

ARMY PEARL HARBOR BOARD EXHIBIT No. 4G

Summary

WAR DEPARTMENT

UNITED STATES ENGINEER OFFICE

Honolulu, T. H.

Contract W414-eng-602

Wheeler Field (Oahu, T. H.).

Job Order #5.0 Feb. 24, 1941.

Construct three reinforced concrete bombproof ammunition storage structures, of 30,000 cubic feet capacity each, with appurtenant work and access roads. Est. Cost \$1,847,000.00.

Commencement date: Feb. 24, 1941.

Est. date for completion: Sept. 1, 1941.

Supervision by John J. Kestly, Area Engr., 3rd Field Area.

Work Authorized by Job Order No. 5.0, Addenda #3 to #7 inclusive:

(a) Construction of six (6) each 30,000 cubic feet capacity bombproof magazines, complete with all necessary utilities and fixtures.

(b) Construction of three (3) each 10,000 cubic feet capacity bombproof magazines, complete with all necessary utilities and fixtures.

(c) Construction of six (6) each 5,000 cubic feet capacity bombproof magazines, complete with all necessary utilities and fixtures.

(d) Construction of all necessary connecting and access roads, complete with paving, culverts, headwalls, and ripped ditches.

(e) Construction and installation of electrical distribution system for magazines.

(f) The installation of all necessary construction plant, equipment, buildings, and facilities to carry out the construction program.

Work is to be performed under Contract No. W-414-eng-602 (1-A. Ammunition Storage Magazines.)

Est. Cost—\$1,083,473 Addenda 3 to 7 incl.

No date for completion given.

WAR DEPARTMENT,
UNITED STATES ENGINEER OFFICE,
Honolulu, T. H., February 24, 1941.

WORK ORDER NO. 5.0.

Contract No. W-414-eng-602.

To: Hawaiian Constructors, Honolulu, T. H.

You are hereby directed to proceed with the following work:

1. PROJECT TITLE: Bomb Proof Ammunition Storage, Wheeler Field, T. H.
2. LOCATION: Wheeler Field, Oahu, T. H.
3. OFFICE FILE REFERENCE: 400.1
4. WORK TO BE DONE: Construct and complete reinforced concrete bombproof ammunition storage structures together with their appurtenant work and all necessary connecting and access roads, as specified in Schedule "A" attached hereto.
5. WORK REQUESTED BY: Commanding General—Hawaiian Department.
6. DRAWINGS AND REFERENCES: As enumerated (See para. 1-03 attached specifications.)
7. APPROPRIATION CHARGEABLE: Seacoast Defenses, Eng 306 P 99 A1204-N.
8. ESTIMATED COST: \$1,847,000.00
9. COMMENCEMENT DATE: February 24, 1941.
10. ESTIMATED DATE FOR COMPLETION: September 1, 1941.
11. ESTIMATED LABOR AT SITE: 375,590 man hours.
12. PLANT REQUIRED: See detailed estimate attached.
13. MATERIALS: See detailed estimate attached.
14. SUPERVISION BY: John J. Kestly, Area Engineer, Third Field Area.

THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

Approved:

Corps of Engineers, Division Engineer.

SECRET DOCUMENT

To Accompany Work Order No. 5.0

Contract No. W-414-eng-602

ESTIMATE OF COST: Bomb Proof Ammunition Storage, Wheeler Field, T. H.
 DISTRICT: Honolulu District, Honolulu, T. H.

The work to be done is at Wheeler Field, on the Island of Oahu, T. H. The work includes the furnishing of all necessary labor, equipment, materials and supplies, and the performing of all work necessary to construct reinforced concrete bombproof magazine structures complete with all necessary utilities and fixtures, together with necessary connecting and access roads, complete with 2½" concrete bituminous pavement, culverts, headwalls, and riprapped ditches, for ingress and egress to magazine structures.

1. Materials to be Furnished:

Item	Designation	Quantity	Unit	Unit	To complete 330,000 cu. ft.
					<i>Amount</i>
1	Reinforcing Steel.....	6,000,000	lbs	\$0.045	\$270,000.00
2	Structural Steel.....	100,000	lbs	0.20	20,000.00
3	Steel Water Stops.....	37,000	lbs	0.10	3,700.00
4	Copper Water Stops.....	1,700	lbs	0.15	255.00
5	4" Tile Drain.....	6,500	lin. ft	0.20	1,300.00
6	Cement.....	60,690	bbl	3.04	184,497.60
7	Fine Aggregate.....	20,880	cu. yd	2.70	56,376.00
8	Coarse Aggregate.....	30,900	cu. yd	3.00	92,700.00
9	30" Reinforced Concrete Culvert Pipe.....	100	lin. ft	4.10	410.00
10	24" Reinforced Concrete Culvert Pipe.....	200	lin. ft	2.90	580.00
11	18" Reinforced Concrete Culvert Pipe.....	200	lin. ft	2.20	440.00
12	12" Reinforced Concrete Culvert Pipe.....	450	lin. ft	1.15	517.50
13	Rip-rap stone.....	2,050	ton	3.00	6,150.00
14	Lumber.....	350	M	45.00	17,750.00
15	Nails, Bolts, Wires.....	10,000	lbs	0.08	800.00
16	Electrical wires, conduits and fixtures (lump sum).....				11,000.00
17	Paint.....	140	gals	2.75	385.00
18	Dynamite.....	10,000	lbs	0.125	1,250.00
19	Hardware.....	2,000	lbs	0.75	1,500.00
20	Asphalt Concrete.....	3,750	tons	6.00	22,500.00
21	Rock Surfacing.....	4,400	cu. yd	2.70	11,880.00
22	3" Galv. Iron Pipe.....	8,000	ft	0.54	4,320.00
23	2" Galv. Iron Pipe.....	10,000	ft	0.26	2,600.00
24	1" Galv. Iron Pipe.....	2,000	ft	0.12	240.00
	Total Cost of Materials.....				710,951.10

2. Day Labor:

	To complete 330,000 cu. ft.	Amount
(a) <i>Clearing and Grubbing:</i>		
800 man hours.....	@ \$1.50	\$1,200.00
1,600 man hours.....	@ 1.00	1,600.00
4,000 man hours.....	@ 0.50	2,000.00
(b) <i>Hauling and Handling Materials:</i>		
1,200 man hours.....	@ 1.50	1,800.00
12,000 man hours.....	@ 0.75	9,000.00
12,000 man hours.....	@ 0.50	6,000.00
(c) <i>Excavation and Backfill Structures:</i>		
7,200 man hours.....	@ 1.50	10,800.00
7,200 man hours.....	@ 1.00	7,200.00
7,200 man hours.....	@ 0.65	4,680.00
43,200 man hours.....	@ 0.50	21,600.00
(d) <i>Road Excavation and Backfill:</i>		
400 man hours.....	@ 1.50	600.00
1,600 man hours.....	@ 1.00	1,600.00
4,000 man hours.....	@ 0.75	3,000.00
4,000 man hours.....	@ 0.50	2,000.00
(e) <i>Culverts:</i>		
120 man hours.....	@ 1.50	180.00
580 man hours.....	@ 1.00	580.00
1,000 man hours.....	@ 0.65	650.00
1,000 man hours.....	@ 0.50	500.00

	To complete 330,000 cu. ft.	Amount
(f) <i>Placing Bituminous Concrete Roads:</i>		
1,200 man hours-----	@ \$1.50	\$1,800.00
1,800 man hours-----	@ 0.75	1,350.00
8,200 man hours-----	@ 0.50	4,100.00
(g) <i>Placing Reinforcing Steel Structures and Burst Course:</i>		
900 man hours-----	@ 1.50	1,350.00
20,000 man hours-----	@ 0.75	15,000.00
20,000 man hours-----	@ 0.50	10,000.00
(h) <i>Mixing, placing, curing concrete in Structures and Burst Course:</i>		
3,600 man hours-----	@ 1.50	5,400.00
30,000 man hours-----	@ 1.00	30,000.00
120,000 man hours-----	@ 0.50	60,000.00
(i) <i>Riprap and Drainage:</i>		
480 man hours-----	@ 1.50	720.00
2,000 man hours-----	@ 0.75	1,500.00
3,500 man hours-----	@ 0.50	1,750.00
(j) <i>Placing Tile Drain:</i>		
100 man hours-----	@ 1.50	150.00
100 man hours-----	@ 1.00	100.00
400 man hours-----	@ 0.50	200.00
(k) <i>Electrical Installation:</i>		
720 man hours-----	@ 1.50	1,080.00
720 man hours-----	@ 1.00	720.00
720 man hours-----	@ 0.65	468.00
(l) <i>Concrete Forms—Framing, Erecting, Stripping:</i>		
1,800 man hours-----	@ 1.50	2,700.00
8,000 man hours-----	@ 1.00	8,000.00
10,000 man hours-----	@ 0.65	6,500.00
(m) <i>Placing Structural Steel:</i>		
150 man hours-----	@ 1.50	225.00
300 man hours-----	@ 1.25	375.00
300 man hours-----	@ 0.75	225.00
(a) <i>Painting:</i>		
100 man hours-----	@ \$1.50	150.00
100 man hours-----	@ 1.00	100.00
100 man hours-----	@ 0.65	65.00
(b) <i>Maintenance, Crew, Warehouseman, etc.:</i>		
1,400 man hours-----	@ \$1.50	2,100.00
10,000 man hours-----	@ 1.00	10,000.00
10,000 man hours-----	@ 0.65	6,500.00
10,000 man hours-----	@ 0.50	5,000.00
Total Cost of Day Labor-----		252,618.00

3. *Plant Rental:*(a) *Plant to be Leased:*

2 2½ yd. Shovels-----	7 mo. @	\$3,115.00	\$43,610.00
3 Caterpillar dozers-----	7 mo. @	\$69.00	18,249.00
1 Grader-----	7 mo. @	558.00	3,906.00
1 Roller, with tractor-----	7 mo. @	806.00	5,642.00
2 Compressors-----	7 mo. @	695.00	9,730.00
6 5 yd. Dump Trucks-----	7 mo. @	407.00	17,094.00
6 9 yd. Dump Trucks-----	7 mo. @	584.00	24,528.00
1 Batching Plant-----	7 mo. @	653.00	4,571.00
2 ¾ yd. Shovels-----	7 mo. @	1,174.00	16,436.00
3 Tractor w/trailer-----	7 mo. @	281.00	5,901.00
1 Sterling Truck and Trailer-----	7 mo. @	1,521.00	10,647.00
1 Welding Machine-----	7 mo. @	93.00	651.00
4 ¾ ton Pick-up Trucks-----	7 mo. @	69.00	1,932.00
4 Sedans, Ford-----	7 mo. @	76.00	2,128.00
4 Coupes, Ford-----	7 mo. @	70.00	1,960.00
1 Rubber-tired 1 sk. mixer-----	7 mo. @	113.00	791.00
1 Concrete Placing Outfit, 7 cu. ft.-----	7 mo. @	168.00	1,176.00
1 AD4 Auto Crane-----	7 mo. @	942.00	6,594.00
1 2 Drum Hoist-----	7 mo. @	281.00	1,967.00
2 16" Radial Saws-----	7 mo. @	81.00	1,134.00
1 Jointer-----	7 mo. @	33.00	231.00
1 Threading Machine-----	7 mo. @	48.00	336.00

3. *Plant Rental*—Continued.

(a) *Plant to be Leased*—Continued.

	<i>To complete 330,000 cu. ft.</i>	<i>Amount</i>
1 Bar Shear-----	7 mo. @ \$109.00	\$763.00
1 Bar Bender-----	7 mo. @ 72.00	504.00
1 250' x 30'' Inclined Conveyor-----	7 mo. @ 690.00	4,830.00
1 200' x 30'' Horizontal Conveyor-----	7 mo. @ 430.00	3,010.00
1 2 yd. Concrete Bucket-----	7 mo. @ 33.00	231.00
1 1 yd. Concrete Bucket-----	7 mo. @ 24.00	168.00
2 Wagon Drill Rigs-----	7 mo. @ 50.00	700.00
2 1 cu. yd. Multifoot Pavers-----	7 mo. @ 837.00	11,718.00
Total Plant to be Leased-----		201,138.00
(b) Fuel, Oil, Small Tools & Supplies-----		15,000.00
(c) Temporary Buildings—Storage-----		5,000.00
Total Cost Leased Plant and Supplies-----		221,138.00

4. *Total Plant Operation Cost to Jobs*

Cost of Materials-----	\$710,951.10
Cost of Day Labor-----	252,618.00
Plant Rental-----	221,138.00

Total Plant Operation Cost----- \$1,184,707.10

5. *Total Cost of Work.*

(a) *Direct Cost.*

Total plant operation cost-----	\$1,184,707.10
Contingencies—15%-----	177,706.06

Total Direct Cost----- \$1,362,413.16

(b) *Indirect Cost.*

Mobilization and Demobilization-----	\$135,000.00
Surveys, inspection, supervision—10%-----	136,241.31

Total Indirect Cost----- 271,241.31

Total Field Cost to Job----- 1,633,654.47

General Office Overhead—8%----- 146,475.62

Buildings, camp, survey, covered by previous Work
Orders----- 66,869.91

Estimated Grand Total Cost by hired labor and
government plant----- 1,847,000.00

THEODORE WYMAN, Jr.,
Lt. Col., Corps of Engineers,
District Engineer.

UNSKILLED LABOR

Class 1—\$0.50 per hour:

Shovelers
Concrete placers
Slopers—roadway
Material handlers
Water boy

Class 2—\$0.65 per hour:

Carpenter's helper
Rigger's helpers
Powderman's helpers
Pipefitter's helper
Tractor operator's helpers
Crane operator's helpers
Electrician's helpers

SEMI-SKILLED LABOR

Class 3—\$0.75 per hour:

Truck Drivers
Steel Tiers
Jackhammer man

SKILLED LABOR

Class 4—\$1.00 per hour:

Carpenters
Tractor operators
Crane operators
Cement finishers
Electricians
Pipefitters

Class 5—\$1.50 per hour:
General Foreman.

SCHEDULE "A"

Work Order No. 5.0

Contract No. W-414-eng-602

1. The site of the work is at Wheeler Field on the Island of Oahu, T. H.
2. The work authorized to be done under Work Order No. 5.0 includes furnishing, by the contractor, of all labor and performing all work for the construction of ammunition storage magazines and appurtenant work in conformity with plans and specifications and within the limits of available funds.
3. The materials essential to the construction provided for herein, will be furnished by the Government, at a convenient location on the Island of Oahu, from which location the materials will be transported, by the contractor to the site of the work.
4. The work to be done at this time under Work Order No. 5.0 is as follows:
 - (a) Clearing and grubbing the site of the work.
 - (b) Transport material to the site of the work.
 - (c) Perform all excavation for structures.
 - (d) Perform all excation for service roads.
 - (e) Install all culverts.
 - (f) Construct and complete three (3) bomb proof ammunition storage magazines (of 30,000 cubic feet capacity each).

MAY 22, 1941.

ESTIMATE OF COST

To Accompany Job Order No. 5.0

Contract No. W-414-eng-602

ADDENDUM NO. 1

ESTIMATE OF COST: Three (3) Each 30,000 Cubic Feet Capacity Bomb Proof Ammunition Storage Structures At Wheeler Field, T. H.
 DISTRICT: Honolulu District, Honolulu, T. H.

The work to be done, as provided for herein, is located at Wheeler Field, on the Island of Oahu, T. H., and is limited to the following specific items:

(1) Furnish all necessary labor and equipment, and perform all work necessary to construct three (3) 30,000 cubic feet reinforced concrete bomb-proof magazine structures, complete with all necessary utilities and fixtures.

(2) Furnish all necessary labor and equipment, and perform all work necessary to construct graded dirt connecting and access roads, complete with culverts, headwalls, and riprapped ditches.

All of the work done shall be in accordance with Specifications, "Bombproof Ammunition Storage and Appurtenant Work to Accompany Job Order No. 5.0," and the details shown on drawings listed in paragraph 1-03 of the Specifications. This addendum No. 1 to Job Order No. 5.0 supplements paragraph 4 (f) of Schedule A to Work Order 5.0 and is not authority for additional construction. The estimated cost of the work to be done is as follows:

Cost to the Contractor

1. Materials to be Furnished:

Item	Designation	Quantity	Unit	Unit price	Amount
1	Reinforcing Steel	1,335,900	Lb.	\$0.045	\$60,115.50
2	Cement	13,262	Bbl.	3.05	40,449.10
3	Fine Aggregate	6,078	Cu. Yd.	2.70	16,410.60
4	Coarse Aggregate	6,301	" "	3.00	18,903.00
5	Structural Steel	31,478	Lb.	0.20	6,295.60
6	Steel Water Stop—3½" x 8"	5,724	Lin. Ft.	0.51	1,389.24
7	Copper Water Stop—16"—24 oz	282	" "	0.40	112.80
8	Wrought Iron Pipe—2" Diam	14	" "	0.26	3.64
9	Wire—#14 Ga	4,540	Lb.	0.08	363.20
10	Paint	8	Gal.	2.75	22.00
11	Vitrified Pipe—4" Diam	1,327	Lin. Ft.	0.225	298.57
12	Graded Aggregate—¾" to 1½"	81	Cu. Yd.	3.00	243.00
13	Lumber	224,220	M	45.00	10,089.90
14	Form Oil	275	Gal.	0.21	57.75
15	Curing Compound	1,520	" "	0.52	790.40
16	Nails	7,850	Lb.	0.08	628.00
17	Galv. Wire #8 Ga	1,323	" "	0.08	105.84
18	Reinforced Concrete Pipe—12" Diam	160	Lin. Ft.	0.855	136.80
19	Reinforced Concrete Pipe—18" "	120	" "	2.02	242.40
20	Reinforced Concrete Pipe—24" "	80	" "	2.70	216.00
21	Reinforced Concrete Pipe—30" "	40	" "	3.98	159.20
22	Rock—12" Thick for Drop Inlets	35	Cu. Yd.	3.00	105.00
23	Electric Installation Lighting		Lump Sum		970.00
24	Hardware		" "		120.00
25	Galv. Iron Pipe—4"	8,600	Lin. Ft.	0.7164	6,161.04
26	Galv. Iron Pipe—2½"	5,000	" "	0.3620	1,810.00
27	Misc. Materials and supplies				500.00
	Total Cost of Materials				166,698.58

2. Day Labor:

(a) Handling and Hauling.

320 man hours	@ \$1.50	\$480.00
3,200 man hours	@ 0.75	2,400.00
6,400 man hours	@ 0.50	3,200.00

(b) Clearing and Grubbing (8½ Acres).

56 man hours	@ \$1.50	84.00
80 man hours	@ 1.00	80.00
80 man hours	@ 0.65	52.00
960 man hours	@ 0.50	480.00

(c) Excavation and Backfill Road.

900 man hours	@ \$1.50	1,350.00
2,160 man hours	@ 1.00	2,160.00
2,000 man hours	@ 0.75	1,500.00
2,000 man hours	@ 0.65	1,300.00
5,760 man hours	@ 0.50	2,880.00

(d) Culverts.

80 man hours	@ \$1.50	120.00
80 man hours	@ 1.00	80.00
160 man hours	@ 0.65	104.00
800 man hours	@ 0.50	400.00

(e) Riprap and Drop Inlets.

40 man hours	@ \$1.50	60.00
480 man hours	@ 0.50	240.00

(f) Excavation and Backfill Structures.

1,600 man hours	@ \$1.50	2,400.00
3,200 man hours	@ 1.00	3,200.00
2,400 man hours	@ 0.75	1,800.00
2,200 man hours	@ 0.65	1,430.00
5,280 man hours	@ 0.50	2,640.00

(g) Concrete Forming and Stripping.

960 man hours	@ \$1.50	1,440.00
3,600 man hours	@ 1.00	3,600.00
2,800 man hours	@ 0.65	1,728.00
2,000 man hours	@ 0.50	1,000.00

(h) <i>Placing Reinforcing Steel-Structure.</i>			
960 man hours	-----	@ \$1.50	\$1,440.00
4,800 man hours	-----	@ 1.00	4,800.00
4,800 man hours	-----	@ 0.50	2,400.00
(i) <i>Mixing, Placing, Curing Concrete.</i>			
2,000 man hours	-----	@ \$1.50	3,000.00
3,600 man hours	-----	@ 1.00	3,600.00
3,900 man hours	-----	@ 0.75	2,925.00
12,200 man hours	-----	@ 0.65	7,930.00
20,000 man hours	-----	@ 0.50	10,000.00
(j) <i>Structural Steel Placing.</i>			
96 man hours	-----	@ \$1.50	144.00
192 man hours	-----	@ 1.00	192.00
192 man hours	-----	@ 0.75	144.00
192 man hours	-----	@ 0.50	96.00
(k) <i>Laying Drainage Tile.</i>			
16 man hours	-----	@ \$1.50	24.00
120 man hours	-----	@ 0.65	78.00
320 man hours	-----	@ 0.50	160.00
(l) <i>Electrical Installation.</i>			
320 man hours	-----	@ \$1.50	480.00
400 man hours	-----	@ 1.00	400.00
420 man hours	-----	@ 0.75	240.00
(m) <i>Cleaning and Painting.</i>			
8 man hours	-----	@ \$1.50	12.00
48 man hours	-----	@ 1.00	48.00
72 man hours	-----	@ 0.50	36.00
(n) <i>Maintenance—Watchmen, etc.</i>			
2,880 man hours	-----	@ \$1.50	4,320.00
2,160 man hours	-----	@ 0.75	1,620.00
1,440 man hours	-----	@ 0.50	720.00
Total Cost of Labor-----			<u><u>\$1,017.00</u></u>

3. *Plant Operation:*

(a) <i>Rental of Equipment.</i>			
2 2½ Cu. Yd. Shovel	-----	2 mo. @ \$3,150.00	\$12,600.00
1 ¾ Cu. Yd. Shovel	-----	3 mo. @ 1,174.00	3,522.00
1 Caterpillar dozer	-----	3 mo. @ 869.00	2,607.00
1 Road Grader	-----	1 mo. @ 558.00	558.00
1 Roller with Tractor	-----	1 mo. @ 806.00	806.00
1 Air Compressor	-----	2 mo. @ 695.00	1,390.00
2 9 Cu. Yd. Dump Trucks	-----	3 mo. @ 584.00	3,504.00
1 Conveyor—inclined	-----	2 mo. @ 690.00	1,280.00
2 5 Cu. Yd. Dump Trucks	-----	3 mo. @ 407.00	2,442.00
2 ¾ Cu. Yd. Dump Trucks	-----	3 mo. @ 69.00	414.00
2 Sedans	-----	3 mo. @ 76.00	456.00
1 Coupe	-----	3 mo. @ 70.00	210.00
1 Batching Plant	-----	2 mo. @ 653.00	1,306.00
1 Pug Mill	-----	2 mo. @ 200.00	400.00
1 Concrete Placing Outfit	-----	2 mo. @ 168.00	336.00
1 AD-4 Auto Crane	-----	3 mo. @ 942.00	2,826.00
1 16" Radial Saw	-----	3 mo. @ 81.00	243.00
1 Jointer	-----	3 mo. @ 33.00	99.00
1 Bar Shear	-----	3 mo. @ 109.00	327.00
1 Bar Bender	-----	3 mo. @ 72.00	216.00
1 2 Cu. Yd. Concrete Bucket	-----	2 mo. @ 33.00	66.00
1 1 Cu. Yd. Concrete Bucket	-----	2 mo. @ 24.00	48.00
1 Conveyor—Horizontal	-----	2 mo. @ 430.00	860.00
Misc. Tools and Equipment	-----		500.00
(b) Fuel, Oil, Gas and Supplies	-----	Lump Sum	5,500.00
Total Plant Rental Cost-----			<u><u>42,516.00</u></u>

4. *Total Plant Operation Cost of Job:*

Cost of Materials-----	\$166,698.58
Cost of Day Labor-----	81,017.00
Cost of Plant Rental-----	42,516.00
Mobilization and Demobilization-----	135,000.00
 Total Cost to Contractor-----	 \$425,231.58

THEODORE WYMAN, JR.,
Lt. Col. Corps of Engineers,
District Engineer.

Recapitulation of estimate of cost

1. *Total Cost of Work:*

(a) *Direct Cost:*

Total Cost of Work to Contractor-----	\$425,231.58
Contingencies—10%-----	42,523.16
 Total Direct Cost-----	 467,754.74

(b) *Indirect Cost:*

Survey, Insp., Engr.—8%-----	\$34,018.53
 Total Indirect Cost-----	 34,018.53
 Total Field Cost-----	 501,773.27
General Office Overhead—8%-----	34,018.73

Estimated Grand Total Cost to the Government----- 535,792.00

This estimate is prepared for use in the District only, and is not for distribution to the contractor.

THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

MAY 26, 1941.

ADDENDUM NO. 2

To Accompany Job Order No. 5.0

Contract No. W-414-eng-602

WORK TO BE DONE: Construct and Complete (5) each 30,000 Cubic Feet Capacity Bombproof Ammunition Storage Structures at Wheeler Field, T. H.

DISTRICT: Honolulu District, Honolulu, T. H.

The work to be done, as provided for herein, is located at Wheeler Field, on the Island of Oahu, T. H., and is limited to the following specific items:

(1) Furnish all necessary labor and equipment, and perform all work necessary to construct five (5) each 30,000 cubic feet reinforced concrete bombproof magazine structures, complete with all necessary utilities and fixtures.

(2) Furnish all necessary labor and equipment, and perform all work necessary to construct graded dirt connecting and access roads, complete with culverts, headwalls, and rip-rapped ditches.

All of the work done shall be in accordance with Specifications, "Bombproof Ammunition Storage and Appurtenant Work to Accompany Job Order No. 5.0," and the details shown on the drawings listed in paragraph 1-03 of the Specifications.

Addendum No. 2 to Job Order No. 5.0, supplants and makes void Addendum No. 1 to Job Order No. 5.0.

Total cost of the work to be one shall not exceed \$585,993.89.

Cost to the Contractor

1. Materials Required for Magazines:

Item No.	Item	Quantity	Unit	Unit price	Amount
1	Cement	21,225	Bbl	\$2.92	\$62,189.25
2	Fine Aggregate	9,342	Cu. Yd	2.70	25,223.40
3	Coarse Aggregate	9,060	" "	3.00	27,180.00
4	¾" to 1½" Graded Aggregate	140	" "	3.00	420.00
5	Reinforcing Steel	2,226,500	Lb	0.0293	65,236.45
6	Structural Steel	52,465	" "	0.1004	5,267.49
7	Steel Water Stop	9,540	Lin. Ft	0.51	4,865.40
8	Copper Water Stop	470	" "	0.40	188.00
9	2" Diam. Black W. I. Pipe	24	" "	0.26	6.24
10	#14 Ga. Black Wire	7,500	Lb	0.08	600.00
11	#8 Ga. Galv. Wire	2,210	" "	0.08	176.80
12	4" Diam. V. C. Pipe	2,212	Lin. Ft	0.225	497.70
13	1" x 6" T & G Flooring	112,620	M. B. M	61.50	6,926.13
14	2" x 4"-4" x 4"-4" x 6" #1 Com. Lumber	140,400	" " "	47.10	6,612.84
15	Form Oil	460	Gals.	0.21	96.60
16	Curing Compound	2,500	" "	0.52	1,300.00
17	Nails—20d, 16d, 10d, 8d, 6d	100	Keg	6.60	660.00
18	Paint	13	Gals.	2.75	35.75
19	Conduit, Wiring and Fixtures	Lump sum	" "		1,940.00
20	4" Diam. W. I. Pipe and Couplings	7,740	Lin. Ft	0.7164	5,544.94
21	2" Diam. W. I. Pipe and Couplings	4,500	" "	0.4125	1,856.25
22	Miscellaneous Hardware	Lump sum	" "		210.00
23	Miscellaneous Supplies	" "	" "		850.00
Total Cost of Materials for Magazines					217,883.24

1-A. Materials Required for Access & Connecting Roads:

1	Cement	75	Bbl	\$2.93	\$219.75
2	Fine Aggregate	50	Cu. Yd	2.70	135.00
3	Coarse Aggregate	48	" "	3.00	144.00
4	Reinforcing Steel	3,500	Lb	0.0293	102.55
5	1" x 6" Shiplap	2,400	B. M	61.50	147.60
6	2" x 4" #1 Com. Lumber	3,000	B. M	47.10	141.30
7	R. C. Pipe 12" Diam	160	Lin. Ft	0.855	136.80
8	R. C. Pipe 18" Diam	120	" "	2.02	242.40
9	R. C. Pipe 24" Diam	80	" "	2.70	216.00
10	R. C. Pipe 30" Diam	40	" "	3.98	159.20
11	Masonry Stone (50#)	35	Cu. Yd	3.00	105.00
12	Galv. W. I. Pipe—4" Diam	860	Lin. Ft	0.7164	616.10
13	Galv. W. I. Pipe—2" Diam	500	" "	0.4125	206.25
14	Nails, Wire, etc		Lump sum		16.50
15	Miscellaneous Supplies		" "		150.00
Total Cost of Materials for Access & Connecting Roads					2,738.45

2. Day Labor (Magazines):

(a) Handling and Hauling (6,200 Tons):

1,000 man hours	@	\$1.50	\$1,500.00
1,000 man hours	@	1.00	1,000.00
1,000 man hours	@	.65	650.00
10,670 man hours	@	.50	5,335.00

(b) Clearing and Grubbing (7½ Acres):

32 man hours	@	\$1.50	48.00
96 man hours	@	.75	72.00
960 man hours	@	.50	480.00

(c) Laying Temporary Water Line (7,740' of 4", 4,500' of 2"):

50 man hours	@	\$1.50	75.00
120 man hours	@	.75	90.00
1,020 man hours	@	.50	510.00

(d) Structure Excavation (82,000 Cu. Yds.):

1,500 man hours	@	\$1.50	2,250.00
3,000 man hours	@	1.00	3,000.00
3,000 man hours	@	.65	1,950.00
9,000 man hours	@	.50	4,500.00

(e) <i>Structure Backfill—Compacted</i> (63,350 Cu. Yds.) :		
1,170 man hours-----	@ \$1.50	\$1,755.00
2,340 man hours-----	@ 1.00	2,340.00
2,340 man hours-----	@ .65	1,521.00
6,932 man hours-----	@ .50	3,466.00
(f) <i>Forming and Stripping</i> (Assembling—263 M., Erecting—368½ M., Stripping—368½ M.) :		
1,340 man hours-----	@ \$1.50	2,010.00
6,000 man hours-----	@ 1.00	6,000.00
6,000 man hours-----	@ .65	3,900.00
15,200 man hours-----	@ .50	7,600.00
(g) <i>Reinforcing steel—Bind'g & Plac'g</i> (2,226,500 Lbs.) :		
2,080 man hours-----	@ \$1.50	3,120.00
20,800 man hours-----	@ 1.00	20,800.00
20,800 man hours-----	@ .65	13,520.00
14,620 man hours-----	@ .50	7,310.00
(h) <i>Placing and Curing Concrete</i> (14,710 Cu. Yds.) :		
4,000 man hours-----	@ \$1.50	6,000.00
8,000 man hours-----	@ 1.00	8,000.00
12,000 man hours-----	@ .75	9,000.00
16,000 man hours-----	@ .65	10,400.00
16,000 man hours-----	@ .50	8,000.00
(i) <i>Laying Drainage Tile</i> (2,212 Lin. Ft.) :		
28 man hours-----	@ \$1.50	42.00
200 man hours-----	@ .65	130.00
536 man hours-----	@ .50	268.00
(j) <i>Structural Steel Placing</i> (52,465 Lbs.) :		
160 man hours-----	@ \$1.50	240.00
640 man hours-----	@ 1.00	640.00
640 man hours-----	@ .75	480.00
960 man hours-----	@ .50	480.00
(k) <i>Conduits, Wiring and Fixtures</i> (Placing) :		
160 man hours-----	@ \$1.50	240.00
480 man hours-----	@ 1.00	480.00
480 man hours-----	@ .75	360.00
960 man hours-----	@ .50	480.00
(l) <i>Maintenance</i> (watchmen, etc.) :		
2,660 man hours-----	@ \$1.50	3,990.00
2,660 man hours-----	@ 1.00	2,660.00
2,000 man hours-----	@ .50	1,000.00
Total Cost of Day Labor for Magazines-----		147,692.00
2-A. <i>Day Labor for Access and Connecting Roads:</i>		
(a) <i>Clearing and Grubbing</i> (9 Acres) :		
40 man hours-----	@ \$1.50	\$60.00
120 man hours-----	@ .75	90.00
1,540 man hours-----	@ .50	770.00
(b) <i>Handling and Hauling</i> (30 Tons) :		
8 man hours-----	@ \$1.50	12.00
16 man hours-----	@ 1.00	16.00
8 man hours-----	@ .65	5.20
96 man hours-----	@ .50	48.00
(c) <i>Laying Temporary Water Line</i> (1,360 Lin. Ft.) :		
8 man hours-----	@ \$1.50	12.00
16 man hours-----	@ .75	12.00
104 man hours-----	@ .50	52.00
(d) <i>Excavation</i> (44,260 Cu. Yds.) :		
800 man hours-----	@ \$1.50	1,200.00
1,600 man hours-----	@ 1.00	1,600.00
1,600 man hours-----	@ .75	1,200.00
1,600 man hours-----	@ .65	1,040.00
4,800 man hours-----	@ .50	2,400.00
(e) <i>Fill—Compacted</i> (24,500 Cu. Yds.) :		
800 man hours-----	@ \$1.50	1,200.00
800 man hours-----	@ 1.00	800.00
800 man hours-----	@ .65	520.00
3,200 man hours-----	@ .50	1,600.00

(f) <i>Culvert Pipe—Placing (400 Lin. Ft.) :</i>			
80 man hours	----- @	\$1.50	\$120.00
80 man hours	----- @	1.00	80.00
160 man hours	----- @	.65	104.00
800 man hours	----- @	.50	400.00
(g) <i>Headcalls—Forming and Stripping (5,400 B. M.) :</i>			
72 man hours	----- @	\$1.50	108.00
144 man hours	----- @	1.00	144.00
144 man hours	----- @	.50	72.00
(h) <i>Reinforcing Steel—Binding & Placing (3,500 Lbs.) :</i>			
24 man hours	----- @	\$1.50	36.00
48 man hours	----- @	1.00	48.00
20 man hours	----- @	.65	13.00
32 man hours	----- @	.50	16.00
(i) <i>Placing and Curing Concrete (50 Cu. Yds.) :</i>			
16 man hours	----- @	\$1.50	24.00
32 man hours	----- @	1.00	32.00
48 man hours	----- @	.75	36.00
80 man hours	----- @	.50	40.00
(j) <i>Drop Inlets—Placing Masonry (35 Cu. Yds.) :</i>			
32 man hours	----- @	\$1.50	48.00
60 man hours	----- @	1.00	60.00
128 man hours	----- @	.50	64.00
(k) <i>Riprap Ditches and Culvert Aprons (100 Sq. Yds.) :</i>			
16 man hours	----- @	\$1.50	24.00
48 man hours	----- @	.50	24.00
(l) <i>Grading and Shaping Roadway (12,000 Sq. Yds.) :</i>			
160 man hours	----- @	\$1.50	240.00
480 man hours	----- @	1.00	480.00
320 man hours	----- @	.65	208.00
540 man hours	----- @	.50	270.00
(m) <i>Maintenance (Watchmen, etc.)</i>			
400 man hours	----- @	\$1.50	600.00
400 man hours	----- @	1.00	400.00
400 man hours	----- @	.75	300.00
400 man hours	----- @	.50	200.00
Total Cost of Day Labor (Access Roads)-----			<u>16,828.20</u>

3. *Plant Operation (Magazines).*

	Months required	Monthly rental	Amount
(a) Rental of Equipment.			
2 2¼ Cu. Yd. Power Shovels	2¼	\$3,150.00	\$15,750.00
1 ¾ Cu. Yd. Power Shovel	2½	1,174.00	2,935.00
1 Caterpillar Dozer	2½	869.00	2,172.50
1 Roller with Tractor	2	806.00	1,612.00
1 Air Compressor	2	695.00	1,390.00
2 9 Cu. Yd. Dump Trucks	2¼	684.00	2,920.00
2 5 Cu. Yd. Dump Trucks	2½	407.00	2,035.00
2 ¾ Cu. Yd. Dump Trucks	2½	69.00	345.00
2 Sedans	2½	75.00	380.00
1 Coupe	2½	70.00	175.00
1 Batching Plant	2½	653.00	1,632.50
1 Pug Mill	2½	200.00	500.00
1 Concrete Placing Outfit	2½	168.00	420.00
1 A. D. Auto Crane	2½	942.00	2,355.00
1 16" Radial Saw	2½	81.00	202.50
1 Joinder	2½	33.00	82.50
1 Bar Shears	2½	109.00	272.50
1 Bar Bender	2½	72.00	180.00
1 2 Cu. Yd. Concrete Bucket	2½	33.00	82.50
1 1 Cu. Yd. Concrete Bucket	2½	24.00	60.00
1 Inclined Conveyor	2½	690.00	1,725.00
1 Horizontal Conveyor	2½	430.00	1,075.00
Miscellaneous Small Tools		Lump Sum	550.00
(b) Fuel, Oil, Gas & Supplies		Lump Sum	7,700.00
Total Plant Operation Cost of Job (Magazines)-----			46,552.00

3-A. Plant Operation (Access Roads):

	Months required	Monthly rental	Amount
a) Rental of Equipment.			
1 2½ Cu. Yd. Power Shovel.....	2	\$3,150.00	\$6,300.00
1 ¾ Cu. Yd. Power Shovel.....	2	1,174.00	2,348.00
1 Caterpillar—Dozer.....	2	869.00	1,738.00
1 Roller with Tractor.....	2	806.00	1,612.00
2 9 Cu. Yd. Dump Trucks.....	1	584.00	1,168.00
2 5 Cu. Yd. Dump Trucks.....	2	407.00	1,628.00
2 ¾ Cu. Yd. Dump Trucks.....	1	69.00	138.00
2 Sedans.....	2	76.00	304.00
1 Coupe.....	2	70.00	140.00
1 ¼ Cu. Yd. Concrete Mixer.....	1	55.00	55.00
1 A. D.-4 Auto Crane.....	½	942.00	471.00
1 16 In. Radial Saw.....	½	81.00	40.50
1 Bar Shears.....	¼	109.00	27.25
1 Bar Bender.....	¼	72.00	18.00
Miscellaneous Small Tools.....		Lump Sum	212.25
(b) Fuel Oil, Gas, Oil and Supplies.....		Lump Sum	2,100.00
Total Plant Operation Cost of Job (Access Roads).....			19,300.00

4. Total Plant Operation Cost of Job (Magazines):

Total Cost of Material.....	\$217,883.24
Total Cost of Labor.....	147,692.00
Total Cost of Plant.....	46,552.00
Mobilization and Demobilization.....	123,365.70

Total Plant Operation Cost of Job (Magazines)..... \$535,492.94

4-A. Total Plant Operation Cost of Job (Access Roads):

Total Cost of Material.....	\$2,738.45
Total Cost of Labor.....	16,828.20
Total Cost of Plant.....	19,300.00
Mobilization and Demobilization.....	11,634.30

Total Plant Operation Cost of Job (Access Roads)..... 50,500.95

5. Total Cost of Work (5 Magazines & Access Road):

Total Cost of 5 Magazines.....	\$535,492.94
Total Cost of Access Road.....	50,500.95

Total Cost to Contractor..... 585,993.89

THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

Recapitulation of estimated cost

1. Total Cost of Work:

(a) Direct Cost:

Total Cost to Contractor.....	\$585,993.89
Contingencies—10%.....	58,599.40
Total Direct Cost.....	644,593.29

(b) Indirect Cost:

Surveys, Inspection and Engr.—8%.....	\$46,879.51
Total Indirect Cost.....	46,879.51

Total Field Cost.....	691,472.80
General Office Overhead—8%.....	48,879.51

Estimated Grand Total Cost to Government..... 738,352.31

This recapitulation is prepared for use in the District only, and is not for distribution to the Contractor.

THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

JUNE 5, 1941.

ADDENDUM NO. 3

To Accompany Job Order No. 5.0 Contract No. W-414-eng-601

WORK TO BE DONE: Complete necessary excavation for all Ammunition Storage Structures authorized by Job Order No. 5.0, together with Construction of graded dirt Connecting and access roads, complete with necessary culverts, headwalls, and riprapped ditches.

DISTRICT: Honolulu District, Honolulu, T. H.

The work to be done, as provided for herein, is located at Wheeler Field, on the Island of Oahu, T. H., and is limited to the following specific items:

(1) Furnish all necessary labor and equipment, and perform all work necessary to complete necessary excavation for all Ammunition Storage Structures, authorized by Job Order No. 5.0.

(2) Furnish all necessary labor and equipment and perform all work necessary to complete Construction of graded dirt Connecting and access roads, Complete with, culverts, headwalls and riprapped ditches.

All of the work done shall be in accordance with Specifications, "Bombproof Ammunition Storage and Appurtenant Work to Accompany Job Order No. 5.0".

Addendum No. 3 is additional Work and does not alter Addendum No. 2 to Job Order No. 5.0.

The Cost of the Work to be done Shall not exceed \$115,034.10.

THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

1. Materials To Be Furnished (Excavation for Magazines):

Item No.	Designation	Quantity	Unit	Unit price	Amount
1	2 In. W. I. Pipe and Fittings.....	1,950	Ft.....	\$0.45	\$877.50
2	Dynamite (Caps & Fuse).....	500	Lbs.....	.20	100.00
3	Miscellaneous Supplies.....		Lump sum.....		72.50
	Total Cost of Material for Magazines.....				1,050.00

1A. Materials to be Furnished (Excavation for Access Road):

Item No.	Designation	Quantity	Unit	Unit price	Amount
1	2 In. W. I. Pipe and Fittings.....	3,200	Lin. ft.....	\$0.4125	\$1,320.00
2	Cement.....	90	Bbl.....	3.19	287.10
3	Fine Aggregate.....	50	Cu. Yds.....	2.70	135.00
4	Coarse Aggregate.....	48	" ".....	3.00	144.00
5	Form Lumber.....	9,000	M-BM.....	57.50	517.50
6	Wire.....	50	Lbs.....	0.08	4.00
7	Nails (20 ^s 16 ^s 8 ^s & 6 ^{ds}).....	3	Kegs.....	6.60	19.60
8	R. C. Pipe—12 In. Diam.....	290	Lin. ft.....	0.855	247.95
9	R. C. Pipe—18 In. Diam.....	80	" ".....	2.02	161.60
10	R. C. Pipe—24 In. Diam.....	120	" ".....	2.70	324.00
11	R. C. Pipe—30 In. Diam.....	60	" ".....	3.98	238.80
12	Masonry and Riprap Stone.....	150	Ton.....	3.00	450.00
13	Dynamite (Caps and Fuse).....	500	Lbs.....	0.20	100.00
14	Reinforcing Steel.....	5,000	" ".....	0.0293	146.50
15	Miscellaneous Supplies.....		Lump Sum.....		103.95
	Total Cost of Material for Roads.....				4,200.00

2. Day Labor (Magazines) :

(a) <i>Handling and Hauling:</i>		
1 man hour-----	@ \$1.50	\$1.50
4 man hours-----	@ 0.50	2.00
(b) <i>Clearing and Grubbing:</i>		
24 man hours-----	@ \$1.50	36.00
72 man hours-----	@ 0.75	54.00
720 man hours-----	@ 0.50	360.00
(c) <i>Laying Temporary Water Line:</i>		
8 man hours-----	@ \$1.50	12.00
20 man hours-----	@ 0.75	15.00
172 man hours-----	@ 0.50	86.00
(d) <i>Structure Excavation:</i>		
2,160 man hours-----	@ \$1.50	3,240.00
4,320 man hours-----	@ 1.00	4,320.00
4,320 man hours-----	@ 0.65	2,808.00
12,960 man hours-----	@ 0.50	6,480.00
(e) <i>Maintenance:</i>		
3,832 man hours-----	@ \$1.50	5,748.00
3,832 man hours-----	1.00	3,832.00
3,200 man hours-----	0.50	1,600.00

Total Cost of Day Labor on Magazines----- 28,594.50

2A. Day Labor (Access & Connecting Roads) :

(a) <i>Clearing and Grubbing:</i>		
24 man hours-----	@ \$1.50	36.00
72 man hours-----	@ 0.75	54.00
960 man hours-----	@ 0.50	480.00
(b) <i>Handling and Hauling:</i>		
8 man hours-----	@ \$1.50	12.00
12 man hours-----	@ 1.00	12.00
12 man hours-----	@ 0.65	7.80
80 man hours-----	@ 0.50	40.00
(c) <i>Laying Temporary Water Line:</i>		
12 man hours-----	@ \$1.50	18.00
24 man hours-----	@ 0.75	18.00
148 man hours-----	@ 0.50	74.00
(d) <i>Excavation for Access Road:</i>		
1,100 man hours-----	@ \$1.50	1,650.00
2,200 man hours-----	@ 1.00	2,200.00
2,200 man hours-----	@ 0.75	1,650.00
2,200 man hours-----	@ 0.65	1,430.00
6,600 man hours-----	@ 0.50	3,300.00
(e) <i>Fill—Compacted:</i>		
800 man hours-----	@ \$1.50	1,200.00
800 man hours-----	@ 1.00	800.00
800 man hours-----	@ 0.65	520.00
3,200 man hours-----	@ 0.50	1,600.00
(f) <i>Culvert Pipe Placing:</i>		
110 man hours-----	@ \$1.50	165.00
110 man hours-----	@ 1.00	110.00
220 man hours-----	@ 0.65	143.00
1,100 man hours-----	@ 0.50	550.00
(g) <i>Headwalls—Forming & Stripping:</i>		
120 man hours-----	@ \$1.50	180.00
240 man hours-----	@ 1.00	240.00
240 man hours-----	@ 0.50	120.00
(h) <i>Reinforcing Steel:</i>		
36 man hours-----	@ \$1.50	54.00
72 man hours-----	@ 1.00	72.00
32 man hours-----	@ 0.65	20.80
44 man hours-----	@ 0.50	22.00

(i) <i>Placing and Curing Concrete:</i>			
24 man hours	-----	@ \$1.50	\$36.00
48 man hours	-----	@ 1.00	48.00
72 man hours	-----	@ 0.75	54.00
120 man hours	-----	@ 0.50	60.00
(j) <i>Drop Inlets & Aprons—Placing Masonry:</i>			
72 man hours	-----	@ \$1.50	108.00
136 man hours	-----	@ 1.00	136.00
288 man hours	-----	@ 0.50	144.00
(k) <i>Grading and Shaping Roadway:</i>			
100 man hours	-----	@ \$1.50	150.00
300 man hours	-----	@ 1.00	300.00
200 man hours	-----	@ 0.60	130.00
340 man hours	-----	@ 0.50	170.00
(l) <i>Maintenance:</i>			
500 man hours	-----	@ \$1.50	750.00
500 man hours	-----	@ 1.00	500.00
500 man hours	-----	@ 0.75	375.00
500 man hours	-----	@ 0.50	250.00

Total Cost of Day Labor on Road----- 19,989.60

3. Plant Operation (Magazines) :

(a) *Rental of Equipment:*

1 2½ Cu. Yd. Power Shovels	3¾ Mos.	@ \$3,150.00	\$11,812.50
1 ¾ Cu. Yd. Power Shovels	3¾ Mos.	@ 1,174.00	4,402.50
1 Caterpillar Dozer	3¾ Mos.	@ 869.00	3,258.75
2 9 Cu. Yd. Dump Trucks	2 Mos.	@ 584.00	2,336.00
2 5 Cu. Yd. Dump Trucks	2 Mos.	@ 407.00	1,628.00
2 ¾ Cu. Yd. Dump Trucks	2 Mos.	@ 69.00	276.00
2 Sedans	3¾ Mos.	@ 76.00	570.00
1 Coupe	3¾ Mos.	@ 70.00	262.50
Miscellaneous Small Equipment.	Lump sum		103.75
(b) Fuel Oil, Gas, Oil & Grease,	Lump sum		3,750.00

Total Plant Operation (Magazines)----- 28,400.00

3A. Plant Operation (Access Road) :

(a) *Rental of Equipment:*

1 ¾ Cu. Yd. Power Shovel	3¾ Mos.	@ 1,174.00	3,228.50
1 2½ Cu. Yd. Power Shovel	3¾ Mos.	@ 3,150.00	8,602.50
1 Caterpillar Dozer	2¾ Mos.	@ 869.00	2,389.75
1 Roller with Tractor	2¾ Mos.	@ 806.00	2,216.50
2 9 Cu. Yd. Dump Trucks	2¾ Mos.	@ 584.00	3,212.00
2 5 Cu. Yd. Dump Trucks	2¾ Mos.	@ 407.00	2,238.00
2 ¾ Cu. Yd. Dump Trucks	2¾ Mos.	@ 69.00	3,795.00
2 Sedans	3 Mos.	@ 76.00	456.00
1 Coupe	3 Mos.	@ 70.00	210.00
1 ¼ Cu. Yd. Concrete Mixer	1 Mo.	@ 55.00	55.00
1 A. D. Auto Crane	½ Mo.	@ 942.00	471.00
1 16 In. Radial Saw	½ Mo.	@ 81.00	40.50
1 Bar Shears	¼ Mo.	@ 109.00	27.25
1 Bar Bender	¼ Mo.	@ 72.00	18.00
1 Batching Plant	¼ Mo.	@ 653.00	163.25
1 Inclined Conveyor	¼ Mo.	@ 690.00	172.50
1 Horizontal Conveyor	¼ Mo.	@ 430.00	107.50
1 Power Road Grader	2 Mos.	@ 460.00	920.00
Miscellaneous Small Equipment.	Lump Sum		166.25
(b) Fuel Oil, Gas, Oil & Grease,	Lump Sum		4,250.00

Total Plant Operation (Access Road)----- 32,800.00

4. Total Plant Operation Cost of Job (Magazines) :

Total Cost of Material	-----	\$1,050.00
Total Cost of Labor	-----	28,594.50
Total Cost of Plant	-----	28,400.00

Total Plant Operation Cost of Job (Magazines)----- 58,044.50

4A. <i>Total Plant Operation Cost of Job (Access Roads) :</i>	
Total Cost of Material-----	\$4,200.00
Total Cost of Labor-----	19,989.60
Total Cost of Plant-----	32,800.00
<hr/>	
Total Plant Operation Cost of Job (Access Roads)-----	\$56,989.60
<hr/>	
5. <i>Total Cost of Work (Magazines & Access Roads)</i>	
Total Cost of Excavation for Magazines-----	\$58,044.50
Total Cost of Excavation for Access Roads-----	56,989.60
<hr/>	
Total Cost to Contractor-----	115,034.10
<hr/>	
THEODORE WYMAN, JR., <i>Lt. Col., Corps of Engineers.</i> <i>District Engineer.</i>	

Recapitulation of estimated cost

1. <i>Total Cost of Job:</i>	
(a) <i>Direct Cost:</i>	
Total Cost to Contractor-----	\$115,034.10
Contingencies—10%-----	11,503.41
<hr/>	
Total Direct Cost-----	126,537.51
(b) <i>Indirect Cost:</i>	
Surveys, Inspection and Engineering, (8%)---	\$9,202.73
Total Indirect Cost-----	9,202.73
<hr/>	
Total Field Cost-----	135,740.24
General Office Overhead—8%-----	9,202.73
<hr/>	
Estimated Grand Total Cost to Government-----	144,942.97

This estimate is prepared for use in the District only, and is not for distribution to the Contractor.

THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

ADDENDUM NO. 4

To Accompany Job Order No. 5.0

Contract No. W-414-eng-602

WORK TO BE DONE: Pave Ammunition Storage Access and Connecting Roads with 4" Waterbound Macadam Base Course and 2½" Asphaltic Concrete Top Course.

DISTRICT: Honolulu District, Honolulu, T. H.

The work to be done, as provided for herein, is located at Wheeler Field, on the Island of Oahu, T. H., and is limited to the following Specific Item:

1. Furnish all labor and equipment and perform all work necessary to pave Ammunition Storage Access and Connecting Roads with 4" Waterbound Macadam Base Course and 2½" asphaltic top course. The work to be done shall be in accordance with the Specifications to be issued and the details shown on the drawings enumerated in the Specifications.

The total Cost of the Work to be done shall not exceed \$47,000.00.

Addendum No. 4 to Job Order No. 5.0 is additional work and does not alter Addendum No. 3.

(Signed) Theodore Wyman, Jr.,
 THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

*Recapitulation of estimated cost*1. *Total Cost of Work:*(a) *Direct Cost:*

Total Cost to the Contractor-----	\$47,000.00
Contingencies—10%-----	4,700.00
Total Direct Cost-----	51,700.00

(b) *Indirect Cost:*

Survey, Inspection Engineering-----	\$3,760.00
Total Indirect Cost-----	3,760.00

Total Field Cost-----	55,460.00
General Office Overhead-----	3,760.00

Estimated Total Cost to the Government-----	59,220.00
---	-----------

This estimate is prepared for use in the District only, and is not for distribution to the Contractor.

(Signed) Theodore Wyman, Jr.,
THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

JULY 1, 1941.

ADDENDUM NO. 5

To Accompany Job Order No. 5.0

Contract No. W-414-eng-602

WORK TO BE DONE: Construct and Complete 4 each 30,000 cubic feet capacity reinforced Concrete bombproof Ammunition Storage Structures.

DISTRICT: Honolulu District, Honolulu, T. H.

The work to be done, as provided for herein, is located at Wheeler Field, on the Island of Oahu, T. H., and is limited to the following Specific Items:

1. Furnish all necessary labor and equipment and perform all work necessary to Construct and Complete 4 each 30,000 cubic feet reinforced concrete bombproof Ammunition Storage Structures. (Structures to be constructed are shown as No. 30-1, 30-2, 30-S, 30-9, on drawing "Bombproof Magazines," General Plan No. 2, File No. F-5/2). All of the work done shall be in accordance with Specifications. "Bombproof Ammunition Storage and Appurtenant Work to Accompany Job Order No. 5.0", and the details shown on the drawings enumerated in the Specifications.

2. Work shall not be initiated on Construction of Burster Course for structures 30-1, 30-2, 30-S, 30-9, until so ordered by the District Engineer.

Addendum No. 5 to Job Order No. 5.0 is additional work and does not alter Addendums 1, 2, 3, and 4.

The Cost of the work to be done shall not exceed \$330,350.00.

(Signed) THEODORE WYMAN, Jr.,
Theodore Wyman Jr.
Lt. Col., Corps of Engineers.
District Engineer

*RECAPITULATION OF ESTIMATED COST*1. *Total Cost of Work:*(a) *Direct Cost:*

Total Cost to Contractor-----	\$330,350.00
Contingencies—10%-----	33,035.00

Total Direct Cost-----	\$363,385.00
------------------------	--------------

(b) *Indirect Cost:*

Survey, Inspection, Engineering-----	\$26,428.00
Total Indirect Cost-----	26,428.00

Total Field Cost-----	389,813.00
General Office Overhead-----	26,428.00

Estimated Total Cost to the Government-----	416,241.00
---	------------

This estimate is prepared for use in the District only, and is not for distribution to the Contractor.

(Signed) Theodore Wyman, Jr.,
THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

AUGUST 14, 1941.

ADDENDUM NO. 6

To Accompany Job Order No. 5.0

Contract No. W-414-eng-602

WORK TO BE DONE: Construct and complete two (2) each 5,000 cubic feet capacity, and three (3) each 10,000 cu. ft. capacity reinforced concrete bombproof ammunition storage structures.

DISTRICT: Honolulu District—Honolulu, T. H.

The work to be done, as provided for herein, is located at Wheeler Field, on the Island of Oahu, T. H., and is limited to the following specific item:

1. Furnish all labor and equipment and perform all work necessary to construct and complete two (2) each 5,000 cubic feet capacity bombproof ammunition storage structures, (Structures to be constructed as shown as No. 5-1, and No. 5-2, on Drawing, "Bombproof Magazines", General Plan No. 2, File No. F-5/2).

2. Furnish all labor and equipment and perform all work necessary to construct and complete three (3) each 10,000 cubic feet capacity reinforced concrete bombproof ammunition storage structures, (Structures to be constructed are shown as No. 10-1, No. 10-2, No. 10-3, on drawing, "Bombproof Magazines", General Plan No. 2, File No. F-5/2).

All of the work done shall be in accordance with Specifications, "Bombproof Ammunition Storage and Appurtenant work to Accompany Job Order No. 5.0", and the details shown on the drawings enumerated in the Specifications.

Work shall not be initiated on the construction of Burster Course for structures 5-1, 5-2, 10-1, 10-2, 10-3, until so ordered by the District Engineer.

Addendum No. 6 to Job Order No. 5.0 is additional work and does not alter Addendums 1, 2, 3, 4, and 5.

The total cost of the work to be done shall not exceed \$230,821.00.

/s/ Theodore Wyman, Jr.,
THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

Summary Sheet

1. Work Authorized by Job Order No. 5.0 Addenda #3 to #7 inclusive:
 - (a) Construction of nine each 30,000 cubic feet capacity bombproof magazines, complete with all necessary utilities and fixtures.
 - (b) Construction of three (3) each 10,000 cubic feet capacity bombproof magazines, complete with all necessary utilities and fixtures.
 - (c) Construction of six (6) each 5,000 cubic feet capacity bombproof magazines, complete with all necessary utilities and fixtures.
 - (d) Construction of all necessary connecting and access roads, complete with paving, culverts, headwalls, and ripped ditches.
 - (e) Construction and installation of electrical distribution system for magazines.
 - (f) The installation of all necessary construction plant, equipment, buildings, and facilities to carry out the construction program.
2. Work is to be performed under Contract No. W-414-eng-602. (1-A. Ammunition Storage Magazines.)
3. Present Construction is Limited to:
 - (a) Excavation for all bombproof magazines.
 - (b) Construct access and connecting roads complete with paving, culverts, headwalls, and drainage ditches.
 - (c) Construct and complete nine (9) each 30,000 cubic feet capacity magazines, except that work on burster courses for magazines No. 30-1, 30-2, 30-8, 30-9, is suspended until further orders by the District Engineer.

- (d) Construct and complete two (2) each 5,000 cubic feet magazines, No. 5-1, and 5-2, *except that work on the burster courses is suspended until further orders by the District Engineer.*
- (e) Construct and complete three (3) each 10,000 cubic feet magazines, No. 10-1, 10-2, 10-3, *except that work on the burster courses is suspended until further orders from the District Engineer.*
- (f) Construction, installation, and repair of necessary plant equipment, and facilities for consumation of construction program.

/s/ THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

SEPTEMBER 2, 1941.

ADDENDUM NO. 7

To Accompany Job Order No. 5.0

Contract No. W-414-eng-602

WORK TO BE DONE: Construct and Complete Four (4) Each 5,000 Cubic Feet Capacity Reinforced Concrete Ammunition Storage Structures.

DISTRICT: Honolulu District, Honolulu, T. H.

The work to be done, as provided for herein, is located at Wheeler Field, on the Island of Oahu, T. H., and is limited to the following specific items:

1. Furnish all labor and equipment, and perform all work necessary to construct and complete four (4) each 5,000 cubic feet capacity reinforced concrete ammunition storage structures, (Structures to be constructed are shown as No. 5-3, 5-4, 5-5, and 5-6, on drawing. "Bombproof Magazines", General Plan No. 2, File No. F-5/2). All of the work to be done shall be in accordance with Specifications, "Bombproof Ammunition Storage and Appurtenant Work to Accompany Job Order No. 5.0", and the details shown on the drawings enumerated in the Specifications.

2. Work shall not be initiated on the construction of Burster Course for structures 5-3, 5-4, 5-5, and 5-6, until so ordered by the District Engineer.

Total Cost of the work to be done shall not exceed \$157,200.00.

Addendum No. 7 is work authorized under Job Order No. 5.0 and does not alter Addendums, No. 1, 2, 3, 4, 5, and 6.

/s/ Theodore Wyman Jr.,
THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

Recapitulation of Estimated Cost

1. Total Cost of Work:

(a) Direct Cost:

Total Cost to the Contractor.....	\$157,200.00
Contingencies—10%	15,720.00

Total Direct Cost.....	172,920.00
------------------------	------------

(b) Indirect Cost:

Survey, Inspection, Engineering.....	\$12,576.00
Total Indirect Cost.....	12,576.00

Total Field Cost.....	185,496.00
-----------------------	------------

General Office Overhead.....	12,576.00
------------------------------	-----------

Estimated Total Cost to the Government.....	198,072.00
---	------------

This estimate is prepared for use in the District only and is not for distribution to the Contractor.

/s/ Theodore Wyman, Jr.,
THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

NOVEMBER 13, 1941.

ADDENDUM NO. 8

To Accompany Job Order No. 5.0

Contract W-414 eng-602.

DISTRICT: Honolulu District, Honolulu, T. H.

Addendum No. 8 *authorizes construction* of burster courses for magazines, numbers: 30-1, 30-2, 30-8, 30-9, 10-1, 10-2, 10-3, 5-1, 5-2, 5-3, 5-4, 5-5, and 5-6, on which work was suspended by Addendum No. 5 dated July 1, 1941; Addendum No. 6 dated August 14, 1941; and Addendum No. 7 dated September 2, 1941.

/s/ Theodore Wyman, Jr.,
THEODORE WYMAN, JR.,
Lt. Col., Corps of Engineers,
District Engineer.

JANUARY 3, 1942.

ADDENDUM No. 9

To Accompany Job Order No. 5.0

Contract W-414-Eng-602

DISTRICT: Honolulu District, Honolulu, T. H.

Addendum No. 9 to accompany Job Order No. 5.0 provides for the plugging of holes in all magazines not contemplated for use of personnel.

/s/ THEODORE WYMAN, JR.,
Colonel, U. S. Army,
District Engineer.

FEBRUARY 20, 1942.

ADDENDUM NO. 10

To Accompany Job Order No. 5.0

Contract W-414-Eng-602

DISTRICT: Honolulu District, Honolulu, T. H.

Addendum No. 10 to accompany Job Order No. 5.0 (Bombproof Ammunition Storage Magazines, Wheeler Field, provides for camouflaging of entrances and approaches to the bomb storage magazines, in accordance with plans and instructions furnished the Area Engineer.

/s/ THEODORE WYMAN, JR.,
Colonel, Corps of Engineers,
District Engineer.

ARMY PEARL HARBOR BOARD EXHIBIT No. 4H

EXHIBIT—CBB

WAR DEPARTMENT

UNITED STATES ENGINEER OFFICE

HONOLULU, T. H.

Contract No. W-414 eng-602

Hickam Field, Oahu, T. H.

Job Order #78 April 25, 1941 (Rev) AUG 15, 1941.

Contractor—Eight (8) Igloo type reinforced concrete Magazines (20' 6" x 40' 4" inside dimensions). Increased to ten (10) by revised job order.

Est. Cost \$91,082.00

Revised \$148,406.00 (to Gov).

Commencement Date: May 1, 1941.