
- Underground electric and communications lines.
- Gasoline and fuel oil lines and pumps.
- Permanent coordinated monuments and triangulation stations.
- Bench marks.
- Manholes and pits.
- Wells.
- Storm drains.
- Railroad tracks, roads and sidewalks.

F-6.03. A color scheme was selected to comply as closely as possible with Bureau of Yards and Docks standards for operating maps, diverging only where it was apparent that the standard color would not furnish satisfactory photostatic reproductions. The final scheme as set forth in Specification No. 2000, Addendum No. 1, is as follows:

| | |
|---|---|
| Fresh Water | Blue |
| Salt Water | Green |
| Steam Lines | Orange |
| Sewers | Black |
| Propane Gas | Carmine |
| Fuel Oil | Carmine |
| Gasoline | Violet |
| Electrical Lines | Scarlet |
| Communications | Brown |
| Paved Roads and Sidewalks | Gray |

F-6.04. Tabulation of 1" = 50' Scale Maps.

| Area | | Quadrangle |
|---|---|---|
| Harford Point Tent Camp | 99 | G-1, G-2, G-3, & G-4 |
| | 119 | A-3 & A-4 |
| Amphibian Base Tent Camp | 118 | H-1 & H-2 |

P-6.04 (Cont'd)

| Area | | Quadrangle |
|---|---|---|
| Residential Area | 119 | L-3 & L-4 |
| | | Q-1, Q-2, Q-3 & Q-4 |
| | | R-1, R-2, R-3 & R-4 |
| | | S-1, S-2, S-3 & S-4 |
| | | W-1 & W-2 |
| | | X-1, X-2, X-3 & X-4 |
| | 139 | D-1 & D-2 |
| | | E-3 & E-4 |
| | | J-3 & J-4 |
| | | O-1, O-2, O-3 & O-4 |
| | | T-1, T-2, T-3 & T-4 |
| Rifle Range | 198 | Q-1, Q-2, Q-3 & Q-4 |
| | | V-1, V-2, V-3 & V-4 |
| | | W-3 & W-4 |
| | 218 | B-3 & B-4 |
| Barrage Balloon & Amphibian Base | 219 | D-1 & D-2 |
| | | E-1, E-2, E-3 & E-4 |
| | | J-1, J-2, J-3 & J-4 |
| | | I-1 & I-2 |
| | | O-1, O-2, O-3 & O-4 |
| | 220 | F-3 & F-4 |
| | | K-3 & K-4 |
| Tent Camps Nos. 1 and 2 | 98 | K-1, K-2, K-3 & K-4 |
| | | P-1, P-2, P-3 & P-4 |
| | | Q-3 & Q-4 |
| | | U-1, U-2, U-3 & U-4 |
| | 118 | A-1, A-2, A-3 & A-4 |
| Industrial Area | 140 | W-1, W-2, W-3 & W-4 |
| | 160 | C-1, C-2, C-3 & C-4 |
| | | B-1 & B-2 |
| | | G-1 & G-2 |
| | | H-3 & H-4 |
| Regimental Area | 140 | P-3 & P-4 |
| | | U-1, U-2, U-3 & U-4 |
| | 159 | E-1 & E-2 |
| | 160 | A-1, A-2, A-3 & A-4 |
| | | B-3 & B-4 |
| | | F-1, F-2, F-3 & F-4 |
| | | G-3 & G-4 |
| | | K-1, K-2, K-3 & K-4 |
| | | L-1, L-2, L-3 & L-4 |
| | | M-3 & M-4 |
| | | Q-1, Q-2, Q-3 & Q-4 |
| | | V-1 & V-2 |

P-6.04 (Cont'd)

| Area | | Quadrangle |
|---|---|---|
| Parachute Buildings | 140 | R-3 & R-4 |
| Landing Field | 118 | R-1, R-2, R-3 & R-4<br>S-3 & S-4 |
| Hospital Area | 139 | X-1, X-2, X-3 & X-4<br>Y-1, Y-2, Y-3 & Y-4 |
| | Total: 79 | |

P-8. Summary.

P-8.01. To summarize briefly, there were completed, with due regard to status of construction and information available, the following:

1. One General Area Map tracing, 1" = 2000' (see section P-3)

2. Twenty-one hard copy drawings, each covering two 10,000' x 15,000' quadrangles, scale 1"= 500' (see section P-4)

3. Thirty-three tracings, each covering one 10,000' x 15,000' quadrangle, scale 1" = 500' (see tabulation section P-6)

4. Seventy-nine hard copy drawings, each covering two 1000' x 1500' quadrangles (see tabulation section P-6)

CARR & J.E. GREINER CO.

MARINE BARRACKS

NEW RIVER, N. C.

SECTION P-7

# RECORD MAP STANDARD SYMBOLS

## PLUMBING

- METER
- HOSE RACK
- HOSE BIBB
- GREASE SEPARATOR

## HEATING

- EXPANSION JOINT
- STEAM ANCHOR

## PIPING

| | |
|---|---|
| FRESH WATER | BLUE |
| SALT WATER (FIRE & FLUSHING) | GREEN |
| HARD WATER | BLUE |
| STORM SEWER | BLACK |
| SANITARY SEWER & MANHOLE | BLACK |
| CATCH BASIN | |
| PROPANE GAS | CARMINE |
| AIR | BLACK |
| HIGH PRESSURE STEAM (FEED) | ORANGE |
| " " " (RETURN) | ORANGE |
| " " " (OVERHEAD) | ORANGE |
| LOW PRESSURE STEAM (FEED) | ORANGE |
| " " (RETURN) | ORANGE |
| FUEL OIL | CARMINE |
| GASOLINE | VIOLET |
| HYDRANT-(FRESH WATER) | BLUE |

## ELECTRICAL

| | |
|---|---|
| OVERHEAD ELECTRIC LINE | RED ORANGE |
| UNDERGROUND ELEC. LINE | RED ORANGE |
| PRIMARY OVERHEAD | RED ORANGE |
| " UNDERBUILT | RED ORANGE |
| SECONDARY & SERVICE | RED ORANGE |
| STREET LIGHTS | RED ORANGE |
| BLACKOUT PILOT | RED ORANGE |
| PILOT FOR OIL CIR. BREAKERS | RED ORANGE |
| POLE MOUNTED TRANSFORMER | |
| PLATFORM MOUNTED TRANSFORMER | |
| GUY | |
| MANHOLE | |
| FUSED CUTOUT | |
| DISCONNECT SWITCH | |

## ELECTRICAL - CONT'D.

- OIL CIRCUIT BREAKER
- STREET LIGHTING-STANDARD
- " " -BRACKET
- FLOODLIGHT
- AIRCRAFT OBSTRUCTION LIGHT

## TELEPHONE - TELEGRAPH & FIRE ALARM

| | |
|---|---|
| TELEPHONE JACK | |
| CHANGE IN CABLE SIZE OR TYPE OF CONST. | |
| TELEPHONE & TELEGRAPH - OVERHEAD | BROWN |
| UNDERGROUND - TEL. & TEL. IN CONDUIT | BROWN |
| " " " " - IN TRENCH | BROWN |
| " " " " - SUBMARINE | BROWN |
| TELEPHONE-TELEGRAPH OR POWER POLE | |
| MANHOLE - STANDARD | CABLE |
| PROTECTED TERMINAL. | |
| UNPROTECTED TERMINAL. | |
| FIRE-ALARM BOX - WALL MOUNTED | |
| " " " - PEDESTAL MOUNTED | |

## MISCELLANEOUS

| | |
|---|---|
| BARB WIRE FENCE | |
| BENCH MARK | CARMINE |
| BOUNDARY OF STATION | BOUNDARY |
| BUOY | |
| CRANE | |
| CRANE TRACKS | |
| CURB | |
| DOLPHIN | |
| FLAGSTAFF | |
| HOSE RACK | |
| HOSE REEL HOUSE | |
| HUB | |
| MARSH - (SALT WATER) | BLUE |
| MARSH (FRESH WATER) | BLUE |
| MONUMENT | BLACK |
| QUAY WALL | |
| RAILROAD TRACKS | |
| RESERVOIR - UNDERGROUND | |
| ROADS - CONCRETE | LIGHT WASH |
| " - MACADAM or ASPHALT | DARK WASH |
| " - CINDER or GRAVEL | |
| " - UNIMPROVED WAGON | |
| TRAIL | |
| TRESTLE | |
| TANKS - ELEVATED. | |
| TREES - DECIDUOUS | GREEN |
| " - EVERGREEN | GREEN |
| TRIANGULATION STATION | CARMINE |
| VALVES | |
| DRINKING FOUNTAIN | BLUE |

CHAPTER Q PART 11

LIST OF DRAWINGS PREPARED

CONTENTS

Q-1. Introduction. Insofar as possible, lists of drawings have been omitted from the preceding chapters of the report. Listed herein are the drawings completed and approved for the entire project. The tracings, 3078 in number, have been turned over to the Public Works Officer, indexed so that a desired drawing may be found readily if either the Yards and Docks number, the temporary drawing number, the accounting project number, the subject or the area involved is known.

Q-2. Roads, Streets, Railroads and Bridges

Q-2.01. Division Training Area.

| Dwg. No. | Y&D No. | Proj. No. | Title |
|---|---|---|---|
| 205 | 161885 | P-108-2 | Typical Cross Section of Highway Improvement |
| 211 | 161891 | P-108-2 | Plan and Profile "D" Street |
| 212 | 161892 | P-108-2 | Plan and Profile "E" Street |
| 213 | 161893 | P-108-2 | Plan and Profile "F" Street |
| 214 | 161894 | P-108-2 | Plan and Profile "G" Street |
| 215 | 161895 | P-108-2 | Plan and Profile "H" Street |
| 216 | 161896 | P-108-2 | Plan and Profile "I" Street |
| 217 | 161897 | P-108-2 | Plan and Profile "J" Street |
| 218 | 161898 | P-108-2 | Plan and Profile "K" Street |
| 219 | 161899 | P-108-2 | Plan and Profile "L" Street |
| 220 | 161900 | P-108-2 | Plan and Profile "M" Street |
| 221 | 161901 | P-108-2 | Plan and Profile "N" Street |
| 222 | 161902 | P-108-2 | Plan and Profile "A" Street |
| 223 | 161903 | P-108-2 | Plan and Profile "B" Street |
| 224 | 161904 | P-108-2 | Plan and Profile "C" Street |
| 225 | 161905 | P-108-2 | Dets. of Conc. Drop Inlet, Superelevated Sec. |
| 226 | 161906 | P-108-2 | River Road North Station 0 to 30 |
| 227 | 161907 | P-108-2 | River Road North Station 30 to 60 |
| 228 | 161908 | P-108-51 | West Lane Main Service Road North Sta. 0 to 3 |
| 229 | 161909 | P-108-2 | Main Service Road Reg. Area No. 1 Sta.30 to 6 |
| 230 | 161910 | P-108-2 | Main Access Road River Rd. to Traffic Circle |
| 231 | 161911 | P-108-51 | Main Access Road Station 28 to 55 |
| 232 | 161912 | P-108-51 | Main Access Road Station 55 to 85 |
| 233 | 161913 | P-108-51 | Main Access Road Station 85 to 107 |
| 234 | 161914 | P-108-51 | Main Access Road Station 276 to 295 |
| 235 | 161915 | P-108-51 | Main Access Road Station 295 to 325 |
| 236 | 161916 | P-108-51 | Main Access Road Station 325 to 355 |
| 237 | 161917 | P-108-51 | Main Access Road Station 358 to 385 |
| 238 | 161918 | P-108-51 | Main Access Road Station 385 to 415 |
| 239 | 161919 | P-108-51 | Main Access Road Station 415 to 445 |
| 240 | 161920 | P-108-51 | Main Access Road Station 445 to 462 |
| 245 | 161925 | P-108-51 | Main Service Road South Station 0 to 30 |
| 246 | 161926 | P-108-2 | Main Service Road South Station 30 to 60 |
| 254 | 161934 | P-108-2 | River Road South Station 0 to 30 |
| 258 | 161938 | P-108-2 | Main Access Road Bridge over Wallace Creek |
| 259 | 161939 | P-108-2 | Superstructure Dets. Main Access Rd. Bridge over Wallace Creek |
| 260 | 161940 | P-108-2 | Main Access Road Bridge over Wallace Creek |
| 261 | 161941 | P-108-2 | Dets. of Alternate Handrails Main Access Rd. Bridge over Wallace Creek |

Dwg. No.

266
281

285
286

1207

1215

1233
1299
2201
2202
2203
2204
2205
2206

Q-2

1208
1209
1222

1258

Q-2

200
201

202

203
204
241
242
243
263
1223
2209

244
248
249
250
251
252
253
257
1246

| Dwg. No. | Y&D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 266 | 161946 | P-108-2 | River Road South Access Road to S. T. P. |
| 281 | 161961 | P-108-2<br>P-108-51 | Layout - Typical Section and Profile Traffic Circle at Int. Main Access Rd. and Service Rd |
| 285 | 161965 | | Details of Conc. Drop Inlet 36"x 48" Pipe |
| 286 | 161966 | P-108-2 | Dimensions, Quantities for Variable Headwalls for Single, Double, Triple and 4 pipe culvert |
| 1207 | 229283 | P-108-2 | Special Dets. Incoming Lane Main Access Rd. Bridge over Wallace Creek |
| 1215 | 229284 | P-108-2 | Regimental Area No. 3 Parking Area & Rd. to Theatre from "G" Street |
| 1233 | 229285 | P-108-2 | Cross St. from River Rd. to Main Service Rd. |
| 1299 | 229286 | P-221-3 | Coal Storage Yards for D. T. A. |
| 2201 | 229287 | P-108-2 | Roads Post Dispensary |
| 2202 | 229288 | P-108-2 | Parking Area for Reg. Area No. 4 |
| 2203 | 229289 | P-108-2 | Parking Area for Reg. Area No. 3 |
| 2204 | 229290 | P-108-2 | Parking Area for Reg. Area No. 2 |
| 2205 | 229291 | P-108-2 | Parking Area for Reg. Area No. 1 |
| 2206 | 229292 | P-108-2 | Parking Area for Reg. Area No. 5 |

Q-2.02 Post Troops

| | | | |
|---|---|---|---|
| 1208 | 229296 | | Post Troops Area Boundary Road Sta. 0 to 16. |
| 1209 | 229297 | | Post Troops Area Boundary Road Sta. 16 to 25. |
| 1222 | 229298 | | Plan of Post Lane Extension "J" Street Extension and Plan of Parking at Hostess House and Protestant Chapel. |
| 1258 | 229299 | | Plan and Profile Gate Road- Gate House Area. |

Q-2.03 Supply and Industrial Area

| | | | |
|---|---|---|---|
| 200 | 161880 | P-108-1 | Northeast Creek Railroad Trestle |
| 201 | 161881 | P-108-1 | Details of Highway and Railroad Crossing and Headwalls. |
| 202 | 161882 | P-108-1 | Revised Grade Line on R.R. Connection between Station 369 to 399 |
| 203 | 161883 | P-108-1 | Wallace Creek Railroad Trestle |
| 204 | 161884 | P-108-1 | Bearhead Creek Railroad Trestle |
| 241 | 161921 | P-108-1 | R.R. Tracks No. 1 and 2 Station 419 to 480 |
| 242 | 161922 | P-108-1 | R.R. Tracks No. 1 and 2 thru Supply Area |
| 243 | 161923 | P-108-1 | R.R. Track No. 3 thru Supply Area |
| 263 | 161943 | P-108-1 | Rip Rap Dets. Trestle over Wallace Creek |
| 1223 | 229301 | P-108-1 | Supply and Industrial Area Switching Tracks |
| 2209 | 229302 | P-232. | Plan and Profile of "Wye" turn track off Track No. 1. |
| 244 | 161924 | | Drainage Layout Supply and Industrial Area |
| 248 | 161928 | P-108-2 | Oak and Pine Street, Supply & Inds. Area. |
| 249 | 161929 | P-108-2 | Gum and Cedar Street, Supply & Ind. Area. |
| 250 | 161935 | P-108-2 | Maple and South street, Supply & Ind. Area. |
| 251 | 161931 | P-108-2 | Plan and Profile West Road, Supply & Ind.Area |
| 252 | 161932 | P-108-2 | Center Road, Supply and Industrial Area |
| 253 | 161933 | P-108-2 | East Road, Supply and Industrial Area |
| 257 | 161937 | P-108-2 | Cypress Street, Supply and Industrial Area |
| 1246 | 229303 | P-224-3 | Hammond Road, Supply and Industrial Area |

Dwg.

1247
1248
1267
1271
1275
1291
1298
1236
276
277
278
1237
1279
2200
2211
206
207
208
209
210
264
265
267
268
269
270
271
272

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 1247 | 229304 | P-224-3 | Plan & Profile Michael Rd. S.& I. Area |
| 1248 | 229305 | P-224-3 | Plan & Profile Cedar, Maple S. Cypress Streets S. & I. Area Extensions to Oak, Pine, Gum Sts. |
| 1267 | 229306 | P-108-2 | Typical Sec. Gibb Rd. Sta. 52 to 80 |
| 1271 | 229307 | P-225-4 | Fin. Grades on Pavement - Motor Parking Area Supply and Industrial Area |
| 1275 | 229308 | P-225-1 | Ext. to Michael Rd. S & I Area to Sneads Ferry Rd. |
| 1291 | 229309 | P-108-2 | Plan of parking bet. West Rd. & Central Rd. |
| 1298 | 229310 | P-108-7 | Dets. of Conc. Slab at C.H.P.-Coal Storage |
| 1236 | 229311 | | Grade Crossing #24 Elec. Flashing Warning Sig. |

Q-2.04. Naval Hospital Area

| | | | |
|---|---|---|---|
| 276 | 191956 | P-108-2 | River Rd. Hospital Area Sta. 60 to 90 |
| 277 | 191957 | P-108-2 | River Rd. Hospital Area Sta. 90 to 120 |
| 278 | 161958 | P-108-2 | River Rd. Hospital Area Sta. 120 to 138 |
| 1237 | 229313 | P-108-2 | Roads - Hospital Area |
| 1279 | 229314 | P-400-1-2 | Surgeons Row and Ent. to Adm. Bldg. |
| 2200 | 229315 | | Roads - Hospital Area |
| 2211 | 229316 | P-400-1-2 | Parking - Family Hosp. & Civilian Nurses Home |

Q-2.05. Residential Area

| | | | |
|---|---|---|---|
| 206 | 161886 | P-108-2 | Paradise Pt. Rd. Plan & Profile |
| 207 | 161887 | P-108-2 | Paradise Pt. Rd. Plan & Profile |
| 208 | 161888 | P-108-2 | Paradise Pt. Rd. Plan & Profile |
| 209 | 161889 | P-108-2 | Paradise Pt. Rd. Plan & Profile |
| 210 | 161890 | P-108-2 | Paradise Pt. Rd. Plan & Profile |
| 264 | 161944 | P-108-2 | Officers Quarters Area - Drainage Layout & Typical Section |
| 265 | 161945 | P-108-2 | Officers Quarters Area - Autumn Oval & Kent Rd. |
| 267 | 161947 | P-108-2 | Officers Quarters Area - St. Mary's Drive Sta. 225 to 249 |
| 268 | 161948 | P-108-2 | Officers Quarters Area - St. Mary's Drive Sta. 196 to 225 |
| 269 | 161949 | P-108-2 | Officers Quarters Area - Charles, Howard, Cecil Carroll and Montgomery Sts. |
| 270 | 161950 | P-108-2 | Officers Quarters Area - River Rd. Sta. 230 to 253 |
| 271 | 161951 | P-108-2 | Officers Quarters Area - River Rd. Sta. 200 to 230 |
| 272 | 161952 | P-108-2 | Officers Quarters Area - River Rd. Sta. 170 to 200 |
| 273 | 161953 | P-108-2 | Officers Quarters Area River Rd. Sta. 140-170 |
| 274 | 161954 | P-108-2 | Officer's Quarters Area-Riv. Rd. Sta. 90-140 |
| 275 | 161955 | P-108-2 | Officers Quarters Area -River Rd. Sta. 60-90 |
| 297 | 161977 | P-108-2 | Plan & Elev. Main Ser. Rd. Bridge over Wallace Ck. |
| 298 | 161978 | P-108-2 | Superstructure Dets. Main Sev. Rd. Bridge over Wallace Creek |
| 299 | 161979 | P-108-2 | Superstruc. Details Main Sev. Road, Bridge over Wallace Creek |

| Dwg. NO. | Y & D No. | Proj. NO. | Title ( Cont'd) |
|---|---|---|---|
| 1212 | 229320 | P-108-2 | Officers' Quarters Area Plan and Profile B.O.Q. and Guest House Road. |
| 1221 | 229321 | P-108-2 | Eden, Jewel, Sumpter and Jackson Streets. |
| 1235 | 229322 | P-205-5 | Officers' Qtrs.Area Wavell and Winston Roads. |
| 1263 | 229323 | P-223-3 | Superstructure Dets. Bridge on River Drive near Officers' Quarters. |
| 1264 | 229324 | P-223-3 | Superstructure Dets. Bridge on River Drive near Officers' Quarters. |
| 1278 | 229325 | P-205-5 | Officers' Qtrs. Area Charles St.Roads Extension and Road to Servants' Quarters. |
| 2210 | 229326 | P-108-2 | Plan of Parking in vicinity of B.O.Q.& Officers' Mess. |

Q-2.06. Rifle Range Area

| | | | |
|---|---|---|---|
| 1225 | 229329 | P-223-2 | Rifle Range Area.Approach Road Station 30 to 55. |
| 1226 | 229330 | P-203-8 | Rifle Range Area. Range Road Station 0 to 30. |
| 1227 | 229331 | P-203-8 | Rifle Range Area. Range Road Station 30 to 60. |
| 1228 | 229332 | P-203-8 | Rifle Range Area. Powder Lane & Typical Section. |
| 1229 | 229333 | (P-203-7) (P-203-8) (P-203-15) | Rifle Range Area. Drainage Layout. Typical sec. of Firing Point and Service Roads. |
| 1230 | 229334 | P-203-8 | Rifle Range Area. Dets. for retaining walls for Roads through Firing Lines. |
| 1231 | 229335 | P-203-8 | Rifle Range Area. Butts Ave. Station 0 to 20 |
| 1232 | 229336 | P-203-8 | Rifle Range Area Service Roads in Ranges 1, 2 and 3. |
| 1234 | 229337 | P-223-2 | Rifle Range Area Approach Road. |

Q-2.07. Balloon Barrage and Amphibian Base

| | | | |
|---|---|---|---|
| 289 | 161969 | P-223-1 | Sneads Ferry Road. Station 772 to 804 |
| 290 | 161970 | P-108-59 | Sneads Ferry Road. Station 458 to 530 |
| 291 | 161971 | P-108-59 | Sneads Ferry Road. Station 530 to 610 |
| 292 | 161972 | P-108-59 | Sneads Ferry Road. Station 610 to 690 |
| 293 | 161973 | P-223-1 | Sneads Ferry Road. Station 690 to 772 |
| 294 | 161974 | P-223-1 | Sneads Ferry Road. Station 804 to 885 |
| 295 | 161975 | P-223-1 | Sneads Ferry Road. Station 885 to 965 |
| 296 | 161976 | P-223-1 | Sneads Ferry Road. Station 965 to 1045 |
| 1217 | 229338 | P-223-1 | Sneads Ferry Road. Station 1045 to 1125 |
| 1218 | 229339 | P-223-1 | Sneads Ferry Road. Station 1125 to 1205 |
| 1238 | 229340 | P-202-7 | Typical Section. Dredging of Amphibian Base. |
| 1241 | 229341 | P-202-7 | General Layout of Dredging |
| 1243 | 229342 | P-202-18 | Amphibian Base Area. Marines Road |
| 1244 | 229343 | P-202-18 | Amphibian Base Area. Marines Road. |
| 1245 | 229344 | P-202-18 | Amphibian Base Area. Courthouse Road. |
| 1251 | 229345 | P-202-7 | Plan of Dredging Details of Mooring Pile |
| 1252 | 229346 | P-202-18 | Clinton Street, Middle Street and Peach Street |

| Dwg. No. | Y & D No. | Proj. No. | Title ( Cont'd) |
|---|---|---|---|
| 1253 | 229347 | P-202-18 | Plan and Profile Front Street |
| 1257 | 229348 | P-223-1 | Sneads Ferry Road Station 1205-1283 |
| 1262 | 229349 | P-202-18 | Grace Lane & Typical Section for Roads in Balloon Barrage School Area |
| 1265 | 229350 | P-202-18 | Poe St. Balloon Barrage School Area |
| 1268 | 229351 | P-223-1 | Superstructural Dets. for Creosoted Bridge on Sneads Ferry Rd. |
| 1269 | 229352 | P-223-1 | Superstructural Dets. for Creosoted Bridge with two spans |
| 1270 | 229353 | P-223-1 | Superstructural Dets. for Creosoted Bridge with three spans. |
| 1280 | 229354 | P-202-18 | Higgins Brown and Kramer Rd. Marine R.R. into Carpentry and Machine Shop |
| 2218 | 229355 | P-150 | Marines Road Station 0 to 30 Typical Sections and Layout |
| 2219 | 229356 | P-150 | Marines Road Station 30 to 90 |
| 2220 | 229357 | P-150 | Marines Road Station 90 to 130 |
| 2221 | 229358 | P-150 | Marines Road Station 130 to 190 |
| 2222 | 229359 | P-150 | Marines Road Station 190 to 252 |

Q-2.08. Parachute Training Area

| | | | |
|---|---|---|---|
| 282 | 161962 | P-108-54 | Parachute Tower Road Plan & Pro. |

Q-2.09. Glider Training Base

| | | | |
|---|---|---|---|
| 280 | 161960 | P-108-2<br>P-108-55 | Approach Road to Landing Field |
| 1200 | 229365 | P-114 | Landing Field Parachute Troops Dets. of Drop Inlet & warm up Apron |
| 1201 | 229366 | P-114 | Landing Field Parachute Troops Drainage Layout and Typical Sec. |
| 1202 | 229367 | P-114 | Landing Field Parachute Troops Dets. of concrete spillway NE - SW Runway. |
| 1203 | 229368 | P-114 | Landing Field Parachute Troops NE-SW Runway |
| 1204 | 229369 | P-114 | Landing Field Parachute Troops NS Runway and taxi way warm up apron |
| 1205 | 229370 | P-114 | Landing Field Parachute Troops NW--SW Runway |
| 1206 | 229371 | P-114<br>P-108-2 | Landing Field Parachute Troops Approach Road Intersection of NS and NE-SW Runways |
| 1213 | 229372 | P-108-2 | Approach Road Landing Field #17 to Station 60. |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 1214 | 229373 | P-108-2 | Approach Road Landing Field Station 60 to 89 |
| 1297 | 229374 | | Approach Rd.Landing Field Grade crossing flashing signals. |
| 2208 | 229375 | | Taxiway and Warm-Up Apron Glider Base |

Q-2.10. Cemetary

| | | | |
|---|---|---|---|
| 283 | 161963 | P-108-56 | Layout Plan and Profile White Cemetary |
| 284 | 161964 | P-108-56 | Layout Colored Cemetary |

Q-2.11. Tent Camp No. 1

| | | | |
|---|---|---|---|
| 10 | 161795 | P-1-2 | Typical Street Sections |
| 11 | 161796 | P-1-2 | Drainage Layout |
| 49 | 161936 | P-1-2 | 1st and 2nd Streets |
| 50 | 161836 | P-1-2 | "A" and "C" Streets |
| 51 | 161837 | P-1-2 | "E" and "D" Streets |
| 52 | 161838 | P-1-2 | 3rd. and 4th. Streets |
| 53 | 161839 | P-1-2 | 5th. and 6th. Streets |
| 54 | 161840 | P-1-2 | "F" and "B" Streets |
| 69 | 161855 | P-1-11 | Railroad Layout |
| 70 | 161856 | P-1-2 | Profile Access Road and "G" Street |
| 71 | 161857 | P-1-2 | Proposed Sidewalk Ext. & Foot Bridge for Mess Hall |
| 99 | 229378 | P-1-2<br>P-250-1-2 | Church Street Plan and Profile |
| 125 | 229379 | P-1-17 | Plan and Details Motor Parking Area |

Q-2.12 Tent Camp No. 2

| | | | |
|---|---|---|---|
| 200 | 229381 | P-50-12 | R.R. Riding Station 23 to 45 |
| 201 | 229382 | P-50-12 | R.R. Riding Station 45 to 59 |
| 202 | 229583 | P-50-2<br>P-50-1 | Plan and Profile "A" Street |
| 203 | 229384 | P-50-1<br>P-50-2 | Plan and Profile "B" Street |
| 204 | 229385 | P-50-1<br>P-50-2 | Plan and Profile "C" Street |
| 205 | 229386 | P-50-1<br>P-50-2 | Plan and Profile "D" Street |
| 206 | 229387 | P-50-1<br>P-50-2 | Plan and Profile "E" Street |
| 207 | 229388 | P-50-1<br>P-50-2 | Plan and Profile "F" Street |
| 208 | 229389 | P-50-1<br>P-50-2 | Plan and Profile 7th Street |
| 209 | 229390 | P-50-1<br>P-50-2 | Plan and Profile 8th. Street |
| 210 | 229391 | P-50-1<br>P-50-2 | Plan and Profile 9th. Street |
| 211 | 229392 | P-50-1<br>P-50-2 | Plan and Profile 10th. Street |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 212 | 229393 | P-50-1<br>P-50-2 | Plan and Profile 11th. Street |

Q-2.13. Tent Camp No. 2.

| | | | |
|---|---|---|---|
| 213 | 229394 | P-50-1 | Typical Sections Dimensions and Quantities for Single Pipe Culverts. |
| 214 | 229395 | P-50-1<br>P-50-2 | Drainage Layout |
| 215 | 229396 | P-50-1<br>P-50-2 | "A" Street Station 45 to 63 |
| 261 | 229397 | P-250-1-2 | Plan and Profile "G" St. Dets. of Ext. to Motor Parking Area |
| 349 | 229398 | P-250-1-2 | Church Street Station 30 to 52 |
| 263 | 229399 | P-1-10<br>P-1-11 | Coal Storage Yard for Tent Camp Area |

Q-2.14. Mumford Point Tent Camp

| | | | |
|---|---|---|---|
| 2 | 229400 | P-500-1 | Mumford Landing Road Station 0-30 |
| 3 | 229401 | P-500-1 | Mumford Landing Road Station 30 to 60 |
| 4 | 229402 | P-500-1 | Mumford Landing Road Station 60 to 82 |
| 5 | 229403 | P-500-1 | Roanoke, Chowan, Paulico, Neuse, Catawba Road |
| 6 | 229404 | P-500-1 | Plan and Profile Waccamaw Rd. |
| 17 | 229405 | P-500-1 | Railroad Siding for Mumford Pt. |

Q-2.15. Peterfield Point Camp

| | | | |
|---|---|---|---|
| 1254 | 229406 | P-249-51 | Coast Guard Facilities - Dets. of South West Creek |
| 260 | 229407 | P-250-4-2 | Amphibian T.C. Flounder, Turtle Salmon Roads |

Q-2.16. Tank Battalion Camp

| | | | |
|---|---|---|---|
| 3 | 229408 | P-250-3-2 | Bedford York and Allegheny Rds. |
| 4 | 229409 | P-250-3-2 | Plan and Profile Lancaster Rd. |

Q-2.17. Midway Park Residental Area

| | | | |
|---|---|---|---|
| 16 | 229410 | P-301-403 | L.C.D.H. Reinforced Concrete Drop Inlet-Brick Masonry Drop |
| 18 | 229412 | P-301-403 | L.C.D.H. Dimensions & Quantitie for various size Headwalls |
| 19 | 229413 | P-301-401 | L.C.D.H. Drainage Layout |

| Dwg. No. | Y & D No. | Proj. No. | Title ( Cont'd) |
|---|---|---|---|
| 20 | 229414 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Typical Sec. and Layout of Parking Courts |
| 21 | 229415 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Onslow Drive Sta. 5 to 20 |
| 22 | 229416 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Onslow Drive Sta.20 to 35 |
| 23 | 229417 | P-301-401 | L.C.D.H. Onslow Drive Sta.35 to end |
| | | P-301-402 | Howard Road Station 0 to 5 |
| 24 | 229418 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Evergreen Rd. Sta. 0 to 15 |
| 25 | 229419 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Evergreen Rd. Sta.15 to 30 |
| 26 | 229420 | P-301-401 | |
| | | P-301-402 | |
| | | P-301-403 | L.C.D.H. Evergreen Rd.Sta.30 to 45 |
| 27 | 229421 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Evergreen Rd.Sta.45 to 60 |
| 28 | 229422 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Pine Rd. Carolina Rd.Sta. 0 to 15 |
| 29 | 229423 | P-301-401 | |
| | | P-301-402 | |
| | | P-301-403 | L.C.D.H. Carolima Rd. Sta.15 to 30 |
| 30 | 229424 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Carolina Rd. Sta.30 to 45 |
| 31 | 229425 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Carolina Rd. Sta.45 to 60 |
| 32 | 229426 | P-301-401 | |
| | | P-301-402 | |
| | | P-301-403 | L.C.D.H. Halifax Rd. and Dare Rd. |
| 33 | 229427 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Washington Square and Warren Road |
| 34 | 229428 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Smyrna Rd., Wilton Rd., Windsor Rd. |
| 35 | 229429 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Carolina Rd. Sta.60 to 74 |
| 36 | 229430 | P-301-401 | |
| | | P-301-402 | L.C.D.H. Evergreen Rd.Sta.60 to 67 |

Q-2.18. C.C.C. Camp

| | | | |
|---|---|---|---|
| 262 | 161942 | P-108-2 | Access Rd. to C.C.C. Camp Station 0 to 54 |

Q-2.19. Magazine Area

| | | | |
|---|---|---|---|
| 1256 | 229432 | P-216 | Charity and Faith Road |
| 1259 | 229433 | P-216 | Hope Road Station 0 to 30 |
| 1260 | 229434 | P-216 | Hope Road Station 30 to 60 |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|

Q-2.20. Mockup Area

| | | | |
|---|---|---|---|
| 1220 | 229435 | | Access Road to Mockup and Typical Sec. |
| 1239 | 229436 | | Access Road to Mockup Sta. 30 to 62 |
| 1265 | 229437 | P-249-52 | Access Road to Mockup Sta. 60 to 78 |
| 1272 | 229438 | P-225-3 | Access Road to Hurst Beach from Duck Ck. |
| 1273 | 229439 | P-225-3 | Access Road to Hurst Beach from Duck Ck. |
| 1274 | 229440 | P-225-3 | Access Road to Hurst Beach from Duck Ck. |
| 1289 | 229441 | P-225-6 | Superstructure Dets. Timber Approach Spans Ponton Bridge Hurst Beach |
| 1290 | 229442 | P-225-6 | Superstructure Dets. Timber Approach Spans Ponton Bridge Hurst Beach |
| 1292 | 229443 | P-225-6 | Plan and Elevation Fender Dets. Ponton Bridge Hurst Beach |
| 1293 | 229444 | P-225-6 | Ponton Bridge Hurst Beach |
| 1294 | 229445 | P-225-6 | Ponton Bridge Hurst Beach |
| 1295 | 229446 | P-225-6 | Machinery House-General Dets. of Barge Ponton Bridge Hurst Beach |
| 1296 | 229447 | P-225-6 | Operating Mechanism for Barge- Ponton Bridge Hurst Beach |
| 2207 | 229448 | P-225-6 | General Dets. of Barge Ponton Bridge Hurst Beach |
| 3741 | 229449 | P-225-6 | Ponton Bridge Hurst Beach- Obstruction and General Lighting |
| 5629 | 229450 | P-225-6 | Ponton Bridge- Hurst Beach- Piping and Dets. of Barge. |
| 2154 | 229451 | P-225-6 | R.R. Grade Crossing Sneads Ferry Road for use in installing electric flash warning signals |

Q-2.21. Area "M"

| | | | |
|---|---|---|---|
| 1281 | 229454 | P-225-2 | 11th. Marines Road Station 0 to 60 |
| 1282 | 229455 | P-225-2 | 11th. Marines Road Station 60 to 120 Sec. |
| 1283 | 229456 | P-225-2 | 11th. Marines Road Station 120 to 180 |
| 1284 | 229457 | P-225-2 | 11th. Marines Road Station 180 to 240 |
| 1285 | 229458 | P-225-2 | 11th. Marines Road Station 240 to 300 |
| 1286 | 229459 | P-225-2 | 11th. Marines Road Station 300 to 360 |
| 1287 | 229460 | P-225-2 | 11th. Marines Road Station 360 to 420 |
| 1288 | 229461 | P-225-2 | 11th. Marines Road Station 420 to 435 General Layout |

Q-2.22. Area "G"

| | | | |
|---|---|---|---|
| 2212 | 229463 | P-149 | Typical Sec. and Layout Duck Creek Road to Starling Store Station 6 to 40 |
| 2213 | 229464 | P-150 | Duck Creek to Starling Store Road Sta. 160 to 250 |
| 2214 | 229465 | | Duck Creek to Starling Store Road Sta. 250 to 310 |
| 2215 | 229466 | P-149 | Duck Creek to Starling Store Road Station 310 to 339 |

| Dwg. No. | Y & D No. | Proj. No. | Title ( Cont'd) |
|---|---|---|---|
| 2216 | 229467 | P-149 | Duck Creek to Starling Store Road Sta. 40 to 100 |
| 2217 | 229468 | P-149 | Duck Creek to Starling Store Road Sta. 100 to 160. |

Q-3. Site Plans

| | | | |
|---|---|---|---|
| 300 | 161980 | | General Area and Layout Map |
| 301 | 161981 | | Site Plan Regimental Area No. 1. |
| 302 | 161982 | | Site Plan Regimental Area No. 2. |
| 303 | 161983 | | Site Plan Regimental Area No. 3. |
| 304 | 161984 | | Site Plan Regimental Area No. 4. |
| | 161985 | Void | |
| 306 | 161986 | | Site Plan Supply and Industrial Area |
| 323 | 161967 | | Grading and Walk Plan Regimental Area No. 1. |
| 321 | 161988 | | Grading and Walk Plan Reg. Area No. 2 |
| 324 | 161989 | | Grading and Walk Plan Reg. Area No. 3 |
| 325 | 161990 | | Grading and Walk Plan Reg. Area No. 4 |
| 330 | 161991 | | Grading and Walk Plan Reg. Area No. 5 |
| 346 | 161992 | | Site Plan-Central Athletic Field - Power House and Circle Area |
| 329 | 161993 | | Grading and Walk Plan-Post Troops Area |
| 367 | 161994 | | Site Plan - Gate House |
| 163 | 161995 | | Preliminary Site Plan for Incinerator Location and Radio Towers |
| 316 | 161996 | | Post Troops Area - Site Plan |
| | 161997 | Void | |
| 318 | 161998 | | Site Plan - Reg. Area No. 5. |
| 328 | 161999 | | Landscaping Treatment Plan-Post Hdqrs. Post Troops Area |
| 320 | 162000 | | Div. Training Area - Numbering of Bldgs |
| 384 | 162001 | | Site Plan-R.R. Wye-Supply & Ind. Area |
| 382 | 162002 | | Site Plan-Hospital Area |
| 356 | 162003 | | Grading and Walks Plan - Naval Hospital |
| 1112 | 162004 | | Medical Officers' Qtrs. Hospital Area |
| 2147 | 162005 | | Naval Hospital Property Map |
| 309 | 162006 | | Officers' Qtrs. Lot Sub-Division Lots 1, 2, 3, 4, and Paradise Road Place |
| 310 | 162007 | | Officers' Qtrs. Lot Sub-Division Lots 5 to 85 Incl. |
| 311 | 162008 | | Officers' Qtrs. Lot Sub-Div. Lots 85 to 133 Incl. |
| 312 | 162009 | | Officers' Qtrs. Lot Sub-Division. River Road Location |
| 313 | 162010 | | Officers' Qtrs. Lot Sub-Division. River Road Location |
| 357 | 162011 | | Grading and Walks Plan Bachelor Officer Qtrs. Area |
| 368 | 162012 | | Numbering Plan of Officers' Qtrs. Area |
| 380 | 162013 | | Typical Plans & Dets. Walks and Drives-Officers' Qtrs. |
| 387 | 162014 | | Walk & Drive Plan for General's Qtrs. |

| Dwg. No. | Y & D No. | Proj. No. | Title (Con't) |
|---|---|---|---|
| 82 | 162015 | | Prelim. Studies for Officer's Quar. showing Rds. and Sites |
| 342 | 162016 | | Site Plan-Rifle Range-near Dixon |
| 343 | 162017 | | Site Plan-Rifle Range- near Dixon |
| 386 | 162018 | | Site Plan-Rifle Range showing Numbering of Bldgs. |
| 1104 | 162019 | | Proposed Site for Rifle Range near Di |
| 352 | 162020 | | Balloon Barrage Battalion at Marines (Troop Area) |
| 353 | 162021 | | Balloon Barrage Battalion at Marines (Officers' Homes Area) |
| 358 | 162022 | | Site Plan-Amphibian Base and Boat Storage Yd. |
| 359 | 162023 | | Site Plan-Balloon Barrage School Area |
| 385 | 162024 | | Site Plan-Balloon Barrage Battalion and Amphibian Base Showing Num. of Bl. |
| 726 | 162025 | | Site Plan-Parachute Training Towers |
| 371 | 162026 | | Site Plan-Bldg. Group-Parachute Tower Area |
| 383 | 162027 | | Site Plan-Additional Parachute Training Tower |
| 189 | 162028 | | Site Plan for Parachute Troops landing Field |
| 376 | 162029 | | Site Plan-Sea Plane Base near Peterfield Point. |
| 40 | 162030 | | Suggestion for a Proposed Cemetery N. C. Rt. 24 |
| 45 | 162031 | | Suggestion for a proposed Cemetery.. U.S. Route 17. |
| 348 | 162032 | | Planting plan for White Cemetery |
| TC 3 | 161794 | | Tent Camp Site Plan |
| TC 112 | 162033 | | Site Plan Tent Camp Hospital |
| TC 220 | 162034 | | Site Plan-Tent Camp No. 2 |
| TC340 | 162035 | | Site Plan-Location for R-2 Bldg., Chapel, and Restaurant Buildings. |
| TC 275 | 162036 | | Addition to Tent Camp Hospital-Plot Plan |
| MP 1 | 162037 | | Site Plan- Mumford Point Tent Camp |
| 1186 | 162038 | | Site Plan-Mumford Point Camp |
| TC 238 | 162039 | | Tent Camp Amphibian Base Site Plan |
| TS 1 | 162040 | | Site Plan-Tank Battalion |
| LCH 45 | 162041 | | Site Plan- Low Cost Defense Housing |
| LCH 46 | 162042 | | Site Plan- Low Cost Defense Housing |
| LCH 47A | 162043 | | Site Plan-Low Cost Defense Housing |
| CCC 1 | 162044 | | Site Development Plan for Civilian Conservation Corps Camp |
| 345 | 162045 | | Magazine Area-Site Plan |
| 360 | 162046 | | Site Plan-Magazine Area-Small Arms and Detonators |
| 361 | 162047 | | Site Plan-Magazine Area-High Explosive: |
| 1174 | 162048 | | Record Mapping Project-General Layout |

| Dwg. No. | Y & D No. | Proj. No. | Title (Con't) |
|---|---|---|---|
| 2157 | 162049 | | Record Mapping Project-General Layout |
| 138 | 162050 | | General Area Map |
| 389 | 162051 | | Officers' Quarters Area, Typical Plan and Section of Underdrains, Married Officers' Homes |
| 388 | 162052 | | Site Plan-Gun Emplacements-Onslow Beach |
| TC 121 | 162053 | | Site Plan-Tent Camp Hospital |
| TC 382 | 162054 | | Site Plan- Tent Camp Incinerator |
| LCH 72 | 162055 | | L. C. D. H.- Treatment of Walks and Oil Tanks |
| 350 | 162056 | | Typical Athletic Fields- D. T. A. |
| 351 | 162057 | | Typical Athletic Fields- D. T. A. |
| LCH 78 | 162058 | | Numbering Plan- L. C. D. H. |
| CCC 8 | 162059 | | Camp Knox-Site Plan- Dog Training Are |
| 381 | 162060 | | Naval Hospital- Athletic Facilities- Layout Plan |
| 26 | 162061 | | Preliminary Site Development Plan No. 11 |

Q- 4. Sewers

| | | | |
|---|---|---|---|
| 400 | 162080 | 108-5 | New River Intercepting Sewer |
| 401 | 162081 | 108-5 | New River Intercepting Sewer |
| 402 | 162082 | 108-5 | Typical Sewer Details |
| 403 | 162083 | 108-5 | Typical Sewer Details |
| 404 | 162084 | 108-5 | Typical Sewer Details |
| 405 | 162085 | 108-5 | New River Intercepting Sewer |
| 406 | 162086 | 108-5 | Sewers Regimental Area No. 2 |
| 407 | 162087 | 108-5 | Sewers Regimental Area No. 3 |
| 408 | 162088 | 108-5 | New River Intercepting Sewer |
| 409 | 162089 | 108-5 | Sewers Regimental Area No. 4 |
| 410 | 162090 | 108-5 | Hospital Area Trunk Sewer |
| 412 | 162092 | 108-5 | Supply and Industrial Area Trunk Sewe |
| 413 | 162093 | 108-5 | Sewers Supply and Industrial Area |
| 414 | 162094 | 108-5 | Sewers Regimental Area No. 1 |
| 415 | 162095 | 108-5 | General Sewer Plan D. T. A. |
| 416 | 162096 | 108-5 | Outfall Sewer |
| 418 | 162098 | 108-5 | New River Intercepting Sewer |
| 419 | 162099 | 108-5 | New River Intercepting Sewer |
| 420 | 162100 | 108-5 | New River Intercepting Sewer |
| 421 | 162101 | 108-5 | New River Interceptor and Officers' Quarters' Sewer |
| 422 | 162102 | 108-5 | New River Interceptor and Officers' Quarters' Sewer |
| 434 | 162114 | 108-5 | General Sewer Plan- Residential Area |
| 456 | 162136 | 400-1-20 | Hospital Area- Sewers |
| 458 | 162138 | 200-11 | Sewers Regimental Area No. 5 |
| 460 | 162140 | 201-5 | Post Troops Area Sewers |
| 462 | 162142 | 123-6 | Parachute Training Towers Sewers |
| 463 | 162143 | 108-5 | Bachelor Officers' Quarters'- Sewers |

| Dwg. No. | Y & D No. | Project No. | Title ( Cont'd) |
|---|---|---|---|
| 464 | 162144 | 203-12 | Rifle Range Sewers |
| 471 | 162151 | 205-4 | Additional Officers' Quarters Sewers |
| 472 | 162152 | 205-4 | Additional Officers' Quarters Sewers |
| 485 | 162165 | 202-15 | Balloon Barrage Battalion Sewers |
| 493 | 162173 | 117 | Landing Field Sewers & Disposal Field |
| 494 | 162174 | 202-15 | Amphibian Base and B.B. Sewers and Disposal Field |
| 1402 | 162300 | 221-4 | Gate House - Sewers |
| 1400 | 162301 | 202-15 | Balloon Barrage Battalion Area-Sewers Pumping Station No. 7. |
| 1408 | 162302 | 129-1 | Additional Parachute Training Tower-Sewer and Septic Tank |
| TC 4 | 161790 | 1-3 | Outfall Sewer Tent Camp Area |
| TC 5 | 161791 | 1-3 | Tent Camp Sewer Plan |
| TC 6 | 161792 | 1-3 | Tent Camp Sewers Profile |
| TC 217 | 162303 | 250-1-3 | T.C. No. 2 Sewers |
| TC 218 | 162304 | 250-1-3 | T.C. No. 2 Sewers |
| TC 246 | 162305 | 250-1-3 | T.C. No. 2 Sewer Profiles |
| TC 355 | 162306 | 133 | T.C. No. 1 and 2 - Addition to Sewage Treatment Plant Force Main & Outfall Sewer |
| MP 7 | 162307 | 500-2 | Sewers- Mumford Point T.C. No.1 |
| TC 303 | 162308 | 250-4-3 | Amphibian Base Peterfield Point T.C. Sewage |
| TB 2 | 162309 | 250-3-3 | Tank Battalion Tent Camp Sewers |
| LCH 7 | 162310 | 301-404 | L.C.D.H. Trunk Sewer |
| LCH 8 | 162311 | 301-404 | L.C.D.H. Trunk Sewer |
| LCH 9 | 162312 | 301-404 | L.C.D.H. Sewer Force Main |
| LCH 10 | 162313 | 301-404 | L.C.D.H. Sewer |
| LCH 11 | 162314 | 301-404 | L.C.D.H. Sewer |
| LCH 12 | 162315 | 301-404 | L.C.D.H. Sewer |

## Q-5. Sewage Structures

### Q-5.01. Sewage Treatment Plant

| | | | |
|---|---|---|---|
| 417 | 162097 | 108-5 | Temporary Settling Tank D.T.A. |
| 446 | 162126 | 108-5 | Sewage Treatment Plant - General Plan Bypass Sewer and Force Main |
| 447 | 162127 | 108-5 | Sewage Treatment Plant - Grading Plan |
| 448 | 162128 | 108-5 | Sewage Treatment Plant - Primary Settling Tank Influent & Effulent Chambers |
| 449 | 162129 | 108-5 | Sewage Treatment Plant-Premary Settling Tank, Sections and Details |
| 450 | 162130 | 108-5 | Sewage Treatment Plant-Primary Settling tank, Reinforcing Details |
| 451 | 162131 | 108-5 | Sewage Treatment Plant - Primary Settling Tank, Reinf. Dets. and Schedule |
| 452 | 162132 | 108-5 | Digester & Sludge Control -Sta-Sleeve Layout |
| 453 | 162134 | 108-5 | Sludge Drying Beds |

Dwg

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| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 454 | 162134 | 108-5 | Digester and Sludge Control Station - Reinforcing Details. |
| 455 | 162135 | 108-5 | Côntrol Chamber & Pig. #3-Structural and Piping Details |
| 459 | 162136 | 108-5 | Primary Settling Tanks - Reinforcing Det. |
| 461 | 162141 | 108-5 | Sludge Control Sta. and Pipe Tunnel |
| 465 | 162145 | 108-5 | Sludge Control Sta. Stair Dets. & Secs. |
| 466 | 162146 | 108-5 | Sludge Control Station - Reinforcing Details |
| 467 | 162147 | 108-5 | Pumping Station Piping and Structural Details |
| 468 | 162148 | 108-5 | Pumping Sta. Calorination Equipment & Miscellaneous details |
| 469 | 162149 | 108-5 | Pumping Station - Reinforcing Details |
| 470 | 162150 | 108-5 | Sludge Control Station - Piping Dets. |
| 475 | 162155 | 108-5 | Sludge Control Station - Pipe Tunnel & Driveway Reinforcing Schedule |
| 476 | 162156 | 108-5 | Sludge Control Station - Reinforcing dets. |
| 477 | 162157 | 108-5 | Sludge Control Station- Pipe Tunnel and Driveway Reinforcing Schedule |
| 478 | 162158 | 108-5 | Sludge Pumping & Chlorinating Sta.Heating |
| 480 | 162160 | 108-5 | Sludge Pumping and Control Station Plumbing |
| 481 | 162161 | 108-5 | Sludge Control Station - Heating |
| 482 | 162162 | 108-5 | Primary Settling Tank No. 3 - Piping and Structural Details |
| 483 | 162163 | 108-5 | Reinforcing Details and Bar Schedule - Piping & Structural Details |
| 484 | 162164 | 108-5 | Sludge Drying Beds 9 to 14 incl. |
| 486 | 162166 | 108-5 | Sludge Digestion Tank No. 3 and Bar Schedule-Reinf. Details |
| 487 | 162167 | 108-5 | Sludge Control Chamber and Pipe Tunnel Reinforcing Details |
| 488 | 162168 | 108-5 | Miscellaneous Details |
| 1730 | 228686 | 108-5 | Control Station - Electrical |
| 1731 | 228687 | 108-5 | Sludge Pumping Station - Electrical |
| 1891 | 228688 | 108-5 | Sludge Pumping and Chlorinating Sta. Plans, Elev. and Dets. |
| 1892 | 228689 | 108-5 | Roof Framing Plan and Details |
| 5842 | 228690 | 108-5 | Sludge Pumping and Chlorinating Station Full size window details |
| 7851 | 228691 | | Sludge Pumping and Chlorination Station S.T.P. Bar Bending Schedule |

Q-5.02. Sõwage Pumping Station No. 1

| | | | |
|---|---|---|---|
| 424 | 162104 | 108-5 | Sewage Pumping Station - Discharge Piping Misc. Details Location Diagram |
| 425 | 162105 | 108-5 | Sewage Pumping Station Pump and Piping Details D.T.A. |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 426 | 162106 | 108-5 | Sewage Pumping Sta. Steel Reinf. Dets. D.T.A. |
| 427 | 162107 | 108-5 | Sewage Pumping Sta. Steel Reinf. Dets. D.T.A. |
| 428 | 162108 | 108-5 | Sewage Pumping Sta. Stair and other Details D.T.A. |
| 429 | 162109 | 108-5 | Sewage Pumping Sta. Steel Schedule & other dets. D.T.A. |
| 430 | 162110 | 108-5 | Sewage Pumping Sta. Dets. of Comminutor Structural and Misc. Dets. |
| 431 | 162111 | 108-5 | Sewage Pumping Sta. Dist. Channel, Bar Screen and Comminutor Dets. |
| 432 | 162112 | 108-5 | Sewage Pumping Sta. Grit Chamber Air Water and Plumbing Dets. |
| 433 | 162113 | 108-5 | Sewage Pumping Sta. Sludge Beds and Drainage Roads |
| 440 | 162120 | 108-5 | Sewage Pumping Sta. Piping Dets. - Gas Engine |
| 734 | 162414 | 108-5 | Sewage Pumping Sta. Electrical Layout |
| 812 | 228692 | 108-5 | Sewage Pumping Sta. No. 1 - Plan Elev. Sec. and Details |
| 961 | 228693 | 108-5 | Sewage Pumping Sta. No. 1 - Full Sized Window Details |

Q-5.03. Sewage Pumping Station No. 2.

| | | | |
|---|---|---|---|
| 457 | 162137 | 400-1-20 | Hospital Area - Sewer Pumping Station |
| 737 | 228694 | 400-1-20 | River Rd. Sewer Pumping Sta. No. 4. Hospital Sewage Pumping Sta. No. 2. Electrical Layout |

Q-5.04. Wallace Creek Sewage Pumping Station No. 3.

| | | | |
|---|---|---|---|
| 435 | 162115 | 108-5 | Wallace Creek Pumping Sta. Structural & Piping Dets. Location and Grading Plan |
| 436 | 162116 | 108-5 | Wallace Creek Pumping Sta.Steel Stairs Stair well Dets. Manhole No. 153. |
| 437 | 162117 | 108-5 | Wallace Creek Pumping Sta. Sump Screen Trough Gas., Engine, Piping |
| 438 | 162118 | 108-5 | Wallace Creek Pumping Sta. Steel Reinf. Dets. |
| 439 | 162119 | 108-5 | Wallace Creek Pumping Sta. Steel Reinf. Dets. |
| 736 | 228695 | 108-5 | Sewage Pumping Sta. No. 3 Wallace Creek Electrical Layout |

Q-5.05. River Road Sewage Pumping Station No. 4.

| | | | |
|---|---|---|---|
| 441 | 162121 | 108-5 | River Rd. Sewage Pumping Sta. Structural Piping Details |
| 442 | 162122 | 108-5 | River Rd. Sewage Pumping Sta. MH-184 Steel Stairs |

| Dwg. No. | Y & D No. | Proj. No. | Title ( Cont'd) |
|---|---|---|---|
| 443 | 162123 | 108-5 | River Rd. S.P.S. Gas Engine Piping Sump. |
| 444 | 162124 | 108-5 | River Rd. S.P.S. - Reinf. Dets. |
| 445 | 162125 | 108-5 | River Rd. S.P.S. - Reinf. Dets. |
| 737 | 228694 | 108-5 | River Rd. S.P.S. No. 4 |
| | | 400-1-20 | Hospital Sewage Pumping Sta. No. 2 - Electrical Layout |

Q-5.06. Sewage Pumping Station No. 5.

| | | | |
|---|---|---|---|
| 473 | 162153 | 108-5 | Autumn Oval Sewage Pumping Station - Structural and Piping Details, Location Plans |
| 474 | 162154 | 108-5 | Autumn Oval Sewage Pumping Station and Reinf. Details - Grading Plan |
| 1701 | 228696 | 108-5 | Autumn Oval Sewage Pumping Station - Electricical Work |

Q-5.07. Sewage Treatment Plant - Rifle Range

| | | | |
|---|---|---|---|
| 489 | 162169 | 203-12 | Imhoff Tank - Piping & Structural Dets |
| 490 | 162170 | 203-12 | Sludge Beds - Miscellaneous Dets. - Location and Layout Plans |
| 491 | 162171 | 203-12 | Rifle Range Sewage Treatment Plant Reinf. Details |
| 492 | 162172 | 203-12 | Rifle Range Sewage Treatment Plant Reinf. Details |
| 1403 | 228697 | 203-12 | Rifle Range Septic Tanks & Disposal Field |

Q-5.08. Sewage Treatment Plant - Balloon Barrage

| | | | |
|---|---|---|---|
| 495 | 162175 | 202-15 | Sludge Beds, Outfall, Layout and Location Plan |
| 496 | 162176 | 202-15 | Imhoff Tank, Piping & Structural Dets. |
| 497 | 162177 | 202-15 | Chlorination Manhole |
| 498 | 162178 | 202-15 | Sewage Treatment Plant - Balloon Barrage Battalion Dets. Reinf. |
| 499 | 162179 | 202-15 | Sewage Treatment Plant - Balloon Barrage Battalion Dets. Reinf. |
| 2790 | 228698 | 202-15 | Balloon Barrage Battalion & Amphibian Base Sewage Pumping Sta. Elec. Layout |

Q-5.09. Parachute Training Area

| | | | |
|---|---|---|---|
| 1404 | 228699 | | Parachute Training Tower - Structural & Piping Dets. Sewage Pumping Station Location and Layout Plan |
| 1405 | 228700 | | Parachute Training Tower - Reinf. Dets. Sewage Pumping Station - Reinf. Dets. |

| Dwg. No. | Y & D No. | Proj. No. | Title (Con't) |
|---|---|---|---|
| 1406 | 228701 | | Parachute Training Tower. Pumping Station-Reinf. Dets. |
| 1407 | 228702 | | Parachute Training Tower and special Sewage Pumping Sta.-Reinf. Dets. Manhole No. 475 |

Q-5.10. Glider Training Base

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| 1401 | 228703 | 117 | Standard Fifty Man Septic Tank Plan Schedule landing Field Sections and Bar |

Q-5.11. Tent Camp No. 1 and No. 2

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| TC 63 | 161849 | 1-3 | Sewage Treatment Plt.-Plan Elevation and Section |
| TC 64 | 161850 | 1-3 | Sewage Treatment Plt.-Reinf. Dets. |
| TC 65 | 161851 | 1-3 | Sewage Treatment Plt.-Chlorinator Piping, Reinf., Sludge Bed Dets. |
| TC 66 | 161852 | 1-3 | Sewage Treatment Plant-Bar List Settling Tank and Sludge Tank |
| TC 76 | 161862 | 1-3 | Sewage Treatment Plt.-Chlorinator House Dets. |
| TC 227 | 228704 | 250-1-3 | Addition to Sewage Treatment Plt. |
| TC 361 | 228705 | 133 | Sludge Pumping and Revolving Scum Troughs |
| TC 363 | 228706 | 133 | Addition to Sewage Treatment Plt.-Sludge Pumping Sta.-Structural and Reinf. Dets. |
| TC 364 | 228707 | 133 | Sludge Pumping Sta. for Sewage Treatment Plt. |
| TC 365 | 228708 | 133 | Addition to Sewage Treatment Plt. Sludge drying bed 5 to 10 |
| TC 366 | 228709 | 133 | Addition to Sewage Treatment Plt.-Digestion Tank E Structural and Piping Dets. |
| TC 368 | 228710 | 133 | Addition to Sewage Treatment Plant sludge Digestion Tank E Reinf. Dets. |
| TC 371 | 228711 | 133 | Addition to Sewage Treatment Plt.-General Plan |
| TC 372 | 228712 | 133 | Addition to Sewage Treatment Plant-Sludge Digestion Tank E Reinforcing Details |
| TC 375 | 228713 | 133 | Addition to Sewage Treatment Plant Sludge Digestion Tank E and Roof Framing Plan |
| TC 376 | 228714 | 133 | Flocculation Tank Structural and Piping Dets. |
| TC 377 | 228715 | 133 | Parshall Flume-Structural and Piping details |

| Dwg. No. | Y & D No. | Proj. No. | Title (Con't) |
|---|---|---|---|
| TC 378 | 228716 | 133 | Flocculation and Parshall Flume Tank Reinf. Dets. |
| TC 379 | 228717 | 133 | Flocculation and Parshall Flume Tank Reinf. Dets. |
| TC 383 | 228718 | 133 | Addition to Sewage Treatment Plt. Misc. Dets. |
| TC 384 | 228719 | 133 | Chemical Building Structural and Piping Dets. |
| TC 386 | 228720 | 133 | Chemical Building Structural and Piping Details |
| TC 392 | 228721 | TC No. 1 & 2 | Addition to Sewage Treatment Plt.-Chemical Bldg. Plans and Elevations |
| TC 393 | 228722 | TC No. 1 & 2 | Addition to Sewage Treatment Plt.-Chemical Bldg. Dets. |
| TC 398 | 228723 | TC No. 1 & 2 | Addition to Sewage Treatment Plant Electrical Layout |
| TC 356 | 228724 | TC No. 1 & 2 | Brinson Ck. Sewage Pumping Station |
| TC 357 | 228725 | TC No. 1 & 2 | Brinson Ck. Sewage Pumping Station Reinfore. |
| TC 358 | 228726 | 133 | TC No. 1 & 2 Brinson Ck. Sewage Pumping Sta. Reinfore |
| TC 360 | 228727 | 133 | TC No. 1 & 2 Brinson Ck. Sewage Pumping Sta. Reinforeing Dets. |
| TC 367 | 228728 | 133 | TC No. 1 & 2 Brinson Ck. Sewage Pumping Station Electrical Layout |

Q-5.12. Mumford Point T. C.

| | | | |
|---|---|---|---|
| MP 35 | 228729 | 500-2 | Sewage Treatment Plt.-Imhoff Tank |
| MP 36 | 228730 | 500-2 | Sewage Treatment Plant-Location Plans Outfall Sludge Beds |
| MP 37 | 228731 | 500-2 | Sewage Treatment Plant-Details |

Q-5.13. Midway Park Residental Area

| | | | |
|---|---|---|---|
| LCH 62 | 228732 | | O. D. S. P. S. Structural and Piping Details-Location and Grading Plan |
| LCH 63 | 228733 | | O. D. S. P. S. Details MH-500 Steel Stairs Well and Hood Float Tube |
| LCH 64 | 228734 | | O. D. S. P. S. Dets. Gasoline Engine Piping and Overflow Headwall Screen Trough |
| LCH 65 | 228735 | | O. D. S. P. S. Reinforcing Details |
| LCH 66 | 228736 | | O. D. S. P. S. Reinforcing Details |
| LCH 73 | 228737 | | L. C. D. H. Temporary Sewage Treatment and Permanent Emergency Overflow |
| LCH 74 | 228738 | | O. D. S. P. S. No. 6 Electric Layout |

Q-6. Water

| | | | |
|---|---|---|---|
| 502 | 162182 | 108-4 | Typical Water Details |

| Dwg. No. | Y & D No. | Proj. No. | Title ( Cont'd) |
|---|---|---|---|
| 503 | 162183 | 108-4 | 12" Feeder Main and Water Dist. System-Supply and Industrial Area |
| 504 | 162184 | 108-4 | Water Distribution System Regimental Area No. 1. |
| 505 | 162185 | 108-4 | Water Dist. System - Regimental Area No. 2. |
| 506 | 162186 | 108-4 | Water Dist. System - Regimental Area No. 3. |
| 507 | 162187 | 108-4 | Water Dist. System - Regimental Area No. 4. |
| 508 | 162188 | 200-8 | Water Dist. System - Regimental Area No. 5. |
| 509 | 162189 | 108-4 | Typical Fire Hydrant Locations |
| 510 | 162190 | 108-4 | Water Main and Fire Hyrant Water Dist. System Location & Elev. Controls |
| 511 | 162191 | 108-4 | Water Feeder Main and Dist. System |
| 512 | 162192 | 201-6 | Water Dist. System for Post Troops |
| 513 | 162193 | 108-4 | 12" Feeder Main to Water Dist. System Officers' Qtrs. Area |
| 514 | 162194 | 108-4 | 12" Feeder Main to Water Dist. System Officers' Qtrs. Area |
| 515 | 162195 | 108-4 | 12" Feeder Main to Water Dist. System Officers' Qtrs. Area |
| 516 | 162196 | 108-4 | 12" Feeder Main to Water Dist. System Officers' Qtrs. Area |
| 517 | 162197 | 108-4 | Water Dist. System - Officers' Qtrs Area |
| 518 | 162198 | 108-4 | Water Dist. System - Officers' Qtrs. Area |
| 519 | 162199 | 108-4 | Water Dist. System - Officers' Qtrs. Area |
| 521 | 162201 | 108-4 | Water Supply, Well Location and Transmission Main D.T.A. |
| 538 | 162218 | 108-4 | General Water Dist. System D.T.A. |
| 539 | 162219 | 108-4 | General Water Dist. System - Officers' Qtrs. Area |
| 562 | 162242 | 203-11 | Water Dist. System - Rifle Range |
| 563 | 162243 | 203-11 | Water Dist. System - Rifle Range |
| 564 | 162244 | 123-5 | Water Dist. System - Parachute Training Towers Area |
| 565 | 162245 | 108-4 | Water Dist. System & Transmission Mains- Parade Grounds D.T.A. |
| 566 | 162246 | 108-4 | Well 7 and 8 & Well Transmission Main D.T.A. |
| 568 | 162248 | 108-4 | Well 2,4, & 10, Well Transmission Main D.T.A. |
| 569 | 162249 | 117 | Water Dist. System - Landing Field |
| 570 | 162250 | 203-11 | Dets. for Sprinkling and Drinking Foundations for Rifle Range |
| 571 | 162251 | 112 | Water Dist. System for Sprinkling White Cemetery |

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TC 2
TC 2
TC 3

MP 2
TC 2

TC 2

TB 9

LCH 5
LCH 5
LCH 5
LCH 5
LCH 6

CCC 3
TC 12

| Dwg. No. | Y & D No. | Proj. No. | Title ( Cont'd) |
|---|---|---|---|
| 572 | 162252 | 202-14 | Water Dist. System Balloon Barrage and Amphibian Base |
| 573 | 162253 | 202-14 | Water Dist. System Balloon Barrage at Marines |
| 575 | 162255 | 221-4 | Water Dist. System for Gate House |
| 576 | 162256 | 202-14 | Water Dist. System Balloon Barrage and Amphibian Base |
| 577 | 162257 | 108-4 | Wells Nos. 11, 12, 13, 14, 15 and 16, Transmission Mains |
| 578 | 162258 | 219-2 | Well Water Trans.Mains, Dets. for Bridge Crossing Main Access and Snead's Ferry Bridge |
| 597 | 162277 | 108-4 | Water Dist. System - 3rd. Parachute Tower |
| 598 | 162278 | 226 | Water Dist. System-Boat Basin-Hospital Area |
| 599 | 162279 | 219-1<br>219-2 | Wells Nos. 17, 18, 19, 20 and 21 and Trans. Mains D.T.A. |
| 567 | 162247 | 108-4 | Well 5,6, & 9, Well Trans.Main D.T.A |
| 1500 | 162280 | 219-1<br>1-4 | Map showing well water supply system and Data - Gen. Area |
| TC 7 | 161793 | 1-4 | Water Dist. for Tent Camp Area |
| TC 58 | 161844 | 1-4 | Typical Water Dets. ( Van Dyke) |
| TC 84 | 161870 | 1-4 | Well Location and Discharge Main T.C. Area |
| TC 221 | 162281 | 250-1-4 | Water Dist. System T.C. No. 2 |
| TC 223 | 162282 | 250-1-4 | Well Location & Transmission Line |
| TC 344 | 162283 | 250-1-4 | Additional Clear Water Storage and Service to Church T.C. No. 1 & 2 |
| MP 24 | 162284 | 500-3 | Water Dist. System - M.P.T.C. |
| TC 224 | 162285 | 250-1-4 | Water Feeder Main Tent Camp Amph. Base ( Peterfield Point ) and Landing Field |
| TC 297 | 162286 | 250-4-4 | Water Dist. System Tent Camp Amph. Base |
| TB 9 | 162287 | 250-3-4 | Water Dist. System - Tank Battalion |
| LCH 50 | 162288 | 301-408 | L.C.D.H. Water Dist. System |
| LCH 51 | 162289 | 301-408 | L.C.D.H. Water Dist. System |
| LCH 52A | 162290 | 301-408 | L.C.D.H. Water Dist. System |
| LCH 53 | 162291 | 301-408 | L.C.D.H. Typical Water Dets. |
| LCH 61 | 162292 | 301-408 | L.C.D.H. General Water Dist. |
| CCC 3 | 162293 | | Water and Sewer Plan |
| TC 122 | 162294 | | Water Dist. System - Hostess House |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| Q.7: Water Structures | | | |
| 522 | 162202 | 108-4 | Water Plt. Location Plan Grading and Drainage |
| 523 | 162203 | 108-4 | Main Pumping Plt.-Pumps- Piping and and Venturi Meter |
| 524 | 162204 | 108-4 | Main Pumping Plt. Floor Plans and Chlorinator Dets |
| 525 | 162205 | 108-4 | Main Pumping Plt. Drainage System-Discharge Header Control Equipment |
| 526 | 162206 | 108-4 | Main Pumping Plt. Gasoline Engine-Fuel Supply-Cooling System |
| 527 | 162207 | 108-4 | Main Pumping Plt. Exhaust Fan-Pump Room-Air Vents at Balcony Floor |
| 528 | 162208 | 108-4 | Main Pumping Plt. Pumphouse-Reinf. Details |
| 529 | 162209 | 108-4 | Main Pumping Plt. Water Storage Bas-in -Plan and Dets. |
| 530 | 162210 | 108-4 | Main Pumping Plt. Water Storage Bas-in-Reinf. Dets. of Foundation |
| 531 | 162211 | 108-4 | Main Pumping Plan Water Storage Basin-Sec. and Reinf. Dets. |
| 532 | 162212 | 108-4 | Main Pumping Plt. Water Storage Bas-in-Reinf. Dets. and Chlorinator Hous |
| 533 | 162213 | 108-4 | Main Pumping Plan Water Storage Basi -Top Slab Reinf. |
| 534 | 162214 | 108-4 | Bill of Material Reinf. Steel |
| 542 | 162222 | 108-4 | Water Plt. and Dets. of Stairs-Plans showing origin of Reinf. Sec. |
| 543 | 162223 | 108-4 | Water Plt. Reinf. Steel Sec.-Water Pump Room-Filters and Wash |
| 544 | 162224 | 108-4 | Water Plt. Reinf. Steel Sec._Fil-ters Reception Hall and Filter Beams |
| 545 | 162225 | 108-4 | Water Plant Reinf. Steel Sec.-Sec. and Dets.-Front Filter Walls |
| 546 | 162226 | 108-4 | Water Plt. Reinf. Steel Sec.-Wall Stair Dets.-Rear Pipe Galley |
| 547 | 162227 | 108-4 | Water Plt. Reinf. Steel Plan-El. 27.5 End, Filter Foundation Walls and Details |
| 548 | 162228 | 108-4 | Water Plt. Reinf. Steel Plan-El. 37.0 Steel in Top Slabs and Catwalks |
| 549 | 162229 | 108-4 | Water Plt. Reinf. Steel Plan-El. 37.0 Steel in Bottom of Slabs and Waterproofing |
| 550 | 172230 | 108-4 | Water Plt. Reinf. Steel Sec.-Filter Walls, Roof Beams, Floor Slab |
| 551 | 162231 | 108-4 | Water Plt. Reinf. Steel Plan-Pipe Galley and Filter Wash Water Pump Room |
| 552 | 162232 | 108-4 | Water Plt. Bill of Materials-Reinf. Steel |

| Dwg. No. | Y&D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 553 | 162233 | 108-4 | Water Plt. Pipe Galley and Wash Water Pump - Underground System |
| 554 | 162234 | 108-4 | Water Plt. Filters and Pipe Galley · Section through Pipe Galley |
| 555 | 162235 | 108-4 | Water Plt. Plan-Filter Operating Floor-Section through Filter and Pipe Galley |
| 556 | 162236 | 108-4 | Water Plt. Pumps, Piping & Control Equipment Sections-Two Longitudinal |
| 557 | 162237 | 108-4 | Water Plt. Transition Piece, Manifold Pipe |
| 558 | 162238 | 108-4 | Water Plt. Pipe Railing, Trench Covers, Steel Floor Covers |
| 559 | 162239 | 108-4 | Water Plt. Key Plans for Misc. Dets |
| 560 | 162240 | 108-4 | Water Plt. Bill of Materials, Reinf Steel |
| 580 | 162260 | 108-4 | Water Plt. Softening Equipment |
| 581 | 162261 | 108-4 | Water Plt. Chemical Feed Equipment Piping D. T. A. |
| 583 | 162263 | 108-4 | Main Water Plt.-Key Plans - Stair Details and Reinf. |
| 584 | 162264 | 108-4 | Main Water Plt. - Reinf. - Walls - Chemical Feed Room |
| 585 | 162265 | 108-4 | Main Water Plt. Reinf. and El. Spiractor Pit and Chem. Feed Room |
| 586 | 162266 | 108-4 | Main Water Plt.-Misc. Sec. and Retaining Walls |
| 587 | 162267 | 108-4 | Main Water Plt.-Reinf. Spiractor and Sediment Pit |
| 588 | 162268 | 108-4 | Main Water Plt.-Reinf. - 1st Floor Chemical Feed Room |
| 589 | 162269 | 108-4 | Main Water Plt.-Reinf.-2nd Floor Chemical Feed Room |
| 590 | 162270 | 108-4 | Main Water Plant - Reinf. - Recarbonation Tank |
| 591 | 162271 | 108-4 | Main Water Plt. - Bill of Materials Reinf. Steel |
| 592 | 162272 | 108-4 | Main Water Plt.-Bill of Materials Reinf. Steel |
| 593 | 162273 | 108-4 | Main Water Plt.-Diagram of Chlorination Control System and Differential Lines |
| 594 | 162274 | 108-4 | Main Water Plt.-Reinf.-Roof Chemical Feed Room |
| 595 | 162275 | 108-4 | Main Water Plt.-Waste Wash Water Tank |
| 1541 | 228745 | 108-4 | Main Water Plt.-Foundation Plan, Reinf. Dets. and Schedules |
| 1709 | 228746 | 108-4 | Main Water Plant - Elec. Conduit |
| 1736 | 228747 | 108-4 | Main Pumping Plt. - Elec. Layout |

| Dwg. No. | Y & D No. | Proj. No. | Title (Con't) |
|---|---|---|---|
| 2867 | 228748 | 108-4 | Water Treatment and Pumping Plt. Door and Window Schedule First Floor Plan Sections |
| 2868 | 228749 | 108-4 | Water Treatment and Pumping Plt. Dets. Roof Draining Plan - Second Floor Plan Sections |
| 2869 | 228750 | 108-4 | Water Treatment and Pumping Plt. Typical Window Dets.- El. Sec. |
| 2870 | 228751 | 108-4 | Water Treatment and Pumping Plt. Gross Sections-Sec. Dets.-Slab and Beam Schedule |
| 3897 | 228752 | 108-4 | Water Treatment Pumping Plt. Sec. Screen Wall 1st and 2nd Floor Toilet Wall |
| 3898 | 228753 | 108-4 | Water Treatment Pumping Plt.-Dets. |
| 3899 | 228754 | 108-4 | Water Treatment Pumping Plt. Platform Railing Dets. and Ret. Wall |
| 6883 | 228755 | 108-4 | Water Treatment and Pumping Plt. Alternate Door and Wood Door Dets. |
| 7887 | 228756 | 108-4 | Water Treatment Pumping Plant-Office Partitions Finish Schedule |
| 7888 | 228757 | 108-4 | Water Treatment Pumping Plant-Bar Bending Schedule |
| 10891 | 228758 | 108-4 | Water Treatment Pumping Plant-Color Scheme |
| 3658 | 228759 | 108-4 | Water Treatment Pumping Plant-1st and 2nd Floor Heating |
| 4678 | 228760 | 108-4 | Water Treatment Pumping Plant_Basement- 1st and 2nd floor plumbing |
| 540 | 162220 | 108-4 | Foundation Plan 300,000Gal. Tank El. Reg. Area No. 1 |
| 536 | 162216 | 230-2 | Foundation Plan 300,000 Gal. Tank Reg. Area No. 5 |
| 596 | 162276 | 108-4 | Well Pump Houses Main Div. Training Area Rifle Range-Amp. Base-Plans, Elev. and Det. |
| 3744 | 228771 | 108-4 | Well Pump Houses Main Div. Training Area Rifle Range-Amp. Base-Elec. Layout |
| 537 | 162217 | 108-4 | Foundation Plan 300,000 Gal. Tank (Elev.) Supply and Ind. Area |
| 3717 | 228772 | 108-4 | Obstruction Lights for Water Tanks |
| 6848 | 228773 | 108-4 | Stabalizing Ring-300,000 Gal. Tank-Fd. for S. & I Area |
| 561 | 162241 | 108-4 | Ground Water Stage Recorder |
| 1502 | 228774 | | Emergency H. L. Pumping Plant-Plans, Elev. and Dets Architectural Dwgs. |
| 1503 | 228775 | | Emergency H. L. Pumping Plant-Foundation Plans, Sections and Details-Reinf. Steel |

| Dwg. No. | Y & D No. | Proj. No. | Title (Con't) |
|---|---|---|---|
| 1504 | 228776 | | Emergency H. L. Pumping Plant-Roof Plans-Beams-Elev. and Dets.-Reinf. Steel |
| 1505 | 228777 | | Emergency H. L. Pumping Plant-Schedules, Sections and Details-Reinforcing Steel |
| 1506 | 228778 | | Emergency H. L. Pumping Plant-Piping Dets.- Location Plan |
| 3743 | 228779 | 230-1 | Div. Training Area By-pass Pumping Station-Elec. Layout |
| 520 | 162200 | 108-4 | Foundation Plan 20,000 Gal. Tank Officers Qtrs. Area |
| 574 | 162254 | 203-11 | Foundation Plan-10,000 Gal. Elev. Tank-Rifle Range |
| 1501 | 228780 | 202-14 | Water Balancing Tanks and Controls Amph. Base-Balloon Barrage Battalion |
| 574 | 162254 | 203-11 | Foundation 100,000 Gal. Elev. Tank Rifle Range- Balloon Barrage |
| T. C. 59 | 161845 | 1-4 | Clear Water Storage and Pumping Plt. Layout |
| T. C. 60 | 161846 | 1-4 | Clear Water Storage Rank Reinf. Dets |
| T. C. 61 | 161847 | 1-4 | Clear Water Storage and Pumping Plt. Grading, Drainage, and Aereator Dets |
| T. C. 62 | 161848 | 1-4 | Pump House-Plan Elev. and Dets. |
| T. C. 67 | 161853 | 1-4 | Clear Water Storage and Pumping Plt Engine Cooling and Exhaust |
| T. C. 68 | 161854 | 1-4 | Pump House-Misc. Details |
| T. C. 77 | 161863 | 1-4 | Typical Pump Connection Discharge from wells T. C. Area |
| T. C. 78 | 161864 | 1-4 | Well Pump Houses-T. C. Area-Plans Elev. and Dets. |
| T. C. 91 | 161977 | 1-4 | Obstruction Lights-Tent Camp Water Tower |
| T. C. 345 | 228781 | 250-1-4 | Aeroator Det. for Additional Clear Water Storage Tank-Grading and Drainage Plan |
| T. C. 222 | 228782 | 250-1-4 | T. C. No. 2 Foundation Plan 100,000 Gal. Elev. Water Tank |
| MP 51 | 228783 | 500-2 | Foundation-40,000 Gal. Elev. Tank |
| T. H. 10 | 228784 | | Water Balancing Tank and Controls T. C. Tank Battalion |
| LCH 58 | 228785 | 301-407 | L. C. D. H. Foundation Plan 200,000 Gal. Elev. Water Tank |
| 579 | 162259 | 132 | Mock-up Water Tank Fd. Plan-Dets. Piping Layout for Tank Truck Loading |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| **Q-8. Telephones.** | | | |
| **Q-8.01. Division Training Area** | | | |
| 777 | 162320 | 124 | Underground Conduit Construction |
| 778 | 162321 | 124 | Underground Cable Construction |
| 779 | 162322 | 124 | O.P.C. Regimental Area No. 1. |
| 780 | 162323 | 124 | O.P.C. Regimental Area No. 2. |
| 781 | 162324 | 124 | O.P.C. Regimental Area No. 3. |
| 782 | 162325 | 124 | O.P.C. Regimental Area No. 4. |
| 783 | 162326 | 124 | O.P.C. Regimental Area No. 5. |
| 787 | 162327 | 124 | Trunking Cable M.A.X. with Carolina Telephone Co. |
| 788 | 162328 | 124 | Trunking Cable M.A.X. with Carolina Telephone Co. |
| 789 | 162329 | 124 | Trunking Cable M.A.X. with Carolina Telephone Co. |
| 790 | 162330 | 124 | Trunking Cable M.A.X. with Carolina Telephone Co. |
| 791 | 162331 | 124 | Trunking Cable M.A.X. with Carolina Telephone Co. |
| 799 | 162332 | 124 | O.P.C. Trunk Cable - M.A.X. to P.A.X. Office & Dist. Cable |
| **Q-8.02. Post Troops Area** | | | |
| 784 | 162333 | 124 | O.P.C. Post Troops Area |
| **Q-8.03. Supply & Industrial Area** | | | |
| 785 | 162334 | 124 | O.P.C. Industrial Area |
| **Q-8.04. Naval Hospital Area** | | | |
| 2780 | 162335 | 400-1-24 | O.P.C. Trunk and Distribution Cable |
| **Q-8.05. Residential Area** | | | |
| 1750 | 162337 | 124 | O.P.C. Trunking Cable M.A.X. to P.A.X. Office & Dist. Cable |
| 1751 | 162338 | 124 | O.P.C. Trunking Cable M.A.X. to P.A.X. Office & Dist. Cable |
| 1752 | 162339 | 124 | O.P.C. Trunking Cable M.A.X. to P.A.X. Office & Dist. Cable |
| 1753 | 162340 | 124 | O.P.C. Trunking Cable M.A.X. to P.A.X. Office & Dist. Cable |
| 1754 | 162341 | 124 | O.P.C. Trunking Cable M.A.X. to P.A.X. Office & Dist. Cable |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 1755 | 162342 | 124 | O.P.C. Trunking Cable M.A.X. to P.A.X. Office & Dist. Cable |
| | Q-8.06. Rifle Range | | |
| 2755 | 162343 | 217 | O.P.C. Rifle Range Rear Dixon |
| 2756 | 162344 | 217 | O.P.C. Rifle Range Near Dixon |
| | Q-8.07. Balloon Barrage Area and Amphibian Base | | |
| 749 | 162345 | 217 | O.P.C. Snead's Ferry Road |
| 2752 | 162346 | 217 | O.P.C. Amphibian Base |
| 2753 | 162347 | 217 | O.P.C. Balloon Barrage Battalion |
| 2754 | 162348 | 217 | O.P.C. Balloon Barrage Battalion |
| | Q-8.08. Glider Landing Field | | |
| 1756 | 162349 | 117 | O.P.C. Airport Approach Road |
| 1757 | 162350 | 117 | O.P.C. Airport Approach Road |
| | Q-8.09. Tent Camp No. 1 and 2 | | |
| TC 399 | 162351 | 250-1-22 | O.P.C. Tent Camp No. 1 |
| TC 400 | 162352 | 250-1-22 | O.P.C. Tent Camp No. 2 |
| | Q-8.10. Mumford Point | | |
| 1758 | 162356 | 500-17 | D.P.C. Mumford Point Tent Camp |
| 1759 | 162357 | 500-17 | O.P.C. Mumford Point Tent Camp |
| | Q-8.11. Peterfield Point | | |
| TC 401 | 162358 | 250-1-22 | O.P.C. Amphibian Base-Peterfield Point |
| | Q-8.12. Tank Battalion | | |
| TC 402 | 162359 | 250-1-22 | O.P.C. Tank Battalion |
| | Q-8.13. General | | |
| 60 | 162360 | 124 | Proposed Layout and Staking Sheet for Temporary Telephone Service Line |
| 702 | 162361 | 108-10 | Location Sketch Showing Carolina A.T. & T. Company's Proposed Pole Line in Boundary of Reservation |
| 786 | 162362 | 124 | Traffic Schematic and Switch Requirements |
| 2765 | 162363 | 145 | O.P.C. Service Cable Main T.C. M.P.T.C. Officers Quarters |

| Dwg. No. | Y&D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 2766 | 162364 | 145 | O. P. C. Service Cable Main T. C. M. P. T. C. - Officers Quarters |
| Q-9. | Propane Gas System | | |
| | Q-9.01. Division Training Area | | |
| 683 | 162372 | 127 | Underground Plans |
| 3624 | 162373 | 127 | Regimental Area No. 1 |
| 3623 | 162374 | 127 | Regimental Area Nos. 2 & 3 |
| 3626 | 162375 | 127 | Regimental Area Nos. 4 & 5 |
| | Q-9.02. P. T. & I. & S. Areas | | |
| 3622 | 162676 | 127 | Industrial and Post Troops |
| | Q-9.03. Naval Hospital | | |
| 3625 | 162377 | 127 | Hospital Area |
| Q-10. | Electrical Distribution | | |
| | Q-10.01. Division Training Area | | |
| 700 | 162380 | 108-9 | Detail & Layout Line to Paradise Point |
| 705 | 162381 | 108-9 | 12,470 Volt Feeder-Main Access Road |
| 706 | 162382 | 108-9 | 12,470 Volt Feeder-Main Service Road |
| 708 | 162383 | 108-9 | Regimental Area No. 1 |
| 709 | 162384 | 108-9 | Regimental Area No. 2 |
| 710 | 162385 | 108-9 | Regimental Area No. 3 |
| 711 | 162386 | 108-9 | Regimental Area No. 4 |
| 719 | 162387 | 108-9 | 12,470 Volt Feeder-Main Access Road Pole 450-382 |
| 720 | 162388 | 108-9 | 12,470 Volt Feeder-Main Service Road Pole 301-317 |
| 728 | 162389 | 108-9 | 12,470 Volt Feeder |
| 730 | 162390 | 108-9 | Dets.-Elec. Dist.-12,470 Volts |
| 731 | 162391 | 108-9 | Electrical Dist. Dets. 12,470 Volts |
| 732 | 162392 | 108-9 | Elec. Dist. Dets.-12,470 Volts |
| 733 | 162393 | 108-9 | Elec. Dist. Dets.-12,470 Volts |
| 735 | 162394 | 108-5 | Elec. Dist. Dets.-Sewage Pumping Station No. 1 |
| 738 | 162395 | 108-9 | Diesel Plt. to Pole 30-12,470 Volt Feeder |
| 741 | 162396 | 108-9 | 12,470 Volt Loop Feeder - Main Service Road |
| 742 | 162397 | 108-9 | 12,470 Volt Loop Feeder-River Drive |
| 755 | 162398 | 400-1-22 | Feeder to Hospital Area |
| 759 | 162399 | 200-9 | Regimental Area No. 5 |

| Dwg. No. | Y&D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 768 | 162400 | 108-9 | 12,470 Volt Feeder-Rear of Officers Quarters |
| 1700 | 162401 | 108-9 | Location Plan for Sectionalizing |
| 2714 | 162402 | 108-9 | Metal Clad Oil Circuit Breakers - Loop Sectionalizing Station |
| 2778 | 162403 | 108-9 | Foundation Plan of four Sectionalizing oil circuit breakers rear of Officers Quarters |
| 3704 | 162404 | 108-9 | Wells Nos. 14, 15, 16 |
| 3706 | 162405 | 108-9 | Wells Nos. 11, 12, 13 |
| 3708 | 162406 | 108-9 | |
| | | 400-1-22 | Street Lights D. T. A. and Naval Hospital Area |
| 3710 | 162407 | 128 | Blackout Control D. T. A. |
| 3711 | 162408 | 108-9 | 12,470 Volt Loop-Sect. Metal Clad Oil Circuit Breaker Stations 5 & 6 |
| 3749 | 162409 | 231 | Wells Nos. 17, 18, 19, 20, & 21 |
| 3750 | 162410 | 231 | Wells Nos. 17, 18, 19, 20, & 21 |
| 776 | 162411 | 201-7 | Post Troops Area |
| 722 | 162412 | 108-9 | Industrial Area |
| 756 | 162413 | 203-10 | |
| | | 202-13 | Tie to Sneads Ferry |
| 1796 | 162415 | 400-1-22 | 2400 Volts - Naval Hospital Area |
| 1797 | 162416 | 400-1-22 | Transformer Vaults - Naval Hospital Area |
| 1798 | 162417 | 400-1-22 | Transformer Vaults - Naval Hospital Area |
| 2789 | 162418 | 400-1-22 | Main Feeder - Naval Hospital Area |
| 2797 | 162419 | 400-1-22 | Manhole Designs - Naval Hospital Area |
| 2798 | 162420 | 400-1-22 | Manhole Designs-Naval Hospital Area |
| 3700 | 162421 | 108-9 | Sub-station Elec. Dist. to Central Heating Plant |
| 3701 | 162422 | 400-1-22 | Sub-station Switching Station-Naval Hospital Area |
| 3702 | 162423 | 400-1-22 | Sub-station Plot Plan - Naval Hospital Area |
| 3703 | 162424 | 400-1-22 | Sub-station-Naval Hospital Area |
| 3716 | 162425 | 400-1-22 | Profile of Underground System - Naval Hospital Area |

Q-10.02. Residential Area

| | | | |
|---|---|---|---|
| 2709 | 162426 | 108-9 | |
| | | 205-2 | 2300 Volts |
| 2710 | 162427 | 108-9 | |
| | | 205-2 | 2300 Volts |
| 2711 | 162428 | 108-9 | |
| | | 205-2 | 2300 Volts |
| 2712 | 162429 | 108-9 | |
| | | 205-2 | 2300 Volts |

| Dwg. No. | Y. &. D. No. | Proj. No. | Title (Con't) |
|---|---|---|---|
| 2713 | 162430 | 108-9 | |
| | | 205-2 | 2300 Volts |
| 2723 | 162431 | 108-9 | 132/24 V-2850 Kva Sub-Station |
| 3714 | 162432 | 108-9 | |
| | | 205-2 | Street Lights |
| 3725 | 162433 | 128 | Blackout Control |

Q-10.03. <u>Rifle Range</u>

| Dwg. No. | Y. &. D. No. | Proj. No. | Title |
|---|---|---|---|
| 748 | 162434 | 203-10 | |
| | | 202-13 | Transmission Lines to Rifle Range |
| 1703 | 162435 | 203-10 | Rifle Range Area |
| 1704 | 162436 | 203-10 | Feeder |
| 3720 | 162437 | 128 | |
| | | 203-10 | Street Lights and Blackout Control |

Q-10.04. <u>Balloon Barrage and Amphibian Base</u>

| Dwg. No. | Y. &. D. No. | Proj. No. | Title |
|---|---|---|---|
| 2704 | 162438 | 202-13 | Balloon Barrage and Amphibian Base |
| 2706 | 162439 | 202-12 | Cable Layout |
| 2780 | 162440 | 202-13 | Amphibian Base and Boat Storage Yd. |
| 2794 | 162441 | 202-13 | Balloon Barrage School Area At Marines. |
| 3722 | 162442 | 202-13 | Dets. of Tbansformer Platform at Operation Bldg. |
| 3753 | 162443 | 202 | Generator Shed at Balloon Barrage |

Q-10.05. <u>Parachute Training Area</u>

| Dwg. No. | Y. &. D. No. | Proj. No. | Title |
|---|---|---|---|
| 1707 | 162444 | 123-2 | Feeder to Parachute Tower |
| 3745 | 162445 | 129-1 | Additional Parachute Training Tower |

Q-10.06. <u>Glider Training Base</u>

| Dwg. No. | Y. &. D. No. | Proj. No. | Title |
|---|---|---|---|
| 1712 | 162446 | 117 | Landing Field Underground Primary Cable and Sub-Station Dets. and Elec. Dist. |
| 2724 | 162447 | 117 | Based on A. B. No. 503 Case No. 142 Dated 2/10/42 |
| 2727 | 162448 | 117 | Lighting & Power-Electrical Dist. Feeder T. C. No. 2 to Airport Sub-Station |
| 3727 | 162449 | 117 | Landing Field for Parachute Troops Night Lighting System-Wiring Diagram |
| 3728 | 162450 | 117 | Night Lighting Vault-Equipment Lay-out |
| 2784 | 162451 | 112 | Electrical Dist. To White Cemetery On Mumford Point Road |

Q-10.07. <u>Tent Camp No. 1</u>

| Dwg. No. | Y & D No. | Proj. No. | Title (Con't) |
|---|---|---|---|
| TC 13 | 161798 | 1-9 | Tent Camp Outside Distribution |
| TC 14 | 161799 | 1-9 | Inventory of Pole Line Const. |
| TC 93 | 162452 | 1-9 | T. C. No. 1 Blackout Control Sev. D. C. Relay Circuits |
| TC94 | 162453 | 250-1-10 | Transmission Line to T. C. No. 1 & 2 |
| MB 743 | 162454 | 250-1-10 | Transmission Line to T. C. No.1&2 |
| MB 744 | 162455 | 250-1-10 | Transmission Line to T. C. No.1&2 |
| MB 747 | 162456 | 250-1-10 | Transmission Lines to T. C. No. 1 & |
| MB 752 | 162457 | 250-1-10 | Transmission Line to T. C. No. 1 & 2 |
| MB 753 | 162458 | 250-1-10 | transmission Line to T. C. No. 1 and 2 |
| MB 754 | 162459 | 250-1-10 | Transmission Line to T. C. No. 1 and 2 |
| MB 761 | 162460 | 250-1-10 | New River Pole Line Construction |

Q-10.08. Tent Camp No. 2

| | | | |
|---|---|---|---|
| TC 228 | 162461 | 250-1-10 | Elec. Dist. Tent Camp No. 2 |
| TC 359 | 162462 | 122 | Elec. Dist. To Sewage Treatment Plt Tent Camp No. 1 and 2 |
| TC 373 | 162463 | 250-1-10 | Tent Camp No. 1 and 2 Elec. Dist. to Wells |
| TC 374 | 162464 | 250-1-10 | Tent Camp No. 1 and 2 Elec. Dist. to Wells |
| TC 403 | 162465 | 140 | Elec. Dist. to Tent Camp Incineratc |

Q-10.09. Mumford Point Tent Camp

| | | | |
|---|---|---|---|
| MP 16 | 162466 | 500-9 | M. P. T. C. Electrical Dist. |

Q-10. 10. Peterfield Point (Amphibian Base)

| | | | |
|---|---|---|---|
| TC 270 | 162467 | 250-4-6 | Amphibian Base-Elec. System |

Q-10.11. Tank Battalion

| | | | |
|---|---|---|---|
| TB 5 | 162468 | 250-3-6 | T. C. T. B. Electrical Dist. |

Q-10.12. Low Cost Housing

| | | | |
|---|---|---|---|
| LCH 55 | 162469 | 301-406 | L. C. D. H. Electrical Dist. |
| LCH 56 | 162470 | 301-406 | L. C. D. H. Electrical Dist. |
| LCH 57 | 162471 | 301-406 | L. C. D. H. Electrical Dist. |
| LCH 67 | 162472 | 301-406 | Sub-station 2000 KWA 12,470 to 2400/416/ V. for L. C. D. H. Proj. |
| LCH 68 | 162473 | 301-406 | L. C. D. H. Electrical Dist. Dets. |

| Dwg. No. | Y & D No. | Proj. No. | Title (Con't) |
|---|---|---|---|
| LCH 69 | 162474 | 301-406 | L. C. D. H. Elec. Dist. Dets. |
| LCH 70 | 162475 | 301-406 | L. C. D. H. Elec. Dist. Dets. |
| LCH 76 | 162476 | 301-406 | L. C. D. H. Elec. Dist. Dets. |
| Q-10.13. General | | | |
| TC 117 | 162477 | 126 | 11th Marine Tent Camp-Elec. Service Plan |
| MB 729 | 162478 | 109-2 | Single Phase Line to C. C. C. Camp and Mumford Point. Col.Hill Res. |
| Q-11. Topography | | | |
| 2158 | 228630 | | Topograph Part of Quad. 98 |
| 2159 | 228631 | | " " " " 98 |
| 2160 | 228632 | | " " " " 98 |
| 2161 | 288633 | | " " " " 98 |
| 2162 | 288634 | | " " " " 98 |
| 2163 | 288635 | | " " " " 98 |
| 2164 | 288636 | | " " " " 98 |
| 2165 | 228637 | | " " " " 117 |
| 2166 | 228638 | | " " " " 118 |
| 2167 | 228639 | | " " " " 118 |
| 2168 | 228640 | | " " " " 118 |
| 2169 | 228641 | | " " " " 118 |
| 2170 | 228642 | | " " " " 118 |
| 2171 | 228543 | | " " " " 118 |
| 2172 | 228644 | | " " " " 118 |
| 2173 | 228645 | | " " " " 118 |
| 2174 | 228646 | | " " " " 118 |
| 2175 | 228647 | | " " " " 118 |
| 2176 | 228648 | | " " " " 118 |
| 2177 | 228649 | | " " " " 118 |
| 2178 | 228650 | | Hydrograph " " " 118 |
| 2179 | 228651 | | Topography " " " 118 |
| 2180 | 228652 | | " " " " 118 |
| 2181 | 228653 | | " " " " 118 |
| 2182 | 228654 | | " " " " 118 |
| 2183 | 228655 | | " " " " 118 |
| 2184 | 228656 | | " " " " 118 |
| 2185 | 228657 | | " " " " 120 |
| 2186 | 228658 | | " " " " 160 |
| 2187 | 228659 | | " " " " 160 |
| 2188 | 228660 | | Topography Magazine Area_Part of Quad. 180 |
| 2189 | 228661 | | Topography Magazine Area-Part of Quad. 180 |
| 2190 | 228662 | | Topography Magazine Area-Part of Quad. 180 |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 2191 | 228663 | | Topography Magazine Area-Part of Quadrangle 181 |
| 2192 | 228664 | | Topography Magazine Area-Part of Quadrangle 181 |
| 2193 | 228665 | | Topography Magazine Area-Part of Quadrangle 181 |
| 2194 | 228666 | | Topography-Part of Quadrangle 182 |
| 2195 | 228667 | | " " " " 182 |
| 2196 | 228668 | | " " " " 198 |
| 2197 | 228669 | | " " " " 198 |
| 2198 | 228670 | | " " " " 198 |
| 2199 | 228671 | | " " " " 198 |
| 3100 | 228672 | | " " " " 199 |
| 3101 | 228673 | | " " " " 218 |
| 3102 | 228674 | | " " " " 219 |
| 3103 | 228675 | | " " " " 219 |
| 3104 | 228676 | | " " " " 219 |
| 3105 | 228677 | | " " " " 219 |
| 3106 | 228678 | | " " " " 219 |
| 3107 | 226679 | | " " " " 219 |
| 3108 | 228680 | | Hydrography-Part of Quadrangle 219 |
| 3109 | 228681 | | Hydrography-Part of Quadrangle 219 |
| 3110 | 228682 | | Topography-Part of Quadrangle 220 |
| 3119 | 248149 | | Topography-Part of Quadrangle 97 |
| 3120 | 248150 | | Topography-Part of Quadrangle 97 |
| 3121 | 248151 | | Topography-Part of Quadrangle 97,117 |
| 3122 | 248152 | | Topography-Part of Quadrangle 97,117 |
| 3123 | 248153 | | Topography-Part of Quadrangle 97 |
| 3124 | 248154 | | Topography-Part of Quadrangle 117 |
| 3125 | 248155 | | Topography-Part of Quadrangle 117 |
| 3126 | 248156 | | Topography-Part of Quadrangle 118 |

Q.12. Gasoline and Oil Storage and Distribution

Q-12.01. Post Troops Area

| | | | |
|---|---|---|---|
| 5603 | 228806 | 226 | Wallace Creek Boat Basin - Gasoline Facilities |

Q-12.02. Supply and Industrial Area.

| | | | |
|---|---|---|---|
| 3602 | 228808 | 108-11 | Main and P. X. Service Stations |
| 3694 | 228809 | 108-7<br>221-2 | No. 6. Fuel Oil Storage and Dist. |
| 3695 | 228810 | 108-7<br>221-2 | No. 6. Fuel Oil Storage and Dist.Dets |
| 4674 | 228811 | 221-5<br>228 | Post and Division Garages-Gasoline Systems |
| 5624 | 228812 | 108-7 | No. 6 Fuel Oil Storage and Dist. Anchor Mat for 8000 Gallon Tank |
| 5640 | 228813 | 108-11 | Three in. Gasoline Line from Storage Tanks to P. X. Service Station. |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| Q-12.03. Naval Hospital | | | |
| 3634 | 22814 | 400-1-9<br>400-1-18 | Gasoline and Fuel Oil Storage Dist. |
| 5625 | 228815 | 400-1-9<br>400-1-18 | Anchor Mats for 2-15000 Gallon and 1-10,000 Gallon Tank |
| Q-12.04. Residental Area | | | |
| 4650 | 228816 | 215<br>202-4 | Bachelor Officers Mess Hall and Balloon Barrage Training School-Gasoline and fuel oil storage and Distribution |
| Q-12.05. Rifle Range | | | |
| 3659 | 228817 | 203-18<br>202-9 | Balloon Barrage Amphibian Base and Rifle Range |
| | | 203-2<br>203-13 | Gasoline and Storage Fuel Oil and Dist |
| 5623 | 228818 | | See Schedule Balloon Barrage Amphibian Base and Rifle Range Mat Details |
| Q-12.06. Amphibian Base | | | |
| 4627 | 228819 | 202-21<br>202-5<br>202-6 | Amphibian Base and Balloon Barrage Battalion Gasoline, Diesel Oil and Fuel Oil Storage and Dist. |
| Q-12.07. Glider Field | | | |
| 1671 | 228820 | 116 | Landing Field 25000 Gal. Gas. St. Tk. |
| 3627 | 228821 | 142-4<br>116 | Parachute Troops Landing Field Gasolin Storage and Dist. |
| 3713 | 228822 | 116 | Parachute Troops Landing Field-Elec. Work for Gasoline Dist. |
| 4666 | 228823 | 116 | Anchor Details for 25,000 Gallon Tank |
| 4667 | 228824 | 116 | Concrete Pit Details for Aqua Gasoline System |
| Q-12.08. Tent Camp No. 1 and No. 2 | | | |
| TC 36 | 161821 | 1-12 | Heating of Existing Fuel Oil Dist. |
| TC 87 | 161873 | 1.12 | General Arrangement of Gasoline and Fuel Oil Storage and Dist. |
| TC326 | 162072 | 250-1-13 | Tent Camp No. 1-Addition to General Arrangement of Fuel Oil and Gasoline Storage and Dist. |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| | | | |

Q-12.09. Peterfield Point Tank Battalion

| | | | |
|---|---|---|---|
| TC 108 | 228825 | 250-3-50<br>250-4-50 | Gasoline and Diesel Oil Distribution Amphibian (Peterfield Point) and Tank Battalion |

Q-12.10. General

| | | | |
|---|---|---|---|
| 3641 | 228826 | 249-51 | Coast Guard Training Facilities - Gasoline & Diesel Oil Service Sta. |
| 3628 | 228827 | | See Schedule Pump and Tank Installation Details |
| 4631 | 228828 | 208-8<br>104-2<br>221-4 | Bakery, Tent Camp Chapel, Guest House, Radio Transmitter, Gate House, Fuel Oil Storage |
| 5642 | 228829 | | See Schedule Tank Schedule for Gasoline and Oils |

Q-13. Steam Distribution.

Q-13.01. Division Training Area

| | | | |
|---|---|---|---|
| 631 | 228835 | 108-8 | North Side "B" Street Area No. 1 Plan and Profile |
| 632 | 228836 | 108-8 | South Side "B" St. Area No. 1 Plan and Profile |
| 633 | 228837 | 108-8 | North Side "E" Street Area No. 2 Plan and Profile |
| 634 | 228838 | 108-8 | South Side "E" Street Area No. 2 Plan and Profile |
| 635 | 228839 | 108-8 | South Side Main Access Road Area No 3. Plan and Profile |
| 636 | 228840 | 108-8 | North Side Main Access Road Area No 3 Plan and Profile |
| 637 | 228841 | 108-8 | North Side "J" St. Area No. 4 Plan and Profile |
| 638 | 228842 | 108-8 | South Side "J" St. Area No. 4 Plan and Profile |
| 639 | 228843 | 200-10 | North Side "M" St. Area No. 5 Plan and Profile |
| 640 | 228844 | 200-10 | South Side "M" St. Area No. 5 Plan and Profile |
| 641 | 228845 | 108-8 | Dets. of Manholes Schedule for Areas No. 1 and No. 2. |
| 642 | 228846 | 108-8 | Dets. of Manholes Schedule for Areas No. 3 |
| 643 | 228847 | 108-8 | Dets. of Manholes Schedule for Areas No. 4 |
| 672 | 228848 | 108-8 | Truck Line Area No. 1 |

| Dwg. No. | Y & D No. | Proj. No. | Tktle (Con't) |
|---|---|---|---|
| 673 | 228849 | 108-8 | Trunk Line Area No. 2 and No. 3 |
| 674 | 228850 | 108-8 | Trunk Line Central Heating Plt. to Circle |
| 675 | 228851 | 108-8 | Trunk Line Area No. 4 and 5 |
| 676 | 228852 | 108-8 | Manhole Dets.-Trunk Line-Manhole T.L. No. 1 to T. L. No. 14 |
| 677 | 228853 | 108-8 | Manhole Dets.-Trunk Line-Manhole T.L. No. 15 to T.L. No. 29 |
| 678 | 228854 | 200-10 108-8 | Manhole Dets.-Anchor, Steam, Syphon, amd Sleeve |
| 679 | 228855 | 200-10 | Dets of Pits and Manholes_Schedule for Area No. 5 |

Q-13.02 Post Troops Area

| | | | |
|---|---|---|---|
| 644 | 228856 | 201-8 | Dets. of Manhole Schedule for Post Troops Area amd Line Anchor |
| 645 | 228857 | 201-8 | Post Troops Area-Plan and Profile |

Q-13.03. Supply and Industrial Area

| | | | |
|---|---|---|---|
| 627 | 228858 | 108-8 | Plan and Profile |
| 630 | 228859 | 108-8 | Manhole Details |

Q-13.04. Naval Hospital Area

| | | | |
|---|---|---|---|
| 3664 | 228860 | 400-1-19 | Naval Hospital-Plan and Profile |
| 3665 | 228861 | 400-1-19 | Manhole Details |

Q-13.05. Residental Area

| | | | |
|---|---|---|---|
| 4611 | 228862 | 215 | Bachelor Officers Quarters-Plan and Profile |
| 4612 | 228863 | 215 | Bachelor Officers Quarters-Manhole Dets |

Q-13.06. Rifle Range Area

| | | | |
|---|---|---|---|
| 680 | 228864 | 203-13 | Rifle Range-Plan and Profile |
| 681 | 228865 | 203-13 | Dets. of Manholes-Schedule for Rifle Range |

Q-13.07. Amphibian-Ball. Barr. and Ball. Barr. S. A.

| | | | |
|---|---|---|---|
| 3653 | 228866 | 202-16 | Balloon Barrage Battalion and Amphibian Base-Plan and Profile |
| 3654 | 228867 | 202-16 | Manhole Dets.-Balloon Barrage Battalion and Amph. Base Dets. |
| 4610 | 228868 | 202-16 | Balloon Barrage Battalion-School Area -Plan and Profile and Manhole Dets. |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| | **Q-13.08. Parachute Training Area** | | |
| 5608 | 228869 | 138 | Parachute Training Area-Steam Dist. And Dets. |
| | **Q-13.09. Glider Training Base Area** | | |
| 5626 | 228870 | 142-6 | Glider Base-Plan and Profile |
| | **Q-13.10 Tent Camp No. 1** | | |
| TC 37 | 161822 | 1-10 | General Arrangement of Steam Dist. and Return System |
| TC 38 | 161832 | 1-10 | Dets. of Steam Dist. and Condensate Return |
| TC 116 | 228871 | 1-19-1<br>1-19-2 | T. C. Hospital and Washroom Steam Dist. |
| | **Q-13.11 Tent Camp No. 2** | | |
| TC 318 | 228872 | 250-1-11 | T. C. No. 2 -Steam Distribution |
| | **Q-13.12. Mumford Point T. C.** | | |
| MP 15 | 228873 | 500-16 | M. P. T. C. Steam Dist.-Plan and Profile |
| **Q-14. Division Training Area** | | | |
| | **Q-14.01. Barracks** | | |
| 801 | 162481 | 101-1 | Foundation Plans and Dets.-Raised First Floor |
| 802 | 162482 | 101-1 | Foundation Plans & Dets. First Fl. on Ground or Slight Fill |
| 803 | 162483 | 101-1 | First Floor Plan and Schedules |
| 804 | 162484 | 101-1 | Second Floor Plan and Dets. |
| 805 | 162485 | 101-1 | Elevations |
| 806 | 162486 | 101-1 | Details |
| 807 | 162487 | 101-1 | Details |
| 820 | 162488 | 101-1 | Full Sized Section Thru Cornice |
| 1811 | 162489 | 101-1 | Revision Sheet |
| 1885 | 162490 | 201-1 | Window Sill Dets. |
| 1045 | 162491 | 101-1 | Suggested Color Scheme |
| 837 | 162492 | 101-1 | Revised Foundation Plan |
| 856 | 162493 | 101-1 | Revised Foundation Plan |
| 858 | 162494 | 101-1 | Reinf. Dets. for Entire 1st Fl. on fill |
| 859 | 162495 | 101-1 | Reinf. Dets. for Entire 1st fl. on Bar Joists |
| 860 | 162496 | 101-1 | Reinf. Dets. for Exterior Steps |

| Dwg. No. | Y & D No. | Proj. No. | Title (Con't) |
|---|---|---|---|
| 861 | 162497 | 101-1 | 1st Fl. on fill-1000#/O' Soil Pressure Foundation Plan and Dets. |
| 862 | 162498 | 101-1 | First Fl. on fill-2000#/Sq. Ft. Soil Pressure Foundation Plan and Dets. |
| 863 | 162499 | 101-1 | Pile Foundation and Dets. |
| 1846 | 162500 | 200-1 | Bar Bending Dets. Reinf. Steel |
| 1877 | 162501 | 200-1 | Half Foundation Plan wall and footing Dets. |
| 2891 | 162502 | 202-8<br>203-1 | Steam Pits and Sleeves |
| 810 | 162503 | 101-1 | Dets. of Mechanical Pit |
| 814 | 162504 | 101-1 | Dets. for Steam Pit |
| 959 | 162505 | 101-1 | Dets. of Steam Pits |
| 1677 | 162506 | 201-1 | Pit Details |
| 656 | 162507 | 101-1 | Mechanical Pit Dets. |
| 1615 | 162508 | 101-1 | Heating-First Floor Plan |
| 1616 | 162509 | 101-1 | Heating-Second Floor Plan |
| 688 | 162510 | 200-1<br>201-1<br>202-8<br>203-1 | Heating-First Floor Plan |
| 689 | 162511 | 200-1<br>201-1<br>202-8<br>203-1 | Heating Second Floor Plan |
| 1617 | 162512 | 101-1 | First Floor Reflected Ceiling Showing Heating Plans |
| 687 | 162513 | 203-1<br>200-1<br>201-1<br>202-8 | Heating Details |
| 607 | 162514 | 101-1 | Toilet and Washroom Ventilation Sys. |
| 649 | 162515 | 101-1 | Heating Expansion Bends Under First Floor |
| 600 | 162516 | 101-1 | Layout of Soil and Vent Piping |
| 601 | 162517 | 101-1 | Layout of Hot and Cold Water Piping |
| 602 | 162518 | 101-1 | Typical Layout of Plumbing Fixtures and Drains |
| 690 | 162519 | 200-1<br>201-1<br>202-8<br>203-1 | Plumbing-Foundation Plan |
| 691 | 162520 | 200-1<br>201-1<br>202-8<br>203-1 | Plumbing and Dets_First and Second Floor Plans |

| Dwg. No. | Y&D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 692 | 162521 | 200-1 | |
| | | 201-1 | |
| | | 202-8 | |
| | | 203-1 | Riser Diagram |
| 757 | 162522 | 101-1 | Electrical - First Floor Plan |
| 758 | 162523 | 101-1 | Electrical - Second Floor Plan |

Q-14.02. Mess Hall

| | | | |
|---|---|---|---|
| 864 | 162530 | 101-2 | Foundation Footings and Curb Plan |
| 865 | 162531 | 101-2 | Foundation and Footing Details |
| 910 | 162532 | 101-2 | Foundation-Footing & Curb Plan |
| 911 | 162533 | 101-2 | Foundation and Footing Details |
| 1822 | 162534 | 101-2 | Foundation Footing & Curb Plan |
| 1823 | 162535 | 101-2 | Foundation, Pier & Footing Details |
| 866 | 162536 | 101-2 | First Floor Plan |
| 867 | 162537 | 101-2 | Roof Plan - Louver Plan |
| 871 | 162538 | 101-2 | Front Right & Left Side Elevation |
| 872 | 162539 | 101-2 | Rear Elevation & Sec. of Storage Wing |
| 873 | 162540 | 101-2 | Sec. of Deck over Galley & Scullery Window and Typical Wall Details |
| 874 | 162541 | 101-2 | Dets. of Exterior Doors & Entrance Porch |
| 875 | 162542 | 101-2 | Rear Entrance Dets. Door Schedule and Details |
| 876 | 162543 | 101-2 | Plan Elevation & F. S. Dets. of Cupola |
| 877 | 162544 | 101-2 | Sec. & F. S. Dets. of Cupola |
| 878 | 162545 | 101-2 | Refrigeration Room Details |
| 879 | 162546 | 101-2 | Dets. of Dormer & Range Exhaust Flue (Galley) |
| 880 | 162547 | 101-2 | Dets. of Coffee Bar |
| 882 | 162548 | 101-2 | Dets. of Blower Platform in Service Corridor Dets. of Switch Closet in Galley |
| 932 | 162549 | 101-2 | Full Sized Dets. of Interior Cases |
| 951 | 162550 | 101-2 | Full Sized Dets. of Steel Casement Sash |
| 6824 | 162551 | 202-9 | |
| | | 201-2 | |
| | | 200-2 | |
| | | 203-2 | |
| | | 101-2 | China Storage |
| 3837 | 162552 | 101-2 | Color Scheme |
| 1824 | 162553 | 101-2 | First Floor Plan |
| 1825 | 162554 | 101-2 | Roof Framing Plan |
| 1826 | 162555 | 101-2 | Truss Details |
| 1827 | 162556 | 101-2 | Truss Details |
| 1828 | 162557 | 101-2 | Truss Details |
| 1829 | 162558 | 101-2 | Elevations of Wall Framing |
| 1830 | 162559 | 101-2 | Eleva. of Wall Framing & Truss Dets. |

| Dwg. No. | Y&D No. | Proj. No. | Title (Con't) |
|---|---|---|---|
| 1831 | 162560 | 101-2 | Truss Dets. and Corner Column Cap |
| 869 | 162561 | 101-2 | Elev. of Wall Framing |
| 870 | 162562 | 101-2 | Elev. of Wall Steel Framing and Truss Diagonals Truss |
| 868 | 162563 | 101-2 | Roof Framing Plan |
| 883 | 162564 | 101-2 | Reinf. Dets. |
| 608 | 162565 | 101-2 | Heating and Ventilating |
| 654 | 162566 | | |
| | | 201-2 | |
| | | 200-2 | |
| | | 203-2 | |
| | | 250-4-9 | Mechanical Pit Dets. |
| 646 | 162567 | 101-2 | Galley and Scullery Ventilation |
| 1618 | 162568 | 101-2 | Refrigerator Room |
| 610 | 162569 | 101-2 | Plumbing |
| 611 | 162570 | 101-2 | Plumbing |
| 3621 | 162571 | 101-2 | |
| | | 200-2 | |
| | | 201-2 | Floor and Ceiling-Piping Layout |
| 1676 | 162572 | 101-2 | Foundation Plan Sleeves and Chases |
| 3600 | 162573 | 101-2 | |
| | | 203-2 | |
| | | 202-9 | |
| | | 250-1-5 | |
| | | 200-2 | |
| | | 201-2 | |
| | | 1-5 | Grease Traps |
| 723 | 162574 | 101-2 | Electrical Layout |
| 2731 | 162575 | 202-2 | Electrical Roughing |

Q-14.03. Battalion Warehouse

| | | | |
|---|---|---|---|
| 819 | 162580 | 101-3 | Foundation and Dets. Rev. 32'X110' |
| 816 | 162581 | 101-3 | 28'-7 5/8" X 95'-10$\frac{1}{4}$" Plans, Elev. and Dets. |
| 815 | 162582 | 101-3 | 32' x 110' Plans and Elev. |
| 817 | 162583 | 101-3 | Dets. of Stone Window Sills and Brick Coursing 32' x 110' |
| 821 | 162584 | 101-3 | 32' x 110' Full Sized Section thru Cornice and Rake |
| 6849 | 162585<br>162586 | 227-6 | 32' x 112' - 8" Bearing Brick and Wood Rafters |

Q-14.04. Regimental Infirmaries

| | | | |
|---|---|---|---|
| 838 | 162587 | 101-4 | Foundation |
| 843 | 162588 | 101-4 | Foundation Plan and Dets. |
| 10807 | 162589 | 101-4 | Foundation Plan and Dets. Amph. Base |
| 2885 | 162590 | 200-4 | Foundation Plan and Dets. |
| 3836 | 162591 | 200-4 | Foundation Plan and Dets. Concrete Slab and Beam |

| Dwg. No. | Y & D No. | Proj. No. | Title (Con't) |
| --- | --- | --- | --- |
| 2846 | 162592 | 200-4 | Steel Pen Floor Dets. |
| 2884 | 162593 | 200-4; 104-1; 200-4; 202-20; 203-19 | --Floor Plans |
| 839 | 162594 | 101-4 | Elev. and Roof Plan |
| 840 | 162595 | 101-4 | Section and Dets. |
| 841 | 162596 | 101-4 | Details |
| 954 | 162597 | 101-4 | Full Sized Window Dets. |
| 2889 | 162598 | 200-4; 201-4; 202-11; 200-5; | --Full Siz. Window Dets. |
| 842 | 162599 | 101-4 | Reinforcing Details |
| 9802 | 162600 | 101-4; | |
| | | 200-4; 202-20; 203-19; | --X-Ray Dark Room |
| 5877 | 162601 | 101-4 | Color Scheme |
| 7815 | 162602 | 101-4; 200-4; 202-20; | |
| | | 203-19 | Schedule of Venetian Blinds |
| 650 | 162603 | 101-4 | Heating and Ventilation |
| 653 | 162604 | 101-4 | Mechanical Pit Dets. |
| 623 | 162605 | 101-4 | Waste and Vent Piping |
| 624 | 162606 | 101-4 | Hot and Cold Water Piping |
| 726 | 162607 | 101-4 | Electrical Layout |
| | Q-14.05. Post Exchanges | | |
| 826 | 162610 | 101-5 | Plans |
| 919 | 162611 | 101-5 | Revised Foundation-Wall Dets. |
| 931 | 162612 | 101-5 | Foundation Plan and Dets. |
| 827 | 162613 | 101-5 | Elev. and Dets. |
| 913 | 162614 | 101-5 | Full Size Window Dets. |
| 828 | 162615 | 101-5 | Reinf. Dets. |
| 6834 | 162616 | 201-4 | |
| | | 101-5 | |
| | | 200-5 | |
| | | 202-11 | |
| | | 203-14 | Foundation, Back Bar, Tobacco Case and Display Case |
| 8820 | 162617 | 136-5 | Dets. and Equipment |
| 7801 | 162618 | 101-5 | |
| | | 201-4 | |
| | | 200-5 | |
| | | 202-11 | Schedule of Venetian Blinds |
| 6832 | 162619 | 201-4 | |
| | | 202-11 | |
| | | 203-14 | |
| | | 200-5, 101-5. | Color Scheme |
| 2889 | 162598 | 200-4 | |
| | | 200-5 | |
| | | 201-4 | |
| | | 200-11 | Post Exchange and Reg. Infirmary Full Size Window Dets. |
| 618 | 162620 | 101-5 | Heating |

| Dwg. No. | Y & D No. | Proj. No. | Title (Con't) |
|---|---|---|---|
| 657 | 162621 | 101-5 | Mechanical Pit Dets. |
| 628 | 162622 | 101-5 | |
| | | 200-5 | |
| | - | 201-4 | Hot and Cold Water Piping |
| 629 | 162623 | 101-5 | Waste and Vent Piping |
| 724 | 162624 | 101-5 | Electrical Layout |

Q-14.06. Theatre

| | | | |
|---|---|---|---|
| 889 | 162627 | 107-4 | Foundation Wall Plan |
| 904 | 162628 | 107-4 | Foundation and Pile Footing Plan |
| 2828 | 162629 | 107-4 | Foundation and Footing 2000 Lbs. Per Sq. Ft. |
| 890 | 162630 | 107-4 | First Floor Plan |
| 891 | 162631 | 107-4 | Mezzanine Plan |
| 892 | 162632 | 107-4 | Reflected Ceiling and Roof Plan-Cat-walk Dets. |
| 893 | 162633 | 107-4 | Elevations Fan Light Dets. |
| 894 | 162634 | 107-4 | Cross Section and Dets. |
| 895 | 162635 | 107-4 | Longitudinal Section and Dets. |
| 896 | 162636 | 107-4 | Typical Cornice and Wall Dets. |
| 897 | 162637 | 107-4 | Part Front Elev.- Arcade Dets. |
| 898 | 162638 | 107-4 | Door Jambs-Window and Brick Course Dets |
| 899 | 162639 | 107-4 | Dets. of Fire Exit Hall |
| 900 | 162640 | 107-4 | Cupola Dets. |
| 901 | 162641 | 107-4 | Cupola Details |
| 905 | 162642 | 107-4 | Full Size Sash Detail |
| 8866 | 162643 | 107-4 | Color Schemes |
| 902 | 162644 | 107-4 | Stair and Stage Details |
| 903 | 162645 | 107-4 | Steel Framing Plan |
| 907 | 162646 | 107-4 | Bar Schedule |
| 908 | 162647 | 107-4 | Bar Bending Details |
| 7895 | 162648 | 107-4 | Wood Substitutes |
| 906 | 162649 | 107-4 | Details of Steam Pipe Trench |
| 652 | 162650 | 107-4 | Mechanical Pit Details |
| 1681 | 162651 | 107-4 | Heating and Ventilation |
| 1682 | 162652 | 107-4 | |
| | | 200-15 | |
| | | 203-17 | |
| | | 209 | Heating |
| 1683 | 162653 | 107-4 | |
| | | 203-17 | |
| | | 200-15 | |
| | | 209 | Waste and Vent Piping |
| 1684 | 162654 | 107-4 | |
| | | 200-15 | |
| | | 203-17 | |
| | | 209 | Hot and Cold Water Piping |
| 1721 | 162655 | 107-4 | First Floor Plan-Electric Layout |

| Dwg. No. | Y & D No. | Proj. No. | Title ( Cont'd) |
|---|---|---|---|
| 1722 | 162656 | 107-4 | |
| 1723 | 162657 | 107-4 | Mezzanine Plan - Electrical Layout |
| 11813 | 162658 | 200-15 | Electrical Details |
| | | 209 | Relocation of 3'-2" Aerofuse |

Q-14.07. Regimental Headquarters

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| 2810 | 162660 | 211 | First Floor and Foundation Plans, Wall Sections |
| 2811 | 162661 | 211 | Elevations, Roof Plan and Details |
| 2812 | 162662 | 221 | Entrance Details and Cross Sections |
| 2883 | 162663 | 211 | |
| | | 210 | Window Details - Battalion Head-Quarters & Regimental Headquarters |
| 5870 | 162664 | 211 | Orientation Plan |
| 6846 | 162665 | 211 | Color Scheme |
| 7816 | 162666 | 211 | |
| | | 200-7 | Schedule of Venetian Blinds |
| 3843 | 162667 | 211 | Foundation and Footing Plan |
| 2813 | 162668 | | First Floor Framing Plan |
| 2814 | 162669 | 211 | Bar Bending Details |
| 1693 | 162670 | 211 | |
| | | 200-7 | Heating |
| 1692 | 162671 | 211 | |
| | | 200-7 | Plumbing |
| 773 | 162672 | 211 | |
| | | 200-7 | 1st. Floor Electrical |
| 797 | 162673 | 211 | |
| | | 200-7 | Telephone System - Conduit Layout |

Q-14.08. Battalion Headquarters

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| 1123 | 162676 | 210 | |
| | | 211 | Preliminary Plans-Battalion Head-Quarters and Regimental Headquarters |
| 2805 | 162677 | 210 | Foundation - First Floor Plan & Dets. |
| 2807 | 162678 | 210 | Roof Plan Sec. and Dets. |
| 2806 | 162679 | 210 | Elevations and Details |
| 6845 | 162680 | 210 | Color Scheme |
| 7813 | 162681 | 210 | |
| | | 200-6 | |
| | | 200-12 | Schedule of Venetian Blinds |
| 3844 | 162682 | 210 | Foundation and Footing Plan |
| 2808 | 162683 | 210 | First Floor Framing Plan |
| 2809 | 162684 | 210 | Bar Bending Details |
| 1691 | 162685 | 210 | |
| | | 202-12 | |
| | | 200-6 | Heating |

| Dwg. No. | Y & D No. | Proj. No. | Title (cont'd) |
|---|---|---|---|
| 1690 | 162686 | 210<br>202-12<br>200-6 | Plumbing and Dets. |
| 772 | 162687 | 210 | 1st. Floor, Electrical |
| 798 | 162688 | 210<br>200-6 | Telephone System-Conduit Layout |
| 2883 | 162663 | 210<br>211 | Window Details - Battalion Headquarters and Regimental Headquarters (Filed with Regimental Headquarters) |

Q-14.09. Regimental Service Club

| | | | |
|---|---|---|---|
| 4836 | 229644 | 212 | Foundation Plan and Footings Bldgs. 1-29, 2-29 and 5-29. |
| 4837 | 229645 | 212 | Foundation Plan and Footings Bldg. 3-30 |
| 4847 | 229646 | 212 | Foundation, Footing Details Schedule Bldg. 4-29 |
| 4839 | 229647 | 212 | 1st Floor Plan and Dets. |
| 4840 | 229648 | 212 | 2nd Floor and Roof Plan |
| 4841 | 229649 | 212 | Elevations |
| 4842 | 229650 | 212 | Wall Sections |
| 4843 | 229651 | 212 | Cross Sections-Toilet Stall Details |
| 4844 | 229652 | 212 | Stair Details |
| 4846 | 229653 | 212 | Exterior Details |
| 4848 | 229654 | 212 | Details of Entrance Door |
| 4849 | 229655 | 212 | Details of Stone Sill |
| 4850 | 229656 | 212 | Profile of Stone Cornices and Elev. |
| 5878 | 229657 | 212 | Bar, Back Bar, and Equipment for Game Room |
| 5879 | 229658 | 212 | Bar, Back Bar and Bar Equipment for Soda Fountain Room |
| 8868 | 229659 | 136-4 | Dets. of Bleachers and Steps for Bowling Alleys Room No. 104 |
| 10829 | 229077 | 207<br>212<br>226 | Schedule of Fire Hose Cabinets Change from Metal to Wood |
| 9828 | 229660 | 212 | Color Schemes |
| 7814 | 229661 | 212 | Schedule of Venetian Blinds |
| 4838 | 229662 | 212 | 2nd Floor Framing-Steam Pit Dets. |
| 6847 | 229663 | 212 | Bar Bending Schedule. |
| 3646 | 229664 | 212 | Foundation Plan - Heating |
| 3647 | 229665 | 212 | First Floor Plan - Heating |
| 3648 | 229666 | 212 | Second Floor Plan - Heating |
| 3649 | 229667 | 212 | Waste and Vent Piping |
| 3650 | 229668 | 212 | Hot and Cold Water Piping |
| 2725 | 229669 | 212 | Electrical Work |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| Q-15. Division Activities | | | |
| Q-15.01. Division Headquarters | | | |
| 52 | 162690 | 107-2 | Preliminary Elev. Scheme A |
| 110 | 162691 | 107-2 | Preliminary Sketch Elev. Boulevard Side |
| 974 | 162692 | 107-2 | Foundation Plan |
| 975 | 162693 | 107-2 | Foundtion Details |
| 976 | 162694 | 107-2 | First Floor Plan |
| 977 | 162695 | 107-2 | Second Floor Plan |
| 981 | 162696 | 107-2 | Entrance Elevation-River Elev. Roof Plan |
| 982 | 162697 | 107-2 | Right and Left Side Elev.-Left Wing Elevation |
| 983 | 162698 | 107-2 | Details Typical Exterior Wall Section and Front Entrance |
| 984 | 162699 | 107-2 | Details of Entrances |
| 985 | 162700 | 107-2 | Details of Cupola and Main Cornice |
| 986 | 162701 | 107-2 | Dets. of Main Stairs |
| 987 | 162702 | 107-2 | Dets. of Secondary Stairs |
| 988 | 162703 | 107-2 | Dets. of Floor and Ceiling Lobby-Vestibule and Entrance |
| 989 | 162704 | 107-2 | Dets. of Court Room Interior |
| 990 | 162705 | 107-2 | Dets. of Staff Room Window and Misc. Int. Dets. |
| 991 | 162706 | 107-2 | Tile and Fixture Dets-First Floor Toilets |
| 992 | 162707 | 107-2 | Tile and Fixture Dets.-Second Floor Toilets |
| 993 | 162708 | 107-2 | Room Finish and Door Schedule |
| 3839 | 162709 | 107-2 | Full Size Window Details |
| 6882 | 162710 | 107-2 | Schedule of Venetian Blinds |
| 9803 | 162711 | 107-2 | Color Scheme |
| 10843 | 162712 | 107-10-1<br>107-2 | Outrigger Flag Pole for Div. and Post Headquarters |
| 978 | 162713 | 107-2 | Structural-First Floor Framing Plan |
| 979 | 162714 | 107-2 | Structural-Second Floor Framing Plan |
| 980 | 162715 | 107-2 | Structural-Roof Framing Plan |
| 661 | 162716 | 107-2 | Heating Mechanical Pit |
| 1605 | 162717 | 107-2 | Heating and Dets.-Foundation |
| 1606 | 162718 | 107-2 | Heating-First Floor |
| 1607 | 162719 | 107-2 | Heating-Second Floor |
| 1602 | 162720 | 107-2 | Plumbing and Dets.-Foundation |
| 1603 | 162721 | 107-2 | Plumbing and Details-First Floor |
| 1604 | 162722 | 107-2 | Plumbing and Dets.-Second Floor |
| 1688 | 162723 | 107-2 | Plumbing Dets. |
| 1689 | 162724 | 107-2 | Plumbing Riser Diagram |
| 1716 | 162725 | 107-2 | Electric Layout-First Floor Plan |
| 1717 | 162726 | 107-2 | Electric Layout-Second Floor Plan |
| 792 | 162727 | 107-2 | Telephone System - Conduit Layout |
| 793 | 162728 | 107-2 | Telephone System-Conduit Layout |

| Dwg. No. | Y & D No. | Project No. | Title |
|---|---|---|---|
| Q-16 | Post Troops Activities | | |
| | Q-16.01 Post Headquarters | | |
| 57 | 162731 | 107-10 | Sketch B |
| 58 | 162732 | 107-10 | Sketch B |
| 994 | 162733 | 107-10 | Foundation Plans |
| 995 | 162734 | 107-10 | Foundation Details |
| 996 | 162735 | 107-10 | First Floor Plan |
| 997 | 162736 | 107-10 | Second Floor and Roof Plan |
| 1002 | 162737 | 107-10 | Elevation A-B |
| 1003 | 162738 | 107-10 | Elevation C-D, E-F, G-H |
| 1004 | 162739 | 107-10 | Wall Cross Section |
| 1005 | 162740 | 107-10 | Steel Stairs and Details |
| 1006 | 162741 | 107-10 | Room Finish Schedules and Door Schedules |
| 1007 | 162742 | 107-10 | Door Details |
| 1008 | 162743 | 107-10 | Second Floor Toilet Details |
| 1009 | 162744 | 107-10 | First Floor Toilet Details |
| 1010 | 162745 | 107-10 | Plaster and Terrazzo Details |
| 1011 | 162746 | 107-10 | Front Entrance Details |
| 1012 | 162747 | 107-10 | Details of Doors and Vaults |
| 1013 | 162748 | 107-10 | Details of Board Room 261 |
| 1050 | 162749 | 107-10 | Layout Plan of Post Office |
| 1051 | 162750 | 107-10 | Plan and Details of Post Office |
| 1052 | 162751 | 107-10 | Details of Post Office |
| 1052 | 162752 | 107-10 | Details of Post Office |
| 2880 | 162753 | 107-10 | Full Size Wood Window Details |
| 8835 | 162754 | 107-10-1 | Details of Rooms |
| 6878 | 162755 | 107-10 | Schedule of Venetian Blinds |
| 7891 | 162756 | 107-10 | Color Schemes |
| 998 | 162757 | 107-10 | First Floor Framing Plan |
| 999 | 162758 | 107-10 | Second Floor Framing Plan |
| 1000 | 162759 | 107-10 | Attic Framing Plan |
| 1001 | 162760 | 107-10 | Roof Framing Plan |
| 1048 | 162761 | 107-10 | Cupola Details |
| 1049 | 162762 | 107-10 | Bar Schedule |
| 2888 | 162763 | 107-10 | Steel Joist Layout for First Floor |
| 9811 | 162764 | 107-10 | Radio Towers |
| 9819 | 162765 | 107-10-1 | Wooden Flag Pole |
| 1611 | 162766 | 107-10 | Heating Piping Pit and Details, Foundation Plan |
| 1612 | 162767 | 107-10 | Heating First Floor Plan |
| 1613 | 162768 | 107-10 | Heating Second Floor Plan |
| 4683 | 162769 | 107-10-1 | Ventilation |
| 1608 | 162770 | 107-10 | Plumbing and Details - Foundation |
| 1609 | 162771 | 107-10 | Plumbing and Details - First Floor Plan |
| 1610 | 162772 | 107-10 | Plumbing and Details - Second Floor Plan |

| Dwg. No. | Y & D No. | Project No. | Title |
|---|---|---|---|
| Q-16 | Post Troops Activities | | |
| | Q-16.01 Post Headquarters | | |
| 57 | 162731 | 107-10 | Sketch B |
| 58 | 162732 | 107-10 | Sketch B |
| 994 | 162733 | 107-10 | Foundation Plans |
| 995 | 162734 | 107-10 | Foundation Details |
| 996 | 162735 | 107-10 | First Floor Plan |
| 997 | 162736 | 107-10 | Second Floor and Roof Plan |
| 1002 | 162737 | 107-10 | Elevation A-B |
| 1003 | 162738 | 107-10 | Elevation C-D, E-F, G-H |
| 1004 | 162739 | 107-10 | Wall Cross Section |
| 1005 | 162740 | 107-10 | Steel Stairs and Details |
| 1006 | 162741 | 107-10 | Room Finish Schedules and Door Schedules |
| 1007 | 162742 | 107-10 | Door Details |
| 1008 | 162743 | 107-10 | Second Floor Toilet Details |
| 1009 | 162744 | 107-10 | First Floor Toilet Details |
| 1010 | 162745 | 107-10 | Plaster and Terrazzo Details |
| 1011 | 162746 | 107-10 | Front Entrance Details |
| 1012 | 162747 | 107-10 | Details of Doors and Vaults |
| 1013 | 162748 | 107-10 | Details of Board Room 261 |
| 1050 | 162749 | 107-10 | Layout Plan of Post Office |
| 1051 | 162750 | 107-10 | Plan and Details of Post Office |
| 1052 | 162751 | 107-10 | Details of Post Office |
| 1052 | 162752 | 107-10 | Details of Post Office |
| 2880 | 162753 | 107-10 | Full Size Wood Window Details |
| 8835 | 162754 | 107-10-1 | Details of Rooms |
| 6878 | 162755 | 107-10 | Schedule of Venetian Blinds |
| 7891 | 162756 | 107-10 | Color Schemes |
| 998 | 162757 | 107-10 | First Floor Framing Plan |
| 999 | 162758 | 107-10 | Second Floor Framing Plan |
| 1000 | 162759 | 107-10 | Attic Framing Plan |
| 1001 | 162760 | 107-10 | Roof Framing Plan |
| 1048 | 162761 | 107-10 | Cupola Details |
| 1049 | 162762 | 107-10 | Bar Schedule |
| 2888 | 162763 | 107-10 | Steel Joist Layout for First Floor |
| 9811 | 162764 | 107-10 | Radio Towers |
| 9819 | 162765 | 107-10-1 | Wooden Flag Pole |
| 1611 | 162766 | 107-10 | Heating Piping Pit and Details, Foundation Plan |
| 1612 | 162767 | 107-10 | Heating First Floor Plan |
| 1613 | 162768 | 107-10 | Heating Second Floor Plan |
| 4683 | 162769 | 107-10-1 | Ventilation |
| 1608 | 162770 | 107-10 | Plumbing and Details - Foundation |
| 1609 | 162771 | 107-10 | Plumbing and Details - First Floor Plan |
| 1610 | 162772 | 107-10 | Plumbing and Details - Second Floor Plan |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 1678 | 162773 | 107-10 | Plumbing - Toilet Room Details |
| 1679 | 162774 | 107-10 | Plumbing - Stack and Riser |
| 1714 | 162775 | 107-10 | Electrical Layout - First Floor Plan |
| 1715 | 162776 | 107-10 | Electrical Layout - Second Floor Plan |
| 2726 | 162777 | 107-10 | Post Office Portion - Room 101 - Electrical Layout |
| 751 | 162778 | 108-9 | Blackout Comtrol Details - Interior |
| 794 | 162779 | 107-10 | Telephone System - Conduit Layout |
| 795 | 162780 | 107-10 | Telephone System - Conduit Layout |
| 750 | 162781 | 124 | Telephone System - Cable Vault - Post Hdqa. Bldg. |
| 10843 | 162712 | 107-2<br>107-10-1 | Outrigger Flag Pole for Post and Division Hdqs. |

Q-16.02. Brig

| | | | |
|---|---|---|---|
| 920 | 228877 | 107-5 | Foundation Plan and Details |
| 921 | 228878 | 107-5 | First Floor Plan |
| 922 | 228879 | 107-5 | Second Floor Plan and Details |
| 923 | 228880 | 107-5 | Elevations and Details |
| 924 | 228881 | 107-5 | Section and Details |
| 926 | 228882 | 107-5 | Sections and Details |
| 927 | 228883 | 107-5 | Sections and Details |
| 2839 | 228884 | 107-5 | Full Size Window Details |
| 9804 | 228885 | 107-5 | Color Scheme |
| 925 | 228886 | 107-5 | Framing Plans and Details |
| 928 | 228887 | 107-5 | Steam, Tables and Dish Washers |
| 5631 | 228888 | 107-5 | Dish Washing Machine Tables |
| 929 | 228889 | 107-5 | Details of Ventilation Ducts |
| 697 | 228890 | 107-5 | Heating and Details - First Floor |
| 698 | 228891 | 107-5 | Heating and Details - Second Floor |
| 1619 | 228892 | 107-5 | Pit Mechanical Details |
| 3633 | 228893 | 107-5 | Galley and Scullery Ventilation |
| 1699 | 228894 | 107-5 | Galley Piping and Equipment |
| 699 | 228895 | 107-5 | Piping Details - Foundation Plan |
| 1600 | 228896 | 107-5 | Plumbing and Details - First Floor |
| 1601 | 228897 | 107-5 | Plumbing and Details - Second Floor |
| 1614 | 228898 | 107-5 | Plumbing - Riser Diagram |
| 1732 | 228899 | 107-5 | Electrical Layout - First Floor |
| 1733 | 228900 | 107-5 | Electrical Layout - Second Floor |

Q-16.03 Chapels

| | | | |
|---|---|---|---|
| 2845 | 228904 | P-220 | Supplementary Drawing to Y&D 168851 and 168852 |
| 3853 | 228905 | P-220 | Exterior Details - Catholic Chapel |
| TC 381 | 228906 | P-220 | Details of Drapes at Side of Alter |
| 8873 | 228907 | P-220 | Protestant and Catholic Chapels - Color Scheme |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 2861 | 228908 | P-220 | Bar Bending Schedule - Protestant Chapel |
| 2872 | 228909 | P-220 | Bar Bending Schedule - Catholic Chapel |
| 2860 | 228910 | P-220 | Mechanical Pit and Details - Protestant Chapel |
| 2873 | 228911 | P-220 | Mechanical Pit Details - Catholic Chapel |
| 3642 | 228912 | P-220 | Heating - Catholic |
| 3643 | 228913 | P-220 | Heating - Protestant |
| 3631 | 228914 | P-220 | Plumbing and Details - Protestant |
| 3632 | 228915 | P-220 | Plumbing and Details - Catholic |
| 2705 | 228916 | P-220 | Electrical Work |

Q-16.04. Incinerator

| | | | |
|---|---|---|---|
| 2830 | 228940 | 108-12 | Concrete Plans and Details |
| 2831 | 228941 | 108-12 | Floor Plans |
| 2832 | 228942 | 108-12 | Elevations, Sections and Details |
| 2859 | 228943 | 108-12 | Bar Bending Schedule |
| 3603 | 228944 | 108-12 | Plumbing and Details |
| 1706 | 228945 | 108-12 | Electrical Layout |

Q-16.05. Radio Transmitter

| | | | |
|---|---|---|---|
| 2800 | 228950 | 120 | Floor Plans Details Elevations |
| 2801 | 228951 | 120 | Floor Plans Details Elevations |
| 4853 | 228952 | 120 | F.S. Window Details |
| 4854 | 228953 | 120 | F.S. Window Details |
| 6879 | 228954 | 120 | Schedule of Venetian Blinds |
| 10816 | 228955 | 120 | Color Scheme |
| 3892 | 228956 | 120 | Details of Antenna Lead Thru's |
| 2802 | 228957 | 120 | Structural Plans and Details |
| 2803 | 228958 | 120 | Bar Bending Details |
| 3601 | 228959 | 120 | Heating and Plumbing |
| 774 | 228960 | 120 | Electrical Layout - Basement |
| 775 | 228961 | 120 | Electrical Layout - First Fl |

Q-16.06. Radio Towers

| | | | |
|---|---|---|---|
| 1054 | 248030 | 119 | 150 Foot Radio Tower Foundation Details |
| 3726 | 248031 | 120 | Obstruction Lights for Radio Towers |

Q-16.07. Gate House and Guard's Station

| | | | |
|---|---|---|---|
| 4887 | 228965 | 221-4 | Plans |
| 4888 | 228966 | 221-4 | Elevations and Sections |
| 4889 | 228967 | 221-4 | Details |
| 6876 | 228968 | 221-4 | Schedule of Venetian Blinds |

| Dwg. No. | Y& D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 9826 | 228969 | 221-4 | Color Scheme |
| 3657 | 228970 | 221-4 | 1st. and 2nd. Floor Plan and Details - Heating |
| 3651 | 228971 | 221-4 | Soil Waste and Vent Piping Plumbing |
| 3652 | 228972 | 221-4 | 1st. and 2nd. Floor Plan Plumbing |
| 2732 | 228973 | 221-4 | 1st. and 2nd. Floor Plan - Guard Station - Electrical Layout |
| 4890 | 228974 | 221-4 | Guard's Station |
| 11833 | 228975 | 235 | Repair and Additions to Gate House |

Q-16.08. Waller Gunnery Trainer Building

| | | | |
|---|---|---|---|
| 8870 | 229732 | 130 | Foundations, Plans and Details |
| 10872 | 229733 | 130 | Color Schemes |

Q-16.09. Wallace Creek Boat Basin - House and Toilet

| | | | |
|---|---|---|---|
| 3111 | 229903 | 226 | Preliminary - Plan |
| 10818 | 229904 | 226 | Plans, Elevations and Details Toilet House |
| 10819 | 229905 | 226 | Wall, Cross-Section and Details |
| 10820 | 229906 | 226 | Lantern Details and Sections |
| 10829 | 229977 | 226 | Fire Hose Cabinets |
| 11815 | 229907 | 226 | Color Schemes |
| 9876 | 229908 | 226 | Piling Plan and Details |
| 9878 | 229909 | 226 | Marine Railway |
| 5622 | 229910 | 226 | Plumbing |
| 3719 | 229911 | 226 | Electrical |

Q-16.10. Hostess House

| | | | |
|---|---|---|---|
| 7866 | 230005 | 214 | Foundation Plan |
| 7867 | 230006 | 214 | First Floor Plan |
| 7868 | 230007 | 214 | Second Floor Plan |
| 7869 | 230008 | 214 | Elevations |
| 7871 | 230009 | 214 | Sections |
| 7872 | 230010 | 214 | Stair Details |
| 7870 | 230011 | 214 | Chimney and Fireplace Details |
| 7874 | 230012 | 214 | Interior Wood Details |
| 7875 | 230013 | 214 | Exterior Wood Details |
| 7876 | 230014 | 214 | Cornice, Rake and Framing |
| 7873 | 230015 | 214 | Bathroom Details |
| 7894 | 230016 | 214 | Venetian Blinds |
| 6833 | 230017 | 214 | Bar, Back Bar and Bar Equipment |
| 10883 | 230018 | 214 | Color Schemes |
| 7877 | 230019 | 214 | Second Floor and Roof Framing |
| 7878 | 230020 | 214 | Isometric of Truss Framing |
| 7879 | 230021 | 214 | Details of Trusses |
| 7880 | 230022 | 214 | Details of Trusses |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 4622 | 230023 | 214 | Foundation Heating Plan |
| 4623 | 230024 | 214 | First Floor Heating Plan |
| 4624 | 230025 | 214 | Second Floor Heating Plan |
| 4652 | 230026 | 214 | Galley Ventilation |
| 4605 | 230027 | 214 | Foundation Plumbing Plan |
| 4606 | 230028 | 214 | First Floor Plumbing Plan |
| 4607 | 230029 | 214 | Second Floor Plumbing Plan |
| 4608 | 230030 | 214 | Plumbing Details |
| 4668 | 230031 | 214 | Galley Plumbing Details |
| 2791 | 230032 | 214 | First Floor Electrical Plan |
| 2792 | 230033 | 214 | Second Floor Electrical Plan |
| | Q-16.11. Post Theatre | | |
| 10800 | 230752 | 201-12 | Substage Plan and Details |
| 9881 | 230753 | 201-12 | Orchestra Plan |
| 9882 | 230754 | 201-12 | Mezzanine and Part Balcony Plan |
| 9883 | 230755 | 201-12 | Machine Room Floor |
| 9884 | 230756 | 201-12 | Roof Plan |
| 9885 | 230757 | 201-12 | Front and Left Side Elevation |
| 9886 | 230758 | 201-12 | Rear and Right Side Elevation |
| 9887 | 230759 | 201-12 | Sections |
| 9888 | 230760 | 201-12 | Detail Plan of Dressing Rooms Wings |
| 9889 | 230761 | 201-12 | Details of Service and Fire Stairs |
| 9890 | 230762 | 201-12 | Details of Dressing Rooms |
| 9891 | 230763 | 201-12 | Toilet Room Details |
| 9892 | 230764 | 201-12 | Interior Elevations and Details |
| 9893 | 230765 | 201-12 | Ceiling Plans and Interior Corner Details |
| 9894 | 230766 | 201-12 | Details of Lobby |
| 9895 | 230767 | 201-12 | Details of Lobby |
| 9896 | 230768 | 201-12 | Dets. of Main Entrance & Ticket Wind. |
| 9897 | 230769 | 201-12 | Door and Window Schedule & Details |
| | | | Brick Coursing Diagram |
| 9898 | 230770 | 201-12 | Terrazzo Floor Layout and Details |
| 9899 | 230771 | 201-12 | Room Finish Details and Schedule |
| 11808 | 230772 | 201-12 | Details and Stage Curtains and Ceiling |
| 11835 | 230773 | 201-12 | Color Schemes |
| 10856 | 230774 | 201-12 | First Floor and Foundation Plan |
| 10857 | 230775 | 201-12 | Machine Room, Balcony, Mezzanine and Stage Plans and Schedule |
| 10858 | 230776 | 201-12 | Roof Plan and Schedule |
| 10859 | 230777 | 201-12 | Structural Details - Truss "D" |
| 10860 | 230778 | 201-12 | Structural Details - Truss "E" |
| 10861 | 230779 | 201-12 | Structural Details - Truss "C", "B", and "C" |
| 10862 | 230780 | 201-12 | Structural Details - Right End Truss "M" |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 10863 | 230781 | 201-12 | Structural Details - Truss "M" Between Field Splice |
| 10864 | 230782 | 201-12 | Structural Details - Truss "F" and Left End Truss "M" |
| 10865 | 230783 | 201-12 | Structural Details - Truss "A" |
| 10866 | 230784 | 201-12 | Concrete Details |
| 10867 | 230785 | 201-12 | Main Stair Structural Details and Miscellaneous Details |
| 10874 | 230786 | 201-12 | Foundation Plan for Placing Reinforcing Steel |
| 10875 | 230787 | 201-12 | Bar Bending Schedule for Foundations |
| 10876 | 230788 | 201-12 | Machine Room, Balcony, Mezzanine and Stage Plans for Placing Reinforcing Steel |
| 10877 | 230789 | 201-12 | Machine Room, Balcony, Mezzanine and Stage Bar Bending Schedule |
| 10878 | 230790 | 201-12 | Roof Beam and Bar Bending Schedule |
| 10879 | 230791 | 201-12 | Roof Plan for Placing Reinforcing Steel |
| 11840 | 230792 | 201-12 | Catwalk Layout |
| 5643 | 230793 | 201-12 | Heating and Ventilation Machine Floor and Under Balcony |
| 5644 | 230794 | 201-12 | Heating Supply System above Auditorium Ceiling |
| 5645 | 230795 | 201-12 | Heating Supply and Exhaust System Under Balcony & above Lobby Ceiling |
| 5646 | 230796 | 201-12 | Heating Supply & Exhaust System under Lobby Orchestra and Stage Floor |
| 5647 | 230797 | 201-12 | Heating Plans and Details Machine, Orchestra and Dressing Room Floors |
| 5648 | 230798 | 201-12 | Heating Plans and Details Substage Floor Level |
| 5633 | 230799 | 201-12 | Orchestra Floor Plan Plumbing |
| 5634 | 230800 | 201-12 | Mezzanine Floor Plan Plumbing |
| 5635 | 230801 | 201-12 | Machine Room Floor Plan Plumbing |
| 5636 | 230802 | 201-12 | Sub-stage Plan and Section Elevation Plumbing |
| 5637 | 230803 | 201-12 | Details Plumbing |
| 5638 | 230804 | 201-12 | Details Plumbing |
| 5639 | 230805 | 201-12 | Stack and Riser Diagram Plumbing |
| 3734 | 230806 | 201-12 | Orchestra Floor Plan - Electrical Layout |
| 3735 | 230807 | 201-12 | Mezzanine and Part Balcony Elect. Layout |
| 3736 | 230808 | 201-12 | Machine Room Floor Electrical Layout |
| 3737 | 230809 | 201-12 | Dressing Room Details |
| 3738 | 230810 | 201-12 | Electrical Details |
| 3739 | 230811 | 201-12 | Electrical Details |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| | | | **Q-16.12. Post Tailor and Cobbler Shop** |
| 5848 | 247999 | 221-7 | Foundation Plan and Details |
| 5849 | 248000 | 221-7 | Floor Plan and Finish Schedule |
| 5850 | 248001 | 221-7 | Elevations |
| 5851 | 248002 | 221-7 | Wall Sections and Exterior Details |
| 5852 | 248003 | 221-7 | Toilet Room Layouts and Mech. Pit |
| 11831 | 248004 | 221-7 | Details of Steam Spotting Table - Work Table - Ramp and Runway |
| 9810 | 248005 | 221-7 | Color Scheme |
| 4625 | 248006 | 221-7 | Heating and Process Steam |
| 5670 | 248007 | 221-7 | Cleaning Plant - Ventilation |
| 3699 | 248008 | 221-7 | Plumbing and Details |
| 5665 | 248009 | 221-7 | Cleaning Plant - Piping and Equipment Layout |
| 2781 | 248010 | 221-7 | Electrical Layout |
| 3755 | 248011 | 221-7 | Dry Cleaning Plant - Electrical Layout |
| 3756 | 248012 | 221-7 | Dry Cleaning Plant - Electrical Layout |
| | | | **Q-16.13. Post Dispensary** |
| 1166 | 248057 | 400-3 | Plans & Sections of Elevator |
| 3857 | 248058 | 400-3 | Basement and Foundation Plan |
| 3858 | 248059 | 400-3 | 1st. Floor Plan |
| 3859 | 248060 | 400-3 | 2nd. Floor Plan |
| 3860 | 248061 | 400-3 | Roof Plan |
| 3861 | 248062 | 400-3 | Schedule of Room Finishes |
| 3862 | 248063 | 400-3 | Front and Sides Elevations |
| 3863 | 248064 | 400-3 | Rear and Inside Wing Elevation Dormer Details |
| 3864 | 248065 | 400-3 | Typical Wall Sections and Cornice Dets |
| 3865 | 248066 | 400-3 | Plan of Entrance No.1 and Area and Stairs #7 |
| 3866 | 248067 | 400-3 | Sections thru Entrance No. 1 and Portico Cornice Details |
| 3867 | 248068 | 400-3 | Details of Entrance 1 and Portico Cornice |
| 3868 | 248069 | 400-3 | Details of Entrance Door No. 1 |
| 3869 | 248070 | 400-3 | Details of Elevator and Stairs No. 1. |
| 3870 | 248071 | 400-3 | Details of Elevator Penthouse and Cupola Framing |
| 3871 | 248072 | 400-3 | Details of Cupola |
| 3872 | 248073 | 400-3 | Details of Rear Entrance Bay |
| 3873 | 248074 | 400-3 | Details of Entrance No. 2. |
| 3874 | 248075 | 400-3 | Sections thru Main Bldg. and Wings |
| 3875 | 248076 | 400-3 | Details of Entrance No. 3. and 4. |
| 3876 | 248077 | 400-3 | Details of Entrance No. 5. |
| 3877 | 248078 | 400-3 | Details of Entrance Nos. 6,7, and 8 |
| 3878 | 248079 | 400-3 | Details of Stairs Nos. 2.and 3. |

| Dwg. No. | Y & D No. | Proj. No. | Title (CONT'D) |
|---|---|---|---|
| 3879 | 248080 | 400-3 | Details of Stairs Nos. 4, 5, and 6. |
| 3880 | 248081 | 400-3 | Typical Interior Door Trim and Base |
| 3881 | 248082 | 400-3 | Door Schedule and Details |
| 3882 | 248083 | 400-3 | Details of Pharmacy - Pharmacy Storage and Lab. |
| 3883 | 248084 | 400-3 | Details of D.O.R. 239, 238, 237, 236, 235, 206, 205, 209, 203, 229 & 227 |
| 3884 | 248085 | 400-3 | Details of Typical D.O.R. Prostlitic Lab. E.E.N.T. |
| 3885 | 248086 | 400-3 | Details of X-Ray and Dark Rooms 208, 209. 110, and 111. |
| 3886 | 248087 | 400-3 | Details of Nurses' Office, Exam. Room 131 Minor Surgical and Malaria Control Room |
| 3887 | 248088 | 400-3 | Details of Out Patients and Dental Waiting Room |
| 3888 | 248089 | 400-3 | Dets. of Linen Rooms 137 - 264 Fire Hose Cabinets Soiled Clothes and Clothes |
| 7854 | 248090 | 400-3 | Dets. of Toilets No. 121, 122 Nurses Sta. 259 Sterl. Room 258 |
| 7855 | 248091 | 400-3 | Dets. of Toilets No. 148,149,166, 167,106,138 |
| 7856 | 248092 | 400-3 | Dets. of Toilets No. 234,243, O.R., Sterl. Room, Dressing Room |
| 7857 | 248093 | 400-3 | Dets. of Toilets Nos. 220, 146, 268, 249, 265, 263. 144. |
| 7858 | 248094 | 400-3 | Dets. of Board Room and Library |
| 7859 | 248095 | 400-3 | Dets. of Diet Kitchen and Issue Room |
| 7860 | 248096 | 400-3 | Dets. of Veneral Treatment Room and Dispensary |
| 7861 | 248097 | 400-3 | Plans and Details of Lobby No. 101 |
| 7862 | 248098 | 400-3 | Details of Entrance Lobby |
| 10842 | 248099 | 400-3 | Tile Wainscot Details |
| 10855 | 248100 | 400-3 | Schedule of Tile Terrazzo |
| 11846 | 248101 | 400-3 | Locker Details for Rooms 138 - 172 - 215 and 251 Bench Details for Room 105. |
| 11847 | 248102 | 400-3 | Storage Cabinet Details for Rooms 155-201 and 240 |
| 11810 | 248103 | 400-3 | Schedule of Venetian Blinds |
| 10888 | 248104 | 400-3 | Color Scheme |
| 4810 | 248105 | 400-3 | Foundation and Piling Plan |
| 4811 | 248106 | 400-3 | Piling Caps and Miscellaneous Dets. |
| 4812 | 248107 | 400-3 | Column Schedule and Steam Pit |
| 6836 | 248108 | 400-3 | Bar Bending Schedule Foundation and Exterior Features Plan "A" |
| 6837 | 248109 | 400-3 | Bar Bending Schedule Foundation and Exterior Features Plan "B" |

| Dwg. No. | Y & D No. | Proj. No. | Title (CONT'D) |
|---|---|---|---|
| 3879 | 248080 | 400-3 | Details of Stairs Nos. 4, 5, and 6. |
| 3880 | 248081 | 400-3 | Typical Interior Door Trim and Base |
| 3881 | 248082 | 400-3 | Door Schedule and Details |
| 3882 | 248083 | 400-3 | Details of Pharmacy - Pharmacy Storage and Lab. |
| 3883 | 248084 | 400-3 | Details of D.O.R. 239, 238, 237, 236, 235, 206, 205, 209, 203, 229 & 227 |
| 3884 | 248085 | 400-3 | Details of Typical D.O.R. Prostlitic Lab. E.E.N.T. |
| 3885 | 248086 | 400-3 | Details of X-Ray and Dark Rooms 208, 209. 110, and 111. |
| 3886 | 248087 | 400-3 | Details of Nurses' Office, Exam. Room 131 Minor Surgical and Malaria Control Room |
| 3887 | 248088 | 400-3 | Details of Out Patients and Dental Waiting Room |
| 3888 | 248089 | 400-3 | Dets. of Linen Rooms 137 - 264 Fire Hose Cabinets Soiled Clothes and Clothes |
| 7854 | 248090 | 400-3 | Dets. of Toilets No. 121, 122 Nurses Sta. 259 Sterl. Room 258 |
| 7855 | 248091 | 400-3 | Dets. of Toilets No. 148,149,166, 167,106,138 |
| 7856 | 248092 | 400-3 | Dets. of Toilets No. 234,243, O.R., Sterl. Room, Dressing Room |
| 7857 | 248093 | 400-3 | Dets. of Toilets Nos. 220, 146, 268, 249, 265, 263. 144. |
| 7858 | 248094 | 400-3 | Dets. of Board Room and Library |
| 7859 | 248095 | 400-3 | Dets. of Diet Kitchen and Issue Room |
| 7860 | 248096 | 400-3 | Dets. of Veneral Treatment Room and Dispensary |
| 7861 | 248097 | 400-3 | Plans and Details of Lobby No. 101 |
| 7862 | 248098 | 400-3 | Details of Entrance Lobby |
| 10842 | 248099 | 400-3 | Tile Wainscot Details |
| 10855 | 248100 | 400-3 | Schedule of Tile Terrazzo |
| 11846 | 248101 | 400-3 | Locker Details for Rooms 138 - 172 - 215 and 251 Bench Details for Room 105. |
| 11847 | 248102 | 400-3 | Storage Cabinet Details for Rooms 155-201 and 240 |
| 11810 | 248103 | 400-3 | Schedule of Venetian Blinds |
| 10888 | 248104 | 400-3 | Color Scheme |
| 4810 | 248105 | 400-3 | Foundation and Piling Plan |
| 4811 | 248106 | 400-3 | Piling Caps and Miscellaneous Dets. |
| 4812 | 248107 | 400-3 | Column Schedule and Steam Pit |
| 6836 | 248108 | 400-3 | Bar Bending Schedule Foundation and Exterior Features Plan "A" |
| 6837 | 248109 | 400-3 | Bar Bending Schedule Foundation and Exterior Features Plan "B" |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 4813 | 248110 | 400-3 | 1st. Floor Framing |
| 6838 | 248111 | 400-3 | Bar Bending Schedule First Floor |
| 4814 | 248112 | 400-3 | 2nd. Floor Framing |
| 6839 | 248113 | 400-3 | Bar Bending Schedule 2nd. Floor |
| 8867 | 248114 | 400-3 | 2nd. Floor Sleeve Layout |
| 4815 | 248115 | 400-3 | Attic Framing Plan |
| 6840 | 248116 | 400-3 | Bar Bending Schedule Attic |
| 8871 | 248117 | 400-3 | Attic Floor Sleeve Layout |
| 4602 | 248118 | 400-3 | Foundation Piping - Heating |
| 4603 | 248119 | 400-3 | First Floor Heating |
| 4604 | 248120 | 400-3 | Second Floor Heating |
| 4600 | 248121 | 400-3 | Air Conditioning - Ventilation |
| 2640 | | (400-1-4) | Symbols and Fixtures - N.H.A.B. and Mess Hall |
| | | (400-1-5) | Naval Hospital Wards and Corridors - Post Dispensary |
| | | (134 ) | Family Hospital |
| | | (400-3 ) | |
| 4615 | 248122 | 400-3 | Foundation Plan - Plumbing |
| 4616 | 248123 | 400-3 | First Floor Plan - Plumbing |
| 4617 | 248124 | 400-3 | Second Floor Plan - Plumbing |
| 4618 | 248125 | 400-3 | Toilet Room Details - Plumbing |
| 4619 | 248126 | | Details - Plumbing |
| 4620 | 248127 | 400-3 | Riser Diagram - Plumbing |
| 2733 | 248128 | 400-3 | Electrical Layout |
| 2734 | 248129 | 400-3 | Electrical Layout |
| 2735 | 248130 | 400-3 | Electrical Layout |
| 2736 | 248131 | 400-3 | Electrical Layout |
| 1742 | 248132 | 400-3 | Telephone System - Conduit Layout 1st. Floor Plan |
| 1743 | 248133 | 400-3 | Telephone System - Conduit Layout 2nd. Floor Plan |

Q-16.14 Finger Piers (4)

| | | | |
|---|---|---|---|
| 10890 | 248028 | 146 | Complete on this Sheet |

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|---|---|---|---|

## Q-17 Supply & Industrial Area

### Q-17.01 Open Shed Warehouse

| | | | |
|---|---|---|---|
| 800 | 162480 | 106-1 | Plan, Elevation, Details & Sections |

### Q-17.02 Open Side Motor Storage Sheds

| | | | |
|---|---|---|---|
| 2119 | 162784 | 227-1 | Complete |
| 2785 | 162785 | 227-1 | Electrical Layout |
| 7890 | 162786 | 227-1 | Truss Details |

### Q-17.03 Lumber Storage Sheds

| | | | |
|---|---|---|---|
| 7809 | 162788 | 227-5 | Architectural |

### Q-17.04 Fire House

| | | | |
|---|---|---|---|
| 854 | 228920 | 107-6 | Foundation Plan and Details |
| 855 | 228921 | 107-6 | Foundation and Details |
| 845 | 228922 | 107-6 | First Floor Plan Details |
| 846 | 228923 | 107-6 | Second Floor Plan Details |
| 847 | 228924 | 107-6 | Elevation and Section |
| 848 | 228925 | 107-6 | Elevation and Section |
| 849 | 228926 | 107-6 | Misc. Sections and Details |
| 952 | 228927 | 107-6 | Full Size Details of Casement Steel Sash |
| 953 | 228928 | 107-6 | Full Size Details of Casement Steel Sash |
| 9817 | 228929 | 107-6 | Color Scheme |
| 852 | 228930 | 107-6 | Alternate Scheme without Coal Bin and Boiler Room |
| 853 | 228931 | 107-6 | Reinforcing Details without Coal Bin |
| 850 | 228932 | 107-6 | Roof Plan, Misc. Details |
| 851 | 228933 | 107-6 | Floor and Roof Framing Plans |
| 626 | 228934 | 107-6 | Heating |
| 615 | 228935 | 107-6 | Plumbing System |
| 718 | 228936 | 107-6 | Electric Layout |

### Q-17.05 Filling Stations

| | | | |
|---|---|---|---|
| 9821 | 228977 | 108-11 | Plan, Elevations and Details |
| 9822 | 228978 | 108-11 | Miscellaneous Details |
| 5612 | 228979 | 108-11 | Plumbing |
| 3733 | 228980 | 108-11 | Electrical Lay outs |

### Q-17.06 Concrete Warehouse 360' X 180' P-106-2

| | | | |
|---|---|---|---|
| 822 | 228983 | 106-2 | Foundation Plan, Sections and Details |
| 823 | 228984 | 106-2 | Floor Plan Elevation and Details |
| 8839 | 228985 | 107-3 | Commissionary Warehouse Part Plan |

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|---|---|---|---|
| 824 | 228986 | 106-2 | Roof Plans and Details |
| 825 | 228987 | 106-2 | Details |
| 811 | 228988 | 106-2 | Details |
| 6884 | 228989 | 106-2 | Details- Showing Concrete Block Lintels |
| 7843 | 228990 | 227-3 | Foundation Plan and Details |
| 7839 | 228991 | 227-3 | Foundation Bar Bending and Schedule |
| 1810 | 228992 | 106-2 | Steel Pan Floor Details |
| 1044 | 228993 | 106-2 | Pile Plan and Details |
| 884 | 228994 | 106-2 | Reinforcing Details Foundation Walls 1st.Fl. |
| 885 | 228995 | 106-2 | Reinforcing Details Column |
| 887 | 228996 | 106-2 | Reinforcing Details Beams |
| 886 | 228997 | 106-2 | Reinforcing Details Roof |
| 5604 | 228998 | 227-3 | Commissionary Warehouse - Heating |
| 622 | 228999 | 106-2 | Plumbing |
| 5607 | 229000 | 227-3 | Commissionary Warehouse - Plumbing |
| 717 | 229001 | 106-2 | Electric Layout |
| 3709 | 229002 | 227-3 | Commissionary Warehouse - Elec. Layout |
| 3721 | 229003 | 227-3 | Commissionary Warehouse - Elec.Work for Heating System. |
| 2759 | 229004 | 227-3 | Commissionary Warehouse - Tele. Conduit |

Q-17.07 Commissary P-107-8

| | | | |
|---|---|---|---|
| 829 | 229010 | 107-8 | Foundation and Footing Plan - Structural Schedule. |
| 835 | 229011 | 107-8 | Foundation Footing and Wall Details |
| 836 | 229012 | 107-8 | Foundation Footing and Wall Details |
| 830 | 229013 | 107-8 | Floor Plan - Door & Window Details |
| 958 | 229014 | 107-8 | Revisions - Part Floor Plan and Details |
| 831 | 229015 | 107-8 | Elevation and Section |
| 834 | 229016 | 107-8 | Door, Window, Porch and Cutter Details |
| 960 | 229017 | 107-8 | Full Size Window Details |
| 3842 | 229018 | 107-8 | Equipment for Sales - Store Room |
| 8674 | 229019 | 107-8 | Details of Shelving |
| 832 | 229020 | 107-8 | Details of Cold Storage Unit |
| 3841 | 229021 | 107-8 | Details of Manholes & Pipe Chases for Refrig. lines. |
| 833 | 229022 | 107-8 | Roof and Framing Plan |
| 965 | 229023 | 107-8 | Reinforcing Details, Foundation Walls |
| 1020 | 229024 | 107-8 | Reinforcing Details, Foundation Plan & Details |
| 964 | 229025 | 107-8 | Reinforcing Details, Floor Beams and Slabs |
| 1021 | 229026 | 107-8 | Reinforcing Details, Columns and Footings |
| 1022 | 229027 | 107-8 | Reinforcing Details, Columns and Footings |
| 1026 | 229028 | 107-8 | Reinforcing Details Roof Plans |
| 1027 | 229029 | 107-8 | Reinforcing Details Roof Details & Schedules |
| 620 | 229030 | 107-8 | Heating Plan and Details |
| 655 | 229031 | 107-8 | Pit-Mechanical Details |
| 619 | 229032 | 107-8 | Plumbing |
| 721 | 229033 | 107-8 | Electric Layout |
| 767 | 229034 | 107-8 | Revisions - Electric Layout |

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| 2722 | 229035 | 107-8 | Electric Layout - Equipment for Sales Store-Room |
| 621 | 229036 | 107-8 | Warehouse Refrigeration Room |
| 1865 | 229037 | 107-8 | Addition - Foundation Plan |
| 1866 | 229038 | 107-8 | Addition - Floor Plan |
| 1867 | 229039 | 107-8 | Addition - Elevations - Transverse Section |
| 3849 | 229040 | 107-8 | Full Size Window Details |
| 1868 | 229041 | 107-8 | Addition - Roof Plan and Framing |
| 1869 | 229042 | 107-8 | Addition - Bar Bending Details |
| 760 | 229043 | 107-8 | Addition Electric Layout |

Q-17.08 Cold Storage Plant

| | | | |
|---|---|---|---|
| 1047 | 229050 | 107-9 | Pile Plan |
| 1835 | 229051 | 107-9 | Floor Plan |
| 1836 | 229052 | 107-9 | Roof Plan - Section and Details |
| 1837 | 229053 | 107-9 | Elevations sections |
| 1838 | 229054 | 107-9 | Door Details |
| 1842 | 229055 | 107-9 | Full Size Window Details |
| 10817 | 229056 | 107-9 | Color Scheme |
| 1834 | 229057 | 107-9 | Floor Framing and Schedules |
| 1839 | 229058 | 107-9 | Bending Diagram - Roof Beam Scheduled |
| 1840 | 229059 | 107-9 | Concrete Details |
| 1841 | 229060 | 107-9 | Bar Schedule |
| 7817 | 229061 | 107-9 | Machine and Dumping Room - Floor Slabs |
| 3620 | 229062 | 107-9 | Heating and Details |
| 3614 | 229063 | 107-9 | Refrigerating Equipment |
| 3618 | 229064 | 107-9 | Meat Racks and Shelves |
| 3619 | 229065 | 107-9 | Plumbing and Details |
| 740 | 229066 | 107-9 | Electrical layout |
| 1739 | 229067 | 107-9 | Machine Room - Electrical Layout |
| 2799 | 229068 | 107-9 | Machine Room - Power Conduit Layout |

Q-17.09 Balloon Storehouse and Shop

| | | | |
|---|---|---|---|
| 6897 | 229075 | 227-2 | Foundation Plan and Details |
| 6898 | 229076 | 227-2 | Floor Plan, Elevations and Details |
| 10829 | 229077 | 227-2 | Fire Hose Cabinets - Schedule |
| | | 207 | |
| | | 212 | |
| | | 215 | |
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| | | 221-5 | |
| | | 228 | |
| | | 400-1-4 | |
| | | 400-1-5 | |
| | | 400-1-7 | |
| | | 400-1-11 | |
| | | 400-1-12 | |

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|---|---|---|---|
| | | 400-1-18 | |
| | | 400-3 | |
| | | 402 | |
| | | 403 | |
| 10854 | 229078 | 227-2 | Color Scheme |
| 4649 | 229079 | 227-2 | Plumbing and Heating |
| 2779 | 229080 | 227-2 | Electrical Layout |

Q-17.10 Laundry P-107-3

| | | | |
|---|---|---|---|
| 966 | 229084 | P-107-3 | Foundation Plans - Details |
| 4689 | 229085 | P-107-3 | Air Compressor Foundations |
| 967 | 229086 | P-107-3 | Floor Plan and Details |
| 968 | 229087 | P-107-3 | Elevations and Sections |
| 969 | 229088 | P-107-3 | Details |
| 2898 | 229089 | P-107-3 | Window Details |
| 2882 | 229090 | P-107-3 | Plans and Details for Steel Supports for Monorail |
| 4621 | 229091 | P-107-3 | Heating and Process Piping |
| 5617 | 229092 | P-107-3 | Ventilating Duct Work - Tumblers - Mangles |
| 2149 | 229093 | P-107-3 | Suggested layout for temporary steam plant for Laundry |
| 1685 | 229094 | P-107-3 | Hot and Cold Water Piping |
| 3629 | 229095 | P-107-3 | Steam and Water Pipe Layout for Roughing |
| 1686 | 229096 | P-107-3 | Vent and Drainage Piping |
| 1734 | 229097 | P-107-3 | Electrical Layout - Lighting |
| 2701 | 229098 | P-107-3 | Electrical Layout - Power |

Q-17.11 Propane Gas Building

| | | | |
|---|---|---|---|
| 4894 | 229102 | 127 | Plans Elevations and Details |
| 3656 | 229103 | 127 | Drain and Steam Piping |

Q-17.12 Bakery

| | | | |
|---|---|---|---|
| 1162 | 229735 | 208 | Bakery - Preliminary Floor Plan - Scheme 1 and 2 |
| 1168 | 229736 | 208 | Bakery - Preliminary Floor Plan - Scheme 3 |
| 6885 | 229737 | 208 | Foundation Plan |
| 6864 | 229738 | 208 | Floor Plan Schedules Details |
| 6865 | 229739 | 208 | Elevations and Details |
| 6866 | 229740 | 208 | Roof Plan Cross Sections and Details |
| 6867 | 229741 | 208 | Storage Platform Plan and Details |
| 10895 | 229742 | 208 | Color Scheme |
| 6886 | 229743 | 208 | Roof Framing Plan |
| 6887 | 229744 | 208 | Structural Details |
| 6888 | 229745 | 208 | Bar Bending Details |
| 6889 | 229746 | 208 | Bar Bending Details |
| 4628 | 229747 | 208 | Heating and Process Steam |

| Dwg. No. | Prod. No. | Title (continued) |
|---|---|---|
| | 400-1-35 | |
| | 400-3 | |
| | 402 | |
| | 403 | |
| 228078 | 227-2 | [illegible] |
| 228079 | 227-3 | [illegible] and [illegible] |
| 228080 | 227-2 | Electrical Layout |

[illegible] Laundry P-107-[illegible]

| | | |
|---|---|---|
| 228084 | P-107-[illegible] | Foundation Plans - Details |
| [illegible] | P-107-[illegible] | Air Compressor Foundation |
| [illegible] | P-107-[illegible] | [illegible] and Details |
| [illegible] | P-107-[illegible] | [illegible] and Sections |
| 228088 | P-107-[illegible] | [illegible] |
| 228089 | P-107-[illegible] | [illegible] |
| 228090 | P-107-[illegible] | [illegible] for [illegible] for [illegible] [illegible] for [illegible] |
| 228091 | P-107-[illegible] | [illegible] and [illegible] Piping |
| 228092 | P-107-[illegible] | [illegible] - [illegible] |
| 228093 | P-107-[illegible] | [illegible] for Temporary [illegible] |
| 228094 | P-107-[illegible] | [illegible] and [illegible] Piping |
| 228095 | P-107-[illegible] | [illegible] |
| 228096 | P-107-[illegible] | [illegible] Piping |
| 228097 | P-107-[illegible] | [illegible] - Layouts |
| 228098 | P-107-[illegible] | [illegible] |

[illegible]-17.11 [illegible]

| | | |
|---|---|---|
| 229102 | [illegible] | [illegible] and [illegible] |
| 229103 | [illegible] | [illegible] |

[illegible]-17.15 [illegible]

| | | |
|---|---|---|
| 229735 | [illegible] | [illegible] |
| 229736 | [illegible] | [illegible] |
| 229737 | [illegible] | [illegible] |
| 229738 | [illegible] | [illegible] Details |
| 229739 | [illegible] | [illegible] |
| 229740 | [illegible] | [illegible] |
| 229741 | [illegible] | [illegible] |
| 229742 | [illegible] | [illegible] |
| 229743 | [illegible] | [illegible] |
| 229744 | [illegible] | [illegible] |
| 229745 | [illegible] | [illegible] |
| 229746 | [illegible] | [illegible] |
| 229747 | [illegible] | [illegible] |

| Dwg. No. | Y & D No. | Proj. No. | Title ( CONT'D) |
|---|---|---|---|
| 4630 | 229748 | 208 | Plumbing and Details |
| 2777 | 229749 | 208 | Electrical Layout |
| 4631 | 228828 | (120<br>(P-8<br>(221-4<br>(104-2<br>(208 | Oil Storage |

Q-17.13 Post Shop Building

| | | | |
|---|---|---|---|
| 4873 | 229928 | 207 | Foundation Plan |
| 4876 | 229929 | 207 | First Floor Plan |
| 4877 | 229930 | 207 | Second Floor Plan and Roof |
| 4878 | 229931 | 207 | Elevations |
| 4879 | 229932 | 207 | Exterior Details |
| 4880 | 229933 | 207 | Exterior Details |
| 4881 | 229934 | 207 | Interior Details |
| 4882 | 229935 | 207 | Interior Details |
| 11809 | 229936 | 207 | Color Schemes |
| 4874 | 229937 | 207 | Roof and Second Floor Framing |
| 4875 | 229938 | 207 | Roof Framing |
| 4884 | 229939 | 207 | Footing and Bar Bending Details |
| 4885 | 229940 | 207 | Bar Bending Schedule |
| 7850 | 229941 | 207 | Concrete Stairway |
| 4646 | 229942 | 207 | First Floor Heating Plan |
| 4647 | 229943 | 207 | Second Floor Heating Plan |
| 5664 | 229944 | 207<br>221-6 | Post Shop Building and Reclamation Building - Ventilation |
| 3635 | 229945 | 207 | First Floor Plumbing Plan |
| 3636 | 229946 | 207 | Second Floor Plumbing Plan |
| 3644 | 229947 | 207 | Plumbing Details |
| 2741 | 229948 | 207 | Electrical Layout - Lighting |
| 2743 | 229949 | 207 | Second Floor Plan - Electrical Layout and Riser Diagram |
| 2742 | 229950 | 207 | Power Distribution |
| 2758 | 229951 | 207 | Telephone System Conduit Layout |
| 5652 | 229952 | 207 | Equipment Layout and Wiring - East Wing |
| 5654 | 229953 | 207 | Center Wing - Equipment and Wiring Layout |
| 5653 | 229955 | 207 | Carpenter Shop - Sawdust Removal System |
| 5655 | 229954 | 207 | Carpentry Shop - Equipment Layout and Wiring |

Q-17.14 Garage and Repair Shop

| | | | |
|---|---|---|---|
| 6891 | 229959 | 221-5 | Foundation Plan |
| 7818 | 229960 | 221-5 | First Floor Plan |
| 7819 | 229961 | 221-5 | Mezzanine Plan |
| 7820 | 229962 | 221-5 | Electrical Sections |
| 7821 | 229963 | 221-5 | Window Details |
| 7822 | 229964 | 221-5 | Interior Details |
| 7823 | 229965 | 221-5 | Detail of Entrance |

| Dwg. No. | Y & D No. | Proj. No. | Title ( CONT'D) |
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| 7824 | 229966 | 221-5 | Toilet Room Layouts |
| 6892 | 229967 | 221-5 | Roof and Mezzanine Floor Plan |
| 6893 | 229968 | 221-5 | Wall Beam Details |
| 6894 | 229969 | 221-5 | Bar Bending Schedule |
| 6895 | 229970 | 221-5 | Bar Bending Schedule |
| 6896 | 229971 | 221-5 | Bar Bending Schedule |
| 8832 | 229972 | 228 | Foundation Plan |
| 8833 | 229973 | 228 | Bar Bending Schedule |
| 8840 | 229974 | 228 | Bar Bending Schedule |
| 10897 | 229975 | 228 | Revised Foundation and Footing Details |
| 10898 | 229976 | 228 | Revised Footing Details |
| 11811 | 229977 | 228<br>221-5 | Color Schemes |
| 4635 | 229978 | 228 | First Floor Plan Heating |
| 4660 | 229979 | 221-5 | Heating |
| 4636 | 229980 | 221-5 &<br>228 | Second Floor Heating |
| 5863 | 229981 | 228 &<br>221-5 | Ventilation Plans and Details |
| 4643 | 229982 | 221-5<br>228 | First Floor Plumbing |
| 4644 | 229983 | 221-5<br>228 | Plumbing Details |
| 4645 | 229984 | 221-5<br>228 | Hot and Cold Water Piping |
| 2774 | 229985 | 221-5 | First Floor Electrical Layout |
| 2775 | 229986 | 221-5 | Mezzanine Floor Electrical Layout |
| 5657 | 229987 | 221-5 | Equipment Layout, Wiring and Work Bench Details |
| 5660 | 229988 | 228 | Equipment Layout and Wiring |
| 11804 | 229989 | 221-5<br>228 | Lubrication Room Pit Details |

Q-17.15 Reclamation Building

| | | | |
|---|---|---|---|
| 6825 | 229993 | 221-6 | Foundation Plan - First Floor |
| 6826 | 229994 | 221-6 | Elevation Roof Plan Wall Section |
| 6827 | 229995 | 221-6 | Cross Section and Interior Details |
| 6829 | 229996 | 221-6 | Steam Pit Details |
| 11814 | 229997 | 221-6 | Color Scheme |
| 6828 | 229998 | 221-6 | Concrete Details |
| 6863 | 229999 | 221-6 | Bar Bending Schedule |
| 4629 | 230000 | 221-6 | Heating and Details |
| 5664 | 229944 | 221-6 | Ventilation - Post Shop and Reclamation Bldg. |
| 3645 | 230001 | 221-6 | Plumbing First Floor |
| 2776 | 230002 | 221-6 | Electrical Layout |
| 5661 | 230003 | 221-6 | Equipment Layout and Wiring |

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| | Q-17.16 | Post Exchange - Storehouse | |
| 8836 | 230275 | 227-4 | Foundation Plan Details Columns and Footing Schedule |
| 8837 | 230276 | 227-4 | Floor Plan, Elevations Details |
| 8838 | 230277 | 227-4 | Roof Plan Framing Details |
| 2127 | 230278 | 227-4 | Preliminary Floor Plan |
| 4669 | 230279 | 227-4 | Heating |
| 4681 | 230280 | 227-4 | Plumbing and Details |
| 3707 | 230281 | 227-4 | Electrical Layout |
| 11812 | 230282 | 227-4 | Color Scheme |
| | Q-17.17 | Scale H ouse at Central Heating Plant | |
| 9818 | 230062 | 221-3 | Scale and Scale House - Central Heating Plant - Foundation Plan - Section and Scale Details |
| 9823 | 230063 | 221-3 | Scale House - Plans Elevation Details |
| 3740 | 230064 | 221-3 | Scale House - Central Heating Plant |
| | Q-17.18 | Main Central Heating Plant | |
| 1056 | 230090 | 108-7 | Trench Plan Details Blow-Off Pit |
| 1057 | 230091 | 108-7 | Ground Floor Plan and Mezzanine Floor Plan |
| 1058 | 230092 | 108-7 | Operating Floor Plan |
| 1059 | 230093 | 108-7 | Scale Platform Plan |
| 1060 | 230094 | 108-7 | Boiler Access Platform Plan |
| 1061 | 230095 | 108-7 | Conveyor and Surge Tank Floor and Main Roof Plan |
| 1062 | 230096 | 108-7 | Upper Level Roof Plan Catwalk above Boilers |
| 1063 | 230097 | 108-7 | Front Elevation |
| 1064 | 230098 | 108-7 | Rear Elevation |
| 1065 | 230099 | 108-7 | Right End Elevation |
| 1066 | 230100 | 108-7 | Left End Elevation Ladder Details |
| 1067 | 230101 | 108-7 | Longitudinal Sec. thru Extended Bay - Details of Battery Room Partition |
| 1068 | 230102 | 108-7 | Longitudinal Section Thru Bunker Bay |
| 1069 | 230103 | 108-7 | Longitudinal Section Thru Boiler Bay |
| 1070 | 230104 | 108-7 | Longitudinal Section Thru Duct Bay |
| 1071 | 230105 | 108-7 | Section Thru Boiler Bay - Stack Foundation |
| 1072 | 230106 | 108-7 | Cross Section Thru Typical 10'-0" Bay |
| 1073 | 230107 | 108-7 | Window Schedule and Window Details |
| 1076 | 230108 | 108-7 | Ground Mezzanine and Operating Floor Stair Details |
| 1077 | 230109 | 108-7 | Stair Details - Surge Tank Area - Misc. |
| 1074 | 230110 | 108-7 | Mezzanine Floor Details |
| 1075 | 230111 | 108-7 | Door Details |
| 1078 | 230112 | 108-7 | Miscellaneous Details |
| 1079 | 230113 | 108-7 | Miscellaneous Details |
| 1080 | 230114 | 108-7 | Miscellaneous Details |
| 1081 | 230115 | 108-7 | Main Coal Handling Pit - Revision |

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| 2816 | 230116 | 108-7 | Pile Plan |
| 2817 | 230117 | 108-7 | Pile Caps - Piers and Sub-framing |
| 2820 | 230118 | 108-7 | Operating Floor Framing Plan |
| 2821 | 230119 | 108-7 | Scale Platform - Framing Plan |
| 2822 | 230120 | 108-7 | Bunker Framing |
| 2823 | 230121 | 108-7 | Main Roof and Conveyor Frame Plan |
| 2824 | 230122 | 108-7 | Roof Framing over Conveyor |
| 2825 | 230123 | 108-7 | Elevations - Structural |
| 2826 | 230124 | 108-7 | Details - Structural |
| 2819 | 230125 | 108-7 | Structural Details |
| 2818 | 230126 | 108-7 | Coal H andling Pit |
| 3889 | 230127 | 108-7 | Bar Bending Schedule |
| 3890 | 230128 | 108-7 | Bar Bending Schedule |
| 6843 | 230129 | 108-7 | Bar Bending Schedule |
| 1652 | 230130 | 108-7 | Machinery Foundation and Sleeve Plans |
| 1653 | 230131 | 108-7 | Machinery Foundation and Sleeve Plan - Operating Floor |
| 1654 | 230132 | 108-7 | Machinery Foundation & Sleeve Plan |
| 1655 | 230133 | 108-7 | Machinery Foundation & Sleeve Conveyor |
| 1620 | 230134 | 108-7 | Coal Handling Layout |
| 1621 | 230135 | 108-7 | Ash Handling Layout |
| 1622 | 230136 | 108-7 | Stack and Breeching Details |
| 1623 | 230137 | 108-7 | Main Steam Piping Plan |
| 1624 | 230138 | 108-7 | Main Steam Piping Elevations |
| 1625 | 230139 | 108-7 | Boiler Control & Meter Panel |
| 1626 | 230140 | 108-7 | Det. of Roll & Anchor Supports |
| 1628 | 230141 | 108-7 | Surge Tank Details |
| 1629 | 230142 | 108-7 | Boiler Blow Off Tanks & Supports |
| 1630 | 230143 | 108-7 | Safety Valve Vent Piping |
| 1631 | 230144 | 108-7 | Boiler Blow Off Piping |
| 1632 | 230145 | 108-7 | Boiler Feed Water Piping Plan |
| 1633 | 230146 | 108-7 | Boiler Feed Water Piping El. & Section |
| 1634 | 230147 | 108-7 | Auxiliary Steam & Exhaust Piping |
| 1635 | 230148 | 108-7 | Auxiliary Steam & Exhaust Pipe El. & Section |
| 1636 | 230149 | 108-7 | Surge Tank Feed Water Heater W. Safety |
| 1637 | 230150 | 108-7 | Surge Tank Fd. Water Heater W. Safety Pipe El. Sec. |
| 1643 | 230151 | 108-7 | Pipe Hanger Details |
| 1644 | 230152 | 108-7 | H.P. Drip Piping Plan |
| 1645 | 230153 | 108-7 | L.P. Drip Piping Plan |
| 1647 | 230154 | 108-7 | Steam Water Fuel Oil Flow Diagram |
| 1651 | 230155 | 108-7 | Comb. Cont. & Piping |
| 1656 | 230156 | 108-7 | Cont. Blow Off Piping Plans |
| 4609 | 230157 | 108-7 | Blow Down Drain and Overflow |
| 4687 | 230158 | 108-7 | Layout - Coal Storage Area & Fut. Coal Handling Equipment |
| 1650 | 230159 | 108-7 | Misc. Drip and Drains |
| 1638 | 230160 | 108-7 | Foundation Plan - Plumbing |
| 1641 | 230161 | 108-7 | Scale Platform Plan - Plumbing |

| Dwg. No. | Y & D No. | Proj. No. | Title ( Cont'd) |
|---|---|---|---|
| 1663 | 230162 | 108-7 | Trench Plan - Plumbing |
| 1664 | 230163 | 108-7 | Ground Fl. Plan - Plumbing |
| 1665 | 230164 | 108-7 | Oper. Floor Plan - Plumbing |
| 1667 | 230165 | 108-7 | C. & S.T. Floor & M.R. Plumbing |
| 1668 | 230166 | 108-7 | Upper Level Roof Plan - Plumbing |
| 1669 | 230167 | 108-7 | Stack & Water Riser Plumbing |
| 1646 | 230168 | 108-7 | Std. Service Water Pipings |
| 1648 | 230169 | 108-7 | Comp. Air Piping |
| 2715 | 230170 | 108-7 | Power Wiring Layout |
| 2716 | 230171 | 108-7 | Power Wiring Layout G. Floor |
| 2717 | 230172 | 108-7 | Power Wiring Layout |
| 2718 | 230173 | 108-7 | Lighting Layout |
| 2719 | 230174 | 108-7 | Lighting Layout |
| 2720 | 230175 | 108-7 | Lighting Layout |
| 2721 | 230176 | 108-7 | Primary Service |
| 2728 | 230177 | 108-7 | Emergency Light Control |
| 2729 | 230178 | 108-7 | Electrical Layout Coal Handling |
| 2745 | 230179 | 108-7 | Ash Conveyer Control Equip. Schedule Power Panels |
| 2747 | 230180 | 108-7 | Conveyor & Bucket Elevators |
| 1725 | 230181 | 108-7 | Unit Substation |
| 3705 | 230184 | 108-7 | Elec. Substation - Sleeves |
| 2739 | 230185 | 108-7 | Lighting Layout of Mezzanine and Lighting Riser Diagram |
| 1639 | 230187 | 108-7 | Machinery Location Plan - Ground Plan |
| 1640 | 230188 | 108-7 | Machinery Location Plan - Operating Floor |

Q-17.19 Gasoline and Oil Storage & Distribution Pump House

| | | | |
|---|---|---|---|
| 11806 | 248017 | 108-11 | Foundations - Floor Plan Elevations Sections and Details |

Q-17.20 No. 6 Fuel Oil Storage & Distribution Pump House

| | | | |
|---|---|---|---|
| 10894 | 248019 | 221-2 | Complete on this sheet |

Q-17.21 Loading and Unloading Ramp Between Tracks 1 & 2 -Ind. Area

| | | | |
|---|---|---|---|
| 10886 | 248021 | 147 | Complete on this sheet |

Q-17.22 Heating Plant at Traffic Circle

| | | | |
|---|---|---|---|
| 4651 | 248045 | 222-1 | Foundation and Location Plan |
| 4675 | 248046 | 222-1 | Piping Layout |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|

Q-18. Naval Hospital Area

Q-18.01. Naval Hospital Transformer Houses

| | | | |
|---|---|---|---|
| 8842 | 229794 | | Transformer House |

Q-18.02. Naval Hospital Men and Women Servants' Quarters

| | | | |
|---|---|---|---|
| 8827 | 229796 | 403 | Women Foundation and First Floor Plan |
| 8829 | 229797 | 403 | Men Plans and Details |
| 8828 | 229798 | 403 | Women Elevations and Details |
| 8830 | 229799 | 403 | Men Elevations and Details |
| 8831 | 229800 | 403 | Men and Women Details |
| 10844 | 229801 | 403 | Men and Women Furniture Layout |
| 11817 | 229802 | 403 | Womens Color Scheme |
| 11816 | 229803 | 403 | Mens Color Scheme |
| 4662 | 229804 | 403 | Men and Women - Heating |
| 4680 | 229805 | 403 | Plumbing - Women |
| 4679 | 229806 | 403 | Plumbing - Men |
| 2795 | 229807 | 403 | Electrical Layout - Women |
| 2796 | 229808 | 403 | Electrical Layout - Men |

Q-18.03. Naval Hospital Corpsmens'Barracks

| | | | |
|---|---|---|---|
| 2847 | 229811 | 400-1-6 | Foundation |
| 2848 | 229812 | 400-1-6 | First Floor Plan and Details |
| 2849 | 229813 | 400-1-6 | Second Floor Plan and Details |
| 2850 | 229814 | 400-1-6 | Elevations and Roof Plans |
| 2851 | 229815 | 400-1-6 | Room and Door Schedule |
| 2852 | 229816 | 400-1-6 | Typical Wall Sections and Details |
| 2853 | 229817 | 400-1-6 | Details |
| 3800 | 229818 | 400-1-6 | Wooden Lockers |
| 8844 | 229819 | 400-1-6 | Detail of Fire Ladders |
| 9820 | 229820 | 400-1-6 | Color Scheme |
| 9837 | 229821 | 400-1-6 | Schedule of Venetian Blinds |
| 2854 | 229822 | 400-1-6 | First Floor Framing |
| 2855 | 229823 | 400-1-6 | Second Floor Framing |
| 2899 | 229824 | 400-1-6 | Bar Bending Schedule |
| 2609 | 229825 | 400-1-6 | Foundation Heating |
| 2610 | 229826 | 400-1-6 | First Floor Heating |
| 2611 | 229827 | 400-1-6 | Second Floor Heating |
| 2606 | 229828 | 400-1-6 | Foundation Plumbing |
| 2607 | 229829 | 400-1-6 | First Floor Plumbing |
| 2608 | 229830 | 400-1-6 | Second Floor Plumbing |
| 1719 | 229831 | 400-1-6 | First Floor Electrical |
| 1720 | 229832 | 400-1-6 | Second Floor Electrical |
| 796 | 229833 | 400-1-6 | Telephone System |

| Dwg. No. | & & D No. | Proj. No. | Title |
|---|---|---|---|
| | | | **Q-18.04. Naval Hospital - Warehouse** |
| 1812 | 229838 | 400-1-13 | Foundation and Floor Plan |
| 1813 | 229839 | 400-1-13 | Elevation and Details |
| 1814 | 229840 | 400-1-13 | Sections and Details |
| 2887 | 229841 | 400-1-13 | Window Details (Warehouse and Shop) |
| 1810 | 229842 | 400-1-13 | Electrical Layout |
| 10841 | 229843 | 400-1-13 | Color Schemes (Warehouse and Shop) |
| 3115 | 229844 | | Preliminary |
| | | | **Q-18.05. Naval Hospital - Medical Storehouse** |
| 2841 | 229846 | 400-1-8 | Foundation Column Schedule |
| 2842 | 229847 | 400-1-8 | Floor Plan Elevation Section Schedule |
| 2843 | 229848 | 400-1-8 | Roof Plan Detail and Beam Schedule |
| 2844 | 229849 | 400-1-8 | Details |
| 8875 | 229850 | 400-1-8 | Shelf Details |
| 8876 | 229851 | 400-1-8 | Shelf Details |
| 1019 | 229852 | 400-1-8 | Bar Bending Schedule |
| 2601 | 229853 | 400-1-8 | Heating Plan and Details |
| 2600 | 229854 | 400-1-8 | Plumbing Plan and Details (Grade Floor) |
| 1726 | 229855 | 400-1-8 | Electrical Layout |
| 10830 | 229856 | 400-1-8 | Color |
| 133 | 229857 | 107-1-4 | Preliminary |
| | | | **Q-18.06. Naval Hospital - Shops** |
| 1815 | 229860 | 400-1-13 | Foundation and Floor Plan |
| 1816 | 229861 | 400-1-13 | Elevations |
| 1817 | 229862 | 400-1-13 | Details and Schedules |
| 2887 | 229841 | 400-1-13 | Window Details (Warehouse and Shop) |
| 10841 | 229843 | 400-1-13 | Color Schemes (Warehouse and Shop) |
| 2605 | 229863 | 400-1-13 | Heating |
| 2604 | 229864 | 400-1-13 | Plumbing |
| 1702 | 229865 | 400-1-13 | Electrical Layout |
| 3114 | 229866 | 400-1-13 | Preliminary |
| | | | **Q-18.07. Naval Hospital Garage** |
| 1887 | 229869 | 400-1-9 | Plans, Sections, Details |
| 1888 | 229870 | 400-1-9 | Elevations, Details |
| 4851 | 229871 | 400-1-9 | F.S. Window Details |
| 4852 | 229872 | 400-1-9 | F.S. Window Details |
| 1889 | 229873 | 400-1-9 | Oil Separator Pit |
| 2886 | 229874 | 400-1-9 | Bar Bending Schedule |
| 2602 | 229875 | 400-1-9 | Grade Fl. Plumbing Plan |
| 2603 | 229876 | 400-1-9 | Grade Fl. Heating Plan |
| 1711 | 229877 | 400-1-9 | Electrical Layout |
| 10839 | 229878 | 400-1-9 | Color Schemes |
| 196 | 229879 | 107-1-5 | Preliminary |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|

Q-18.08. Nurses' Quarters Family Hospital

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| 4800 | 229883 | 400-1-11 | Foundation |
| 4801 | 229884 | 400-1-11 | 1st. Floor Plan & Details |
| 4802 | 229885 | 400-1-11 | 2nd. Floor and Roof Plan |
| 4803 | 229886 | 400-1-11 | Elevations |
| 4804 | 229887 | 400-1-11 | Elevations and Sections |
| 4805 | 229888 | 400-1-11 | Sections and Details |
| 4808 | 229889 | 400-1-11 | Stair Details |
| 4807 | 229890 | 400-1-11 | Toilet Details |
| 4806 | 229891 | 400-1-11 | Mechanical Pit |
| 8822 | 229892 | 400-1-11 | Venetian Blinds |
| 10815 | 229893 | 134-1 | 1st. and 2nd. Fl. Plans - Rugs & Furniture |
| 3690 | 229894 | 400-1-11 | Foundation Heating |
| 3691 | 229895 | 400-1-11 | 1st. Floor Heating |
| 3692 | 229896 | 400-1-11 | 2nd. Floor Heating |
| 2644 | 229897 | 400-1-11 | Foundation Plumbing |
| 2645 | 229898 | 400-1-11 | 1st. Floor Plumbing |
| 2646 | 229899 | 400-1-11 | 2nd. Floor Plumbing |
| 10822 | 229900 | 400-1-11 | Color Schemes |

Q-18.09. Naval Hospital Warrant Officers' Quarters

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| 2874 | 229915 | 400-1-15 | Plan and Elevation |
| 3827 | 229916 | 400-1-15 | Foundation Plan and Details |
| 3828 | 229917 | 400-1-15 | Floor Plan and Details |
| 3829 | 229918 | 400-1-15 | Elevations |
| 3830 | 229919 | 400-1-15 | Details |
| 7811 | 229920 | 400-1-15 | Venetian Blinds |
| 10806 | 229921 | 400-1-15 | Color Schemes (N.H.) |
| 2656 | 229922 | 400-1-15 | Heating |
| 3637 | 229923 | 400-1-15 | Foundation Plumbing |
| 3638 | 229924 | 400-1-15 | Floor Plan Plumbing |

Q-18.10. Navy Hospital - Bachelor Officers' Quarters

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| 8800 | 230196 | 402 | Foundation Plan & Footing Details |
| 8801 | 230197 | 402 | Footings - Foundation and Refrigeration Walls |
| 8803 | 230198 | 402 | 1st. and 2nd. Floor Plan |
| 8804 | 230199 | 402 | Elevation and Details |
| 8807 | 230200 | 402 | Stair Section and Details |
| 8811 | 230201 | 402 | Brick Coursing Detail |
| 8805 | 230202 | 402 | Section A-A Bay Window Details |
| 8806 | 230203 | 402 | Section B-B Dining Room Cornice Details |
| 8808 | 230204 | 402 | Main Entrance Details |
| 8809 | 230205 | 402 | Side Entrance Details |
| 8810 | 230206 | 402 | Brick Terraces and Details |
| 8812 | 230207 | 402 | Room Finish and Door Schedule |
| 8813 | 230208 | 402 | F.S. Details Elevation P.L. and R.H. |
| 8872 | 230209 | 402 | Furniture Layout |
| 9036 | 230210 | 402 | Schedule of Venetian Blinds |

| Dwg. No. | Y&D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 10892 | 230211 | 402 | Color Schemes |
| 8802 | 230212 | 402 | Boiler Room Structural and Miscellaneous Details |
| 3680 | 230213 | 402 | Foundation - Heating |
| 3681 | 230214 | 402 | 1st. and 2nd. Floor - Heating |
| 4663 | 230215 | 402 | Galley Layout and Exhaust Vent |
| 3677 | 230216 | 402 | Foundation Plumbing |
| 3678 | 230217 | 402 | 1st. and 2nd. Floor - Plumbing |
| 3679 | 230218 | 402 | Stacks and Risers - Plumbing |
| 4677 | 230219 | 402 | Galley Layout and Plumbing |
| 1786 | 230220 | 402 | Electrical Layout 1st. and 2nd. Floor |

Q-18.11. Navy Hospital - Nurses' Home

| | | | |
|---|---|---|---|
| 3801 | 230224 | 400-1-7 | Foundation Plan |
| 3808 | 230225 | 400-1-7 | 1st. Floor Plan |
| 3809 | 230226 | 400-1-7 | 2nd. Floor Plan |
| 3810 | 230227 | 400-1-7 | Elevations |
| 3811 | 230228 | 400-1-7 | Elevations |
| 3812 | 230229 | 400-1-7 | Stair Details |
| 3813 | 230230 | 400-1-7 | Bath Room Details |
| 3814 | 230231 | 400-1-7 | Main Entrance |
| 3815 | 230232 | 400-1-7 | Side Entrance Details |
| 3816 | 230233 | 400-1-7 | Typical Sections |
| 3817 | 230234 | 400-1-7 | Refrigerator Details |
| 3818 | 230235 | 400-1-7 | Room Finish Schedule |
| 8865 | 230236 | 400-1-7 | Venetian Blinds Schedule |
| 10829 | 229077 | 400-1-7 | Fire Hose Cabinets |
| 3802 | 230237 | 400-1-7 | 1st. Floor Framing Plan |
| 3803 | 230238 | 400-1-7 | 1st. Floor Framing Plan |
| 3804 | 230239 | 400-1-7 | 1st. Floor Framing Plan |
| 3805 | 230240 | 400-1-7 | 2nd. Floor Framing Plan |
| 3819 | 230241 | 400-1-7 | Bar Bending Schedule |
| 3820 | 230242 | 400-1-7 | Bar Bending Schedule |
| 3660 | 230243 | 400-1-7 | Heating - Foundation & 1st. Fl. Plan |
| 3661 | 230244 | 400-1-7 | Heating - 2nd. Floor Plan |
| 4664 | 230245 | 400-1-7 | Galley Layout Exhaust Vent |
| 2628 | 230246 | 400-1-7 | Plumbing - Foundation Plan |
| 2629 | 230247 | 400-1-7 | Plumbing - 1st. Fl. Plan |
| 2630 | 230248 | 400-1-7 | Plumbing - 2nd. Floor Plan |
| 2631 | 230249 | 400-1-7 | Plumbing Details |
| 4661 | 230250 | 400-1-7 | Galley Plumbing Details |
| 1782 | 230251 | 400-1-7 | 1st. Floor Electrical |
| 1783 | 230252 | 400-1-7 | 2nd. Floor Electrical |
| 3675 | 230253 | 400-1-7 | Refrigeration Fixtures |
| 5605 | 230254 | 400-1-7 | Galley Equipment Steam |
| 10873 | 230255 | 400-1-7 | Color Scheme |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|

Q-18.12. Naval Hospital - Laundry

| | | | |
|---|---|---|---|
| 4861 | 230258 | 400-1-12 | Foundation Plans, Str. Dets., Beam Schedule |
| 4862 | 230259 | 400-1-12 | Floor, Monitor and Roof Plan |
| 4863 | 230260 | 400-1-2 | Elev. Sections, Details and Schedules |
| 4865 | 230261 | 400-1-12 | Details |
| 4864 | 230262 | 400-1-12 | Toilet Room Details |
| 10871 | 230263 | 400-1-12 | Color Scheme |
| 4867 | 230264 | 400-1-12 | Bar Bending Schedule and Roof |
| 2689 | 230265 | 400-1-12 | 1st. Fl. Plan - Heating & Process Piping & Details |
| 2688 | 230266 | 400-1-12 | 1st. Fl. Plumbing Plan & Details |
| 3718 | 230267 | 400-1-12 | Electrical Power Layout |
| 1776 | 230268 | 400-1-12 | Electrical Layout |
| 1170 | 230269 | 400-1-12 | Preliminary. |

Q-18.13. Naval Hospital - Wards and Corridors

| | | | |
|---|---|---|---|
| 2892 | 230283 | 400-1-5 | West Wing - Foundation Plans |
| 2893 | 230284 | 400-1-5 | East Wing - Foundation Plans |
| 2894 | 230285 | 500-1-5 | Foundation - Sections - Ward Stair Hall - Window Dets. |
| 2895 | 230286 | 400-1-5 | Service Bays 17, 18, 19 & 20 Basement and Foundation Plans Sections and Details |
| 4895 | 230287 | 400-1-5 | West Wing - 1st. Floor Key Plan |
| 4896 | 230288 | 400-1-5 | West Wing - 2nd. Floor Key Plan |
| 4897 | 230289 | 400-1-5 | East Wing - 1st. Floor Key Plan |
| 4898 | 230290 | 400-1-5 | East Wing - 2nd. Floor Key Plan |
| 4899 | 230291 | 400-1-5 | Ward 6 - 1st. Fl. Plan - Sick Officer Qtrs. |
| 5800 | 230292 | 400-1-5 | Ward 6 - 2nd. Fl. Plan - Sick Officer Qtrs. |
| 5801 | 230293 | 400-1-5 | Ward 7,8,9, & 10 - 1st. Fl. Plan - Typical Medical Ward |
| 5802 | 230294 | 400-1-5 | Ward 7,8,9 & 10 - 2nd. Fl. Plan - Typical Medical Ward |
| 5803 | 230295 | 400-1-5 | Ward 11 - 1st. Fl. Plan - Urological Ward |
| 5804 | 230296 | 400-1-5 | Ward 11 - 2nd. Fl. Plan - Dermatology and Syphillis Ward |
| 5805 | 230297 | 400-1-5 | Ward 12 - 1st. Fl. Plan - Typical Medical Ward |
| 5806 | 230298 | 400-1-5 | Ward 12 - 2nd. Fl. Plan - Sick Officers Qtrs |
| 5807 | 230299 | 400-1-5 | Ward 13,14, & 15 - 1st. Fl. Plan - Typical Medical Ward |
| 5808 | 230300 | 400-1-5 | Ward 13,14, & 15 - 2nd. Floor Plan - Typical Surgical Ward |
| 5809 | 230301 | 400-1-5 | Ward 16 - 1st. Fl. Plan - Neuropsychiatric Ward |
| 5810 | 230302 | 400-1-5 | Ward 16 - 2nd. Fl. Plan - Isolation Ward |
| 5811 | 230303 | 400-1-5 | Service Bays 17,19,20 and Connecting Corridors & Elevations - 1st. & 2nd. Floor Plans |
| 5812 | 230304 | 400-1-5 | Service Bays 18 & Connecting Corridors & Elevations - 1st. & 2nd. Floor Plans |
| 5813 | 230305 | 400-1-5 | Typical Ward - Elevations |

| Dwg. No. | Y & D No. | Proj. No. | Title (CONT'D) |
|---|---|---|---|
| 5814 | 230306 | 400-1-5 | Typical Ward - Elevations |
| 5815 | 230307 | 400-1-5 | Ward 16 - Elevations |
| 5816 | 230308 | 400-1-5 | Section thru Typical Wards |
| 5817 | 230309 | 400-1-5 | Plans and Details Service Bays |
| 5818 | 230310 | 400-1-5 | Sections thru Service Bays |
| 5819 | 230311 | 400-1-5 | Plans and Dets. of Expansion Joints |
| 5820 | 230312 | 400-1-5 | Sections and Details of Expansion Joints |
| 5821 | 230313 | 400-1-5 | Stair Hall Entrance Details |
| 5822 | 230314 | 400-1-5 | Service Bay Entrance Details |
| 5823 | 230315 | 400-1-5 | Corridor Entrance Details |
| 5824 | 230316 | 400-1-5 | Interior Door Schedules |
| 5825 | 230317 | 400-1-5 | Interior Door Details |
| 5826 | 230318 | 400-1-5 | Window Schedules |
| 5827 | 230319 | 400-1-5 | Window Details |
| 5828 | 230320 | 400-1-5 | Room Finish Schedule |
| 5829 | 230321 | 400-1-5 | Room Finish Schedule |
| 5830 | 230322 | 400-1-5 | Details Utility Wing - Typical Medical and Surgical Wards |
| 5831 | 230323 | 400-1-5 | Details Utility Wing - Urological - Dermatology and Syphillis Wards |
| 5832 | 230324 | 400-1-5 | Details Utility Wing - Neuropsychiatric Ward |
| 5833 | 230325 | 400-1-5 | Isolation Ward |
| 5834 | 230326 | 400-1-5 | Typical Toilet and Bath Details |
| 5835 | 230327 | 400-1-5 | Typical Toilet and Bath Details |
| 5836 | 230328 | 400-1-5 | Typical Diet Pantry and Treatment Room |
| 5837 | 230329 | 400-1-5 | Cornice Details |
| 5838 | 230330 | 400-1-5 | Details of Equipment |
| 5839 | 230331 | 400-1-5 | Typical Stair Details |
| 5840 | 230332 | 400-1-5 | Miscellaneous Details |
| 5841 | 230333 | 400-1-5 | Glazed Brick Coursing - Stair Halls |
| 6818 | 230334 | 400-1-1 | Adm. Bldg. Wards and Corridors - Full Sized Details - Basement Window |
| 8847 | 230335 | 400-1-5 | Ward 6 - Sick Officers Qtrs. - Schedule of Venetian Blinds |
| 8848 | 230336 | 400-1-5 | Ward 7,8,9, & 10 - Medical & Surg. Wards Schedule of Venetian Blinds |
| 8849 | 230337 | 400-1-5 | Ward 11 - Uro., Dermatology and Syphilis Wards |
| 8850 | 230338 | 400-1-5 | Ward 12 - Med. Ward & Sick Officers Qtrs. Schedule of Venetian Blinds |
| 8851 | 230339 | 400-1-5 | Ward 13,14, & 15 - Med. and Surgical Wards - Schedule of Venetian Blinds |
| 8852 | 230340 | 400-1-5 | Ward 16 - 2nd. Floor - Isolation Ward - Schedule of Venetian Blinds |
| 8853 | 230341 | 400-1-5 | Service Bays 17,18,19,20 and Conn. Corr. - Schedule of Venetian Blinds |
| 9830 | 230342 | 400-1-5 | Full Sized Window Details |
| 9831 | 230343 | 400-1-5 | Full Sized Details |
| 10814 | 230344 | 400-1-4 | Adm. Bldg. Wards and Corridors - Door Details |
| 10829 | 229077 | Many | Fire Hose Cabinets and Schedule - See Balloon Storage and Shop |

| Dwg. No. | Y & D No. | Proj. No. | Title ( Cont'd) |
|---|---|---|---|
| 11826 | 230345 | 400-1-5 | Color Scheme |
| 11827 | 230346 | 400-1-5 | Color Scheme |
| 11828 | 230347 | 400-1-5 | Color Scheme |
| 11829 | 230348 | 400-1-5 | Color Scheme |
| 11830 | 230349 | 400-1-5 | Color Scheme |
| 4821 | 230350 | 400-1-5 | Wards Anchor or Bolt Plans |
| 4822 | 230351 | 400-1-5 | Corridors Anchor Bolt Plans |
| 2897 | 230352 | 400-1-5 | Footing Details |
| 3838 | 230353 | 400-1-5 | Column and Pier Schedule |
| 3854 | 230354 | 400-1-5 | Wards - First Floor Framing Plan |
| 3893 | 230355 | 400-1-5 | Wards 6 & 12 - 1st. Floor Plans - Depressed Area and Pipe Sleeve Layout |
| 3894 | 230356 | 400-1-5 | Wards 7,8,9,10,13,14, & 15 - 1st. Floor Plan Depressed Area & Pipe Sleeve Layout |
| 3895 | 230357 | 400-1-5 | Wards 11 & 16 - 1st.Floor Plan - Depressed Area & Pipe Sleeve Layout |
| 3896 | 230358 | 400-1-5 | Corridors - First Floor Framing Plans |
| 4817 | 230359 | 400-1-5 | Ward - Second Floor Framing Plans |
| 4818 | 230360 | 400-1-5 | Wards 6 & 12 - 2nd. Floor Framing Plans & Depressed Area & Pipe Sleeve Layout |
| 4819 | 230361 | 400-1-5 | Wards 7,8,9,10,13,14, & 15 Floor Framing Plans Depressed Area & Pipe Sleeve Layout |
| 4820 | 230362 | 400-1-5 | Wards 11 & 16 Floor Framing Plans depressed Area & Pipe Sleeve Layout |
| 4823 | 230363 | 400-1-5 | Corridors Sleeve Layout |
| 6873 | 230364 | 400-1-5 | Ward 13,14, & 15 2nd. Floor Plan - Depressed Areas & Pipe Sleeves Layout |
| 6874 | 230365 | 400-1-5 | Ward 16 2nd. Floor Plan - Depressed Areas & Pipe Sleeve Layout |
| 5876 | 230366 | 400-1-5 | Bar Bending Schedule |
| 7810 | 230367 | 400-1-5 | Wards & Corridors - 2nd. Floor - Bar Bending Schedule |
| 2896 | 230368 | 400-1-5 | Wall Sections & Dets. of Expansion Joint |
| 2613 | 230369 | 400-1-5 | Ward 6 - 1st. and 2nd. Floor Plans Heating |
| 2614 | 230370 | 400-1-5 | Ward 7,8,9,& 10 - 1st. & 2nd. Floor Plan Heating |
| 2615 | 230371 | 400-1-5 | Ward 11 1st. & 2nd. Floor Plans Heating |
| 2616 | 230372 | 400-1-5 | Ward 12 1st. & 2nd. Floor Plans Heating |
| 2617 | 230373 | 400-1-5 | Ward 13,14, & 15 1st. & 2nd. Floor Plan Heating |
| 2618 | 230374 | 400-1-5 | Ward 16 1st. & 2nd. Floor Plans Heating |
| 2619 | 230375 | 400-1-5 | Service Bay #18 & Connecting Corridor 1st. & 2nd. Floor Plan Heating |
| 2620 | 230376 | 400-1-5 | Service Bay 17,19, & 20 Connecting Corridor 1st. & 2nd. Floor Plan Heating |
| 2621 | 230377 | 400-1-5 | Ward 6 Foundation Plan Heating |
| 2622 | 230378 | 400-1-5 | Ward 7,8,9 & 10 Foundation Plan Heating |
| 2623 | 230379 | 400-1-5 | Ward 11 Foundation Plan Heating |
| 2624 | 230380 | 400-1-5 | Ward 12 Foundation Plan Heating |
| 2625 | 230381 | 400-1-5 | Ward 13,14 & 15 Foundation Plan Heating |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 2626 | 230382 | 400-1-5 | Ward 16 Foundation Plan Heating |
| 2627 | 230383 | 400-1-5 | West Wing Corridor Foundation Plan and Dets. Heating |
| 3669 | 230384 | 400-1-5 | East Wing Corridors Foundation Plans & Dets. Heating |
| 3670 | 230385 | 400-1-4 | Pipe Tunnel, H.P. Steam Line and Dets. Heating |
| 3667 | 230386 | 400-1-5 | Wards - Ventilation - 1st. and 2nd. Floors |
| 3668 | 230387 | 400-1-5 | Wards - Ventilation - Units in Attic |
| 2640 | 230388 | 400-1-5<br>400-1-4<br>400-1-5 | Naval Hospital N. & C., A & M., Post Disp. Plumbing |
| 2657 | 230389 | 400-1-5 | Ward 6 - Foundation Plan Plumbing |
| 2658 | 230390 | 400-1-5 | Ward 6 - 1st. Floor Plan & Details Plumbing |
| 2659 | 230391 | 400-1-5 | Ward 6 - 2nd. Floor Plan & Details |
| 2660 | 230392 | 400-1-5 | Ward 6 - Plumbing Details |
| 2661 | 230393 | 400-1-5 | Ward 7,8,9, & 10 Foundation Plan Plumbing |
| 2662 | 230394 | 400-1-5 | Ward 7,8,9 & 10 1st. Floor Plan and Det. |
| 2663 | 230395 | 400-1-5 | Ward 7,8,9 & 10 2nd. Floor Plan and Det. |
| 2664 | 230396 | 400-1-5 | Ward 7,8,9 & 10 Plumbing Details |
| 2665 | 230397 | 400-1-5 | Ward 11 Foundation Plan - Plumbing |
| 2666 | 230398 | 400-1-5 | Ward 11 First Floor Plan and Details Plumbing |
| 2667 | 230399 | 400-1-5 | Ward 11 Second Floor Plan and Details Plumbing |
| 2668 | 230400 | 400-1-5 | Ward 11 Plumbing Details |
| 2669 | 230401 | 400-1-5 | Ward 12 Foundation Plan - Plumbing |
| 2670 | 230402 | 400-1-5 | Ward 12 1st. Floor Plan and Details Plumbing |
| 2671 | 230303 | 400-1-5 | Ward 12 2nd. Floor Plan and Details Plumbing |
| 2672 | 230404 | 400-1-5 | Ward 12 Plumbing Details |
| 2673 | 230405 | 400-1-5 | Ward 13,14 & 15 Foundation Plan Plumbing |
| 2674 | 230406 | 400-1-5 | Ward 13,14, & 15 1st. Fl. Plan and Dets. Plumbing |
| 2675 | 230407 | 400-1-5 | Ward 13,14 & 15 2nd. Floor Plan & Dets. Plumbing |
| 2676 | 230408 | 400-1-5 | Ward 13,14 & 15 Plumbing Details |
| 2677 | 230409 | 400-1-5 | Ward 16 Foundation Plan Plumbing |
| 2678 | 230410 | 400-1-5 | Ward 16 1st. Floor Plan and Details Plumbing |
| 2679 | 230411 | 400-1-5 | Ward 16 2nd. Floor Plan and Details Plumbing |
| 2680 | 230412 | 400-1-5 | Ward 16 Plumbing Details |
| 2681 | 230413 | 400-1-5 | West Wing Corridors Foundation Plan Plumbing |
| 2682 | 230414 | 400-1-5 | West Wing Corridors 1st. Floor Plan & Dets. Plumbing |
| 2683 | 230415 | 400-1-5 | West Wing Corridors 2nd. Floor Plan & Dets. Plumbing |
| 2684 | 230416 | 400-1-5 | East Wing Corridors Foundation Plan Plumbing |
| 2685 | 230417 | 400-1-5 | East Wing Corridors 1st. Floor Plan |
| 2686 | 230418 | 400-1-5 | East Wing Corridors 2nd. Floor Plan |
| 2687 | 230419 | 400-1-4<br>400-1-5 | Corridor and Adm. Bldg. Foundation Plan Plumbing Details |
| 1762 | 230420 | 400-1-5 | Ward 6 Sick Officers Qtrs. - Electrical |

| Dwg. No. | Y & D No. | Proj. No. | Title (CONT'D) |
|---|---|---|---|
| 1763 | 230421 | 400-1-5 | Ward 6 Sick Officers Quarters Electrical |
| 1764 | 230422 | 400-1-5 | Ward 7,8,9 & 10 Typical Medical Ward - Electrical |
| 1765 | 230423 | 400-1-5 | Ward 7,8,9, & 10 Typical Medical Ward - Electrical |
| 1766 | 230424 | 400-1-5 | Ward 11 Cronological - Electrical |
| 1767 | 230425 | 400-1-5 | Ward 11 Cronological - Electrical |
| 1768 | 230426 | 400-1-5 | Ward 12 Medical Ward - Electrical |
| 1769 | 230427 | 400-1-5 | Ward 12 Sick Officers Quarters - Electrical |
| 1770 | 230428 | 400-1-5 | Ward 16 Neuropsychiatric - Electrical |
| 1771 | 230429 | 400-1-5 | Ward 16 Isolation - Electrical |
| 1772 | 230430 | 400-1-5 | West Wing Ward and Corridor - Electrical |
| 1773 | 230431 | 400-1-5 | Electrical Details - Nurses Call - Nurses Station Cabinet and Exp. Boxes |
| 1774 | 230432 | 400-1-5 | Electrical Details |
| 1775 | 230433 | 400-1-5 | Service Bays Plans - Emergency Lighting Dets. |
| 1167 | 230434 | 400-1-4<br>400-1-5 | Adm. Building Wards and Corridors Elevator Dets. |
| 11842 | 230435 | 400-1-5 | Additional Expansion Joint - 1st. and 2nd. Floors |

Q-18.14. Naval Hospital - Administration Bldg. and Mess Hall

| | | | |
|---|---|---|---|
| 1167 | 230434 | 400-1-4<br>400-1-5 | Administration Building - Wards & Corridors |
| 5880 | 230455 | 400-1-4 | Administration Building - 1st. Floor Plan |
| 5881 | 230456 | 400-1-4 | Mess Hall - 1st. Floor Plan |
| 5882 | 230457 | 400-1-4 | Administration Building - 2nd. Floor Plan |
| 5883 | 230458 | 400-1-4 | Mess Hall - 2nd. Floor Plan |
| 5884 | 230459 | 400-1-4 | Administration Building - 3rd. Floor Plan |
| 5885 | 230460 | 400-1-4 | Mess Hall - 3rd. Floor Plan - Adm. Bldg. & Mess Hall - Roof Plan |
| 5886 | 230461 | 400-1-4 | Administration Building - Elevations |
| 5887 | 230462 | 400-1-4 | Administration Building - Elevations |
| 5888 | 230463 | 400-1-4 | Administration Building - Elevations |
| 5889 | 230464 | 400-1-4 | Administration Building - Elevations |
| 5890 | 230465 | 400-1-4 | Mess Hall - Cross Sections and Details |
| 5891 | 230466 | 400-1-4 | Mess Hall - Cross Sections and Details |
| 5892 | 230467 | 400-1-4 | Mess Hall - Cross Sections and Details |
| 5893 | 230468 | 400-1-4 | Administration Building - Wall Sections |
| 5894 | 230469 | 400-1-4 | Administration Building - Wall Sections - Pavilion and Main Entrance |
| 5895 | 230470 | 400-1-4 | Administration Building - Pavilion and Cupola Details |
| 5896 | 230471 | 400-1-4 | Administration Building - Window Details |
| 5897 | 230472 | 400-1-4 | Administration Building - Cornice Details |
| 5898 | 230473 | 400-1-4 | Administration Building - Public Lobby Details |
| 5899 | 230474 | 400-1-4 | Administration Building - Finish Schedule |
| 6800 | 230475 | 400-1-4 | Mess Hall - Finish Schedule |
| 6801 | 230476 | 400-1-4 | Administration Building - Door Schedule |
| 6802 | 230477 | 400-1-4 | Mess Hall - Door Schedule |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 6803 | 230478 | 400-1-4 | Administration Building - 1st. Floor Toilet and Bath Room Details |
| 6804 | 230479 | 400-1-4 | Administration Building - 2nd. Floor Toilet Details |
| 6805 | 230480 | 400-1-4 | Administration Building - 3rd. Floor Toilet Details |
| 6806 | 230481 | 400-1-4 | Mess Hall - Details of Toilets |
| 6807 | 230482 | 400-1-4 | Administration Building - Details of Stairs No. 1 |
| 6808 | 230483 | 400-1-4 | Mess Hall - Details of Stairs No. 2,3,4, & 5 |
| 6816 | 230484 | 400-1-4 | Administration Building and Mess Hall - Glazed Brick Details and Galley |
| 6817 | 230485 | 400-1-4 | Administration Building - Revised 3rd. Floor Plan & Detail |
| 6818 | 230334 | 400-1-4<br>400-1-5 | Administration Building - Wards and Corridors Full Sized Details - Basement Window |
| 6819 | 230486 | 400-1-4 | Mess Hall - Half Ceiling Plan and Details of Pilaster and Cove Cornice |
| 6820 | 230487 | 400-1-4 | Mess Hall - Details of Accoustical Ceilings |
| 6821 | 230488 | 400-1-4 | Details of Promenade Tile for Decks |
| 6835 | 230489 | 400-1-4 | Mess Hall - Equipment for Refreshment Room and Kitchen Second Floor |
| 8845 | 230491 | 400-1-4 | Administration Building - Schedule of Venitian Blinds |
| 8846 | 230491 | 400-1-4 | Mess Hall - Schedule of Venitian Blinds |
| 9829 | 230492 | 400-1-4 | Administration Building - Full Sized Window Details |
| 9832 | 230493 | 400-1-4 | Mess Hall - Galley Dresser Details |
| 9833 | 230494 | 400-1-4 | Details of Rails and Counters in Record Office No. 155 & Administration Bldg Dis-bursing Office No. 161 |
| 9834 | 230495 | 400-1-4 | Administration Building - Details of Counter in Public Lobby |
| 9867 | 230496 | 400-1-4 | Closet Details |
| 9868 | 230497 | 400-1-4 | Mess Hall - Post Office Equipment Details |
| 9869 | 230498 | 400-1-4 | Mess Hall - Post Office Equipment Details |
| 9870 | 230499 | 400-1-4 | Details of X-Ray Suite and Ship Stores |
| 9871 | 230500 | 400-1-4 | Details of Equipment E.E.N.G. and Library No. 241 |
| 9872 | 230501 | 400-1-4 | Details of Operating Suite |
| 10814 | 230344 | 400-1-4<br>400-1-5 | Administration Building - Wards and Corridors Door Details |
| 10829 | 229077 | Several | Firehouse Cabinets and schedules ( See Ball-oon Storehouse and Shop ) |
| 10837 | 230502 | 400-1-4 | Mess Hall - Details of Store Shelving, Bins and Platforms in Dry Storage and Issue Room |
| 10848 | 230503 | 400-1-4 | Administration Building and Mess Hall - Tile and Terrazzo |
| 10850 | 230504 | 400-1-4 | Third Floor Corridor - Elevation Details |
| 10852 | 230505 | 400-1-4 | Details of Light Proof Shades |

| Dwg. No. | Y & D No. | Proj. No. | Title (CONT'D) |
|---|---|---|---|
| 10853 | 230506 | 400-1-4 | Mess Hall Details of Refrigerator Doors and Glazed Brick Coursing |
| 11821 | 230507 | 400-1-4 | Administration Building - Color Scheme |
| 11822 | 230508 | 400-1-4 | Administration Building - Color Scheme |
| 11823 | 230509 | 400-1-4 | Administration Building - Color Scheme |
| 11824 | 230510 | 400-1-4 | Administration Building - Color Scheme |
| 11825 | 230511 | 400-1-4 | Administration Building - Color Scheme |
| 11841 | 230512 | 400-1-4 | Mess Hall - Color Scheme |
| 3831 | 230522 | 400-1-4 | Details of Partitions in Room No. 371 |
| 3832 | 230523 | 400-1-4 | Administration Building - Foundation Plan |
| 5855 | 230524 | 400-1-4 | Mess Hall - Foundation Plan |
| 5856 | 230525 | 400-1-4 | Administration Building - 1st. Floor Framing Plan |
| 5857 | 230526 | 400-1-4 | Mess Hall 1st. Floor Framing Plan |
| 5858 | 230527 | 400-1-4 | Administration Building - 2nd. Floor Plan |
| 5859 | 230528 | 400-1-4 | Mess Hall - 2nd. Floor Plan |
| 5860 | 230529 | 400-1-4 | Administration Building - 3rd. Floor Framing Plan |
| 5861 | 230530 | 400-1-4 | Mess Hall - 3rd. Floor Framing Plan |
| 5862 | 230531 | 400-1-4 | Administration Building - Attic Framing Plan |
| 5863 | 230532 | 400-1-4 | Mess Hall - Attic Framing Plan |
| 5864 | 230533 | 400-1-4 | Administration Building - Roof Framing Plan |
| 5867 | 230534 | 400-1-4 | Mess Hall - Roof Framing Plan |
| 5868 | 230535 | 400-1-4 | Administration Building Bar Bending Schedule and Details Footings, Walls and Basement Floor |
| 5869 | 230536 | 400-1-4 | Mess Hall - Footings Bar Bending Schedule and Details |
| 6850 | 230537 | 400-1-4 | Mess Hall - Basement Wall and Column Bar Bending Details |
| 6851 | 230538 | 400-1-4 | Administration Building Columns - Bar Bending Details |
| 6852 | 230539 | 400-1-4 | Mess Hall - 1st, 2nd, & 3nd, Story Columns, Bar Bending Details |
| 6853 | 230540 | 400-1-4 | Adm. Building - 1st. Floor Bar Bending Details |
| 6854 | 230541 | 400-1-4 | Mess Hall - 1st. Floor Bar Bending Details |
| 6855 | 230542 | 400-1-4 | Adm. Building & Mess Hall - 2nd. Floor Bar Bending Details |
| 6856 | 230543 | 400-1-4 | Adm. Building & Mess Hall - 3nd Floor Bar Bending Details |
| 6857 | 230544 | 400-1-4 | Adm. Building & Mess Hall - 3rd. Floor Bar Bending Details |
| 6858 | 230545 | 400-1-4 | Administration Building - 1st. Floor Depressed Area & Pipe Sleeve Layout |
| 6859 | 230546 | 400-1-4 | Mess Hall - 1st. Floor Depressed Area and Pipe Sleeve Layout |
| 6860 | 230547 | 400-1-4 | Administration Building - 2nd. Floor Depressed Area and Pipe Sleeve Layout |
| 6861 | 230548 | 400-1-4 | Mess Hall - 2nd. Floor Depressed Area and Pipe Sleeve Layout |
| 6862 | 230549 | 400-1-4 | Adm. Bldg. - 3rd. Floor Depressed Area & Pipe Sleeve Layout |
| | | | Mess Hall - 3rd. Floor Depressed Area and Pipe Sleeve Layout |

| Dwg. No. | Y & D No. | Proj. No. | Title (CONT'D) |
| --- | --- | --- | --- |
| 10853 | 230506 | 400-1-4 | Mess Hall Details of Refrigerator Doors and Glazed Brick Coursing |
| 11821 | 230507 | 400-1-4 | Administration Building - Color Scheme |
| 11822 | 230508 | 400-1-4 | Administration Building - Color Scheme |
| 11823 | 230509 | 400-1-4 | Administration Building - Color Scheme |
| 11824 | 230510 | 400-1-4 | Administration Building - Color Scheme |
| 11825 | 230511 | 400-1-4 | Mess Hall - Color Scheme |
| 11841 | 230512 | 400-1-4 | Details of Partitions in Room No. 371 |
| 3831 | 230522 | 400-1-4 | Administration Building - Foundation Plan |
| 3832 | 230523 | 400-1-4 | Mess Hall - Foundation Plan |
| 5855 | 230524 | 400-1-4 | Administration Building - 1st. Floor Framing Plan |
| 5856 | 230525 | 400-1-4 | Mess Hall 1st. Floor Framing Plan |
| 5857 | 230526 | 400-1-4 | Administration Building - 2nd. Floor Plan |
| 5858 | 230527 | 400-1-4 | Mess Hall - 2nd. Floor Plan |
| 5859 | 230528 | 400-1-4 | Administration Building - 3rd. Floor Framing Plan |
| 5860 | 230529 | 400-1-4 | Mess Hall - 3rd. Floor Framing Plan |
| 5861 | 230530 | 400-1-4 | Administration Building - Attic Framing Plan |
| 5862 | 230531 | 400-1-4 | Mess Hall - Attic Framing Plan |
| 5863 | 230532 | 400-1-4 | Administration Building - Roof Framing Plan |
| 5864 | 230533 | 400-1-4 | Mess Hall - Roof Framing Plan |
| 5867 | 230534 | 400-1-4 | Administration Building Bar Bending Schedule and Details Footings, Walls and Basement Floor |
| 5868 | 230535 | 400-1-4 | Mess Hall - Footings Bar Bending Schedule and Details |
| 5869 | 230536 | 400-1-4 | Mess Hall - Basement Wall and Column Bar Bending Details |
| 6850 | 230537 | 400-1-4 | Administration Building Columns - Bar Bending Details |
| 6851 | 230538 | 400-1-4 | Mess Hall - 1st,2nd, & 3nd, Story Columns, Bar Bending Details |
| 6852 | 230539 | 400-1-4 | Adm. Building - 1st. Floor Bar Bending Details |
| 6853 | 230540 | 400-1-4 | Mess Hall - 1st. Floor Bar Bending Details |
| 6854 | 230541 | 400-1-4 | Adm. Building & Mess Hall - 2nd. Floor Bar Bending Details |
| 6855 | 230542 | 400-1-4 | Adm. Building & Mess Hall - 3nd Floor Bar Bending Details |
| 6856 | 230543 | 400-1-4 | Adm. Building & Mess Hall - 3rd. Floor Bar Bending Details |
| 6857 | 230544 | 400-1-4 | Administration Building - 1st. Floor Depressed Area & Pipe Sleeve Layout |
| 6858 | 230545 | 400-1-4 | Mess Hall - 1st. Floor Depressed Area and Pipe Sleeve Layout |
| 6859 | 230546 | 400-1-4 | Administration Building - 2nd. Floor Depressed Area and Pipe Sleeve Layout |
| 6860 | 230547 | 400-1-4 | Mess Hall - 2nd. Floor Depressed Area and Pipe Sleeve Layout |
| 6861 | 230548 | 400-1-4 | Adm. Bldg. - 3rd. Floor Depressed Area & Pipe Sleeve Layout |
| 6862 | 230549 | 400-1-4 | Mess Hall - 3rd. Floor Depressed Area and Pipe Sleeve Layout |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 8824 | 230550 | 400-1-4 | Adm. Bldg. & Mess Hall - 3rd. Floor Bar Bending Schedule |
| 8825 | 230551 | 400-1-4 | Adm. Bldg. & Mess Hall - Attic Framing Placing Schedule for Bars Beam |
| 8826 | 230552 | 400-1-4 | Adm. Bldg. & Mess Hal l - Attic Framing Bar Details |
| 10887 | 230553 | 400-1-4 | Scale Pit Details |
| 2690 | 230554 | 400-1-4 | Adm. Bldg. Foundation Plan - Heating |
| 2691 | 230555 | 400-1-4 | Adm. Bldg. 1st. Floor Plan - Heating |
| 2692 | 230556 | 400-1-4 | Adm. Bldg. 2nd. Floor Plan - Heating |
| 2693 | 230557 | 400-1-4 | Adm. Bldg. 3rd. Floor Plan - Heating |
| 2694 | 230558 | 400-1-4 | Adm. Bldg. Pit and Details - Heating |
| 3670 | 230385 | 400-1-4<br>400-1-5 | Pipe Tunnel, H.P. Steam Line and Details Heating |
| 2695 | 230559 | 400-1-4 | Mess Hall - Foundation Plan - Heating |
| 2696 | 230560 | 400-1-4 | Mess Hall - 1st. Floor Plan - Heating |
| 2697 | 230561 | 400-1-4 | Mess Hall - 2nd. Floor Plan - Heating |
| 2698 | 230562 | 400-1-4 | Mess Hall - 3rd. Floor Plan - Heating |
| 3666 | 230563 | 400-1-4 | Administration Bldg. - Ventilation Duct Work |
| 3682 | 230564 | 400-1-4 | Mess Hall Galley Heating & Duct Work in Basement |
| 3684 | 230565 | 400-1-4 | Mess Hall Heating Galley Ventilation |
| 3685 | 230566 | 400-1-4 | Mess Hall 2nd. Floor Ventilation |
| 3686 | 230567 | 400-1-4 | Exhaust Duct Work in Operating Pavilion |
| 3687 | 230568 | 400-1-4 | Air Condition Duct Work in Attic for Operation Pavilion |
| 3688 | 230569 | 400-1-4 | Mess Hall - Heating and Ventilating Duct Work 3rd. Floor Ceiling |
| 5696 | 230570 | 400-1-4 | Adm. Bldg. - Ventilation 1st, 2nd. and 3rd. Floors |
| 3689 | 230571 | 400-1-4 | Mess Hall - Fan Room |
| 4670 | 230572 | 400-1-4 | Mess Hall - Service Station |
| 4671 | 230573 | 400-1-4 | Mess Hall - Main Galley Layout - 1st. Floor Equipment Plan |
| 4672 | 230574 | 400-1-4 | Mess Hall - Galley Storage Preparation Rooms |
| 3671 | 230575 | 400-1-4 | Mess Hall Refrigeration - Sh. 1. |
| 3672 | 230576 | 400-1-4 | Mess Hall Refrigeration - Sh. 2. |
| 3673 | 230577 | 400-1-4 | Mess Hall Refrigeration - Sh. 3. |
| 2640 | 230388 | 400-1-4<br>400-1-5<br>400-1-3 | N aval Hospital - Wards and Corridors, Mess Hall, Adm. Bldg. Post Dispensary, Family Hospital, Symbol and Fixtures Schedule - Plumbing |
| 2632 | 250578 | 400-1-4 | Adm. Bldg. Plumbing Foundation Plan |
| 2633 | 230579 | 400-1-4 | Adm. Bldg. Plumbing 1st. Floor |
| 2634 | 230580 | 400-1-4 | Adm. Bldg. Plumbing 2nd. Floor |
| 2635 | 230581 | 400-1-4 | Adm. Bldg. 3rd. Floor Plumbing |
| 2687 | 230449 | 400-1-5<br>400-1-4 | Corridor and Adm. Bldg. Foundation Plan - Plumbing Detail |
| 2636 | 230582 | 400-1-4 | Adm. Bldg. Plumbing Details 1st. & 2nd. Floor |

| Dwg. No. | Y & D No. | Proj. No. | Title (CONT'D) |
|---|---|---|---|
| 2637 | 230583 | 400-1-4 | Adm. Bldg. Plumbing Details 3rd. Floor |
| 3638 | 230584 | 400-1-4 | Adm. Bldg. Plumbing Stack Diagram |
| 2639 | 230585 | 400-1-4 | Adm. Bldg. Plumbing Riser Diagram |
| 2647 | 230586 | 400-1-4 | Mess Hall - Foundation Plan - Plumbing |
| 2648 | 230587 | 400-1-4 | Mess Hall - 1st. Floor Plan - Plumbing |
| 2649 | 230588 | 400-1-4 | Mess Hal l - 2nd. Floor Plan - Plumbing |
| 2650 | 230589 | 400-1-4 | Mess Hall - 3rd. Floor Plan - Plumbing |
| 2651 | 230590 | 400-1-4 | Mess Hall - 1st. Floor Details - Plumbing |
| 2652 | 230591 | 400-1-4 | Mess Hall - 2nd. Floor Details - Plumbing |
| 2653 | 230592 | 400-1-4 | Mess Hall - 3rd. Floor Details - Plumbing |
| 1778 | 230593 | 400-1-4 | Adm. Bldg. - 1st. Floor - Electrical |
| 1779 | 230594 | 400-1-4 | Adm. Bldg. 2nd. Floor - Electrical |
| 1780 | 230595 | 400-1-4 | Adm. Bldg. 3rd. Floor - Electrical |
| 1781 | 230596 | 400-1-4 | Adm. Bldg. - X-ray Suite - Electrical |
| 1784 | 230597 | 400-1-4 | Adm. Bldg. - Foundation Plan - Electrical |
| 1785 | 230598 | 400-1-4 | Adm. Bldg. - X-ray Suite - 3rd. Floor - Electrical Details |
| 1787 | 230599 | 400-1-4 | Adm. Bldg. - Electrical Details |
| 1788 | 230600 | 400-1-4 | Adm. Bldg. - Electrical Details |
| 1789 | 230601 | 400-1-4 | Mess Hall - First Floor Plan - Electrical |
| 1790 | 230602 | 400-1-4 | Mess Hall - Lighting Layout - Electrical |
| 1791 | 230603 | 400-1-4 | Mess Hall - 2nd. Floor Plan - Electrical |
| 1792 | 230604 | 400-1-4 | Mess Hall 3rd. Floor Plan - Electrical |
| 1793 | 230605 | 400-1-4 | Mess Hall - Riser Diagram |
| 1794 | 230606 | 400-1-4 | Mess Hall - Electrical Panels and Air Conditioning |
| 1795 | 230607 | 400-1-4 | Mess Hall - Electrical Layout - Fan Room |
| 3715 | 230608 | 400-1-4 | Adm. Bldg. - Entrance Lamp |
| 1745 | 230609 | 400-1-4 | Adm. Bldg. - Telephone System - Conduit Layout - 1st. Floor Plan |
| 1746 | 230610 | 400-1-4 | Adm. Bldg. - Telephone System - Conduit Layout - 2nd. Floor Plan |
| 1747 | 230611 | 400-1-4 | Adm. Bldg. - Telephone System - Conduit Layout - 2nd. Floor Plan |
| 1748 | 230612 | 400-1-4 | Adm. Bldg. - Telephone System - Conduit Layout - 3rd. Floor Plan |
| 1749 | 230613 | 400-1-4 | Adm. Bldg. - Telephone System - Conduit Layout - 3rd. Floor Plan |
| 6810 | 230614 | 400-1-4 | Adm. Bldg. - 1st. Floor Plan - Equipment Plans |
| 6811 | 230615 | 400-1-4 | Adm. Bldg. - 2nd. Floor Plan - Equipment Plans |
| 6812 | 230616 | 400-1-4 | Adm. Bldg. - 3rd. Floor Plans - Equipment Plans |
| 6813 | 230617 | 400-1-4 | Mess Hall - 1st. Floor Equipment Plans |
| 6814 | 230618 | 400-1-4 | Mess Hall - 2nd. Floor Equipment Plans |
| 6815 | 230619 | 400-1-4 | Mess Hall 3rd. Floor Equipment Plans |
| 8878 | 230621 | 400-1-4 | Adm. Bldg. & Mess Hall - Details of Sheldon Equipment |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 8877 | 230620 | 400-1-4 | Adm. Bldg. & Mess Hall - Details of Sheldon Equipment |
| 8879 | 230622 | 400-1-4 | Adm. Bldg. & Mess Hall - Details of Sheldon Equipment |
| 8880 | 230623 | 400-1-4 | Adm. Bldg. & Mess Hall - Details of Sheldon Equipment |
| 8881 | 230624 | 400-1-4 | Adm. Bldg. & Mess Hall - Details of Sheldon Equipment |
| 8882 | 230625 | 400-1-4 | Adm. Bldg. & Mess Hall - Details of Sheldon Equipment |
| 8883 | 230626 | 400-1-4 | Adm. Bldg. & Mess Hall - Details of Sheldon Equipment |
| 8884 | 230627 | 400-1-4 | Adm. Bldg. & Mess Hall - Details of Sheldon Equipment |
| 8885 | 230628 | 400-1-4 | Adm. Bldg. & Mess Hall - Details of Operating Suite |
| 8886 | 230629 | 400-1-4 | Adm. Bldg. & Mess Hall - Details of Operating Suite |

Q-18.15. Naval Hospital Boiler House

| | | | |
|---|---|---|---|
| 5843 | 230645 | 400-1-18 | Foundation and 1st. Floor Section |
| 5844 | 230646 | 400-1-18 | Elevations and 3/8" Scale Details |
| 5845 | 230647 | 400-1-18 | Details |
| 11820 | 230648 | 400-1-18 | Extension for Motor Generator Set |
| 10840 | 230649 | 400-1-18 | Color Schemes |
| 4871 | 230650 | 400-1-18 | Foundation and Footing Plan - Roof |
| 4872 | 230651 | 400-1-18 | Structural Details |
| 3662 | 230652 | 400-1-18 | 1st. Floor Plan - Plumbing and Details |
| 5632 | 230653 | 400-1-18 | Piping |
| 3752 | 230654 | 400-1-18 | Electrical Layout |

Q-18.16. Naval Hospital Officers' Quarters

| | | | |
|---|---|---|---|
| 4855 | 230658 | 400-1-14 | Foundation Plans and Details |
| 4856 | 230659 | 400-1-14 | 1st. and 2nd. Floor Plans and Details |
| 4857 | 230660 | 400-1-14 | Elevations |
| 7812 | 230661 | 400-1-14 | Schedule of Venetian Blinds |
| 9835 | 230662 | 400-1-14 | Color Schemes |
| 3682 | 230663 | 400-1-14 | Heating |
| 3674 | 230664 | 400-1-14 | 1st. and 2nd. Floor Plans - Plumbing |

Q-18.17. Naval Hospital Storage Garage

| | | | |
|---|---|---|---|
| 11819 | 230668 | 410 | Architectural |
| 11834 | 230669 | 410 | Truss Details |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| | Q-18.18. | Family Hospital | |
| 9840 | 230671 | 134 | First Floor Plan |
| 9841 | 230672 | 134 | Second Floor Plan |
| 9842 | 230673 | 134 | Roof Plan |
| 9843 | 230674 | 134 | Front and Left Side Elevation |
| 9844 | 230675 | 134 | Rear and Right Side Elevation |
| 9845 | 230676 | 134 | Front Entrance Details |
| 9846 | 230677 | 134 | Exterior Details |
| 9847 | 230678 | 134 | Cross Section and Details |
| 9848 | 230679 | 134 | Cross Section and Details |
| 9849 | 230680 | 134 | Details of Door Jambs and Types |
| 9850 | 230681 | 134 | Door Schedules |
| 9851 | 230682 | 134 | First Floor Room Finish Schedule |
| 9852 | 230683 | 134 | Second Floor Room Finish Schedule |
| 9853 | 230684 | 134 | Details of Stairs No. 1 and No. 2 |
| 9854 | 230685 | 134 | Details of Plan Stairs No. 3 and Pent House |
| 9856 | 230686 | 134 | Details and Sections No. 3. and Pent House |
| 9856 | 230687 | 134 | Dets. of Toilets Baths Utility Rooms etc. and Dets. of Counter in Lobby |
| 9857 | 230688 | 134 | Details of Toilets, Baths, Utility Room etc. |
| 9858 | 230689 | 134 | Dets. of Cubicals in rooms 166 and 212 - Dets. of Shelves |
| 9859 | 230690 | 134 | Glazed Brick Details |
| 9862 | 230691 | 134 | Window Schedules and Details |
| 9875 | 230692 | 134 | Schedule of Venetian Blinds |
| 10845 | 230693 | 134 | Details for Windows in Operating Room |
| 11803 | 230694 | 134 | Details of Lobby 102 |
| 11807 | 230695 | 134 | Details of Operating and Delivery Suite |
| 10829 | 229077 | Many | Fire Hose Cabinet See Balloon Storehouse & Shop |
| 11836 | 230696 | 134 | Tile Schedule |
| 11837 | 230697 | 134 | Color Scheme |
| 11838 | 230698 | 134 | Color Scheme |
| 11839 | 230699 | 134 | Color Scheme |
| 8854 | 230700 | 134 | Foundation Plan |
| 8855 | 230701 | 134 | Foundation Details and Column Schedule |
| 8856 | 230702 | 134 | Part First Floor Plan Framing & Sleeve Layout |
| 8857 | 230703 | 134 | Part First Floor Plan Framing & Sleeve Layout |
| 8858 | 230704 | 134 | Part First Floor Plan Framing & Sleeve Layout |
| 8859 | 230705 | 134 | Second Floor Framing Plan |
| 8861 | 230706 | 134 | Second Floor Sleeve Layout |
| 8860 | 230707 | 134 | Second Floor Structural Details |
| 8862 | 230708 | 134 | Roof Framing Plan |
| 8863 | 230709 | 134 | Roof Framing Details |
| 9806 | 230710 | 134 | Foundation Plan Bar Layout |
| 9807 | 230711 | 134 | Bar Schedule for Pier and Footings - Details |
| 9808 | 230712 | 134 | Schedule for Placing Bars in 1st. Floor Beams, Joists, Columns & Bar Bending Dets. |

| Dwg. No. | Y & D No. | Proj. No. | Title (CONT'D) |
|---|---|---|---|
| 9809 | 230713 | 134 | Second Floor Plan for Placing Steel |
| 9877 | 230714 | 134 | Second Floor Bar Bending Schedules |
| 4698 | 230715 | 134 | Foundation Plan - Heating |
| 4699 | 230716 | 134 | First Floor Plan - Heating |
| 5600 | 230717 | 134 | Second Floor Plan - Heating |
| 5613 | 230718 | 134 | Foundation Plan - Air Conditioning - Galley Vent. |
| 5614 | 230719 | 134 | First Floor Plan - Air Conditioning - Galley Equipment |
| 5615 | 230720 | 134 | Second Floor Plan - Air Conditioning - Galley Equipment |
| 5616 | 230721 | 134 | Attic Floor Plan - Air Conditioning - Galley Equipment |
| 5627 | 230722 | 134 | Pent House Floor - Air Conditioning Equipment Layout |
| 5601 | 230723 | 134 | Galley Layout |
| 4682 | 230724 | 134 | Galley Refrigeration |
| 2640 | 230388 | Many | N.H. A.B. & M.H. - N.H.W. & C. - Post Dispensary Family Hospital |
| 4692 | 230725 | 134 | Foundation Plan - Plumbing |
| 4693 | 230726 | 134 | First Floor Plan - Plumbing |
| 4694 | 230727 | 134 | Second Floor Plan - Plumbing |
| 4695 | 230728 | 134 | Toilet Details |
| 4696 | 230729 | 134 | Galley Layout - Plumbing |
| 4697 | 230730 | 134 | Plumbing Details |
| 3729 | 230731 | 134 | First Floor - Electrical Layout |
| 3730 | 230732 | 134 | Second Floor - Electrical Layout |
| 3731 | 230733 | 134 | Power Layout for Basement Galley, Pent House and Electrical Details |
| 3732 | 230734 | 134 | Fixture Schedule Nurses Station - Electrical Dets. |
| 2761 | 230735 | 134 | Telephone System - Conduit Layout |
| 2762 | 230736 | 134 | Telephone System - Conduit Layout |
| 9860 | 230737 | 134 | First Floor Equipment Drawings |
| 9861 | 230738 | 134 | Second Floor Equipment Drawings |
| 10880 | 230739 | 134 | Dets. of Built-in Equipment |
| 10881 | 230740 | 134 | Dets. of Built-in Equipment |
| 10882 | 230741 | 134 | Dets. of Built-in Equipment |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| Q-19. | Residential Area | | |
| | Q-19.01. Officers' Quarters | | |
| 1035 | 229106 | 105-1 | Foundation - First Floor and Dets. - House A |
| 1036 | 229107 | 105-1 | Second Floor - Cross Sections and Dets. - House A |
| 1037 | 229108 | 105-1 | Elevations and Details - House A |
| 1038 | 229109 | 105-1 | Details - House A |
| 1039 | 229110 | 105-1 | Supp. Plan and Elevations Porch Det. House A&A-1 |
| 1040 | 229111 | 105-1 | Supp. Plan and Elevations & Dets. - House A- |
| 1043 | 229112 | 105-1 | Supp. Plans Elevations & Dets. House C&C-1 - B&B-1 |
| 1041 | 229113 | 105-1 | Elevations - House B |
| 1042 | 229114 | 105-1 | Elevations - House C |
| 1852 | 229115 | 105-1 | Supp. Plans, Elevations and Det. House E&E-1 D&D-1 |
| 1850 | 229116 | 105-1 | Elevations - House D |
| 1851 | 229117 | 105-1 | Elevations - House E |
| 1856 | 229118 | 105-1 | Foundation & First Floor Plan - House F & G |
| 1878 | 229119 | 105-1 | Elevations - House F |
| 1879 | 229120 | 105-1 | Elevations House G |
| 1880 | 229121 | 105-1 | Supp. Elevation Front Ent. Dets. - House G&G-1, F&F-1 |
| 1855 | 229122 | 105-1 | Supp. Elevations, Front Ent. Det. - House H&H-1, I&I-1 |
| 1853 | 229123 | 105-1 | Elevations - House H |
| 1854 | 229124 | 105-1 | Elevations - House I |
| 1881 | 229125 | 105-1 | Elevations - House J |
| 1857 | 229126 | 105-1 | Foundation Plans Reversed |
| 6870 | 229127 | 105-1 | Foundation Plan - First & Second Floor Plans |
| 6871 | 229128 | 105-1 | Elevations |
| 6872 | 229129 | 105-1 | Details of Entrances |
| 1858 | 229130 | 105-1 | Det. of Kitchen Cabinets to be furnished by M. C. |
| 1859 | 229131 | 105-1 | Details of Main Cornice |
| 1860 | 229132 | 105-1 | Details of Rake Cornice House C-E&1 |
| 8843 | 229133 | 105-1 | Details of Porch Screening |
| 6877 | 229134 | 105-1 | Schedule of Venetian Blinds |
| 1863 | 229135 | 105-1 | Interior Color Scheme |
| 1862 | 229136 | 105-1 | Exterior Color Scheme |
| 685 | 229137 | 105-1 | Heating Foundation - House A-2 |
| 686 | 229138 | 105-1 | Heating First & Second Floor - House A-2 |
| 4601 | 229139 | 105-1 | Steam Heating - Rifle Range |
| 4640 | 229140 | 105-1 | Heating - Kent Road Losts 1,2,3, & 4 |
| 684 | 229141 | 105-1 | Plumbing Basement First & Sec. Fl. House A-2 |
| 4641 | 229142 | 105-1 | Plumbing - Houses AA-E, G & DD |
| 3630 | 229143 | 105-1 | Details of Kitchen Sink - Plumbing |
| 764 | 229144 | 105-1 | House A-2 - 1st & 2nd Floor Electric |
| 2757 | 229145 | | Telephone System |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| | Q-19.02. | Bachelor Officers' Quarters | |
| 934 | 229150 | 104-1 | Foundation Plan and Details |
| 936 | 229151 | 104-1 | First and Second Floor Plan |
| 937 | 229152 | 104-1 | Elevations and Details |
| 941 | 229153 | 104-1 | Main Entrance Details |
| 942 | 229154 | 104-1 | Side Entrance Details & Connector Details |
| 943 | 229155 | 104-1 | Elevations of Public Lounge & Recp. Room |
| 944 | 229156 | 104-1 | Entrance and Alt. Room Arrangement |
| 945 | 229157 | 104-1 | Room Finish and Door Schedule |
| 2877 | 229158 | 104-1 | Full Size Dets. of Typical Window and Transom Bar |
| 940 | 229159 | 104-1 | Brick Coursing and Details |
| 946 | 229160 | 104-1 | Color Schemes |
| 7800 | 229161 | 104-1<br>203-16 | Schedule of Venetian Blinds |
| 2878 | 229162 | 104-1 | Bay Window |
| 2879 | 229163 | 104-1 | Bay Window |
| 933 | 229164 | 104-1 | Foundation Plan & 1st. Floor Framing Plan |
| 3834 | 229165 | 104-1 | Footing Plans and Details |
| 938 | 229166 | 104-1 | Sec. "AA" Truss Dets. & Bay Window Dets. |
| 939 | 229167 | 104-1 | Sec. "BB" and Details |
| 935 | 229168 | 104-1 | Mechanical Pit & Misc. Details |
| 667 | 229169 | 104-1 | Service Pit Mech. Plan and Detail |
| 662 | 229170 | 104-1 | Location of Sleeves & Sump Pit |
| 665 | 229171 | 104-1 | Basement Plan - Heating |
| 666 | 229172 | 104-1 | First & Second Floor Plan - Heating |
| 663 | 229173 | 104-1 | Riser and Basement Floor Plans |
| 664 | 229174 | 104-1 | First & Second Floor Plan - Plumbing |
| 745 | 229175 | 104-1 | Basement Plan - Electric |
| 746 | 229176 | 104-1 | First & Second Floor Plan - Electric |
| | Q-19.03. | Guest House | |
| 914 | 229181 | 104-2 | Foundation Plan and Details |
| 915 | 229182 | 104-2 | First and Second Floor Plan & Details - also Electrical layout |
| 916 | 229183 | 104-2 | Elevations, Roof Plan & Cross Sections |
| 918 | 229184 | 104-2 | Details of Front Entrance |
| 917 | 229185 | 104-2 | Details |
| 3852 | 229186 | 104-2 | Full Size Details of Windows |
| 5872 | 229187 | 104-2 | Color Scheme |
| 6880 | 229188 | 104-2 | Schedule of Venetian Blinds |
| 669 | 229189 | 104-2 | Heating Basement Plan |
| 668 | 229190 | 104-2 | Heating |
| 671 | 229191 | 104-2 | Plumbing Basement |
| 670 | 229192 | 104-2 | Plumbing First and Second Floor |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| | Q-19.04. | | Men & Women Servants' Quarters Bachelor Officers' Quarters |
| 7863 | 229195 | 215 | Men - Plans Elevations |
| 7864 | 229196 | 215 | Women - Plans Elevations |
| 7865 | 229197 | 215 | Men and Women - Details |
| 10846 | 229198 | 215 | Women's - Color Scheme |
| 10847 | 229199 | 215 | Men's - Color Scheme |
| 4642 | 229200 | 215 | Heating and Details |
| 4613 | 229201 | 215 | Women - Plumbing and Details |
| 4614 | 229202 | 215 | Men - Plumbing and Details |
| 2786 | 229203 | 215 | Electrical Layout |
| | Q-19.05. | | Bachelor Officers' Mess and Officers' Club |
| 7802 | 229672 | 215 | Foundation and First Floor plan |
| 10885 | 229673 | 215 | Revised Boiler Room Foundations |
| 7830 | 229674 | 215 | 1st Floor Plan |
| 7831 | 229675 | 215 | 2nd Floor Plan and Roof Plan |
| 7832 | 229676 | 215 | Elevations |
| 7833 | 229677 | 215 | Sections and Details |
| 7834 | 229678 | 215 | Exterior Details |
| 7835 | 229679 | 215 | Exterior Details |
| 7836 | 229680 | 215 | Interior Details |
| 7837 | 229681 | 215 | Window Schedule and Jam Details |
| 7838 | 229682 | 215 | Refrigerator and Toilet Room Details |
| 7839 | 229683 | 215 | Schedules |
| 7840 | 229684 | 215 | Color Scheme |
| 7841 | 229685 | 215 | Layout of Terrazzo Floor in Bar |
| 7893 | 229686 | 215 | Schedule of Venetian Blinds |
| 7897 | 229687 | 215 | Bar Bending Schedule |
| 7803 | 229688 | 215 | Boiler Room Foundation Schedule & Details |
| 7804 | 229689 | 215 | Roof Framing Plan |
| 7805 | 229690 | 215 | Truss Details |
| 7806 | 229691 | 215 | Truss Details |
| 7807 | 229692 | 215 | Truss Details |
| 7808 | 229693 | 215 | 1st Floor Pipe Sleeve & Opening Layout |
| 4648 | 229694 | 215 | Refrigeration Details |
| 5650 | 229695 | 215 | Boiler Room Details |
| 5651 | 229696 | 215 | Boiler & Stoker Setting Details |
| 4653 | 229697 | 215 | 1st Floor Plan - Heating |
| 4654 | 229698 | 215 | Foundation Plan Heating |
| 2783 | 229699 | 215 | Galley Details Plumbing and Heating |
| 4655 | 229700 | 215 | 1st Floor Plan Ventilation |
| 4656 | 229701 | 215 | 2nd Floor Plan Ventilation |
| 4676 | 229702 | 215 | Ventilation Details |
| 4638 | 229703 | 215 | 1st Floor Plan Plumbing and Details |
| 4639 | 229704 | 215 | 2nd Floor and Roof Plan Plumbing & Details |
| 2771 | 229705 | 215 | 1st Floor Plan - Electrical Layout |
| 2772 | 229706 | 215 | 2nd Floor Plan - Electrical Details |
| 2782 | 229707 | 215 | Kitchen Power Layout - Electrical |

| Dwg. No. | Y&D No. | Proj. No. | Title ( Cont'd) |
|---|---|---|---|
| 2760 | 229708 | 215 | Telephone System - Conduit Layout |

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Q-20.01. Armory and Office Building

| | | | |
|---|---|---|---|
| 3833 | 229206 | 203-4 | Foundation Plan |
| 3822 | 229207 | 203-4 | 1st Floor Plan - Schedules & Details |
| 3823 | 229208 | 203-4 | 2nd Floor Plan - Details |
| 3824 | 229209 | 203-4 | Elevations - Typical Wall Sections Details |
| 3825 | 229210 | 203-4 | Exterior Details |
| 3826 | 229211 | 203-4 | Sections and Interior Details |
| 6881 | 229212 | 203-4 | Schedule of Venetian Blinds |
| 9812 | 229213 | 203-4 | Color Schemes |
| 3847 | 229214 | 203-4 | Slab and Beam - 1st Floor |
| 3610 | 229215 | 203-4 | Foundation - Heating |
| 3611 | 229216 | 203-4 | First Floor - Heating |
| 3612 | 229217 | 203-4 | Second Floor - Heating |
| 3605 | 229218 | 203-4 | Foundation Plans - Plumbing and Details |
| 3606 | 229219 | 203-4 | First Floor Plans - Plumbing and Details |
| 3607 | 229220 | 203-4 | Second Floor Plans - Plumbing and Details |
| 3608 | 229221 | 203-4 | Riser Diagram - Plumbing and Details |
| 1728 | 229222 | 203-4 | First Floor - Electrical |
| 1729 | 229223 | 203-4 | Second Floor - Electrical |
| 1740 | 229224 | 203-4 | First Floor - Telephone |
| 1741 | 229225 | 203-4 | Second Floor - Telephone |

Q-20.02. Range Houses - Toilets and Target Sheds

| | | | |
|---|---|---|---|
| 2856 | 229228 | 203-20 | Range House Plan Section and Details |
| 2857 | 229229 | 203-20 | Range House Exterior Details |
| 2858 | 229230 | 203-20 | Range House Exterior and Interior Details |
| 3609 | 229231 | 203-20 | Range House - Rifle Range Toilets and Target Shed, Plumbing and Heating |
| 2703 | 229232 | 203-20 | Range House - Electrical |
| 2871 | 229233 | 203-5 | Target Shed - Rifle Range - Plans, Elevations, Details |
| 2875 | 229234 | 203-20 | Toilets - Rifle Range |

Q-20.03. Pistol Range, Firing Line Shelters and Target House

| | | | |
|---|---|---|---|
| 4893 | 229237 | 203-7 | Pistol Range - Firing Line Shelter |
| 9825 | 229239 | 203-6 | Pistol Range Target House - Plans Elevations and Details |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| | | | **Q-20.04. Drill and Recreation Hall** |
| 8816 | 229714 | 202-19 | Foundation and Footing Plan |
| 8889 | 229715 | 202-19 | First Floor Plan Door Schedule & Details |
| 8890 | 229716 | 202-19 | Mezzanine Plan & Toilet Room Details |
| 8892 | 229717 | 202-19 | Elevations - Fan Light Details |
| 8896 | 229718 | 202-19 | Part Front Elevation & Arcade Details |
| 8891 | 229719 | 202-19 | Reflected Ceiling Plan - Catwalk - Duct - Attic Stairs Details |
| 8893 | 229720 | 202-19 | Cross Sections "X-X" & "W-W" & Stage Dets. |
| 8894 | 229721 | 202-19 | Longitudinal Sections "Z-Z" & "Y-Y" Dets. |
| 8895 | 229722 | 202-19 | Wall - Pier and Cornice Details |
| 8897 | 229723 | 202-19 | Window and Brick Coursing Details |
| 8898 | 229724 | 202-19 | Details of Fire Exit Hall |
| 8899 | 229725 | 202-19 | Mezzanine Stairs & Wood Paneling Details |
| 8817 | 229726 | 202-19 | Roof and Mezzanine Framing Plan |
| 8818 | 229727 | 202-19 | Wood Trusses and Details |
| 8819 | 229728 | 202-19 | Bar Bending Schedules |
| 5611 | 229729 | 202-19 | Heating and Ventilation |
| | | | **Q-20.05. Boiler House for Rifle Range and Balloon Barrage** |
| 2863 | 229770 | (202-16 (203-13 | Sketch - Scheme A |
| 7892 | 229771 | (202-16 (203-13 | Foundation & Footing Plan - Roof Framing Plan and Structural Details |
| 4868 | 229772 | (202-16 (203-13 | Floor & Roof Plans & Details |
| 4869 | 229773 | (202-16 (203-13 | Elevations and Details |
| 4684 | 229774 | (202-16 (203-13 | Stoker Installation Details |
| 4626 | 229775 | (202-16 (203-13 | Boiler Piping Layout |
| 3655 | 229776 | (202-16 (203-13 | 1st Floor Plan Plumbing & Details |
| 2773 | 229777 | (202-16 (203-13 | Electrical Layout |
| 10896 | 229778 | ----- | Temporary Stacks To Be Added To Stacks |
| | | | **Q-20.06. Rifle Ranges** |
| 1844 | 229781 | 203-7 | Rifle Range No. 1 Profile & Sections |
| 1845 | 229782 | 203-7 | Rifle Range No. 2 Profile & Sections |
| 1847 | 229783 | 203-7 | Rifle Range No. 3 Profile & Sections |
| 2815 | 229784 | (203-7 (203-6 | Rifle Range Miscellaneous Details |
| 7898 | 229785 | 203-5 | Rifle Range Butts Plan and Sections |
| 7899 | 229786 | 203-5 | Rifle Range Tunnel Plan and Sections |
| 6842 | 229787 | 203-5 | Rifle Range Butts Reinforcing Details |

| Dwg. No. | Y&D No. | Proj. No. | Title ( Cont'd) |
|---|---|---|---|
| 2740 | 229788 | 203-5 | Rifle Range Tunnel Electrical Layout |
| 3891 | 229789 | 203-5 | Rifle Range Profile & Sections Type A Concrete Butt Wall |
| 6875 | 229790 | 203-5 | Rifle Range Butts Wall, West End of Range No. 1 Sections Type B4 & B5 |
| 4860 | 229791 | 203-5 | Rifle Range Safety Wall Between Ranges 2&3 |

Q-20.07. Magazines Small Arms

| | | | |
|---|---|---|---|
| 7896 | 230274 | 216 | Brick Wall Alternate Section Details |

Q-21. Barrage Balloon and Amphibian Base

Q-21.01. Amphibian Base - Carpentry Shop

| | | | |
|---|---|---|---|
| 1155 | 229241 | 202-5 | Preliminary |
| 4827 | 229242 | 202-5 | Footing and Foundation Plan |
| 4824 | 229243 | 202-5 | Floor Plan, Elevations Sections |
| 4825 | 229244 | 202-5 | Details |
| 4826 | 229245 | 202-5 | Roof Plans |
| 4828 | 229246 | 202-5 | Framing Plan |
| 4829 | 229147 | 202-5 | Sections |
| 10825 | 229248 | 202-5 | Color Schemes |
| 4690 | 229249 | 202-5 | Boiler Setting Plan |
| 4632 | 229250 | 202-5 | Heating |
| 3698 | 229251 | 202-5 | Plumbing |
| 2749 | 229252 | 202-5 | Electrical Layout |
| 4659 | 229253 | 202-5 | Equipment Layout |

Q-21.02. Amphibian Base - Machine Shop

| | | | |
|---|---|---|---|
| 1156 | 229255 | 202-6 | Preliminary |
| 4833 | 229256 | 202-6 | Footing and Foundation Plan |
| 4830 | 229257 | 202-6 | Floor Plans - Elevations Sections and Schedules |
| 4831 | 229258 | 202-6 | Details |
| 4832 | 229259 | 202-6 | Roof Plans |
| 4835 | 229260 | 202-6 | Sections |
| 4834 | 229261 | 202-6 | Framing Plan |
| 5871 | 229262 | 202-6 | Bar Bending Schedule |
| 10824 | 229263 | 202-6 | Color Schemes |
| 4633 | 229264 | 202-6 | Heating |
| 2748 | 229265 | 202-6 | Electrical Layout |
| 3697 | 229266 | 202-6 | Plumbing |
| 4658 | 229267 | 202-6 | Amphibian Base - Machine Shop Equipment Layout |
| 9801 | 229268 | 202-6 | Gantry Crane for Machine Shop |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| | | | Q-21.03. Amphibian Storehouse |
| 2881 | 230270 | 202-3 | Foundation & Footing Details |
| 4675 | 230271 | 202-3 | 1st Floor & Mezzanine Plans & Plumbing |
| 2787 | 230272 | 202-3 | Electrical Layout Sheet No. 1 |
| 2793 | 230273 | 202-3 | Electrical Layout Sheet No. 2 |
| | | | Q-21.04. Amphibian Base - Ramp, Derrick and Pier |
| 3851 | 248037 | 202-1 | Plans, Sections and Details |
| 3850 | 248038 | 202-1 | Bulkhead & Pier, Plans, Sections & Details |
| 8823 | 248039 | 202-1 | Bulkhead & Pier, Bar Bending Schedule |
| 8834 | 248040 | 202-1 | Foundation Plan & Dets. Stiff Leg Derrick |
| 2837 | 248041 | 202-2 | 30 Ton Derrick for Amphibian Dock |
| | | | Q-21.05. Barrage Balloon School Buildings |
| 1500-94 | 248166 | 202-4 | Balloon Barr. Batt. at Marines School Building, Heating |
| 1500-95 | 248167 | 202-4 | Balloon Barr. School Bldg., Plumbing |
| 1500-97 | 248168 | 202-4 | Balloon Barr. Batt at Marines School Area Electrical Layout |
| 1500-87 | | | Balloon Barr. Batt. at Marines - Supply and Storage |
| 1600-7 | 248169 | 202-4 | Bldg. & Trans. Bldg.-Plumbing & Heating |
| 1500-96 | 248170 | 202-4 | Balloon Barrage Batt. at Marines School Area - Electrical Layout |
| 1600-14 | 248171 | 202-4 | Balloon Barr. Batt. at Marines - Balloon Building - Heating - Plans & Details |
| 1600-15 | 248172 | 202-4 | Balloon Bldg. for the Balloon Barrage School - Plumbing |
| 1600-34 | 248173 | 202-4 | Balloon Barrage Batt. at Marines - Admin. Building - Heating - Plans & Details |
| 1600-25 | 248174 | 202-4 | Admin. Bldg. for Balloon Barrage School Plumbing |
| 1600-39 | 241875 | 202-4 | Amphibian Base - Balloon Barrage School Boiler House Boiler & Piping - Plumbing |
| 1600-49 | 248176 | 202-4 | Boiler House - Balloon Barrage School and Amphibian Base - Electrical Layout |
| 5602 | 248177 | 202-4 | Amphibian Base Balloon Barrage School Boiler Setting Plan |
| Q-22. Parachute Training Area | | | |
| | | | Q-22.01. Buildings Under Parachute Towers |
| 1871 | 229270 | 123-3 | Foundation - 1st & 2nd Floor Plan |
| 1872 | 229271 | 123-3 | Elevations Cross Sections Details |
| 1873 | 229272 | 123-3 | Wall Sections Framing Stair & Ladder Dets. |
| 1874 | 229273 | 123-3 | Brick and Tile Coursing |
| 3840 | 229274 | 123-3 | Bar Bending Details |

| Dwg. No. | Y&D No. | Proj. No. | Title ( Cont'd) |
|---|---|---|---|
| 1680 | 229275 | 123-3 | Plumbing |
| 10809 | 229276 | 129-1 | Foundation 1st.&2nd. Floor Plans Schedules |
| 10810 | 229277 | 129-1 | Elevations Sections Details |
| 10811 | 229278 | 129-1 | Details |
| 10812 | 229279 | 129-1 | Miscellaneous Details |
| 10849 | 229280 | (129-1 (123-3 | Color Scheme |

Q-22.02. Parachute Training Building

| | | | |
|---|---|---|---|
| 8887 | 230037 | 138 | Foundation and Details |
| 8888 | 230038 | 138 | Wood Trusses |
| 9827 | 230039 | 138 | Door and Window Details |
| 11801 | 230040 | 139 | Catwalk Dets. Application Dets. for Fiberboard |
| 10899 | 230041 | 138 | Color Schemes |
| 4686 | 230042 | 138 | Heating Floor Plan |
| 3754 | 230043 | 138 | Electrical work for Heating System - Parachute Building & Parachute Training Building |
| 3748 | 230044 | 138 | Electrical Riser Diagram - Parachute Building & Parachute Training Building |

Q-22.03. Parachute Building

| | | | |
|---|---|---|---|
| 9805 | 230046 | 138 | Foundation and Details |
| 9813 | 230047 | 138 | Room Elevation |
| 9814 | 230048 | 138 | Door, Window & Skylight Details |
| 11818 | 230049 | 138 | Parachute Packing Tables & Storage Bins |
| 10851 | 230050 | 138 | Revised Framing Drying Room |
| 11802 | 230051 | 138 | Catwalk Details |
| 11800 | 230052 | 138 | Color Schemes |
| 4685 | 230053 | 138 | Floor Plan - Heating & Detail Heating |
| 3754 | 230043 | 138 | Parachute Building & Parachute Training Building - Electrical Work for Heating System |
| 3743 | 230044 | 138 | Parachute Bldg. & Parachute Training Building - Electrical Riser Diagram |

Q-22.04. Heating Plant - Parachute Training School

| | | | |
|---|---|---|---|
| 9838 | 230055 | 138 | Plans Elevations and Details |
| 9839 | 230056 | 138 | Cross Sections and Details |
| 4691 | 230057 | 138 | Boiler Room Details |
| 5658 | 230058 | 138 | Boiler and Stoker Setting Plan |
| 5609 | 230059 | 138 142-1 | Parachute Training School and Glider Base - Plumbing |
| 3742 | 230060 | 138 142-1 | Parachute Training School and Glider Base - Elec. Layout |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| | Q-22.05. Parachute Towers | | |
| 2702 | 230822 | 123 | Free & Captive Operation - Electrical System Including Lightning Protection & Obstruction Lights |
| 888 | 230823 | 123 | Tower Foundations - Details |
| 1046 | 230824 | 123 | Tower No. 2 Foundation - Details |
| 1875 | 230825 | 123 | Foundation Plan & Section for Equipment for Both Free & Captive Parachute Towers |
| 9824 | 230826 | 129-1 | Foundations for Parachute Tower No. 3 |
| | Q-22.06. Parachute Training Facilities | | |
| 9866 | 248023 | 204 | Parachute Training Suspension Assemblies |
| 9863 | 248024 | 204 | Parachute Troop 3 Foot Training Platforms |
| 9864 | 248025 | 204 | Parachute Troop 6 Foot Training Platforms |
| 9865 | 248026 | 204 | Parachute Troop Mock Cabins |
| Q-23. Glider Training Base | | | |
| | Q-23.01. Operations Building | | |
| 1893 | 229759 | 115 | Foundation Plans and Details |
| 1894 | 229760 | 115 | 1st & 2nd Floor Plans Details & Schedule |
| 1895 | 229761 | 115 | Elevations |
| 1896 | 229762 | 115 | Cross Sections and Details |
| 1897 | 229763 | 115 | F. S. Window Details |
| 8821 | 229764 | 115 | Color Scheme |
| 1695 | 229765 | 115 | Foundation & First Floor - Heating |
| 1698 | 229766 | 115 | Foundation Plan Plumbing |
| 1694 | 229767 | 115 | First Floor Plan Plumbing |
| 1718 | 229768 | 115 | Electrical Layout |
| | Q-23.02. Transformer House - Glider Training Base And Parachute Landing | | |
| 10823 | 230066 | 142-6 | Transformer House |
| | Q-23.03. Administration Building Glider Training Base | | |
| 10831 | 230067 | 142-1 | Floor Plan - Details and Schedules |
| 10832 | 230068 | 142-1 | Elevation and Details |
| 10833 | 230069 | 142-1 | Interior Details |
| 10834 | 230070 | 142-1 | Interior Details |
| 10838 | 230071 | 142-1 | Structural Plans and Details |
| 5630 | 230072 | 142-1 | Heating |
| 5628 | 230073 | 142-1 | Plumbing |
| 3747 | 230074 | 142-1 | Electrical Layout |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|
| | **Q-23.04. Central Heating Plant - Glider Training Base** | | |
| 5619 | 230076 | 142-1 | Steam Distribution - Heating & Details |
| 5620 | 230077 | 142-1 | Heating Sections and Details |
| 5621 | 230078 | 142-1 | Boiler Room Details |
| 5609 | 230059 | 142-1 | Heating Plant at Parachute Training School-Plumbing - Glider Training Base - (Parachute Training School) |
| 3742 | 230060 | 142-1 | Electrical Layout (Parachute Training School) |
| 5656 | 230079 | 142-1 | Boiler and Stoker Settings |
| | **Q-23.05. Wooden Hose Hanger - Glider Training Base** | | |
| 10826 | 230080 | 142-1 | Framing Plans & Dets. - Utility Shop Unit "C" |
| 10827 | 230081 | 142-1 | Foundation Dets. & Roof Plans - Utility Shop Units A, B, D & E |
| 10828 | 230082 | 142-1 | Truss Details - Utility Shops - Unit "A" |
| 5618 | 230083 | 142-1 | Plumbing - Unit "C" |
| 3723 | 230084 | 142-1 | Electrical Layout - Utility Shops - Units A, B, C, D, & E |
| 3724 | 230085 | 142-1 | Electrical Layout - Unit "C" - Transformer Station - Unit "F" |
| | **Q-23.06. Bulkhead - Ramp - Breakwater - Glider Training Base** | | |
| 2153 | 230086 | 142-1 | Preliminary-Warmup Platform-Ramp-Breakwater and Bulkhead |
| 9879 | 230087 | 142-1 | Bulkhead, Ramp and Details |
| 108088 | 230088 | 142-1 | Bulkhead, Ramp Breakwater - Steel Placing and Bar Bending |
| | **Q-23.07. Morgans Bay Dredging - Glider Training Base** | | |
| 2156 | 230089 | | Control Surveys |
| | **Q-23.08. Transformer House at Parachute Landing Field** | | |
| 8841 | 248033 | 117 | Plans, Elevations, Sections, Details |
| | **Q-23.09. Tower for Rotating Beacon - Parachute Troops Landing Field** | | |
| 8869 | 248035 | 117 | Structural Details |
| **Q-24. Cemetery** | | | |
| | **Q-24.01. Cemetery Buildings** | | |
| 2890 | 229752 | 112 | Plans Elevations & Details - Office and Tool House |
| 1192 | 229753 | 112 | Plans Elevations & Details Gateway to Cemetery |

| Dwg. No. | Y & D No. | Proj. No. | Title |
|---|---|---|---|

Q-25. Tent Camps No. 1 and 2

Q-25.01. Tent Camp Subsistence Building

| | | | |
|---|---|---|---|
| 21 | 161806 | P-1-5 | Foundation Plan |
| 22 | 161807 | P-1-5 | 1st Floor Plan |
| 23 | 161808 | P-1-5 | Elevations and Sections |
| 24 | 161809 | P-1-5 | Sections and Details |
| 25 | 161810 | P-1-5 | Refrigeration Details |
| 26 | 161811 | P-1-5 | Interior Electrical Work |
| 27 | 161812 | P-1-5 | Steam and Condensate Piping Plan |
| 31 | 161816 | P-1-5 | Soil Pipe Layout |
| 32 | 161817 | P-1-5 | Hot & Cold Water Piping Layout |
| 90 | 161876 | P-1-5 | Refrigeration Mech. Details |
| 3600 | 162575 | P-1-5 | Grease Trap Regimental & Tent Camp Mess Halls |
| 219 | 229476 | P-250-1-5 | Foundation Plan |
| 226 | 229481 | P-250-1-5 | Refrigerator Rooms |
| 231 | 229477 | P-250-1-5 | Elevations Sections and Details |
| 232 | 229478 | P-250-1-5 | Sections and Details |
| 234 | 229479 | P-250-1-5 | Roof Framing and Details |
| 388 | 229480 | P-250-1-5 | Plan of Attic over Galley Showing Fire Stops |
| 233 | 229482 | P-250-1-5 | Refrigerator Details |
| 254 | 229483 | P-250-1-5 | Interior Electrical Work |
| 363 | 229484 | P-250-1-5 | Condensate Pump House |

Q-25.02. Tent Camp Storehouse (Small)

| | | | |
|---|---|---|---|
| 17 | 161802 | P-1-6 | Storehouse Type SH-9 Plans |
| 18 | 161803 | P-1-6 | Storehouse Type SH-9 Elevations |

Q-25.03. Tent Camp Storehouse (Large)

| | | | |
|---|---|---|---|
| TC 19 | 161804 | P-1-7 | Storehouse Type SH-13 Plans |
| TC 20 | 161805 | P-1-7 | Storehouse Type SH-13 Elevations |

Q-25.04. Tent Camp Ice Storage House

| | | | |
|---|---|---|---|
| TC 28 | 161813 | P-1-18 | Ice Storage House - Plans Sections & Dets. |
| TC 29 | 161814 | P-1-18 | Ice Storage House - Elevations |

Q-25.05. Tent Camp Metal Sheds

| | | | |
|---|---|---|---|
| TC 30 | 161815 | P-1-17 | Metal Sheds |

Q-25.06. Tent Camp Outpost Building

| | | | |
|---|---|---|---|
| TC 33 | 161818 | P-1-50 | Outpost Building - Alternations |
| TC 34 | 161819 | P-1-50 | Outpost Building - Plumbing |

| Dwg. No. | Y&D No. | Proj. No. | Title |
|---|---|---|---|
| | | | **Q-25.07. Enlisted Mens' Washroom** |
| 35 | 161820 | P-1-16<br>P-1-15 | Officers' and Enlisted Men's Washroom<br>Hot Water Storage Tank |
| 43 | 161828 | P-1-15 | Enlisted Men's Washroom Plans & Sections |
| 44 | 161829 | P-1-15 | Enlisted Men's Washroom Elevations & Dets. |
| 48 | 161834 | P-1-15 | Enlisted Men's Washroom Soil Pipe Layout |
| 55 | 161841 | P-1-15 | Enlisted Men's Washroom Hot & Cold Water Piping Plan |
| 56 | 161842 | P-1-15 | Enlisted Men's Washroom Vent Layout |
| 57 | 161843 | P-1-15<br>P-1-16 | Officers' & Enlisted Men's Washroom<br>Details Plumbing Fixtures |
| 72 | 161858 | P-1-15<br>P-1-16 | Officers' & Enlisted Men's Washroom<br>Electrical System |
| 74 | 161860 | P-1-15<br>P-1-16 | Officers' and Enlisted Men's Washroom<br>Water Supply Details |
| 75 | 161861 | P-1-15<br>P-1-16 | Officers' and Enlisted Men's Washroom<br>Steam and Condensate Piping |
| 242 | 229486 | P-250-1-15 | TC No. 2 Enlisted Men's Washroom<br>Plan and Sections |
| 243 | 229487 | P-250-1-15 | TC No. 2 Enlisted Men's Washroom<br>Elevations and Details |
| 253 | 229488 | P-250-1-15 | Washrooms - Officers & Enlisted Men -<br>Electrical System |
| 339 | 229489 | P-250-1-15 | Washrooms for Enlisted Men Foundation and Floor Plan TC No. 2 |
| | | | **Q-25.08. Tent Camp Officers' Washrooms** |
| 35 | 161820 | P-1-15<br>P-1-16 | Officers' and Enlisted Men's Washroom<br>Hot Water Storage Tank |
| 46 | 161831 | P-1-16 | Officers' Washrooms - Plans and Dets. |
| 47 | 161832 | P-1-16 | Officers' Washroom - Elevations & Plot Plan |
| 57 | 161843 | P-1-15<br>P-1-16 | Officers' and Enlisted Men's Washroom<br>Details Plumbing Fixtures |
| 72 | 161858 | P-1-15<br>P-1-16 | Officers' and Enlisted Men's Washroom<br>Electrical System |
| 73 | 161859 | P-1-16 | Officers' Washrooms - Plumbing Layouts |
| 74 | 161860 | P-1-15<br>P-1-16 | Officers' and Enlisted Men's Washroom<br>Water Supply Details |
| 75 | 161861 | P-1-15<br>P-1-16 | Officers' and Enlisted Mens Washroom<br>Steam and Condensate Piping |
| 241 | 229490 | P-250-1-16 | TC No. 2 Washroom for Officers -<br>Plans and Details |
| 253 | 229488 | P-250-1-15<br>P-250-1-16 | Washroom Officers and Enlisted Men -<br>Electrical System |
| 312 | 229491 | P-250-1-16 | Washroom for Officers TC No. 2 - Plumbing |

| Dwg. No. | Y&D No. | Proj. No. | Title |
|---|---|---|---|
| | Q-25.09. | Tent Camp No. 1 Boiler House | |
| 39 | 161824 | P-1-10 | Boiler House Equip. Foundation Details |
| 40 | 161825 | P-1-10 | Boiler House Piping Details |
| 41 | 161826 | P-1-10 | Boiler House Steel Stack & Breeching Dets. |
| 42 | 161827 | P-1-10 | Boiler House Feed Water Heated Platform |
| 80 | 161866 | P-1-10 | Boiler House Plans and Elevations |
| 81 | 161867 | P-1-10 | Boiler House Foundations & Details |
| 82 | 161868 | P-1-10 | Boiler House Elevations Sections & Details |
| 89 | 161875 | P-1-10 | Boiler House Plumbing Layout |
| 98 | 229493 | P-400-2-5 | Addition to Boiler House - Elevations, Plans and Details |
| 109 | 229494 | P-400-2-5 | Addition to Boiler House - Electrical System |
| 138 | 229495 | P-1-10 | Boiler House Stoker Installation Details |
| 139 | 229496 | P-1-10 | Addition to Boiler House - TC No. 1 Boiler Setting Breeching and Piping |
| | Q-25.10. | Tent Camp No. 2 Boiler House | |
| 322 | 229497 | P-250-1-11 | Boiler House T.C. No. 2 Foundation Plan |
| 323 | 229498 | P-250-1-11 | Boiler House T.C. No. 2 Elevations Sections and Details |
| 324 | 229499 | P-250-1-11 | Boiler House T.C. No. 2 Details |
| 341 | 229500 | P-250-1-11 | Boiler House T.C. No. 2 Foundations for Boilers, Pumps and Tanks |
| 342 | 229501 | P-250-1-11 | Boiler House T.C. No. 2 Boilers & Piping |
| 352 | 229502 | P-240-1-11 | Boiler House T.C. No. 2 Electrical System |
| 387 | 229503 | P-250-1-11 | Boiler House T.C. No. 2 Stoker Setting Plan |
| | Q-25.11. | Tent Camp Strong Back Frames | |
| 45 | 161830 | | Strong Back Frames for Tents |
| 100 | 229505 | P-1-19 | Strong Back Frames for Hospital Tents and Ward Tents |
| | Q-25.12. | Tent Camp Chapel | |
| 96 | 229506 | P-8 | T.C. Chapel - Plumbing |
| 97 | 229507 | P-8 | T.C. Chapel - Heating |
| 330 | 229508 | P-8 | T.C. Chapel - Footing & Foundation Plan |
| 331 | 229509 | P-8 | T.C. Chapel - Floor & Roof Framing Plan |
| 332 | 229510 | P-8 | T.C. Chapel - First Floor Plan & Interior Details |
| 333 | 229511 | P-8 | T.C. Chapel - Truss and Exterior Details |
| 334 | 229512 | P-8 | T.C. Chapel - Elevations |
| 335 | 229513 | P-8 | T.C. Chapel - Dets. of Reversible Alter |
| 336 | 229514 | P-8 | T.C. Chapel - Color Scheme |
| 338 | 239515 | P-8 | T.C. Chapel - Electrical Layout |
| 381 | 228906 | P-8 | T.C. and Regimental Chapel - Details of Drapes at Alter |

| Dwg. No. | Y&D No. | Proj. No. | Title |
|---|---|---|---|

Q-25.13. Tent Camp Hospital

| | | | |
|---|---|---|---|
| 101 | 229517 | P-1-19 | Hospital Tent Camp Area Foundation & Dets. |
| 102 | 229518 | P-1-19 | Hospital Tent Camp Area Floor Plan |
| 103 | 229519 | P-1-19 | Hospital Tent Camp Area Front & Rear Elevations and Details |
| 104 | 229520 | P-1-19 | Hospital Tent Camp Area Side Elevation Section and Roof Plan |
| 105 | 229521 | P-1-19 | Hospital Tent Camp Area Structural Dets. |
| 113 | 229522 | P-1-19 | Hospital Tent Camp Area Heating Plan |
| 114 | 229523 | P-1-19 | Hospital Tent Camp Area Plumbing Plan |
| 115 | 229524 | P-1-19 | Hospital Tent Camp Area Electrical Layout |
| 118 | 229525 | P-1-19 | Hospital Tent Camp Area Dets. Cabinets - Gate to Surgical Suite |
| 119 | 229526 | P-1-19 | Hospital Tent Camp Area Mill work Cabinet Dets. |
| 120 | 229527 | P-1-19 | Hospital Tent Camp Area Mill Work Cabinet Dets. |
| 276 | 229528 | P-400-2-3 | Addition to Tent Camp Hospital Foundation Plan and Details |
| 277 | 229529 | P-400-2-3 | Addition to Tent Camp Hospital Foundation Plan and Details |
| 278 | 229530 | P-400-2-3 | Addition to Tent Camp Hospital Floor Plan |
| 279 | 229531 | P-400-2-3 | Addition to Tent Camp Hospital Floor Plan |
| 280 | 229532 | P-400-2-3 | Addition to Tent Camp Hospital Elevations and Details |
| 281 | 229533 | P-400-2-3 | Addition to Tent Camp Hospital Elevations and Details |
| 282 | 229534 | P-400-2-3 | Addition to Tent Camp Hospital Roof Framing and Truss Details |
| 304 | 229535 | P-400-2-3 | Addition to Tent Camp Hospital North Wing Plumbing |
| 305 | 229536 | P-400-2-3 | Addition to Tent Camp Hospital South Wing Plumbing |
| 306 | 229537 | P-400-2-3 | Addition to Tent Camp Hospital North Wing Heating |
| 307 | 229538 | P-400-2-3 | Addition to Tent Camp Hospital South Wing Heating |
| 315 | 229539 | P-400-2-3 | Addition to Tent Camp Hospital Electrical Layout |
| 316 | 229540 | P-400-2-3 | Addition to Tent Camp Hospital Electrical Layout |

Q-25.14. Tent Camp Hospital Administration Bldg.

| | | | |
|---|---|---|---|
| 271 | 229542 | | Administration Bldg. - Tent Camp Hospital |
| 272 | 229543 | P-400-2-12 | Administration Bldg. - Tent Camp Hospital Color Scheme |
| 314 | 229544 | P-400-2-12 | Administration Bldg. - Tent Camp Hospital Electrical |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 320 | 229545 | P-400-2-12 | Administration Bldg. - Tent Camp Hospital Plumbing |
| 321 | 229546 | P-400-2-12 | Administration Bldg. - Tent Camp Hospital Heating |

Q-25.15. Tent Camp Hospital Storehouse

| | | | |
|---|---|---|---|
| 106 | 229547 | P-1-19 | T.C. Hospital Storehouse 108' X 24' Plans and Sections |
| 107 | 229548 | P-1-19 | T.C. Hospital Storehouse 108x24 Elevations and Sections |

Q-25.16. Tent Camp Hospital Generator Bldg.

| | | | |
|---|---|---|---|
| 110 | 229549 | P-400-2-7 | T.C. Hospital Standby Generator Building |
| 111 | 229550 | P-400-2-7 | T.C. Hospital Standby Generator Building Electrical Layout |
| 123 | 229551 | P-1-19-1 | T.C. Hospital Standby Generator Building Alteration and addition |
| 395 | 229552 | P-1-19-1 | T.C. Hospital Standby Generator Building Alteration and Addition - Plumbing |
| 380 | 229553 | P-1-19-1 | T.C. Hospital Standby Generator Building Revised Electrical Layout |

Q-25.17. T.C. Incinerator

| | | | |
|---|---|---|---|
| 137 | 229555 | P-140 | Tent Camp Incinerator |
| 138 | 229556 | P-140 | Tent Camp Incinerator Plans Elevations Sections and Details |
| 396 | 229557 | P-140 | Tent Camp Incinerator Electrical Layout |
| 397 | 229558 | P-140 | Tent Camp Incinerator Plumbing and Dets. |

Q-25.18. Tent Camp Post Exchange

| | | | |
|---|---|---|---|
| 264 | 229562 | P-250-1-19 | T.C. No. 2 Post Exchange Color Scheme |
| 391 | 229563 | P-250-1-19 | T.C. No. 2 Post Exchange Electrical Work |

Q-25.19. Tent Camp Guest House

| | | | |
|---|---|---|---|
| 369 | 229564 | P-250-1-20 | Guest House - Color Scheme |

Q-25.20. Tent Camp Officers' Subsistance Building

| | | | |
|---|---|---|---|
| 287 | 229565 | P-250-1-6 | Subsistance Building - 570 Officers - Foundation Plan - Details |
| 288 | 229566 | P-250-1-6 | Subsistance Building - 570 Officers - Floor Plan - Details |
| 289 | 229567 | P-250-1-6 | Subsistance Building - 570 Officers - Elevations Sections Details |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 290 | 229568 | P-250-1-6 | Subsistence Building - 570 Officers - Roof Framing |
| 291 | 229569 | P-250-1-6 | Subsistence Building - 570 Officers - Window, Framing and Toilet Details |
| 292 | 229570 | P-250-1-6 | Subsistence Building - 570 Officers - Meat Hanger, Refrigerator and Toilet Dets. |
| 293 | 229571 | P-250-1-6 | Subsistence Building - 570 Officers - Refrigeration |
| 308 | 229572 | P-250-1-6 | Subsistence Building - 570 Officers - Heating Plan |
| 309 | 229573 | P-250-1-6 | Subsistence Building - 570 Officers Plumbing - Soil & Waste Piping |
| 310 | 229574 | P-250-1-6 | Subsistence Building - 570 Officers - Plumbing - Water Piping |
| 311 | 229575 | P-250-1-6 | Subsistence Building - 570 Officers - Plumbing - Riser Diagram |
| 313 | 229576 | P-250-1-6 | Subsistence Building - 570 Officers - Electrical Layout |
| 370 | 229577 | P-250-1-6 | Toilet Adjoining Officer Subsistance Bldg. |
| 386 | 229578 | P-250-1-6 | Toilet Adjoining Officer Subsistance Bldg. Heating |
| 390 | 229579 | P-250-1-6 | Toilet Adjoining Officer Subsistance Building - Plumbing |

Q-25.21. Tent Camp Recreation Building

| | | | |
|---|---|---|---|
| 327 | 229581 | P-250-1-18 | Recreation Bldg. - Mod. R-2 - 1st. Floor Plan |
| 328 | 229582 | P-250-1-18 | Recreation Bldg. - Mod. R-2 - Elevations & Sections |
| 329 | 229583 | P-250-1-18 | Recreation Bldg. Mod. R-2 - Details |
| 346 | 229584 | P-250-1-18 | Recreation Bldg. Mod. R-2 - Electrical Layout |
| 347 | 229585 | P-250-1-18 | Recreation Bldg. Mod. R-2 - Electrical Dets. |
| 348 | 229586 | P-250-1-18 | Recreation Bldg. Mod. R-2 - Plumbing Dets. |
| 350 | 229587 | P-250-1-18 | Recreation Bldg. Mod. R-2 - Foundation Plan - Heating |
| 354 | 229588 | P-250-1-18 | Recreation Bldg. Mod. R-2 - Color Scheme |

Q-26. Mumford Point Camp No. 1

Q-26.01. Mumford Point Subsistence Building

| | | | |
|---|---|---|---|
| 8 | 229596 | P-500-4 | Subsistence - Mumford Point - Foundation |
| 9 | 229597 | P-500-4 | Subsistence Building - Mumford Point - Floor Plan |
| 10 | 229598 | P-500-4 | Subsistence Building - Mumford Point - Elevations |

| Dwg. No. | Y & D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 11 | 229599 | P-500-4 | Subsistence Building - Mumford Point - Roof Plan |
| 12 | 229600 | P-500-4 | Subsistence Building - Mumford Point - Details |
| 30 | 229601 | P-500-4 | Subsistence Building - Mumford Point - Soil and Waste Piping Plumbing |
| 31 | 229602 | P-500-4 | Subsistence Building - Mumford Point - Hot and Cold Water Piping Plumbing |
| 43 | 229603 | P-500-4 | Subsistence Building - Mumford Point - Electrical Layout |
| 45 | 229604 | P-500-4 | Subsistence Building - Mumford - Heating Plan |

Q-26.02. Mumford Point Administration Building

| | | | |
|---|---|---|---|
| 14 | 229606 | P-500-15 | Administration Building - Mumford Point |
| 41 | 229607 | P-500-15 | Administration Building - Mumford Point Electrical Layout |
| 46 | 229608 | P-500-15 | Administration Building - Mumford Point Plumbing |
| 50 | 229609 | P-500-15 | Administration Building - Mumford Point Heating |

Q-26.03. Mumford Point Storehouse ( Large )

| | | | |
|---|---|---|---|
| 18 | 229611 | P-500-7 | Storehouse SH-13 - Mumford Point - Foundation Plan - Wall Section and Details |
| 19 | 229612 | P-500-7 | Storehouse SH-13 - Mumford Point - Floor Plan - Elevations and Sections |

Q-26.04 Mumford Point Post Exchange

| | | | |
|---|---|---|---|
| 21 | 229614 | P-500-13 | Post Exchange - Mumford Point - Foundation Plan & Dets. |
| 22 | 229615 | P-500-13 | Post Exchange - Mumford Point - First Floor Plan and Details |
| 23 | 229616 | P-500-13 | Post Exchange - Mumford Point - Elevations and Truss Details |
| 20 | 229617 | P-500-13 | Post Exchange - Mumford Point - Plumbing |
| 42 | 229618 | P-500-13 | Post Exchange - Mumford Point - Electrical Layout |

Q-26.05. Mumford Point Brig

| | | | |
|---|---|---|---|
| 32 | 229621 | P-500-6 | Brig - Mumford Point - Foundation - 1st. Floor Plan and Details |
| 33 | 229622 | P-500-6 | Brig - Mumford Point - Elevations and Details |
| 25 | 229623 | P-500-6 | Brig - Mumford Point - Plumbing |
| 26 | 229624 | P-500-6 | Brig - Mumford Point - Heating |

| Dwg. No. | Y&D No. | Proj. No. | Title (Cont'd) |
|---|---|---|---|
| 39 | 229625 | P-500-6 | Brig - Mumford Point - Electrical Layout |

Q-26.06. Mumford Point Dispensary Building

| | | | |
|---|---|---|---|
| 27 | 229627 | P-500-11 | Dispensary Bldg. - Mumford Point-Fl. Plans |
| 28 | 229628 | P-500-11 | Dispensary Bldg. - Mumford Point-Elevations |
| 29 | 229629 | P-500-11 | Dispensary Bldg. - Mumford Point-Details |
| 34 | 229630 | P-500-11 | Dispensary Bldg. - Mumford Point-Plumbing and Details |
| 40 | 229631 | P-500-11 | Dispensary Bldg. - Mumford Point-Heating |
| 38 | 229632 | P-500-11 | Dispensary Building - Mumford Point - Electrical Layout |
| 53 | 229633 | P-500-11 | Dispensary Building - Mumford Point - Cabinet Details |

Q-26.07. Mumford Point - Heating Plant

| | | | |
|---|---|---|---|
| 44 | 229635 | P-500-16 | Heating Plant - Mumford Point |
| 47 | 229636 | P-500-16 | Heating Plant - Mumford Point - Plans, Elevations, and Sections |
| 48 | 229637 | P-500-16 | Heating Plant-Mumford Point-General Dets. |
| 49 | 229638 | P-500-16 | Heating Plant - Mumford Point - Electrical Layout |
| 52 | 229639 | P-500-16 | Heating Plant - Mumford Point - Stoker Installation Details |
| 2130 | 229640 | P-500-16 | Sketch |

Q-27. Peterfield Point

Q-27.01. Peterfield Point Pier

| | | | |
|---|---|---|---|
| 262 | 229561 | P-249-51 | Dets. of Piers at Peterfield Point |

Q-28. Tank Battalion

Q-28.01. Tank Battalion Huts

| | | | |
|---|---|---|---|
| 235 | 229559 | P-50-10 | T.C. No. 2 Enlisted Mens' Huts Elect. System |
| 302 | 229560 | 250-3-8&9<br>250-4-7&8 | Officers Washroom Plumbing (Huts) |

Q-28.02. Tank Battalion Shops

| | | | |
|---|---|---|---|
| 1899 | 229589 | P-250-3-10<br>P-250-4-10 | Shop Bldg. - Motor Storage Sheds Foundation Plan and Footing Dets. |

| Dwg. No. | Y&D No. | Proj. No. | Title |
|---|---|---|---|

Q-28.03. Tank Battalion Mess Hall

| | | | |
|---|---|---|---|
| TB 7 | 229642 | P-250-3-7<br>P-250-4-9 | Mess Hall Foundation Floor Plans and Details |
| TB 8 | 229643 | P-250-3-7<br>P-250-4-9 | Mess Hall Elevations and Details |

Q-29. Midway Park Residential Area

Q-29.01. Midway Park Dwellings

| | | | |
|---|---|---|---|
| LCH 54 | 229472 | 301-201<br>301-202 | L.C.D.H. Waste and Vent Piping for Typical Bath and Kitchen |
| LCH 60 | 229473 | 301-201<br>301-202 | L.C.D.H. Exterior and Interior Color Schemes |
| LCH 77 | 229474 | 301-202 | Revision - Showing Apts. with Three and One Bedroom each |

Q-30. Mockup Area

Q-30.01. Mockup Ship

| | | | |
|---|---|---|---|
| 3855 | 229754 | 132 | Plans, Elevations and Sections |
| 3856 | 229755 | 249-52 | Details and Sections |
| 9875 | 229756 | 132 | Derrick "A" |
| 9874 | 229757 | 132 | Derrick "B" |

Q-31. Miscellaneous

Q-31.01. Gun Mounts

| | | | |
|---|---|---|---|
| 11805 | 248043 | 233 | Foundations for 20 MM. and 155 MM. Gun Mounts |

Q-31.02. P.W.O. Record Drawings

| | | |
|---|---|---|
| 1 | 228331 | Quadrangle 98 |
| 2 | 228332 | Quadrangle 99 |
| 3 | 228333 | Quadrangle 100 |
| 4 | 228334 | Quadrangle 118 |
| 5 | 228335 | Quadrangle 119 |
| 6 | 228336 | Quadrangle 120 |
| 7 | 228337 | Quadrangle 139 |
| 8 | 228338 | Quadrangle 140 |
| 9 | 228339 | Quadrangle 159 |
| 10 | 228340 | Quadrangle 160 |

| P. W. Dwg. No. | Y&D No. | Title (Cont'd) |
|---|---|---|
| 11 | 228341 | Quadrangle 179 |
| 12 | 228342 | Quadrangle 180 |
| 13 | 228343 | Quadrangle 181 |
| 14 | 228344 | Quadrangle 198 |
| 15 | 228345 | Quadrangle 199 |
| 16 | 228346 | Quadrangle 217 |
| 17 | 228347 | Quadrangle 218 |
| 18 | 228348 | Quadrangle 219 |
| 19 | 228349 | Quadrangle 220 |
| 20 | 228350 | Quadrangle 167 |
| 21 | 228351 | Wells |
| 22 | 228352 | Wells |
| 23 | 228353 | Wells |
| 24 | 228354 | Wells |
| 25 | 228355 | Quadrangle 201 |
| 26 | 228356 | M.B. Drawing Numbers 1 to 99 List |
| 27 | 228357 | M.B. Drawing Numbers 100 to 199 List |
| 28 | 228358 | M.B. Drawing 1100 to 1199 List |
| 29 | 228359 | M.B. Drawing Numbers 2100 to 2199 List |
| 30 | 228360 | M.B. Drawing Numbers 3100 to 3199 List |
| 31 | 228361 | M.B. Drawing Numbers 200 to 299 List |
| 32 | 228362 | M.B. Drawing Numbers 1200 to 1299 List |
| 33 | 228363 | M.B. Drawing Numbers 2200 to 2299 List |
| 34 | 228364 | M.B. Drawing Numbers 300 to 399 List |
| 35 | 228365 | M.B. Drawing Numbers 400 to 499 List |
| 36 | 228366 | M.B. Drawing Numbers 1400 to 1499 List |
| 37 | 228367 | M.B. Drawing Numbers 500 to 599 List |
| 38 | 228368 | M.B. Drawing Numbers 1500 to 1599 List |
| 39 | 228369 | M.B. Drawing Numbers 600 to 699 List |
| 40 | 228370 | M.B. Drawing Numbers 1600 to 1699 List |
| 41 | 228371 | M.B. Drawing Numbers 2600 to 2699 List |
| 42 | 228372 | M.B. Drawing Numbers 3600 to 3699 List |
| 43 | 228373 | M.B. Drawing Numbers 4600 to 4699 List |
| 44 | 228374 | M.B. Drawing Numbers 5600 to 5699 List |
| 45 | 228375 | M.B. Drawing Numbers 700 to 799 List |
| 46 | 228376 | M.B. Drawing Numbers 1700 to 1799 List |
| 47 | 228377 | M.B. Drawing Numbers 2700 to 2799 List |
| 48 | 228378 | M.B. Drawing Numbers 3700 to 3799 List |
| 49 | 228379 | M.B. Drawing Numbers 800 to 899 List |
| 50 | 228380 | M.B. Drawing Numbers 900 to 999 List |
| 51 | 228381 | M.B. Drawing Numbers 1000 to 1099 List |
| 52 | 228382 | M.B. Drawing Numbers 1800 to 1899 List |

| Dwg. No. | Y & D No. | Title (Cont'd) |
|---|---|---|
| 53 | 228383 | M.B. Drawing Numbers 2800 to 2899 List |
| 54 | 228384 | M.B. Drawing Numbers 3800 to 3899 List |
| 55 | 228385 | M.B. Drawing Numbers 4800 to 4899 List |
| 56 | 228386 | M.B. Drawing Numbers 5800 to 5899 List |
| 57 | 228387 | M.B. Drawing Numbers 6800 to 6899 List |
| 58 | 228388 | M.B. Drawing Numbers 7800 to 7899 List |
| 59 | 228389 | M.B. Drawing Numbers 8800 to 8899 List |
| 60 | 228390 | M.B. Drawing Numbers 9800 to 9899 List |
| 61 | 228391 | M.B. Drawing Numbers 10800 to 10899 List |
| 62 | 228392 | T.C. #1 Drawing Numbers T.C. 1 to 99 List |
| 63 | 228393 | T.C. #1 Drawing Numbers T.C. 100 to 199 List |
| 64 | 228394 | T.C. #2 Drawing Numbers T.C. 200 to 299 List |
| 65 | 228395 | T.C. #2 Drawing Numbers T.C. 300 to 399 List |
| 66 | 228396 | T.C. #2 Drawing Numbers T.C. 400 to 499 List |
| 67 | 228397 | Tank Battalion, C.C.C. and Mumford Point Drawing No. Lists |
| 68 | 228398 | Mumford Point Continued and Barrage Balloon Battalion Drawing Number Lists |
| 69 | 228399 | Low Cost Housing Drawing Number List |
| 70 | 228400 | Quadrangle 177 - Scale 1" - 500' |
| 71 | 228401 | Quadrangle 197 - Scale 1" - 500' |
| 1-S | 228402 | Quadrangle 98 - Sewage Key Map Scale 1" - 500' |
| 5-S | 228403 | Quadrangle 119 - Sewage Key Map Scale 1" = 500' |
| 6-S | 228404 | Quadrangle 120 - Sewage Key Map Scale 1" = 500' |
| 7-S | 228405 | Quadrangle 139 - Sewage Key Map Scale 1" = 500' |
| 8-S | 228406 | Quadrangle 140 - Sewage Key Map Scale 1" = 500' |
| 10-S | 228407 | Quadrangle 160 - Sewage Key Map Scale 1" = 500' |
| 73 | 228409 | Quadrangle 142 - Scale 1" = 500' |
| 74 | 228410 | Quadrangle 162 - Scale 1" = 500' |
| 76 | 228412 | Quadrangle 121 - Scale 1" = 500' |
| 77 | 228413 | Quadrangle 122 - Scale 1" = 500' |
| 78 | 228414 | Quadrangle 182 - Scale 1" = 500' |
| 79 | 228415 | Quadrangle 202 - Scale 1" = 500' |
| 80 | 228416 | Quadrangle 221 - Scale 1" = 500' |
| 81 | 228417 | Quadrangle 241 - Scale 1" = 500' |
| 84 | 228420 | M.S. Drawing Number 11800 to 11899 List |
| 85 | 228421 | Quadrangle 240 - Scale 1" = 500' |
| 93 | 228429 | New River Water Sampling Stations |
| 94 | 228430 | Sewage Treatment Plant Operating Map |

CHAPTER R PART II

LIST OF SPECIFICATIONS PREPARED

Listed herein are 201 Specifications prepared to cover the construction of the Marine Barracks, New River, North Carolina, arranged in numerical order as follows:

| | |
|---|---|
| 100 - 167 | Tent Camps |
| 168 | Glider Training Base |
| 201 - 207 | Roads, Railroads, Dredging, Bridges, and Airports |
| 300 - 301 | Clearing and Planting |
| 400 - 411 | Sewerage |
| 500 - 509 | Water Supply |
| 600 - 608 | Mechanical |
| 700 - 708 | Electrical |
| 800 - 896 | Architectural |
| 994 - 999 | Structural |
| 1000 | Record Drawings |
| EL | Elevators |

All extra copies of Specifications were turned over to the Public Works Officer.

| SPEC. NO. | TITLE |
|---|---|
| | Wood Warehouses<br>Main Spec.<br>Addenda 1 and 2 |
| 100 | Water Distribution<br>Construction & Material Spec. |
| 101 | Main Specification<br>Addendum No. 1 |
| 102 | Sanitary Sewers<br>Main Specification |
| 103 | Sewage Treatment Plant<br>Main Specification<br>Addenda Nos. 1 to 11 incl. and 13 |
| 104 | Water Storage Treatment and Pumping Plant<br>Main Specification<br>Addendum No. 1 |
| 105 | Roads, Streets, Railroads<br>Main Specification<br>Addenda 1 to 7 inclusive |

CHAPTER [illegible] - PART II

[illegible] SPECIFICATIONS PREPARED

Listed herein are [illegible] specifications prepared to cover the construction of the [illegible], [illegible] arranged in numerical order as follows:

| | |
|---|---|
| 1[illegible] - [illegible] | Tent Camps |
| [illegible] | [illegible] Training Base |
| [illegible] - [illegible] | Roads, Railroads, Drainage, [illegible], and Airports |
| [illegible] - [illegible] | Plumbing and Heating |
| [illegible] - [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |
| [illegible] | [illegible] |

All [illegible] specifications were changed [illegible] the public [illegible].

| [illegible] | Title |
|---|---|
| | [illegible]<br>[illegible]<br>[illegible] |
| 1[illegible] | [illegible]<br>[illegible] |
| 1[illegible] | [illegible]<br>[illegible] |
| 1[illegible] | [illegible]<br>[illegible] |
| 1[illegible] | [illegible]<br>[illegible]<br>[illegible] |
| 1[illegible] | [illegible]<br>[illegible]<br>[illegible] |
| 1[illegible] | [illegible]<br>[illegible]<br>[illegible] |

| SPEC. NO. | TITLE |
|---|---|
| 106 | Electrical Distribution System<br>Main Specification<br>Addendum No. 1 |
| 107 | Steam Supply and Distribution<br>Addendum No. 1<br>Parts 1, 2, 3, 4, 5, 6, & 7 |
| 108 | Subsistence Building<br>Main Spec. - Sections 1 to 9 incl. & 21<br>Addendum No. 4 (Section 10)<br>Addendum No. 1 (Section 11)<br>Addendum No. 2 (Section 11)<br>Addendum No. 1 (Section 12)<br>Addendum No. 2 (Section 12)<br>Addendum No. 5 (Section 13) |
| 109 | 2 Metal Sheds<br>Main Specification<br>Addenda Nos. 1 and 2 |
| 110 | Washrooms for Officers & Enlisted Men<br>Sections 1 to 9 incl. & Sec. 20<br>Addenda Nos. 1 to 7 inclusive |
| 111 | Warehouses SH 9 & SH 13 (T. C. Area)<br>Sections 1 to 8 inclusive<br>Addenda Nos. 1, 2, and 3 |
| 112 | Boiler House (T. C. Area)<br>Main Specification<br>Addenda Nos. 1 to 5 inclusive |
| 113 | Pump House<br>Main Specification<br>Addenda Nos. 1 and 2 |
| 114 | Ice Storage House<br>Main Specification<br>Addenda Nos. 1, 2, 3, & 4 |
| 115 | Chlorinator House<br>Sections 1 to 9 inclusive |
| 116 | Strongback Frames for Tents<br>Sections 1 to 4 inclusive |
| 117 | Gasoline-Fuel Oil Storage-Distribution<br>Part 1<br>Addenda Nos. 1, 2, 3, & 4<br>Part 2<br>Addendum No. 1 |

| SPEC. NO. | TITLE |
|---|---|
| 118 | Landscaping<br>Section No. 1 |
| 119 | Hospital Facilities<br>Sections 1 to 16 inclusive<br>Addenda Nos. 1 to 9 inclusive |
| 120 | Hospital Storehouse<br>Sections 1 to 10 inclusive |
| 121 | Outpost Buildings<br>Sections 1 to 10 inclusive<br>Addendum No. 1 |
| 122 | T. C. Hospital Administration Building<br>Sections 1 to 11 inclusive and<br>Sections 12, 13, & 14<br>Addenda Nos. 1 and 2 |
| 123 | Recreation Building - R-2<br>Section P and E |
| 150 | Refrigeration Units and Cold Storage Room in Mess Hall - Tent Camp No. 2<br>Sections Nos. 6, 13, & 14 |
| 151 | Fuel Oil Fired Steam Generator Equipment and Appurtenances<br>Addendum No. 1<br>Sections Nos. 1 and 2 |
| 152 | Addition to T. C. Hospital<br>Sections 1 to 11 inclusive and<br>Sections 12, 13, 14, & 15 |
| 153 | Subsistence Building, 570 Officers (Mess Hall)<br>Sections 1 to 9 inclusive and<br>Sections 10, 11, & 12<br>Addenda Nos. 1, 2, & 3 |
| 155 | Chapels<br>Sections 1 to 11 inclusive and<br>Sections 12 and 13<br>Section H<br>Addenda Nos. 1, 2, & 3 |
| 156 | Well Pumps - H, I, J, K, L, & M - T. C. 1 & 2<br>O-Tank Bat. T. C. - Materials & Installation<br>Main Specification |
| 157 | Naval Hospital - Equipment Purchase<br>Main Specification |

| SPEC. NO. | TITLE |
| --- | --- |
| 160 | Field Painting of Metal Roofs of Motor Storage Sheds<br>Section No. 1 |
| 161 | Field Painting of Elevated Water Storage Tanks<br>Main Specification |
| 163 | Sewage Pumping Station No. 8 (T. C. 1 & 2)<br>Sections 1 to 11 inclusive and Sec. 12<br>Advance Specification "A" |
| 164 | Mumford Point (T. C.) Buildings (7 Bldgs.)<br>Section E<br>Sections 1 (P), 2 (HHW), 3(HS), 4 (BP), and 5 (SD)<br>Sections 1 to 16 inclusive<br>Addenda Nos. 1 to 4 inclusive |
| 165 | Mumford Point - T. C. - Sewage Treatment Plant<br>Sections 1 to 13 inclusive<br>Addendum No. 1 |
| 167 | Incinerators<br>Section E and Sec. No. 1<br>Spec. for Incinerator - Plumbing<br>Incinerator, Tent Camp |
| 168 | Glider Base<br>Spec. for Utility Shops - Hangars - Adm. Building - P<br>Spec. for Boiler Plant & Steam Distribution<br>Spec. for Shop Equipment<br>Spec. for Utility Shops - Hangars - Adm. Building - H<br>Section E<br>Addenda Nos. 1, 2, 4, & 5<br>Sections 1 to 16 inclusive |
| 201 | Construction & Material-Railroad Tracks & Timber<br>Main Specification<br>Addenda Nos. 1, 2, 3, 4, 5, 10, & 15 |
| 202 | General Specifications for Roads & Structure<br>Main Specification<br>Addenda Nos. 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12 & 13.<br>Addenda Nos. 15 to 27 inclusive |
| 203 | Airport - Full Title - Grading, drainage and Construction of the Landing Field for Parachute Troops<br>Main Specification<br>Addenda Nos. 1, 2, & 3 |

| SPEC. NO. | TITLE |
|---|---|
| 204 | Dredging Basin & Channel at Amphibian Base<br>Main Specification |
| 205 | Bridge on Sneads Ferry Road<br>Main Specification |
| 206 | Concrete Pavement for Coal Storage Yards<br>Sections No. 1 and 2<br>Addendum No. 1 |
| 207 | Bulkhead, Ramp, Mooring Piles & Derrick Foundations<br>Sections Nos. 1 to 3 inclusive |
| 300 | Clearing of Site Regimental Areas 1 to 4 incl.<br>Main Specification Sec. 1 to 4 inclusive |
| 301 | Supplying & Planting Trees, Shrubs, Lawns, etc.<br>Main Specification Sec. 1 to 10 incl.<br>Addendum No. 1 |
| 400 | Construction and Materials (Sewers)<br>Main Specification<br>Addenda Nos. 1 to 4 inclusive |
| 401 | Sewage Pumping Station #1<br>Advance Specification "A"<br>Addenda 1 and 2 (Advance Spec. A)<br>Main Specification<br>Sections 30, 31, & 32<br>Addenda Nos. 1 and 2 |
| 402 | Sewage Treatment Plant<br>Advance Specification "C"<br>Addendum No. 1 (Adv. Spec. C)<br>Advance Specification "D"<br>Addendum No. 1 (Adv. Spec. D)<br>Main Specification<br>Addenda Nos. 1 and 2<br>Sections Nos. 16, 18, 19, 20, 24, 25, 26, & 27 |
| 403 | Sewage Pumping Station No. 3<br>Sections Nos. 1 to 13 incl. and Sec. 15<br>Addenda Nos. 1 and 2<br>Advance Specification "A"<br>Addendum No. 1 (Adv. Spec. A) |
| 404 | Sewage Pumping Equipment Sewage Pumping Station No. 4, River Road, 1200' Southeast of Charles St.<br>Main Specification (Sec. 14 & 15 not included)<br>Addenda Nos. 1, 2, & 3 |

| SPEC. NO. | TITLE |
|---|---|
| | Section EL<br>Advance Specification "A"<br>Addenda Nos. 1 & 2 (Adv. Spec. A) |
| 405 | Sewage Pumping Equipment Autumn Oval Sewage Pumping Station # 5<br>Advance Specification "A"<br>Sections Nos. 1 to 12 incl. and Sec. 13<br>Addendum No. 1 |
| 406 | Sewage Pumping Equipment, Hospital Area Sewage Pumping Station No. 2<br>Advance Specification "A"<br>Addendum No. 1 (Adv. Spec. A)<br>Sections Nos. 1 to 12 inclusive<br>Section El (14)<br>Addendum No. 1 |
| 407 | Specification for Barrage Balloon Battalion Sewage Pumping Station # 7<br>Advance Specification "A"<br>Sections Nos. 1 to 11 incl. and Sec. 12 |
| 408 | Rifle Range - Sewage Treatment Plant<br>Sections 1 to 12 inclusive |
| 409 | Laboratory Supplies & Equipment for Water and Sewage Analyses, Main Laboratory, Sewage Treatment Plant<br>Main Specification |
| 410 | Sewage Treatment Plant - Amphibian Base and Barrage Balloon Battalion<br>Sections 1 to 12 inclusive |
| 411 | Parachute Tower Area, Sewage Pumping Station<br>Advance Specification "A"<br>Sections 1 to 11 inclusive |
| 500 | Elevated Water Storage Tank<br>Architectural Specification<br>Addendum No. 1<br>Water Specification |
| 501 | Water Distribution System<br>Main Specification - Well Pump<br>Construction & Material<br>Addendum No. 1 |
| 502 | Water Pumping Equipment<br>Advance Specification "A"<br>Addenda Nos. 1 and 2 |

[illegible]

Ordnance Specification [illegible]

[illegible]

[illegible]

Ordnance Specification [illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

| SPEC. NO. | TITLE |
|---|---|
| | Advance Specification B |
| | Addendum No. 1 |
| | Advance Specification D, E & F |
| | Main Specification, Sections 1 to 12 incl. |
| | Sections 30-A and 30-B |
| | Section H |
| | Sections 13 to 20 incl. & Sections 22, 23, 24, 26, & 27 |
| | Sections 31 to 45 inclusive, & Sec. Plumbing |
| | Addendum No. 3 |
| | Advance Spec. C |
| | Add. 1 (Adv. Spec. C) |
| | Section E |
| 503 | Well Pumps - Materials & Installation |
| | Main Specification |
| 504 | Well Pumps - Nos. 2, 7 R.T.U.V. |
| | Main Specification |
| | Addenda Nos. 1 to 5 inclusive |
| 505 | Chlorination Equipment for Sterilization of Well Supplies |
| | Main Specification |
| | Addenda Nos. 1 and 2 |
| 506 | Well Pump - White Cemetery |
| | Main Specification |
| 507 | Water Level Controllers for Well Pumps |
| | Main Specification |
| | Addendum No. 1 |
| 508 | Water Pumping Equipment, Emergency Pumping Station |
| | Advance Specification A |
| 509 | Equipment for Carrier-Current Well Controls |
| | Section E |
| | Addendum No. 1 |
| 600 | Bachelor Officers' Quarters Boiler Spec. |
| | Sections Nos. 1 to 12 inclusive |
| | Addendum No. 1 |
| 601 | Liquified Gas Storage & Distribution System |
| | Sections Nos. 1 to 3 inclusive |
| 603 | Gas & Fuel Oil Tanks for D.T.A., Amphibian Base, Rifle Range, T. C. #2, etc. |
| | Sections Nos. 4 and 5 |
| | Addenda Nos. 1 to 7 inclusive |
| | Sections 1 to 3 inclusive |

| SPEC. NO. | TITLE |
|---|---|
| 604 | Steam Distribution - Division Training Area, Post Troops Area, Fifth Regimental Area, and Extension Steam Distribution<br>Main Specification<br>Addendum No. 1 |
| 605 | Parachute Landing Field - Gasoline Distribution<br>Section No. 1 and Section E<br>Addenda Nos. 1 and 2 |
| 606 | Mechanical Equipment for Amphibian Shops<br>Main Specification<br>Addenda Nos. 1 and 2 |
| 607 | Steam Distribution - Amphibian Base & Rifle Range<br>Section S |
| 608 | Steam Distribution - Naval Hospital<br>Main Specification |
| 700 | Electrical Distribution<br>Sections Nos. 1 to 4 inclusive and Sec. 5<br>Addenda Nos. 1 to 7 inclusive |
| 701 | Telephone Communication System<br>Part I, Revised - Sec. 1 to 3 inclusive<br>Revised (Sec. 1 to 3 incl.)<br>Addenda Nos. 1 and 2<br>Part II<br>Addendum No. 1 (Part 2) |
| 702 | Obstruction Light on Parachute Tower<br>Section No. 1<br>Section No. 28 (Void)<br>Addendum No. 1 |
| 703 | Parachute Troops Landing Field - Electrical Power and Lighting<br>Section No. 2 |
| 704 | Equipment Specification for Transformer Substations - Naval Hospital Administration Building, Mess Hall, Wards and Corridors.<br>Section E<br>Part 1 and Part 2<br>Part 3 and Part 5<br>Addenda Nos. 1 (Part 4) and 2 |
| 705 | Private Branch Exchange Switchboard<br>Section No. 1 |

| SPEC. NO. | TITLE |
|---|---|
| 707 | Automatic Telephone System - Main Tent Area<br>Sections Nos. 1 and 2 |
| 708 | Street Lighting - Officers Quarters Area<br>Section No. 1 |
| 800 | Open Shed Warehouses - 2<br>Sections Nos. 1 to 9 inclusive |
| 801 | Barracks B-Modified<br>Sections Nos. 1 to 25 inclusive<br>Addenda Nos. 1 to 34 inclusive |
| 802 | Battalion Warehouses<br>Sections Nos. 1 to 13 inclusive and Sec. 14<br>Addenda Nos. 1 to 4 inclusive |
| 803 | Warehouses 360' x 180'<br>Sections Nos. 1 to 21 inclusive<br>Addenda Nos. 1 and 2<br>Addendum No. 3 (Void)<br>Addenda Nos. 4 to 18 inclusive<br>Section Heating |
| 804 | Mess Hall<br>Sections Nos. 1 to 21 inclusive and Sections 22, 23, 24, & 25<br>Addenda Nos. 1 to 11 inclusive<br>Addenda Nos. 13 to 20 inclusive |
| 805 | Firehouse<br>Sections Nos. 1 to 25 inclusive<br>Addenda 1 to 17 inclusive |
| 806 | Commissary<br>Sections Nos. 1 to 18 inclusive and Sections 19, 20, 21, & 22<br>Addenda Nos. 1 to 8 inclusive |
| 807 | Infirmary<br>Sections Nos. 1 to 25 inclusive and Sec. 26<br>Addenda Nos. 1 to 22 inclusive |
| 808 | Post Exchange<br>Sections Nos. 1 to 21 inclusive<br>Addenda 1 to 20 inclusive |
| 809 | Division Training Area - Theatre<br>Sections Nos. 1 to 27 inclusive, except 24, 25, & 26<br>Sections Nos. 24, 25, & 26<br>Addenda Nos. 1 to 12 inclusive |

| SPEC. NO. | TITLE |
|---|---|
| 810-1 | Central Steam Heating Plant Boiler<br>Sections Nos. 1 to 15 inclusive |
| 810-2 | Boiler Feed Pumps for Central Heating Plant<br>Sections Nos. 1 to 3 inclusive |
| 810-3 | Boiler Feed Water Regulators for C.H.P.<br>Sections Nos. 1 to 3 inclusive |
| 810-4 | Stacks, Breeches & Ducts - C.H.P.<br>Sections Nos. 1 to 4 inclusive<br>Addendum No. 1 |
| 810-5 | Coal Handling Equipment - C.H.P.<br>Sections Nos. 1 to 8 inclusive<br>Addendum No. 1 |
| 810-6 | Central Heating Plant Burner Equipment (Fuel Oil)<br>Sections Nos. 1 to 4 inclusive<br>Addendum No. 1 |
| 810-7 | Central Heating Plant - Steam Pneumatic Ash Conveyor System<br>Sections Nos. 1 to 6 inclusive |
| 810-8 | Deaerating Taps Feed Water Heaters - C.H.P.<br>Sections Nos. 1 to 4 inclusive |
| 810-9 | Water Softners - C.H.P.<br>Sections 1 to 4 inclusive |
| 810-10 | Surge, Condensate & Boiler Blow Off Tank<br>Sections Nos. 1 to 3 inclusive |
| 810-11 | Combustion Control Equipment - C.H.P<br>Sections Nos. 1 to 6 inclusive |
| 810-12 | Unit Substation, Low Voltage Switch Gear and Control Panels - C.H.P.<br>Section No. 1<br>Addenda Nos. 1 to 3 inclusive |
| 810-13 | Sump Pump - C.H.P.<br>Sections Nos. 1 to 3 inclusive<br>Addendum No. 1 |
| 810-14 | Air Compressor - C.H.P.<br>Sections Nos. 1 to 4 inclusive |
| 810-15 | Plumbing<br>Section P<br>Addendum No. 1 |

| SPEC. NO. | TITLE |
|---|---|
| 810-16 | Condensate Pumps and Receiver for C.H.P.<br>Sections Nos. 1 to 3 inclusive |
| 810-17 | Piping, Including Valves, Fittings, & Accessories for C. H. P.<br>Sections Nos. 1 to 3 inclusive |
| 810-18 | Insulation and Painting of Piping, Ducts, Breechings and Stacks for the Central Heating Plant<br>Sections Nos. 1 to 4 inclusive |
| 810-19 | Continuous Blow-Off System for Central Heating Plant - D. T. A.<br>Sections Nos. 1 to 3 inclusive |
| 810-20 | Two Ton Chain Hoist and Trolley for C.H.P. - D.T.A.<br>Main Specification |
| 811 | Guest House<br>Sections Nos. 1 to 16 inclusive and Sections 17, 18, & 19<br>Addenda Nos. 1 to 9 inclusive |
| 812 | Quarter's Building - B.O.Q. - Wood Preservative Treatment<br>Section No. 1 |
| 813 | Quarters Building - B.O.Q.<br>Sections Nos. 1 to 19 inclusive and Sections 20, 21 and 22<br>Addenda Nos. 1 to 13 inclusive |
| 814 | Mess Hall - B.O.Q. and Officers Recreation Bldg.<br>Wall Sheathing<br>Sections P, R1, E, and EE<br>Sections Nos. 1 to 23 inclusive<br>Sections V, H, and BP<br>Addenda Nos. 1 to 9 inclusive |
| 815 | Laundry Building<br>Sections Nos. 1 to 25 incl, except 21, 22, & 23<br>Sections Nos. 21A, 21B, 22 (Plumbing), 23, 24, and 25<br>Addenda Nos. 1 to 3 inclusive<br>Addenda Nos. 5 to 9 inclusive |
| 816 | Post Headquarters<br>Sections Nos. 1 to 29 inclusive and 34<br>Sections Nos. 30, 31, 32, 33, 35, & 36<br>Section Ventilation and Sec. Radio Towers<br>Addenda Nos. 1 to 5 inclusive |

| SPEC. NO. | TITLE |
|---|---|
| 817 | Division Headquarters Building<br>Sections Nos. 1 to 28 inclusive and 32<br>Sections Nos. 29, 30, 31, & 33<br>Addenda Nos. 1, 2, 4, 5, & 6 |
| 818 | Naval Hospital - Medical Storehouse<br>Sections Nos. 1 to 25 inclusive<br>Sections P, H, E, & R (28)<br>Addenda Nos. 1 to 6 inclusive |
| 819 | Naval Hospital - Shops and Warehouse<br>Sections Nos. 1 to 24 inclusive and 25<br>Sections H and P<br>Section No. 28<br>Addenda Nos. 1, 2, 4, 6, 7, & 8 |
| 820 | Officers' Quarters<br>Sections Nos. 1 to 16 inclusive and 20<br>Sections Nos. 17, 18, 19 & 19A<br>Addenda Nos. 1 to 3 inclusive<br>Addenda Nos. 5 to 17 inclusive |
| 821 | Radio Facilities, Tower<br>Sections Nos. 1 to 4 inclusive<br>Addenda Nos. 1 and 2 |
| 822 | Brig<br>Sections Nos. 1 to 23 inclusive and Sections 24, 25, & 26<br>Addenda Nos. 1 to 4 inclusive<br>Addenda Nos. 6, 8, & 9 |
| 823 | Incinerator<br>Sections Nos. 1 to 10 inclusive and Sections 11, 12, 13A, & 13B<br>Addenda Nos. 1 to 5 inclusive |
| 824 | Heating Plant - Structural Steel Specification - Sections Nos. 1, 8, 9, & 25<br>Sections 1 to 22 inclusive<br>Sections Nos. 1 & 2 (Interior Elect. Work)<br>Addendum No. 1 |
| 825 | Cold Storage Plant<br>Sections Nos. 1 to 20 inclusive<br>Sections Nos. 21A, 21B, 22, 23, & 24<br>Addenda Nos. 1 to 7 inclusive |
| 826 | Building Under Parachute Tower<br>Sections Nos. 1 to 22 inclusive and Sec. P<br>Addendum No. 1 |

| SPEC. NO. | TITLE |
|---|---|
| 827 | Rifle Range - Butts, Targets, Firing Points<br>Sections Nos. 1 to 8 inclusive |
| 828 | Radio Transmitter Building<br>Sections Nos. 1 to 18 incl. and Sec. 22<br>Sections Nos. 19, 20, & 21 (Heating)<br>Addendum No. 2 |
| 829 | Battalion & Regimental Headquarters Building<br>Sections Nos. 1 to 22 incl. & Sec. 26<br>Sections Nos. 23, 24, and 25<br>Addenda Nos. 1 to 6 inclusive |
| 830 | Naval Hospital Garage<br>Sections Nos. 1 to 22 inclusive and Sections 23, 26, P, and H<br>Addenda Nos. 1 to 5 inclusive |
| 832 | Operation Building - Parachute Landing Field<br>Sections Nos. 1 to 18 inclusive and Sections Nos. 19, 20, and 21<br>Addenda Nos. 1 to 3 inclusive |
| 833 | Naval Hospital - Administration Building and Mess Hall, Naval Hospital - Wards & Corridors<br>Sections E5, E2, EQ, Air Conditioning, H, E, P, E4, and E3.<br>Sections Nos. 1 to 34 inclusive<br>Part II (Galley Equipment)<br>Sections Nos. 35 and 36<br>Part 6<br>Sections R1, EA (Elect. Appliances), V (Wards & Corridors), V (Adm. Building).<br>Sections Nos. 37 to 43 inclusive and Sections Nos. 44, 45, 46, 47, 48, and 49.<br>Spec. for Mess Hall - V.<br>Section SEQ<br>Addenda Nos. 3 to 19 inclusive<br>Addenda Nos. 21 to 47 inclusive |
| 835 | Post Dispensary - (Division Infirmary, Dental Clinic & Sick Bay & Out-Patient Clinic)<br>Sections Ventilation, AC, H, P, E, and SEQ<br>Sections Nos. 1 to 22 inclusive<br>Addenda Nos. 1 to 6 inclusive |
| 836 | 30 - Ton Derrick Amphibian Base<br>Section No. 6 |
| 837 | Chapels - Protestant & Catholic<br>Sections 1 to 20 inclusive<br>Sections P, H, and 18<br>Addenda Nos. 1 and 2 |

| SPEC. NO. | TITLE |
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| 838 | Naval Hospital - Purchase X-Ray Equipment<br>Main Specification<br>Addenda Nos. 1 and 2 |
| 839 | Naval Hospital - Corpsmen's Barracks<br>Sections P, H, and E<br>Sections Nos. 1 to 22 inclusive and Sec. 23<br>Addenda Nos. 1 to 4 inclusive |
| 840 | Amphibian Storehouse<br>Section No. 1 |
| 841 | Range House - Rifle Range Toilets - Target Shed for Rifle Range<br>Sections Nos. 1 to 16 inclusive<br>Section P<br>Addendum No. 1 |
| 842 | Armory & Office Building - Rifle Range<br>Section P, E, and H<br>Sections Nos. 1 to 22 inclusive |
| 843 | Naval Hospital - Warrant Officers' Quarters<br>Sections P, E, and H<br>Sections Nos. 1 to 16 inclusive<br>Addenda Nos. 1, 2, and 4 |
| 844 | Naval Hospital - Nurses' Home<br>Sections Nos. 1 to 25 inclusive and Sec. H<br>Addendum No. 1<br>Sections P, E, V, and R1<br>Galley Equipment<br>Sections 26 and LE<br>Addenda Nos. 2 to 5 inclusive |
| 845 | Naval Hospital - Family Hospital Nurses' Qtrs.<br>Sections E, H (Division Training Area), H (Naval Hospital), and P<br>Sections Nos. 1 to 16 inclusive and Sec. 17<br>Addenda Nos. 1 to 4 inclusive |
| 846 | Naval Hospital - Laundry<br>Sections WS, EQ, P, H, and E<br>Sections Nos. 1 to 19 inclusive<br>Addenda Nos. 1 to 8 inclusive |
| 847 | Field Painting for 2 Obaervation Towers<br>Section No. 1 |
| 848 | Magazines<br>Section No. 4 |

| SPEC. NO. | TITLE |
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| 849 | Regimental Service Clubs<br>Sections H, P, and E<br>Sections Nos. 1 to 25 inclusive<br>Addenda Nos. 1 to 5 inclusive |
| 850 | Gate House<br>Sections P, H, and E<br>Sections Nos. 1 to 19 inclusive<br>Addenda Nos. 1 and 2 |
| 852 | Amphibian Machine Shop and Carpenter Shop (2 Buildings)<br>Sections Nos. 1 to 19 inclusive and Sections El, P, H, and C<br>Addendum No. 1 |
| 853 | Reclamation Building<br>Sections Nos. 1 to 20 inclusive<br>Sections P, H, and E<br>Addendum No. 1 |
| 854 | Post Shop Building<br>Sections Nos. 1 to 26 inclusive<br>Sections H, P, and E<br>Addenda Nos. 1 to 4 inclusive |
| 855 | Building for Propane Gas<br>Sections Nos. 1 to 12 inclusive and Sec. 13 |
| 856 | Naval Hospital - Power Plant<br>Sections Nos. 1 to 16 inclusive<br>Sections P, E, and BP<br>Addenda Nos. 1 and 2 |
| 857 | Rifle Range - Boiler House<br>Sections Nos. 1 to 14 inclusive<br>Sections E, P, and BP<br>Addendum No. 1 |
| 859 | Post Tailor & Cobbler Shop<br>Sections Nos. 1 to 17 inclusive<br>Sections P and H |
| 860 | Bakery<br>Sections Nos. 1 to 21 inclusive<br>Sections H, P, E, and Rl<br>Addenda Nos. 1 to 3 inclusive |
| 861 | Mockup<br>Stiff-Leg Derricks |
| 862 | Naval Hospital - Officers' Quarters<br>Sections Nos. 1 to 16 inclusive |

| SPEC. NO. | TITLE |
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| 863 | Hostess House<br>Sections Nos. 1 to 19 inclusive<br>Sections P, H, E-1, and Galley Equipment<br>Addenda Nos. 1 to 3 inclusive |
| 864 | Fountain & Refreshment Equipment for Post Exchanges, Regimental Service Clubs, Hostess House, and Naval Hospital Administration Building.<br>Sections Nos. 1 to 7 inclusive |
| 866 | Furniture and Rug Specification (for Bldgs. listed)<br>Sections Nos. 1 to 8 inclusive<br>Addenda Nos. 1 and 2 |
| 867 | Garage & Repair Shop - D.T.A.<br>Sections 1 to 20 inclusive<br>Sections H, P, and E<br>Addendum No. 1 |
| 868 | Naval Hospital - Equipment for Electro-Therapy Treatment, Apparatus Naval Hospital Administration Building and Mess Hall in D. T. A.<br>Section E1<br>Addendum No. 1 |
| 869 | Ecclesiastical Furnishings for 2 Chapels<br>Sections Nos. 1 to 4 inclusive |
| 870 | Void. |
| 871 | Bachelor Officers' Quarters - Servants' Quarters<br>Sections Nos. 1 to 15 inclusive<br>Section H and P<br>Addendum No. 1 |
| 872 | Naval Hospital - Servants' Quarters<br>Sections Nos. 1 to 16 inclusive<br>Sections P, H, and 17<br>Addendum No. 1 |
| 873 | Painting - Parachute Towers<br>Section No. 1<br>Addenda Nos. 1 and 2 |
| 875 | Naval Hospital - B.O.Q.<br>Sections P, Galley Refrigerations, Galley Equipment List, E, Galley Equipment, H, and<br>Sections Nos. 1 to 22 inclusive and Sec. [illegible]<br>Addenda Nos. 1 to 5 inclusive |

| SPEC. NO. | TITLE |
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| 876 | Bowling Alleys and Bleacher Seats for (5) Regimental Service Clubs<br>Sections Nos. 1 to 4 inclusive (Void) |
| 877 | Balloon Storehouse and Shop<br>Sections Nos. 1 to 15 inclusive and Sec. E |
| 880 | Post Theater<br>Sections SE-1 to SE-3 inclusive<br>Sections ES and E<br>Sections Nos. 1 to 21 inclusive<br>Section Plumbing<br>Addenda Nos. 1 to 4 inclusive |
| 881 | Buildings at Barrage Balloon Training School<br>Section E, H, and P<br>Boiler House<br>Addendum No. 1 |
| 882 | Equipment for 3 Recreation Buildings Type (R-2)<br>Sections Nos. 1 to 6 inclusive<br>Section EE |
| 883 | Post Exchange Warehouses<br>Sections H, E, and P<br>Sections Nos. 1 to 18 inclusive<br>Addendum No. 1 |
| 884 | Lumber Storage Sheds<br>Sections Nos. 1 to 7 inclusive |
| 885 | Parachute Training Building and Parachute Building<br>Sections Nos. 1 to 5 inclusive<br>Sections P and E<br>Addenda Nos. 1 to 4 inclusive<br>Section Heating<br>Sections Nos. 1 to 14 inclusive |
| 887 | Transformer House at Landing Field<br>Sections Nos. 1 to 9 inclusive |
| 888 | Transformer Houses at Naval Hospital<br>Sections Nos. 1 to 9 inclusive |
| 889 | Architectural Bldg. Work, Well Pump Houses<br>Sections Nos. 1 to 11 inclusive |
| 890 | Equipment Specification for Radiographic & X-Ray apparatus for Family Hospital<br>Sections EX and R<br>Part I & II |

| SPEC. NO. | TITLE |
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| | Sections Heating, E, Plumbing, and SEQ<br>Sections Nos. 1 to 24 inclusive<br>Part I Heating - Part II Ventilation<br>Addenda Nos. 1 to 7 inclusive |
| 891 | Service Station at Post Exchange<br>Sections Nos. 1 to 14 inclusive<br>Section Plumbing and Electrical |
| 892 | Boat House - W. Creek Boat Basin<br>Plumbing<br>Sections Nos. 1 to 10 inclusive<br>Addendum No. 1 |
| 893 | Scale House at Central Heating Plant<br>Sections Nos. 1 to 11 inclusive and Sec. E |
| 894 | Pistol Range Target Houses<br>Sections Nos. 1 to 9 inclusive |
| 895 | Building Under Parachute Tower<br>Sections Nos. 1 to 19 inclusive |
| 896 | Amphibian Base - Drill and Recreation Building<br>Sections Nos. 1 to 21 inclusive<br>Addendum No. 1 |
| 994 | Pier and Marine Railroad for Small Boat Basin at Wallace Creek<br>Main Specification |
| 995 | Bulkhead, Ramp and Breakwater at the Glider Training Base<br>Main Specification (Sections Nos. 1 to 19 incl.)<br>Addendum No. 1 |
| 996 | General Specification for Ponton Bridge Across Inland Waterway<br>Ponton Bridge Across Inland Waterway<br>Piping |
| 997 | Pile Foundations<br>Sections Nos. 1 and 2 |
| 998 | Timber Pile Foundations, D.T.A. & Industrial - Supply Area<br>Main Specification |
| 999 | Strip Steel Framing Joists, etc.<br>Sections Nos. 1 to 3 inclusive |
| 1000 | Specification for the Preparation of Record Drawings |

| SPEC. NO. | TITLE |
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| | Main Specification<br>Addendum No. 1 |
| Spec. El | Elevators for Administration Building, Wards, Corridors, and Post Dispensary<br>Main Specification |