

PUBLIC WORKS

(Drainage)

C.S.

1924.

No.

402/24

Mr. A. A. P. Neave

SUBJECT.

192 4

STANLEY IMPROVEMENT SCHEME

31st May

Submits Report on Drainage Scheme

Previous Paper.

MINUTES.

*Report by Mr. A. A. P. Neave of 31<sup>st</sup> May 1924 — End ①*

*Y.B. Submitted with the plans under separate cover*

*H.H.H. 10 June '24*

*H.C.S.*

*Will you please have this circulated for consideration in Ex. Co.*

*See 254/1923.*

*12 July 1924.*

*Hon. Asst. Treasurer  
Hon. Colonial Surgeon }.*

Subsequent Paper.

*Circulated*

*G.H. Brown*

*Clerk, Executive Council  
14 July 1924*

HPS.

I have written a note relating with scheme

in C.S.O. copyd: 14/4/24

Jh.

As 5/4/24 pf

(1)

Port Stanley,

FALKLAND ISLANDS.

31st May, 1924.

STANLEY IMPROVEMENT SCHEME - DRAINAGE.

Sir,

I beg to forward herewith 3 No: plans showing the proposed drainage scheme together with basis of estimate amounting to £9,000., for executing those portions of the work which I recommend should be carried out in order to alleviate some of the worst of the existing insanitary conditions of the town; further extensions being left till such time as and when more funds are available.

2. In view of the need for economy in new works I have designed the scheme in such a way that use is to be made of the existing gips, culverts and drains wherever practicable principally for dealing with stormwater; the primary object of the new sewers being to take domestic and offensive water underground in accordance with modern practice, whilst at the same time they will also relieve some of those areas which at present have little or no provision for carrying off stormwater.

3. The unsatisfactory condition of the existing drainage system from a sanitary point of view has been dealt with at some length in my preliminary report dated February, 1923., and the recommendations for improvement may be briefly summarised by stating that all sewer outlets discharging on the foreshore should be connected up to properly designed

outfalls



outfalls discharging at or beyond Low Water Spring Tides, and that all foul water should be carried in underground pipes and sewers connected ultimately right up to all buildings; no offensive liquid being permitted in any open grip or channel.

Whilst, owing to limitation of funds, this may take some years to achieve the town drainage cannot be regarded as sanitary until such work is completed throughout.

4. In contemplating any drainage work it must be understood that it is absolutely essential for ultimate satisfactory results that the whole of the urban area must be considered as one and a clear idea formed as to probable future requirements and extensions; and any policy of treating small areas as individual units and choosing the path of least resistance for dealing with minor drainage difficulties irrespective of surrounding areas and requirements can only be described as thoroughly unsound.

It would appear however that during the eighty years that Stanley has been the capital of the Colony no proper drainage scheme or policy has ever been laid down, and the whole of the drainage works have been carried out in a most haphazard manner; with the result that the general inadequacy of the existing drainage does not represent a good return in respect of the considerable sums that, having regard to the cheap labour conditions prevailing years ago, have doubtless been expended on such works during this lengthy period.

This has been due probably to lack of skilled direction; drainage work requiring specialised knowledge. I strongly advise that a proper scheme be adopted now and no sections of drainage works approved for execution in future except such as will ultimately lend themselves to proper embodiment in the main scheme; the sound policy being to take certain sections of the main scheme and execute them in proper manner as and when funds are available so that ultimately the town will have a satisfactory drainage system throughout.

5. A very large proportion of stormwater flowing across the town comes from the Murray Heights, and to reduce the quantity to be carried in the drains to a minimum I have provided for two open grips to be cut from a point at an altitude of about 150 feet on the Common due South of Dean Street, one to discharge to the Westwards into the Magazine Valley stream and thence seawards and the other to discharge down the West side of Hebe Street and under Ross Road through a culvert to the sea.

The existing grip along the West side of lower Hebe Street will require partial filling and complete re-grading and together with the new grip to be cut along the West side of upper Hebe Street will require lining in view of the steep gradient and the quantity of water to be carried. This should be done with stone similar to the existing channel down the East side of lower Dean Street - too smooth a surface on this steep gradient being undesirable. A culvert to carry this water under Fitzroy Road will also

be necessary, which will also carry the water from an extension of the existing open grip on the South side of Fitzroy Road sloping uphill to the Eastward; all as indicated on plan.

6. I have provided for 3 No: main sewer outfalls composed of Cast Iron pipes from the shore manholes to Low Water Spring Tides; one to be carried along the underside of the old Water Pier (which, if the recommendation contained in my report dated 30th April, 1924 on water supply to abandon the low level reservoir be adopted, will no longer be required), one on the foreshore between the West Jetty and the Public Jetty and one opposite the end of Lebe Street, the last two being carried on piles: The intention being that the whole of the drainage from practically all the dwellings in Stanley (excepting Government House and the buildings lying to the Westward) shall normally be discharged at one or other of these outfalls, flood reliefs to existing outlets to the Sea wall being provided at selected manholes to come into operation only at times of abnormal flood water.

7. Drainage work should obviously be commenced at the low level and continued upwards so as to completely discharge water from work carried out at the higher levels, and the above three main outfalls should be provided in the first instance.

8. The roads

8. The roads which most require drainage prior to formation of proper road surfaces are :-

James Street

Fitzroy Road

Brury Street

Allardyce Street

and St: Mary's Walk,

also the area to the South West of the Cathedral,  
together with Ross Road } in connection with road  
and John Street } improvement works,

and the connecting sewers in lower Philomel Street,  
lower Hebe Street, mid Dean Street, and from the Town  
Hall to the old Water Pier, etc.: linking up the above  
drainage with the main outfalls.

9. The estimate of 79,000 provides for the work detailed in paragraphs 5, 6, 7 and 8 above and is indicated in full red on the drawings, future extensions being more lightly tinted. It includes for 4" connections to gullies and boundaries of house property, (say 200 No: connections average 5 yards each = 1,000 yards lin: of 4" pipe).

10. The existing grips on the South sides of Fitzroy Road, Allardyce Street, St: Mary's Walk and James Street should be retained for dealing with stormwater, being in some cases regraded to proper gradients observing that there appears a tendency to cut these deeper and deeper without any corresponding gain in efficiency. Drainage work cannot be set out properly 'by eye', and the use of the level and staff and proper sight rails and boring rods

is essential to satisfactory workmanship.

Catch pits with proper outlet gratings should be provided to these grips to intercept detritus before discharge of the effluent into any existing or new drains or sewers and these have been allowed for in the estimates for individual roads.

The stone lined culvert on the North side of Drury Street is to be completely filled up and replaced with underground pipes, but the bulk of the grips and existing drains running down hill from South to North should be retained for storm water.

11. In view of the prevailing low temperature normally experienced in these latitudes I do not advise the complication of trapping and ventilating street sewers, but recommend that ventilating type street manhole covers (similar to Messrs H. Baker & Co: Ltd's No: 190A) be used, and that straight connections between road gullies and sewers be adopted.

All drains connected to houses should however be cut off from the street sewers and in cases where W.C.'s are allowed proper inlet and outlet ventilation in accordance with Home practice should be installed in addition.

Ultimately every house should be provided with at least one yard gulley with 8" x 8" grating and properly trapped and with cleaning eye, similar to Messrs G. Farniloe & Sons Ltd's No: 7725., with hinged grating and lock and with an inspection chamber and trap inside and near the boundary of the property on the 4" branch to street sewer;

the



The 4" branch being provided from the street sewer to the property boundary by the local authority, and work on the property being paid for by the landlord.

12. Road gullies should be fitted with gratings and frames 18" x 12" across top or equivalent superficial area (Messrs H. Baker & Co. Ltd's No: 158 being a very suitable type), and each should have a pit of sufficient capacity to catch detritus, which should periodically be cleaned out together with the catch pits to grips mentioned in paragraph 10. I have indicated the approximate number of gullies for each road in the estimates but they are not indicated on plan, but in general a pair of gulleys (one on South East and South West corners of the North and South roads) will be required on the uphill sides of all cross roads with intermediate gullies along East and West roads each fed by a length of gradient normally not exceeding say about 50 yards; these intermediate gulleys will not be required on the South side of roads provided with open grips (e.g. Fitzroy Road or James Street, etc:).

13. The whole of the sewers have been designed to self-flushing gradients giving a general minimum velocity of some 3 feet per second when the proportional depth of flow is one quarter the diameter of the pipe increasing to some 4 feet per second when the pipes are flowing full.

In order to keep the sewers sweet it will be advisable to divert a proportion of stormwater into them especially in their upper reaches; in time of abnormal flood the reliefs throwing the water into existing sewers will come

into

into operation. By the adoption of this principle the size and cost of the new sewers will be kept within reasonable limits and they will work more efficiently at normal periods.

The invert level of these flood reliefs in manholes should generally be placed at a height of  $\frac{9}{10}$ ths the diameter of the pipe it is intended to relieve above the invert of the latter pipe (i.e. bottom of manhole) in order to come into operation when the latter pipe is discharging at its maximum capacity.

14. It is essential for satisfactory results that the new work be properly set out and executed by competent workmen so that the lines and gradients are true between manhole and manhole, any deviation or zigzagging in either vertical or horizontal plane being fatal to efficiency of working; and manholes with inlets and outlets of inverts properly beached and side inlets worked to easy curves must be constructed wherever a sewer changes either in line or gradient.

In view of the heavy cost of bricks I recommend that manholes be built of 'winget' blocks (4½" work up to 3 feet depth and 9" work to 6 feet depth), and that gullies be cast in situ in concrete being designed with an interior tapering from top to bottom for facility in connection with drawing of moulds.

All pipes should be jointed with Portland cement mortar (2 : 1), and not as in many cases of the existing drains with clay.

15. The quantities of 12", 9", 6" and 4" pipes required in connection with the extent of work now proposed are approximately equal and they should be demanded "nested" in order to avoid very heavy freight charges - any small surplus being retained for stock purposes.

Sufficient "1" branch pipes (mostly 4" branches) and specials should be arranged and laid in street sewers for house connections and future extensions even although the actual branches be not extended till later; this will avoid having to break into street mains at a later date, any open ends being blanked off meantime with Stanford stoppers.

I am,

Sir,

Your obedient Servant,



E. Sc.:., Assoc: M.Inst: C.E.

The Honourable, *ing, Administration*

The Colonial Secretary,

STANLEY.

FAKELAND ISLANDS.

Enclosures.

3 No: plans.

Basis of Estimates (10 Sheets)

31st May, 1924.

DRAINAGE OF STANLEY.

Basis of Estimate.

DIVERSION OF WATER FROM THE MURRAY HEIGHTS.

900 yds: lin:	From apex of drainage area South of Dean Street to Magazine Valley open grip (15" x 12")	at 6d.	£. s. d. 22. 10. 0.
500 yds: lin:	From apex of drainage area to top of Hebe Street open grip (15" x 12").	at 6d.	12. 10. 0
350 yds: lin:	Stone lined culvert 18" x 9" down West side of Hebe Street including filling to raise level of existing grip.	at 7/6.	131. 5. 0.
500 yds: lin:	Provisional extension of drainage trenches to East of Hebe Street.	at 6d.	12. 10. 0
	Allow for culverts under roads and outfall to sea wall for Hebe Street stone lined grip.		60. 0. 0
	Allow for rough bridges over open grips on Common with culverts under.		30. 0. 0
			£258. 15. 0
Contingencies	10%		26. 17. 6
			£285. 12. 6
Engineering, Administration	10%		29. 11. 3.
			£325. 3. 9.

SAY £325.



DRAINAGE OF STANLEY.Basis of Estimate.

ROSS ROAD. (From Town Hall to Public Jetty), but  
including road gullies West of Town  
Hall to Western Boundary of Malvina House.

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			£.	s.	d.
100 feet.	Cast iron Outfall, 12".	at £1.	(say) 100.	0	0.
215 yds: lin:	9" Stoneware drain.	at 22/-.	286.	10.	0.
315 yds: lin:	12" Stoneware drain	at 27/-.	425.	5.	0.
200 yds: lin:	6" Stoneware drain	at 15/-.	150.	0.	0.
10 No:	Manholes.	at £25.	250.	0.	0.
25 No:	Gullies.	at £12.	300.	0.	0.
Item.	Allow for 4" connections to house drains and inspection pit West of school.		60.	0.	0.
			£1,521.	15.	0.
	Contingencies	10%.	152.	3.	6.
			£1,673.	18.	6.
	Engineering, Administration	10%.	167.	7.	10
			£1,841.	6.	4.

SAY £1,825.

DRAINAGE OF STALEY.Basis of Estimate.JAMES STREET and HEBB STREET and OUTFALL.

			£.	s.	d.
	12" Cast iron outfall.	(say)	100.	0.	0.
15 yds: lin:	12" Stoneware pipe	at 27/-.	20.	5.	0.
320 yds: lin:	6" Stoneware pipe.	at 15/-.	240.	0.	0.
5 No:	Manholes.	at £25.	125.	0.	0.
6 No:	Gullies.	at £12.	72.	0.	0.
Item.	Relay grip on South side of James Street and provide catch pit.		100.	0.	0.
Item.	Allow for 4" connections to house drains.		00.	0.	0.
			£757.	5.	0.
	Contingencies 10%		75.	14.	6.
			£832.	19.	6.
	Engineering, Administration 10%		83.	6.	0.
			£916.	5.	6.
	Say	£900.			

DRAINAGE OF STANLEY.Basis of Estimate.

TOWN HALL TO WATER PIER CUTFALL TO SOUTH OF  
ROSS ROAD.

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			£.	s.	d.
320 yds: lin:	12" Stoneware sewer	at 27/-.	432.	0.	0.
4 do:	Manholes.	at £25.	100.	0.	0.
	Connection to existing manhole and Barrack Street drain, and to drains from Hospital, etc:		25.	0.	0.
			<hr/>		
			£557.	0.	0.
	Contingencies	10%	55.	14.	0.
			<hr/>		
			£612.	14.	0.
	Engineering; Administration.	10%	61.	5.	5.
			<hr/>		
			£673.	19.	5.
			<hr/>		

SAY £673.

(5).

DRAINAGE OF STANLEY.

Basis of Estimate.

ELTEROY ROAD AND PHILOMEL STREET TO OUTFALL AT END  
OF WERN STREET INCLUDING 6" SEWER VIA DEAN STREET TO  
JOHN STREET AND THENCE 12" SEWER TO PHILOMEL STREET.

				£	s.	d.
470 yds: lin:	12" Stoneware sewer.	at 27/-	684.	10.	0.	
380 yds: lin:	9" " "	at 22/-	568.	0.	0.	
150 yds: lin:	6" " "	at 15/-	112.	10.	0.	
12 No:	Manholes	at £25	300.	0.	0.	
24 No:	Gullies.	at £12.	288.	0.	0.	
Item.	Allow for 4" connections to house drains.		100.	0.	0.	

£1,798. 0. 0.

Contingencies 10% 179. 16. 0.

£1,977. 16. 0.

Engineering, Administration 10% 197. 15. 6.

£2,175. 11. 6.

SAY £2,150.





(7).

DRAINAGE OF STANLEY.

Basis of Estimate.

ALLARDYCE STREET AND RESERVOIR ROAD TO WATER PIER  
OUTFALL.

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EAST OF KING STREET.

			£	s.	d.
80 yds: lin:	6" Stoneware sewer.	at 15/-.	60.	0.	0.
2 No:	Manholes.	at £25.	50.	0.	0.
4 No:	Gullies.	at £12.	48.	0.	0.
	Allow for 4" connections to house drains.		20.	0.	0.

WEST OF KING STREET.

	12" Cast iron outfall.		70.	0.	0.
115 yds: lin:	9" Stoneware sewer.	at 22/-	126.	10.	0.
200 yds: lin:	6" " "	at 15/-	150.	0.	0.
8 No:	Manholes.	at £25.	200.	0.	0.
15 No:	Gullies.	at £12.	180.	0.	0.
	Allow for 4" connections to house drains.		50.	0.	0.
			£954.	10.	0.
Contingencies	10%		95.	9.	0.
			£1,049.	19.	0.
Engineering, Administration	10%		104.	19.	11.
			£1,154.	19.	0.

SAY £1,150.

(8).

DRAINAGE OF STANLEY.

Basis of Estimate.

St: MARY'S WALK.

			£	s.	d.
250 yds: 114:	6" Stoneware sewer.	at 15/-.	187.	10.	0.
3 No:	Manholes.	at £25.	75.	0.	0.
6 No:	Gullies.	at £12.	72.	0.	0.
Item.	Allow for 4" connections to house drains.		40.	0.	0.
			£374.	10.	0.
	Contingencies 10,		37.	9.	0.
			£411.	19.	0.
	Engineering, Administration etc:10%		41.	4.	0.
			£452.	3.	0.

SAY £450.

## DRAINAGE OF STANLEY.

## SUMMARY OF ESTIMATES.

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Diversion of Water from the Murray Heights. ....	325.
Ross Road. (From Town Hall to Public Jetty). ....	1,625. ✓
James Street & Hebe Street and Outfall. ....	900.
Town Hall to Water Pier Outfall to South of Ross Road. ....	675. ✓
Fitzroy Road & Philomel Street to outfall at end of Hebe Street, 6" sewer via Dean Street to John Street and thence 12" sewer to Philomel Street. ....	2,150.
John Street from Barrack Street to Dean Street. ....	825.
Drury Street, etc.:. ....	700.
Allardyce Street and Reservoir Road to Water Pier Outfall. ....	1,150.
St. Mary's Walk. ....	400.
TOTAL.....	<u><u>£9,000.</u></u>



# STANLEY IMPROVEMENT SCHEME - DRAINAGE.

## BASIS OF ESTIMATE.

### SEWERS PER YARD LINEAL.

#### MATERIALS.

Size of drainpipe.	Cost f.o.b. Liverpool.	No: of units freight at 3d.	Cost per pipe f.o.b. Liverpool
			s. d.
4"	2/6d. yd: lin.	2.	2 ft: = 1. 8.
6"	3/9d. " "	3.	2 ft: = 2. 6.
9"	6/9d. " "	6.	2'. 6" = 5. 7½
12"	11/3d. " "	9.	2'. 6" = 9. 4½
		<u>20 units.</u>	<u>Total cost per 'nest'.</u> 19. 2.

Freight on 'nest' of pipes  
say 2½ cubic feet at 1/10d. = 5/- = 60d. 60  
Unit = 20. = 3d.

(40 cubic feet - 65/- freight plus 10/- landing charges  
= 55. 13. 0).

				<u>Freight.</u>	Cost per pipe d'ld. at Stanley.	Cost per yard lineal delivered at Stanley.		
2 feet.	4" pipe	=	1/3d.	plus	6d.	=	2/2d.	(say) 3/3d. yd:
2 feet.	6" "	=	2/6d.	plus	9d.	=	3/3d.	(say) 4/10d. "
2'. 6"	9" "	=	5/7½d.	plus	1/6d.	=	7/1½d.	(say) 3/6d. "
2'. 6"	12" "	=	9/4½d.	plus	2/3d.	=	11/7½d.	(say) 14/- "

#### MATERIALS and LABOUR.

	4".	6"	9".	12".
	s. d.	s. d.	s. d.	s. d.
Piping (per yard).	3. 3.	4. 10.	8. 6.	14. 0.
Labour including excavation, laying, jointing, filling & cartage surplus to dump & transport etc:.	10. 0.	10. 0.	13. 0.	13. 0.
	13. 3.	14. 10.	21. 6.	27. 0.
(SAY)	13/6d.	15/-	22/-	27/- per yard lineal laid complete.