

OFFICIAL
WAR HISTORY
OF THE
PUBLIC WORKS DEPARTMENT

VOL. II

Ex Libris



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OFFICIAL WAR HISTORY
OF THE
PUBLIC WORKS DEPARTMENT
VOL. 2.

COMMISSIONER OF DEFENCE
CONSTRUCTION

Schedule of Unit Prices

FOR

Auckland

Works carried through under the War
Emergency Regulations and agreed
upon between the Department of
Public Works and the Master Builders'
Associations

COMMISSIONER OF DEFENCE CONSTRUCTION

SCHEDULE OF UNIT PRICES

ent comprises the "Master Schedule" for the provided for in the system of contracting adopted under the Commissioner of Construction in agreement with the Master Builders' Association and it is that the system as set out below shall be followed and the prices set in this schedule shall be adopted in all Defence contract work in that District

Commissioner of Defence Construction.

For Master Builders' Association.

INSTRUCTIONS FOR FIXING CONTRACT PRICES FOR WORK UNDER THE COMMISSIONER OF DEFENCE CONSTRUCTION

NOTE:

Division has been divided into 17 districts and for each of these a Master Schedule is required.

Commissioner of Defence Construction has appointed Quantity Surveyors to the Government in this work. They are:-

AUCKLAND - Mr. J.A. Stewart and Mr. A. Maltby.
WELLINGTON - Mr. A.L. Robertson.
DUNEDIN - Messrs. C.E. George and Sons.

Master Schedule for each district has been prepared by the Quantity Surveyor of that district in collaboration with the Master Builders' Association and same operative upon approval by the Commissioner.

been made as comprehensive as possible at the outset but will be added to time to time as fresh materials or fresh classes of workmanship present themselves.

rates will be based on the Schedule of Wages Rates for Defence Work must include Foremen's supervision on the job and the material rates will be based on prices of materials which will be furnished by the Price Controller, on materials which may be supplied by the Department and who will fix the same, and on prices of materials for which the Contractor has to procure elsewhere the prices of materials have been fixed by the Price Controller, i.e. of timber, should it be necessary to draw stocks from Merchants' yards, Contractor will be paid the difference in the cost between ex-yard timber on job, price for timber ex mills' price, plus freight to job. It is clearly that none of these prices may be varied except by the consent of the Government.

rates for labour and material are to be based as if the work was carried out in the city or town area of the particular district to which the rule applies.

and the work be carried through outside any of the above mentioned areas still in the district, variations to the unit rates for labour will be in the event of the Contractor having to pay fares, travelling time, country board allowances. The sum to be allowed for board is 50/- per week per man to be provided by the Department. A further variation to the rule is that in the event of wet weather and it so happens that the Contractor may have to make up to any workmen the difference between his actual wage and the minimum weekly wage in any one week, this difference will be added to the contract sum.

variations to the material rates will be made for increased or reduced costs of transport charges, etc. These variations will be adjusted on the production of a statement by the Contractor has been put to this additional cost or that it is proved that the rates, freight charges etc., are more or less than that on which the rates were made up.

except in the case of scantling, the measurements shown are the net measurements and the rate includes full allowance for waste, shrinkage, chiselling, tongues, grooves, laps, mortising, tenoning, nails, clouts, brads, washers; all dressing except in the case of flooring, the final sand dressing in the case of sanitary work, for completing the work in accordance with the Plumbing Regulations and By-Laws; in the case of electrical work in accordance with the Electrical Wiring Regulations 1935 and amendments in the case of Asbestos-cement work including all nails, clouts, screws and bolts in accordance with the specifications.

measurements are to the nearest six inches and where the length is less than six inches, and where the length is less than six inches and no allowances for waste.
of materials which require to be produced in a workshop (for example, plumbers' requisites, heating and hot water services, electrical works, plaster, metal work, etc.) it includes any sums by which the nett material rates are to be increased by way of allowance for sub-contract charges if the work is done by sub-contract or by the contractor.
If the principal for whom works are being constructed excludes from the general contract and makes other arrangements for the execution of any of the items listed in paragraph (b) of this clause, the Master Schedule prices for the items of materials and labour in every such excluded trade for work upon, or for the construction of, any building or other structure to be constructed under the contract, shall be totalled and a sum equal to 5% thereof assessed for the contractor's profit and a further sum of 2½% of the total of those shall be assessed for overhead charges. The total sums so assessed for profit and overhead charges shall be included in the fixed contract price for the general contract.
The trades referred to in the last preceding paragraph are:-

Work excepting structural work

Plaster

Plaster, including joinery and fixtures but excluding movable articles.

Plaster-cement, Patent Fabric and other usual roofing work

Plaster

Structural and Sanitary) but excluding hot water and heating system, gas systems and other systems of a specialised character.

Plaster

Work in the nature of reticulation including switchgear and fittings not exceeding 10 amps per circuit, and including cooking and water heating apparatus of the type sufficient for not more than 10 persons.

Plaster

Plaster

Plaster

Flooring and other Lithic Flooring essentially part of the structure.
and

Price allowed for each class of material and labour is provisional only and the Commissioner of Defence Construction reserves the right to alter any price in the Master Schedule from time to time on evidence available as to actual costs.

Note: The rates fixed throughout the Schedule do not include allowances for the extra Sales Tax of 10% wherever it applies. The Fibrolite rates show the basis for work executed prior to May 1st, the date of increased rates, and also the rates after May 1st, inclusive of Sales Tax. The rates do not include the 5% bonus on wages to a maximum of 5/- per week on labour sums will be allowed to the Contractor on properly attested vouchers.

A contract based upon this Schedule shall be deemed to vest in the Commissioner or his Agent full right and liberty to examine every document in connection with the contract, including accounts, bill of quantities, calculations, invoices, orders, wages books and all records in respect of the works.

OF QUANTITIES:

The Quantity Surveyor for the district where the work is located (hereinafter referred to as the Quantity Surveyor) prepares from the plans and specifications a list of quantities of labour and materials pricing each according to the Master Schedule for the District. The Quantity Surveyor will total these figures, add 5% for the Contractor's profit and add a further 2½% of the total plus profit, for overhead charges. The sum so reached is the initial price and a copy of the Schedule complete with the list of quantities will be supplied to the Contractor with the Plans and Specifications.

The Quantity Surveyor may in any case where he thinks it necessary re-survey the works or any part of them before releasing the Schedule of Quantities. The Quantity Surveyor shall supply to the local office of the Timber Controller a list of quantities of timber only as early as is practicable. The Quantity Surveyor shall give prompt consideration to lists of adjustments submitted by Contractors and shall within seven days of receiving same inform the Contractor that the list of adjustments is approved or else shall refer it to the Assistant Architect for investigation by another Quantity Surveyor. The points in the list shall be accompanied by a summary of the Contractor's arguments and his own replies.

the list of adjustments has been finally settled the Quantity Surveyor shall set the Schedule of Quantities accordingly so as to show the fixed contract shall supply copies thereof to the District Engineer and the Contractor.

AFTER CONTRACT PRICE IS FIXED:

Quantity Surveyor shall investigate and make a report and recommendation for information of the Commissioner upon the following claims:

Claims for variation of prices actually paid or reserved by the Contractor if authorised by the Price Tribunal, Arbitration Court or other competent authority.

Claims for other alterations of the fixed contract price permitted under the Conditions of Contract if such claim is based upon or affected by the assessment of quantities of materials or the prices payable therefor.

Claims based upon any difference between the nett Quantities shown in the schedule of Quantities and the nett quantities actually incorporated in the works.

Other applications for variations of the fixed contract shall be settled between the contracting parties according to their contract.

SCHEDULE OF ITEMS
PRELIMINARIES & GENERAL

	Kind	Labour Rate	Material Rate
for setting out the works	each		
" erection of Clerk of Works Office	"	Quantity Surveyor Builder and Resident Engineer will adjust	
" " " Foremen's Office	"		
" " " Workmen's Sheds	"		
" " " Tool & Material Stores	"		
" " " Temporary Latrines	"		
" Temporary Water Supply			
" Provision of Telephone			
" " " Power			% on cost of job
" " and Cartage Erection and Demolition of Scaffolding Buildings 12 ft. high	per ft.	3d. Brick	Measured from Ground to Eaves
" " and Cartage of Plant		Q. S. &	Builder
" Removing Rubbish & Cleaning Down at completion	super ft.	1d.	Floor area where applicable
" Maintenance		P.W.D. will maintain	
" Return of Deposit returned with 1st progress payment			
The erection of Cookhouses and accom- modation for workmen (if and where required) will be carried out at Schedule rates, and will become the property of the Government. This applies only to the larger contracts.			
All Insurances including Workmen's Compensation, Public and Fire Risks will be borne by the Government.			
upon Plumber Electrician and all other trades, and make good.		Q.S. &	Builder

EXCAVATIONS

An allowance of minimum 6" on either side of each trench or excavated area where excavation is over 5 ft., in depth is made so as to allow for Timbering to support the Banks.

Where concrete in foundations less than 5 ft. in depth is required to be boxed, an allowance of 3" only on each side has been allowed for boxing.

Excavation prices to include for all back filling required, and for wheeling and spreading the balance not exceeding 100 ft. from the pit or trench.

Additional rates for haulage to greater distances are scheduled.

It is assumed that the Building sites have been excavated to a datum level, and excavations will be measured from the datum level to the depths required, but in the event of the Contractor having to excavate in open cutting to sites this work will be measured separately. Machine digging by arrangement.

Excavations by hand in open cut for levelling of sites, and deposited and spread not exceeding 100 ft. distant.

Ordinary Soil, Clay, Scoria, etc.

Loose Shale or Shingle

Gravel

Solid Rock

Kind	Labour Rate	Labour Material
per cub. yd.	@ 5/6	
"	@ 9/6	
"	@ 10/3	Pug excepted
"	@ 23/6	

Pug
excepted

EXCAVATIONS TO TRENCHES & FOOTINGS

EXCEEDING 5 FT. DEEP, MOSTLY SHALLOW

Ordinary Soil, Clay, etc.

Loose Shale or Shingle

Gravel

Solid Rock

"	@ 6/9	
"	@ 9/6	
"	@ 25/-	Pug excepted
"	@ 35/-	

Pug
excepted

EXCAVATIONS - (Contd.)

	Kind	Labour Rate	Material Rate
<u>OVER 5 FT. & NOT EXCEEDING 10 FT. DEEP</u>			
in Clay etc.	per yd. cube	@ 10/-	
in Loose Shale	"	@ -	
in Papa	"	@ 30/-	
in Solid Rock	"	@ 40/-	
<u>OVER 10 FT. & NOT EXCEEDING 15 FT. DEEP</u>			
in Clay, etc.	"	@ 13/-	
in Loose Shale	"	@ -	
in Papa	"	@ 33/6	
in Solid Rock	"	@ 43/6	
<u>EXCAVATIONS IN BASEMENTS & OTHER AREAS</u>			
<u>NOT EXCEEDING 5 FT. DEEP, HAND DIGGING</u>			
in Clay, etc.	"	@ 6/9	
in Loose Shale or Shingle	"	@ 9/6	
in Papa	"	@ 23/6	
in Solid Rock	"	@ 32/-	
<u>FROM 5 TO 10 FT. DEEP</u>			
in Clay, etc.	"	@ 9/2	
in Loose Shale	"	@ -	
in Papa	"	@ 27/-	
in Solid Rock	"	@ 35/6	
Excavation in piles or post holes 50% on items 6, 7, 8, 9.			
Charge of Spoil from Site			
per Cubic yard (loose) for ½ mile	"	@ 1/9	
" " " " " 1 "	"	@ 2/3	
" " " " " each extra ½ mile	"	@ 6d.	

DATA.

Scoria 6/- yd. D/D. nett

Sand Less 5% = 23/6 D/D. nett

EXCAVATIONS - (Contd.)

TIMBERING

All Excavations up to 5 ft. in depth to include for the provision of any necessary Timbering.

Timbering (heavy) to faces of open faces or trenches. (Face area measured)

Miss (light) Timbering to ditto

Kind	Labour Rate	Material Rate
super ft.	@ 6d.	@ 1/-
"	@ 4d.	@ 8d.

PUMPING

ist

SUNDRIES

ing only material from Excavation below

yard cube @ 1/-

de floors spoil and ram below floors

" @ 4/6

le or Scoria filling below floors

" @ 3/6 @ 6/-

ing surfaces of filling with sand

yard super @ 4d. @ 10d.

vide coat of hot Tar on ground below ground plates

" @ 8d. @ 1/4

sealing to surfaces of shingle filling
ecification before Valuing

" @ 6d. @ 1/-

CONCRETOR

Small Jobs Hand Mixed	Kind	Labour Rate	Material Rate
Large Jobs by arrangement			
Concrete in all work to foundations, cement Floor & Walls, etc. up to 1st Floor Level, including any pier base walls below Ground Floor and any slabs on solid.	yard cube	Small jobs hand mixed @ 18/6	@ 53/6
ditto ditto	"	@ 20/-	@ 52/-
Concrete in Walls, Piers, etc. from Ground 1st Floors for hand hoisting	"	@ 20/9	- 53/6
ditto ditto	"	@ 22/9	- 52/-
Concrete in 1st Floor Beams & Gable	"	@ 20/9	- 53/6
ditto ditto	"	@ 22/9	- 52/-
Concrete in Walls, Piers etc., from 1st 2nd Floors Mechanical hoist by arrangement	"		- 53/6
ditto ditto	"	C.S. & Builder will adjust	- 52/-
Concrete in 2nd Floor Slab & Beams	"		- 53/6
ditto ditto	"		- 52/-
Cost per cubic yard for hoisting concrete above this 2nd floor level Tank Stands, etc.	"		-
Concrete in Ablutions Benches & Urinals.	"	@ 21/6	- 52/-
Ditto in Septic Tanks	"	20/-	- 52/-
Ditto in Piles including boxing below wood floors	lin ft.	@ 1/2	@ 1/4
Galv. Wire Ties built into foundation walls and piles	per doz.	@ 2/-doz	@ 1/-doz
Blue only for using Repello in lieu of Portland	yd. cube	@ 1/6	@ 12/6
Ditto for using Wilsomite in lieu of ditto	"		@ 6/6
<u>SUNDRIES</u>			
Reinforced joints in concrete slabs 4 x 3/8	lin. ft.	@ 4d.	@ 9d.
Concrete with neat cement & trowelling floors, treads & risers	yd. super	@ 1/-	@ 4 1/2 d.
Ditto with Allundum grit or similar 1 lb. per yard.	"	@ 1/4 1/2	@ 2/1 1/2
Cement Mortar to floors 1" thick	"	@ 2/-	@ 2/2
Ditto with Allundum grit	"	@ 2/3	@ 3/11

	Kind	Labour Rate	Material Rate
Cement Mortar to floors $\frac{1}{2}$ " thick	yd. super	@ 1/8	@ 1/4
do with Allundum grit	"	@ 1/11	@ 3/1
Opello cement to floors 1" thick	"	@ 2/2	@ 2/9
a Valve for forming semi-circular channels in floors	lin. ft.	@ 1/6	
3 Concrete fireplaces complete with grates, etc.	Q.S.	& Builder will adjust	
Millon concrete coppers complete with flues and 10 ft. flue pipe	each	@ 29/-	@ P.C. \$10.10.-
ete Wash Tubs complete with outlet plug and chain	"	@ 5/-	@ P.C. \$3.3.-

BOXING

Based on supply of Timber by Builder
at own rate.

BOXING

	Kind	Labour Rate	Material Rate
ing is measured the nett face area of concrete surfaces to be boxed, and price for labour must include for the erection and stripping of all Boarding studs, plates, braces and supports, and material rates must include for the supply of all these materials and also the fillets at angles, and all blockings at Sills etc., if required.			
ing to sides of concrete foundations (where required) & up to 3 ft. above ground	sup. ft.	@ 6d.	@ 4d.
to Basement walls and dwarf walls up to Ground Floor Slab & ditto	"	@ 6d.	@ 4d.
for Ground Floor Slabs & beams where suspended	"	@ 6d.	@ 6d.
for Piers & Walls Ground to 1st Floor	"	@ 6d.	@ 6d.
for 1st & other floors & beams	"	@ 6d.	@ 6d.
for Piers & Walls above 1st Floor	"	@ 6d.	@ 6d.
for Stairs Soffites, strings & steps all floors	"	@ 8d.	@ 7d.
in Water Towers, Fill Boxes & the like	"	by arrangements	
a value only for boxing to circular faces	"	@ 2 1/2 d.	- 2d.

BASIS FOR STEEL

BASIS	£18/-/-	Ton ex Store
$\frac{3}{8}$ "	£18/15/-	" "

DUNEDIN ROLLINGS

$\frac{3}{4}$ " $\frac{5}{8}$ " $\frac{1}{2}$ " Dias. £28/10/- ton ex Store or Station

REINFORCING STEEL

(Prices include all tying wire)

	Kind	Labour Rate	Material Rate
1 1/8" Mild Steel Bar reinforcement	per cwt.	1 1/4" 1 1/8" 4/6 5/-	@ 18/-
2", ditto ditto	"	1" 3/8" 6/7 7/6	@ 18/-
ditto ditto	"	@ 8/3	@ 28/6 Dunedin
ditto ditto	"	@ 9/4	
ditto ditto	"	@ 10/-	
ditto ditto	"	@ 16/6	@ 18/9
A. ditto in Binders & Stirrups	"	@ 13/-	@ 28/6 D.
ditto	"	@ 21/-	@ 18/9
ditto	"	@ 37/-	
ing Wire based on 68 Tons per 100 Tons	"	Included	@ 40/-
for Hoisting above 1st Floor	"	@ 1/-	-
for Hoisting to Tank Stands etc.	"	@ 2/6	-

RICKWORK DATA BASED ON PRICES PRIOR TO INCREASED S.T.

ce	Bricks (common)	£6.10.9	1,000 at yard less 5%
S.T.		£7.11.0	including haulage City area less 5%
	Cement	£4.18.3	less 5% D/D
	Lime	£4. 2.0	" " "
	Sand	£1. 6.3	yd. " " "
	Washed & Screened		
	Wilsonite	£6. 5.6	Ton " " "
	Repello	£8. 2.3	" " " "

MATERIALS

Mortar	£2.13.3	per 1000 bricks nett	
Bricks	£7. 3.6	" " nett	<u>Labour</u>
			Based on
			£5.10.0 per
			1000
	£9.16.9	per 1000 material	+ 8d. yd. for
			striking
			joints

Briector Bonding: 5/9 roll of 50 ft.

BRICKWORK (measured nett)

PRICE TO INCLUDE FOR ALL WASTE ROUGH CUTTINGS, PLUMBINGS ETC.

on Brickwork in Mortar composed of
1 part lime 10 of sand and to this
mixture gauge with 1 part cement
and 3 of the above in Walls up to
1st floor level

thick Brickwork struck one side

" ditto " " "

" ditto " " "

" Hollow Brickwork

ditto ditto

Brick in Chimney flues built in Fire-
clay mortar, reduced to 4 1/2" thick

thick Breeze Concrete Block Walls

Flow Tile Walls

ing Brickwork (struck joints)

value for hoisting Bricks any height
above 1st floor level and up to 3rd
floor level.

lies 4 to yard

or Bonding

SUNDRIES

in flue pipes from ranges etc.

CI Soot Doors & Frames

a. Chimney Pots

hearths, mantels and surrounds

hearths (& Open Fireplaces facework
only)

proof course to Brickwork, Repello
cement and Sand 1 to 1

zzo slabs polished, plain 3'0" x 2'0"
x 1 1/2"

Kind	Labour Rate	Material Rate
per sup. yard	@ 5/6	@ 8/7
"	@ 10/-	@ 17/2
"	@ 15/-	@ 25/9
"	@ 12/6	@ 17/2
"	@ 16/-	@ 25/9
"	@ 7/6	@ 27/-
"	@ 5/3	@ 6/6
"		
"	included	
per 1000 bricks	@ 6d. yard per floor for 4 1/2" work	
sup.yd	@ -	@ 6d.
lin.ft	@ 1/2d.	@ 1d.
each	@ 4/-	@ -
"	@ 1/-	@ P.C. £1.8.0
"	@ 5/3	@ P.C. £1.6.0
"	@ 35/-	P.C. 8um
"	@ 60/-	@ sum £2.10.0
yd. super	@ 3/-	@ 2/10
each	@ 2/6	@ £2.5.0

PLASTERER DATA

Cement	£4/18/3	less	5%	D/D
Sand	£1/6/3 yd.	"	"	"
Whangarei Sand	£1/10	"	"	"
Keenes	£20/-/-Ton	less	5%	
Hardwall Plaster	£13/2/-	"	"	"

PLASTERER (openings deducted)

Prices to include all Labours to angles arrisses (projecting sills etc., if required) also all Scaffolding and erection.

EXTERNALLY

Plaster with 3-1 cement plaster and set with colonial coloured cement, silver and in the proportion of 3-1

Kind	Labour Rate	Material Rate
per super yard	@ 3/7	@ 1/11

and set with Portland Cement and in the proportion of 3 to 1

"	@ 3/7	@ 1/8
---	-------	-------

See scaffold below where it applies
Extra

INTERNALLY

Plaster with 3-1 Portland cement plaster one coat trowelled smooth

"	@ 2/6	@ 1/2
---	-------	-------

and set with Hardwall plaster and all quantity of lime putty

"	@ 3/7	@ 1/8
---	-------	-------

and set with Keenes Cement and small quantity of putty

"	@ 3/7	@ 2/2
---	-------	-------

value forming recesses for sparge
to urinals

lin. ft.	@ 1/6	@
----------	-------	---

old external up to 12 ft. height, 9d. yd. extra

Over 12 ft. " 1/6 " (for high buildings)

internal 6d. " to internal plaster

thick Fibrous Plaster Sheets to walls, c. 1st Class work stopped and pointed

super yd.	@ 3/6	@ 2/3
-----------	-------	-------

ditto ditto

"	@ 4/3½	@ 2/4
---	--------	-------

us plaster cornice per 6" in girth
per extra inch in girth

lin. ft.	@ 5d.	@ 5d.
	2d.	1d.

s to ditto = 1 ft. of cornice

each

ous Plaster walls or ceilings, nail
stopped only (for wood battens)

M & L	@ 4/-
-------	-------

ous Plaster joints flush pointed
(no battens)

"	@ 4/9
---	-------

" " nail holes stopped (for
wood battens)

"	@ 4/9
---	-------

" " ditto flush pointed

"	@ 5/6
---	-------

TIMBER DATA

Based on 32/- 100
and 1/6 Cartage
33/6

Cartage adjustable to district.
Add nails where applicable.

CARPENTER & JOINER

NOTE: All framing timber is measured to the nearest foot above the length required to cut 10 fts. and over and lengths below this to the nearest 6 inches for cutting.

Flooring is measured nett laid area.

Roof course consisting of two layers of Building paper, or a good coat of Tar on walls and piles.

or 3 x 2 Ground Plates

MEMBER OF SCANTLING SIZES UP TO 6" x 2"

Roofs & Sleepers

Joists

Plates & Noggings & Framing generally

Framing Joists

Roofs

Joists

MEMBER IN SIZES IN EXCESS OF 6" x 2"

Roofs & sleepers

Joists

Plates & Framing generally

Framing Joists

Roofs

Joists

Roof in Valley Rafter, Hips, framing to eaves, etc.

Roof in framing to Roof principals in Scantling sizes

Roof in ditto sizes in excess of 6 x 2

Framing Roof Principals for every 10 ft. or part in span and 10 ft. in height

ditto but 20 ft. in height

Kind	Labour Rate	Material Rate
super yd.	@ 1/9	@ 3d.
100 sup.ft.	@ 15/-	@ 33/6
"	Based on up to	
"	5 x 2	33.6
"	22/6	nails 2.0
"	6 x 2	35.6
"	20/-	
"		
"		
"		
"	@ 20/-	@ 35/6
"		
"		
"		
"	@ 28/-	@ 35/6
"	@ 50/-	@ 33/6
"	@ 46/-	Nails 1/-
		34/6
		====
	included	

TIMBER DATA

Treasury pays A/c.
Then deduct from
Builder

10	6 x 1 P T. & Gd. Sarking	54. 0
	Cart.	<u>1. 6</u>
		55. 6
	27½% waste	15. 3
	Nails	<u>3. 0</u>
		<u>73. 9</u>

54. 0 .
27½% 14.10
68.10 per 100
measured

11	Sawn Sarking	32. 0
	Cart.	<u>1. 6</u>
	15% Waste	5. 0
	Nails	<u>3. 0</u>
		<u>41. 6</u>

32. 0
15% 4. 9
36. 9 "

12	8d Timber Item	54. 0
	Cart.	<u>1. 6</u>
	7½% Waste	4. 2
	Nails	<u>3. 0</u>
		<u>62. 8</u>

54. 0
7½% 4. 0
58. 0 "

or 7½d. foot
base on 8d. ft.

CARPENTER & JOINER (Contd.)

HANGARS, ETC.

	Kind	Labour Rate	Material Rate
Timber framing to Hangar posts, etc. and the like	per 100 ft. sup.		
Plating, plates, noggings, etc. between posts etc., (scantling sizes)	"		
ditto sizes in excess of 6 x 2	"		
Timber framing in Gentries, overhead travellers and similar work	"	Q.S. & Builder adjust	
Timber Framing to Hangar Principals	"		
Plating Principals span height	each		
ditto ditto ditto	"		
ditto ditto ditto	"		
Planks and roof timbers (not framed)	per 100 sup. ft.		
Plating, etc., to Hangar roof up to 40 ft. high percentage on the following rates for extra hoist			
Plating to roofs of low buildings up to 20 ft. high			
6" P.L. & Gd. Sarking (nett laid area) 27 1/2% waste	100 super ft.	@ 22/6	@ 75/9
Hand sarking in 6" widths 15% waste	"	@ 16/-	@ 41/6
ditto (Hit & Miss) adjust for material	"	@ 16/-	
ditto in 6" widths	"	@ 16/-	@ 41/6
ditto in 6" widths thickened to walls	"	@ 16/-	@ 41/6) Thickening 4/6)
Planks over Ceilings reduced to 1" thick	"	@ 18/6	@ 41/6
Boards face measure inc. 3 x 2 Battens @ 2 ft. crs.	"	@ 35/-	@ 58/6
Galv lined gutter including framing	"	1/9	@ 1/9
Labour & waste to diagonal sarking	extra	@ 2/-	@ 3/9
<u>DRESSED TRIM EXTERNALLY</u> Based on 54/- 100	lin. ft.		Based on 54/- 100
Plating to gutters 3 x 1	"	@ 3d.	@ 2d.
Plating to eaves 3 x 1	"	@ 8d.	@ 5d.
Plating to eaves 7 x 1	"	@ 8d.	@ 5d.

DATA

Boards

Boards	37. 6.
	1. 0.
Waste	3. 0.
Batten	7. 6.
	1. 0.
	<hr/>
	50. 6. per
	100 ft.

Matchlining

All measured as 1".	
	54. 0.
Cart.	1. 6.
Waste 27 $\frac{1}{2}$ %	15. 3.
Nails	4. 0.
	<hr/>
	74. 9. per 100
	measured

Treasury pays Account,
then deduct from Builder.

Timber	54. 0.
27 $\frac{1}{2}$ %	14.11.
	<hr/>
	68.11.

Boards

1. 3/16" Thick	30. 0.
	1. 0.
Waste	3. 0.
ns	7. 6.
	1. 6.

43. 0. per 100 revised to 41/- per 100.

1/4" Thick	42. 9.
	1. 0.
Waste	4. 3.
ns	7. 6.
	1. 6.

57. 0. per 100 revised to 55/4 per 100.

	Kind	Labour Rate	Material Rate
Surfacing, 1 No. 1 $\frac{1}{2}$ paper & 1 No. 0 paper	100 super ft.	@ 10/-	
Shlining $\frac{3}{8}$ "x4" thick P.T. & Gd. V Jointed, nett laid area, 27 $\frac{1}{2}$ % waste	"	@ 34/-	@ 74/9
Shlining $\frac{1}{2}$ " thick P.T. & Gd. V Jointed, nett laid area	"	@ "	@ "
Shlining $\frac{3}{8}$ " thick P.T. & Gd. V Jointed, nett laid area	"	@ "	@ "
Shlining 1" thick P.T. & Gd. V Jointed, nett laid area	"	@ "	@ "
Boarding $\frac{1}{2}$ " Pinex inc. battens, check costs to be instituted	"	@ 15/-	@ 50/6
Galtar Board $\frac{1}{4}$ " thick	Winstones Price		
" $\frac{3}{8}$ " "	P.C. 50/- 100,		
	fixed & stopped		
Asbestos sheets to walls & ceilings 3/16" thick including wood battens	"	@ 27/6	@ 41/-
Asbestos ditto, $\frac{1}{4}$ " thick	"	@ 27/6	@ 55/4
Wallpapering, 3 ply mock	super ft.	Q.S. & Builders arrange	
Wallpapering, 5 ply mock	"		
Wallpapering, plain mock	"		
Wallpapering, framed & molded	"		
			Based on 54/- 100 @ 2 $\frac{1}{2}$ d.
Platings, 4 x 1 on Studs	lin. ft.	@ 2 $\frac{1}{2}$ d.	
Platings, 6 x 1 on Studs	"	@ 3d.	@ 4d.
Platings, 8 x 1 on Studs	"	@ 4 $\frac{1}{2}$ d.	@ 5d.
Boards, 5 x 1	"	@ 9d.	@ 3d.
Boards, 3 x 1	"	@ 6d.	@ 2d.
Traverses, 4 x 1	"	@ 4d.	@ 2 $\frac{1}{2}$ d.
Traverses, 3 x 1	"	@ 4d.	@ 2d.
Coat Rails, 4 x 1	"	@ 9d.	@ 2 $\frac{1}{2}$ d.
Coat Stands 3 x 3 dressed posts & rails (of 3 x 3)	"	@ 1/4	@ 7 $\frac{1}{2}$ d.
for 2 grounds plugged to walls	"	@ 1/-	@ 3d.
for 1 ground " " "	"	@ 6d.	@ 1 $\frac{1}{2}$ d.
for 1" at floor	"	@ 2d.	@ 1 $\frac{1}{2}$ d.

JOINERY

Pricing Prior to increased Sales Tax

WINDOWS		Kind	Labour Rate	Material Rate
<u>WINDOWS delivered City Area</u>				
1. Timber	} no hanging or fitting sashes or Fans no facings no glazing	fixing each	Fixing on Site	
2. "				
3. "				
<u>with Transome</u>				
39 $\frac{1}{2}$ x 22 - 3	panes each	17-8	7 $\frac{1}{2}$ d. per ft.	5.10.0
39 $\frac{1}{2}$ x 22 - 3	" "			
<u>with Transome</u>				
39 $\frac{1}{2}$ x 20 - 3	panes	8-9	7 $\frac{1}{2}$ d.	3.4.0
39 $\frac{1}{2}$ x 20 - 3	" "			
<u>with Transome</u>				
39 $\frac{1}{2}$ x 22 - 3	panes each	15-1	7 $\frac{1}{2}$ d.	5.5.0
27 $\frac{1}{2}$ x 22 - 2	" "			
<u>with Transome</u>				
39 $\frac{1}{2}$ x 20 - 3	panes	7-6	7 $\frac{1}{2}$ d.	2.19.6
27 $\frac{1}{2}$ x 20 - 2	" "			
<u>with Transome</u>				
39 $\frac{1}{2}$ x 20 - 3	panes	7-6	7 $\frac{1}{2}$ d.	3.6.6
for glass 27 $\frac{1}{2}$ x 20				
<u>with Transome</u>				
27 $\frac{1}{2}$ x 20 - 2	panes	6-3	7 $\frac{1}{2}$ d.	3.3.0
for glass 27 $\frac{1}{2}$ x 20				
<u>with Transome</u>				
39 x 22 - 3	panes each	12-8	7 $\frac{1}{2}$ d.	4.7.6
16 x 22 - 1	" "			
<u>with Transome</u>				
39 x 22 - 3	panes	6-3	7 $\frac{1}{2}$ d.	2.14.0
16 x 22 - 1	" "			
<u>with Transome</u>				
27 x 22 - 2	panes each	10-2	7 $\frac{1}{2}$ d.	4.4.0
16 x 22 - 1	" "			
<u>with Transome</u>				
27 x 22 - 2	panes	5-1	7 $\frac{1}{2}$ d.	2.9.6
16 x 22 - 1	" "			

JOINERY (Contd.)

Pricing Prior to increased Sales Tax

	Kind	Labour Rate	Material Rate
	Fixing each	Fixing on site	
for Glass 16 x 20	4.2	1/3 per ft.	1 6 9
6 x 20 - 1 pane	4.2	1/3 "	1 7 6
39 x 22 - 3 panes each	9.0	7 th d. "	3 7 6
for Glass 27 x 20	6.6	1/3 "	1 15 9
ditto 24 x 20	5.10	1/3 "	1 14 -
9 x 20 - 3 panes	4.6	7 th d. "	1 16 -

JOINERY

WINDOWS

	Kind	Labour Rate	Material Rate
New Schedule			
" "			
Double hung windows all sizes measured over all	sup.ft.	@ 7 ² d.	@ 6/4
New Schedule			
sash & fix fastener	each	@ 5/-	
fanlight & ditto	"	@ 4/6	
pulley cords, weights, fasteners, lifts, to double hung windows	per window	@ 15/6	
only fixed sashes	each	@ 2/6	
wire frames for Glass under 10 ft.	per ft.	@ 1/3.	

DOORS

Price for all doors includes doors, jamb linings, (but not architraves) and for fixing butts and locks and hanging doors. (No glass)			
Side Doors Ht. Type S.1.7'0" x 4'6"	per pair	@ 25/-	@ 8.0.0
(in pairs) 9 x 2 pane & sill	"	@ 25/-	@ 6.5.0
Doors OB Type S.1.7'0" x 4'6" 7" casing (no sill)	each	@ 18/-	@ 5.5.0
" " " 8.2.7'0" x 3'0" (single)	"	@ "	@ 4.15.0
" Ht. Type S.3. 6'8" x 2'8" (sill)	"	@ "	@ 3.3.0
" OB " S.3. " " (no sill)	"	@ "	@ 3.1.0
" " T.1. 7'0" x 3'0" (no sill)	"	@ "	@ 2.17.6
" " T.2. 6'8" x 2'8"	"	@ "	@ 2.17.6
" " T.3. 6'6" x 2'6"	"	@ "	@ 5.3.0
" " Y 6'10" x 2'10"	"	@ 15/-	@ 2.12.6
" " Z 5'6" x 2'3"	"	@ "	@ 2.12.6
" " U 5'6" x 2'0"	"	@ "	@ 8.5.0
" Ht. " V 6'8" x 4'6" (Pairs) (sill)	per pair	@ 25/-	@ 6.10.0
" OB " V " " (no sill)	"	@ "	

JOINERY - (Contd.)

	Kind	Labour Rate	Material Rate
s, others, framed & panelled	sup. ft.	Q.S. & Builder arrange	
" " & sheathed with 1" P.T. & Gd. V. Jointed	"		
Box Doors	each	@ 35/-	@ P.C. Sum
ing Doors various sizes	sup.ft.	Q.S. & Builder	
s 8'0" x 8'0" x 2½" (in pairs)	per pair	@ 60/-	@ 218.0.0
Store Doors	each	@ 80/-	P.C. Sum
Store Doors	sup.ft.	@ 10d.	@ 5/9
RIGHTS to doors, including extension of casings 1'6" x 4'6" and fixing hinges and fasteners.	each	@ 10/-	@ 30/-
itto ditto, 1'6" x 3'0" and ditto	"	@ "	@ 27/6
itto ditto, 1'6" x 2'10" and ditto	"	@ "	@ "
itto ditto, 1'6" x 2'8" and ditto	"	@ "	@ "
ing to Window & Door Facings 3" x 1"	lin. ft.	@ 3d.	@ 2d.
. Iron Flashings to ditto	"		
o Flashings to ditto	"	@ 2d.	@ 4d.
creens of galv. wire gauze	sup.ft.	@ 1/3	@ 2/3
ry Sashes & Frames (sliding)	"	@ 2/-	@ 8/6
ard Fronts including doors, etc.	"	@ 9d.	@ 3/6
ick sides, tops, bottoms & shelves	"	@ 10d.	@ 8d.
es 6'0" x 1'3" x 1'8" single	each	@ 3/9	@ 3/10/-
ditto in batteries of 6	per range	@ 15/-	@ 17/10/-
es with Cupboards under	lin.ft.	@ 5/-	@ 1/5/-
to ditto	each	@ 3/6	@ 1/6/6
es to same	"	@ 2/6	@ 17/6
Tops (no Cupboards) measured as 1"	sup.ft.	@ 10d.	@ 8d.
nd Framing to last item	"	@ 10d.	@ 8d.
ng 1" thick including cleats	"	@ 8d.	@ 8d.
ng Slat including bearers	"	@ 8d.	@ 8d.
gs framed of 1" dressed Timber	"	@ 8d.	@ 8d.
able racks of 1" " "	"	@ 8d.	@ 8d.

JOINERY - (Contd.)

	Rate	Labour Rate	Material Rate
for Ablution Blocks	Labour 10d. Material 8d. Measure at 1" thick	lin. ft.	@ 10d. @ 8d.
tion Benches	" "	"	@ 10d. @ 8d.
aters with shelving & false floor under	"	@ 3/-	@ 1/7/6
to ditto	each	@ 5/-	@ 1/-/-
ed Framing for Racks etc., chiefly 3x2	ft. super	@ 10d.	@ 8d.
Tubs & Stands & Plugs & Washers each 4'6" long and chains	each pair	@ 20/-	@ 3/15/-
for small swill Tubs	each		
for large swill Tubs	"		
Small	"		
Large	"		
for Fuel Drums approx. 3'6" high	"		
for H.W. Cylinders 150 gallons	"	Q. S. &	
for Cold Water Tanks	lin. ft.in height	Builders	
for ditto, double tanks	"		
for ditto treble tanks	"		
ers Block	each		
nails	lin. ft.		

JOINERY - (Contd.)

HARDWARE

includes butts, screws, locks and
furniture, double action springs,
padbolts, tower bolts, cabin hooks
and eyes, sliding tracks and hangers,
padlocks, casement openers, fan open-
ers, sash lifts and catches, sash
weights and cords, cupboard catches
and fasteners. H. & C. Hooks, Toilet
Paper Holders, etc

P.C. Sum

Items included in Joinery Labours
excepting the following:

Sliding Tracks & Hangers

lin.
ft. @ 3/-

Locks, hasps and staples

each @ 1/9

H. & C. Hooks

dozen @ 6/-

Toilet Paper Holders

each @ 9d.

Sliding Rails

each @ 1/10

METAL WORKER

	Kind	Labour Rate	Material Rate
Iron Ladders			
rails 3 x $\frac{3}{8}$ buffed	per lb.	@ 3d.	@ 1/-
ers 2 x $\frac{1}{4}$	"	@ 3d.	@ 1/6
or Plate doors & frames	"	@ 5d.	@ 1/6
	"	@ 2d.	@ 1/7
Galv. Iron Wire Holding Down Ties to 3'6" Girth Trusses	per strand	@ 9d	@ 3d.
t Rings in Roof Construction 2 $\frac{1}{2}$ "	each	@ 1/3	@ 1/2 $\frac{1}{2}$
ditto 4"	"	@ 1/3	@ 1/4 $\frac{1}{2}$
g Ragbolts	"	@ 8d.	@ 4 $\frac{1}{2}$ d.
$\frac{1}{2}$ "	"	@ 8d.	@ 5 $\frac{1}{2}$ d.
g Bolts & Nuts	"	@ 1/7	@ 8 $\frac{1}{2}$ d.
" "	"	@ 1/4	@ 7 $\frac{1}{2}$ d.
" "	"	@ 1/2	@ 6 $\frac{1}{2}$ d.
" "	"	@ 1/-	@ 6 $\frac{1}{2}$ d.
g Bolts & Nuts	"	@ 1/7	@ 1/-
" "	"	@ 1/4	@ 10 $\frac{1}{2}$ d.
" "	"	@ 1/2	@ 9 $\frac{1}{2}$ d.
" "	"	@ 1/-	@ 9d.
s 10" & upwards	per lb.	@ 2d. inch	@ 7 $\frac{1}{2}$ d.
and $\frac{1}{4}$ washers		Fixing with bolts	@ 6d.

FIXED FIBROLITE PRICES

Work executed prior to May 1st, less 5%
 " " after May 1st, Nett

Plaster on Wood Purlins	2" S.L.	£3.10.0 + 5/- = £3.15. 0
Plaster on Wood Purlins	7" S.L.	£3.15.0 + 5/- = £4. 0. 0
Plaster on Steel Purlins	2" S.L.	£3.17.6 + 5/- = £4. 2. 6
Plaster on Steel Purlins	7" S.L.	£4. 2.6 + 5/- = £4. 7. 6
Plaster on Wood Purlins		£3.10.0 + 5/- = £3.15. 0
Plaster on Steel " "		£3.17.6 + 5/- = £4. 2. 6
Plaster on Walls	2" S.L.	£3.15.0 + 5/- = £4. 0. 0
Plaster on Walls	7" S.L.	£4. 0.0 + 5/- = £4. 5. 0
Plaster on Walls	2" S.L.	£4. 2.6 + 5/- = £4. 7. 6
Plaster on Walls	7" S.L.	£4. 7.6 + 5/- = £4.12. 6
Plaster on Walls		£3.15.0 + 5/- = £4. 0. 0
Plaster on Walls		£4. 2.6 + 5/- = £4. 7. 6

FIXED FIBROLITE PRICES

Work executed prior to May 1st. loss 5%
 " " after May 1st. Nett

ing

uper Six Adaptable 2 Piece fluted Ridging
 Standard " " "

luted Sawtooth Ridging 9" Plain Wing
 " " Standard

ing to Super Six
 " Standard

, gutter or Apron Big 6. 9" x 2,3,4

" " 9" x 5,6

" " Standard 6 x 2"

" " 8" x 2,3,4

" " 8" x 5,6

0 x 10" Plain

axed angle 10 x 10"

ing Ridge Art. 85

" " 86

" " 89

" / Stop Ends to 85

" " 86

" " 89

fluted Ridging Stop Ends

ers

lds Art 102

" 103

" 104

" 105

" 106 9 x 9

ings 207 and 218

Corner Moulds 270 6 x 6

" " 271 6 x 6

" " 272

es 7 1/2 x 4"

9 x 4"

10 x 4"

12 x 4"

15 x 4"

18 x 4"

21 x 4"

24 x 4"

Stop Ends 1 foot of Gutter

Outlets

Angles 1 1/2 " "

Sump Outlets

ers 4"

5"

6"

8"

Stop Ends 1 foot of Gutter

Outlets

Angles 1 1/2 " "

ers Art 171 add 3d. per lin.ft. on each rate per lin. ft.

Sump Outlets

r Heads 12 x 6"

18 x 12"

24 x 12"

30 x 12"

3" @ 2 1/2 per lin.ft. Spreaders or Swan Necks @ 15/- each

4" @ 2 2/9 " " " " @ 17/6 "

5" @ 3/5 " " " " @ 17/6 "

6" @ 4/- " " " " @ 17/6 "

equal to 2 foot of Downpipe

" " 1 " "

9d. per lin. ft.

9d. per lin. ft.

3/6 per lin. ft.

3/- per lin. ft.

2/6 per lin. ft.

2/6 per lin. ft.

1/- per lin. ft.

1/- per lin. ft.

1/7 per lin. ft.

1/9 per lin. ft.

1/3 per lin. ft.

1/6 per lin. ft.

1/9 per lin. ft.

2/6 per lin. ft.

2/- per lin. ft.

25/- per lin. ft.

19/- per lin. ft.

14/- per lin. ft.

25/-

19/-

14/-

5/-

5/-

12/6

2/6 per ft.

2/- per ft.

1/6 per ft.

1/6 per ft.

1/9 per ft.

1/8 per ft.

2/- per ft.

2/3 per ft.

2/9 per ft.

3/6 per ft.

3/8 per ft.

4/- per ft.

4/6 per ft.

5/- per ft.

5/6 per ft.

5/10 per ft.

6/3 per ft.

25/- each

2/3

2/6

3/-

4/-

ing of Ventilated Roofs with wire netting

1/- per lin. ft.

SKYLIGHTS B1 Six Extra Value

30	Unglazed 40/-	Glazed	Art 81	Unglazed	Glazed
	" 42/6				
	" 45/-	Add glass			
	47/6	17/6		48/-	
	50/-			50/-	Add glass
				55/-	25/-

MANHOLES Super Six

47/6
50/-
52/6
55/-
57/6

MANHOLES Standard

37/6
40/-
42/6
45/-
47/6

SKYLIGHTS Standard Extra Value

76	Unglazed 30/-	Glazed	Art 77	Unglazed	Glazed
	" 32/6				
	" 35/-	Add glass		38/-	Add glass
	37/6	17/6		40/6	
	40/-			43/-	25/-

VENTILATORS Super Six Exhaust Type with Ridge Bases

complete with Ridge Base	£6.10.0	Ridge base only	£2.10.0
" " " "	8.15.0	" " "	3. 0.0
" " " "	10.10.0	" " "	4. 0.0
" " " "	15. 0.0	" " "	4. 0.0

STANDARD VENTS as above

EXHAUST VENTILATION with Sloping Bases Super Six

including sloping bases			sloping bases only			
12"	16"	22"	9"	12"	16"	22"
8. 4.6	9.12.0	14. 7.0	54/-	64/6	72/-	87/-
8. 7.6	9.15.0	14.10.0	57/-	67/6	75/-	90/-
8.10.6	9.18.0	14.15.0	60/-	70/6	78/-	93/-
8.15.6	10. 1.0	14.16.0	63/-	73/-	81/-	96/-
8.16.6	10. 4.0	14.19.0	66/-	76/6	84/-	99/-

STANDARD EXHAUST VENTS as above

3. 0.0	9. 0.0	14.16.0	50/-	60/-	67/6	96/-
3. 3.0	9. 3.0	14.19.0	53/-	63/-	70/6	99/-
3. 6.0	9. 6.0	15. 2.0	56/-	66/-	73/6	102/-
3. 9.0	9. 9.0	15. 5.0	59/-	69/-	76/6	105/-
3.12.0	9.12.0	15. 8.0	62/-	72/-	79/6	108/-

ROOFER (Contd.)

	Kind	Labour Rate	Material Rate
Asph. Fabric roofing of 3 layers of 1 ply, and one layer of gravel and hot bitumen	super yd.	Material & Labour	@ 12/6
ditto of 2 layers of 2 ply only	"		@ 10/6
ditto of 1 layer of 3 ply and 1 layer of Building paper only	"		@ 10/6
layer of 3 ply, lap 2" in hot bitumen, at 2'0" centres, double thickness	"		@ 5/6
Fabric at ridge gutters and outlets of valleys, secured with galv. clouts	"		
Asph. 1½ x ¾	lin. ft.	3d.	2d.

NOTE: Fabric prices for areas 50 yards and over. 12 to 50 yards 15% on above prices. 10 yds. and under by arrangement.

BASIS FOR DRAINAGE GOODS

Amalgamated Price List Nov. 20th 1939
Less 5% and 10%.

DRAINER

Price for connection to Main Sewer, Cost				Kind	Labour Rate	Material Rate
glazed 4" dia. laid including digging				plus	72%	P.O. Sun
lay up to 3 ft. deep				lin.	Material	
" 6" dia. "				ft.	& Labour	@ 3/6
lay for same 2'0" deep in clay				"		@ 5/6
" 3'0" " "				lin.		
" 4'0" " "				yd.	@ 3/-	
" 6'0" " "				"	@ 4/-	
" 9'0" " "				"	@ 6/-	
" 12'0" " "				"	@ 13/4	
" over 12'0" "				"	@ 22/-	
				"	@ 35/-	
				By arrangement		
value only for 6" Branches				each	Material	@ 9/3
" " 4" "				"	& Labour	@ 7/6
" " 6" Inspection Branch				"		@ 24/9
" " 4" "				"		@ 19/-
" " 6" Bends				"		@ 7/10
" " 6" Inspection Pipe				"		@ 17/10
" " 4" Bends				"		@ 5/7
" " 4" Inspection Pipe				"		@ 11/6
Wiley Traps complete				"		@ 36/-
ditto				"		@ 26/6
Base Traps complete				"		@ 5/10/-
ditto				"		@ 5/-/-
Man Trap complete Mushroom Top Only				"		@ 3/10/-
ditto				"		@ 2/15/-
as with flagged cover & ring,				"		@ 4/5/-
2'0" 2'0" deep x 3'6" x 2'0" inside				"		@ 5/-/-
3'0" " "				"		@ 5/17/6
4'0" " "				"		@ 7/2/6
5'0" " "				"		@ 2/5/-
over 5 ft. each extra foot				"		
value only for concrete beds & benches				lin.		@ 1/-
6" and 4" dia. drains				ft.		
value only for complete concrete				"		@ 1/6
rounds to ditto						

N.Z. PRICES FOR PLUMBING DEFENCE CONTRACTS.

The values in accompanying Schedule are based for pricing on these Costs
UNIT COST PRICES EXCLUSIVE OF ANY PLUMBERS' PREFERENTIAL
GROSS OR PROFIT, ON WHICH SCHEDULES ARE BASED AND ALL DELIV-
ERED CITY AREAS.

£1. 16. 7d. Less 2½% O.T. Less Null
Baths, £3. 6. 3d. " " "
" single 8/6d. " " "
Basins with P. & W. £2. 1. 6d. Less 2½% only O.T.
Cast Enamelled Sink with P. & W. £2. 15. 0d. Less 2½% O.T.
Baths with Feet & P. & W. Standard Quality £9. 12. 6d. deliv-
ered Less 2½% O.T.
Wall Urinal with Cistern & Fittings £22.1.0d. Less 2½% O.T.
Additional per stall £16. 13. 0d. Less 2½% O.T.
Auto Cisterns £4. 10. 0d. Less 2½% O.T.
" " £5. 2. 6d. " " "
" " £5. 17. 6d. " " "
" 2/7d. 1b. Less 2½% O.T.
Super ton £47. 12. 6d. Plus 10% (24 wg) 26 wg. £51. 2. 6d.
" " £47. 12. 6d. " " (24 wg) 26 wg. £49. 17. 6d.
Plus 10%
Gall and lids £6. 1. 0d. Less 2½% O.T.
" " £4. 16. 6d. " " "
Hnds £1. 7. 6d. each
1/2" and 3/4" List Prices Less 2½% Plus 10% Nett
1" to 3" (incl) List Less 2½% Plus 13½% Plus 10% Nett
£57 per ton Plus 10%
List Less 5% Plus 10%
£48 per ton Plus 10%
1 2/4½ per lb.
2/10 per lb.
Whven List Plus 2½% Plus 5% Plus 10% Nett (W.C.O. weight
allowed)
In Pipe per length Single Socket £1. 7. 6d.
Double " £1.10. 6d.
In Junction Plain 16/3
Bend " 11/-
Junction Insp. 1/6
Bend " 26/-
Offset 9" Off 18/-
2" £1. 9. 6 Each
1½" £1. 2. 0 "
1½" 19/- "
1" 15/- "
ing (in operation 8/5/42 List Price Less 2½% O.T.)
Fittings - Plus 10% Nett on list price
Pipes and Fittings. Amalgamated Brick & Tile Co. List
20th November, 1939 - Less 5% Plus 10%
Sales Tax increase from 10% to 20% not included in
foregoing prices.

PLUMBER - SANITARY
ALL CENTRES

	Kind	Labour Rate	Material Rate
Following are works on single floor buildings where on high buildings the vertical lengths of soil pipe, etc. are measured at the rates in the Table.			
Drains connected with short length of 2" Iron pipe to drains and complete single seat, flushing cistern, copper connections and overflow, galvanised or lead flushpipe and connection and with short length of 2" Lead Pipe wiped joints, unions and 12 ft. of 2" Pipe, and flashed through roof finished with wire top.		3. 8. 4	11. 0. 0
Drains "P" Trap with 3 ft. of cast iron extension, connected to earthen- ware drain and with 4" lead bend and cleaning eye and short 2" iron connection to wrought iron and 12 ft. 2" wrought iron flashed through roof and complete with wire top. Seat, cistern, flushpipe and overflow all as		4. 6. 8	14. 4. 0
Drains as "P" trap, with 4" lead bend wiped joints, ferrules and cleaning eye, connected to 4" cast iron Soil-pipe with union (total length of soil pipe 15') 4" cast iron offset over drain and with wire top. (Seat cistern as all as Item 1)		4. 4. 6	17.13. 6
Drains "Basin (N.2.) with brackets, copper waste and copper connections complete with 1½" lead trap, unions wiped joints and 10 ft. of 1½" W.I. extension to Gully Trap.		1. 2.11	4. 9. 1
Drains or deductions on 1½" W.I. (192/2½ per ft.) as Item 77.			
Drains enamelled sink 20" x 14" waste and complete with trap with unions and wiped 10 ft. of 1½" W.I. Pipe as to Gully Trap.		1.10. 4	5. 9. 3
Drains or deductions on 1½" W.I. (192/2½ per ft.) As Item 45.			
Drains complete with brackets and waste P.C. 26 and complete lead trap with unions and 10 ft. of 2" W.I. Pipe to Gully Trap		1.19. 0	12. 3. 6
Drains or deductions on 2" W.I. (192/1d. per lin. ft.) As Item 47			

PLUMBER - SANITARY (Contd.)

	Kind	Labour Rate	Material Rate
Install sinks complete with brackets and P.C. £30 and complete with cistern and overflow lead or flushpipe and with 4" lead bend draining eye connected with cast iron to terminal vent (total length terminal vent 15') with offset flushed with wire top.		4. 6. 8	47. 0. 0
Install standard quality baths com- plete with Plug and Waste and with 1 1/2" trap, unions and wiped joints and 1 1/2" W.I. Pipe as extension to Gully Trap.		1.12. 6	13. 0. 0
Install tall Urinal, cistern and brackets with Searge Pipes connected direct to stoneware drain.		1. 8. 2	25. 4. 3
Install for stall		19. 6	19. 0. 0
Install Automatic Copper Cistern with brackets with drop piece and 6 ft. Searge Sparge Pipe and Clips		17. 4	6. 6. 0
Install ditto with 9 ft. of Copper Searge Pipe		19. 6	7. 3. 6
Install ditto with 12 ft. of Copper Searge Pipe		1. 1. 8	8. 8. 4
Install galvanised iron ablution troughs about 3 ft. fixed in wood frame made by Carpenter, total length 9' complete with 1 1/2" trap, unions and wiped joints and 10 ft. length of 1 1/2" W.I. Pipe as extension to Gully Trap.		1.10. 4	5. 1. 6
Delivery and put into position of P.C. £30 and add profit		1. 0. 0	32. 5. 0
Delivery and put in o position of Machine P.C. £30 and add profit		1. 0. 0	32. 5. 0
Install and fix 4.1/2" diam. Copper pipes		2. 3	4. 6
Install and fix 1 1/2" Lead Trap to Tubs with unions and wiped joints and 10 ft. 1 1/2" W.I. Pipe as extension to Gully Trap		1. 6. 0	2. 6. 2
Install and fix 1 1/2" Lead Trap and waste to ditto ditto to Showers		1. 6. 0	2. 6. 2
Install 1/2". Lead Floor Wastes 6' long.		8. 8	13. 0
Install 24 wg. Galv. Corrugated Tanks 1/2" wg. lid, 3/4" Ballcocks and connection, painted inside one with bitumen.		17. 4	7.10. 0

PLUMBER - SANITARY (Contd.)

	Kind	Labour Rate	Material Rate
and fix 200 gal. 24 wg. galv. tanks with 26 wg. lid, 3/4" ball-valve and one 1" connection, painted and one coat bitumen.			
" ditto		10.10	6. 0. 0
" ditto		6. 7	2. 7. 6
" ditto		6. 7	1.15. 5
With galv. iron trays 2'6" x 2'6" with 2" 24 wg. galv. over-panels outside wall			
" Tray per ft. Super 1/-)	10.10		16. 6
Delivery and fix 150 gallon H.W. boiler P.C. £20 and add profit	10. 6		21.10. 0
" with 2 layers of hair and canvas sewn on.			
" ft. Super 1/11)			
" to water-main P.C. £10 and add profit			10.15. 0
" 1 Gate Valve 2" diam. ea.	1. 6		1.12. 6
" " 1 1/2" diam. ea.	1. 5		1. 4. 3
" " 1 1/4" " "	1. 3		1. 1. 0
" Stopcocks, 1" " "	1. 3		14. 6
" " 3/4" " "	1. 0		7. 6
" " 1/2" " "	9d.		4. 5
" P. Bibs & Extension	1. 2		18.10
" " "	1. 2		13. 5
" Pillar Cocks with Copper Connections	2. 2		16. 3
" P. Stopcocks	1. 0		10. 5
" Unit complete with 2 - 1/2" Stopcocks, breeches piece, and riser and extension for rose.	13. 0		2.15. 3
" Brass Bib Cocks, each	1. 0		7. 6
" " " "	1. 0		4. 8
" Brass Hose Taps, "	1. 0		9. 8
" " " "	1. 0		6. 5
" Galv. Pipe internally per ft. including all fittings	5d.		11d.
" ditto ditto	5d.		1. 0 2d.
" ditto ditto	6d.		1. 5 1/2

PLUMBER - SANITARY (Contd.)

	Kind	Labour Rate	Material Rate
W.I. Pipe internally with and supports (no fittings)		4 $\frac{1}{2}$ d.	1.10 $\frac{1}{2}$ d.
W.I. Pipe Fittings fixed each.		1. 6	4. 1
Pipe internally with clips supports (No Fittings)		5	2. 8
Pipe Fittings fixed (average) each.		2. 3	6. 6
W.I. Pipe Internally with and supports (No fittings)		6	4. 0
W.I. Pipe Fittings fixed (average) each.		3. 6	14.10
Pipe Internally with and supports (No Fittings)		1. 8	4. 1
Pipe Fittings fixed (average) each.		4. 3	1. 2. 9
for water mains in Soil per ft. lin.		9	
Copper Tube with necessary clips and connections per ft. lin.		4 $\frac{1}{2}$	1. 7 $\frac{1}{2}$
ditto per ft. lin.		5 $\frac{1}{2}$	1. 9 $\frac{1}{2}$
ditto per ft. lin.		6 $\frac{1}{2}$	2.10
ditto per ft. lin.		9	4. 9
Copper Tube with clips and clips (No Fittings) per ft. lin.		7 $\frac{1}{2}$	3.11
Copper Fittings and brazed clips each.		5. 0	10. 6
Copper Tube with clips and clips (No Fittings) per ft. lin.		1. 0	4. 8
Copper Fittings and brazed clips each.		5. 6	15. 6
Galvanac Lagging No.24 Complete per ft.		4	1. 9
ditto per ft.		4	1. 6
ditto per ft.		4	1. 4
ditto per ft.		4	1. 2 $\frac{1}{2}$
ditto per ft.		3	1. 1
ditto per ft.		3	10

PLUMBER - SANITARY (Contd.)

ADDITIONAL PIPING TO BUILDING OVER ONE FLOOR OR HIGHER			Kind	Labour Rate	Material Rate
Gal Pipe	per ft. lin.			5d.	5. 6
Galv. Branches				2. 2	19. 6
Galv. Bends				2. 2	13. 9
Galv. spec. Branches	each			2. 2	36. 4
" Bends	"			2. 2	30. 3
Galv. sets 9" off	"			2. 2	27. 6
Galv. Waste Pipe (No Fittings)	per ft. lin.				5. 3
ditto	" " "				4. 6½
ditto	" " "				3. 0½
ditto	" " "				2. 2½
ditto	" " "				1. 10½
Sanitary Tees	each			2. 3	9. 6
" "	"			1. 6	6. 9
" "	"			1. 3	5. 3
Sanitary Bends	"			1. 6	8. 6
" "	"			1. 0	5. 6
" "	"			1. 0	5. 6
Sheet Lead Overflashing 6"	per ft. lin.			5	1. 3½
Sheet Lead Step-flashings average	per ft. lin.			1. 0	1. 11
Sheet Lead Underflashings, 12"	per ft. lin.			7	2. 5
Sheet Lead Underflashings 15"	per ft. lin.			8	2. 11
Galv. iron flashing 6" girth	per ft. lin.			5	4
ditto 9" girth	" " "			6	8
ditto 12" girth	" " "			7	1. 0
Pipes through roof with 4 lb.	each			6. 9	4. 9
clip				6. 9	4. 3
ditto ditto	each.			6. 9.	4. 0
1½" and 1¼" Pipes ditto	each.				

N.Z. PRICES FOR PLUMBING DEFENCE CONTRACTS

PLUMBER - SANITARY

ADDITIONAL PRICES

	Labour Rate	Material Rate
as Item 1 omitting back vent and short length of cast iron pipe	1 16 -	7 14 -
valvecocks	2 2	13 10
"	2 2	2 4 -
position Concrete Coppers and frames out- side cookhouse	4 4	- - -
ing 600 gallon Corrugated tanks fittings up to 1½" to be measured at pipe rates, exceeding 1½" as per Schedule).	1 5 -	- - -
ing Ranges in Cookhouses.	1 10 4	7 6
	6d. per mile.	
profit to the following P.C. sums which have been paid for by the Public Works Department, and will not be charged to the Contractor.		
on Circulating tanks with 2 only sockets	£6 15 10 each.	
on Corrugated Tanks with 1 only socket	£8 2 11 each.	
on Corrugated Tanks with 2 only sockets	£8 6 5 each.	
ing Room Stoves with set of flues, cones For	£10 2 9	
Concrete Coppers and frames complete	£5 16 9 each	
Tubs	£2 6 3 per set.	
Fired Boiler	£65 - - each	
axer	£3 15 - each	
ulating Pipes	£2 19 - per set.	
fired Ranges	£141 - - each.	
oughs	£11 5 - each.	

SPECIAL EQUIPMENT ETC.

Delivery and place	Kind	Labour Rate	Material Rate
complete Kitchen Ranges	each	@ 3.0.0	P.C. Sum
" " Hot Presses	"	@ 3.0.0	"
" " Dish Washers	"	@ 2.0.0	"
" " Grillers	"	@ 2.0.0	"
" " Toasters	"	@ 1.0.0	"
" " Fish Fryers	"	@ 2.0.0	"
" " Bread-Slicers	"	@ 10.0	"
" " Potato Peelers	"	@ 10.0	"
" " Coffee Urns	"	@ 5.0	"
" " Tea Urns	"	@ 5.0	"
" " Hoods over Urns	"	@ 1.10.0	"
" " Refrigerators	"	@ 2.10.0	"
" " Cell Concrete Insulation	-	P.C. Sum	P.C. Sum

At the afternoon session, Chas. C. Livingston presided. After introducing the directors and honored guests at the speakers table, he presented the first speaker of the afternoon, Herbert J. Taylor, vice-chairman, Price Adjustment Board, War Dept., Mr. Taylor's topic was Re-negotiation of Contracts, a subject of widespread interest to the industry. A digest of the speech is presented herewith:

The topic I have is Re-negotiation of War Contracts. Some of you can relax and not take any interest in this talk because some of you are not subject to re-negotiation. Any contractor or sub-contractor who has less than \$100,000 worth of war business during a fiscal year is not subject to re-negotiation. However, all of you who have over \$100,000 worth are subject to re-negotiation, and just because we haven't come around to see you yet, don't think you are eliminated. First we take the larger companies, and then we take the ones that come forward and volunteer for the operation. Finally we get down to some of the smaller cases.

To give you an idea of the volume of this work, we have approximately 20,000 contractors to re-negotiate, and the total volume of War Department appropriation alone is over one hundred billion dollars. Up to March 31st, the total refund in excessive profits from contractors for the War and Navy Department and Maritime Commission, has been approximately 2 1/2 billion dollars.

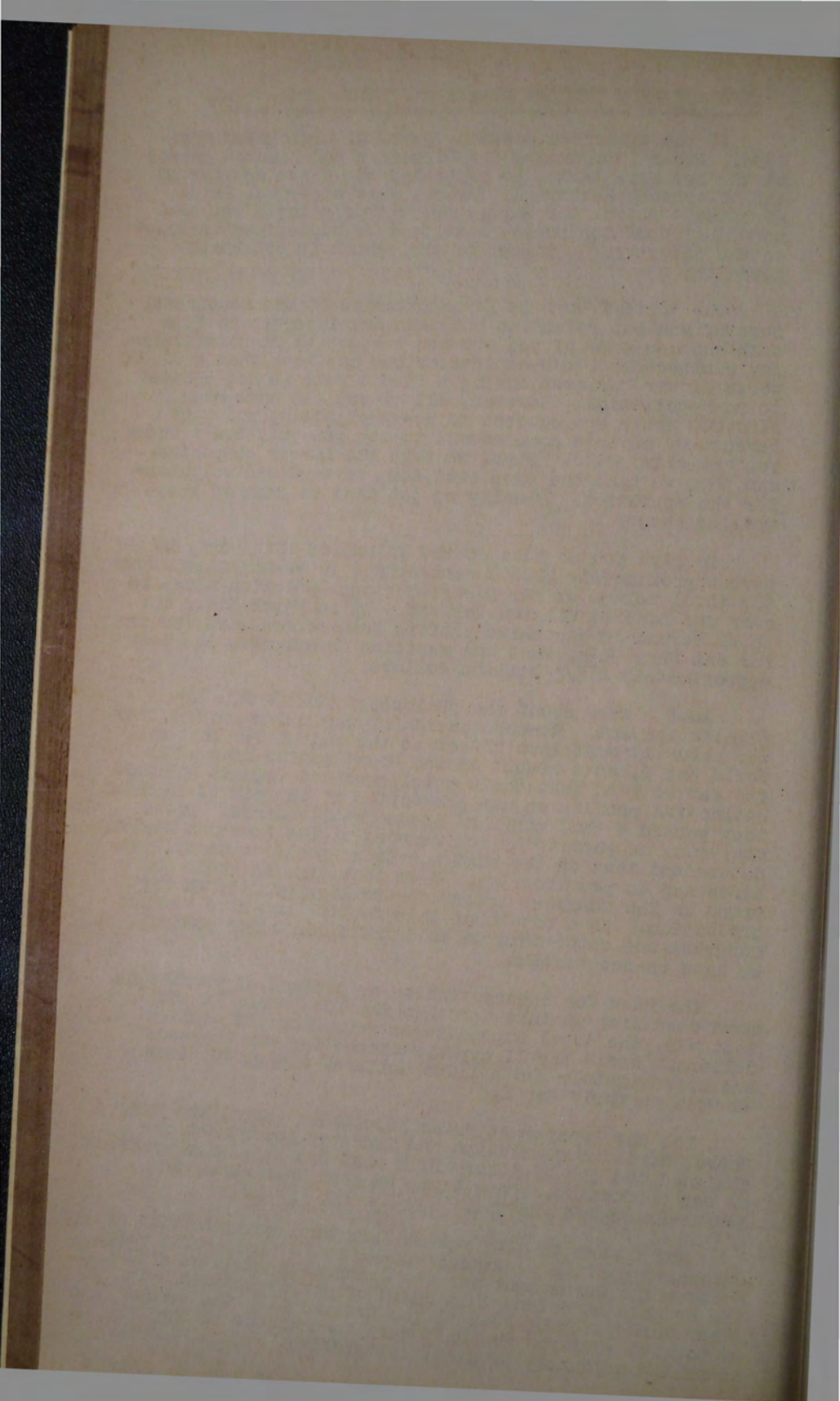
Just a word about the philosophy behind this Re-negotiation Act. Re-negotiation of war contracts for this war actually went into effect at the end of the last war, World War I, as a result of the boys' coming back after the war to find that their neighbours and friends had made outlandish profits on war production in the plants in which they worked - that many had become millionaires. These men, many of whom today are members of the American Legion, determined that in the next war there would be no millionaires and no profiteering. From that time on there was a trend in the Congress toward controlling profits on war production. As a result of this feeling and also because Congress was determined to hold inflation under control we have re-negotiation.

The need for re-negotiation or control of profits is more essential in this war than the last war. In the last war, the total expenditures were about 22 billion dollars. World War II appropriations for war purposes are approximately 240 billion dollars, almost 10 times as much as World War I.

The War Department Price Adjustment Board, the Navy Board, Maritime Commission and Treasury Department are assigned the job of determining what are excessive profits on war production. Many times we have been asked to define excessive profits.

Now I want to give you at this time my definition of excessive profits. Excessive profit is that profit which neither the Government nor the Contractor would be willing or able to defend in a court of public opinion. In other words, coming down to you individually the amount of profits that you wouldn't care to announce to the assembled community is excessive profits.

Now, that's one definition - and we do have to account



to the public as you know. We know we have to account to the public because our Boards are continually being investigated by Congress. We got through a short time ago with a thorough investigation by the Truman Committee of the Senate. You know their report was published. Now we are being investigated by the Vinson Committee, and we'll continue to be investigated because the Congress has placed the responsibility on our shoulders to determine what are excessive profits, to see that industry is treated fairly and justly, and that the Government recaptures excessive profits on war operations.

Now, the second definition I want to give you is that of a fair profit. A fair profit is that which the Contractor would be willing to announce to the men who have left his plant and are serving in the Armed Forces. You look over your profits for the year. If you would be willing to announce those profits to the boys after they return to the plant and say "Boys, this is what I made with this capital investment and this percentage on sales while you were in the fighting forces winning this war for us"; if you could announce that, feel that it was a fair profit and think they'd feel it was a fair profit, then that is a fair profit on war production. The amount above that figure would be excessive profits and that it is the amount we propose to have refunded to the Government. We arrive at that amount by sitting down with you at individual conferences and determining it through one or more conferences between the executives of the company and the representatives of the Government.

Coming down to the reasons for excessive profits the Under-secretary of Navy said that the time lost in placing orders, never can be recaptured, while excessive profits made on war contracts can be recovered at a later date. Now, all that the Under-secretary means is this: When Pearl Harbour came, it came suddenly. Immediately we had to buy billions of dollar of armaments. The procurement officers are doing an excellent job. But they didn't have time to go out and get competitive bids; they didn't have time to give a test lot or order to find out how much a tank would cost. They had to do it and do it quickly and in many cases they deliberately made the prices high because they knew if the contractor would lose money on it, it would slow up production. As a result there were tremendous profits.

Another thing that wasn't realised when Pearl Harbour came was that sales and profits were going to pyramid through 4,5,6,7,8,9, 10 times the production with, in some cases, the same working and invested capital as in peacetimes.

The second reason we have tremendous excessive profits is that we don't have competitive peacetime situations. Someone has said that re-negotiating is the substitute for peacetime competition. As I mentioned before, large corporations like Chrysler, General Motors, and others that have taken on millions of dollars of war production and are making entirely different things than they were making in peacetime, didn't know what their cost would be until they got into mass production. When they did they found they were making 10, 20, 30 per cent more than they had contemplated. And that is why we have re-negotiation.

Now 95 per cent of the contractors give us splendid co-operation on re-negotiation. You can't be in this kind

of work, seeing a cross section of all American industry without feeling a great admiration for the marvellous job it is doing on war production. Here in a period of one year, you have developed new ideas and products and substitute products that in normal peacetime probably would have taken you 5 to 10 years to develop - you all know that.

It is a wonderful job, and we want to do what we can on re-negotiations to see that your industry and other industries come out of this war clean and strong because we need to be strong for the competitive situation we are going to be up against when the war is ended. One of our objectives is to bring about greater efficiency, lower cost, higher quality, thus helping to win the war more quickly.

Now the objectives of re-negotiation. First, to recapture excessive profits; second, to secure lower prices on present contracts; third, to assist in securing lower prices on new contracts.

Price reductions act as a brake on inflation and reduce Government expenditure with a reduction in the taxes you and I must pay to meet the cost of this war. Also they result in a lower cost of production. If you are making 60 per cent profit, there isn't the same incentive to lower cost as there is if you are making 6 or 7 per cent profit on a much higher volume. Price reductions result in a release of plant capacity and materials, of machinery and equipment as well as capital for more war production. They encourage and stimulate efficiency in operation.

Now, I am going to talk to you specifically on re-negotiation and how it works. I am going to take you inside and tell you just how it will be handled in the case of our own company. Some of you already have been re-negotiated, others are just starting, while still others have not commenced.

In the first place, we attempt to arrive at a fair profit on your war production. In the case of certain industries, for example, the brass industry, a number of large companies have been manufacturing the same items for years. We can make a study of peacetime operations, the valleys, the ups and downs, the return on the invested capital before and after taxes, and we can apply the study to your own picture. The same is true in the rubber industry, the machinery and tool industry, the textile industry, etc. And it is true of plastics, except in the plastics industry we have the immediate situation that you are a comparatively new industry.

In order to arrive at what is a fair profit, we naturally look at your performance during what we term the base years. The base years are 1936 to 1939 inclusive. We chose those years because the Congress picked them in connection with the excess profits tax, and consequently you will be asked by the men in your re-negotiating committee to submit your figures from 1936 to the present fiscal year.

Let us say that your base years are from 1936 to 1942. You will have your expense and operating figures for that base period, also your balance sheets. We don't send a flock of auditors out to your plant to get these

figures. We use your audited operating statements. It is true that those handling the re-negotiating, the cost analysis people, will get additional facts and information on your operations in the past and present, but they do that in order to be sure that you get a fair and equitable treatment on re-negotiation. Each individual case is handled on a basis of its own merits. In the case of plastics, some of you weren't operating during the base years. You're new companies, many of you, and therefore, you can't use your operating figures for 1936 to 1939, without taking other figures into consideration.

Now you will say, "Well, if you use the base year that means you won't give these companies any profit at all because they didn't make any money in the competitive peacetimes, 1936 to 1939". But we do. In these cases we have to set up a norm in line with what is a fair profit for turning out approximately the same production they turned out in peacetime. Let's say it was 10 million dollars, or around 6 to 8 per cent. Whatever the figure happened to be for that particular industry, we would go up and down from there depending on the plus and minor factors. The things we give weight to is what is the final cost to the Government of the item manufactured. Now, if a company produced at a lower cost than their competitors, they're left with a higher margin of profit.

We use the over-all approach when we re-negotiate you for a fiscal year, and we take your entire operations for the fiscal year. We operate from your operating statements and your balance sheets, taking the whole 12-month period. There is an advantage to you in this. If we did it by contracts, you might make a nice profit on one contract but lose on another. However, by re-negotiating for a fiscal period, it takes up the lowest and the highest and levels it off.

The next thing we do is apply an approach. Let's say during the base year 1936 to 1939 you did a million dollars worth of business - an average of a million dollars a year for the 4 years - and let us say that you made 10 per cent profit before taxes for those 4 years. Now let's say you have a million dollars worth of invested capital or a half million dollars. In 1942 because of war production you had 5 million dollars worth of sales instead of a million, and you do it with the same invested capital just turning it over more times. As we go up on these increments on the first million dollars, you might be allowed the 10 per cent from the base years. When you came to the second million dollars you'd be dropped down, because in the same plant, the same working capital, same administrative overhead, you have more dollars of sales, so it is spread over more sales, and, therefore, you can take that extra million dollars at a lower figure and still have a fair profit.

Here are some of the facts to be considered. When you come in for re-negotiation I encourage you to give the complete picture because every item and factor in connection with your performance on war production is weighted and given a certain importance in connection with determining what is a fair profit on what you have done to help win this war.

For example, a truck assembly company with 4 million dollars of capital which in peacetime was required for

turning out 10 million dollars a year of trucks, against competition of the Big Three: Ford, Chrysler, General Motors, last year turned out 90 million dollars of trucks for the Government. That was an outstanding job because they didn't get additional working capital. They didn't have 2 or 3 additional plants for it, and they didn't get any loans, but they did a very efficient job. They're smart operators, and they were given a very definite plus sign on re-negotiation and a higher margin because they used less plant capacity, less man-hour production, and less capital in turning out what they produced to help the war efforts. So, increased volume with a limited capital and facilities is a plus sign.

Another is prompt delivery. That is, we check your performance. We have these figures available for use, not only in Ordnance and Air Corps but in all the services. We co-operate closely with them in the Procurement Division. Also a man from WPB serves on our Board, one from OPA, the Treasury Dept., and so forth. Once in a while we have to go over to the FBI. When I refer to the Dept. of Justice, I have in mind the fellow with the 13 relatives with \$30,000 each.

Coming back to these other factors, the quality of your production is a plus sign, and this probably is given the most weight in every case. It is the final net cost to the Government - in other words, how your prices compare with similar items that the Government is purchasing from you.

In other words, let us take a contractor who is producing guns. I happen to know that one contractor produced guns in 1942, and the same gun was being produced in 2 other plants. One price to the Government was \$250 a gun; another was \$300 a gun; the third was \$400 a gun. Well, when we came to re-negotiate these 3 firms, we gave a higher margin of profit to the manufacturer who produced that gun for \$250, and that is a factor that is given the most weight. Now, of course, that means not only the price made to the Government by you, but also after recapture of excessive profits what would be the final net cost to the Government of the item manufactured by you.

Now here is a case where a high margin of profit on 1942 sales is left with the contractor. A firm that has produced a bomb-sight - the ones you have heard of a great deal and have meant so much to us in the winning of the war - for a period of 3 years previous to the war, took a very heavy loss on that development. When we came to re-negotiate that company we allowed them all the losses for the 3 years and threw it all in on the profit they made in 1942. As a result that company got a very high margin left to them after re-negotiation of 1942, and they really earned it. Now, you can't catch a thing like that by taking a flat formula of a certain percent of, say, 4 percent, or 6 percent or anything of that kind. It will never take care of a man like that, a manufacturer who has done an outstanding job to win the war.

Then we have another factor to take into consideration, and that is the difficulty of conversion from your peacetime operation to your war operation. In other words, if your cost of materials run 80 percent of your

total costs, then you are not very highly integrated in plastics. But if your cost of materials runs 20 or 30 percent and includes the items sub-contracted, then you are more highly integrated and that is taken into consideration.

Now I want to talk about risks. We do take risks into consideration. We take into consideration the risks you have in connection with the change in labour and material costs, and also product hazards - explosions. I am thinking of one of the powder manufacturing firms. We completed a re-negotiation of this firm. This firm was carrying all the explosive risks on these plants because no insurance company would write them. They had one explosion a couple of years back that cost them a lot of money, and now they have a number of additional plants and they are doing a splendid job on production of powder. We took into consideration this explosion risk, and we allowed them that additional cost item.

We have material shortages. Companies spring up in the war effort, and after the war is over they don't have any regular civilian business to go back to. They are, therefore, taking greater risks, and they're taken into consideration. Some of the risks you have are on inventory losses and in connection with contract terminations, particularly if you are down in the fourth or fifth years of the contract.

Then we take into consideration the amount of money you invested - the amount of money you put into your business to turn out war production. Let us say that you had a million dollars invested and you put in another million at your own risk. Naturally we allow you more than if you had the D.P.C. build a plant for you and turn it over to you, because that would be a million dollars of the Government's money.

Last of all, the N.A.M. made a survey in connection with war production. They questioned a large group of people throughout the Country in order to hit the law of averages, whether or not they thought excessive profits were being made by industry on war production, and learned that approximately 30 percent of those voting said they were quite certain that excessive profits were being made on war production. Along in December N.A.M. made another survey and this survey resulted in the public saying - I mean over 70 percent of those voting - that excessive profits were being made out of war production. In winding up the summary on this survey the N.A.M. said a public indictment of industry for profiteering may serve to tip the scales against retention of free enterprise system after the war. In other words, the N.A.M. is interested as we are in seeing to it that industry comes out of this war clean and strong, with the marvellous record which they have already made on producing what nobody thought was possible 2 years ago.

Now, we need the co-operation of industry for industry's own sake. We have to get the facts. We work on a sort of a four-way plan. We first get the facts because the man's judgement is not better than his information, and then we use the facts as a basis for planning what is a fair profit. Then, naturally, we on our side prepare to sell you on our ideas as to what is a fair profit. You on the other side of the re-negotiations table, if you prepare your case properly and I'm

recommending that you do it, get all the facts on your performance, risk, and so forth and, when you come in try to sell the re-negotiators what you think is a fair profit and what you think is excessive.

Finally, we have what we call the following up where we are both anxious to get the job completed - to get the amount established - to get a just price - to get an adjusted price - and to get the cost of this war reduced and still leave a just and fair profit to industry. Now, as I said, the co-operation has been splendid from this industry, and when your executives asked me to come and talk to you today I was most happy to do so, for no other reason but to tell you that we do appreciate what you are doing in co-operating with us in getting this job done and determining what are excessive profits in getting the cost of war production lowered, and in doing your part in winning this war.

We have a big job to do. As I said there are over 20,000 contractors, and in the War Department alone over 100 billion dollars appropriations already affected in the way of purchasing contracts.

We want to emphasise again that with your co-operation we will at all times attempt to give each one of you a fair and just profit on war production and to take up as little as possible of your time in filling out any forms, or anything of that kind to get the job done, so we can all spend as much of the time as we can on the big number-one job, and that is to lick Hitler and the Japanese as quickly as possible.

PART I : GENERAL

CHAPTER 8 : WORKMEN AND STAFF

- (1) Workmen (Working Conditions, Rates of Pay, Allowances, Service in Armed Forces, etc.)
- (2) Staff (Allowances, Shortage of Staff, Enlistments).
- (3) Defence Engineer Service Corps.

1848

CHAPTER 8

WORKMEN AND STAFF.1. WORKMEN.

During the earlier years of the war public works workmen engaged on construction works, including defence, were employed under the provisions of the Public Works Workers Agreement 1939 - an industrial agreement governing rates of pay and terms and conditions arrived at as between the Minister of Public Works and the New Zealand Workers' Union. The hours of work prescribed in the Agreement were 40 weekly (with the exception of drivers), comprising eight hours daily, Monday to Friday. Time and a half was payable for hours worked outside of the usual working hours, 7.30 a.m. to 5 p.m., and double time for Saturdays, Sundays, and holidays. Drivers of motor vehicles, etc worked a 42½ hour week for an inclusive weekly rate of pay.

Defence Works Labour Legislation Suspension Order, 1942.

Immediately following the Government's decision to set up a Defence Construction Council to expedite completion of, and to give absolute priority to, defence works, the Defence Works Labour Legislation Suspension Order, 1942⁽¹⁾ was issued, under the Labour Suspension Emergency Regulations, 1940⁽²⁾ This came into effect on 14 March 1942. The order suspended the provisions of all awards, industrial agreements, and voluntary agreements relating to employment in any industry engaged on defence construction work. Its principal provisions were (1) the institution of a 54 hour week - nine hours per day for six days of the week (2) payment of hourly wages as set out in the order, (3) the elimination of overtime for work on Sundays or holidays, (4) payment of a minimum wage of £5.5.0 per week, and (5) payment of an allowance of 30/-

(1) Serial No. 1942/65.
 (2) Serial No. 1940/123.

per week on country work, unless board and lodgings were provided by the employer, also the cost of transport and travelling time (once only) incurred in proceeding to and from the work.

The rates of wages payable under the order included 2/9d per hour for labourers, and for tradesmen ranged from 3/2d in the case of painters, electricians, and tilers to 3/4d for bricklayers and plasterers. Under the Public Works Workers' Agreement labourers were paid 2/3d per hour and tradesmen 2/10½d, these rates including a cost-of-living allowance of 1½d per hour (5/- per week). The order stipulated that classes of workers other than those enumerated were to be paid wages calculated on the basis of 1/50 of the total amount payable under the relevant award or agreement for a 50 hour week, with overtime at the rate of time and a half for the hours in excess of the ordinary hours.

By Amendment No. 2 of the Defence Works Labour Legislation Suspension Order, 1942,⁽¹⁾ gazetted on 23 April 1942, it was provided that the rates of remuneration prescribed in the principal order were to be subject to the provisions of the General Order of the Court of Arbitration dated 31 March 1942, whereby a second cost-of-living allowance (of 5/- per week) was allowed from 7 April 1942: the original rates included the first cost-of-living allowance of 5% on Award rates.

Shifts were to be worked as required, shift workers to be paid 2/- per shift additional. Where shifts were worked, they were to be rotated. Nothing in the order was to prevent work being carried out by co-operative contract.

Application of Order to Public Works. Copies of the Defence Works Labour Legislation Suspension Order and of the Building Emergency Regulations, 1939, Amendment No.2⁽²⁾

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were circulated to all District Engineers by the Permanent Head on 19 March 1942⁽¹⁾. The latter defined 'defence work' as 'any work (including any public work under the Public Works Act, 1928) that is required for defence purposes or for any purposes connected directly or indirectly with any war in which His Majesty may now or at any time hereafter be engaged; and includes any work or service that is incidental to or required for the purpose of such work.' It further stipulated that if any question arose as to whether any work was a defence work, it would be determined by the Prime Minister or by some person authorised by him in that behalf, such decision to be final.

The circular pointed out that clause 2 of the Defence Works Labour Legislation Suspension Order provided that the order applied to 'all industries carried on in connection with defence works within the meaning of the Building Emergency Regulations 1939, and to all workers employed on such works and to their employers;' and went on to say that so far as the Public Works Department was concerned any work which would be paid for out of the War Expenses Account might be regarded as a 'defence work', whether carried out by contract or by the Department with its own workmen.

The circular then dealt in detail with the application of the order to public works. As the order stated that the provisions of the relevant award or agreement would apply to matters not covered specifically by the order, several provisions of the Public Works Workers' Agreement remained in force, notably in respect of payment for working in wet places, and payment of travelling expenses (the order allowed fares only) when on transfer. A schedule of rates of wages payable to all classes of workmen was attached to the circular. These had been

calculated on a more liberal basis than the formula laid down in the order, since public works rates generally were lower than award rates, although award conditions were less favourable than the Public Works Workers' Agreement in regard to holidays and annual leave, and public works workmen normally enjoyed certain concessions and privileges not extended to employees of private interests.

The country allowance of 30/- weekly was reducible on public works to 25/- if workmen were provided with single men's huts or tents and were required to batch.

Wages for camp cooks on defence works was the subject of a separate circular⁽¹⁾ issued to District Engineers on 11 April 1942⁽²⁾.

The annual leave provisions of the Public Works Workers' Agreement were to continue to apply, but no statutory holidays on pay would be granted.

The provisions of the appropriate awards were to apply to defence works in areas adjacent to cities or towns, subject, of course, to the rates of pay and other conditions prescribed in the order. Thus a workman transferred to an urban work would be entitled to an allowance of 30/- per week if not supplied with board and lodgings. (The problem of accommodating workers transferred to defence projects in Wellington and Auckland is dealt with in Part 5 Chapter 2).

Workmen were expected to travel in their own time and at their own expense from their places of residence to the assembly point for city and suburban works. Travelling time would commence from the assembly point, and the cost of fares would be refunded where transport was not made available by the Department. The circular mentioned that in Wellington a system adopted which had proved satisfactory to the men and to the Department was to allow an identical amount of travelling time for each

(1) No. 1942/19

work, seeing that the time occupied in travelling was substantially the same, and men were being changed frequently from one work to another.

The circular stated that workmen employed on maintenance of aerodromes, emergency landing grounds, and defence works were to be brought under the order, also the public works workshops, plant depots, and stores yards at Auckland and Wellington. District Engineers were invited to make urgent representations to Head Office if they considered other workshops should be included. (Subsequently, the public works workshops at Wanganui, Christchurch, Whangarei, Dunedin, Napier and Westport were brought under the order whilst engaged substantially on defence work, also the construction and equipment of linen flax factories in Otago and Southland).

The circular concluded by giving 14 March 1942 as the date on which the provisions of the order were to be brought into effect.

Maintenance of Highways Brought under Order. With the approval of the Minister of Public Works, given on 25 March 1942,⁽¹⁾ the maintenance of main highways was classed as defence works from and including 7 April 1942. This was the subject of a circular (No. 1942/20) issued to all District Engineers on 11 April 1942 by the Permanent Head, which enclosed a schedule of rates of pay applicable to departmental workmen employed on the maintenance of highways and roads. The same conditions as set out in the circular relative to workmen employed on ordinary defence works (circular No. 1942/15 of 19 March 1942) were extended to the highways maintenance men, with minor variations, notably in respect of country work. Except where specifically amended by the provisions of the order, the terms and conditions of the Highway and Road Maintenance Workers' Agreement, 1939, were to

(1) 32/9025/2 p.1.

continue to apply.

Minimum Wage. As amended by Amendment No. 3 of the Defence Works Labour Legislation Suspension Order, 1942, ⁽¹⁾ which operated from 1 July 1942, clause 8 of the order read as follows:

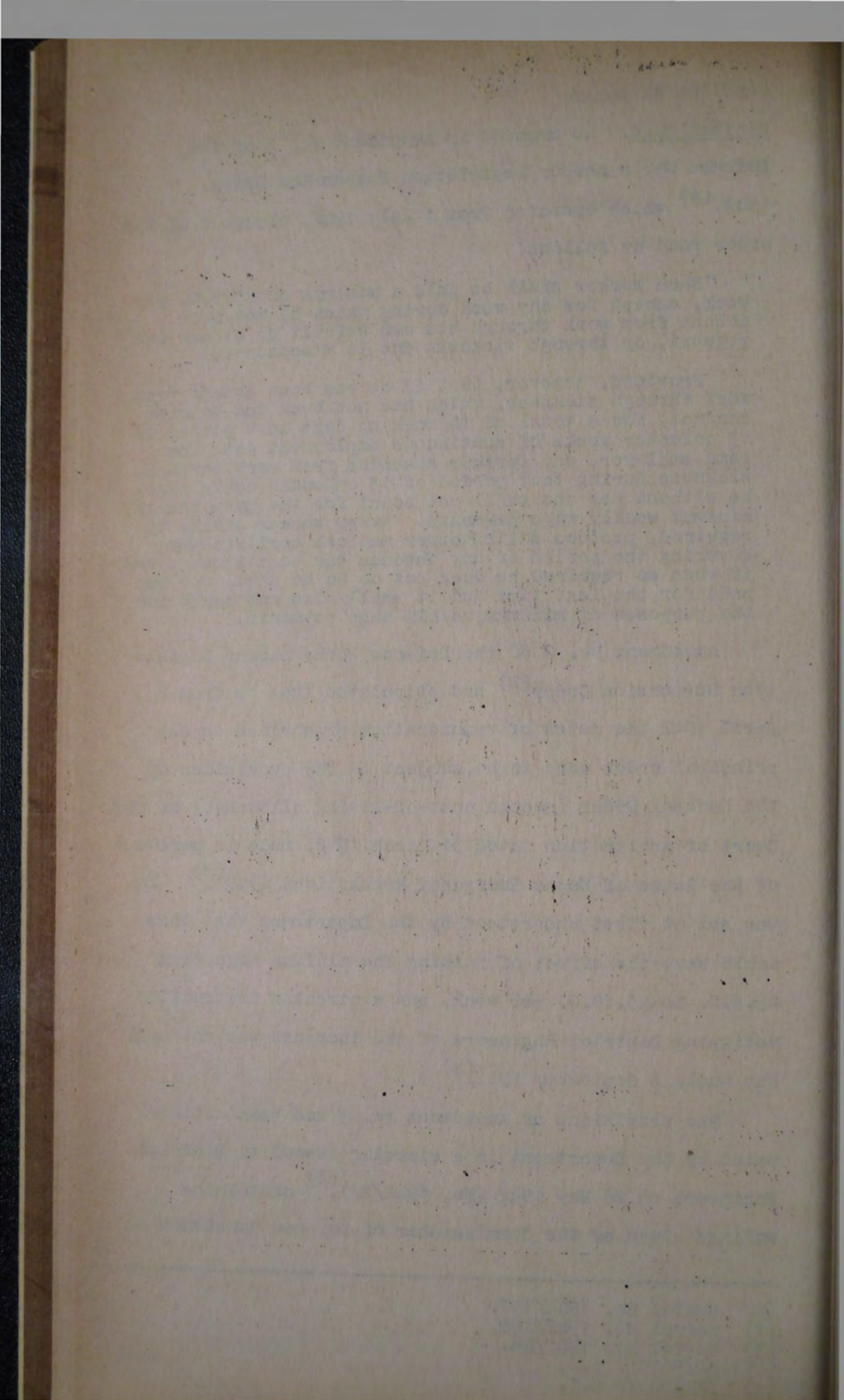
'Each worker shall be paid a minimum of £5.5.0. per week, except for any week during which he has been absent from work through his own default or at his own request, or through sickness due to misconduct.

Provided, however, that if he has been absent from work through sickness, which has not been due to misconduct, for a total of 14 working days in a period of 13 calendar weeks of continuous employment with the same employer, any further absences from work through sickness during that period of 13 calendar weeks shall be without pay and shall not count for the purposes of minimum weekly wage payments. Every worker shall, if required, produce satisfactory medical certificates covering the period of any absence due to sickness, and if when so required he does not do so he shall not be paid for the lost time and it shall also not count for the purposes of minimum weekly wage payments.'

Amendment No. 2 of the Defence Works Labour Legislation Suspension Order ⁽²⁾ had stipulated that as from 7 April 1942 the rates of remuneration prescribed in the principal order were to be subject to the provisions of the General Order (second cost-of-living allowance) of the Court of Arbitration dated 31 March 1942, made in pursuance of the Rates of Wages Emergency Regulations 1940 ⁽³⁾. It was not at first understood by the Department that this would have the effect of raising the minimum wage from £5.5.0. to £5.10.0. per week, and a circular instruction notifying District Engineers of the increase was not sent out until 8 September 1942 ⁽⁴⁾.

The provisions of Amendment No. 3 had been anticipated by the Department in a circular issued to District Engineers on 26 May 1942 (No. 1942/27) ⁽⁵⁾ containing rulings given by the Commissioner of Defence Construction

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- (1) Serial No. 1942/197.
 - (2) Serial No. 1942/109.
 - (3) Serial No. 1940/86.
 - (4) 32/9025/2, p.2.
 - (5) 32/9025/2, p.1.



'in order to clarify clause 8 and to remove anomalies.'
The circular covered the same ground as the amendment,
but stated in addition that:

(a) If a workman commenced work with an employer after two working days had elapsed in a working week, his minimum wage for that week might be reduced to the basis of 17/6d for each of the remaining days of that working week.

(b) If a workman worked overtime on any working-day from Monday to Saturday (both inclusive) or worked on a Sunday, the payment for such overtime and/or Sunday work should not count for the purposes of minimum weekly wage payments, and would be in addition thereto. Payments for travelling time on any day from Monday to Saturday (both inclusive) would not, however, count as overtime, but would count for the purposes of minimum weekly wage payments.

(c) If a workman met with an accident arising out of and in the course of his employment and became entitled to compensation under the Workers' Compensation Act, 1922, he would be treated in terms of that Act.

Medical Certificates. The circular explained that the expression 'if required' used in connection with medical certificates was introduced owing to the difficulty experienced by workmen in obtaining medical certificates on works in remote localities, and the time lost in doing so. With regard to workmen in the employ of the Department, District Engineers were requested to follow the usual practice adopted on public works, whereby sick leave for not more than five working days could be granted without the production of a medical certificate, provided the officer in charge of the work was satisfied that the workman had been genuinely ill. If the period of sick leave was in excess of five working days, a supporting medical certificate must be supplied.

This departmental requirement did not, however, apply to contractors, and when dealing with claims for refunds of sick pay (in master schedule contracts) the Department on occasions found that some contractors had been lax in insisting on the production of medical certificates, or retaining them for record purposes. But in the absence of any compulsion about the production of certificates, such claims could not, of course, be

disputed.

Another difficulty which arose was the practice of some doctors in issuing medical certificates covering the full period of two weeks for illnesses of doubtful genuineness - a practice which permitted unscrupulous workmen to take, in effect, a fortnight's paid holiday every three months. The Auckland Master Builders' Association protested publicly in March, 1943, regarding the manner in which the minimum wage provisions of the Defence Works Labour Legislation Suspension Order were being abused, quoting as an example a certificate issued on 1 March 1943 and reading as follows:⁽¹⁾

'Mr - is totally unfit for any work owing to debility. He will be able to resume on March 15.'

The matter had been taken up with the British Medical Association (Auckland Division) by the Master Builders' Association, and the reply received was that the remedy lay in 'the employers demanding what they considered proper medical certificates from their employees.'

In lump-sum or Treasury contracts sick pay to workmen in terms of the minimum wage provision of the order had to be met by the contractor, and could not be passed on to the Crown as an extra as in the case of master schedule contracts.

The Department had its own troubles on the same score, though it was not a new problem and had been a difficulty over many years in regard to accident compensation. It was recognised that medical practitioners were meticulously careful to avoid assisting in what amounted to fraud, but there were cases of giving the workman the benefit of any doubt rather than advising the Department of the existence of the doubt and leaving it to the Department to determine whether the workman should have the benefit of it. It was perhaps a matter of where

(1) Auckland memo of 16 March 1943 on 32/9025/2, p.3.

the doctors' sympathy lay.

The remedy adopted was to refer the workman to another doctor for an independent report, in cases where there was reason to doubt the value of the certificate presented. After this had been done a few times both the doctor and the workman concerned soon learned that the certificates were being closely watched, and this had an immediate deterrent effect on both parties.

The Commissioner of Defence Construction had no hesitation in approving the Departments recommendation of this procedure being followed with a view to preventing abuses of the sick-pay privileges on defence works.⁽¹⁾

The Department took the view that a workman who had suffered from a long-standing complaint before becoming employed on defence works was not entitled to the minimum weekly wage when he lost time through a recurrence of that complaint or in undergoing medical treatment in respect of it. With the concurrence of the Commissioner of Defence Construction, rulings to this effect were given on several occasions. The Department's attitude was not, however, supported by the Crown Law Office when a case involving a complaint of long duration (cataract of the eye) was referred to the Solicitor-General by direction of the Minister following repeated representations made by the New Zealand Workers' Union on behalf of the workman concerned. The Crown Solicitor stated he was unable to see that under the terms of the order the fact that the malady was of long standing freed the Department from liability to pay the minimum wage during sickness.⁽²⁾

Hours of Work. Clause 9 of the Defence Works Labour Legislation Suspension Order, as amended by Amendment No. 1,⁽³⁾ which came into effect from 31 March 1942,

(1) Memo of 14 April 1943, 32/9025/2, p.3.
 (2) Crown Solicitor's memo of 20 Act 1942, 32/9025/2, p.2.
 (3) Serial No. 1942/90

provided:

'All time worked in excess of nine hours per day or 54 hours per week, or on any Sunday or holiday or half holiday, shall be paid for at the same rate as for ordinary time, and no payment shall be made in respect of any Sunday or holiday or half holiday except for time actually worked.'

Head Office circular No. 1942/18 of 2 April 1942⁽¹⁾ advised districts that the intention of clause 4 of the principal order, stipulating nine hours work daily for six days of the week, meant Monday to Saturday, both inclusive. It went on to say that the Minister of Public Works had informed the New Zealand Workers' Union that he considered a nine hour day (exclusive of travelling time) for six days per week (Monday-Saturday) should be sufficient and that Sunday work should be avoided except when absolutely necessary to complete really urgent works. The six day week of nine hours (Monday-Saturday) was to be adhered to on works being carried out by the Department with its own workmen, save for specially urgent projects such as aerodrome construction at Ohakea and Whenuapai.

'As ample labour can now be made available for our defence works' the circular continued, 'Sunday work could be overcome almost entirely by engaging extra men.'

The circular requested District Engineers, by direction of the Commissioner of Defence Construction, to enquire into all cases where contractors were working a seven day week, with a view to eliminating Sunday work except when really necessary 'owing to the urgency of the works and the impracticability of employing extra men.' Contracts at Ohakea and Whenuapai were excluded from this direction.

The circular concluded by giving two rulings, viz:
(1) that annual leave granted to workmen after 14 March 1942 would be payable for the same number of working

days as provided in the Public Works Workers' Agreement but at the new rates of wages and for nine hours a day, and (2) that all the allowances mentioned in subsection (b) of section (1) of the Agreement, also gumboot allowance in terms of Section (14) were still payable, but not locality allowances under section (11).

Control over the hours worked by contractors' employees was tightened by a memorandum written on 1 April 1942 by the Building Controller to the Secretary of the Master Builders' Federation, instructing that time in excess of the hours laid down in the order (5½ weekly on six days of nine hours) or on Sundays must not be worked unless so directed by the District Engineer. A copy of the Building Controller's letter was embodied in a memorandum sent to all District Engineers by the Under-Secretary on 4 April 1942.⁽¹⁾

Special approval was given from time to time for contractors to work a seven day week on defence works of particular urgency. Arrangements were also made on occasions for departmental workmen to depart from the six days of nine hours principle to enable them to enjoy long week-end leave at, say, four weekly intervals. This would be done by working, for example, six days of 9½ hours for three weeks, and allowing a break of from Friday evening to Tuesday morning during the fourth week of the period.

Hours of Works Reduced. By June 1942 the question of reducing the hours of work on defence construction projects was under consideration, and on the 22nd of that month⁽²⁾ the Engineer-in-Chief wrote to the Commissioner of Defence Construction - further to discussions which had taken place with him on the subject - suggesting that a 48 hour week be instituted, because (1) of the short hours of daylight during the winter months and (2)

(1) 32/9025/2. p.1.

workmen, especially those doing really hard work out in the open, were 'cracking up' under the strain of the 54 hour week. The consensus of opinion of his officers, he said, was that as much work - if not more - could be accomplished under a 48 hour week as under the existing 54 hour week. Moreover, he added, the authorised programme of defence work was well under way. The Engineer-in-Chief enclosed a schedule setting out three different methods of arranging a 48 hour week.

The Commissioner, in his reply dated 23 June 1942, stated he was fully in agreement with the suggestion to reduce the hours of work to 48 weekly, which he considered should consist of 5 days of $8\frac{1}{2}$ hours and $4\frac{1}{2}$ hours on Saturday. He had been in communication with the Federation of Labour and expected an announcement in the matter would be made by the Minister that week.

Amendment No. 3 of the Defence Works Labour Legislation Suspension Order⁽¹⁾ was gazetted on 2 July 1942, with effect from 1 July 1942. It revoked clause 4 of the principal order, and substituted a 48 hour week comprising $8\frac{1}{2}$ daily, Monday to Friday, inclusive, and $4\frac{1}{2}$ hours on Saturday, to be worked before noon. It was provided that these hours might be varied or extended in respect of any particular contract by agreement between the District Engineer of the Public Works Department and the local Defence Works Labour Committee set up by the Commissioner of Defence Construction, or, failing such agreement or in the absence of any such local Defence Works Labour Committee, by the Commissioner of Defence Construction after consultation with the Central Defence Works Labour Committee.

This provision, it will be noted, could be applied to any contract. In his circular No. 1942/3 of 8 July 1942⁽²⁾ (confirming a telegram of 3 July 1942) the

(1) Serial No. 1942/197.

Permanent Head instructed that the new hours prescribed were to be adhered to by departmental workmen, except where slight variations were necessary to fit in with transport arrangements or to enable men employed on isolated jobs to be granted a long week-end off every second or fourth week.

It was later ruled by the Department that overtime worked on the Saturday of a long week-end which would normally have been free in view of extra hours worked in previous weeks must be paid for at time and a half up to noon and double time for the afternoon. Work would, of course, only be allowed on the free week-end in an emergency. This led to the curious position that under the circumstances outlined time worked on Saturday mornings was paid for at a rate (time and a half) expressly provided for neither in the Public Works Workers' Agreement (double time) nor in the Defence Works Labour Legislation Suspension Order, Amendment No. 3 (ordinary time).

Amendment No. 3 stipulated that all time worked outside or in excess of the hours prescribed were to be paid for in accordance with the relevant award or agreement. This was a most important provision, in that it re-introduced payment of overtime on defence works. It was made clear in the Permanent Head's circular that the working of extra hours to facilitate the granting of long week-ends was a privilege extended to workmen and must not entail payment of overtime rates.

The conditions governing shift work remained unaltered, so that overtime was not payable for hours worked under that system on Saturday afternoons or evenings. Otherwise, the Public Works Workers' Agreement provisions were to apply to departmental workmen. This meant that overtime would be payable as follows: Monday to noon on Saturday - time and a half: Saturday noon to midnight - double time: Sundays double time. Travelling time did

(N.B. All time worked on Saturday was under the Public Works Workers' Agreement payable at double rates, but Amendment No. 3 overrode this so far as work before noon on Saturday was concerned.)

Adherence to 48 Hour Week. On 26 March 1943 the Commissioner of Defence Construction submitted to the Minister of Works for approval a draft circular (prepared in the Public Works Head Office) instructing District Engineers that 'now that the necessity for working extended hours on defence construction works has passed and winter is approaching', the working week of 48 hours as specified in Amendment No. 3 of the Defence Works Labour Legislation Suspension Order was to be adhered to on all defence construction works on and after 5 April 1943. The working of the longer hours was not to be permitted, except that alternative long and short weeks to allow of a free Saturday each fortnight could be arranged at the request of the majority of the men employed and with the consent of the District Engineer. 'If any contractors should depart from this instruction, 'stated the draft circular, 'they will not be allowed to include the cost of the overtime in their claims for progress or final payments on their contracts.'

In his covering memorandum the Commissioner of Defence Construction said that after reviewing the amount of work in hand, the state of it, and the probable future requirements of the Armed Services, including the Americans, he was definitely of the opinion that the time had arrived for adhering to the working week of 48 hours, and eliminating the large amount of overtime being worked regularly on numerous defence construction projects. Moreover, he added, it would not be possible for men to work 54 hours per week in winter, and his considered opinion was that it would be in the interests of all concerned to adhere to the 48 hour week in future.

ation and the circular was duly issued on 31 March 1943⁽¹⁾ District Engineers were asked to forward copies to Defence Works Labour Committees in their districts for their information with a request that they notify their members and contractors accordingly.

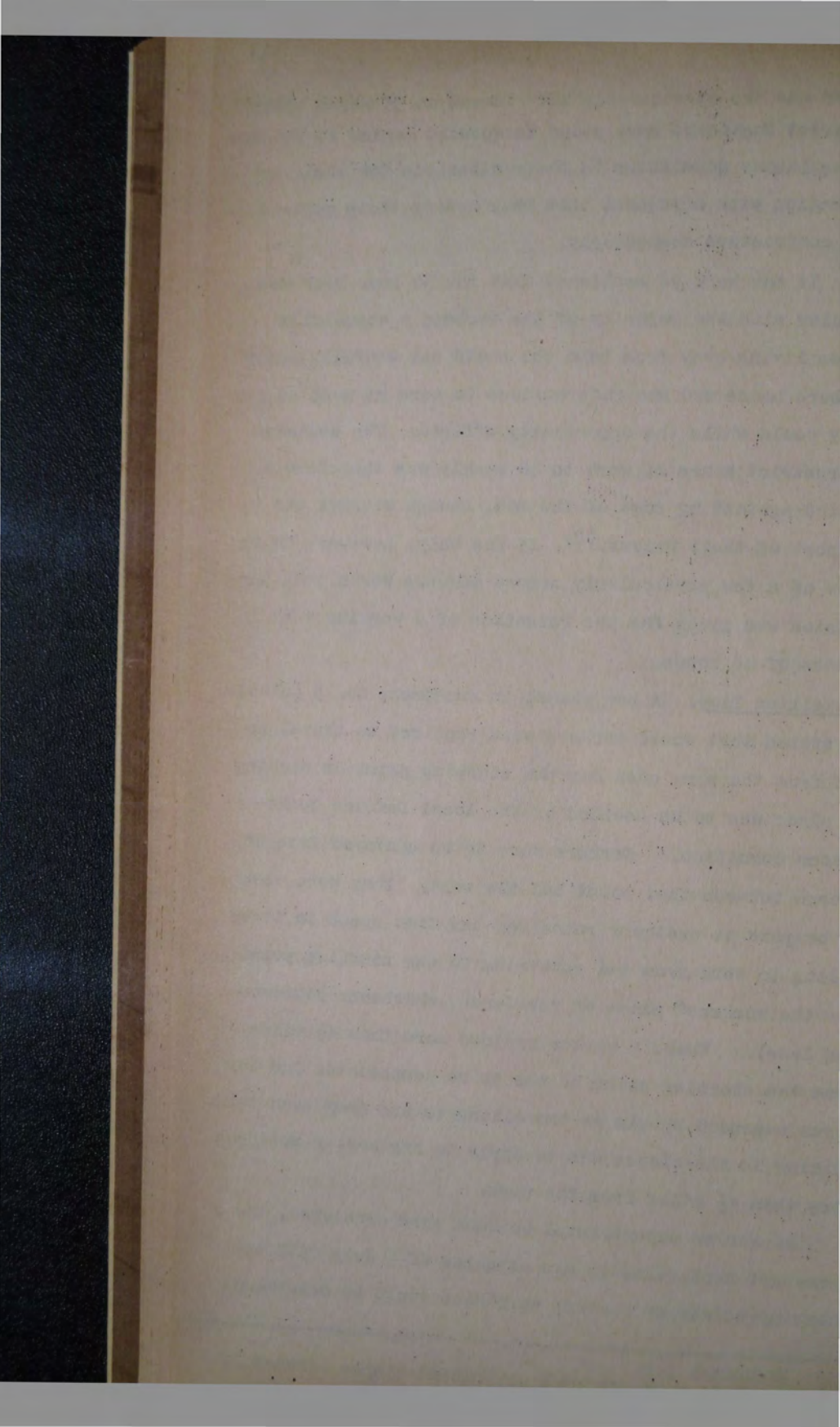
It may here be mentioned that the 54 hour week was popular with the majority of the workmen - especially those living away from home who could not usefully enjoy leisure hours and who were anxious to earn as much as they could while the opportunity offered. The decision to restrict hours of work to 48 weekly was therefore protested against by some of the men, though without the support of their Unions.⁽²⁾ It was only, however, in the case of a few particularly urgent defence works that permission was given for the retention of a working week in excess of 48 hours.

Travelling Time. A new clause in Amendment No. 3 (clause 9) stated that where workers were required to travel to and from the work each day the starting point or picking up place was to be decided by the local Defence Works Labour Committee. Workers were to be conveyed free of charge between that point and the work. They were also to be paid at ordinary rates for the time spent in travelling to work from and returning to the starting point (or the workers' place of residence, whichever distance was less). Where a worker resided more than $1\frac{1}{2}$ miles from the starting point he was to be compensated for any fares expended by him in travelling to and from such point. Nothing in the clause was to apply to any worker residing less than $1\frac{1}{2}$ miles from the work.

So far as departmental workmen were concerned, the Permanent Head ruled in his circular of 8 July 1942 that starting points or picking up places would be determined

(1) 32/9025/2 p.3.

(2) Deputation to Minister on 8 April 1943 - minutes of interview dated 9 April 1943 on 32/9025/2 p.3.



by the District Engineer after conferring with the branch secretary of the New Zealand Workers' Union or his representative. Workmen employed in workshops, plant depots, and store yards were not to be paid for travelling time or fares except when sent to suburban work necessitating additional travelling. The travelling time conditions of the Highway and Road Maintenance Workers Agreement 1939 (section 6) were to continue to apply to this class of departmental workman. (These provided for free transport or an allowance if the workman resided more than 2 miles from the site of his work).

It was definitely understood, stated the circular, that workmen were to travel to and from work outside of working hours, and travelling time was not to be regarded as part of the day's work.

District Engineers were requested to review all instances where men were travelling long distances to work daily, in case it might be possible by a re-arrangement of manpower to employ them nearer their homes.

Although a 48 hour week was established by the issue of Amendment No. 3 of the Defence Works Labour Legislation Suspension Order, the Commissioner of Defence Construction authorised the working of 54 hour weeks on important and specially urgent defence projects. This involved payment of overtime in terms of the Public Works Workers' Agreement to departmental workmen and in terms of the appropriate award in the case of contractors' employees. Most awards contained a provision whereby works could be regarded as 'country works' when the men were camped on the site and supplied with free board and lodgings or an allowance in lieu thereof. By agreement between the contractor and his workmen, all overtime worked on country works could be paid for at the rate of only 1d per hour additional to the ordinary rate of wages.

A telegram was sent to all District Engineers on 9

Construction had agreed to their authorising contractors on works where men were camped on the job to work on Saturday afternoons. The workmen would be entitled, the telegram stated, to only 1d per hour extra, vide country work section of awards.⁽¹⁾ (NB. This statement was later queried by the Department of Labour⁽²⁾ on the grounds that it was legally doubtful whether work done after noon on Saturdays or in excess of four hours on Saturdays, and all work on Sundays, should not be paid for at the full overtime rates prescribed in the award (the Carpenters' and Joiners' Award was cited) rather than merely the 1d per hour additional. The Department of Labour did, however, refrain from taking contractors to Court over the matter, since any extra payments would have been passed on to the Crown by the contractors, although the Union was advised of what the Secretary for Labour considered to be the correct interpretation of the position).

Country Allowance. Clause 10 of the Defence Works Labour Legislation Suspension Order 1942 read: 'Where a worker is transferred or engaged to proceed to a locality elsewhere than at his genuine place of residence the employer shall either supply the worker with suitable board and lodgings or shall pay him the sum of 30/- for each week'. Although referred to generally as country allowance, the 30/- per week was, of course, payable regardless of the location of the work provided the conditions governing payment applied. The Department was frequently asked by districts to give a ruling as to whether a workmen was entitled to the allowance, one typical case being as follows: Married departmental workmen were transferred from irrigation works in Mid-Canterbury to defence works in and around Christchurch, and, as the understanding was that such workmen would leave their wives and families in the rent-free quarters

provided for them on the irrigation works, the men were granted the country allowance of 30/-. The District Engineer discovered after a time that some of the men had left their furniture in the quarters on the irrigation works, but had brought their wives and families to Christchurch and were occupying furnished flats or rooms or living in boarding houses. The District Engineer contended that the irrigation works quarters were still the workmen's 'genuine place of residence', but the Union took the reverse view and the question was accordingly referred to Head Office for a decision. The Under-Secretary supported the District Engineer's ruling, seeing that the men had changed their 'genuine place of residence' from Mid-Canterbury to Christchurch.

Earnings of Workmen On Defence Works. It may be of interest to record some details of the earnings of workmen engaged on defence construction works. These figures were quoted in a report submitted by the Permanent Head on 11 August 1942⁽¹⁾ to the Minister in Charge of War Expenditure :

(1) 54 Hour Week - 6 days of 9 Hours.

<u>Trade.</u>	<u>Award.</u>	<u>DLLSO.</u>	<u>Amendment No. 3.</u>
Labourer	£8. 0. 0.	£7. 13. 6	£8. 8. 5.
Carpenter	£9. 11. 11.	£9. 0. 6.	£9. 18. 0.
Electrician	£9. 15. 7.	£8. 16. 0.	£9. 13. 0.
Painter	£9. 14. 2.	£8. 16. 0.	£9. 13. 0.
Plasterer	£10. 4. 3.	£9. 5. 0.	£10. 2. 11.
Plumber	£9. 18. 6.	£9. 0. 6.	£9. 18. 0.

(2) 48 Hour Week - 5 days of 8 $\frac{3}{4}$ Hours and 4 $\frac{1}{2}$ Hours on Saturday Morning.

<u>Trade.</u>	<u>Award.</u>	<u>Amendment No. 3.</u>
Labourer	£6. 12. 5.	£6. 17. 0.
Carpenter	£7. 18. 8.	£8. 1. 0.
Electrician	£8. 0. 11.	£7. 17. 0.
Painter	£8. 1. 3.	£7. 17. 0.

The first part of the report
 contains a general description of the
 work done during the year.
 It also includes a list of the
 names of the persons who
 have been employed during the
 year, and a list of the
 names of the persons who
 have been employed during the
 year.

Summary of the work done during the year			
1.	2.	3.	4.
5.	6.	7.	8.
9.	10.	11.	12.
13.	14.	15.	16.
17.	18.	19.	20.
21.	22.	23.	24.
25.	26.	27.	28.
29.	30.	31.	32.
33.	34.	35.	36.
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53.	54.	55.	56.
57.	58.	59.	60.
61.	62.	63.	64.
65.	66.	67.	68.
69.	70.	71.	72.
73.	74.	75.	76.
77.	78.	79.	80.
81.	82.	83.	84.
85.	86.	87.	88.
89.	90.	91.	92.
93.	94.	95.	96.
97.	98.	99.	100.

<u>Trade.</u>	<u>Award.</u>	<u>Amendment No. 3.</u>
Plasterer	£8. 8. 0.	£8. 5. 0.
Plumber	£8. 3. 3.	£8. 1. 0.

(3) 40 Hour Week - 5 Days of 8 Hours.

<u>Trade.</u>	<u>Award.</u>
Labourer	£5. 2. 11.
Carpenter	£6. 3. 2.
Electrician	£6. 0. 6.
Painter	£6. 0. 6.
Plasterer	£6. 5. 9.
Plumber	£6. 2. 3.

NB. All these amounts include both cost-of-living allowances.

Taking the wages of a carpenter for example, the earnings shown were made up as follows, in respect of a ^{hour} 54/week of six days of nine hours:

Award Rates.

5 days of 8 hours = 40 hours @ 2/9 $\frac{3}{4}$ d	= £5. 12. 6.
Overtime: 1 hour per day for 5 days (5 hrs)	
and 4 $\frac{1}{2}$ hours on Saturday mornings	
= 9 $\frac{1}{2}$ hours at time and a half (4/2 $\frac{3}{4}$ d)	= £2. 0. 2.
Saturday afternoon - 4 $\frac{1}{2}$ hours at	
double time (5/7 $\frac{1}{2}$ d)	= £1. 5. 4.
	£8. 18. 0.
1st cost-of-living allowance (5%)	8. 11.
	£9. 6. 11.
2nd cost-of-living allowance (5/- per wk)	5. 0.
	£9. 11. 11.
<u>Defence Works Labour Legislation Suspension Order 1942.</u>	
54 hours @ 3/3	= £8. 15. 6.
2nd cost-of-living allowance	5. 0.
	£9. 0. 6.

Defence Works Labour Legislation Suspension Order 1942.
Amendment No. 3.

5 days of $8\frac{3}{4}$ hours = $43\frac{3}{4}$ hrs & $4\frac{1}{4}$ hrs on Saturday morning = 48 hours @ 3/3	= £7. 16. 0.
Overtime: $\frac{1}{2}$ hour on 5 days = $1\frac{1}{2}$ hrs at time and a half ($4/10\frac{1}{2}$ d)	= 6. 1.
Saturday afternoon - $4\frac{3}{4}$ hours @ double time ($6/6$ d)	= £1. 10. 11.
	<hr/>
	£9. 13. 0.
2nd cost-of-living allowance	= 5. 0.
	<hr/>
	£9. 18. 0.

Modification Order. The Defence Works Labour Legislation Suspension Order and Amendments were superseded on 16 June 1943 by the Essential Building Works Labour Legislation Modification Order, 1943, issued by the Minister of Labour. This order consolidated the provisions of the previous one with certain modifications, and it also provided for the establishment of a National Building Committee (in Wellington) and local building committees in each district.

The principal modifications brought into effect were:

- (1) Minimum Wage: It was stipulated that each worker was to be paid a minimum of £5.10.0. per week (as previously) 'except for any week during which he has been absent from work through his own default, or at his own request, or through sickness.' Where workers were directed to any employment necessitating their sleeping elsewhere than at their genuine places of residence, absence through sickness was not to operate to deprive any such worker of the right to the minimum weekly wage. This meant that, generally speaking, the privilege of sick leave on pay was now extended only to workmen living away from home. As in the case of the Suspension Order (Amendment No. 3) sick leave on pay was limited to 14 working days in a period of 13 calendar weeks of continuous employment.

... to the nature of

the disability was validated in the Modification Order, which stipulated that sickness for this purpose was not to be deemed to include sickness due to misconduct 'or arising out of any complaint of a permanent or long-standing nature unless aggravated by the conditions of employment.'

(2) Suburban Work: The Modification Order defined 'sub-urban work' as meaning work (other than country work) performed elsewhere than at the shop of the employer and irrespective of where the employment took place. 'Central points' in respect of various cities and towns were defined (e.g. Te Aro Post Office, Wellington; Cathedral Square, Christchurch; and, in the case of most other places, the post office). The privilege of free transport between the central point and the scene of the work was continued, provided the work was more than $1\frac{1}{2}$ miles from the central point, also payment for time spent in travelling to work from and returning to the central point or the worker's home, whichever distance was less. The earlier provision of compensation for fares expended in travelling between the central point and his home, if he resided more than $1\frac{1}{2}$ miles distant, was, however, dropped.

Building Committees: Clause (12) of the Modification Order provided that there should be established a National Building Committee, comprising three members as representatives of the workers and three members as representatives of the employers, appointed by the Minister of Works, together with a chairman appointed by the Minister. A similar local building committee was to be established in each district with a chairman and two members each representing the workers and the employers, respectively. The functions of the National Building Committee were defined as:-

(i) To promote and maintain harmonious relationship between workers and employers.

(ii) To endeavour to settle any differences or disputes

arising out of this order or the undertakings affected thereby.

(iii) To make any suggestions to the Minister of Works for the smoother running or for the more efficient conduct of the operations on the works.

(iv) To make any suggestions for the elimination of defective work or waste of materials.

(v) To deal with any matter that may be referred to the Committee by the Minister of Works.

Local building committees were to exercise similar functions in their respective districts, except that all matters required to be submitted to the Minister of Works were to be referred to the National Building Committee for its consideration and such action as it thought fit.

(The Public Works Department was not concerned with the setting up of these committees, reference to which will no doubt be made in the Official War Histories of the Labour and National Service Departments).

Declaration of Essentiality. On 27 February 1942 the whole of the Public Works Department was declared an essential undertaking for the purposes of the National Service Emergency Regulations 1940.⁽¹⁾ District Engineers were notified accordingly on 3 March 1942 and supplied with copies of the relative certificate, poster (N.S. 129), and an explanatory memorandum issued by the National Service Department to all managers or persons in charge of essential undertakings. The original declaration did not include works being carried out by contract, but this was remedied by a further certificate given by the Minister of National Service on 16 March 1942 in respect of 'all buildings and construction works being carried out for any of H.M.'s Military, Naval and Air Forces, or for civil defence.'⁽²⁾ A memorandum advising District Engineers of this decision was despatched on 23 March 1942.

The declaration of essentiality applied, of course,

(1) Memo of 2 Mar 1942 from Director of National Service, 32/9056, p.1.

(2) Memo of 18 Mar 1942 from Director of National Service, 32/9056, p.1.

to departmental staff as well as to workmen. Later, on 31 July 1942, the whole of the Public Service was declared an essential undertaking.

The principal effects of the declaration of essentiality were that a worker's employment could not be terminated by his employer (except for serious misconduct) without the consent in writing of a District Manpower Officer, nor could a worker terminate his employment without a District Manpower Officer's consent.

There was at first no power to reduce the rate of wages of a workman engaged in an essential undertaking, and this would have led to complications in a large Department such as Public Works with its multifarious activities, since it was not always possible to keep a man employed continuously on the same class of work (e.g. a labourer might be engaged temporarily in the higher paid capacity of axeman). However, by Amendment No. 10 to the National Service Emergency Regulations⁽¹⁾ which came into effect on 20 May 1942, a transfer to lower paid work could be arranged with the consent of the District Manpower Officer.

Although the whole of the Department's activities, including defence works being carried out by contract (but not other contracts unless specially so declared), were now classed as an essential undertaking, some works were still being prosecuted under the terms, conditions, and rates of pay of the Public Works Workers' Agreement. The difference in earnings under the two sets of conditions (Modification Order and Public Works Workers' Agreement) were substantial. The Essential Building Works Labour Legislation Modification Order provided for:

(a) A 48 hour week.

(b) Special rates of pay with a flat rate up to 48 hours

(1) Serial No. 1942/142.

(e.g. carpenter $3/3$ per hour, labourer $2/9$ per hour) plus the second cost-of-living allowance of $5/-$ per week.

- (c) Minimum weekly wage payments for time lost due to wet weather.
- (d) Minimum weekly wage for time lost on account of sickness up to 14 days within any period of 13 calendar weeks.
- (e) Country allowance of $30/-$ per week or free meals in lieu thereof.
- (f) A reduced country allowance of $\$1$ per week to married workmen when occupying rent-free married quarters on the work.

Thus a carpenter's gross weekly earnings under the Modification Order were 48 hours $\times 3/3 = \$7.16.0.$ + $5/-$ cost-of-living allowance + $30/-$ country allowance, a total of $\$9.11.0.$ A labourer earned (at $2/9$ per hour) $\$8.7.0.$

Under the Public Works Workers' Agreement 1939, a 40 hour week at the carpenter's rate of $2/9$, plus the two cost-of-living allowances, aggregated $\$6$, and a labourer earned, at $2/3$ per hour, $\$5$ per week. The minimum weekly wages did not apply to time lost on account of sickness, and the only allowance payable was a camp allowance of $5/-$ per week to married men not provided with married quarters on the work (in certain remote localities an allowance to cover the increased cost of living was paid to all workmen).

Higher rates of wages came into force on public works as from 30 June 1944 (e.g. tradesmen $3/0\frac{1}{2}$ and $3/2$ per hour, labourers $2/7\frac{1}{2}$). These were incorporated in the Public Works Workers' Agreement, 1945, which also provided for an increased camp allowance of $15/-$ per week. Prior to this, however, the Workers' Agreement rates of pay and conditions were, in the eyes of the workmen, most unattractive when compared with the earnings of men employed under the Suspension Order (later the Modification Order), especially when the hours of work were restricted to

workmen were working under the order - all employees engaged on defence works, maintenance of highways, important civil works such as hydro-electric development, and the main workshops and plant depots. In some cases men working under defence conditions and rates of pay reverted to the Public Works Workers' Agreement conditions and wages. For example, the public works workshops at Westport had by August 1942 insufficient work available to warrant continuation of the 48 hour week, and a decision was therefore made to revert to the 40 hour week and Public Works Workers' Agreement rates of pay. A similar position arose in other centres. The dissatisfaction caused among the men through the reduction in their weekly earnings was met to some extent (where feasible) by the working of say, a 44 hour week (or even a 48 hour week) under the agreement, involving payment of overtime for the hours in excess of 40.

Some districts wished to reduce the hours of work and continue to pay the rates of wages provided in the order. This could not be agreed to, since the rates under the order were calculated originally on the basis of a 50 hour week with overtime for time worked in excess of the ordinary hours.

Modification Order Revoked. It is understandable that until the Public Works Workers' Agreement 1945 came into effect on 1 July 1945, departmental workmen employed on works which did not come under the Modification Order and who thus earned less remuneration than those engaged under the order, were discontented, and increasing difficulty was experienced in manning the lower paid projects, e.g. railway construction. With the completion of defence works, the problem remained unsolved, and it was not until the final month of the war, August 1945, that the Government made a decision to revoke the Emergency Building Works Labour Legislation Modification Order. This was

all districts accordingly and stating that all works would thenceforward be carried out under the conditions, including rates of pay, of the Public Works Workers' Agreement or, in the case of contractors, under the relative awards. The hours of work were not, however, to be reduced in the meantime, and any 'beneficial clauses' contained in the order but not in the Public Works Workers' Agreement were to continue to apply until further notice so far as departmental workmen were concerned and until completion of the contract on which they were engaged in the case of contractors' employees. (1)

'The order' said the Minister of Works in a Press statement announcing its revocation 'was introduced for the purpose of achieving stability in the building industry in relation to our defence construction programme, but now that the threat of invasion has receded from our shores and peace-time conditions have largely returned, the time is opportune to remove this particular control.' (2)

The declarations of essentiality covering the activities of the Department were partially revoked on 11 October 1945, the exceptions being the construction, maintenance, and operation of hydro-electric schemes, the erection of hospitals, schools, and houses, and construction work at Devonport Naval Base. Declarations of essentiality in respect of these particular projects were revoked on 31 January 1946. (3)

The shortage of manpower in the Dominion did not abate with the cessation of hostilities. On the contrary, it remained as acute as ever, and the difficulties and problems with which the manning of public works had been attended during the war years were carried over into the peace. It is axiomatic that concessions and privileges soon become accepted as rights, and however much the high

(1) 32/9056, p.2.

(2) 'Evening Post' 3 Aug 1945.

(3) N.Z. Gazette No. 5.

wages and liberal allowances on war-time public works contributed, as they did, to the successful prosecution of the huge defence construction programme entrusted to the Department, they inevitably left a legacy of industrial repercussions which would not be finally disposed of until many years after the conclusion of the war.

Number of Men Employed on Defence Works. It was not until September 1939 that the number of men employed on defence works was shown separately in the Department's records. The accompanying graph indicates the number of men engaged including contractors' employees, on all public works, on defence works, and on aerodromes, from September 1939 to August 1945.

Service With the Armed Forces. In the earlier years of the war the Minister of Public Works was advised from time to time of the number of staff and workmen accepted for overseas service in the Armed Forces - particularly during the period prior to the introduction of compulsory military service. A summary of these returns is given below: ⁽¹⁾

<u>From Commencement of War to.</u>	<u>No. of Men Accepted.</u>	<u>Total No. of Deptl. Employees.</u>	<u>Percentage Accepted.</u>
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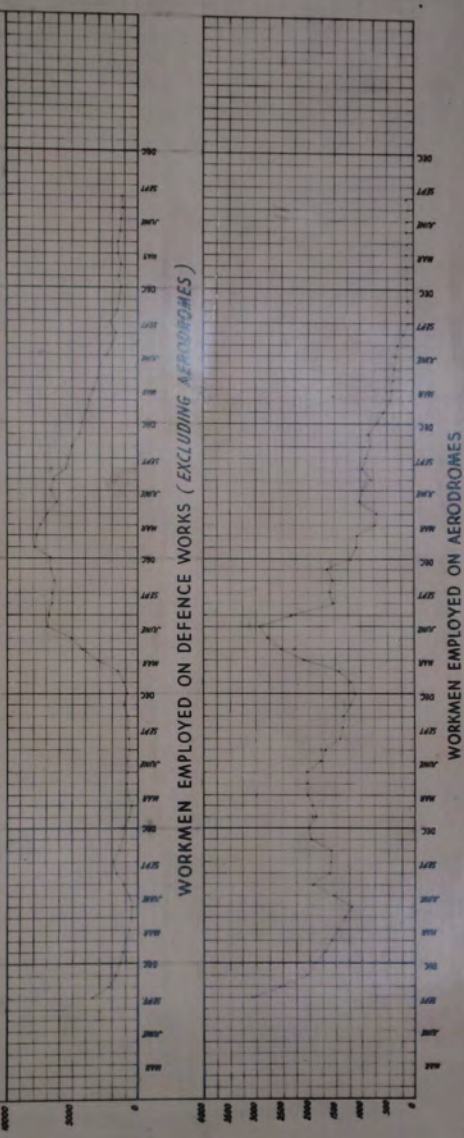
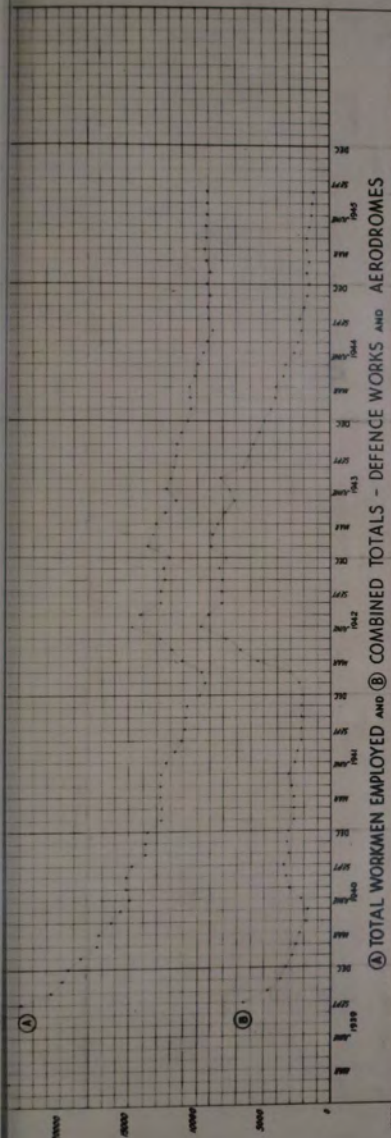
4. 1. 40	310	16,565	2
29. 2. 40	835	15,500	6

(N.B. At this date, 29 February 1940, it was estimated that the total enlistments i.e., volunteers for all branches of the expeditionary Forces by public works workmen would be in the region of 1,300. It must be remembered that something like 2/3 of the Department's workmen would be married or over age. ⁽²⁾)

22. 11. 40	1,773	10,394	17
31. 3. 41	1,912	9,806	20
30. 4. 41	2,021	9,820	21
30. 9. 41	2,238	9,134	25

(1) 32/8491 p.1. and Current.

(2) Report of 10 April 1940 to Minister, 32/8491 p.1.



WORKMEN EMPLOYED ON AERODROMES

Altogether about 3,000 workmen served overseas during the war.⁽¹⁾ Workmen volunteering or ballotted for military service were granted reasonably sufficient time off on pay for the purpose of undergoing medical examination. Upon being accepted for service, they were paid for proportionate annual leave, even if they had not completed one year of continuous service with the Department.⁽²⁾

Annual Leave Privileges. Provided they had six months of continuous service to their credit before leaving the Department to join the Armed Forces, workmen were granted on their return accumulated annual leave on the basis of ten days for each complete year of military service, plus one day for each period of five weeks in excess of complete years. In the case of workmen who served overseas, 'military service' for leave purposes counted from the date of leaving the work to proceed to camp (or from the termination of proportionate annual leave, whichever date was the later) to the date of returning to New Zealand. As home servicemen had enjoyed liberal leave privileges in the Forces since 30 April 1943, this date or the date of discharge, whichever was the earlier, was taken as the termination of military service for leave purposes, i.e. accumulated annual leave was not granted for home service in the Armed Forces after 30 April 1943.

To qualify for payment of annual leave, workmen returned from overseas had to make application within one month of the date of their discharge from the Forces, whether or not they resumed work with the Department. Home servicemen had, however, actually to resume work with the Department within one month of their discharge - otherwise annual leave would be forfeited.

If a workman with less than six months service to his credit returned from overseas and resumed work with the Department within one month, he was granted at the

(1) P.W. Statement 1945.
(2) P.W. Statement 1945 on 32/8491. p.1.

following Christmas ten days annual leave on pay. This concession was not extended to home servicemen, who, in similar circumstances, were allowed proportionate annual leave only at the following Christmas, viz., one day for each complete period of five weeks worked since re-entering the Department's employ.

All questions relative to holiday and leave privileges for workmen returning from service in the Armed Forces were fully discussed with the New Zealand Workers' Union before the Department submitted its recommendations to the Minister for approval.⁽¹⁾

Rent-Free Accommodation. Shortly after the outbreak of war the Minister of Public Works approved a recommendation by the Permanent Head⁽²⁾ that workmen who joined the military forces would be allowed to leave their wives and families in the rent-free accommodation occupied by them on departmental works, with the proviso that electric current, if supplied, was to be paid by the wives. District Engineers were advised accordingly by Head Office circular 1940/4 of 18 January, 1940.

The dependents of Government officers were also permitted to remain in occupation of departmental premises, provided these were not required by the substitute officer and on condition that the usual rental was paid.⁽³⁾

Some officers protested against this discrimination with regard to payment of rental, but the Government, having adopted a line of demarcation, adhered to the decision, seeing that the rentals payable were in any case nominal and the concession was a valuable one in that the greater expense of renting privately-owned accommodation (if it could be found) was obviated.

(1) Head Office circulars of 24 Dec 1943 and 5 May 1944 on 32/8491/2.

(2) On 6 November 1939, 32/8491/1.

(3) Memo of 25 Sept 1939 from Public Service Commissioner and memo of 27 Mar 1940 to all District Engineers, 32/8491/1.

Allowances. The Permanent Head represented to the Public Service Commissioner on 14 July 1942⁽¹⁾ that since the provisions of the Defence Works Labour Legislation Suspension Order⁽²⁾ had substantially increased the remuneration of workmen engaged on defence works, an anomalous position had been created in regard to the earnings of the staff employed on such works. Members of the staff were being paid overtime for hours worked in excess of 40 weekly, but the lower salaried personnel were still at a decided disadvantage when compared with the workmen.

The Commissioner on 20 July 1942 approved an allowance of £40 on annual salaries or 15/- on weekly salaries, with effect from 30 March 1942 and 'for the duration of the Defence Works Labour Legislation Suspension Order 1942.' Total remuneration, excluding overtime payments and cost-of-living allowance was not, however, to exceed £380 per annum or £7.6.0. per week. Thus an officer on a salary of between £340 and £380 per annum would qualify for an allowance equal only to the difference between his salary and £380.

The allowances were payable only to staff employed on defence works: not to district office or sub-office staffs.

All engineers were advised accordingly on 23 July 1942.⁽³⁾

It was made clear later⁽⁴⁾ that the allowances were not to be paid to single officers who were provided with free board and lodgings or to married officers in receipt of separation allowance (3/- per day) as well as free board and lodgings.

By direction of the Public Service Commissioner,⁽⁵⁾

(1) 30/757/2.

(2) Serial No. 1942/65.

(3) 30/757/2.

(4) Memo of 28 April 1943 to all District Engineers.

(5) Minute of 9 February 1943 on 30/757/2.

the allowances were reduced from 1 March 1943 to £26 per annum or 10/- per week. This was in consideration of overtime rates and conditions in the Public Service having been improved considerably. The maximum salaries benefiting were reduced to £355 per annum or £6.16.6. per week. (1)

These allowances to lower paid members of the staff ceased on 30 June 1944, the date on which salary increases were granted to the Public Service generally. In a few cases a reduced allowance was continued until 8 November 1945, by which time the terms and conditions of the Public Works Workers' Agreement had been reverted to on all construction works, following the revocation of the Essential Building Works Labour Legislation Modification Order on 1 August 1945.

Shortage of Staff. During the war the Public Works Department was faced, on the one hand, with the largest construction programme in its history and, on the other, with a constant drain on its staff as each year more and more officers joined the Armed Forces. The problem was, of course, common to the Public Service, and, indeed, to the Dominion as a whole, but perhaps no other Department had to release so many of its experienced and qualified engineering, architectural, and administrative officers at a time when their services were sorely needed for works of paramount national importance. The gap was filled as far as possible by the recruitment of temporary officers ineligible for military service, but nevertheless the bulk of the burden had of necessity to be borne by those members of the permanent staff who remained available to the Department throughout the war.

Writing to District Engineers under date of 16 February 1942,⁽²⁾ the Engineer-in-Chief commented that it was becoming increasingly difficult to find staff for all

(1) Head Office circular memo of 18 Feb 1943.

the urgent works authorised and that in some cases it would be necessary for District Engineers to make whatever temporary arrangements they could to enable them to cope with the position. 'If it is possible to obtain the services of private architects or engineers, and it is considered they can be of assistance' he continued 'recommendations should be put forward accordingly. District Engineers should also where necessary explore the possibility of obtaining the services of suitable local body engineers, particularly County Engineers.'

The following figures show how total expenditure by the Department climbed during the war, without a corresponding increase in staff. Total expenditure includes expenditure on defence works:

Financial Year.	Total Expenditure.	Defence Expenditure.	Workmen Employed at 31 Mar.	Staff Employed at 31 Mar.
1939-40	16,952,507	3,568,215	19,531	3,340
1940-41	16,059,660	3,384,158	14,797	3,095
1941-42	15,164,060	5,340,505	12,478	2,901
1942-43	24,807,936	16,507,422	14,243	2,889
1943-44	21,571,792	11,485,447	11,663	3,031
1944-45	16,271,991	4,760,761	10,248	3,376

Dividing the total expenditure by the number of staff employed discloses that the annual expenditure per each member of the staff was:

1939-40	:	£5,075.
1940-41	:	£5,188.
1941-42	:	£5,227.
1942-43	:	£8,587.
1943-44	:	£7,117.
1944-45	:	£4,819.

These figures graphically illustrate the extent to which the staff was below strength during the peak years of defence construction, 1942-43 and 1943-44. By 1944-45 the pendulum had swung the other way slightly, owing to the increased numbers of officers returning to duty

Staff Enlistments. Altogether 1,336 officers of the Department served overseas with the Armed Forces, 'many of whom' commented the Minister of Works in his 1945 Public Works Statement presented to the House 'attained high rank and filled important administrative and combatant posts.'

A return furnished to the Minister of Public Works in December 1940⁽¹⁾ set out the percentages of the staffs of all Government Departments absent with the fighting forces or who had enlisted and were waiting to be called up (as at 1 April 1940). The total staff was 20,870: enlistments, 2,507 = 12.01%. Figures on record in respect of the Public Works Department are:

Date.	Total Staff.	Number on Military Leave.	Percentage.
31. 3. 40	3,569	229	6
31. 3. 41	3,580	485	14
31. 3. 42	3,749	821	22
31. 3. 43	3,940	1,019	26
31. 3. 44	3,977	903	23
31. 3. 45	4,046	616	15

Up to 50 officers were on loan to other Departments, chiefly in connection with defence, during the later war years.

In November 1940, at about the time voluntary enlistment gave way to conscription, 401 members of the staff were with the Armed Forces and another 86 on territorial service. Of those released for the Forces, more than 50% consisted of engineers (60), draughtsmen (54), and clerks (111). Sixty-three engineers out of 317 on the staff had enlisted and been accepted, representing nearly 20%.

The extent to which officers and workmen enlisted

in specialist engineering companies for overseas service is described in Chapter 9, Part 1.

3. DEFENCE ENGINEER SERVICE CORPS.

'Under the stress of emergency conditions, the efforts of the Public Works Department in the interests of the three fighting services are likely to break down unless the Department functions as an integral part of the Services' organisation.'

Thus ran the opening sentence of a circular memorandum⁽¹⁾ issued by Army Headquarters on 18 February 1942 to its district and area officers and to the Public Works Department. The circular then went on to say that following a recommendation made by the Chiefs of Staff, in which it was stated that the mobilisation of public works personnel in fighting units would cause very serious interference with the large programme of important and urgent defence works required throughout the Dominion, War Cabinet had on 28 January 1942 approved proposals to organise the engineering services and form a Defence Engineer Service Corps. All personnel of the Defence Engineer Service Corps were to be attested for service in the Territorial Force, and the Corps regarded in every way as part of the Territorial Force establishment. In the event of mobilisation, members of the Corps would be placed on Territorial Force rates of pay. Enlistment in the Corps, the circular stated, would not be restricted solely to Public Works employees, but would be open also to 'employees of selected organisations who would have the necessary technical or trade qualifications for service in the Corps.' In the selection of personnel, every effort was to be made to choose persons who would not be liable to military service by ballot.

The circular stressed that although the Corps was to be constituted on a Territorial Force basis and its members attested in the Territorial Force, mobilisation would take place only in the event of an extreme

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emergency. In the meantime the personnel of the Corps would carry on in their civil occupations and attend weekly parades and lectures for military instruction and training.

The whole question had been the subject of discussions between the Head Office of the Department and Army since early in January 1942, following the receipt by the Engineer-in-Chief of a memorandum from the Chief of the General Staff⁽¹⁾ enclosing a draft submission to the Minister of Defence. In this it was mentioned that 'a proposal for the utilisation of the Public Works Department as an engineer organisation behind the fighting services is being submitted by the Chiefs of Staff. This plan will enable the available resources of the country to be directed as the situation demands and allow the normal work of the Department to proceed with the least interference.' The two problems to be solved at this critical stage of the war in the Pacific were : firstly, to ensure that the construction of urgent defence works by the Public Works Department was not impeded by further releases of personnel to the Armed Forces, and, secondly, to endeavour as far as possible to preserve the Department's organisation so that it could continue to operate even if an enemy attack or invasion had the effect of disrupting the Public Service generally and bringing to a halt the civilian processes of the Dominion. In other words, if New Zealand became a theatre of war the Public Works Department might, as an ordinary Government Department, have ceased to function and, unless it could carry on as a unit of the Armed Forces, its value as a constructional agency would have been seriously restricted or perhaps lost altogether.

The formation of a Defence Engineer Service Corps aimed at the solution of both these problems.

Already by early 1942 a large proportion - something

(1) D209/1/25 of 3 Jan 1942.

THE HISTORY OF THE
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FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME
IN TWO VOLUMES
BY NATHANIEL BENTLEY
OF THE BARRISTER AT LAW
IN GREAT BRITAIN
AND OF THE CHURCH OF ENGLAND
IN THE UNITED STATES OF AMERICA
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BOSTON: PUBLISHED BY
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1822.

like 20% - of the Department's staff and workmen had joined the Armed Forces, almost entirely for overseas service. Of those remaining, the great majority were ineligible for overseas service owing to age or medical grading, but large numbers were liable for home service in the Territorial Force. Works companies in the Territorial Force had been formed early in 1941, mainly from the ranks of public works personnel, for training on a spare-time basis, and with the understanding that the companies would not be fully mobilised except in the event of an emergency. When, activated by the southwards drive of Japan and with the threat of actual invasion facing New Zealand, the Government decided to mobilise the existing Territorial Force and call up for service in that Force, by ballot, all who were eligible, the Public Works Department was confronted with a loss of manpower which would have well-nigh crippled its organisation and resources. At that time no less than 5760 employees of the Department (staff and workmen) were engaged on construction works, with another 1233 on aerodrome works in the Pacific.

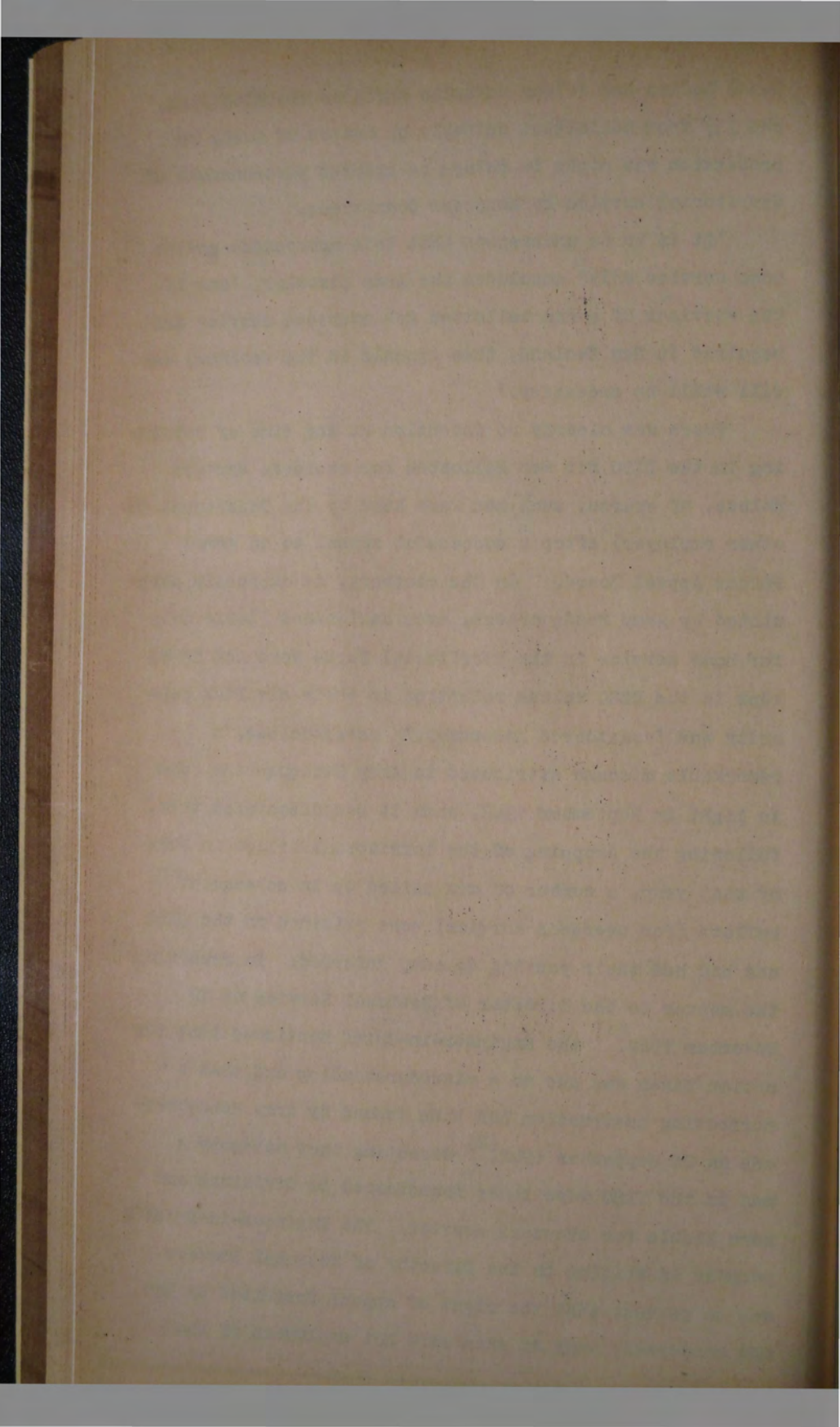
Personnel and Recruiting.

The Army circular previously referred to (No. 257/1942 of 18 February 1942) set out that the personnel required to fill the DESC establishment would be obtained (1) by transferring from the works companies all public works employees and 'all other personnel not available for immediate mobilisation', except that certain men with high technical qualifications and experience could, if desired by Army, be retained for full-time territorial service (in newly formed Army troop companies), (2) from suitable persons who volunteered and who were not liable for balloting into the Territorial Force, (3) from public works personnel called up by ballot whose retention both in the Department and in the DESC was considered necessary, (4) from ballottees employed by contractors,

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local bodies and 'other suitable engineer organisations,' and (5) from ballottees suitable by reason of trade or profession who might in future be granted postponement of territorial service by Manpower Committees.

'It is to be understood that this memorandum covers home service only' concluded the Army circular, 'and if the services of a man balloted for overseas service are required in New Zealand, then appeals in the ordinary way will still be necessary.'

There was clearly no intention at any time of retaining in the DESC fit men balloted for overseas service unless, of course, such men were held by the Department (or other employer) after a successful appeal to an Armed Forces Appeal Board. On the contrary, as expressly stipulated by Army Headquarters, even ballottees liable only for home service in the Territorial Force were not to be kept in the DESC unless retention in their civilian capacity was 'considered necessary.' Nevertheless, a remarkable mistake attributed to Army Headquarters came to light in September 1942, when it was discovered that, following the dropping of the territorial ballot in June of that year, a number of men called up in subsequent ballots (for overseas service) were retained in the DESC and had had their posting to camp deferred. In reporting the matter to the Director of National Service on 10 November 1942,⁽¹⁾ the Engineer-in-Chief mentioned that the action taken was due to a misunderstanding and that a correcting instruction had been issued by Army Headquarters on 21 September 1942,⁽²⁾ directing that category A men in the DESC were to be transferred to divisions and were liable for overseas service. The Engineer-in-Chief's purpose in writing to the Director of National Service was to request that the right of appeal forfeited by the men concerned, many of whom were not employees of the



Department, be reinstated. This request was granted.

Copies of Army's circular were distributed to all District Engineers of the Department, and were followed up by a circular memorandum issued by the Engineer-in-Chief on 24 March 1942.⁽¹⁾ After outlining the sources from which recruits for the DESC were to be obtained, the Engineer-in-Chief stated that the personnel required were blacksmiths, bricklayers, carpenters, clerks, concretors, draughtsmen, drivers, electricians, fitters, mechanics, painters, plant operators, plumbers, surveyors, tinsmiths, welders, and other classes of workmen required for general engineering work. The numbers of each classification in each unit, he said, was left to the discretion of the company commander, dependent on the recruits forthcoming and the particular types of work likely to be carried out in each district. Arrangements might also be made for local sections of companies in centres of population away from their headquarters, and for isolated men if on essential work (e.g. highway surfacemen) to join the Corps even if such men could not train regularly with the main unit.

District Engineers should recruit their units immediately, the circular continued, receiving applications themselves (a draft form was attached) and making selections in consultation with their Assistant Directors of Engineering Services (these were the District Engineers at Auckland and Christchurch and, for Wellington, an Inspecting Engineer located in Head Office). The age limit was given as 55 years, but this could readily be increased in special cases.

District Engineers were to arrange with local Army offices for medical examination of recruits and posting to the DESC, or for transfers from the works companies to the Corps. They were also as far as possible to

THE HISTORY OF THE
CITY OF BOSTON
FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME
IN TWO VOLUMES
BY NATHANIEL BENTLEY
OF THE BARRISTER AT LAW
IN THE SUPREME COURT OF JUDICATURE
IN THE COUNTY OF MIDDLESEX
LONDON: PRINTED BY J. JOHNSON, ST. PAULS CHURCH-YARD, 1733.
IN TWO VOLUMES.
THE FIRST VOLUME.
CONTAINING THE HISTORY FROM THE FIRST SETTLEMENT
TO THE YEAR 1630.
THE SECOND VOLUME.
CONTAINING THE HISTORY FROM THE YEAR 1630
TO THE PRESENT TIME.
LONDON: PRINTED BY J. JOHNSON, ST. PAULS CHURCH-YARD, 1733.

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contact other Government Departments, local bodies, trade unions, builders' associations, contractors and others for suitable recruits, although steps had already been taken in Head Office to get in touch with the headquarters of such organisations likely to be of service from a recruiting point of view. (This was done in the form of a letter sent by the Engineer-in-Chief, embodying generally the contents of the circular to district offices).

The Engineer-in-Chief's circular concluded: 'It should be made clear to recruits that while enlistment is voluntary and in the event of mobilisation they would be placed on territorial rates of pay, yet this would occur only in extreme emergency, in which case many of the civil functions not only of the Public Works Department but of the community at large would automatically cease.'

In a separate covering memorandum sent to District Engineers on 24 March 1942, the Engineer-in-Chief advised that the formation of the DESC would be the subject of a Ministerial announcement in a few days time, and that as soon as this had been made active steps should be taken along the lines indicated in the circular. (The statement appeared in the Press at the end of March 1942).

Establishment.

The war establishment for the DESC was approved by Army Headquarters in a memorandum D209/1/25A of 6 March 1942 to the Engineer-in-Chief. It provided for as follows:

DGES. HQ. Wellington	: 30 officers, 50 O.Rs	: Total 80
	(Includes 5 liaison officers)	
ADES, HQ. Auckland	: 19 officers, 36 O.Rs	: " 55
	(Includes 5 liaison officers)	
" " Wellington	: 19 officers, 36 O.Rs	: " 55
	(Includes 5 liaison officers)	
" " Christchurch	: 19 officers, 36 O.Rs	: " 55
	(Includes 5 liaison officers)	

Northern Military District: 6 companies and 1 section:-
1 company, North Auckland, 3 Auckland, 1 Waikato, 1 Bay of Plenty, and 1 section, King Country.

Central Military District: 5 companies and 2 sections:-

1 company, Hawke's Bay, 1 Wanganui, 1 Manawatu, 2 Wellington, and 2 sections, Poverty Bay.

Southern Military District: 6 companies and 2 sections:- 3 companies Christchurch, 1 Nelson, 1 Greymouth, 1 Dunedin, and 2 sections, Invercargill.

The establishment of each company consisted of 3 officers and 38 O.Rs at Headquarters, 2 officers and 63 O.Rs in an electrical and mechanical section, and 2 officers and 45 O.Rs in each of four sections; a total of 13 officers and 281 O.Rs = 294 personnel.

The total personnel in each military districts was thus:

	<u>Officers.</u>	<u>O.R.</u>	<u>Total.</u>
DGES, H.Q. Wellington :	30	50	80
<u>Northern</u> : ADES, H.Q. 55, and 6 companies at 294 plus 1 section, 47	99	1767	1866
<u>Central</u> : ADES, H.Q., 55 and 5 companies at 294 plus 2 sections at 47	88	1531	1619
<u>Southern</u> : ADES, H.Q., 55 and 6 companies at 294, plus 2 sections at 47	101	1812	1913
Totals :	318	5160	5478

Included in the Corps personnel were liaison officers appointed to the Navy, Army and Air Departments. Provision was made for similar appointments to important civil Departments such as Railways, Forestry, Lands and Survey, etc., but these were not proceeded with.

For many years the Engineer-in-Chief, Public Works Department, had held, with the honorary rank of Colonel, the position of Director of Fortifications and Works to the Army, also Director-General of Works and Buildings, RNZAF, with the honorary rank of Group Captain.

As the function of the DESC was to provide engineering services to the three forces, Army, Navy and Air, its Commanding Officer was designed Director-General of Engineer Services, with the rank of Colonel. The Engineer-

The Assistant Engineer-in-Chief was appointed Deputy Director of Engineer Services (Air and Navy), and the senior Inspecting Engineer became Deputy Director of Engineer Services (Army), both ranking as Lieutenant Colonels. An Assistant Director of Engineer Services was appointed to command each military district organisation, with the rank of Lieutenant Colonel. These three positions were filled by the District Engineers at Auckland and Christchurch and the Inspecting Engineer at Head Office, Wellington. In each military district the various component companies were located to follow as closely as possible the set-up of the existing Public Works Department organisation, being distributed geographically as dictated by availability of men, plant, and stores, and likely requirements of engineer services.

Many of the officers and NCOs in the DESC were members of the staff of the Public Works Department, experienced in various branches of the engineering and associated professions including architecture, technical design and construction, administration, and the supply of plant and materials. Senior officers of the Corps Headquarters comprised, in addition the DGES and two DDES, a Chief Engineer and Buildings Officer, a Chief Stores and Plant Officer, and a Chief Administration Officer (all ranked as Majors), and, in the rank of Captain, an Engineer Officer, a Buildings Officer, a Deputy Chief Stores Officer, a Deputy Chief Plant Officer, a Deputy Chief Administration Officer, a Deputy Chief Accounts Officer, and an Engineer-Adjutant.

Recommendations for appointments as senior officers of the ADES's staff or as company commanders required the prior approval of the DGES. All other appointments to commissioned rank could be recommended direct to Army by the ADES concerned.

The staff of each ADES was divided into sections in

the same manner as DGES Headquarters, with a Major as Deputy ADES, Captains holding positions such as District Engineer and Building Officer, District Stores and Plant Officer, and District Administration Officer, and various assistants to each of these officers in the rank of subaltern.

The official relationship between Army and the DESC was that each Military Command (Northern, Central, and Southern) would direct the functioning of engineer services through the ADES, while the DGES and Corps Headquarters would function under the direction of the Chiefs of Staff. Thus, under emergency conditions, the Officer Commanding each military district would have at his disposal the complete public works organisation of his district centralised for administration purposes through the ADES. The DGES and his staff would have become a unit of Army Headquarters.

At one stage the Engineer-in-Chief represented to Army Headquarters that the ranks allotted to the DGES and other senior officers of Corps Headquarters were not commensurate with their responsibilities. He recommended that the DGES be ranked as Brigadier, instead of Colonel, with a corresponding increase in the ranks of the next five senior officers.⁽¹⁾ Army did not agree.

Although the establishment provided for a total of 5478 officers and men, the DESC never reached anything approaching full strength, notwithstanding that volunteers were invited from employees of other Departments carrying out professional and technical work, such as Railways, Lands & Survey, etc., in addition to Public Works, from the ranks of counties, harbour boards, and similar local bodies, and, indeed, from the public generally, which had been acquainted with the proposal to form the Corps by means of a statement issued to the

(1) Memo of 17 Feb 1942 to Adjutant-General,

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Press by the Minister of Defence. The strength of the Corps as at 16 October 1942 (as reported to Army Headquarters by the Adjutant on 19 October 1942⁽¹⁾), was 3,193, made up as follows:

Corps Headquarters, Wellington	58
Northern Command	813
Central "	1,381
Southern "	941
	<u>3,193</u>

Training. Under the Heading 'Training and Duties', the Engineer-in-Chief, in his circular memorandum of 24 February 1942⁽²⁾ to all District Engineers, stated:

'Training should include platoon and company drill and weapon training, but in the meantime this may have to be confined to the bare essentials necessary for discipline and control, so that as soon as possible they may undertake the more technical duties hereunder. Lectures and exercises should include instruction in classes of work most likely to be met with in an emergency, e.g. demolition, road blocks, etc.

'In addition to the present duties of the Public Works Department in undertaking engineering services for the three Fighting Services, Company Commanders of the DESC should arrange with Army to carry out the construction of some of the essential defensive work such as gun pits, pill-boxes, dug-outs, aid post, anti-tank ditches, road blocks, etc now being undertaken by Field Companies.'

'It is of paramount importance', he continued, 'that as far as possible the defence now in hand by the Public Works Department should continue even under emergency conditions and to this end training should commence as soon as possible so that if emergency demands mobilisation, the change-over should be effected smoothly.'

Training proceeded on these lines, usually on the basis of weekly evening parades and periodic Saturday afternoons or Sundays. Experienced instructors were made available by Army, their services being supplemented by NCOs in the DESC who had themselves had training in the Forces. Lectures were given by Army and DESC

(1) 30/2626, p.2.
(2) 30/2626, p.1.

personnel on a wide variety of subjects; shoots were arranged; instruction given in demolition, bridge strengthening, camouflage, and similar courses of value to engineering units; and in some districts Army were able to facilitate practical experience in the construction of the classes of work which would have been allocated to the DESC in the event of mobilisation. Many of the Corps' officers availed themselves of the opportunity of attending full time courses of instruction in Army establishments for two-or three-weekly periods, and were able in turn to impart the knowledge gained to NCOs and men under their control.

Had New Zealand become a theatre of war, the DESC would normally have functioned as line of communication troops, i.e. a service unit. Fighting units would have had their engineering requirements attended to by field companies, with Army troop companies acting as an intermediary between the forward area and the lines of communication zone. Experience overseas, however, had made it obvious that all lines of communication troops such as service engineers should have adequate soldier training to fight as assault troops if necessary and, in the course of a memorandum dated 29 September 1942 to the DGES,⁽¹⁾ Army Headquarters pointed out that under New Zealand conditions the indications were that the DESC might function as operation troops more than as service troops. The importance of soldier training and not merely engineering training was therefore emphasised, and instructions to this effect were issued to ADESS on 8 October 1942.⁽²⁾ With the greater part of New Zealand's long coast-line undefended, particularly in coastal areas, it might well have been that first contact with an enemy invading force would have been made by a unit of the DESC. This possibility was recognised by Army in item (1) of

(1) D319/1/102 FW.

the schedule of duties which would have been allotted to the DESC during an enemy attack or other emergency. This schedule (accompanying Army Headquarters memorandum D319/1/102FW of 29 September 1942) read as follows:

- (i) Function as sections of Field Companies initially and as long as desired, where tactical situation and geographical disposition demand, and supply reinforcements to Field Companies and Army Troop Companies as required.
- (ii) Construct emplacements, buildings, encampments, tunnels, earthworks, demolitions, roads, bridges, and wharves, and maintain bases.
- (iii) Assist in maintenance and operation of roads, highways, waterways, power lines, and railways if necessary.
- (iv) Provide bulk round and sawn timber (through forestry units).
- (v) Carry out fortress duties.
- (vi) Co-operate with Works Sections, EPS organisations, and direct or assist on behalf of Army as and when required.
- (vii) Provide mapping requirements of the Division.
- (viii) Technical advice and direction.
- (ix) Preparation of plans.
- (x) Collection and distribution of plant, stores, and equipment, and establishment of engineer dumps at Public Works Department, local body, and other suitable yards.
- (xi) Provide hirings and labour service.

The programme of training aimed at fitting DESC personnel for the performance of this formidable list of duties, with emphasis on 'soldier training', and with this end in view a copy of the schedule was circulated for the information of all company commanders. (1) In the early stages training was hampered to some extent by delays in the issue of uniforms and equipment, including rifles, but every endeavour was made to prepare the Corps in the limited time available in the evenings and at week-ends, for the role it would have been called on to play had the war been brought to the shores of the Dominion.

Conclusion. It was in April 1942 that formation of the

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DESC commenced - at the height of the Japanese threat of invasion and before their southwards advance had been checked at the Battle of the Coral Sea. By the time of the United States landing on Guadalcanal in August the Corps had been established in practically all parts of the country and was training solidly.

Apart from routine 'soldier training', administrative problems had to be considered by Corps Headquarters in Wellington. The administrative section (comprising senior Head Office clerical officers) devoted many evenings to round-table discussions on the procedure which would need to be adopted in changing over from civilian to military control, and the steps which would require to be taken to minimise confusion and misunderstanding in the event of the Department, with its thousands of staff and workmen and its million of pound's worth of stores and equipment, having to cease functioning as a civil organisation. It was difficult to visualise just in what manner or to what extent enemy action was likely to affect the Department, but all possible contingencies that could be foreseen were discussed and, where necessary, clarified with Army Headquarters. For example, it was decided that in the event of mobilisation of the Corps the Department's existing procedure would be adhered to with minor amendments, in regard to the supply of engineer stores for military purposes.

By June 1943, when the danger of invasion had passed, the future of the DESC came under review. It was at first proposed to continue as a unit of the Territorial Force, but the Chief of the General Staff⁽¹⁾ drew attention to the fact that this Force was bound by regulations, orders, etc., in such matters as pay, clothing and equipment, and compulsory training, and that unless the DESC could undertake Territorial obligations in full an

(1) Memo of 1 July 1943, 30/2626/3.

anomalous position would be created. He suggested that the Corps might function as a Territorial Reserve Unit, for which special conditions could be laid down, including two weeks camp per annum and voluntary parades of 12 hours a month. The alternative would be to adopt Home Guard status, involving only one muster parade every three months.

The question was put to all company commanders of the Corps, with the result that on 10 August 1943 the DGES reported the following figures to the Chief of the General Staff:

Full strength of Corps	: 3,646
Effective strength	: 1,421
Personnel likely to volunteer for DESC as a Territorial Reserve Unit with 12 hours' parade per month and one fortnight's camp per annum	: 1,069
Personnel in DESC within Territorial Force category i.e. liable to immediate posting to full-time service with the Forces	: 674

The DGES recommended that the DESC retain its present identity, role, and establishment, that it be given an intermediate status such as Territorial Reserve Unit, and that training revert for the time being to the same basis as the Home Guard, viz: one full day parade every three months.

Army's decision, given on 28 October 1943⁽¹⁾ was that in view of the changed conditions and re-organisation of the Territorial Force, which entailed a very considerable reduction in the Force, and as the service required of members of the DESC approximated more nearly to that in the Home Guard organisation than in the Territorial Force, the Corps was to be included in the Home Guard organisation but would retain its designation of DESC.

The final note was sounded when on 10 December 1943 Army notified the DGES that War Cabinet had decided that

as from 1 January 1944 the Home Guard, including the DESC, was to be placed on reserve, and that no further parades would be held except for the purpose of handing in equipment. This advice was passed on to ADESSs on 14 December 1943, and to all intents and purposes the DESC then went out of existence.

That the formation and training of the DESC was a wise move, under the circumstances, is beyond doubt. It is equally certain that the objects aimed at would have been achieved at least in part had New Zealand been attacked and the vast organisation and resources of this huge construction Department subjected to grave interference and disruption at a time when its services were indispensable to the defence of the Dominion.

Appendices.

1. Rates of Wages Emergency Regulations, 1940 (1940/86).
2. Labour Legislation Suspension Emergency Regulations,
1940 (1940/123).
3. Defence Works Labour Legislation Suspension Order,
1942 (1942/65).
4. Amendment No. 1 (1942/90).
5. " " 2 (1942/109).
6. " " 3 (1942/197).
7. Building Emergency Regulations, 1939, Amendment No. 2
(1942/64).
8. Essential Building Works Labour Legislation
Modification Order, 1943.
9. Public Works Workers' Agreement, 1939.
10. Highway and Road Maintenance Workers' Agreement, 1939.
11. Public Works Workers' Agreement, 1945.

THE DEFENCE WORKS LABOUR LEGISLATION SUSPENSION
ORDER 1942.

WHEREAS it appears to me to be necessary for securing the public safety, the defence of New Zealand, the efficient prosecution of any war in which His Majesty may be engaged, and for maintaining supplies and services essential to the life of the community, I, Patrick Charles Webb, Minister of Labour, pursuant to the Labour Legislation Emergency Regulations 1940, do hereby order as follows:-

1. This Order may be cited as the Defence Works Labour Legislation Suspension Order 1942.

2. This Order applies to all industries carried on in connection with defence works within the meaning of the Building Emergency Regulations 1939,* and to all workers employed on such works and to their employers.

3. The provisions of all Acts and regulations and Orders thereunder, and of all awards and industrial agreements under the Industrial Conciliation and Arbitration Act, 1925, and of all other voluntary agreements affecting conditions of employment are hereby suspended in so far as they operate to prevent or restrict the employment of the workers hereinbefore mentioned from being employed on the terms and conditions hereinafter set forth.

4. The normal hours of work shall be fifty-four per week - viz., nine hours per day for six days of the week.

5. Shifts may be worked as required, and where shifts are worked they shall be rotated.

6. Each worker employed on shift-work shall be paid in addition to his ordinary wages the sum of 2s. per shift.

7. The following rates of wages shall be paid:-

(a)	Carpenter	..	..	..	3s. 3d.	per hour.
(b)	Labourer	..	..	..	2s. 9d.	"
(c)	Labourer (concrete)	..	..	..	2s. 10d.	"
(d)	Bricklayer	..	..	..	3s. 4d.	"
(e)	Painter	..	..	..	3s. 2d.	"
(f)	Plumber	..	..	..	3s. 3d.	"
(g)	Electrician	..	..	..	3s. 2d.	"
(h)	Plasterer	..	..	..	3s. 4d.	"
(i)	Tiler	..	..	..	3s. 2d.	"
(k)	Timber-worker -					
	Machinist	..	..	..	3s. 1d.	"
	Small saw	..	..	..	2s. 9d.	"
(l)	Driver	..	..	..	£7. 15s.	per week
(m)	Any other class of worker employed shall be paid wages calculated on the basis of one-fifth of the total amount payable under the relevant award or agreement for a fifty-hour week, with overtime at the rate of time and a half for the hours in excess of the ordinary hours.					

*Statutory Regulations 1939 Serial number 1939/155,
page 695.

Amendment No. 1 : Statutory Regulations 1940, Serial
number 1940/323, page 1116.
Amendment No. 2 : Statutory Regulations 1942, Serial
number 1942/64, page 138.

8. Each worker shall be paid a minimum of £5 5s. per week, except for any week during which he has been absent from work through his own default.

9. All time worked in excess of nine hours per day or fifty-four hours per week, or on any Sunday or holiday or half-holiday, shall be paid for at the same rate as for ordinary time.

10. Where a worker is transferred or engaged to proceed to a locality necessitating his sleeping elsewhere than at his genuine place of residence the employer shall either supply the worker with suitable board and lodging or shall pay him the sum of 30s. for each week. He shall also convey the worker free of charge or pay his fare to and from the work, but once only during the continuance of such work, and shall pay for the time occupied in such travelling during the ordinary working-hours for such work at ordinary rates of pay, but once only each way.

11. Nothing shall prevent work being carried out by contract on a co-operative basis.

12. In respect of all other matters the provisions of the relevant award or agreement shall apply.

13. The Labour Legislation Suspension Order 1939 (defence and emergency works)* is hereby revoked.

14. This Order shall come into effect on the day of the date hereof.

Dated at Wellington, this 13th day of March, 1942.

P.C. WEBB,
Minister of Labour.

*Statutory Regulations 1939, Serial number 1939/168,
page 736.

Issued under the authority of the Regulations Act, 1936.
Date of notification in GAZETTE : 13th day of March, 1942.
These regulations are administered in the Department of Labour.

THE DEFENCE WORKS LABOUR LEGISLATION SUSPENSION
ORDER 1942, AMENDMENT NO. 2

PURSUANT to the Labour Legislation Emergency Regulations 1940*, the Minister of Labour doth hereby order as follows:-

1. This Order may be cited as the Defence Works Labour Legislation Suspension Order 1942, Amendment No. 2, and shall be read together with and deemed part of the Defence Works Labour Legislation Suspension Order 1942[†] (hereinafter referred to as the principal Order).

2. The principal Order is amended by inserting, after clause 12, the following new clause:-

"12A. The rates of remuneration hereinbefore prescribed shall be subject to the provisions of the general order of the Court of Arbitration dated 31st March, 1942, made in pursuance of the Rates of Wages Emergency Regulations 1940**

3. This Order shall be deemed to have come into effect on and from the 7th day of April, 1942.

Dated at Wellington, this 21st day of April, 1942.

W.E. PARRY,
For the Minister of Labour.

*Statutory Regulations 1940, Serial number 1940/123,
page 436.

[†]Statutory Regulations 1942, Serial number 1942/65,
page 140.

Amendment No. 1 : Statutory Regulations 1942, Serial
number 1942/90, page 193.

**Statutory Regulations 1940, Serial number 1940/86,
page 301.

Issued under the authority of the Regulations Act, 1936.
Date of notification in GAZETTE : 23rd day of April, 1942.
These regulations are administered in the Department of
Labour.

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The Essential Building Works Labour Legislation Modification Order 1943.

PURSUANT to the Labour Legislation Emergency Regulations 1940, the Minister of Labour doth hereby order as follows:-

1. This Order may be cited as the Essential Building Works Labour Legislation Modification Order 1943.

2. This Order applies -

(1) To industries carried on in connection with -

- (a) Existing Defence works within the meaning of the Building Emergency Regulations 1939; and
- (b) Future Defence works to which the Minister of Works declares that the provisions of this Order shall apply; and

(2) To industries carried on -

- (a) In connection with the construction in the North Island of New Zealand of hospitals and of buildings comprising part of State Housing Schemes and in connection with works forming part of such projects;
- (b) In connection with the construction in the South Island of New Zealand of hospitals and of buildings comprising part of State Housing Schemes in respect of which it is directed that a forty-eight-hour week shall be worked, and to which the Minister of Works declares that the provisions of this Order shall apply and in connection with works forming part of such projects;
- (c) In connection with any other works in respect of which it is directed that a forty-eight-hour week shall be worked, and to which the Minister of Works declares that the provisions of this Order shall apply.

(3) To workers employed in such industries and to their employers.

3. The provisions of all Acts and regulations and Orders thereunder, and of all awards and industrial agreements under the Industrial Conciliation and Arbitration Act, 1925, and of all other voluntary agreements affecting conditions of employment, are hereby modified to the extent hereafter set forth in their application to the industries, workers, and employers to which this Order applies.

4. (1) The normal hours of work shall be forty-eight per week, namely -

- (a) $8\frac{1}{2}$ hours per day (Monday to Friday inclusive) and
- (b) $4\frac{1}{2}$ hours on Saturday, to be worked before 12 noon :

Provided that these hours may be varied and extended in respect of any particular contract by the Minister of Works or some person authorized by him in that behalf.

(2) All time worked outside or in excess of the hours hereinbefore prescribed shall be paid for in accordance with the relevant award or agreement, subject, however, to the provisions of any Order made by the Minister of Labour in pursuance of the Labour Legislation Emergency Regulations 1940 that may be applicable to such award or agreement.

5. Shifts may be worked as required, and where shifts are worked they shall be rotated.

6. Each worker employed on shift work shall be paid in addition to his ordinary wages the sum of 2s. per shift.

7.(1) The following rates of wages shall be paid:-

	s.	d.	
(a) Carpenter and joiner	2	0	3
(b) Labourer	0	2	9
(c) Labourer (concrete)	0	2	10
(d) Bricklayer	0	3	4
(e) Painter and paperhanger	0	3	2
(f) Plumber and gasfitter	0	3	3
(g) Electrician	0	3	2
(h) Plasterer and tiler	0	3	4
(i) Roof-tiler	0	3	2
(k) Timber worker -			
Machinist	0	3	1
Small saw	0	2	10
(l) Driver	7	10	0
(m) Any other class of worker employed shall be paid wages calculated on the basis of one-fiftieth of the total amount payable under the relevant award or agreement for a fifty-hour week, with overtime at the rate of time and a half for the hours in excess of the ordinary hours.			

(2) The above rates shall be subject to the provisions of the General Order of the Court of Arbitration dated 31st March, 1942, made in pursuance of the Rates of Wages Emergency Regulations 1940, and to any order of the Court of Arbitration hereafter made in pursuance of the said regulations and of the Economic Stabilization Emergency Regulations 1942.

Statutory Regulations 1939, Serial number 1939/155, page 695.

Amendment No. 1 : Statutory Regulations 1940, Serial number 1940/323, page 1116.

Amendment No. 2 : Statutory Regulations 1942, Serial number 1942/64, page 138.

Amendment No. 3 : Statutory Regulations 1942, Serial number 1942/279, page 679.

Amendment No. 4 : Statutory Regulations 1943, Serial number 1943/89, page 181.

8.(1) Each worker shall be paid a minimum of £5.10s. per week, except for any week during which he has been absent from work through his own default, or at his own request, or through sickness.

(2) Where workers are directed to any employment necessitating their sleeping elsewhere than at their genuine places of residence, absence through sickness shall not operate to deprive any such worker of the right to the minimum weekly wage : provided, however, that if he has been absent from work through sickness for a total of fourteen working-days in a period of thirteen calendar weeks of continuous employment with the same employer, any

further absence from work through sickness during that period of thirteen calendar weeks shall be without pay and shall not count for the purpose of minimum weekly wage payments. Every worker shall, if required, produce satisfactory medical certificates covering the period of any absence due to sickness, and if when so required he does not do so he shall not be paid for the lost time and it also shall not count for the purpose of minimum weekly wage payments. For the purposes of this subclause sickness shall not be deemed to include sickness due to misconduct or arising out of any complaint of a permanent or long-standing nature unless aggravated by the conditions of employment.

9.(1) "Suburban work" shall mean work (other than country work) performed elsewhere than at the shop of the employer and irrespective of where the engagement takes place.

Workers employed on suburban work distant more than one and a half miles from the central points hereinafter specified shall either proceed to and from such work or they shall be conveyed to and from such work at the expense of the employer as the employer shall determine. Time reasonably occupied by the workers in travelling, or time occupied in conveying the workers to and from such work beyond the one and a half miles or beyond the worker's home, whichever is the less, shall be allowed and paid for by the employer. No worker residing less than one and a half miles from the place where the work is to be performed shall be entitled to the allowance mentioned in this clause. For the purpose of this clause all distances shall be measured by the nearest convenient mode of access for foot-passengers.

The central points hereinbefore referred to are -

- (i) In the case of the Auckland Metropolitan Area, as defined later in this clause, the corner of Symonds Street and Khyber Pass
- (ii) In the case of the City of Wellington, the Te Aro Post-office :
- (iii) In the case of the City of Christchurch and the Borough of Riccarton, Cathedral Square :
- (iv) In the case of the City of Dunedin and the Borough of St. Kilda, the corner of Princes Street and High Street, Dunedin :
- (v) In the case of the Borough of Greymouth, the Greymouth Main School, Tainui Street.
- (vi) In the case of the Borough of Hokitika, the Main School :
- (vii) In the case of the City of Wanganui, the corner of Ingestre Street and the Avenue :
- (viii) In the case of any city or town or borough other than those included in the areas mentioned in the foregoing seven paragraphs, the chief or principal post-office in such other city or town or borough :
- (ix) The central points specified in the foregoing paragraphs (i) to (viii) apply where the employer has a shop, office, store, or other recognized place of business in any of the areas mentioned therein apart from any shop, office, or store established at, on, or in connection with any separate contract carried on by him. Where any employer has no such shop, office, store, or other recognized place of business, the central point shall be (a) if the place where the work is to be performed is in any of the

areas mentioned in paragraphs (i) to (viii), the point specified in the appropriate paragraph : or (b) if the place where the work is to be performed is in any other city or town or borough or elsewhere, the chief or principal post-office, in the city or town or borough in or nearest to which the worker employed by him resides :

- (x) For the purposes of this clause the Auckland Metropolitan Area is defined as comprising the City of Auckland, the boroughs of Birkenhead, Northcote, Takapuna, Devonport, Ellerslie, Mount Albert, Mount Eden, New Lynn, Newmarket, One Tree Hill, Onghena, Otahuhu, Manurewa, and Papakura, the Mount Roskill, Mount Wellington, and Panmure Road Districts, the town districts of Henderson, Glen Eden, Papatoetoe, and Howick, and all those portions of the Manukau County situated within one mile of the boundaries of any of the foregoing local-authority areas :
- (xi) In the case of all persons, firms, companies, or local bodies whose operations come within the scope of clause 22 (b) of the New Zealand Carpenters and Joiners' award, Book of Awards, Vol. 42, page 332, and whose trade or business premises are situated within the Auckland Metropolitan Area as defined in the preceding paragraph, the said trade or business premises shall be regarded as the shop of the employer for the purposes of the suburban-work clause in respect only of carpenters permanently employed under the provisions of clause 22 (b) of the award :
- (xii) Notwithstanding the foregoing provisions of this clause the existing arrangements regarding travelling time and fares in respect of suburban work on Defence works in the Auckland Metropolitan Area shall apply to work coming under this Order in such area.

(2) If any worker is required to use the ferry for the purpose of going to or returning from any place outside his employer's shop where the work is to be done, his fare shall be paid by the employer.

(3) Carpenters in the employ of the Wellington Harbour Board who are required to perform work outside the Lambton Harbour - i.e., taking a line drawn from the end of the concrete breastwork at Kaiwarra on the north and the Te Aro Baths on the south as the extreme boundaries - shall be considered to be engaged on suburban work, and workers employed on work outside such limits shall be conveyed at the expense of the Wellington Harbour Board. The present practice of the Wellington Harbour Board to pay ordinary rates for time occupied outside ordinary working-hours in travelling outside the one and a half miles limit shall be continued.

(4) The National Building Committee, established under the provisions of clause 12 of this Order, shall consider and recommend to the Minister of Works for his decision any variation or modification of any of the provisions of this clause to remove any anomalies or to meet any special circumstances that may arise.

10. Where a worker is transferred or engaged to proceed to or directed to employment in a locality necessitating his sleeping elsewhere than at his genuine place of residence the employer shall either supply the worker with

THE HISTORY OF THE
CITY OF BOSTON
FROM THE FIRST SETTLEMENT
TO THE PRESENT TIME
IN TWO VOLUMES
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*Statutory Regulations 1942, Serial number 1942/65,
page 140.

Amendment No. 1 : Statutory Regulations 1942, Serial
number 1942/90, page 193.

Amendment No. 2 : Statutory Regulations 1942, Serial
number 1942/109, page 251.

Amendment No. 3 : Statutory Regulations 1942, Serial
number 1942/197, page 475.

PART I : GENERAL

CHAPTER 9 : SPECIALIST ENGINEERING COMPANIES
FOR OVERSEAS SERVICE

- (1) Railway Construction Companies.
- (2) Mechanical Equipment Company.
- (3) Aerodrome Construction Squadron.

CHAPTER 9SPECIALIST ENGINEERING COMPANIES FOR OVERSEAS
SERVICE.

Early in the war, at the request of Army Headquarters, the Public Works Department undertook to invite volunteers from amongst its staff and workmen, and to select from these and other sources the personnel required for specialist engineering companies for service in the New Zealand Army overseas. In all, the Department assisted in the formation of two railway construction groups, two Army troop companies, and a mechanical equipment company, as well as selecting reinforcements from time to time.

The Department also called for volunteers for two aerodrome construction squadrons required by the Air Department for service in the Far East and in the South Pacific.

1. RAILWAY CONSTRUCTION COMPANIES, N.Z.E.

The Director of Mobilisation, Army Headquarters, wrote to the Engineer-in-Chief, Public Works Department on 26 December 1939,⁽¹⁾ forwarding particulars of the war establishments for (1) headquarters of a railway construction and maintenance group, (2) a railway survey company, and (3) a railway construction company, and stating that it would be appreciated if the personnel required (especially officers and tradesmen) could be recruited through the Department. The Director of Mobilisation mentioned that a similar memorandum was being addressed to the General Manager, New Zealand Railways.

The group was to comprise a total of 16 commissioned officers and 355 other ranks. It was indicated in Army's memorandum that the personnel selected would be required to enter camp on 24 January 1940, and proceed overseas

(1) Army memo D300/1/10 on 32/933, p.1.

after a short period of training.

On 5 January 1940 an appeal for recruits by the Minister of Public Works was circulated to all officers and employees of the Department by the Permanent Head.⁽¹⁾ The Minister's circular recalled that in the previous Great War the New Zealand Tunnelling Corps had established a high reputation, and he expressed his conviction that the men now employed on public works, who had demonstrated their ability in the constructional field, would be able to organise a company for this work which would put up a record unprecedented in the past. 'This is going to be a titanic struggle of human rights over despotism', he stated, 'and all of those who contribute something towards successfully concluding this struggle will not only confer a blessing upon the people of the British Commonwealth but also upon posterity.'

The Permanent Head's covering memorandum, after observing that the general conditions of enlistment and service would be the same as for other units of the Special Force (as the 2nd New Zealand Expeditionary Force was then designated), outlined the various trades of which the railway construction group would be made up, and requested volunteers to submit their applications to the officer-in-charge of the work they were employed on. Officers-in-charge of works were directed to forward applications to the District Engineer, who in turn was to submit them to Head Office - where they were required by 17 January if at all possible. It was stated that the Army Department would arrange for enrolment and medical examination of volunteers after applications had been considered in Wellington.

Presumably by verbal arrangement with Army Headquarters, the Permanent Head's circular memorandum, also

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the Minister's letter, mentioned that accepted applicants would enter camp early in February 1940.

Within a few days after the issue of the appeal, applications for inclusion in the group began to pour in from all over the Dominion. These were immediately sorted and summarised in the Head Offices of both the Public Works and the Railways Departments. Applicants were representative of every branch of both Departments, from District Engineers, clerks, and draughtsmen to artisans, porters, and labourers, and ranged from men under the minimum age of 21 to others well past the maximum of 35 years. There was naturally a preponderance of single men, although the minority of married men, with and without dependants, was by no means a small one.

Nearly 1,200 applications were received by the two Departments - about two-thirds from public works employees and the remainder from railwaymen. The latter were, after scheduling in the Railways Department, referred to the public works Head Office, where all applications were considered by the Engineer-in-Chief and other senior officers and the final selections made.

On the afternoon of Friday, 26 January 1940 - just three weeks after the appeal had been issued - Army Headquarters was handed a schedule⁽¹⁾ containing the names and particulars of 413 volunteers selected for N.C.Os and rank and file vacancies. Of these 240 were from public works employees and 173 from employees of the Railways Department. At the same time tentative recommendations for commissioned officers were submitted to the Director of Mobilisation by the Engineer-in-Chief.⁽²⁾

The selection of 413 men for the 335 vacancies allowed for in the establishment of the railways construction group left an excess of 58 to offset men who might

(1) Copy on 32/933, p.1.

(2) Memo of 26 Jan 1940 on 32/933, p.1.

The first part of the paper is devoted to a general
discussion of the subject. It is shown that the
theory of the subject is very complicated and
that it is not possible to give a complete
account of it in a single paper. The author
therefore confines himself to a general outline
of the theory, and to a discussion of the
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of the theory, and to a discussion of the
main results.

fail to pass the medical examination. This did not prove sufficient, however, principally owing to the fact that the urgency attending the formation of the group did not permit consideration of men who were temporarily unfit. Medical examination was arranged by Army Headquarters, and fit men only were called up for posting to camp. To meet the deficit, the Public Works Department selected a further 118 suitable applicants.

Selected recruits found medically fit for overseas service were posted to Burnham Military Camp, where training of the group commenced on 14 February 1940.

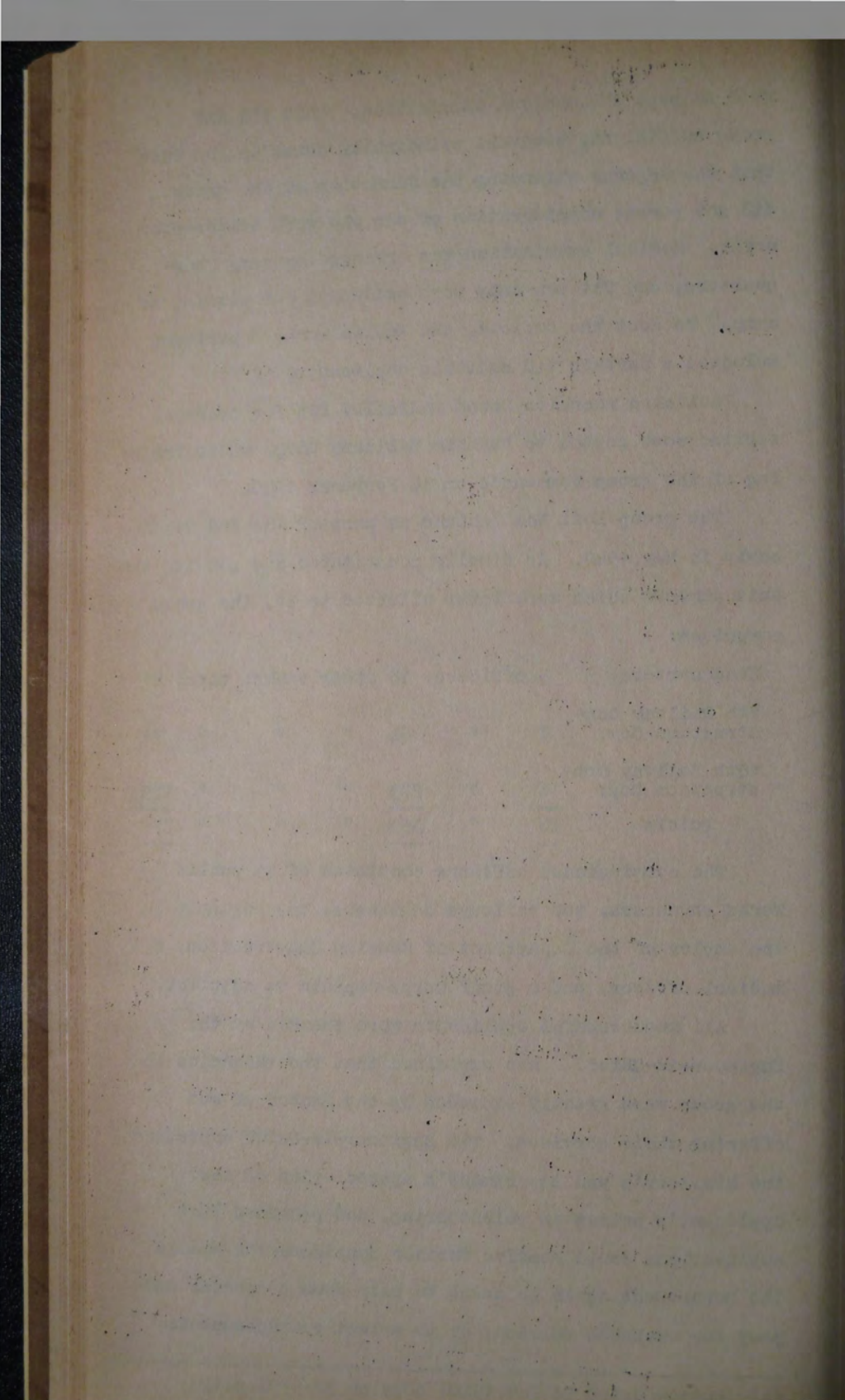
The group left New Zealand as part of the 2nd Echelon early in May 1940. As finally constituted and showing the unit numbers which were later allotted to it, the group comprised:

Headquarters:	3	officers:	18	other ranks:	total	21
9th Railway Construction Coy:	7	"	64	"	"	71
10th Railway Construction Coy:	6	"	273	"	"	279
Totals	16	"	355	"	"	371

The commissioned officers consisted of 11 public works engineers, two railways engineers, one engineer in the employ of the Department of Housing Construction, a medical officer, and a Staff Corps Captain as adjutant.

All unsuccessful applicants were thanked by the Engineer-in-Chief,⁽¹⁾ who explained that the vacancies in the group were greatly exceeded by the number of men offering their services. The Engineer-in-Chief expressed the Minister's and Department's appreciation of the applicant's action in volunteering, and promised that applications would receive further consideration should the Department again be asked to help form a special company for overseas service, or to select reinforcements

(1) Letter dated 26 Feb 1940: copy on 32/933, p.1.





12TH. RAILWAY SURVEY COY., N.Z.E.



THE RAILWAY CONSTRUCTION GROUP, N.Z.E. IN CAMP AT BURNHAM.
(HQ AND 9TH AND 10TH RAILWAY CONSTRUCTION COYS.)

for the group already completed.

Second Railway Construction Group. Following a verbal request by Army Headquarters in June 1940, the Public Works proceeded to invite volunteers for a second railway construction group, identical to the earlier one except that another headquarters section was not required, i.e. the need was for further railway survey and railway construction companies, consisting in all of 13 officers and 337 other ranks. Actually, Army's requirements were the railway survey and construction companies, two forestry companies, two railway operating companies, and two Army troop companies, comprising a total of 49 officers 1959 other ranks.

The Minister of Public Works again appealed to all officers and employees to volunteer their services.⁽¹⁾ His circular memorandum reiterated the conditions of enlistment, set out the trade openings available, stipulated that applications must be made on forms obtainable from officers-in-charge of works, and emphasised that the whole matter was one of urgency. The trend of the war in Europe, following the fall of France, was reflected in one of the concluding paragraphs of the Minister's appeal. This read as follows:

'The gravity of the international situation hardly needs stressing, and I feel confident that the response to this appeal will be as great, if not greater, than to the former one which resulted in as fine a body of men as the world can turn out proceeding overseas to do their bit towards defending all that we hold dear from the menace of totalitarian despotism.'

The Permanent Head's covering memorandum of 14 June 1940⁽²⁾ instructed his engineers to complete in the space provided at the foot of the application form a report 'brief and to the point' on each applicant, this report to relate to the applicant's suitability for the position sought in the railway construction group and not

(1) Circular memo of 14 June 1940 on 32/933, p.2.
 (2) 32/933, p.2.

necessarily to his work in the Department. The form of application⁽¹⁾ had been drawn up and distributed for the convenience of volunteers and also to facilitate handling the applications in the public works Head Office. It gave the applicant the opportunity of indicating the trade or occupation desired by him in the group, presupposing that some men might wish to undergo military service in a different capacity from their civil occupations, e.g., a clerk who could drive a truck.

With a view to expediting the formation of the group, Army Headquarters verbally asked the Department to have all applicants medically examined, through the local Army area office. This ensured that a selection would be made only from medically fit volunteers. District Engineers were accordingly telegraphed as follows on 21 June 1940⁽²⁾:

'Please make available immediately to Army Area officers concerned names and addresses all applicants railway survey and construction group to enable medical examination to be completed preparatory to calling up of selected recruits.'

By this time, 21 June 1940, the formation of the group was regarded by Army as of such pressing urgency that the selection of the rank and file was made in Army Headquarters, where a representative of the Public Works Department collaborated with the mobilisation branch in the calling up for posting to camp of medically fit applicants as and when their names and occupations came to hand by long-distance telephone from Army area offices. Such names were checked with the applications, embodying reports, from District Engineers, which continued to arrive at the public works Head Office.

In effect, the orderly procedure laid down for considering applications in the public works Head Office and making selections therefrom for submission to Army Headquarters had to be subordinated to the urgent

(1) Copy on 32/933, p.2.

(2) 32/933, p.1.

necessity for completing the formation of the railway construction group and other specialist engineering companies. Public works applicants not required for the railway construction group were posted to the forestry, railway operating, or Army troop companies, and, conversely, any gaps in particular trades in the group were filled from applicants for the other companies. The forestry and railway operating companies were in the main composed of men recruited through the State Forest Service and the Railways Department, respectively, and the overflow of public works applicants was diverted primarily to the two Army troop companies.

All men for the railway construction group were in camp by the end of June, the survey company proceeding to Trentham and the construction company to Ngaruawahia. They went overseas as part of the 3rd echelon in September 1940.

Of the 14 commissioned officers in the group, eight were members of the staff of the Public Works Department, as also were three of the Army troop companies' officers.

2. 21ST MECHANICAL EQUIPMENT COMPANY.

Accorded even greater urgency than the 2nd railway construction group was the formation of a mechanical equipment company in November 1940. At the verbal request of Army Headquarters the Public Works Department once again circularised its by now somewhat depleted ranks of skilled artisans and tradesmen, inviting volunteers especially for drivers or operators capable of handling mechanical plant units such as tractors, shovels, carryalls, scrapers, bulldozers, angledozers, excavators, etc, of whom 178 were required out of a total of 252 rank and file.⁽¹⁾ The Permanent Head's circular memorandum, including a notice for display on all works went out on

(1) Circular memo and enclosure on 32/933, p.3.



OFFICERS OF NO. 1 AERODROME
CONSTRUCTION SQUADRON, RNZAF.
(TAKEN AT TEBRAU, MALAYA.)

PUBLIC WORKS STAFF ARE WELL REPRESENTED IN THESE GROUPS
TOP LEFT 18TH ARMY TROOP COY. RIGHT 21ST. MECHANICAL EQUIPT. COY. (OFFICERS & N.G.O.S)
LOWER LEFT OFFICERS OF 21ST. MECH. EQUIPT COY RIGHT 19TH ARMY TROOP COY.

2 November 1940. Simultaneously, Army Headquarters circularized its district and area officers⁽¹⁾ requesting them to co-operate with the Public Works Department.

On 6 November 1940 copies of the circular memorandum and notice were sent to the Lands & Survey Department and State Forest Service, with an intimation that applications for the unit would be welcomed from men employed on their works.⁽²⁾

With a view to attracting applicants from every possible source, District Engineers had been requested in the circular memorandum of 2 November 1940 to have the notice inviting volunteers distributed to all likely local bodies and large contractors as well as to public works in their districts.

The procedure adopted was that, as in the case of the railway companies, applications would be made to District Engineers through officers-in-charge of works, on Army's stock recruitment form (NZ 339) or on plain paper if forms were not available. On receipt of applications District Engineers were to select men suitable for inclusion in the company and then arrange with the Army Area officers to have them called up for medical examination. The names and occupations of fit men were to be communicated immediately to Head Office by District Engineers either by telegraph or telephone, and the final selection of the unit's personnel would be made in Head Office.

(N.B. This procedure took into account the benefit of experience gained in forming the railway construction groups. The necessity for forwarding on to Head Office all applications received was now dispensed with, and only men considered by the District Engineer as suitable for selection were to be called up for medical

(1) Copy on 32/933, p.3.

(2) Ibid.

examination. This enabled the District Engineer to exclude men employed in 'key' positions who could not be released without serious inconvenience to important works. Thus all men whose names reached Head Office were known to be physically fit, suitable for inclusion in the company, and available for release by the Department.)

The notice calling for volunteers stated that it was expected selected applicants would be required to enter camp at Trentham not later than 15 November 1940, and indicated that there would be no final leave granted prior to proceeding overseas.

The speed with which applications were dealt with in the public works Head Office and postings to camp made by Army Headquarters will be apparent from the fact that on 11 November, precisely one week after the date of launching the appeal for volunteers - and it had to circulate to jobs all over the country, including many isolated localities - the Engineer-in-Chief was able to report⁽¹⁾ to the Prime Minister that the final roll of the company would be completed that evening and that all men would be in camp by the scheduled date, 15 November. After mentioning that the majority of the officers selected were from the staff of the Public Works Department, the report added 'in view of the extremely short notice, the response to the appeal for specialist volunteers has been excellent and, except for a few men culled from the rolls for the 5th Reinforcements, the personnel of the 21st Mechanical Equipment Company has been filled from applicants who offered their services knowing they would be required to proceed overseas almost immediately.'

This report was noted with appreciation by the Prime Minister and War Cabinet.⁽²⁾

Although the 21st Mechanical Equipment Company had

(1) 32/933, p.3.

(2) Minute on 32/933, p.3.

been formed in a great hurry, it did not actually leave New Zealand as part of the 4th Reinforcements until February 1941.

Reinforcements. Reinforcement drafts for the specialist engineering companies were selected by the Public Works Department from time to time, usually from lists of volunteers whose services had not up to then been accepted. These men were called up for inclusion in the various echelons which proceeded overseas during 1940 and in early 1941. The last draft was submitted to Army Headquarters on 2 April 1941, under cover of a memorandum⁽¹⁾ in which the Permanent Head commented as follows:

'This is probably the last occasion on which the Department will be able to assist to any extent with the formation of specialist engineering units, as it is clear that the ranks of our fit and eligible workmen and staff have been virtually exhausted, the majority of those now offering being over age or ruled out on account of domestic responsibilities.'

Altogether, the Public Works Department had been concerned with the formation of:

	<u>Officers</u>	<u>Men</u>	<u>Total</u>
Headquarters Group, Railway Survey & Construction Companies :	3	18	21
9th Railway Survey Company :	7	64	71
10th Railway Construction Company :	6	273	279
12th Railway Survey Company :	7	64	71
13th Railway Construction Company :	6	273	279
18th Army Troop Company :	7	298	305
19th Army Troop Company :	7	298	305
21st Mechanical Equipment Company :	11	252	263
	54	1540	1594

Including reinforcement drafts aggregating upwards of 300 men, the total personnel enlisted for the specialist engineering companies was not far short of 2,000, the great majority of whom were officers or employees of the Public Works Department.

(1) 32/933, p.4.

[The text on this page is extremely faint and illegible. It appears to be a multi-paragraph document, possibly a letter or a report, with several lines of text visible across the page. The content cannot be transcribed accurately.]



18th ARMY TROOP COY., NZE.



19th ARMY TROOP COY., NZE.



21st MECHANICAL EQUIPMENT COY., NZE.

The Chief of the Air Staff advised the Minister of Defence on 9 May 1941 that the authorities in the Far East were experiencing difficulty in providing all the aerodromes essential for defence purposes, and that they would welcome any assistance which could be given by New Zealand.⁽¹⁾ The Chief of the Air Staff recommended that an aerodrome construction unit comprising approximately 140 personnel should be formed in New Zealand, equipped by the New Zealand Government at a cost of about £110,000, and placed at the disposal of the Commander-in-Chief, Far East.⁽²⁾

Anticipating that the foregoing recommendation would be approved, the Air Secretary wrote on 12 May 1941 to the Engineer-in-Chief (in his capacity as Director-General of Works and Buildings to the RNZAF), asking him to consider the provisional personnel establishment of the unit and to investigate the question of equipment to be provided.⁽³⁾ The Engineer-in-Chief replied on 15 May 1941, suggesting minor amendments to the proposed establishment.⁽⁴⁾

On the following day, 16 May 1941, in terms of a verbal request by Air Headquarters, the Permanent Head issued a circular to all engineers in charge of districts, enclosing copies of a notice inviting applicants to fill the personnel of the proposed aerodrome construction squadron.⁽⁵⁾ Engineers were instructed to distribute the notice to all works in their districts, and to all local bodies, contractors, and other sources (e.g. sawmills, etc) from which suitable applicants were likely to be forthcoming. Supplies of the notice had also been forwarded

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- (1) Copy of report 104/9 on 32/933/2, p.1.
(2) Ibid.
(3) 32/933/2, p.1.
(4) Ibid.
(5) Ibid.

to the Lands & Survey, Railways and Forestry Depts for distribution to their works.⁽¹⁾

The procedure adopted in calling for volunteers was much the same as that followed in the formation of the specialist Army Companies. The notice detailed the positions vacant in the squadron (trade or occupation and corresponding rank), and stipulated that applications were to be made only to the nearest District Engineer of the Public Works Department. The normal age group from which recruits would be selected was given as 20 to 40 years, with preference to men over 30 years. Suitable applicants between the ages of 40 and 50 years would not be excluded if of good physique and medically fit for overseas service. Consideration would also be given to applicants who, because of some slight physical defect, were ineligible for front-line service but were nevertheless in good general health and capable of standing up to rigorous living and climatic conditions. Applicants were enjoined not to leave their employment nor to make other arrangements unless and until they received official notification of the result of their application.

District Engineers were requested in the circular memorandum to select men suitable and eligible for inclusion in the squadron as applications came to hand, and to arrange for these to complete form A.F.2 in the case of commissioned officers or A.F.32 in the case of N.COs and other ranks. Before issuing forms AP2 (the stock RNZAF form for enlistment as an officer in the Air Force) the heading was to be altered to read 'Application for Commission in Aerodrome Construction Squadron.' Completed forms were to be forwarded to the public works Head Office, together with a report on each applicant indicative of his suitability for selection and mentioning how

(1) 32/933/2, p.1.

soon he would be available for overseas service. This report was to be appended in a space available at the foot of the application forms.

It was indicated to District Engineers⁽¹⁾ that for the present it would be necessary to exclude 'key' men whose enlistment would seriously inconvenience aerodrome maintenance in New Zealand or the Public Works Department generally. Where possible, other Departments were to be consulted as to the availability of applicants employed by them.

By the end of May 1941 applications from all over the Dominion had been received in Head Office. These, together with the District Engineer's reports endorsed thereon (or made separately), were referred to Air Headquarters, who took all further action with regard to selecting the personnel required. Technical officers of the Public Works Department were, however, represented on the Air Department's selection committee.

On the 16 commissioned officers in the aerodrome construction squadron, five were selected from the staff of the Public Works Department, which Department also supplied the greater part of the rank and file.

No. 2 Aerodrome Construction Squadron. At the request of the Air Department,⁽²⁾ the Public Works Department undertook in September 1941 to invite applications for a second aerodrome construction squadron, identical in all respects to the earlier one except that it was required for service in 'New Zealand and the New Zealand Pacific Area.' As previously, notices⁽³⁾ were forwarded to District Engineers and to the Lands & Survey, Railways, and Forestry Departments for distribution on all works, the same conditions of enlistment, etc applying, but District Engineers

(1) Circular memo of 16 May 1941 on 32/933/2, p.1.

(2) Memo of 2 Sept 1941 from Air Force Member for Supply to Engineer-in-Chief, PWD, on 32/933/2, p.1.

(3) 32/933/2, p.1.

were instructed⁽¹⁾ to send completed applications to the Officer-in-Charge, Personnel Branch, Air Headquarters, Wellington, instead of to the Head Office of the Public Works Department. District Engineers, were, however, to supply their Head Office with copies of the reports on applicants for commissioned rank, along with such additional comment as would enable the Permanent Head to bring before the selection committee the most suitable men offering in each district.

Several applications were attracted by newspaper advertisements inserted by the Air Department.⁽²⁾

On 29 September 1941 District Engineers were advised that applications for the squadron would close at Air Headquarters on 4 October 1941.⁽³⁾

Squadrons Disbanded. Nearly two years later, in April 1943, the Public Works Department, by arrangement with the Air Department,⁽⁴⁾ took over the services of a number of men ex Nos. 1 and 2 Aerodrome Construction Squadrons. These comprised about 160 artisans and tradesmen who, by direction of War Cabinet, were being demobilised to make them available for employment on public works of urgent national importance.⁽⁵⁾

Conclusion. Another request made of the Public Works Department for personnel for overseas service arose out of a memorandum of 29 May 1944⁽⁶⁾ from the Adjutant General, Army Headquarters to the Under-Secretary, forwarding for distribution among the engineering staff a circular inviting applications for employment in the Indian Army. Army's circular, giving the rates of pay

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- (1) Circular memo of 15 September 1941 on 32/933/2, p.1.
 - (2) "Dominion", Wellington, 20 September 1941.
 - (3) 32/933/2, p.1.
 - (4) 32/933/2, p.2.
 - (5) Memo of 21 April 1943 from Under-Secretary to District Manpower Officer, File 32/933/2, p.2.
 - (6) 32/933/3.

and allowances and conditions of enlistment as engineer officers, was brought to the notice of departmental engineers. Several volunteered their services, but only a few who could be released without undue inconvenience to the Department were made available. Of these, but one officer was accepted.

Doubtless the Official War History of the Army (and of the Air Force) will recount the services rendered by the specialist engineering units formed with the assistance of the Public Works Department and largely manned from its staff and workmen. Whatever their record on active service may have been - and unofficial reports indicate that it was excellent - they enjoyed an advantage not usually accorded military companies, in that every man was specially selected for the job. If, for example, six carpenters were called for in the establishment, six carpenters would be provided - and each one favourably reported on by a District Engineer or other controlling officer familiar with his work.

The very cream of the Department's highly trained technical staff and workmen was released to the special units, leaving behind the older and less physically fit to meet the huge programme of defence work which had to be accomplished on the home front.

PART 1 : GENERAL

CHAPTER 10 : CONSTRUCTION PLANT AND
EQUIPMENT SENT OVERSEAS

- (1) Plant for Army (Middle East and South Pacific)
- (2) Plant for Air Force (Far East).

CHAPTER 10.

CONSTRUCTION PLANT AND EQUIPMENT SENT OVERSEAS.

The services of the Public Works Department were freely availed of by the Armed Forces in connection with obtaining and despatching overseas mechanical plant and equipment required in the various theatres of war. Plant was sent to the Middle East and to the South Pacific for Army use, and to the Far East and the South Pacific for the RNZAF.

Urgency was the prime consideration in meeting Army and Air's requests of this nature, as in practically every case the plant was required at short notice and had to be assembled in Wellington from all over the country, overhauled as necessary, packed, and despatched overseas in a matter of days.

Altogether, no less than 555 items of plant, valued at over £500,000, were sent overseas.⁽¹⁾

1. PLANT FOR ARMY.

Middle East. The Quartermaster-General wrote to the Engineer-in-Chief on 6 August 1940,⁽²⁾ stating that a communication received from Egypt had suggested that power machinery such as was required for the construction of anti-tank trench pits and other earthworks in sand and sand matrix, also power drills and concrete mixers for pill boxes, might be sent from New Zealand as a contribution towards the security of the Middle East. The Quartermaster-General asked to be advised urgently whether any such machines in the possession of the Public Works Department could be made available for despatching overseas. He mentioned that the most useful units would be portable power concrete mixers, air compressors with power drills, and mechanical excavators.

A copy of this memorandum was submitted to the Prime

(1) P.W. Statement 1945: P.v.

Minister by the Engineer-in-Chief on 8 August 1940,⁽¹⁾ stating that the following plant items could be released at short notice, and that the Minister of Public Works concurred in their being despatched overseas:

- 6 Diesel excavators.
- 3 large crawler tractors, with angledozers.
- 3 carryall scrapers.
- 4 small crawler tractors.
- 10 concrete mixers.
- 6 Diesel engine compressors, with rock drills and equipment.
- 2 Acetone plants.

These items were available from the Napier, Wellington, Nelson, and Christchurch public works districts. Their transfer value was estimated at £32,500, of which approximately £8500 represented the purchase price, ex New Zealand stocks, of spare parts and accessories.⁽²⁾

Particulars of the plant proposed to be released, including the maximum broken-down weights and shipping dimensions of the largest packages, were conveyed to the Quartermaster-General by the Engineer-in-Chief on 15 August 1940.⁽³⁾ He added that he understood the services of ex-Public Works Department mechanical officers and plant operators now in the 2nd NZEF would be available to put the plant into operation at its point of destination, and that Diesel distillate fuel and lubricating oil would be provided there.

Replying on the same date, the Quartermaster-General outlined the arrangements contemplated for shipping the plant from Wellington (on transport No. 12), and intimated that loading would commence on 19 August 1940.⁽⁴⁾

(1) 29/1032/2, p.1.

(2) Enclosure to Engineer-in-Chief's minute of 8 Aug 1940 to Prime Minister, on file 29/1032/2, p.1.

(3) 29/1032/2, p.1.

(4) Army memo D7/31/15N of 15 August 1940 on 29/1032/2, p.1.

War Cabinet on 14 August 1940 approved the proposal submitted by the Engineer-in-Chief to the Prime Minister, the actual minute of approval being received in Army Headquarters on 19 August 1940 and subsequently forwarded to the Public Works Department for filing purposes in January 1941.⁽¹⁾

Immediate instructions were telephoned from Head Office to the districts concerned, and, by working at high pressure during the week commencing 15 August 1940, the Stores and Mechanical Branches completed by 23 August the formidable task of gathering together, overhauling, and placing the plant, complete with spare parts, into the ship's hold. In a report to the Permanent Head dated 27 August 1940,⁽²⁾ the Chief Mechanical Engineer commented 'The stores and mechanical staffs concerned worked long hours over a week-end and in some cases right round the clock The Department has on many occasions of national emergency carried out similar efforts, but I consider that this compares favourably with the best it has done to date'. Credit was also due, he added, to the Railways Department, the shipping and other transport organisations, and to the Department's field staff, for services rendered during and after ordinary working hours.

In a memorandum of 26 August 1940⁽³⁾ the Engineer-in-Chief advised the Quartermaster-General that all the plant had been placed aboard transport No. 12, together with a reasonably complete supply of spare parts for future maintenance. All items had been checked over as thoroughly as possible in the limited time available, and were considered to be in reasonably good working order. The manifest comprised 69 foolscap pages. The Engineer-in-Chief stressed the importance of having the plant

(1) 29/1032/2, p.1.
 (2) Ibid.
 (3) Ibid.

operated under competent mechanical supervision, and in this connection he suggested following the procedure adopted by the Public Works Department whereby periodic inspections are made by qualified plant inspectors. He mentioned the names of several officers of the Public Works Department's mechanical staff then in the Army who would be suitable to undertake responsibilities of that nature, especially with regard to the maintenance and testing of Diesel fuel injection equipment, which was beyond the capacity of ordinary mechanical fitters.

A letter conveying the Department's appreciation of their services was sent by the Engineer-in-Chief on 5 September 1940⁽¹⁾ to the District Engineers concerned, and to the New Zealand Railways and the Union Steam Ship Company Limited.

The transfer value of the plant released from Public Works amounted to £23,854, plus £1,181 to cover the cost of new items specially purchased for the Army. Added to this was a disbursement of £12,997.6.9. on spare parts, tyres, tools, freight and cartage, crating etc., so that the total expenditure incurred by the Public Works Department aggregated £38,032.6.9. (This figure would be £50,300 if the original cost of the plant were taken instead of the book value).

The plant duly arrived in the Middle East at the end of September, 1940, and was unloaded under the supervision of experienced public works employees (then in the Army), led by a member of the mechanical engineering staff of the Department. This officer (a senior NCO in the Army) was entrusted with the responsibility for delivering all the plant and equipment to its destination near Cairo, where it passed to the control of the British Army.⁽²⁾

(1) 29/1032/2, p.1.

(2) From report to Army H.Q. by Chief Ship's Q.M., dated 9 Oct 1940. Copy on 29/1032/2, p.1.

Additional Spare Parts. Following a request from Army Headquarters dated 4 November 1940,⁽¹⁾ the Engineer-in-Chief supplied on 18 December 1940⁽²⁾ an estimate of the cost of providing full running spares for the plant to cover 12 months' operation. This amounted to £10,360. War Cabinet approval to the expenditure having been obtained,⁽³⁾ the Public Works Department ordered the spare parts required, mostly from U.S.A., and handed them over to the Army Department when received for delivery to the Middle East.

South Pacific. Following a verbal request by Army Headquarters, the Engineer-in-Chief reported⁽⁴⁾ to the Minister of Public Works that the following items of road construction and maintenance plant were required in the Kiwi Divisional Area i.e., the South Pacific:

- 2 road graders.
- 2 stone crushing plants, including power units (tractors).
- 6 road drags and tractors.

The Engineer-in-Chief indicated that this equipment could be released by the Department in view of Army's need for it, and he suggested that the question be submitted to War Cabinet for a decision. This was done, and on 18 December 1942 War Cabinet approved the proposal,⁽⁵⁾ a supporting Treasury report reading, inter alia: 'The reason for the request is that the roads in the area allocated to the Division are in a very bad state and unless steps are taken immediately to improve the roads, the wear and tear on mechanical transport will be enormous and quite beyond the capacity of the Divisional Workshop to cope with'.⁽⁶⁾

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- (1) Army memo D316/11/2 of 4 Nov 1940 on 29/1032/2, p.1.
 - (2) 29/1032/2, p.1.
 - (3) Army memo D316/11/2 of 15 Jan 1941 on 29/1032/2, p.1.
 - (4) Report of 1 Dec 1942 on 29/1032/2.
 - (5) Approval on 29/1032/2.
 - (6) Treasury report of 11 Dec 1942: Copy on 29/1032/2.

[The text on this page is extremely faint and illegible. It appears to be a multi-paragraph document, possibly a letter or a report, with several lines of text visible across the page. The handwriting is cursive and typical of the 19th century.]

Prompt action was taken to obtain the requisite plant from districts which could more readily spare it, and by 7 January 1943 the Engineer-in-Chief was able to advise the Quartermaster-General that two road graders, two stone crushers with tractors, and four road planers with two tractors had been made available to the Army Department at a total transfer value of £2,780, (original cost £5,683) plus transport and handling charges.⁽¹⁾ A confirmatory order was placed on the Department by the Quartermaster-General on 14 January 1943.

Other material was specially purchased by the Public Works Department for the Army Department from time to time, such as an electric generating set with all accessories, sawmilling equipment, and any similar items which could be procured more readily or satisfactorily with the expert advice of the Department's technical officers and the assistance of the experienced purchasing staff attached to the Stores Manager's branch.

2. PLANT FOR AIR FORCE, (FAR EAST).

Acting under the same War Cabinet approval of 20 May 1941 as authorised the formation of an aerodrome construction squadron for service in the Far East (see Part 1 Chapter 9), the Air Department looked to the Public Works Department to provide the necessary plant and equipment for the unit, estimated to cost £110,000.

By this time, however, the Department was beginning to feel a shortage of construction machinery, particularly tractors, brought about mainly through the despatch of plant to the Middle East during 1940. Ten crawler type tractors had already been released to the Army overseas, three others had been converted into tanks, and some were in use by the Army in New Zealand periodically for the haulage of guns, etc. Reporting on the position to the

Minister of Public Works early in 1941⁽¹⁾ the Engineer-in-Chief mentioned that the Department's fleet of 84¹⁰⁰/horse-power crawler type tractors then in operation had been working two or three shifts daily since they were purchased from one to five years previously, with the result that the stage had been reached where their replacement should be seriously considered. In support of his recommendation that 14 R.D.8 tractors, eight 12 cubic yard carryall scrapers, and four angledozers be purchased from the United States at a cost of £47,744 sterling, the Engineer-in-Chief stated, in his report of 21 February 1941: 'I have only today received an intimation from the RNZAF that we will be asked to provide construction plant for urgent aerodrome work overseas, and there is no suitable plant available for sending abroad upon that work. I am confidently of the opinion that additional plant should be obtained as quickly as possible to meet existing and projected calls upon the Department for urgent national works and major disasters which may occur at any time.'

The purchase of the plant items asked for was approved by Cabinet on 10 April 1941⁽²⁾ with the proviso (suggested by Treasury) that six of the 14 tractors were to be used for urgent and essential work directly connected with the war effort, the balance to be retained in store for urgent dispatch overseas, unless Cabinet decided otherwise. The Public Works Department had agreed to these stipulations.⁽³⁾

The new plant was ordered through the Ministry of Supply on 18 April 1941⁽⁴⁾ but within the next few weeks the equipment of the aerodrome construction squadron had

(1) Reports of 15 Jan 1941, 21 Feb 1941 and 26 Feb 1941 on 29/1032/3.

(2) Approval on 29/1032/3.

(3) Engineer-in-Chief's minute of 31 Mar 1941 to Minister of Public Works on 29/1032/3.

(4) Copy on 29/1032/3.

been authorised,⁽¹⁾ and its requirements had to be fulfilled almost immediately to enable the plant to accompany to the Far East the personnel of the unit, which was then in process of formation. It was at first proposed to equip the squadron by purchasing all plant from the United States, estimated to cost £61,280 in addition to the items already ordered (except for the six tractors wanted in New Zealand). This would have involved a total expenditure, in New Zealand funds, of nearly £121,000 mainly on tractors (nine), six ton trucks (12), 20 ton trailers (four), carryall scrapers (eight), station waggons (two), cars (three), runabout trucks (two), an excavator, a ditcher, and a land leveller, together with all necessary spare parts and equipment.

An order for the additional plant was cabled to Washington through Air Headquarters on 9 May 1941,⁽²⁾ but as the weeks passed and messages from the New Zealand Supply Mission at Washington indicated that delivery could not be made until September at the earliest, it was decided to ship overseas with the squadron whatever suitable equipment could be spared from the Dominion. Fortunately, an opportunity arose to purchase from the contracting firm of Butler & Carroll Ltd., whose managing director had been commissioned in the squadron, the whole of their aerodrome construction plant. This was offered to the Government at valuation, the estimated value being £35,000, and it was anticipated by the Engineer-in-Chief that some additional £10,000 would require to be spent on spares and extra equipment.⁽³⁾

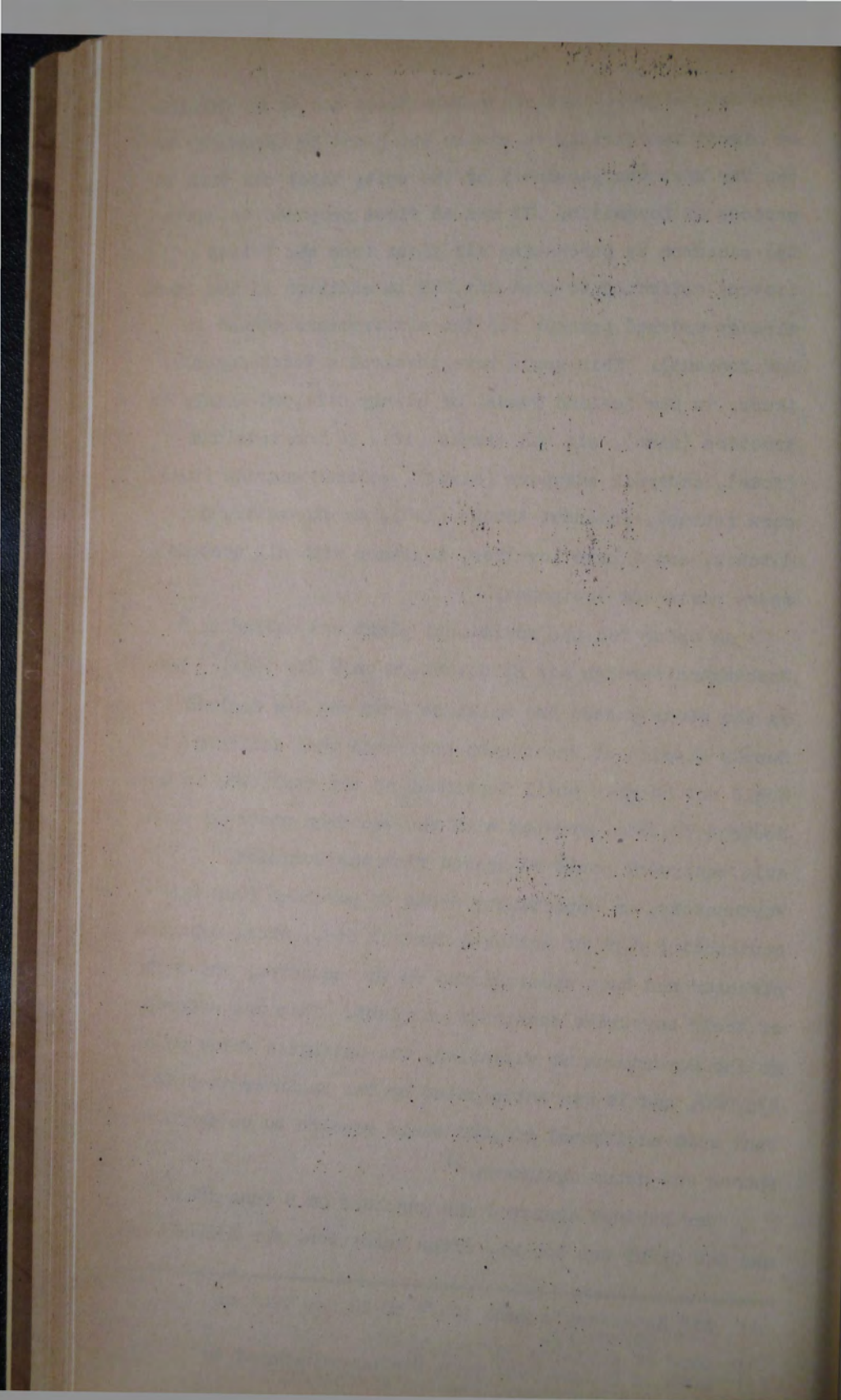
War Cabinet approved the purchase on 9 June 1941,⁽⁴⁾ and the plant was bought, after valuation, for £32,433.44.

(1) Air Secretary's memo 104/9 of 22 May 1941 on 29/1032/3.

(2) Copy of cable on 29/1032/3.

(3) Memo of 4 June 1941 from Engineer-in-Chief to Air Secretary, copy on 29/1032/3.

(4) 29/1032/3.



on the basis of payment being made six months after the war, free of interest.

Butler & Carroll Ltd's plant was not in itself sufficient for the squadron, so a quantity of suitable units was selected by Head Office from various public works districts, including seven tractors, six angledozers, three compressors, two excavators, a crusher and elevator, and many other items of earth-moving and construction equipment. The total transfer value was nearly £16,000. With this amount added to the purchase price of Butler & Carroll Ltd's plant, also the cost of spare parts, freight, handling, servicing, crating, etc., the aggregate expenditure incurred by the Public Works Department on behalf of the Air Department was £78,301.13.11. (Based on original cost instead of the transfer value of the plant released, this figure would be £93,458.11.8). The balance of the £155,000 authorised by War Cabinet (£110,000 for equipping the unit plus £45,000 approved in respect of the Butler & Carroll transaction) was not expended by the Public Works Department.

As mentioned above, a considerable quantity of plant had been ordered from U.S.A. for delivery to New Zealand. On 26 June 1941⁽¹⁾ a message was sent to the Supply Mission at Washington (through the Air Secretary) instructing that all the material ordered, except six tractors, was to be despatched direct to the Officer Commanding, RNEAF Squadron 24, care Chief Engineer, Air Headquarters, Far East Command, Singapore. The Mission were asked to endeavour to obtain priorities for shipment of this plant. They replied on 3 July 1941⁽²⁾ acknowledging receipt of the instructions regarding delivery. Subsequent advices from Washington indicated that the material commenced to go forward to Singapore from the beginning of August 1941

(1) 29/1032/3.

onwards⁽¹⁾

Some of the plant ordered, including the tractors, was procured under lend-lease, according to a cablegram and confirmatory memorandum of 12 June 1941 from the Supply Mission at Washington, which not only saved New Zealand dollar funds but had the effect of accelerating delivery. No payment for any of the plant ordered was made by ^{the} Public Works Department, and presumably whatever charges were incurred were met by the Air Department.

In a memorandum dated 5 November 1941,⁽²⁾ the Air Member for Supply expressed to the Engineer-in-Chief his Department's thanks for the services rendered in equipping the aerodrome construction squadron, in the following terms:

'It is desired that you convey to all concerned this Headquarters' appreciation of the energy and organisation displayed by all those members of the Public Works Department concerned with the recent emergency.

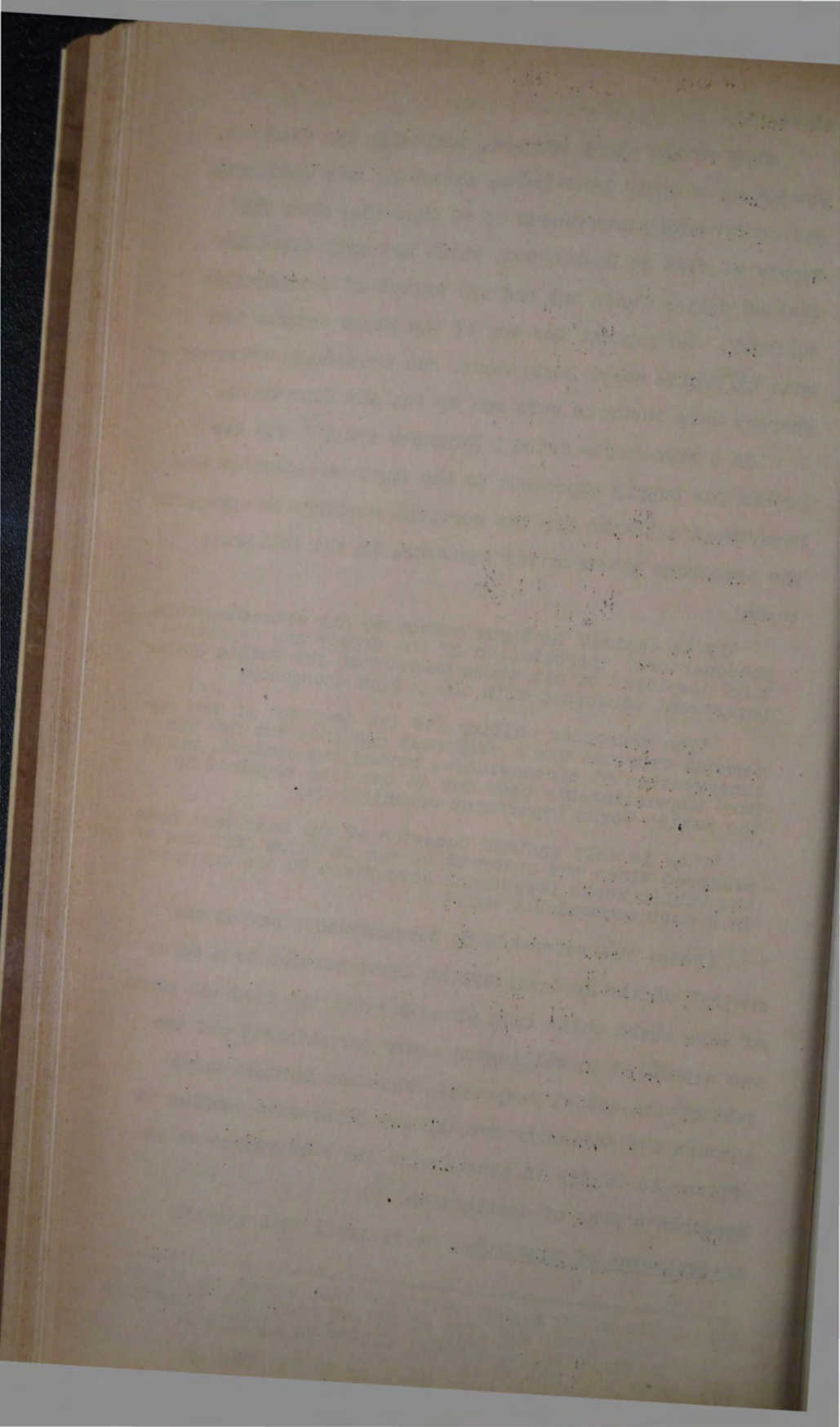
'The emergency calling for the despatch of the equipment overseas was a very real one and, but for the intervention of circumstances beyond our control, would have unquestionably been met in the time required by the Public Works Department organisation.

'This is only another occasion of the many that have occurred since the outbreak of war in which officers of the Public Works Department have risen to the emergency in a most commendable way.'

(Note: The reference to circumstances beyond the control of Air Headquarters no doubt relates to a delay of some weeks which took place between the time the plant was assembled in Wellington ready for shipment and the date of its actual despatch. This was brought about through the necessity for the Air Department sending an officer to confer in person with the authorities at the Squadron's port of destination.⁽³⁾)

Re-equipment of Squadron. On 23 April 1942 the Air

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- (1) Cable of 20 August 1941 from NEAM Ottawa to Air Hdqrs, Wellington, and memo of 21 Aug from NZSM Washington to Secretary of Supply: Copies on 29/1032/3.
 (2) Memo 5/11/41W on 29/1032.
 (3) Air Secretary's memo 104/9 of 22 May 1941 on 29/1032/3.



Secretary reported⁽¹⁾ to the Minister of Defence that the aerodrome construction squadron (now referred to as No. 1 Unit) had returned from Malaya minus all its plant, equipment, and stores, which were lost as a result of enemy action in Singapore Harbour. The Air Secretary stated that heavy plant for re-equipping and provisioning the unit had been ordered from the United States under lond-lease, but it would be some time before this would arrive and in the meantime the unit 'should be re-established on a proper service footing at the earliest possible moment, firstly for use in the event of enemy attack in this country and secondly to proceed with RNZAF units that may proceed overseas as soon as we assume the offensive against the Japanese.'

War Cabinet on 15 May 1942 authorised £90,000 on the re-equipping and provisioning of the unit 'with temporary plant from within New Zealand', a copy of the approval being referred to the Engineer-in-Chief by the Air Secretary on 26 May 1942.⁽²⁾

The re-equipment of the unit presented a problem, in that most of the necessary plant, etc was just not available in the country, either new or second-hand. All that could be done was to release from public works whatever units could be spared, and to purchase such items as could be located in the possession of contractors, merchants, farmers, and other persons. With this in view, a survey of all suitable plant in the Dominion was carried out by District Engineers, and, on receipt of their reports, a committee comprising an officer of the Mechanical Branch of the Public Works Department and two RNZAF personnel visited the various districts and submitted to the Engineer-in-Chief recommendations relative to the condition and value of the material offered for

(1) Copy of report 1/1/63 on 29/1032/6.
(2) 29/1032/6.

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sale. The Engineer-in-Chief referred such recommendations to the Air Secretary, who then authorised the Public Works Department to arrange the purchase on behalf of his Department - for delivery to the No. 1 Aerodrome Construction Unit at Rukuhia.

Where, however, plant specially required for the unit had been located but was not for sale, the matter was referred by Air Headquarters to the Chief Impressment Officer (Post & Telegraph Department) for action under the Motor Vehicles Impressment Emergency Regulations 1941. Compulsory acquisition had to be resorted to only in a very few cases.

Following a request dated 24 September 1942⁽¹⁾ from the Acting Air Secretary, the Engineer-in-Chief reported to the Minister of Works on 7 October 1942⁽²⁾ that, in order to facilitate the unit's proceeding overseas again, the Public Works Department would raise no objection to the release from its works of a number of plant items ranging from tractors to a portable field sawmill. These, he added, had been in constant service for a long period and for the most part were in a doubtful condition for reliable operation overseas. Nevertheless, the plant could ill be spared by the Department. The departmental equipment was to be supplemented by several tractors, carryall scrapers, scoops, etc owned privately and which the Air Department proposed to acquire either by purchase or by impressment.

* * * *

On other occasions also the resources of the Public Works Department organisation for the purpose of equipping overseas units with various items of mechanical construction plant, and generally the same service was rendered as in the case of the Army Department, that is,

(1) 29/1032/6.
(2) Ibid.

all possible co-operation and assistance in meeting their requirements and a willingness at all times to give the highest measure of priority to the demands of the Dominion's war effort overseas - often to the detriment of the vast programme of defence works with which the Department was entrusted in New Zealand itself.

PART 2DEFENCE WORKS FOR THE ARMY

- (1) Military Camps.
- (2) Coastal Batteries.
- (3) Magazines.
- (4) Hospitals and Convalescent Depots.
- (5) Anti-aircraft Batteries.
- (6) Bulk Petrol Reserves.
- (7) Ranges (Rifle, Grenade, Mortar, AFV, etc.)
- (8) Combined Headquarters.
- (9) Internment and Prisoner-of-War Camps.
- (10) Army Colleges and Schools.
- (11) Guard Posts, Coast Watching Stations, etc.
- (12) Military Roading.
- (13) Field Defensive Works.

PRINCIPAL DEFENCE WORKS (EXCLUDING AERODROMES) NORTH AUCKLAND (WHANGAREI P.W. DISTRICT)

NAVY •

1. MINE STATION WHANGAREI
2. " STATIONS BAY OF ISLANDS
3. RADAR STATION CAPE BRETT.
4. " " BREEM HEAD

ARMY •

- 1. MILITARY CAMP, SWEETWATER.
- 2. B. BLOCK, KAITIA HOSPITAL.
- 3. MILITARY CAMP, TAIPA.
- 4. COASTAL BATTERY, WHANGAREI.
- 5. " " MOTUROA ISLAND.
- 6. " " WAITATA POINT.
- 7. " " TAPU POINT ROAD.
- 8. " " KAWAHAWA ROAD.
- 9. " " BAY OF ISLANDS.
- 10. B. BLOCK, KAWAHAWA HOSPITAL.
- 11. MILITARY HOSPITAL, KAIKOE.
- 12. BRIGADE CAMPS, KAIKOE.
- 13. B. BLOCK, RAWENE.
- 14. BRIGADE CAMPS, WHANGAREI.
- 15. MILITARY CAMP KENSINGTON PARK WHANGAREI.
- 16. MILITARY HOSPITAL, WHANGAREI.
- 17. COASTAL BATTERY, WHANGAREI HEADS

BRIGADE CAMPS

BRIGADE CAMPS

BAY OF ISLANDS CAMPS

North Island - showing
Area covered by Map.

KEY TO COLOURS: ARMY - Red •
NAVY - Blue •

10 20 30

PORT FITZROY

MOUNTAIN CAMP

GT. BARRIER I.

PRINCIPAL DEFENCE WORKS (EXCLUDING AERODROMES) AUCKLAND - WAIKATO (AUCKLAND P.W. DISTRICT)

U.S. FORCES

 1. MILITARY CAMP
 CAMBRIA PARK

CIVIL AND GENERAL

 1. DEHYDRATION FACTORY
 PUKEKOHE
 2. C.A.C. FACTORY
 HAMILTON

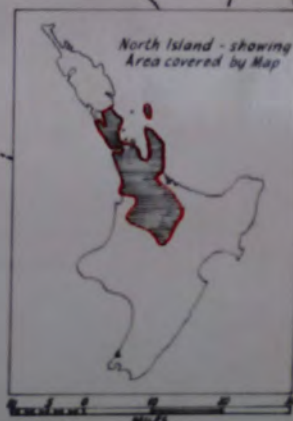
ARMY

 1. GARRISON CAMP, MT. ROSS, MT. ROSS IS.
 2. GARRISON CAMP, WARKWORTH
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NAVY

 1. GARRISON STN. GT. BARRIER IS.
 2. GARRISON STN. CAPE RODNEY
 3. GARRISON STN. CAPE COLVILLE
 4. GARRISON STN. TIRITIRI IS.
 5. GARRISON STN. WHANGAPARA
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KEY TO COLOURS:

 1. NAVY - Red
 2. NAVY - Blue
 3. U.S.A. - Green
 4. CIVIL - Brown


PRINCIPAL DEFENCE WORKS (EXCLUDING AERODROMES) AUCKLAND METROPOLITAN AREA

3

ARMY

CASTOR BAY
MOTUTAPU IS.
RESS OBSERVATION POST, RANGITOTO IS.
BATTERY, NORTH COTE
BAYSWATER
BELMONT
DISTRICT SCHOOL
OF INSTRUCTION
BATTERY, MT VICTORIA, AUCKLAND
CAUTLEY, NORTH HEAD
FORT BASTION
ORAKEI
AUCKLAND DOMAIN
CHAMBERLAIN PARK
AUCKLAND
RACECOURSE
ELLERSLIE
MIDDLEMORE

NAVY

SUBMARINE FIXED DEFENCE STATION MOTUTAPU IS.
CONTROLLED MINE BASE, RANGITOTO ISLAND
TAMAKI MOTUHI IS.
KAIHIA POINT
SHOAL BAY
DEVONPORT
DEVONPORT
WAIHEKE DOOM, WAIHEKE HARBOUR

U.S. FORCES

MOTUTAPU IS.
TAMAKI MOTUHI IS.
KAIHIA POINT
VICTORIA PARK
WALSLEY ST. STORES
OLD DOCK SITE STORES
MECHANICS BAY
INNER DOMAIN
OUTER DOMAIN
PUREWIA
MT. ROSSON
WESTERN SPRINGS
HOSPITAL
TAMAKI
CORNWALL PARK HOSPITAL
MT. ALBERT
MAUNGAKIEKIE REST HOME
SYLVIA PARK STORES

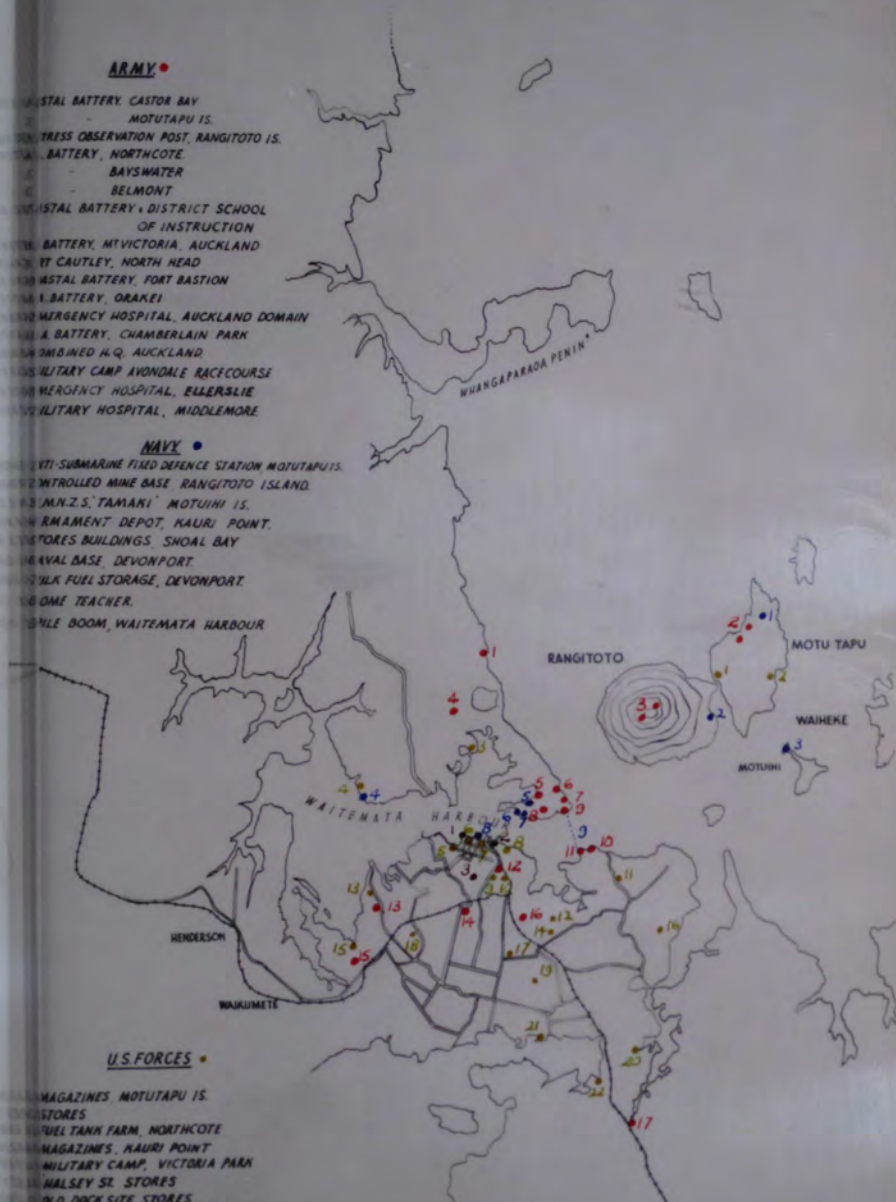
U.S. FORCES

21. MILITARY CAMP, WAIKARAKA PARK
22. MILITARY CAMP AND STORES
MANGERE CROSSING

CIVIL AND GENERAL

1. SHIP CONSTRUCTION BUILDING, AUCKLAND
2. STEEL STORE, KINGS DRIVE
3. C.A.C. FACTORY, MT. EDEN

KEY TO COLOURS:
ARMY Red
NAVY Blue
U.S.A. Green
CIVIL Brown



PRINCIPAL DEFENCE WORKS (EXCLUDING AERODROMES) COUNTRY TARANAKI WANGANUI (P.W. DISTRICTS)

ARMY

- COASTAL BATTERY, NEW PLYMOUTH
- WAIKURU - TOKAUNU ROAD
- WAIKURU MILITARY CAMP
- MAGAZINES, WAIKURU
- MOVING TARGET RANGE, WAIKURU
- WAIKURU - TAIHAPE ROAD
- MILITARY CAMP
- WATERLEY RACE-COURSE
- MILITARY CAMP
- WANGANUI RACE-COURSE

1 NEW PLYMOUTH

STRATFORD

HAWERA

ARMY

- MILITARY CAMP,
- SPRIGGEN'S PARK,
- COASTAL BATTERY,
- WANGANUI.

7

NAVY

- WIRELESS TELEGRAPHY STATION, WAIKURU.

9 10 8 WANGANUI

MARTON

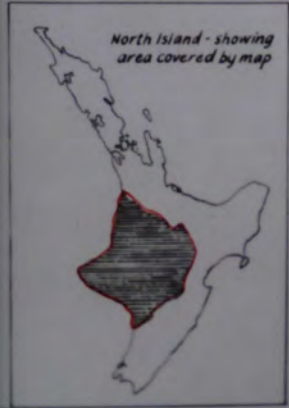
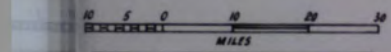
WOODVILLE

PALMERSTON NTH.

OTAKI

MASTERTON

Lake Taupo



KEY TO COLOURS:

- ARMY — Red ●
- NAVY — Blue ●
- USA — Green ●
- CIVIL — Brown ●

PRINCIPAL DEFENCE WORKS
(EXCLUDING AERODROMES)
BAY OF PLENTY · POVERTY BAY · HAWKES BAY
(TAURANGA GISBORNE NAPIER P.W. DISTRICTS)

5



PRINCIPAL DEFENCE WORKS (EXCLUDING AERODROMES) MANAWATU (NORTHERN PORTION OF WELLINGTON) (P.W. DISTRICT)



1. MILITARY CAMP, ASHHURST RACE-COURSE
2. 4TH DIVISION CAMPS, PALMERSTON NORTH.

4TH DIV. CAMP, LEVIN RACE COURSE
 " " " BRIGHTWATER TERRACE, P.N.
 " " " MAIN ROAD, FEILDING
 " " " GOLF LINKS, " "
 " " " RACE-COURSE " "
 " " " ADARANGI

3. BRIGADE CAMPS, MANAWATU
 BRIGADE CAMP, AWATAPU, PALMERSTON NTH.
 " " " ESPANADE " "
 " " " PARK ROAD " "
 " " " HOROWHITU " "
 H.Q. 2ND BRIGADE, PALMERSTON NTH.
 BRIGADE CAMP, JOHNSTON PARK, FEILDING
4. SHOWGROUNDS CAMP, PALMERSTON NTH.
5. ARMY STAFF COLLEGE, PALMERSTON NORTH
6. MILITARY ANNEX etc. PALMERSTON NORTH HOSPITAL
7. LINTON MILITARY CAMP
8. MILITARY CAMP, AWAPUNI RACE COURSE
9. " " " FOXTON
10. MAGAZINES, MAKOHAKO (PAHIATUA)
11. INTERNMENT CAMP, PAHIATUA

CIVIL AND GENERAL

1. DEFAULTERS DETENTION CAMP, PIANA
2. " " " WHITMORE-WHITANUI

KEY TO COLOURS:

ARMY: --- Red ●
 NAVY: --- Blue ○
 U.S.A.: --- Green ⊗
 CIVIL: --- Brown ●

North Island - showing
area covered by Map



U.S. FORCES

- 1. MILITARY CAMP, MEMORIAL PARK, MASTERTON.
- 2. " SOLWAY SHOWGROUNDS MASTERTON.
- 3. " M'KAYS CROSSING
- 4. " RUSSELL
- 5. " PAKAKARIRI
- 6. " STORE, PAKAKARIRI.
- 7. " TEMPORARY HOSPITAL.
- 8. " TRENTHAM RACECOURSE.
- 9. " MILITARY CAMP, PAKAUTANUI.
- 10. " JUDGEFORD
- 11. " PLIMMERTON
- 12. " STREAM HOSPITAL.
- 13. " STORE, PAREMATA.
- 14. " MILITARY CAMP, TITAHU BAY.

**PRINCIPAL DEFENCE WORKS
EXCLUDING AERODROMES
WAIRARAPA - WELLINGTON
(SOUTHERN PORTION, WELLINGTON P.W. DISTRICT)**

ARMY

- 1. BRIGADE CAMPS, WAIRARAPA.
- 2. PRISONER-OF-WAR CAMP, FEATHERSTON.
- 3. TRENTHAM MILITARY CAMP
- 4. MAGAZINES, BELMONT
- 5. FORTRESS CAMP, PORIRUA.
- 6. VEHICLE RECEPTION DEPOT, PETONE.
- 7. FORTRESS CAMPS, JOHNSONVILLE.
- 8. A.A. BATTERY JOHNSONVILLE.
- 9. FORT OPAU

S. FORCES

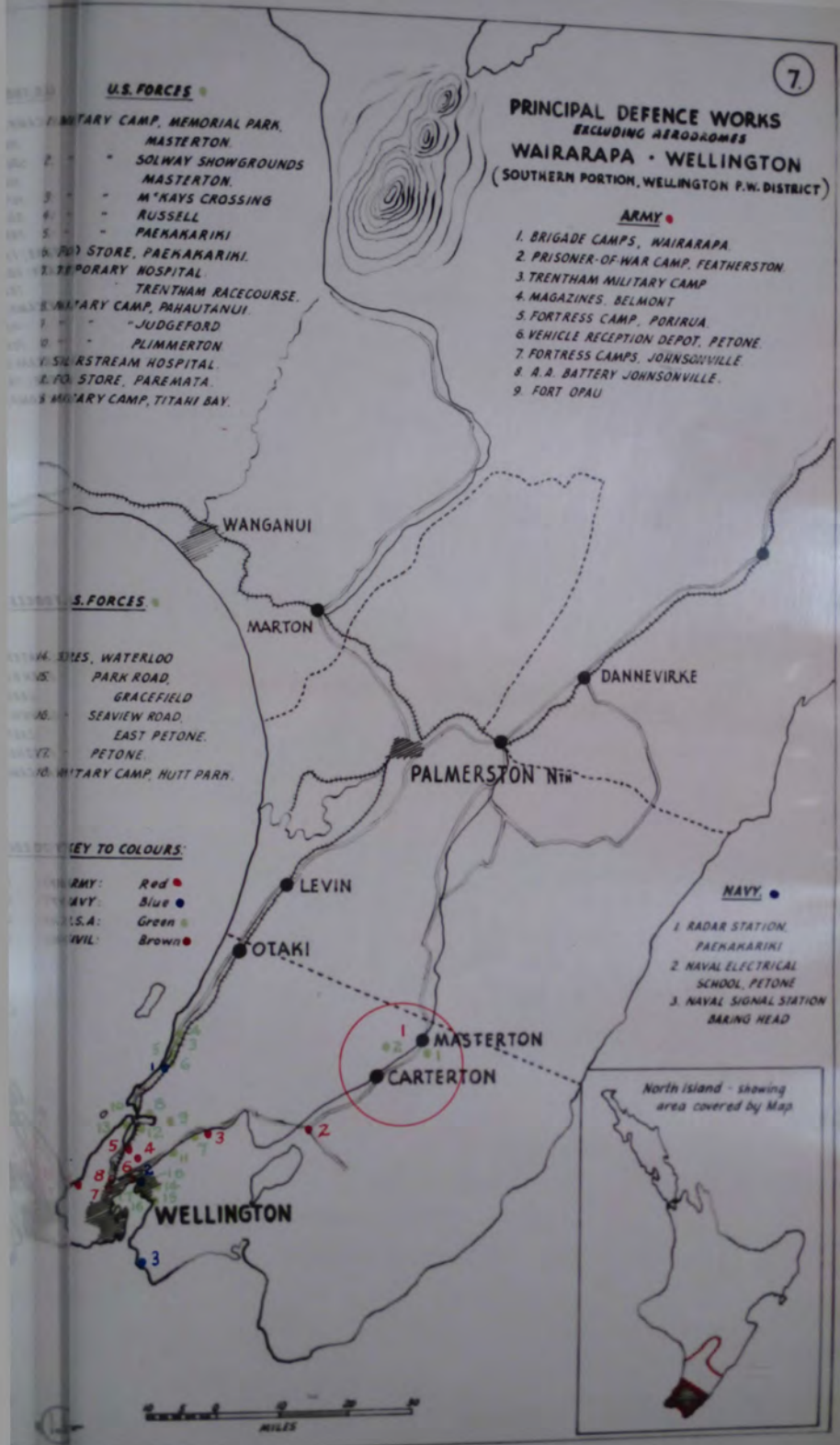
- 1. RIFLES, WATERLOO
- 2. " PARK ROAD,
- 3. " GRACEFIELD
- 4. " SEAVIEW ROAD,
- 5. " EAST PETONE.
- 6. " PETONE.
- 7. " MILITARY CAMP, HUTT PARK.

KEY TO COLOURS:

- ARMY: Red ●
- NAVY: Blue ●
- S.A.: Green ●
- CIVIL: Brown ●

NAVY

- 1. RADAR STATION, PAKAKARIRI
- 2. NAVAL ELECTRICAL SCHOOL, PETONE
- 3. NAVAL SIGNAL STATION, BAKING HEAD



North Island - showing area covered by Map

PRINCIPAL DEFENCE WORKS (EXCLUDING AERODROMES) WELLINGTON METROPOLITAN AREA

⑧

ARMY

1. FORTRESS H.Q. AND CAMPS, KHANDALLAH
2. A.A. BATTERY, SOMES ISLAND
3. A.A. BATTERY, WADESTOWN
4. CLEARING HOSPITAL
5. A.A. BATTERY, MT CRAWFORD
6. FORT BALLANCE
7. W.A.A.C. CAMP, MIRAMAR
8. A.A. BATTERY, MT VICTORIA
9. COASTAL BATTERY, WRIGHT'S HILL, KARORI
10. COMBINED HEADQUARTERS, WELLINGTON
11. A.A. BATTERY, BROOKLYN
12. FORTRESS CAMP, NEWTOWN
13. - - - HATAITAI PARK
14. EMERGENCY WARD BLOCK, WELLINGTON HOSPITAL
15. WINTER SNOW CAMP, WELLINGTON
16. FORTRESS CAMP, MIRAMAR
17. SCHOOL OF ARTILLERY

18. FORT DORSET
19. COASTAL BATTERY, PALMER HEAD

NAVY

1. DEGAUSSING RANGE, SOMES ISLAND
2. BULK FUEL STORAGE, WELLINGTON
3. NAVAL SIGNAL STATION, POINT HALSWELL
4. NAVAL AUXILIARY PATROL SERVICE H.Q., ANTISUBMARINE MAINTENANCE BASE, AND MINE SWEEPING STORGE
5. NAVAL BASE, SHELLY BAY
6. PILE BOOM, WELLINGTON HARBOUR
7. MINE STATION, WORSEY BAY
8. NAVAL SIGNAL STATION, BEACON HILL

U.S. FORCES

1. MILITARY CAMP, KAIWARA PARK
2. BARRACKS, AOTEA QUAY, WELLINGTON
3. BARRACKS, AOTEA QUAY, WELLINGTON
4. MILITARY CAMP, ANDERSON PARK
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100. MILITARY CAMP, ANDERSON PARK

KEY TO COLOURS:

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|--------|-------|---|
| ARMY | Red | ● |
| NAVY | Blue | ● |
| U.S.A. | Green | ● |
| CIVIL | Brown | ● |

PRINCIPAL DEFENCE WORKS (EXCLUDING AERODROMES) NELSON - MARLBOROUGH (NELSON PUBLIC WORKS DISTRICT)

ARMY •

1. COASTAL BATTERY, TORY CHANNEL
2. " " BLUMINE ISLAND
3. " " MARAETAI
4. " " POST OFFICE POINT
5. " " MAUD ISLAND
6. EMERGENCY BLOCK, WAIRAU HOSPITAL
7. " HOSPITAL, MARLBOROUGH COLLEGE
8. BRIGADE CAMPS, BLENHEIM AREA
9. DELTA MILITARY CAMP

9

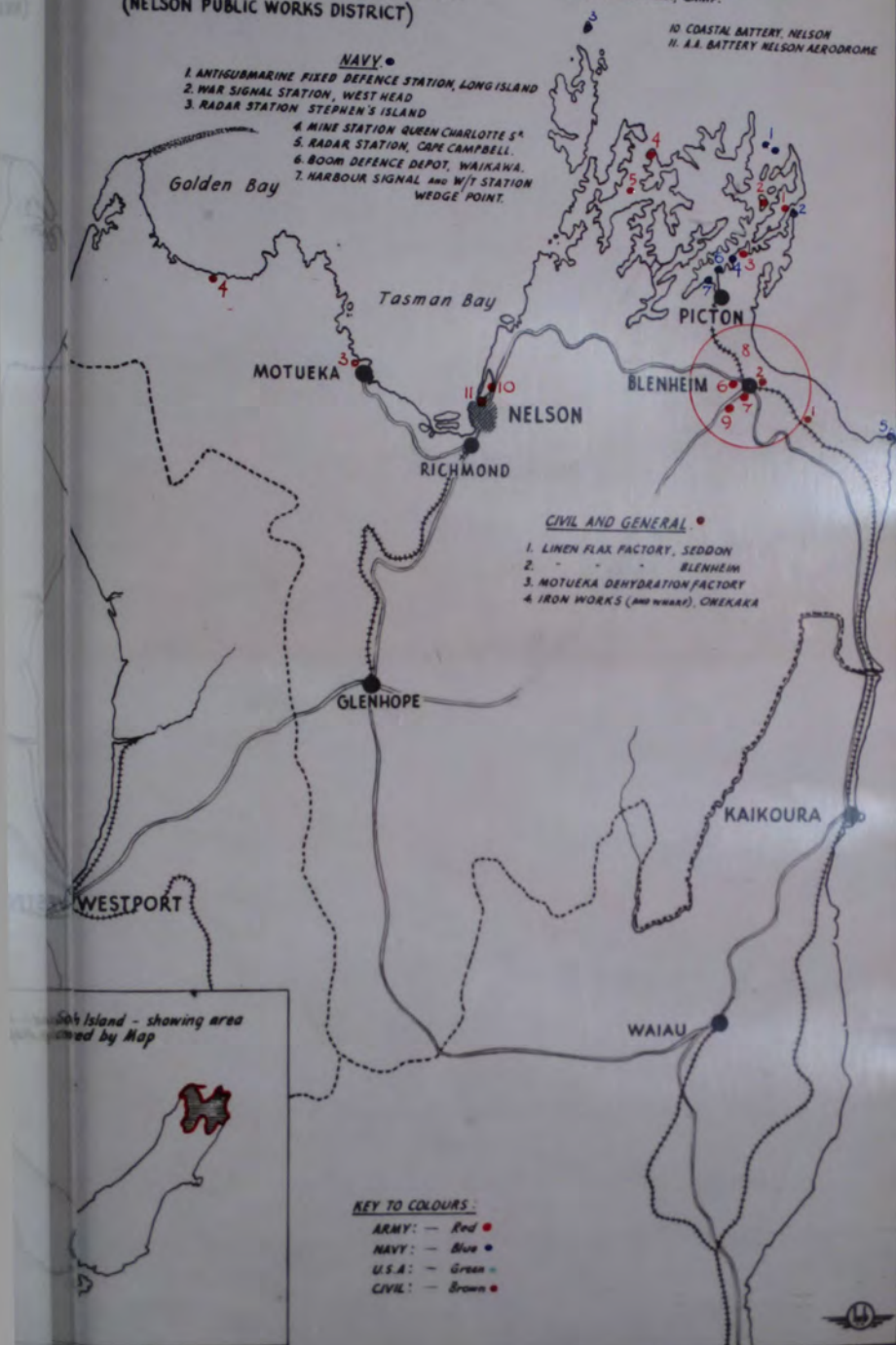
NAVY •

1. ANTIGUERRAINE FIXED DEFENCE STATION, LONG ISLAND
2. WAR SIGNAL STATION, WEST HEAD
3. RADAR STATION, STEPHEN'S ISLAND
4. MINE STATION, QUEEN CHARLOTTE'S
5. RADAR STATION, CAPE CAMPBELL
6. BOOM DEFENCE DEPOT, WAIKAWA
7. HARBOUR SIGNAL AND W/T STATION, WEDGE POINT

10. COASTAL BATTERY, NELSON
11. A.A. BATTERY, NELSON AERODROME

CIVIL AND GENERAL •

1. LINEN FLAX FACTORY, SEDDON
2. " " BLENHEIM
3. MOTUEKA DEHYDRATION FACTORY
4. IRON WORKS (AND WHARF), ONEKAKA



KEY TO COLOURS:

- ARMY: — Red •
NAVY: — Blue •
U.S.A.: — Green •
CIVIL: — Brown •

PRINCIPAL DEFENCE WORKS
(EXCLUDING AERODROMES)
SOUTHERN COAST - CANTERBURY
LYNNMOUTH & CHRISTCHURCH
PUBLIC WORKS DISTRICTS)

ARMY •

- ASTAL BATTERY, WESTPORT.
- GREYMOUTH.
- IGADE CAMP, RANGIORA RACECOURSE.
- LE RANGE, WEST MELTON.
- IGAZINES, HORORATA.
- IGADE CAMP, HORORATA RACECOURSE.
- T.V. CAMP, MAREWOOD.
- IGADE CAMP, WEEDONS DOMAIN.
- TENTION BARRACKS, BURNHAM.
- IGAZINES, BURNHAM.
- BURNHAM MILITARY CAMP.
- IGAZINES, MT. SOMERS.
- IGADE CAMP, MOTUKARARA RACE-COURSE
- RAKAIA DOMAIN
- ASTAL BATTERY, AKAROA
- MILITARY CAMP, WESTERFIELD.
- IGADE CAMPS, ASHBURTON -
- RACE-COURSE AND SHOWGROUNDS
- IGAZINES, WINScombe (FAIRLIE)
- IGADE CAMP, WASHDYKE
- RACE-COURSE
- ASTAL BATTERY, TIMARU.
- IGADE CAMP, TIMARU SHOWGROUNDS

NAVY •

- NE DEPOT, TE KAO BAY.
- NE STATION, AKAROA (WAINUI)

CIVIL AND GENERAL •

- EN FLAX STATION, OXFORD
- METHVEN
- LESTON
- FAIRLIE
- GERALDINE
- WASHDYKE
- MANIHURI

KEY TO COLOURS:

- NAVY: — Red •
- ARMY: — Blue •
- CIVIL: — Green •
- GENERAL: — Brown •



AMBERLEY

SEFTON

RANGI ORA

KAIAPOI

CHRISTCHURCH

HORNBY

TEMPLETON

PREBBLETON

LINCOLN

Banks Peninsula

LITTLE RIVER

AKAROA

NAVY •

1. PORT WAR SIGNAL STATION, GODLEY HEAD
2. MINE STATION, GODLEY HEAD
3. RADAR STATION, GODLEY HEAD
4. ARMAMENT DEPOT, CASS BAY
5. NAVAL BARRACKS, LYTTELTON (H.M.N.Z.S. "TAEMAN")
6. BULK FUEL STORAGE, LYTTELTON
7. BOOM DEFENCES, LYTTELTON.





CIVIL AND GENERAL •

- ### 1. RICCARTON DEHYDRATION FACTORY

ARMY. •

1. MILITARY HOSPITAL, BURWOOD
2. BRIGADE CAMP, NEW BRIGHTON RACE COURSE
3. " " " " " "
4. " " " " " " RICCATON
5. " " " " " " LANCASTER PARK
6. " " " " " " ADDINGTON RACECOURSE
AND SNOWGROUNDS
7. SOLDIERS BLOCK, CASHMIRE SANITARIUM
8. FORTRESS CAMP, REDCLIFFS (RIFLE RANGE)
9. " " " " " " SUMNER (SANDILANDS)
10. " " " " " " MT. PLEASANT (COOK'S FARM)
11. COMBINED HEADQUARTERS CHRISTCHURCH
12. A. A. BATTERY, MT PLEASANT
13. COASTAL BATTERY GODLEY HEAD
- " " " " " " BATTERY POINT

KEY TO COLOURS:

ARMY:	Red	
NAVY:	Blue	
U.S.A.:	Green	
CIVIL:	Brown	

PRINCIPAL DEFENCE WORKS

(EXCLUDING AERODROMES)

DUNEDIN · SOUTHLAND

(IN EDIN PUBLIC WORKS DISTRICT)

ARMY ●

COASTAL BATTERY, OAMARU.

2 MAGAZINES, ALEXANDRA

3. VAIWERA MILITARY CAMP
4. CASTLE BATTERY BUNKER

40ASTAL BATTERY, BLUFF

NAVY ●

1. IDAR STATION. BLUFF.

KEY TO COLOURS:

IV: — Red ●

17Y: — Blue ●

(A) Green

(2) — Brown

ASHBURTON

TIMARU

WAIMATE

OAMARU

PALMERSTON

DUNEDIN

GORLE

INVERCARGILL

CIVIL AND GENERAL ●

LINEN FLAX FACTORY, TAPANUI

CLYDEDALE

BALCLUTHA

• • • GORE

WINTON
CHATEAU

OTAU TAU
WOODLAND

WOODLANDS

STEWART IS.

South Island - showing areas covered by Map. (5)



PRINCIPAL DEFENCE WORKS
(EXCLUDING AERODROMES)
DUNEDIN METROPOLITAN AREA

(13)

WAIKOUAITI

WAITATI

DUNEDIN

OUTRAM

MOSGIEL

OTAGO
PENINSULA

ARMY •

1. COASTAL BATTERIES, TAIAROA HEADS
2. MAGAZINES, KAIKORAI VALLEY
3. MILITARY CAMP, WINGATUI RACE-COURSE
4. A. A. BATTERY, DUNEDIN
5. COASTAL BATTERY, TOMAHAWK

NAVY •

1. R.N.Z.N.V.R. HEADQUARTERS, DUNEDIN

CIVIL & GENERAL •

1. OTAGO IRON ROLLING MILLS

KEY TO COLOURS:

ARMY	Red
NAVY	Blue
U.S.A.	Green
CIVIL	Brown

PART 2DEFENCE WORKS FOR THE ARMY

This section of the Official War History is devoted to a review of the principal defence works carried out during the war for the New Zealand Army. Works for the RNZ Navy and the US Forces follow, while the story of the development of aerodromes and associated activities on behalf of the RNZAF is the subject of a separate report.

In general, the works described in this and the succeeding two sections (parts 3 and 4) are confined to those on which expenditure (by the Public Works Department) exceeded £5,000. Smaller works are not touched on specifically except where they form part of a group of works costing upwards of £5,000 (e.g. brigade camps) or are otherwise of special interest from a technical or military point-of-view.

To review even briefly each of the main defence works undertaken for the Services necessarily involves a certain amount of repetition. This however, is unavoidable if the object aimed at - a self-contained story in every case - is to be achieved. Fundamentally, the erection of large new mobilisation camps such as Papakura and Burnham, of identical design and built to a common specification, involved much the same engineering and architectural features. Similarly, the construction of gun emplacements, battery observation posts, and accommodation for battery personnel followed a uniform pattern throughout the Dominion. But each work was a separate and distinct link in the chain of the country's defence system and frequently presented problems of design and construction peculiar to the locality - arising, for example, out of difficult accessibility. For this reason, and for the purpose of placing on record facts and figures

which would soon be lost to the memory of officers at present in the Department (this happened after World War I, concerning which very little official record of the Department's activities now exists) the story of all principal defence works is set out substantially as told by the officers responsible for, or personally conversant with, their construction.

* * * *

Defence works for the Army consisted of:

- (1) Military camps - mobilisation, territorial, brigade, and fortress.
- (2) Coastal batteries.
- (3) Magazines.
- (4) Hospitals and convalescent depots.
- (5) Anti-aircraft batteries.
- (6) Bulk petrol reserves.
- (7) Ranges - rifle, grenade, mortar, AFV, etc.
- (8) Combined headquarters.
- (9) Internment and prisoner-of-war camps.
- (10) Army colleges and schools.
- (11) Guard posts, coast watching stations, etc.
- (12) Military roading (including bridge strengthening).
- (13) Field defensive works.

Several projects included in this section concerned the Navy and the RNZAF also - combined headquarters, for instance, and hospital buildings erected for the treatment of servicemen patients generally.

The provision of office, storage, and workshops, etc. accommodation, both rented and in the form of new buildings, is covered fully in a separate chapter of part 5 of this history. Similarly, camouflage, the splinter-proofing of bulk fuel tanks, and the construction of pre-fabricated huts and warehouses are dealt with comprehensively in part 5.

The total expenditure incurred by the Public Works
Department on defence works for the Army was as under:

1939-40	:	81,271,128
1940-41	:	1,480,443
1941-42	:	1,389,971
1942-43	:	6,471,107
1943-44	:	4,046,071
1944-45	:	1,633,636
1945-46	:	<u>842,423</u>
		<u>817, 134,779</u>



AN AERIAL VIEW OF WATTS PENINSULA AND THE WELLINGTON HARBOUR, SHOWING THE LOCATION OF PRINCIPAL DEFENCES, VIZ:

- | | |
|--------------------------------------|-----------------------|
| ① PALMER HEAD. | ② FORT DORSET. |
| ③ FORT BALLANCE | ④ WRIGHT'S HILL. |
| ⑤ FORT OPAU (OUT OF SIGHT). | ⑥ RONGOTAI AERODROME. |
| ⑦ NAVAL SIGNAL STATION, BEACON HILL. | |
| ⑧ " " " PT. HALSWELL. | |



ANOTHER LONG-DISTANCE VIEW OF THE CAPITAL, LOOKING FROM UPPER HUTT CLEAR ACROSS TO THE SOUTH ISLAND.

Mobilisation Camps: The principal camps constructed for Army in the first year of the war consisted of new mobilisation bases at Papakura and Burnham, while extensive additions were carried out to the existing camp at Trentham. These camps, which were for the training of volunteers accepted for the 2nd NZEF, were ready for partial occupation within a few weeks of the outbreak of hostilities. Two battalion areas were authorised initially at each camp, providing accommodation for the 6,000 men of the first echelon. This was completed in four months. A third battalion area was subsequently erected at Papakura and Burnham for the training of units of the Territorial (home defence) Force. All three camps continued to expand throughout most of the war years, as new buildings were added - administrative, stores, hospitals and the like, and improvements and extensions effected to recreational and training facilities. This work, combined with responsibility for camp maintenance, necessitated keeping sizeable teams of departmental and contractors' employees in constant attendance.

The overflow of recruits in Northern Military District was encamped at Ngaruawahia pending completion of Papakura. This camp (Ngaruawahia) was later altered and extended, and served as an auxiliary mobilisation base.

A two battalion camp at Waiouru was also proposed soon after the outbreak of war, but by the time construction commenced in June, 1940, it had been decided to build a much larger camp capable of holding seven battalions. Excellent photographic and statistical records of the progress of the work at Waiouru were kept by departmental officers. The photographs, mounted and annotated, are too bulky for inclusion in the official history, but are on file in the public works head

office. The statistics are appended to the story of the camp.

Territorial Camps: In the latter half of 1940 camp accommodation was required for the Territorial Force, the members of which were being ballotted for three months' 'intensive training'. For this purpose substantial additions were made to existing mobilisation bases and territorial camps, while a number of new camps were established in different parts of the country, mainly on race-courses and similar properties where the nucleus of camp accommodation already existed.

As the situation in the Pacific deteriorated towards the end of 1941 two large new camps for the training of territorials were authorised - at Linton and Delta, and two smaller ones at Westerfield and Waiwera. The erection of these was accorded a high priority when Japan entered the war and the Territorial Force became fully mobilised, for even the taking over of race-courses, showgrounds, parks, playing fields, schools, colleges, etc. by the score could barely provide sufficient accommodation for the men being called up for 'home' service by the thousands and tens of thousands.

Brigade Camps: In the fateful early months of 1942 a series of what were known as brigade camps sprang up all over the Dominion, located strategically within easy reach of battle stations. These consisted of a small brigade group headquarters and a number of camps dispersed over a fairly wide area. Each camp was essentially self-contained and consisted of the bare minimum of buildings and services. Army personnel carried out much of the work of erection in some districts, with the co-operation of the Public Works Department in regard to the supply of materials and the provision of water, electricity, drainage, and sewerage. This was especially so in North Auckland, where local Army commanders rushed up new camps

on their own initiative with but little assistance from the Department.

When the winter months approached, steps were taken to improve the standard of accommodation in brigade camps.

As the threat of invasion mounted, the original brigade groups were expanded to divisions and still more camp sites were acquired. On the North Auckland peninsula, the 12th Brigade Group, encamped in the Kaipara area, and the 1st Brigade Group (Whangarei) became the 1st Division. Similarly, brigade groups in the Manawatu-Wairarapa were reconstituted as the 4th Division, while troops stationed in the South Island became the 5th Division. Two series of brigade camps north and south of Auckland city (in the Warkworth and Pukekohe areas, respectively,) were built for units of the 3rd Division returned from Fiji for reconstitution for further service in the Solomons. These, however, were occupied by US Forces almost as soon as they had been completed.

Troops deployed for the defence of New Zealand (as distinct from those training for overseas service) were thus accommodated in four different classes of camps: in portions of the permanent mobilisation bases; in the semi-permanent territorial camps at Linton, Delta, Westerfield, and Waiwera; in the dispersed 'brigade' camps; and in camps where existing buildings and services were readily available for conversion to Army use, notably race-courses and showgrounds. In effect, very few of the camps erected for Army (except those for fortress troops) did not fill some role in the brigade-divisional tactical set-up.

Passing reference is given in the stories of Trentham, Dannevirke, and Burnham camps to Army schools of instruction there. These formed a not inconsiderable part of the programme of work undertaken at military

camps in the central and southern districts. In the Northern Military District, the school of instruction which had for many years been at Narrow Neck, where its re-establishment during the war proceeded step by step with development of the coastal battery in that locality. Mention of the Northern District School of Instruction is accordingly included in the story of the Narrow Neck coastal fortification. The Army school at Melrose, Wellington, and the Army Staff College at Palmerston North are dealt with separately. The construction of Waiouru Camp included the provision of an armoured fighting vehicles school.

Although detention barracks at Papakura, Trentham, and Burnham were for the use of both Army and the RNZAF in the whole of each military district, from the public works point-of-view their erection was part and parcel of the construction of the mobilisation camp. They have therefore for the purpose of this History been touched on in the story of each camp. Similarly, no attempt has been made to transfer to the section headed 'Hospitals and Convalescent Depots' particulars of, and expenditure on, such hospitals as (again from the public works point-of-view) were regarded as complementary to the camps themselves.

Ordnance storage space was required urgently on the outbreak of war, and the provision of new buildings at Burnham and Trentham proceeded along with the camp construction programme. Large ordnance stores were also erected at Papakura, Ngauruawahia, and Waiouru camps.

Fortress Camps: Camps to accommodate troops defending fortress areas were erected in some of the more heavily defended coastal districts, supplementing the quarters provided for battery personnel at the site of the gun emplacements, fortress observation posts, coast watching stations, etc. These camps were located in the Bay of

Islands, in and around Auckland and Wellington, and in the Lyttelton-Summer area. A description of them has been recorded under 'Military Camps' rather than under 'Coastal Fortifications', although the latter works in almost every case included the provision of camp accommodation in one form or another.

When the use of WAAC's in the Army was introduced, accommodation of a higher standard than for troops had to be provided, especially ablution, lavatory, and dormitory facilities. As far as possible quarters previously occupied by men were adapted for use by the WAAC's - involving fairly extensive alterations. The construction of a new camp for WAAC's at Miramar, Wellington, has been treated as a separate project; other than this, passing reference only is given to the provision of accommodation for women at the Auckland Fortress Area, Fort Dorset, Godley Head, Burnham, and Taiaroa Head.

References in the following pages to camp accommodation being of phase one, two, or three standard may perhaps be clarified at this point. Phase one construction was designed to meet elementary needs only: a cook-house with cooking equipment, drying rooms, ablution sheds, latrines, laundries, mess-rooms, and sleeping quarters in tents or in pre-fabricated huts. Water supply, lighting, heating, and sewerage would be provided to cover the bare minimum of requirements. The whole camp would be essentially of a temporary nature, but so constructed that its standard could later be raised if desired without undue waste of existing services and structures. Most of the brigade camps were originally of phase one construction. The approximate cost ran to £50 per head.

Phase two accommodation cost about £100 per head and could best be described as improvement of phase one

to a semi-permanent standard. In particular, roads, water supply, sewerage, lighting, heating, and refrigeration services would be designed to meet any ultimate demands, while key buildings such as messes, latrines, ablutions, administration offices, stores, and recreation buildings would be built to phase three (permanent) standard. Sleeping quarters would be in portable huts.

Typical of phase two construction were the large new camps at Linton, Delta, Westerfield, and Waiouru.

Phase three represented the final standard of war-time construction - wooden buildings and permanent engineering services. The transition from phase two to three was mainly brought about by adding dormitories to replace huts and, usually, erecting more durable administration offices, canteens, and recreational buildings. Phase three accommodation cost approximately \$150 per head. Examples of this class of construction were the main mobilisation bases and at some of the static coastal defence fortifications.

1. Name of Work: Papakura Military Camp.
2. Locality: Approximately $\frac{3}{4}$ mile east of Papakura township.
3. Nature of Work: The erection of a mobilisation base for the training of 2nd NZEF troops in the Auckland area.
4. References: File: 23/457 & bar Nos. Map: 2/A7
5. History: The construction of a new military camp near Papakura was the largest of the early war-time works carried out in the Auckland district.

The site, comprising 170 acres of farm land, had been tentatively selected some months prior to the outbreak of war, but its purchase by the Crown was not authorised until August, 1939. Simultaneously, the Public Works Department was requested to proceed with sub-surface and sewer drainage, external and internal roading, the provision of a water supply, and the erection of 'key' buildings for storage purposes.

Originally, it had been proposed to construct a canvas camp capable of accommodating a brigade group plus ancillaries (10,000 personnel), but when the Dominion entered the war a last-minute decision was made by Army to develop the camp on a permanent basis, including the immediate erection of two hatted battalion areas complete with all ancillary buildings. Each battalion block consisted of nearly 50 buildings, principally dormitories for officers and men, together with mess-rooms, kitchens, a drying hut, a recreation hut, a boiler house, ablution and shower blocks, latrines, tank stands, orderly and guard rooms, and M and ration stores.

By the first week in September, 1939, construction had commenced on an impressive scale. The erection of the first battalion block was allocated to a large contracting firm on a cost-plus basis. Buildings

Papakura Military Camp (Cont'd).

comprising the second block were divided among this and two other firms on a similar basis. The Department itself undertook the erection of certain service buildings (showers, latrines, ablutions, tank-stands, etc.) the preparation of the site, roading, and the installation of services such as drainage, sewerage, electricity, water supply, in addition, of course, to supervising the work of the contractors and generally administering the progress of the whole project. A large staff of departmental officers was stationed at Papakura - engineering, architectural, and clerical, enabling practically every problem of construction, supervision, costing, etc. to be solved on the spot.

As Army had requested that both battalion blocks be ready for occupation within eight weeks from 18 September, the entire resources of the Department and of the contractors were organised with a view to achieving this objective. All available plant and machinery were diverted to Papakura, and graders, rollers, bulldozers, mechanical shovels, draglines, trench diggers, mechanical loaders, compressors, and similar equipment were seen in operation. Despite adverse weather conditions in the initial stages, the work progressed uninterruptedly for 12 hours a day, six days weekly. The number of men employed reached 1,200 during October.

On 6 November 1939 the Permanent Head was able to report to the Minister of Public Works that Nos. 1 and 2 battalion areas were completed and ready for occupation; they were, indeed, to be occupied by troops on the following day. The administration building for brigade headquarters was three weeks off completion, while the hospital block would be finished in about a fortnight's time. These were to be followed by a post office and canteens. Later, a cinema, YMCA, and other recreational

Papakura Military Camp (Cont'd).

centres were added, and, by the time the third battalion area had been completed, the camp contained virtually all the amenities and facilities of a fair-sized township.

The camp was built to a comparatively high standard of construction, in semi-permanent materials. Timber was used throughout, with concrete floors laid in the kitchens, ablutions, latrines, showers, boiler houses, etc. The dormitories, messes, and similar buildings had wooden floors. The exterior finish of most of the structures was in weather boards, and the roofs of corrugated iron or, as this became scarce, of corrugated fibrolite.

The end of March, 1940, saw the completion of the three battalion areas, also the hospital and the contagious diseases blocks. The hospital originally consisted of two main wings but was subsequently extended by the addition of a 200 bed unit from Whangarei and one of 30 beds from Ohakawai. In all, a total of 191 buildings had been erected at the camp up to this date, covering a floor area of 420,000 square feet and involving the use of 3,000,000 super feet of timber. These figures grew to 468 buildings of a total area of 550,000 square feet at the end of the four-year period during which the camp was under construction by the Department, notwithstanding that the greater part of the work was completed within the first six months.

Few towns in the province were reticulated for water supply, sewage disposal, and electricity on a larger scale than Papakura camp, while the lay-out of paths and roads would have been a source of civic pride in any municipality.

One of the first difficulties encountered by the Department was to lower the water-level of the whole site, which, although an excellent class of dairy-farming land, was of a spongy, peaty nature, and made the use of normal

Papakura Military Camp (Cont'd).

block foundations out of the question, as ordinary piles merely sank deeper into the peat and could not carry the weight of the buildings. The remedy adopted was to remove the turf and lay continuous concrete foundations, to spread the load over a wider area. A deep drainage ditch was cut around the edge of the encampment, and other drains dug cross-wise - full use being made of mechanical equipment. Altogether, by 31 March 1940, nine miles of sub-surface drainage, $5\frac{1}{2}$ miles of stormwater drainage, and $4\frac{1}{2}$ miles of sewer drainage had been excavated.

Metal for roading was obtained from local quarries and spread on the sub-grade without formation - an expedient adopted partly in the interests of speed but mainly because the even surface of the ground made such a course feasible, and, indeed, desirable, in order to obviate exposing the spongy peat sub-surface. A total of 8 miles 14 chains of road metalling and sealing was carried out, plus the surfacing of $7\frac{1}{2}$ acres of paths and building surrounds and of $3\frac{1}{2}$ acres of parade grounds.

Five and a half miles of water piping were laid, and $3\frac{3}{4}$ miles of electric power reticulation.

The problem of sewerage was dealt with by building an Imhoff digester tank, with a capacity for 4,000 persons. This was completed and in use within six weeks.

Water was originally drawn from the Papakura borough mains, but a gravity section dam, filter plant, and reservoir, with a capacity of 500,000 gallons, were later constructed and connected with the camp by three miles of 8 inch mains.

Five miles of fencing were erected.

The grounds at the camp were laid out carefully, shelter trees being planted extensively and flowering

shrubs introduced on the lawns. In all, 2,100 trees were planted, and 14½ acres of lawns and gardens prepared.

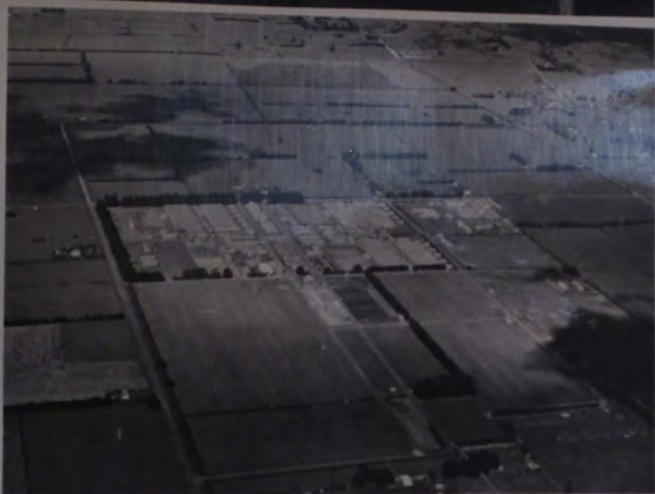
Detention Barracks, Ardmore: (References: File 23/457/25
Map: 2/A8)

Large detention barracks, complete with staff quarters, were erected adjacent to the military camp, on high ground near the entrance to a valley about three miles east of Papakura. The site was levelled by machinery and, when this had been done, construction commenced on the barracks building proper, a U-shaped structure containing 30 cells and having an exercise yard, 121 feet by 70 feet, in the centre. It was built very solidly in timber and was entirely self-contained, including a kitchen, prisoners' mess, guards' mess, boiler room, showers, latrines, ablutions, laundry, and work-shop. The guards' quarters adjoined, with accommodation for 20 men.

A water supply from bores was installed, together with a 30,000 gallon storage tank. These serviced both the detention barracks and the warden's residence on the classification range. Similarly, a sewerage system with a large septic tank and irrigation facilities was provided to serve both establishments.

Ardmore Magazines: (References: File: 23/457/19/1,
Map: 2/A9)

Eight large magazines in brick, ten in reinforced concrete, and two in precast concrete slabs, together with a brick and concrete laboratory, an explosive store, and a camp for guards were erected in a valley east of and adjacent to the detention barracks. The site, which had been selected by Army after due consideration of its suitability and accessibility, was surrounded by steep slopes, necessitating excavation into the hillsides. Road access was formed to the sites of the magazines and the whole area was completely fenced off.



PAPAKURA MILITARY CAMP.

TOP: Three months after the outbreak of war.
 MIDDLE: An aerial view taken in Nov 1943.
 LOWER: The detention barracks at Ardmore.

Expenditure: The total expenditure by the Public Works Department on Papakura Camp and associated works was as follows:

1939-40	:	34,053.45
1940-41	:	175,543
1941-42	:	51,502
1942-43	:	55,740
1943-44	:	66,577
1944-45	:	49,729
1945	:	25,610
		<u>883,346</u>

1. Name of Work: Ngaruawahia Military Camp.
2. Locality: Ngaruawahia.
3. Nature of Work: Additions and extensions to the existing military camp.
4. References: File: 23/317 & bar Nos. Map: 2/A13
5. History: Built in 1927 for territorial training purposes, Ngaruawahia Military Camp was primarily intended for use during the warmer months of the year, its facilities being limited to ablutions, showers, latrines, kitchens, and messes for up to 1,000 men sleeping under canvas. At the outbreak of war, however, the construction of the new mobilisation base at Papakura was only just commencing, so it was decided in the meantime to encamp volunteers for the 2nd NZEF in the Northern Military District at Ngaruawahia.

Minor additions to the camp were carried out in the early months of the war, chiefly in the nature of temporary (phase one) accommodation and services, and including 250 huts, a garage and transport shed, a store, and an RAP building. Before Papakura camp became available the Ngaruawahia camp was crowded with something

Ngaruawahia Military Camp (Cont'd).

like 3,000 troops, and even when this number fell to 2,000 the position was still most unsatisfactory owing to the inadequacy of the existing facilities. The matter was brought to the attention of the Minister of Public Works during a visit in October, 1940, and shortly afterwards the District Engineer at Auckland submitted a comprehensive report on the camp together with an estimate of the cost of converting it into a permanent training establishment. This ran to £119,175.

Army Headquarters deferred consideration of the conversion proposal, though miscellaneous alterations and additions and the erection of small new buildings continued to be authorised from time to time.

In November, 1941, War Cabinet approval was obtained to the expenditure of £29,000 on 'reconstruction and extensions' to Ngaruawahia camp. This covered the estimated cost of an officers' and sergeants' mess, an officers' dormitory, an administration building, company stores, a latrine for cooks, a ration store, the shifting of ablutions to a new site and providing additional facilities, sewerage extensions, sub-surface drainage, roading and paths, an augmented water supply, stormwater drainage, and various other improvements.

The bulk of this work was carried out by contract, the Department attending itself to such items as the erection of huts (300 four-men and 102 two-men), a railway loop, extensions to the electrical system, camp magazines, a workshop and garage, and additions to the fire station, etc. Apart from the huts, the new buildings erected covered a total floor area of 22,456 square feet. A large filtration plant with a capacity of 80,000 gallons daily was installed.

Ordnance Stores: As well as developing Ngaruawahia Camp from a territorial to a permanent mobilisation base, the

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Ngaruawahia Military Camp (Cont'd).

Public Works Department undertook substantial extensions to the ordnance buildings, including the erection of a large new bulk store.

Ngaruawahia was the permanent ordnance depot for Northern Military District.

Additions were carried out to the ordnance office in the latter half of 1942. In September, 1943, Army requested the Department to proceed with work estimated to cost £28,731, and comprising the construction of a small ordnance workshop, a reserve store, and a group store, the last-mentioned being estimated at over £20,000. A contract was let for the buildings, the Department arranging for preparation of site, electrical work, etc. Including roading and sealing, provision of fire fighting facilities, drainage, and installation of fittings, the expenditure incurred amounted to £48,848.

Magazines: Although a separate magazine area was developed outside the precincts of the camp, several additional magazines were erected in the camp immediately prior to and during the war, adjacent to those constructed in earlier years.

Including ordnance stores, and camp magazines, the total expenditure recorded in respect of reconstruction, extensions, and maintenance work at Ngaruawahia Military Camp during the war was £206,642.



NGARUAWAHIA MILITARY CAMP

A high altitude view, showing magazines in the foreground.



ARMY PETROL TANK, NGARUAWAHIA.

The enclosure on the left is a drum storage site.

1. Name of Work: Waiouru Military Camp.
2. Locality: Just south of the National Park area, in approximately the centre of the North Island.
3. Nature of Work: Erection of a general mobilisation and training camp.
4. References: File: 23/406 & bar Nos. Map: 4/43
5. History:

Site: The acquisition of a large area of land at Waiouru for the purpose of establishing a permanent training ground for the military forces was approved by Cabinet in September, 1939. Previously, a portion of the site had been used as a training centre for territorials, mainly accommodated under canvas. The area was proclaimed a military reserve in November, 1939. It was bounded on the west by the Waitangi Stream (a tributary of the Manawatu River) and on the east by the Kowhanga River, and extended for a distance of about ten miles north.

Some 1,250 acres of the Ugamata Swamp were included - suitable for flying fields or farming land when drained. Firing rights were secured over an additional 20,000 acres on the north-west and north-east of the reserve.

The location, almost in the centre of the North Island, had an elevation of 2,800 feet and enjoyed a moderating climate. The surrounding terrain ranged from flat to mountainous, the major portion being undulating or hilly. The military area proper comprised about 60,000 acres, adjoining the Waiouru-Tokaanu Road, but further substantial areas were available for training purposes if required. As almost the whole country-side was unoccupied, unrestricted scope was afforded for the training of artillery, infantry, and motorised units, including live shell firing.

Construction of Camp: Authority to proceed with the development of the military reserve as a semi-permanent camp for two battalions of infantry or equivalent

Waiouru Military Camp (Cont'd)

units (a maximum of 2,000 men) was received from Army Headquarters in November, 1939. In June, 1940, however, amending instructions were issued to provide for the accommodation of seven battalions, complete with all necessary buildings such as a hospital, recreation huts, and stores, etc., also a separate headquarters area. This would cover 140 acres and allow for a total personnel of 7,000.

Construction of the camp was undertaken on the following basis:-

1. The Public Works Department to carry out all engineering work.
2. Contractors to carry out all building work.
3. The Public Works Department to unload all materials from rail both for itself and for contractors and to deliver same to the site.
4. The Public Works Department to supply contractors with certain materials, notably corrugated iron, glass, building hardware, and electrical fittings.

Detailed surveys commenced on 20 June 1940. The erection of the first building started ten days later, and thereafter, for the next six months, buildings were completed at an average rate of 40 per month, each averaging 2,000 square feet of floor space.

The camp was originally scheduled for completion as early as October, 1940, which would have meant the employment of 2,000 workmen and the supply of a tremendous quantity of materials, especially timber. But the available labour only sufficed to maintain an average of 1,000 employees, while at certain stages of the work supplies of timber and various other materials ran short. It was found possible, however, to accommodate three battalions by the latter part of November, the essential

Waiouru Military Camp (Cont'd).

In January, 1941, the camp was ready for occupation, but a great deal of clearing up and finishing work remained to be done, most of which was completed by June, 1941.

During November, 1940, a branch railway about one mile long (for Army use only) was run from Waiouru Station onto the camp supply depot, and a portion of the camp was prepared for the accommodation of public works and contractors' employees. The whole of the Public Works Department's camp was removed early in 1942 to a site outside the main camp boundary, the area vacated being taken over by Army.

The work carried out fell generally under two headings, viz: engineering and architectural.

The engineering programme included the building of two rifle ranges; the formation, metalling, and sealing of 25 miles of access roading; the erection of new bridges; the levelling and metalling of land for building sites; the provision of several miles of fencing; the grassing and sealing of large areas of land; diversions within the camp precincts of the Waiouru Stream; and, as already mentioned, the construction of railway access between the Main Trunk Line and the camp. In addition, two dams, one on the Waiouru Stream and the other on the Waitangi Stream, and a 40,000 gallon concrete reservoir were constructed, all impounding water of excellent quality. The Waiouru Stream dam provided a gravity supply while water from the Waitangi Stream was lifted approximately 200 feet and delivered about one mile. The 40,000 gallon reservoir was filled by pumping from a small spring-fed creek.

Two reinforced concrete septic tanks, a power house, a pumping station, and a bulk fuel tank were also provided. The septic tanks were situated about half a mile

from the camp and functioned satisfactorily even when 8,000 persons were stationed at Waiouru.

Electric light, water, and sewerage reticulation were installed. The electricity was obtained from the national grid, with two Diesel generating sets as a standby. The standby plant alone could have supplied the needs of the whole camp in an emergency.

The principal buildings erected were:-

Army buildings (Phase A)	313
" " (Non standard)	48
Portable huts	1384
Hospital, 100 beds	1
Nurses home	1
Camp theatre	1
Magazines	30

The new buildings had a floor area of approximately 800,000 square feet.

A central heating system and a fire fighting system (with a modern engine and reels) were also provided.

The hospital contained such modern features as X-ray equipment, an operating theatre, a heating system, and a convalescing sun house. The camp theatre had seating accommodation for 850.

Entertainment of the troops was provided for by the erection in the camp of Church Army, Roman Catholic, Salvation Army, YMCA, and Everyman's huts.

The construction of a camp of the dimensions of Waiouru at short notice and during the depths of winter was an undertaking of considerable magnitude. A large public works staff was soon assembled on the site, and as plant, material, and equipment began to arrive in huge quantities, the work commenced in earnest. For about four months as many as 70 motor-trucks and 35 units of heavy earth-moving machinery, including bulldozers, angledozers, carryalls, mechanical shovels, etc. were continuously in service, day and night. At night the scene of activities was lit by flares and, later, by

The first thing I noticed when I stepped out of the car was the cold. It was a sharp contrast to the warm blanket of the car. I shivered slightly, but then I remembered that I was in the city, and the cold was just another part of the experience. I took a deep breath and walked towards the entrance of the building. The door was open, and I saw a man in a suit standing there. He looked at me and smiled, and I felt a little more at ease. I followed him into the building, and I saw that it was a large, modern structure with many floors. I was in luck, as I had just found the place I was looking for.

The man in the suit led me to a small, private office. He introduced me to a woman who was the manager of the office. She was a friendly woman with short, dark hair. She showed me to a desk and gave me some papers to fill out. I sat down at the desk and started to fill out the forms. The man in the suit came back and stood next to me. He looked at the forms and nodded. He then went to the door and opened it. I followed him out of the office and into a large, open area. There were many people working at desks, and I saw that this was a busy office. I felt a little nervous, but I knew that I was in the right place.

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Waiouru Military Camp (Cont'd).

proper lighting sets. Swamps were filled in and trees hauled out by the roots, virtually changing the face of the land every 24 hours. To the larger items of plant were added excavators, ditching tools, graders, planers, wheeled tractors, rock rooters, and various other units, while at Waiouru Railway Station a fleet of trucks was kept extremely busy taking delivery of an endless stream of supplies for the camp. So great did the volume of inwards stores become that at times the public works staff was almost overwhelmed.

Rain, snow, and wind made working conditions most unpleasant, but staff, workmen, and contractors were driven by a strong incentive to get the camp ready for occupation as quickly as possible. In particular, departmental fitters and mechanics did a magnificent job in keeping the plant and machinery in running order throughout the progress of the work.

In the early stages of construction the buildings were erected on a 'cost-plus' basis, but subsequently fixed price contracts were let as much as possible. The master schedule system was not used to any great extent.

The number of men employed reached a peak of 1,250 during 1940 and declined to about 250 in the following year.

A great deal of overtime was necessarily worked by both staff and workmen, since speed was at all times the primary consideration.

Some 10,000,000 super feet of timber were used on the construction of buildings in the camp. The cost of erection averaged approximately 20/- per square feet of floor area.

Construction was completed in 1945 with the installation of the heating system.

The total cost of the project amounted to £1,250,000,

plus the expenditure of £100,000 on maintenance.

APPENDIX: Details of construction, costs, etc. in statistical form follow.

ACCOMMODATION OF CAMP:

7 Battalion Areas @ 850 each.	5,950.
Headquarters Area and Fire Station.	300.
Hospital Area.	120.
Motor Transport Area.	20.
Recreation Area.	30.
PWD & Contractors Area (Being portion of No 8 Battalion Area).	600.
	<hr/> 7,020

PREPARATION AND FINISHING OF CAMP SITE.

Area of Ground Surface prepared for Camp and Buildings	140 Acres.
Topsoil removed and general excavation.	134,000 cub.yds.
Gravel Surfacing, Locally Quarried.	45,000 "
Road Metal, Quarried and Crushed Locally.	7,000 "
Pumice Sand, Local.	80,000 "
Area, Tar Sealed. (1st Coat).	58 Acres.
Area, Tar Sealed. (2nd Coat).	38.4 Acres.
Area sown down in grass.	56.25 "
Length of Roading.	7.1 Miles.
Length of Kerbing & Channelling.	9.25 "
Road Bridges across Waiouru Stream.	5
Length of Open Drains.	142 Chains.
Length of Stream Diversion	
76 Chains, representing	14,000 cub.yds.
Length of Railway, 1 mile: including Sidings.	134 chains.
Length of Railway Platform.	1,000 feet.
Cost of Preparing and finishing Site.	£85,500.
Average Cost per Acre.	£610.

BUILDINGS:

Timber handled from Rail to Site.	5,000,000 Sup.Feet.
Approximately	
Crushed metal & sand procured by rail	8,900 cub.yds.
for concrete, Plastering, Etc.	1,500 Tons.
Cement.	50,000 Sheets.
Galvanised Iron.	23,000 Feet.
Ridging.	300 Tons.
Nails.	1,167,000 Sq.Ft.
Building Paper.	30 Tons.
Hinges & Hardware.	17,000 Sheets.
Glass of all sizes.	69
Boilers & Heating Systems.	
Number of completely new Buildings erected.	203
Number of Buildings from Original Camp shifted and/or altered.	20
Number of Buildings, including farm buildings, demolished to make way for Camp.	12
Total Floor space of Finished Camp.	453,810 Sq.Ft.
Average Floor Space of each building.	2,050 "
Overall Cost of Buildings, complete.	£147,500.

Waiouru Military Camp (Cont'd).

Note. The above figures exclude cost of YMCA, Church
Army, Roman Catholic, Everyman's and Salvation Army Huts.

ENGINEERING SERVICES:

Electrical.

Power House. (Containing 2 Units).	550 KW.
Electric Reticulation. (Cables & Wire) over	90 Miles.
Electric Poles.	313.
Lighting Poles for Army Tents.	250.
Total Cost of Power House & Reticulation.	£22,000.
Cost per Capita of Camp Population of 7000.	£3.

WATER SUPPLY.

Dam, Concrete.	70 cub.yds.
18" Water Main, Concrete.	5,150 Ft.
12" " " " "	1,200 "
9" " " " "	4,150 "
6" " " " "	15,260 "
Galvanised Pipe branches to Buildings.	10,000 "
Number of Fire Hydrants provided.	46
Total Cost of Water Service.	£17,800.
Cost per Capita of Camp Population of 7,000.	£2.11.0.

SEWERAGE.

Septic Tanks, Reinforced Concrete.	450 Cub.yds.
" " " " " " " " " " " "	100 " "
Main Sewer Outfall, 15" Concrete.	2,400 Ft.
(Portion being laid through a Tunnel, 1250' long).	
Main Sewer, 12" Concrete.	800 Ft.
" " " " " " " " " " " "	3,150 "
" " " " " " " " " " " "	12,000 "
Branches to Buildings, 4" GEW.	20,000 "
Effluent Line, 12" Concrete.	1,100 "
Total Cost of Sewerage.	£20,000.
Cost per Capita of Camp Population of 7,000.	£2.17.0.

STORMWATER

Total Length of 24" Concrete Pipes.	900 Ft.
" " " " " " " " " " " "	650 Ft.
" " " " " " " " " " " "	1,130 "
" " " " " " " " " " " "	1,280 "
" " " " " " " " " " " "	1,810 "
" " " " " " " " " " " "	4,000 "
" " " " " " " " " " " "	1,600 "
Number of Sumps Provided.	94.
Cost of Stormwater Drainage.	£7,900.
Cost per Acre of Camp Site.	£56.10.0.

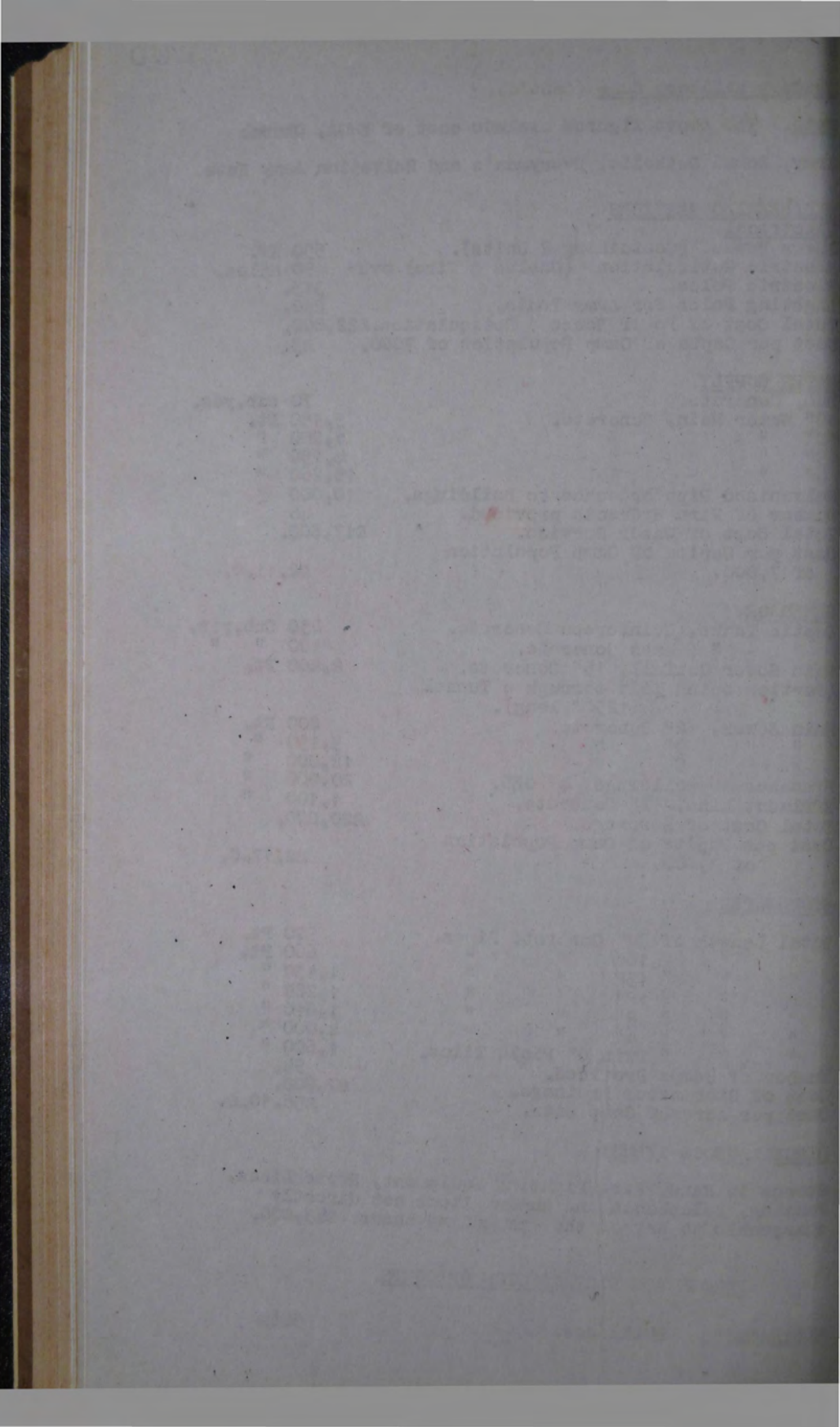
MISCELLANEOUS ITEMS:

Stores in Hand, Fire Fighting Equipment, Horse Lines,
Fencing, Telephones and Sundry Items not directly
chargeable to any of the preceding heads: £45,000.

PERCENTAGE DISTRIBUTION OF COSTS.

CONTRACTORS: Buildings.

54 1/2%



Waiouru Military Camp (Cont'd).PUBLIC WORKS DEPARTMENT:

Materials & Services supplies in connection with buildings.	12%
Preparation of Site, Roading, Parade Grounds, etc.	17½%
Electrical Supply.	3½%
Sewerage.	3%
Water Supply.	2¾%
Stormwater Drainage.	1%
Miscellaneous Items.	6%
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Total =	100%
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WAIOURU MILITARY CAMP.
 TOP LEFT: Under canvas. RIGHT: Building construction
 in progress. LOWER: A comprehensive view of the
 completed camp.

1. Name of Work: Trentham Military Camp.
2. Locality: Trentham.
3. Nature of Work: Provision of accommodation and facilities for an ordnance depot, an Army school of instruction and for the training of expeditionary force troops.
4. References: File: 23/403 A bar Nos. Map: 7/A3
5. History: A military camp was constructed at Trentham during World War I. In the period between the two wars it was used chiefly as an ordnance depot and for an Army school of instruction. Many of the sleeping huts became stores for materials, while the hospital and adjacent buildings were in use as living quarters for married members of the camp staff.

Just prior to the outbreak of war in 1939, a concrete ordnance store, 720 feet by 100 feet and served by a railway siding, had been completed.

The erection of two new huttled battalion areas at Trentham was formally authorised by Army on 9 September 1939, but two months earlier preliminary instructions indicating probable requirements in the event of war had been issued, setting out the extent and type of accommodation proposed for personnel, stores, vehicles, etc. Staff and workmen had been organised and everything was in readiness to make an immediate start. The work commenced, in fact, within 12 hours of the declaration of war.

In the early stages of the building programme contracts were let to local contractors on a 'cost plus a fixed fee' basis, with very satisfactory results. Later, when contractors and labour were brought in from other districts, the master schedule system was followed. Most of the work associated with roading, sealing, preparation of foundations, water supply, sewerage, and similar engineering services was carried out by the Public Works Department with its own forces.

Trentham Military Camp (Cont'd).

During the first year of the war 233,651 square feet of new buildings were erected at a cost of £144,911; existing buildings were renovated and altered at a cost of £24,691; and £54,994 was spent on roading, sealing, drainage, electrical services, the construction of a public works depot, and other miscellaneous work. The total expenditure thus amounted to £225,596.

The war-time expansion of Trentham military camp fell generally within the following categories:

Mobilisation Area: A new area of land adjacent to the existing camp was taken over and developed as a site for two battalion camps. These were constructed complete with cook-houses, messes, latrines, ablutions, drying rooms and company stores. Tents were at first provided for sleeping accommodation, but were later replaced by barrack huts.

In this area were also erected new buildings for church institutes (five), wet and dry canteens, a post office, a headquarters building, the main QM store, two MT barns, each 360 feet by 50 feet, and an MT workshop.

Heating, electric power, water, and drainage systems were provided and the streets and paths formed and sealed.

Ordnance Area: In this area 43 buildings for stores and workshops were erected, including one large wooden structure, 700 feet by 100 feet, similar to the concrete one which had been constructed prior to the outbreak of war.

Ordnance buildings were thus able to be grouped together, the barrack huts in the old part of the camp (which had been used as stores) being freed for the accommodation of troops.

For the storage of a reserve petrol supply, it was at first proposed to construct underground water-jacketed concrete tanks. This plan was discarded, however, in

arrangement of storage in drums. The drums were placed in stacks of about 1,000, each stack being protected by an earth bank around it and camouflaged with a covering of earth. The whole area was surrounded with a six inch galling main, with fire hydrants at regular intervals. About 1,000,000 gallons of petrol were stored in this manner.

Hospital Area: The 1914-18 hospital was renovated throughout and an annexe, an emergency ward, and a skin hospital added. A boiler house was built and equipped with sufficient plant to supply heat to all buildings.

WAAC Area: Up to 400 WAAC's were employed at Trentham and a composite camp was erected to accommodate them. The camp consisted of a cook-house, a mess room, a laundry and shower block, a recreation hall, and a boiler house. The old 1914-18 headquarters building was converted into a hospital. Sleeping accommodation was in the form of eight-men huts.

Magazine Area: A magazine area was established in a valley to the south-east of the main camp. The buildings comprised 20 explosive stores - dispersed and protected by earth banks, a laboratory, a workshop, a boiler-house, and quarters for guards and staff. The area was roaded and fenced and fire breaks were cut in it.

Water Supply: At the outbreak of war two sources of supply were available, viz:

- (a) The old camp reservoir, which gave only 15 lbs. pressure and water of doubtful quality.
- (b) The Upper Mutt borough supply, which was often insufficient for the requirements of the borough itself, the pressure in the camp at such times being almost zero.

A number of test wells were sunk until one was found which gave an ample supply of suitable water. It was

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TRENTHAM MILITARY CAMP.

Top Left: Under canvas. Right: A section of the completed camp.
 Lower Left: The southern portion of the camp. The magazine area appears
 in the far background. Right: The sewage treatment plant.

Trentham Military Camp (Cont'd).

decided to pump from this well direct into the mains during the day and to rely on the borough supply at night but as the borough supply at times proved to be insufficient to maintain pressure even at night, the pumps had to be operated almost continuously.

Interference with the supply due to power failure or to breakdowns of electric and Diesel motors sometimes caused inconvenience in the camp and was a source of worry to the maintenance staff. Plans were prepared for a storage reservoir on the nearby hills but the end of the war came before it could be proceeded with.

Sewerage System: An interesting part of the work at Trentham Camp was the sewerage system installed.

The existing system was inadequate for the enlarged camp and did not come up to modern standards. Moreover, trouble was experienced with the old pumping main to the Hutt River, and the discharge of sewage into the river caused a nuisance.

After several proposals had been investigated it was decided to construct a bio-filtration system which had been used with success in Australia.

As the effluent was discharged into a small creek flowing through a residential area, it was essential that the operation of the plant be highly efficient. Samples of the effluent were therefore taken regularly and submitted to the Dominion Analyst for testing. The result was always satisfactory.

A complete description of the plant is on file in the Head Office of the Public Works Department. It was also described by Mr. J.P. Rowntree in his paper on 'Sewage Treatment in New Zealand', published in Vol. XXXII of the Proceedings of the NZ Institution of Engineers.

Maintenance: Early in 1942 the Public Works Department

Trentham Military Camp (Cont'd).

to look over the maintenance of Trentham Camp, employing
about 70 artisans and cleaners on this work and relieving
army of supplying up to 250 trainees daily for fatigues.
maintenance covered all buildings, operation and mainten-
ance of services, cleaning of ablution, laundry and latrine
blocks, and collection and disposal of rubbish.

The extent of the work carried out at Trentham
Military Camp during the war is indicated by the
following figures :

Area levelled	112 acres
Roads constructed and sealed	5½ miles
Stormwater drains laid	11 miles
Fencing erected	3 miles
Water mains laid	36,000 feet
Fire hydrants installed	70
Sewage system included	32,000 feet of mains
New buildings erected	390
Floor area of new buildings	800,000 square feet
The total expenditure (including maintenance)	

amounted to £1,223,482.

A FINE PANORAMIC VIEW OF TRENTHAM MILITARY CAMP.
(TAKEN IN 1940)

- | | |
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| (1) MT SECTION | (10) CAMP HQ |
| (2) RECREATION HUTS (C OF E, S.A., R.C., YMCA) | (11) HOSPITAL |
| (3) CANTEEN | (12) RAILWAY STATION |
| (4) POST OFFICE | (13) GYMNASIUM |
| (5) NO 2 TRAINING UNIT | (14) BARRACKS SQUARE |
| (6) DENTAL & LIBRARY | (15) NO 4 TRAINING UNIT |
| (7) NO 1 TRAINING UNIT | (16) P.W.D. STORE. |
| (8) NO 3 TRAINING UNIT | (17) TRENTHAM RACE-COURSE |
| (9) CAMP Q.M. STORE | (18) ARMY SCHOOL. |



1. Name of Work: Burnham Military Camp.
2. Locality: In Malvern County, 18 miles south of Christchurch, on the main road and railway.
3. Nature of Work: Erection of a new mobilisation camp for the training of 2nd NZEF troops in the South Island.
4. References: File: 23/313 & bar Nos. Map: 10/A11
5. History: Burnham was the logical choice for the site of the new mobilisation base required in the South Island, as Army already owned a large area of land in that locality and a small camp and ordnance depot had been in existence for a number of years. This camp, incidentally, was not merged into the new base but was extended and enlarged to become the southern district school of instruction.

The construction of Burnham camp began immediately after the outbreak of war. Mechanical plant was diverted to the scene of the work from all over the province - particularly from irrigation projects in South Canterbury. The services of every available building contractors and of as many departmental officers and workmen as could be spared were organised in an all-out drive to prepare the camp for occupancy by troops by the middle of October, 1939. Contractors were engaged on a 'cost-plus' basis.

Two complete battalion blocks were built initially, together with mess-rooms, stores, orderly rooms, and ablution facilities for a third. Each block consisted of an officers' and sergeants' mess and sleeping quarters, a men's mess, a company orderly room, company stores, ablutions, drying rooms, fuel stores, and 22 dormitories. A theatre to accommodate 600 men was provided, also a post office, a wet and dry canteen, and several recreation huts. These were followed by an administration building, additional dormitories, a camp hospital complete with nurses' quarters, a dental block, and

Burnham Military Camp (Cont'd).

isolation blocks for contagious diseases. The third battalion block was later completed, and from time to time numerous other buildings were added.

A convalescent depot - entirely self-contained and capable of holding 300 men - was erected on a separate part of the camp's precincts. Spread over an area of 15 acres, the depot included a small administration block, stores, accommodation for a staff of 20, sleeping quarters for officers and men, dining rooms, and recreation buildings complete with gymnasium, picture-hall, billiards room, canteen, and reading, writing, and lecture rooms.

Located alongside the main rail access to the camp was a large concrete ordnance store. This was later extended in timber to about double its original size. A supply and transport depot was built in the same locality: through this passed all bulk stores for the camp.

When Burnham became the headquarters of a mechanical transport repair section a substantial garage and a workshop building were constructed for their use.

Complementary to the building programme, the Department was proceeding with the provision of all necessary engineering services, including roading, water supply, drainage, sewerage, electricity, and rail access.

Road formation was greatly facilitated by the flat nature of the ground, reducing earthworks to a minimum. The presence of nearby gravel pits was also a considerable asset, especially as the gravel was well graded and thus suitable for immediate use in base course construction. Screening only was needed to provide top course material. As the roading traversed shingle country, a good base already existed.

Parade grounds were constructed simultaneously with roading. Later, both these and the roads were sealed,

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and kerbing and channelling built along the roads.

Water for the old camp was obtained from a deep well, pumped to an elevated tank of 13,000 gallons capacity by a 4 inch pump capable of delivering 50 gallons a minute. This supply soon proved inadequate, however, and new wells were sunk and additional storage tanks erected. But even with delivery stepped up to 300 gallons a minute, sufficient water was available only for cooking purposes, and, until reticulation throughout the camp could be completed, water for ablutions and fire fighting had to be drawn from a water race flowing past the area. An old swimming bath provided storage for fire fighting purposes.

Reticulation was simplified by the fact that the country at Burnham was very suitable for mechanical excavation, and, with the use of concrete, rubber-jointed, pressure pipes, water was laid on quickly and without difficulty.

A special sewage treatment plant was eventually installed at Burnham Camp. Prior to this, as a temporary measure a pan system was operated.

The effluent from cookhouses and ablutions was disposed of in three lines of soakage trenches situated in juxtaposition to the buildings they served. These trenches were about seven feet deep and were excavated and back filled with boulders to provide soakage. This gave satisfactory results, except that grease and soap sometimes sealed up the boulders, preventing the water from flowing down amongst them. Regular inspection overcame this trouble. To procure the 1,700 cubic yards of boulders required, a 25 mile trip had to be made to Paparua Prison, where a large number of big stones rejected from the crushing plant were offering.

The existing power lines were not heavy enough for

the new camp, so fresh

engines were run from Rolleston, about four miles away.
A sub-station was erected in the camp to control internal
electrical reticulation.

Rail sidings were constructed into the camp, alongside the new ordnance stores, these being used for delivering goods as well as the entraining and detraining of troops. Previously, much inconvenience had been caused by through supplies arriving for the camp overflowing the normal facilities at Burnham railway station and having to be shunted into every small station within ten miles of the camp.

At a later stage in the war three extra blocks of buildings were erected at Burnham Camp on an area of 33 acres which had to be acquired for the purpose. Drainage, water supply, and lighting facilities were extended accordingly. Mess-rooms, cookhouses, stores, etc. were built to the standard already prevailing, but the troops were accommodated in eight-men huts instead of in dormitories.

A number of permanent houses were erected at the camp for the use of the instructional staff.

The total expenditure incurred on the construction of Burnham Military Camp was as follows:

Buildings	2422,202
Water supply, drainage, etc.	97,783
Convalescent depot	94,695
Roading, parade grounds, etc.	92,593
Ordnance store & MT workshops	76,955
Electrical reticulation	10,828
Rail access	5,038
General, surveys, etc.	4,923
	<hr/>
	£804,017

Detention Barracks: (References: File: 23/313/24
Map: 10/A9)

Army in July, 1941, authorised the erection of detention barracks on a site a few miles to the north of



BURNHAM MILITARY CAMP

TOP: A Close-up of the Buildings in the Main Camp Area

LOWER: A more distant View (Northern Section) showing the Magazine Area in the Right Foreground. The Ordnance Store may be seen in the Left Foreground.

the main camp area. This consisted of the barracks building proper and an adjoining structure to house the guards.

The site was prepared by the Department and a contract let for the erection of the buildings.

The work was completed in April, 1942.

Expenditure amounted to £18,945.

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1. Name of Work: Linton Military Camp.
2. Locality: Fitzherbert West district, between Linton and Palmerston North.
3. Nature of Work: Construction of a permanent territorial training camp.
4. References: File: 23/581 Map: 6A7
5. History: The construction of a large new military camp in the vicinity of Palmerston North was authorised in December, 1941. The site selected at Linton covered an area of over 700 acres, and was ideal for the purpose both from an engineering and military point-of-view.

The site had firstly to be cleared of some 450 acres of stumps and timber. Simultaneously, the main drains were excavated by power shovels and roads were formed and metalled. All this work was carried out by the Public Works Department with its own forces, no particular difficulties being encountered.

A completely equipped camp for public works personnel was erected adjacent to, but independent of, the military camp area, providing accommodation for a total of 260 departmental and contractors' employees. Parts of this area were allocated to the principal contractors for the erection of workshops and for marshalling their building materials. The main buildings in the public works camp comprised a large combined mess, quarters for the caterers, ablution and laundry blocks, offices, stores,

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Linton Military Camp (Cont'd).

a workshop, a substation and house, and a recreation hall. Standard two-men huts were used for sleeping quarters.

It was originally intended to construct only the minimum number of permanent buildings for each battalion area in the new military camp, accommodating the troops in portable huts or under canvas. Later, Army decided to have the whole camp erected up to permanent (phase three) standard. It was also decided to adopt the principle of full dispersal, as a protection against bombing attacks.

Building work on the main camp started in February, 1942, contractors from the Manawatu, Wellington, and Wanganui districts being organised under the supervision of the Department. During the construction programme a total of 25 building contractors was employed, some of whom had up to 60 men working for them. The procedure followed at the start in allocating contracts was to obtain tenders from the larger contractors for the more substantial buildings, and from the small contractors for the smaller buildings. A price was then fixed for each class of building - usually approximating the average of the tenders received, and the work was allocated according to each contractor's capacity. Contractors engaged their own electrical, plumbing, and painting sub-contractors for all inside work. The whole of the heating services for the camp was undertaken by a well-known firm of heating engineers, which co-opted other plumbing concerns in Palmerston North. Boiler houses were built for each battalion area and the hospital, steam being supplied to service buildings through underground pipe ducts. On two areas especially, trouble was experienced on account of the substantial flow of ground water in the gravel three to four feet below the surface. Water seeped into the ducts (some of which were badly

(condo) and a considerable loss of efficiency resulted until some of the ducts were re-laid.

Building contracts were brought under the master schedule system in the latter stages of the project.

Building activities reached a peak in May and June, 1942. The initial programme of work authorised was sufficiently completed by the end of November, 1942, to enable seven battalion areas and the supply area to be occupied by troops. Further buildings continued to be added right up to March, 1944, including a 50 bed hospital block and nurses' home, a theatre, a wet and dry canteen, a post office, a library, magazines, ordnance and QM stores, a workshop, and a service station.

Altogether, a total of 182 permanent buildings was erected at Linton, also 521 two-men huts, 155 four-men huts, and 480 eight-men huts.

As already mentioned, the formation and metalling of roads, tracks, parade grounds, parking areas, etc. were carried out by public works labour and plant. Formation work was readily handled by road graders. Ample quantities of road metal were available from the river bed at the northern end of the camp, something like 125,000 cubic yards being used for this purpose. Main roads were constructed to highway standards to take heavy Army traffic. Most of these and some of the secondary roads and parade grounds were sealed with tar and chips or emulsion. Other secondary roads were sprayed with sludge oil, chiefly to keep the dust down. The extent of formation and metalling carried out was : main roads, 11 miles 23 chains : internal block roads, 7 miles 12 chains : paths, 3 miles 43 chains : parade grounds, 21 acres : parking areas, 15 acres. A total area of 200,000 square yards was sealed (by contract). Four miles 53 chains of fencing were erected, and five

miles of shelter belts planted.

Railway access from Linton Station to the supply area yard was constructed by the Department, with the assistance of the Railways Department. Linton Station yard had to be considerably enlarged to handle military traffic.

The main outfall sewer to the septic tank was excavated and laid by an Auckland firm of contractors. Sewerage reticulation for the independent areas, including manholes, grease traps, etc. was carried out by the Department's own forces. The even slope of the land towards the Manawatu River made the planning of the main intercepting sewer, reticulation, and the disposal of the sewage a relatively simple matter.

Water was supplied from a series of artesian wells put down by a local well borer, reticulation being completed by the Department.

Stormwater drainage was easily disposed of to the Kahuterawa Stream on one side and to a large open drain excavated through the swampy land on the western side. Open drains were used as much as possible in order to save pipes. Most parts of the camp had good natural drainage.

Tanks for fire fighting were provided at various points throughout the camp. These and the septic tanks were excavated and concreted by contract.

Electricity was supplied from the existing power system, a substation to control the reticulated area being erected at the public works camp, along with a house for an electrician.

Other measures associated with Linton Camp were the provision of a 25 yard rifle range on the banks of the Kahuterawa Stream, an incinerator and rubbish tip, magazines, and a certain amount of river protection work.



LINTON MILITARY CAMP



SHOWGROUNDS CAMP, PALMERSTON NORTH.

The number of men employed on the project reached a maximum of 647 at the height of construction, of whom 168 were engaged directly by the Department and 479 by contractors. A 54 hour week was normally worked, but for short periods some contractors worked up to 60 hours weekly. No shift work was necessary.

Departmental staff employed at one time totalled 22.

The total cost of Linton Military Camp aggregated £642,229, of which about £400,000 was spent on buildings.

Due to the rapid improvement in the war situation in the early months of 1944, the new camp was never fully occupied. After the war, it was announced that the camp would eventually replace Trentham Military Camp.

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1. Name of Work: Delta Military Camp.
2. Locality: At the confluence of the Waihopai and Wairau Rivers, 12 miles due west of Blenheim.
3. Nature of Work: Construction of a military camp.
4. References: File: 23/594 & bar Nos. Map: 9/A9
5. History: The construction of a large new military camp in the Blenheim district was authorised towards the end of 1941. This was intended primarily as an advanced territorial training centre. The site selected, known as the Delta, was an ideal locality for the purpose, as it contained a substantial area for the dispersal of units, enjoyed maximum sunshine and protection from prevailing winds, and was within easy access of Blenheim.

The number of troops to be accommodated was approximately 4,000, and the Department's instructions were to complete the work with all possible speed, giving priority to such buildings and services as would enable partial occupation to be given to Army even before the camp was completed.

Delta Military Camp (Cont'd).

Immediately Army Headquarters had in February, 1942, definitely decided on the Delta site steps were taken to let contracts for the erection of the necessary buildings. These, of course, comprised the greater part of the project, and came at a time when the Department was reaching the peak of its war-time defence activities and when the competitive tendering system was on the point of being abandoned in favour of the master schedule system. It was at first proposed to accept a fixed price tender from one contractor for the whole of the building work and, indeed, instructions to accept this tender were actually telegraphed to the District Engineer on 2 April 1942. Within the next few days, however, the Building Controller intervened, and on 13 April he notified the Engineer-in-Chief that the work was to be divided among three contracting firms (one of them the original tenderer and the others representing combined groups of contractors in the Nelson district and in the Mutt Valley). The building programme fell generally into a number of different sections, each comprising a separate 'battalion group'. In all six camps were erected.

Separate contracts were let for plumbing and engineering services, the Department itself carrying out such items as preparation of sites, drainage, sewerage, water supply, and roading, etc. With the assistance of nearly all cartage contractors in the Blenheim district a total of 50,000 cubic yards of shingle and gravel was laid in the course of site preparation. Additional buildings were required by Army as the work progressed, and two or three more contractors were allocated a share of the work.

Despite so many different contractors being engaged on the project, as well as departmental staff and workmen, and notwithstanding that it was an urgent job carried out under rush conditions, the District Engineer was able to

report that ... 'so well was the work organised between the various contractors that the Army was able to occupy the camp within three months of commencement... at all times harmony was maintained between the Department and the contractors, and it was due to this co-operation that no delays in the work were experienced at any stage.'

The principal buildings erected at the Delta Camp were: men's messes (5); officers' and sergeants' messes (5); ration stores (5); boiler houses and latrines (7); men's ablutions (7); men's latrines (7); officers' and sergeants' ablutions (5); cooks' latrines (5); field latrines (25); company stores (30); battalion stores (6); battalion orderly rooms (5); brigade headquarters; a hospital; combined messes (2); ammunition stores (45); canteens (7); medical huts (6); a bootmakers' and armourers' building; a signal section building; and a quartermaster's store. An office, store, ablutions, staff accommodation, mess-rooms, workshop, etc. were also erected in a separate camp built for public works personnel.

The total cost of all buildings was £368,235.

The provision of a water supply, which cost £22,050, involved the use of 7,138 feet of galvanised piping and 4,467 feet of concrete pressure piping. Drainage cost £24,150 and entailed 9,386 cubic yards of excavation, the laying of 25,805 feet of piping, 97 manholes, 192 gully traps, 37 grease traps, 73 strainers, and three septic tanks. Five hundred and twenty eight feet of field tiles and 323 feet of stormwater drains were laid.

Other expenditure incurred was: site preparation, £8,400; sewerage, £16,800; electrical installations, £16,800; roading and sealing, £23,100; fencing, £2,100. Miscellaneous expenditure brought the total cost of the new camp to £509,385.

The first part of the paper is devoted to a general
discussion of the various methods of determining the
velocity of light. It is shown that the most accurate
method is that of measuring the time taken for light
to travel a known distance. This is done by means of
a rotating mirror, which reflects the light back to its
source. The time taken for the light to travel the
distance is then measured by the number of rotations
of the mirror. The velocity of light is then calculated
from the distance and the time. The result is that the
velocity of light is about 186,000 miles per second.

The second part of the paper is devoted to a
discussion of the various methods of determining the
refractive index of a substance. It is shown that the
most accurate method is that of measuring the angle
of refraction. This is done by means of a refractometer,
which measures the angle of refraction of light passing
through a substance. The refractive index is then calculated
from the angle of refraction. The result is that the
refractive index of a substance is a measure of its
density. The refractive index of a substance is also a
measure of its optical properties. The refractive index
of a substance is a measure of its ability to bend light.



DELTA MILITARY CAMP

READING FROM TOP TO BOTTOM, LEFT TO RIGHT: Camps A, B, C, D, E, F and G. LOWER RIGHT: The theatre building under construction; camp G.

Delta Military Camp (Cont'd).

Sufficient buildings were ready by August, 1942, to enable the first draft of troops to move in. This was but three months after building construction had commenced and four months since a start was made on the preliminary engineering work.

The RNZAF took over the camp in June, 1943, and spent a further £300,000 on a very extensive programme of additions and alterations.

1. Name of Work: Military Camp, Westerfield.
2. Locality: In Westerfield Survey District, near Springburn Branch Railway, 10 miles from Ashburton.
3. Nature of Work: Erection of camp accommodation for the 10th Brigade Group.
4. References: File: 23/590 Map: 10/A16
5. History: Sites for a series of five dispersed camps to accommodate units of the 10th Brigade Group were selected early in 1942. The camps were located one to two miles apart and were each spread out over about 150 acres of land. Westerfield met requirements from a tactical point-of-view and also because the even terrain made for easy construction; water was readily available; drainage and sewerage presented no difficulties; numerous pine plantations afforded both protection and concealment; and the existing railway access facilitated construction as well as operation.

Contracts for the erection of the buildings were let in March, 1942, on a 'schedule rate' basis arranged between the District Engineer and the Canterbury Master Builders Association (this was just before the introduction of the master schedule system which, indeed, it forestalled). The principal buildings in each camp were mess-rooms for officers and men, ration stores, boiler houses, and ablutions and latrines. All these were

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Military Camp, Westcote (Cont'd).

constructed to the high standard prevailing at the beginning of the war. The men were, however, accommodated in huts instead of in dormitories. A small camp was erected for public works personnel. Other buildings provided were a 30-bed field hospital, brigade headquarters, orderly rooms, and stores.

Twenty miles of roading were formed and metalled throughout the camp area, the flat surface of the ground and the gravelly nature of the sub-soil making this a relatively simple matter. No sealing was necessary.

A potable water supply was piped from springs through a six inch diameter rubber-jointed, concrete pressure pipe to a reservoir of 100,000 gallons capacity which had been constructed in one of the camps. From this it was reticulated to three other camps through a four inch pipe and stored in elevated tanks each of 4,000 gallons capacity. The fifth camp was supplied from a well 80 feet deep.

Water for ablutions, showers, and boilers was pumped from streams at each camp by electrically drawn pumps delivering 800 gallons a minute.

Altogether 5,000 feet of six inch and 25,000 feet of four inch concrete pipe were used, together with 18,000 feet of galvanised piping for reticulation purposes.

The sewerage system installed consisted of five reinforced concrete tanks each of 2,000 gallons capacity, also 20 pre-cast septic tanks. Sewage was water borne from the officers' and sergeants' messes and living quarters and from all mess staff quarters. The effluent from the septic tanks was disposed of in boulder filled soak pits. Camp latrines were constructed over trenches 18 feet deep. These were excavated by a dragline.

Electric power was obtained from power lines under the control of the Ashburton Electric-power Board.

The total cost of the work carried out by the Department at Westerfield was as under:

Buildings	: £270,500
Water supply	: 19,630
Sewerage	: 17,150
Land purchase and compensation	: 13,070
Roading	: 10,560
Electrical reticulation	: 6,600
Fencing	: 1,600
Preparation of sites	: 1,700
	<hr/>
	£340,810

1. Name of Work: Waiwera Military Camp.
2. Locality: Approximately 68 miles by road and rail south-west of Dunedin, between the South Island Main Trunk Railway and the Dunedin-Gore State highway.
3. Nature of Work: Erection of a military camp.
4. References: File: 23/595 Map: 12/A3
5. History: The site for a military camp at Waiwera to accommodate up to 1,000 men was approved by Army in January, 1942, the land (370½ acres) being acquired shortly afterwards under the Public Works Act.

By pooling the resources of several different contracting firms, which amalgamated for the purpose of erecting the camp buildings, the services of about 200 men were made available. These workmen were accommodated in standard public works huts, and existing buildings on the site were fitted up as mess-rooms. Sleeping quarters for troops were provided in the form of four-men huts. The total area of the buildings erected was 33,000 square feet.

Plumbing, water supply, and drainage were carried out under separate contracts. Water was obtained from

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Waiwera Military Camp (Cont'd).

the Waiwera Stream, 1½ miles from the camp, and pumped through a 4 inch main to a concrete storage reservoir of 66,000 gallons capacity located on a hillside adjacent to the site. From here it was reticulated throughout the camp.

As the buildings were dispersed over a wide area, the drainage was divided into two systems: foul sewerage was treated by septic tanks while the effluent, together with stormwater, discharged into a natural watercourse.

Since the nearest source of electrical power was at Waitepeka, nine miles away, it was decided to install steam-driven generating plant at the camp, with a Diesel set for standby and night-time supply. The erection of poles and overhead aerials to the various buildings was carried out by the Otago Electric-power Board, internal reticulation being undertaken by a contracting firm.

Excavation of building sites, formation and metalling of access roading (43½ chains), the construction of a storage reservoir and pumphouse, mole draining (75 acres), and the installation of 3,000 feet of tile drains were undertaken by the Department itself.

The camp was maintained by departmental workmen, who were accommodated on the northern boundary of the military area.

Including maintenance, the total cost of Waiwera Military Camp was £104,717.

The following is a list of the names of the persons who have been appointed to the various positions in the Department of the Interior, and who have been assigned to the various divisions of the Department.

As the list of names is long, it is not possible to give a full list of the names of the persons who have been appointed to the various positions in the Department of the Interior, and who have been assigned to the various divisions of the Department.

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1. Name of Work: Brigade Camps, Kaikohe.
2. Locality: An area in Bay of Islands County, centering on Okaihau, Waitangi, Waimate North and Kaikohe.
3. Nature of Work: Erection of camps for the accommodation of a brigade of troops (12th Brigade).
4. References: File: 23/593 Map: 1/A12
5. History: In January, 1942, Army selected sites for a number of dispersed camps in the Kaikohe district, and an immediate start was made with their erection. Army labour was used as much as possible, the Public Works Department concerning itself in the main with essential engineering services such as roading, drainage, water supplies, and the installation of electric power, etc. Pre-fabricated huts were used extensively, these and other materials being supplied through the Department and distributed from a central marshalling yard at Okaihau.

The camps were at first placed under natural cover but were later moved to open ground. In the ten months before huts were available, the troops lived in tents and other makeshift accommodation - anything, in fact, which would serve as shelter, however primitive.

There were in all 13 principal camps, and 16 smaller ones. Their construction involved the use of 1½ million super feet of timber, 46,940 feet of water piping, 23 water pumps, 15 electric motors, and 11 petrol and Diesel engines. Altogether, no less than 922 buildings were erected, 16 miles of roads formed, and 37 water bores sunk.

The programme of work extended from January, 1942, to April, 1943. It included, in addition to the camps, the erection of a 30-bed field hospital at Ohaiawai, costing £13,118. (This was later transferred to the hospital at Papakura Military Camp).

The total expenditure by the Public Works Department

Brigade Camps, Maikohu (Cont'd).

on the brigade camps and hospital amounted to
£68,014.

* * * *

Further north, near Waipapakauri aerodrome, camps at Sweetwater and Taipa were erected for a mechanised regiment attached to the 12th Brigade. Construction was carried out between May and September, 1942, by or under the direct supervision of Army. Water supplies and electric power were installed by the Public Works Department but otherwise the Department had little to do with the camps beyond arranging payment of accounts for materials used.

The expenditure recorded was £5,362.

References: File: 23/720

Map: 1/A1 & 3

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1. Name of Work: Brigade Camps, Whangarei.
2. Locality: Within a seven mile radius of Whangarei.
3. Nature of Work: Erection of camps for a brigade of troops (1st Brigade).
4. References: File: PW 23/720 Map: 1/A14
5. History: Construction of a second series of brigade camps in North Auckland commenced in April, 1942, the sites (42) being selected by Army with the advice and assistance of officers of the Public Works Department. Building contractors organised by the Auckland Master Builders' Association co-operated actively with the Department in carrying out the work. As in the case of the Kaikohe camps, supplies of materials, including pre-fabricated huts, were arranged by the Department and distributed from a central depot at Kauri.

By the time the camps had been completed in October, 1942, a total of 2,633 buildings had been erected, while 55 miles of roads were formed and 38 water bores sunk.

A 30-bed field hospital was built at Maunu, Whangarei, at a cost of £6,894. This later became the nucleus of a children's health camp.

The headquarters of the 1st Division (of which the 1st and 12th Brigades formed a part) was also established at Whangarei. Two old residences were converted into officers' quarters, and new accommodation erected for other ranks and for administrative buildings. The work carried out by the Department at divisional headquarters cost £13,732.

After being vacated by New Zealand troops, some of the Whangarei brigade camps were occupied for a short period by US troops returned from the Pacific for rest and recuperation.

Including the field hospital and divisional headquarters, the total cost of the camps aggregated £228,809.

1. Name of Work: Military Camp, Kensington Park, Whangarei.
2. Locality: Kensington Park, Whangarei.
3. Nature of Work: Erection of accommodation for troops.
4. References: File: 23/525 Map: 1/A15
5. History: In September, 1940, the Department was requested to assist in making urgent preparations for the erection of a military camp on the race-course at Kensington Park, Whangarei. This was intended to be occupied for only a short period, but the park was not vacated by Army until February, 1944. It was normally used for race meetings, shows, sports, etc. and the existing buildings owned by the Racing Club and the A. & P. Society formed the nucleus of the military camp.

During the first three months of Army's occupation, something like £2,400 was spent on tents and huts, mess-rooms, cookhouses, recreation rooms, ablution and shower blocks, etc. A further programme of work was embarked on in December 1941, for the purpose of increasing the available accommodation and improving facilities for the training and comfort of the men.

The total expenditure incurred was £8,045.

The Whangarei Racing Club was paid a sum of £2,575 as compensation for the use of its property, while a settlement of £1,781.16.0 was authorised in favour of the A. & P. Society.

1. Name of Work: Brigade Camps, Warkworth.
2. Locality: Dispersed over an area of approximately five miles radius from Warkworth, bounded by Kaipara Flats in the west to Matakana in the east and from Dome Valley in the north to Gubbs' Farm in the south.
3. Nature of Work: Erection of 41 camps, dispersed over the area mentioned, to provide accommodation for a brigade of trained troops whose role would be to defend Auckland in the event of an enemy attack from the north. NB. An identical project was carried out simultaneously south of Auckland centring on Pukekohe and Papakura.

4. References: File: 23/824 Map: 2/A2

5. History: At the end of April, 1942, several senior Army Officers, accompanied by a public works architect, went to Warkworth and selected the sites of the various camps. These were laid out with due regard to aspect, water supply, drainage, and natural camouflage.

The scheme was designed to accommodate 5,000 men and comprised, as stated, 41 different camps. Altogether 1,714 buildings were erected, of a total area of 263,320 square feet, and, within 11 weeks from the commencement of the work, troops were in occupation. A 30-bed field hospital was built at Warkworth.

The Auckland Master Builders' Association arranged for a party of the smaller builders to proceed to the various sites as soon as these were ready and to erect temporary accommodation for their workmen. Supplies of materials in bulk were organised, most of same being sent by rail to Kaipara Flats station, where a large marshalling yard had been set up. This marshalling yard, which was controlled by the Public Works Department, enabled a continuous flow of materials to be maintained. Handling the materials at the Auckland end was dealt with

Brigade Camps, Warkworth (Cont'd).

by the Master Builders' Association.

Transporting the materials over such a widely scattered area called for careful organisation in order to conserve petrol and tyres.

Bulldozers and graders were kept busy forming access to sites and roading and grading the camp sites, a total of $8\frac{1}{2}$ miles of roads being formed. The nature of the country, the general inaccessibility of the sites, the wet weather conditions prevailing, and the de-centralisation of manpower and materials all contributed to an unusually difficult and trying job, but the work proceeded smoothly and rapidly, with the maximum co-operation from all concerned.

Besides the formation of roads, water had to be located and bores driven; long runs of drainage installed; electric power brought in and reticulated around the area; and many other services associated with the building programme carried out. Most of this was undertaken by the Public Works Department with its own forces, but above all the Department was responsible for supervising the activities of the numerous contractors engaged, and for the general organisation of the whole project - particularly transport by road, sea, and rail.

The class of construction known as phase one was adopted for the buildings, consisting of open-fronted shelters with concrete floors for messes, kitchens, stores, showers, etc., and 15 feet by 8 feet and 10 feet by 8 feet huts as sleeping accommodation for officers and men. This type of construction facilitated speedy erection, as everything was standardised and all timber was cut to the requisite lengths before delivery. Similarly, the huts were made in sections and bolted together.

Several joinery firms were awarded contracts for

the manufacture of huts (two-men and four-men), from templates supplied by the Department for the individual sections. This ensured quick construction, delivery, and erection, except, as in one instance, where two firms took it upon themselves to alter the templates, and a truck-load of hut sections arrived from each and were distributed to the camp sites. The sections would not, of course, fit (in some cases the bolt centres were as much as five inches out of alignment), and all had to be collected, sorted into their respective makes at the marshalling yard, and re-distributed.

It may be mentioned that the use of open-fronted shelters proved unsatisfactory, especially in exposed positions. For example, cooks had to try to prepare meals with wind and rain driving in on their ranges, while messes were often wet right to the back walls. This defect was overcome in later camps by building the huts in pairs, with an opening at each end.

The floors of all buildings other than huts were constructed in concrete. This was very desirable from a sanitary point-of-view, but became a liability when the camps were demolished, particularly in brigade camps at Warkworth, Whangarei, and Pukekohe, where the buildings were scattered around farm paddocks. Experience indicated that with camps of a temporary nature it would have been advisable to use a less permanent type of flooring.

The cost of the Warkworth brigade camps project amounted to £191,029. The camps were occupied entirely by New Zealand forces at first, but when the majority of these moved further north the Americans took possession, and the area became one of their main training establishments.

1. Name of Work: Military Camp, Avondale Race-course.
2. Locality: Avondale Race-course, Auckland.
3. Nature of Work: Conversion of existing buildings and erection of new ones.
4. References: File: 23/492 Map: 3/A15
5. History: Early in the war space beneath the grandstand of Avondale race-course was converted into mess-rooms, a kitchen, etc., while the totalisator building was used for sleeping quarters, augmented by tents. This was to provide quick accommodation for an artillery unit. Later, huts were erected and the camp divided into three sections. The main portion was occupied by Army personnel, another by the Navy for trainees awaiting postings to ships, and the third as a holding camp for prisoners-of-war.

The cost of the building work carried out by the Public Works Department amounted to £5,562.
The work was completed in December 1942.

* * *

Most of the work required at the other public parks, etc. occupied by Army in and around Auckland was undertaken by Army personnel, but at Cornwall Park, where the 5th Auckland Regiment and a portion of the ASC were accommodated, some phase one cook-houses and mess-rooms were built and a number of four-men huts supplied. At Gloucester Park, Waikaraka Park, Parnell Park, Alexandra Park, the Epsom Showgrounds, and elsewhere a certain amount of work was carried out by the Department but on nothing like the same scale as the more important military establishments.

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1. Name of Work: Brigade Camps, Pukekohe.
2. Locality: In an area south of Auckland, widely dispersed from Manurewa to Pukekohe.
3. Nature of Work: Provision of camp accommodation for a brigade of trained troops deployed for the protection of Auckland from the south.
4. References: File: 23/751 Map: 2/A11
5. History: In May, 1942, after suitable sites had been located giving good aspect, access, drainage, and water supply, a start was made on the construction of the second group of brigade camps near Auckland. The sites decided upon were not, of course, ideal and in many cases new roads had to be constructed, new water-bores driven, and entirely new drainage facilities provided. Of paramount importance in the siting of the camps were the twin principles of dispersal and camouflage: military orderliness and precision were ignored, the huts being erected in irregular pattern along rows of trees or half hidden under boundary hedges.

There were 11 camps in all, viz: Grand Vue, Orford's, Opaheke East, Opaheke West, Hilldene, Karaka North, Paerata, Roosevelt, Pukekohe Race-course, Manurewa, and Helvetia. The sites ranged from the grounds of private homes, a race-course, and a college to (at Helvetia) an old ostrich farm, complete with ageing barns and lofts still containing mute evidence of an industry which had been abandoned long before the first World War.

Throughout May, June, and July, 1942, departmental officers supervised the construction of the camps - arranging supplies of materials, organising teams of workers, prospecting for water, and generally ensuring that the work proceeded smoothly and expeditiously. A field hospital was erected at Paerata.

Before the camps had been completed, it had been decided to make them available to the US Marine Corps for

Brigade Camps, Pukekohe (Cont'd).

accommodation of a portion of the 37th Division, and the Americans took possession as soon as the camps were ready. The same Division also entered into occupation of the brigade camps in the Warkworth area.

Writing to the District Engineer at Auckland on 8 July 1942 the Engineer-in-Chief commented as follows on the camps in the Papakura-Pukekohe area:

'I have perused with great interest your memo 8/89/19 of the 20th ulto, enclosing a report on the construction of the above camps, together with sketch plans and details of the organisation set up to cope with this urgent work.

'The arrangements made and the organisation set up reflect great credit on the officers concerned, and I should be glad if you would convey to them my personal congratulations on the splendid work which they have carried out in record time.'

The 2,182 different buildings erected covered a floor area of 279,320 square feet, and provided accommodation for 7,460 troops.

The total expenditure on the Pukekohe brigade camps amounted to £163,627.

The work was completed in March, 1943.

Although the brigade camps in both the Warkworth and Pukekohe areas were occupied by the US Forces, they have been included in this section of the War History because their construction was originally authorised for use by the Dominion's own troops and they were thus not specifically 'works for the US Forces.'

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SOME OF THE BRIGADE CAMPS OCCUPIED BY THE U.S. FORCES IN THE PUKEKOHE AREA.

TOP ROW (L TO R): PUKEKOHE RACE-COURSE, HELVETIA, PAERATA,

LOWER (L TO R): HILLDENE, KARAKA NORTH, MANUREWA.

1. Name of Work: Military Camp, Claudelands.
2. Locality: Claudeland Showgrounds and Race-course, Hamilton.
3. Nature of Work: Provision of accommodation for troops.
4. References: File: 23/519 Map: 2/A15
5. History: In December, 1941, Army entered into occupation of the showgrounds and race-course at Claudelands. Use was made of the existing buildings, but a number of others were erected by the Department and the usual engineering services carried out.

The rental agreed to was £1,500 per annum (£800 in respect of the A. & P. Association's property and £700 for the use of the Waikato Trotting Club's course and buildings).

The Trotting Club portion of the grounds was vacated in June, 1943, but possession was retained of most of the showgrounds until nearly the end of the war. Four Army huts and 23 lavatories were handed over to the A. & P. Association in partial settlement of their claim for rental and reinstatement of their property.

The total expenditure by the Department was £5,388.

1. Name of Work: Military Camp, Tauranga Race-course.
2. Locality: Tauranga Race-course.
3. Nature of Work: Provision of accommodation for troops.

4. References: File: 23/662 Map: 5/A1

5. History: The Bay of Plenty Racing Club's race-course and buildings at Tauranga were occupied by Army in January, 1942. Between that date and the end of the following year, when the property was vacated by Army, a considerable quantity of work was carried out by the Department.

Existing buildings (grandstand, horse boxes, and outbuildings) were converted to suit requirements, while two large mess huts (accommodating 200 men each) were supplied and erected at a cost of £3,000, together with drying rooms, laundry and ablution blocks, a dental hut, and other camp buildings. Water and electricity were reticulated and drainage and sanitary facilities installed. Materials were supplied for the erection by Army personnel of a number of smaller structures.

At one time well over 1,000 men were accommodated in the camp.

The total expenditure by the Public Works Department amounted to £6,493.

No rental or other payment was made in respect of the use of the race-course, the Racing Club being content to accept a refund of rates and insurance premiums.

1. Name of Work: Military Camp, Rotorua Race-course.
2. Locality: Rotorua Race-course, Arawa Park.
3. Nature of Work: Conversion of existing buildings and provision of additional accommodation for troops.
4. References: File: 23/420 Map: 5/A2
5. History: Prior to the war Arawa Park was used periodically as a territorial training camp. The existing training facilities were converted during 1940 into a more permanent camp, and in 1941 further extensions were carried out for the purpose of establishing a remedial training centre to accommodate approximately 900 men. When the necessity for remedial training had lessened, in 1943, the camp became a re-equipment and rest base for US Forces returned from active service in the South Pacific. About 600 Americans were located there. Later, the camp was again used by New Zealand troops.

The programme of work carried out consisted of the provision of hatted accommodation for a maximum of 1,000 men. Existing buildings were converted into mess-rooms and offices, together with the usual ablution and sanitary conveniences. New buildings were erected as required, including mess-rooms, stores, and a hospital. The parade area and access roads were sealed.

The work was completed in July, 1944, at a cost of £15,447. Restoration of the property and payment of compensation for its occupancy by the Armed Forces involved a further expenditure of some £4,500. It may be mentioned incidentally that soldiers undergoing remedial treatment carried out a good deal of work which resulted in permanent improvements to Arawa Park.

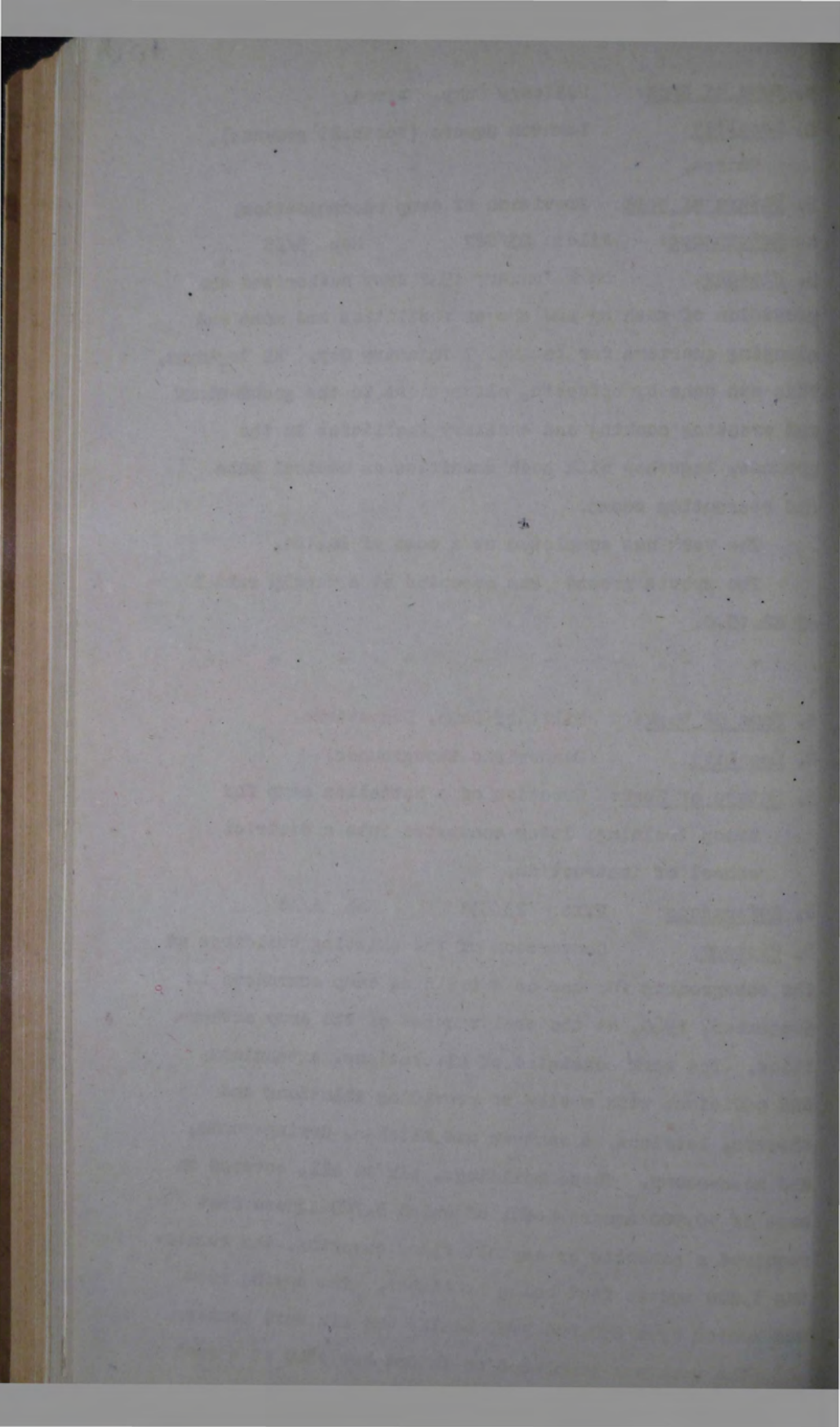
1. Name of Work: Military Camp, Wairoa.
2. Locality: Lambton Square (Football grounds), Wairoa.
3. Nature of Work: Provision of camp accommodation.
4. References: File: 23/827 Map: 5/A5
5. History: On 6 January 1942 Army authorised the provision of washing and shower facilities and mess and sleeping quarters for the No. 7 Infantry Coy., HB Regiment. This was done by effecting alterations to the grand-stand and erecting cooking and sanitary facilities in the grounds, together with such amenities as medical huts and recreation rooms.

The work was completed at a cost of £4,181.

The sports ground was occupied at a weekly rental of £2.10.0.

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1. Name of Work: Military Camp, Dannevirke.
2. Locality: Dannevirke Showgrounds.
3. Nature of Work: Erection of a battalion camp for troop training: later converted into a district school of instruction.
4. References: File: 23/531 Map: 5/A8
5. History: Conversion of the existing buildings at the showgrounds for use as a training camp commenced in September, 1940, at the oral request of the Army authorities. The work consisted of alterations, extensions, and additions with a view to providing ablutions and showers, latrines, a canteen and kitchen, drying-rooms, and mess-rooms. These buildings, six in all, covered an area of 10,900 square feet, of which 9,700 square feet required a concrete or asphalt floor covering, the remaining 1,200 square feet being of timber. The drying room was heated by a 250,000 BTU boiler and six unit heaters. The work was completed on 14 October 1940 at a cost



Military Camp, Dannevirke (Cont'd).

of £2,781.

On 25 August 1941 Army advised that the battalion camp was to be transferred to Woodville, and the Dannevirke showgrounds camp put into use as a central district school of instruction. This entailed the provision of additional buildings and further structural alterations to the existing buildings.

Accommodation for 200 men was made available by the transfer of 100 huts from the Waikokopu-Gisborne Railway at a cost of £1,400. Other buildings erected were unit stores, an armoury, a kitchen, a butcher's shop, officers' showers, lecture rooms, dormitories, a regimental aid post, and a canteen. Altogether, 34,840 square feet of space was provided - 8,000 by the huts, 4,600 square feet of new buildings, and 22,240 square feet by the conversion of existing structures, including a 12,000 square foot drill hall.

The total cost of alterations, additions, etc. necessary to convert the camp to a school of instruction was £6,545. The programme involved the use of 50,000 super feet of timber. The work was completed in February, 1943.

No rental was charged for the use of the showgrounds, the Dannevirke A. & P. Association agreeing to take over improvements valued at £2,334 in lieu of compensation for damages, etc. arising out of Army's occupation of their property.

1. Name of Work: Military Camp, Woodville Race-course.
2. Locality: Woodville Race-course.
3. Nature of Work: Construction of a battalion training camp.
4. References: File: 23/548 Map: 5/49
5. History: Arising out of the conversion of Dannevirke Camp into a central district school of instruction, Army on 29 April 1940 authorised the establishment of a battalion training camp at Woodville race-course. The work requested comprised alterations to nine existing buildings covering an area of 14,200 square feet, and the erection of ten new buildings having 2,860 square feet of concrete flooring. These buildings were constructed on a cost plus a fixed sum basis, the work commencing on 10 December 1941.

In all, 63,600 super feet of timber were used, together with 15 tons of cement, 70 cubic yards of shingle, 2,500 bricks, and 3,000 square feet of malthoid. Four 400-gallon supply tanks, two 300-gallon cylinders, a 600-gallon mixing tank, and a 250,000 BTU boiler were installed to provide a hot water system. To ensure an adequate water supply for the camp, a pumping plant was installed at the intake of the borough supply system, to boost the supply through the mains. A 45 HP Diesel engine with a belt drive to a centrifugal pump was erected and maintained a continuous supply of 130,000 gallons per day, which was ample for both Woodville borough and the camp.

A length of 30 chains of road was constructed, involving the use of 450 cubic yards of shingle.

Electric power was provided by the borough council.

The work was completed during March, 1942.

The total cost of establishing the camp, including the pumping station, was £7,125.

Restoration of the race-course after its vacation by Army in January, 1943, cost the Crown £2,105 which

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Military Camp, Woodville (Cont'd).

included a payment of £57.5.6 made to the Woodville A. & P. Association in respect of the use of a large building owned by it. No rental was charged for the use of the race-course or buildings.

1. Name of Work: Military Camps, Wanganui District.
2. Locality: (1) Wanganui Race-course (2) Spriggen's Park (3) Waverley Race-course.
3. Nature of Work: Providing accommodation for the training of troops.
4. References: File: 23/515 & 23/530 Map: Wanganui Race-course 4/A8
Spriggen's Park 4/A9
Waverley Race-course 4/A7
5. History: Instructions were received in July, 1940, to proceed speedily with the conversion of the Wanganui race-course and the Rugby Union grounds (Spriggen's Park) into establishments for the training of about 800 troops. The work involved included the provision of hot and cold showers, drainage, the installation of extra water supplies, and the erection of cook-houses, ablution stands, wash-up stands, and a drying room, etc. The camps were occupied by Army in October, 1940, the expenditure incurred on both of them being approximately £5,300.

In October, 1940, the grounds and buildings of Waverley race-course were fitted up as a camp for one battalion of infantry at a cost of £2,200.

Seventeen thousand super feet of timber were used on these three camps in the Wanganui district, of which 10,000 super feet came from the wrecked 'Port Bowen'.

Restoration of the Wanganui race-course and football grounds cost £6,500, including compensation settlements, but this amount was offset to some extent by the sale of salvaged materials.

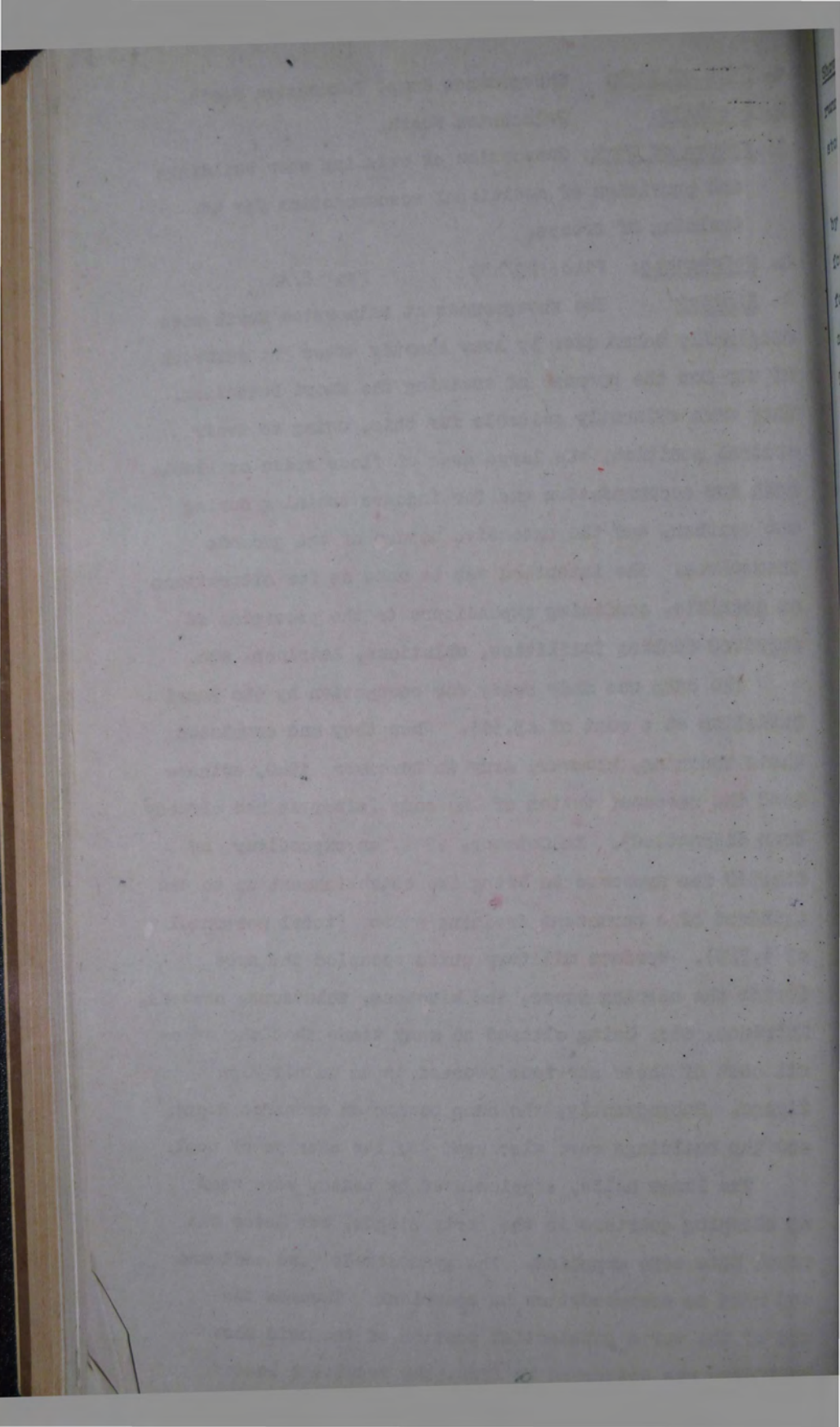
1. Name of Work: Showgrounds Camp, Palmerston North.
2. Locality: Palmerston North.
3. Nature of Work: Conversion of existing show buildings and provision of additional accommodation for the training of troops.

4. References: File: 23/489 Map: 6/A4

4. History: The showgrounds at Palmerston North were originally taken over by Army shortly after the outbreak of war for the purpose of training the Maori Battalion. They were eminently suitable for this, owing to their central position, the large area of floor space available both for accommodation and for indoors training during wet weather, and the extensive nature of the grounds themselves. The intention was to make as few alterations as possible, confining expenditure to the provision of improved cooking facilities, ablutions, latrines, etc.

The camp was made ready for occupation by the Maori Battalion at a cost of £3,511. When they had completed their training, however, Army in December, 1940, authorised the re-constitution of the camp (after it had already been dismantled). In October, 1941, an expenditure of £14,000 was approved to bring the establishment up to the standard of a permanent training cadre (total personnel of 1,325). Various military units occupied the area during the ensuing years, the kitchens, ablutions, showers, latrines, etc. being altered so many times that the overall cost of these services mounted to an unduly high figure. Subsequently, the camp became an ordnance depot, and the buildings were also used for the storage of wool.

The large halls, supplemented by tents, were used as sleeping quarters in the early stages, but later the usual huts were supplied. The grandstands were enclosed and used as accommodation on occasions. Towards the end of the war a substantial portion of the main show buildings was destroyed by fire, the resultant loss



Showgrounds Camp, Palmerston North (Cont'd).

running to about \$20,000, not counting the value of stores and equipment contained in them.

Most of the cooking and water heating was done by gas. Although the existing water supply was adequate for cooking and ablutions, it was necessary to extend a four inch main through the camp to give good fire cover and to provide water for the washing of vehicles. The existing sewerage facilities also required to be extended.

When the final work had been carried out in the latter half of 1944, the expenditure incurred by the Department reached a total of \$39,404.

1. Name of Work: 4th Division Camps, Palmerston North.
2. Locality: Palmerston North Area.
3. Nature of Work: Erection of camp accommodation.
4. References: File: 23/814 Map: 6/A2
5. History: In August, 1942, Army authorised the provision of camp accommodation in the Palmerston North area for new units attached to the 4th Division.

Four of these were located in and around Feilding (known as the Race-course, Main Road, Golf Links, and Aorangi camps) one at Levin race-course, and another at Brightwater Terrace, Palmerston North.

The work consisted of providing the usual phase one class of camp buildings (huts, mess-rooms, kitchens, stores, offices, ablutions, etc.) complete with roading, drainage, sewerage, water and electricity, fencing, and other necessary engineering services. Where available, as at the race-courses, existing accommodation was brought into use.

In some cases the camps were connected to existing water supply and sewerage facilities; in the absence of these, artesian wells were sunk and pit latrines provided. Extensive areas were metalled for the use of tanks and motor vehicles.

The work was given high priority and was completed within a few months.

The total expenditure was as follows:

Feilding camps	:	£45,379
Levin race-course	:	35,598
Brightwater Terrace, Palmerston North	:	4,546
		<u>£85,523</u>



TYPICAL CAMPS ON OR ADJACENT TO GOLF COURSES IN THE
MANAWATU.

HOKOWHITI

BELOW: PALMERSTON NORTH.

1. Name of Work: Brigade Camps, Manawatu.
2. Locality: Palmerston North Area.
3. Nature of Work: Erection of camp accommodation.
4. References: File: 23/716 Map: 6/A3

5. History: The erection of a number of camps to accommodate units of the 2nd Brigade Group in the Manawatu district was authorised by Army in May, 1942. Of those, the two largest were at Hokowhitu and on the Awatapu golf links - both located on the outskirts of Palmerston North.

The usual phase one type of hatted accommodation was provided, together with the necessary engineering services.

At Hokowhitu, a vacant city reserve, water and electricity supplies were readily extended to the camp. Pit type latrines were constructed. Ablution and kitchen waste was piped clear of the camp and disposed of by soakage. Large areas were metalled for the parking of motor vehicles. This camp was later used for transit housing by the City Council.

A complete sewage system was installed at Awatapu, draining to a holding tank from which it was pumped to the city system. City water was extended to each company area. Owing to the dispersed nature of the camp, the cost of roading, and paths was substantial. The clubhouse was converted into an officers' mess.

Smaller camps were erected on Johnston Park, Peilding, and in Park Road and on the Esplanade, Palmerston North. Brigade headquarters were located in South Street, Palmerston North.

The work was completed by the end of July, 1942.

Expenditure incurred by the Department was as follows:

Hokowhitu	:	£7,200
Awatapu	:	10,200
Other camps	:	9,930
		<u>£27,330</u>

The first thing I noticed when I stepped out of the car was the cold. It was a sharp contrast to the warm blanket of the car. I looked around, trying to get my bearings. The street was empty, the only sound being the distant hum of traffic. I felt a sense of isolation, a feeling that I was alone in a vast, unfamiliar world. The air was crisp and clear, and I could see the stars in the night sky. It was a beautiful sight, but it also made me feel even more alone. I took a deep breath, trying to steady my nerves. I knew I had to find my way to the hotel, but I didn't know which way to go. I started walking, my feet hitting the cold pavement. I felt a sense of purpose, a determination to find my way. I walked for what felt like hours, my legs growing tired and my head spinning. I was lost, completely and utterly lost. I had no idea where I was, and I had no idea how to get back. I was alone in a strange, cold world, and I was completely alone.

1. Name of Work: Military Camp, Ashhurst Race-course.
2. Locality: Ashhurst Race-course.
3. Nature of Work: Alterations to existing buildings and provision of new accommodation.
4. References: File: 23/873 Map: 6/A1
5. History: In July and August, 1942, the Public Works Department carried out alterations to the race-course buildings at Ashhurst and erected a number of new buildings in order to provide accommodation for an Army unit (2nd ASC Coy.).

The grandstand was converted into a men's mess, the stewards' stand became an officers' mess and quarters, while the totalisator was adapted for use as a QM store. Stables, etc. were used as stores. New buildings provided included a large shower and laundry block, an ablutions block, a sergeants' mess, ammunition stores, and a petrol store.

As the race-course water supply was inadequate, an artesian well was sunk and water from it pumped into tanks at the camp site. Septic tanks were used, the effluent being disposed of into a nearby swamp. Extensive areas of land were metalled.

During the period of Army's occupancy of the race-course, a fire destroyed some of the buildings. Compensation for this loss and for damages to the property generally involved the Crown in a claim which was ultimately settled at £1,343.

The cost of the work carried out by the Department on Ashhurst race-course amounted to £6,026.

1. Name of Work: Military Camp, Foxton Race-course.
2. Locality: Foxton Race-course.
3. Nature of Work: Alterations to existing buildings and provision of new accommodation.
4. References: File: 23/532 Map: 6/49
5. History: Foxton race-course was occupied by Army in October, 1940. The existing buildings were altered to meet military requirements, the only new structures erected being a large kitchen and an ablutions block. Pit latrines were constructed in the early stages, but water and sewer mains were later extended to the camp, and electric power laid on.

The cost of the work carried out by the Department amounted to £4,804. The property was vacated by Army in December, 1943.

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1. Name of Work: Military Camp, Awapuni Race-course.
2. Locality: Awapuni Race-course, three miles south of Palmerston North.
3. Nature of Work: Alterations to existing buildings and provision of new accommodation.
4. References: File: 23/175 Map: 6/18
5. History: Between November, 1941, and January, 1942, the race-course buildings at Awapuni were converted into accommodation for troops. The grandstands, supplemented by tents, were used as sleeping quarters. A combined ablution and laundry block was erected, also temporary ablution facilities and latrines. A 30-bed field hospital was also built.

The existing artesian water supply, with some additional reticulation, proved adequate, and minor extensions only were necessary to the Racing Club's sewerage system.

Expenditure incurred by the Department totalled

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TYPICAL RACECOURSES OCCUPIED AS MILITARY CAMPS.

TOP LEFT: ROTORUA

RIGHT: LEVIN

LOWER LEFT: DANNEVIRKE

RIGHT: AWAPUNI



were installed.

Metalling of roads and tracks in the camps was carried out partly by the Public Works Department and partly by the troops themselves.

The locations of the various camps and the units occupying them were as follows:-

Camp.	Unit.
Memorial Park, Masterton.	8th Field Ambulance 1st Hawkes Bay GVP.
Solway Showgrounds, Masterton.	1st Ruahine.
Opaki Racecourse & adjoining properties	9th AFV. 58th LAD.
Rayner's Farm, Mt. Bruce Road,	5th ASC.
Carterton Showgrounds.	7th Brigade Headquarters.
Olanyille Racecourse.	22nd Field Coy. 4th Provost Coy.
Youle's Farm, Taratahi.	MT Park.
Booths Farm, Carterton.	2nd Wellington Regiment.
Cemetery Reserve, Greytown.	10th Field Ambulance 4th MAC.
Walls Farm, Greytown.	5th Motor Ambulance Convoy.
Tauherenikau Racecourse.	1st Scottish.
Borthwicks, Tauherenikau.	12th Field Regiment 23rd AF Battery.
Donalds Farm, Tauherenikau.	MT Park.
Featherston Camp.	Queen Alexandra's Mounted Regiment. 5th Reserve MT Coy.
Flat Point.	Coast Watching Station.

Buildings in Masterton and Featherston were also taken over for use as stores, etc.

At the end of 1942 the 7th Brigade was withdrawn. Memorial Park and Solway showgrounds camps at Masterton were then occupied by the US Marine Corps for a further year, while the Featherston camp was converted into a prisoner-of-war camp.

Brigade Camps, Wairarapa (Cont'd)

The total expenditure by the Department on the Wairarapa brigade camps, including the cost of dismantling the camps and reinstating damage to private property, was nearly £50,000.

1. Name of Work: Brigade Camps, Blenheim Area.
2. Locality: Spring Creek : Tua Marina : and Lansdowne Park, Showgrounds, and Waterloo Park, Blenheim.
3. Nature of Work: Conversion of existing buildings and erection of new accommodation for units of the 11th Brigade.
4. References: File: 23/112/17 Map: 9/A8
5. History: A series of camps were hurriedly erected in the Blenheim area to provide dispersed accommodation for troops mobilised following Japan's entry into the war. The selection of sites was in most cases influenced by the availability of existing buildings which could be converted for Army use quickly and cheaply.

Blenheim race-course was taken over in the latter half of December, 1941, and eight-men huts, mess-rooms, latrines, etc provided to supplement the existing buildings. Other camps followed as more and more troops were drafted to the district.

The work was carried out chiefly by one contractor. It was of a sporadic nature, and was spread out over a period of about 12 months. The District Engineer acted on direct requests from Southern Military District.

The total expenditure recorded by the Department was £16,800.

1. Name of Work: Brigade Camps, Canterbury.
2. Locality: Race-courses at Rangiora, Motukarara, New Brighton, Addington, Riccarton, Hororata, Ashburton, and Washdyke, showgrounds at Addington, Ashburton, and Timaru; Lancaster Park, Christchurch; and Rakaia and Woodons Domains.
3. Nature of Work: Conversion of existing buildings and provision of new accommodation for troops.
4. References: See below.
5. History: Although some of the properties mentioned above were occupied by Army earlier in the war for various purposes (e.g. Rangiora, Addington, Riccarton, and Washdyke race-courses in 1940 and 1941), the principle use to which they were put was as camp accommodation for brigade and divisional units following general mobilisation of the territorial forces towards the end of December, 1941.

In practically all cases the existing buildings were readily convertible into administrative offices, stores, mess-rooms, and, to some extent, sleeping quarters. Additional sleeping accommodation was provided in the form of pre-fabricated huts. With the erection of cookhouses, ablutions, and lavatories complete camps were made available quickly and economically. Moreover, the drain on building materials and manpower was eased considerably, and the restricted activities of such bodies as racing clubs were not seriously interfered with, as sufficient race-courses remained for meetings to carry on right through the war.

Water supply, sewerage, and electricity facilities were already laid on, and only needed extending to meet the increased requirements arising out of occupation by troops. Where necessary, new wells were driven for water or larger pumps installed; additional septic tanks or soak pits were constructed; and the electrical

Brigade Camps, Canterbury (Cont'd).

reticulation was strengthened or expanded - considerably so at country race-courses. Roads also had to be strengthened in many cases and a certain amount of new roading carried out.

Generally speaking, racing clubs and similar bodies were content to accept a refund of actual outgoings (rates, insurance premiums, etc.) on their properties plus, of course, compensation for any loss or damage incurred. For instance, the destruction by fire of the new grandstand on the Ashburton race-course during Army's term of occupancy involved the Government in a payment of £5,000. The outgoings on properties such as Lancaster Park, Christchurch, and the Addington showgrounds were substantial (£15 per week and over £2,000 per annum, respectively) but nowhere near their real rental value.

Some of the race-courses and showgrounds, etc. were used merely as transient camps for comparatively short periods by small numbers of troops. Others became semi-permanent establishments and remained in commission for the greater part of the war. The extent of their use for military purposes is reflected in the following expenditure figures.

<u>Name of Property</u>	<u>File ref.</u>	<u>Map ref.</u>	<u>Expenditure</u>
Hororata race-course	23/591	10/A6	£24,307
Addington showgrounds and race-course	23/512	11/A5	15,344
Riccarton race-course	23/554	11/A3	14,636
Ashburton showgrounds	23/590	10/A17	10,270
Ashburton race-course	23/590/1	10/A17	9,667
Weedons domain	23/859	10/A8	7,928
Lancaster Park	23/769	11/A4	6,519
Washdyke race-course	23/515	10/A19	5,608
Timaru showgrounds	23/878	10/A21	5,516
Rakaia domain	23/592	10/A14	4,762
New Brighton race-course	23/516	11/A2	4,054
Rangiora race-course	23/498	10/A3	3,225
Motukarara race-course	23/448	10/A13	762

1. Name of Work: 'Armoured Fighting Vehicles' Camp
Harewood.
2. Locality: Harewood Golf Links, Christchurch.
3. Nature of Work: Provision of camp and workshops
accommodation.
4. References: File: 23/877 Map: 10/47
5. History: A camp for an AFV squadron was established on the Harewood golf links in October, 1942.

A number of buildings were required, including ablutions, stores, etc., also a workshop for the repair and maintenance of tanks. Sleeping quarters were provided in the form of eight-men huts.

About 20 chains of roading were constructed.

A two inch well was driven and the water from it pumped into a storage tank of 3,000 gallons capacity, whence it flowed by gravity throughout the camp.

Sewerage was by way of earth closets, while the free, gravelly nature of the soil allowed drain water to be disposed of by seepage.

Electricity was laid on from the power lines passing the camp.

In the interests of camouflage, the camp buildings were erected amongst trees over a dispersed area.

The total expenditure incurred was £14,337.

1. Name of Work: Military Camp, Wingatui Race-course.
2. Locality: Wingatui Race-course, nine miles south of Dunedin.
3. Nature of Work: Conversion of existing buildings for the accommodation of troops.
4. References: File: 23/521 Map: 13/43
5. History: In August, 1940, Army requested that Wingatui race-course be fitted up as a camp for early occupation by territorials.

All existing buildings were adapted for use, supplemented by the erection of showers and ablution benches under the stands, and additional cooking facilities. Sleeping quarters were in the form of bell tents, with pre-fabricated wooden floors (120 of these were provided). As the existing electricity supply proved insufficient to carry the extra loading, heavier overhead lines were run from the mains to the switchboard and thence to the various buildings.

Most of the work was carried out by the Department with its own forces.

Later, it became necessary to add to the existing lavatory facilities, as trouble was being experienced with the septic tanks. A dry pan lavatory block was erected.

When the personnel to be accommodated increased to about 1,000 early in 1942, further buildings were constructed; minor alterations and additions were, indeed, required almost continuously during Army's period of occupancy owing to fluctuations in the numbers of men encamped at Wingatui.

A total expenditure of £6,037 was recorded.

No charge was made for the use of the Racing Club's property.

1. Name of Work: Fortress Camps, Bay of Islands.
2. Locality: Russell, Opuia, Waitangi, and Paihia.
3. Nature of Work: Erection of camps for fortress troops.
4. References: File: 23/840 Map: 1/49
5. History: In September, 1942, the construction of a series of camps in the Bay of Islands fortress area was authorised. The usual phase one buildings were erected - huts, stores, canteens, kitchens, mess-rooms, ablutions and showers, etc., supplemented where possible by the taking over of existing premises. At Paihia, for instance, a number of sea-side residences were occupied.

The bulk of the work was carried out by contract, under the master schedule system.

Water was obtained either by bores or by connecting with local supplies. At Russell a 30,000 gallon circular concrete reservoir was constructed.

Drainage and sewerage facilities were provided as required, also a certain amount of access roading, including a link between the main Russell Road and Tapu Point (opposite Opuia).

An important new road was formed, connecting Kawakawa and Paihia by a through route across difficult country. This reduced the distance between Opuia and Kawakawa by about ten miles and at the same time enabled Paihia to be reached from Opuia by a direct route along the coast. The initial survey, location, and formation work was carried out by an aerodrome construction unit (for which a camp at Opuia was built by the Department) and was taken over and completed by the Department between October, 1942, and April, 1944, at a cost of £36,012. Altogether, 11 miles of road, 18 feet wide, were constructed. The new road later became a very popular route for visitors to the Bay of Islands.

Expenditure on the fortress camps totalled £38,492. They were completed in February, 1943.

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1. Name of Work: Fortress Camps, Great Barrier Island.
2. Locality: Great Barrier Island.
3. Nature of Work: Erection of three camps for fortress troops.

4. References: File: PW 23/535 Map: 2/A1

5. History: A coast watching station was established for Army on Great Barrier Island following the outbreak of war. In June, 1942, Army requested that the accommodation be extended by the construction of new camps at (1) the aerodrome, (2) Fitzroy Wharf, and (3) the 'mountain', Fitzroy. The usual phase one buildings were required, such as cookhouses, mess-rooms, ablutions, stores, etc., and normally the provision of these would have been a simple and comparatively inexpensive matter.

As with other island projects, however, the delivery of materials was attended with serious difficulties. These had to be loaded on to barges, hauled long distances by water, unloaded on to beaches, and then carried up to the sites. At one site near the southern entrance to Port Fitzroy the barges were run on to a steeply sloping beach at high tide and shingle, steel, etc. dumped over the side into the water. Later, when the tide had receded, the shingle was bagged and along with the steel and other water-proof goods hauled up the face of a cliff with a winch. Timber, cement, and similar materials which could not be immersed in water were hauled up direct from the barges. From the top of the cliff the supplies would have to be transported to the building sites, sometimes involving the use of pack-horses. On other occasions it would be necessary to send a bulldozer ahead to cut a track from the beach or landing place.

The bulk of the work on Great Barrier Island was carried out between July and December, 1942. It cost a total of £16,760.

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CAMP AT PAREMATA.



WAAC CAMP, MIRAMAR, WELLINGTON.



CAMP NEAR BLENHEIM HOSPITAL.

1. Name of Work: Fortress Camps, Wellington Fortress Area.
2. Locality: Wellington and environs (see below).
3. Nature of Work: Erection of camp accommodation for fortress troops.
4. References: See below.
5. History: Following the general mobilisation of the Territorial (home defence) Force in December, 1941, a series of camps was established in the Wellington Fortress Area.

Khandallah. (File: 24/3071 & 23/627 Map: 8/A1)

Fortress headquarters were located in a house at 83A Jubilee Road, Khandallah. The construction of a phase one camp in the same street was authorised in May, 1942, comprising cookhouse and mess buildings, ablutions and showers, stores, an orderly room, a YMCA hut, etc. of a total floor area of 2,700 square feet. Twenty four-men huts were provided for sleeping quarters. This camp was adapted for the accommodation of WAACs at the end of 1943. Expenditure amounted to £10,249.

In March, 1942, a camp for 150 men was built on Nairnville Park, Old Porirua Road, Khandallah, for an Army signals unit. A football gymnasium was taken over and converted into a cookhouse and mess, while phase one buildings were erected for stores, a battery room, an instrument room, a motor cycle shelter, laundry and drying rooms, and ablution blocks, etc. Portable huts were used for sleeping quarters.

Most of the buildings were constructed on sidling ground, necessitating the excavation and drainage of sites. Roads and paths were formed and metalled. Water, sewerage, and electrical services were drawn from the city systems.

In August, 1943, additional accommodation for 30 WAACs was provided.

To permit the signals unit to carry on during an

Fortress Camps, Wellington (Cont'd).

enemy attack, semi-underground shelters were built at the camp and at Rangoon Road. A tunnel shelter consisting of two chambers each 100 feet long by 18 feet wide, together with 210 feet of approach tunnels, six feet wide, was excavated near Woodmancote Road.

The total cost of all work carried out was £23,540.

Hataitai. (File: 23/618

Map: 8/A13)

Wellington College and grounds had been occupied by the 1st Wellington Regiment in December, 1941. To enable this property to be released, a camp was established on Hataitai Park, Ruahine Street in March, 1942. A gymnasium and other buildings on the park were taken over by Army, while three latrine blocks, four shower and ablution blocks, a laundry and drying room, and four cooking shelters were erected by contract. Portable huts were supplied for sleeping quarters. Later, ten mess-rooms were added, together with three extra cookhouses and food stores, etc. Water, sewerage, and electricity were provided by connecting to the city systems.

In September, 1943, a portion of the camp was converted into accommodation for defence workers, the remainder being retained by Army until it was demolished in September, 1944.

The expenditure incurred totalled £17,189.

Johnsonville. (File: 23/658

Map: 7/A7)

Two canvas camps were set up in Johnsonville immediately upon general mobilisation in December, 1941 - one at the old Johnsonville School (for the 13th Field Ambulance) and the other (of battalion strength) on the recreation ground and on adjoining properties.

The construction of a hutted camp on the recreation ground was authorised in April, 1942. Three groups of buildings were erected under contract, each comprising

Fortress Camps, Wellington (Cont'd).

cooking shelters, mess-rooms, laundry and drying rooms, showers and ablutions, sleeping huts, and other facilities for the accommodation of a complete company of fortress troops. Buildings for QM and ration stores, for dental and medical huts, and for a canteen were also erected. The work was finished by October, 1942.

In July, 1942, similar steps were taken to convert the Field Ambulance camp from canvas to buildings. A 20-bed hospital was contemplated, but owing to the improving situation in the Pacific this was not proceeded with.

The question of supplying water to both camps gave cause for concern right from the start, since the Johnsonville township supply was barely sufficient for the civilian population. Test wells were sunk near the battalion camp but all proved unsatisfactory, and after several proposals had been investigated the problem was eventually solved by laying a new main from the city system at Khandallah. At the ambulance camp well water was used for laundry and car washing purposes.

The battalion camp was later occupied for a short time by units of the US Forces.

The cost of both camps amounted to £31,511.

Porirua: (File: 23/678

Map: 7/A5)

The 3rd Wellington Battalion was encamped in tents in the Porirua area for several months, until in April, 1942, authority was given to build a phase one camp. The site was near the Porirua Railway Station. With the aid of contractors, a camp of battalion strength was quickly erected, consisting of cookhouses, mess-rooms, a canteen, stores, workshops, laundries, drying rooms, ablutions, etc., as well as numbers of two- and four-men huts.

Water was obtained from a creek in the hills behind the camp, but at times this proved inadequate. After

several trial wells had been driven in an endeavour to find an auxiliary supply, a satisfactory one was located and the necessary pumping equipment ordered. However, the number of men in camp began to fall off, and no further action needed to be taken to augment the existing water supply. Septic tanks were installed for sewage disposal.

Roads and tracks in and around the camp area were formed and metalled. Associated with this work was the provision of metalled vehicle parks at various localities in the district.

In February, 1943, additional land adjoining the camp was taken over for use as a vehicle parking depot.

The Porirua camp eventually became the temporary home of artisans engaged on the reconstruction of the mental hospital.

Expenditure on behalf of Army was £13,142.

Newtown: (File: 23/711/36 Map: 8/A12)

A canvas camp at Nairn Street Park, Newtown, for breeding and training pigeons had been in existence for some time when the Department was requested in September, 1942, to proceed with the construction of more permanent accommodation. Ablutions and latrines were the first requirement, followed by cookhouses, mess-rooms, stores, boiler rooms, laundries, and drying rooms. All these covered a total floor area of some 10,000 square feet. Sleeping huts for up to 500 men were provided. A heating system was installed, roads and paths were formed and metalled, and water, sewerage, and electrical services brought in by connecting to the city systems.

Pigeon lofts, holding boxes, carrying boxes, tossing boxes, etc. were also built.

In July, 1943, the camp was extended by the erection of buildings to accommodate WAACs. Later still, a store

Fortress Camps, Wellington (Cont'd).

and a number of huts were transferred from Johnsonville.

The expenditure incurred aggregated £4,512.

Miramar. (File: 23/112/4 Map: 8/A16)

A camp for seven men and 26 WAACs was erected urgently in April, 1943, on the Polo Grounds, Miramar. The existing dressing shed served as a nucleus, after alterations and extensions had been carried out, while a new building was provided for a plotting room, etc. Portable huts were supplied for sleeping quarters.

The cost amounted to £2,351.

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Summarised, the eight fortress camps erected in the Wellington area accounted for a total expenditure of £102,494.

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TYPICAL FORTRESS CAMPS IN THE WELLINGTON DISTRICT.
TOP LEFT: PORIRUA, With Mental Hospital in background
RIGHT: JOHNSONVILLE LOWER: HATAITAI PARK, WELLINGTON,
 With Mt. Victoria and a portion of the Harbour and City in
 background

1. Name of Work: Fortress Camps, Sumner-Lyttelton Area.
2. Locality: Redcliffs Rifle Range; Sandilands, Sumner; and Cooke's Farm, Mt. Pleasant.
3. Nature of Work: Erection of camp accommodation for fortress troops.
4. References: File: 23/694, 744 & 780
 Map: Redcliffs : 11/A7
 Sumner : 11/A8
 Mt. Pleasant : 11/A9

5. History: In the latter half of 1942 many areas in and around Lyttelton and Sumner were taken over by Army for the accommodation of fortress troops. The School for the Deaf at Sumner was occupied, also a number of cottages at the seaside resort of Taylor's Mistake. Of the new camps established, the largest were located at Redcliffs (on the rifle range), Sandilands (near the Anglican Church, Sumner), and at Cooke's Farm, about $\frac{3}{4}$ mile from the junction of Mt. Pleasant Road with the Summit Highway.

The usual type of phase three buildings were erected - mess-rooms, cookhouses, ablutions, stores, etc., huts being used for sleeping quarters.

Roading was reduced to a minimum in order to lessen the chances of the camps being spotted from the air. The Redcliffs and Sumner Camps were connected to the borough sewerage system, while at Cooke's Farm a septic tank was installed and the effluent allowed to discharge down a hillside. All camps were connected with electricity.

The only engineering difficulty encountered was in regard to water supply. The camps at Redcliffs and Sumner drew their water from the Sumner borough reticulation and the Cooke's Farm camp from Heathcote county's. The heavy draw-off strained the capacity of these systems, however, and measures had to be taken to improve the sources of supply. This was done in the case of Sumner borough by driving six new wells, each 70 feet deep, at the site of the main pumping station. By re-arrangement of their pumps the borough was able to bring

Fortress Camps, Sumner-Lyttelton (Cont'd).

the new wells into service.

The remedy at Cooke's Farm camp was not quite so simple. The Heathcote County reservoir was about 15 chains from, and 100 feet higher than, Cooke's Farm, so it was decided to pump additional water to the reservoir and then draw off the camp's requirements by gravity. A 2,000 gallon reservoir was built at Cooke's Farm and filled at night-time. Water from it was used by troops during the day, thus lessening the draw-off and minimising interference with the civilian supply during the hours of daylight. A reservoir of 10,000 gallons capacity was constructed some 300 feet above the county reservoir, and the two were connected by a four inch steel concrete-lined pipe, 5,000 feet long. It was intended to pump water from the county to the Army reservoir (for storage) but the pump did not come to hand in time and the proposal therefore did not eventuate.

The total cost of the work carried out by the Department at the three camps was £38,347, of which £14,187 was expended on the provision of water supplies.

1. Name of Work: Winter Show Camp, Wellington
(Also Area 5 HQ.)
2. Locality: Winter Show Grounds, John Street,
Wellington.
3. Nature of Work: Erection of camp accommodation and
adapting show buildings for use as offices, stores, etc.
4. References: File: 23/396 Map: 8/A15
5. History: Early in the war, the space available at
Area 5 HQ, Buckle Street, was found to be inadequate for
training purposes as well as for recruiting, medical
boarding, etc. The Winter Show Buildings were therefore
taken over, and used at first chiefly for the training
of troops.

Minor alterations were effected to provide cooking, messing, and sleeping accommodation for guards and others, and to make orderly rooms and storage space available for the various units which were using the main hall and grounds for part-time training.

Upon general mobilisation in December, 1941, a base camp was established at the Winter Show grounds, from which operational camps in the district were supplied with rations, clothing, stores, etc., Armourers', boot repair and other workshops were manned. Guards of vital points were quartered at the Winter Show Camp and for some months (until they moved out to other camps) a signal company and an army troop company were also accommodated there.

This necessitated a considerable increase in the cooking, messing and sleeping facilities. Additional buildings were erected for workshops, etc., while phase one camp buildings, with huts and tents for sleeping in, were built on the flat areas of the grounds.

Further additions and alterations were made when in July, 1942, approval was given to provide accommodation at the Winter Show Buildings for the whole of Area 5 personnel, complete with offices and medical board rooms.

Winter Show Camp, Wellington (Cont'd).

and including the erection of a YMCA hut and a canteen.

Other minor alterations were carried out from time to time at the request of Army, and maintenance work to buildings and roads was undertaken when necessary.

The cost of all work carried out was £29,840.

1. Name of Work: WAAC Camp, Miramar.
2. Locality: Municipal Motor Camp, Miramar.
3. Nature of Work: Erection of camp accommodation.
4. References: File: 23/829 Map: 8/A7
5. History: In August, 1942, Army decided to take over the Miramar Motor Camp and adapt it for the accommodation of WAAC's.

Temporary arrangements for 200 women were made by altering existing buildings plus the addition of four standard phase one messing shelters and portable huts for sleeping quarters.

With these temporary facilities the camp was occupied on October 17, 1942. In the meantime, contracts had been let for the construction of a boiler room; a laundry; a mess and kitchen; latrines; showers; a reception room; a store; a hospital; and an orderly room, etc.

As plans came to hand, further contracts were awarded for a recreation hall, a dental hut, a hair-dressing salon and other amenities.

The buildings were occupied as they reached completion. The kitchen, for instance, was put into operation with temporary gas coppers until such time as a steam system had been installed.

All contracts were completed by July, 1943, but additional minor works such as lining and electric lighting of sleeping huts and general maintenance continued throughout the period of occupancy. Accommodation was provided for a total of 600 WAACs.

Expenditure amounted to £61,645.

After the war the camp was handed over to the Netherlands Government for use as a rest and convalescent centre for evacuees from the Netherlands East Indies. It eventually became a transit housing camp.

1. Name of Work: Vehicle Reception Depot, Petone.
2. Locality: Nevis, McKenzie and Jackson Streets, Petone.
3. Nature of Work: Provision of accommodation for personnel and of facilities for workshops and for the storage of vehicles.
4. References: File: 23/746 Map: 7/A6
5. History: In June, 1942, the Quartermaster-General instructed that a vehicle reception depot was to be established in the old Thorndon railway yard, and some preliminary work was carried out there. A few months later, however, this site was abandoned, and it was decided to set up the depot at Petone.

Three areas were occupied, as follows :-

- (a) Depot headquarters and 'A' park on an area fronting Nevis, Locky and Te Puni Streets.
- (b) 'B' park and a railway siding on an area between McKenzie Street and the railway line, immediately north of the Petone railway crossing.
- (c) 'C' park on the north-east corner of the junction of Jackson and Te Puni Streets.

The surface of these areas had to be levelled, metalled and eventually sealed; unclimbable fences were erected.

Semi-permanent buildings for office, storage, and workshop accommodation were erected on the headquarters area, also cookhouse, messes, a laundry and drying room, ablutions and showers etc. Phase one buildings covering

Vehicle Reception Depot, Petone (Cont'd).

a total floor space of 1,200 square feet were later moved from other camps and re-erected at the depot. Sleeping quarters were in the form of portable huts.

At 'B' park the railway siding was extended and an end loading and a side loading ramp were constructed.

Expenditure aggregated £5,716..



