

Government of Madras

HOME DEPARTMENT (EDUCATION)

G.O. No. 100, 29th January 1918

Grant

Sanctioning in supersession of the previous orders on the subject, a — of Rs. 11,233 towards the cost of the water-supply scheme for St. Patrick's Orphanage, Adyar.

INDEXED

ORIGINAL

Government of Madras

HOME DEPARTMENT (EDUCATION)

G.O. No. 100, 29th January 1918

Grant

Sanctioning in supersession of the previous orders on the subject, a — of Rs. 11,233 towards the cost of the water-supply scheme for St. Patrick's Orphanage, Adyar.

READ—the following papers :—

I

G.O. No. 331, Educational, dated 31st July 1916.

ABSTRACT.—Sanctioning a grant not exceeding one-half of the actual expenditure nor Rupees 2,750 towards the cost of providing water-supply arrangements for St. Patrick's Orphanage, Adyar.

G.O. No. 1027, Home (Education), dated 8th August 1917.

ABSTRACT.—Declining to allow the free use of boring tools by the St. Patrick's Orphanage, Adyar, but promising to consider any application for the enhancement of the grant already sanctioned.

II

Letter—from the Hon'ble Mr. J. H. STONE, M.A., F.R.H.S., C.I.E., Director of Public Instruction.

To—the Secretary to Government, Home (Education) Department.

Dated—Madras, the 23rd November 1917.

No.—R.O. 1862/16.

With reference to G.O. No. 1027, Home (Education), dated 8th August 1917, regarding the water-supply scheme for St. Patrick's Orphanage, Adyar, I have the honour to submit revised plans (Nos. 21 E/1 to 21 E/5) and estimates amounting to Rs. 16,850 and a report from the Sanitary Engineer to Government received from the correspondent. The correspondent states that the considerable rise in the estimates which has been accounted for in the Sanitary Engineer's report makes it absolutely impossible for the management to meet half the cost, and requests therefore that a two-thirds grant may be sanctioned as a very special case. In the circumstances stated, I beg to recommend the request for sanction.

2. The grant, if sanctioned, may be paid when funds are available.

ENCLOSURE

Water-supply for St. Patrick's Orphanage, Adyar.

St. Patrick's Orphanage is located on the right bank of the Adyar river near its mouth and between the Buckingham canal and the Adyar Bridge Road.

2. The area of the compound is large the surface soil being generally brick earth with alluvial clay and sand underneath and syenitic rock at a depth of about 45 feet. Good water in quantity is remarkable for its absence. Investigation by boring has shown that this is due to the fact that the estate occupies what must have been in ancient days part of a backwater or the bed of the river Adyar. Consequently except in the upper layers there is no fresh water as the alluvial clay deposited on the site when the area was a backwater or part of the Adyar river bed, which at this place is under tidal influence, contain salts either alkaline or acid which render the water contained in the deeper layers of the subsoil either alkaline or brackish.

3. Investigation for a water-supply by the Orphanage authorities has been going on for many years and the undersigned has given advice from time to time.

4. Lately three borings have been put down. Two of these were put down inside existing wells, i.e., the present drinking-water well and a well in the mango tops to the south-east of the Orphanage buildings and the third at a selected point between the drinking-water well and the Orphanage buildings. All these borings show the existence of fresh water in limited quantity in the upper layers and alkaline water at greater depths.

5. The third boring referred to above (called first boring on the plans) was put down to a depth of 108 feet 10 inches, rock being met with at a depth of 49 feet. The water from the clay, sand and pebble layer above the rock level at 46 feet, while ample in quantity and artesian in character, was unfortunately found on being analysed to be alkaline and unfit for drinking purposes. It is however considered suitable for washing and other sanitary purposes. In this boring

which appears to be a characteristic boring of the area of land belonging to St. Patrick's Orphanage, there is a layer of brick earth 7 feet thick, then a layer of black clay 5 feet thick and below this a layer of sand four feet thick. These dimensions are shown on the plan of proposed new well and were checked on the spot by the undersigned. The description of soils and depths met with on the boring plan are those given by the maistri of the Agricultural Department. The water in the upper sand layer was found to be fresh and it appears to be the same layer of sand which provides fresh water for the existing drinking water well in which the second boring was put down.

6. In the first boring underneath the sand layer containing fresh water there is clay to a depth of 19 feet and below this a second water bearing stratum of clay and sand mixed. In this layer there is a relatively large quantity of water which on the superincumbent layer of clay being pierced rises to a depth of 13 feet below ground. Unfortunately this water was discovered on analysis at the King Institute to be alkaline and unfit for drinking purposes. The quantity of water from the deep boring in the rock below this water bearing layer was found to be exceedingly small.

7. After the first boring was made the undersigned recommended a boring in the existing drinking-water well 655 feet to the south of the first boring. The results showed practically the same strata as met with in the first boring and also showed that the reason why the existing drinking-water well contained fresh water was because its depth was limited to the upper sand layer which as in the first boring contained fresh water. As the quantity of water in the existing drinking-water well was limited, it was hoped to obtain a better supply elsewhere and consequently a third boring was put down in an old masonry well in the mango tope to the south-east.

This boring was taken down to 70 feet and disclosed the same upper strata as in the other borings. The water when analysed from the deeper layers was condemned.

8. The water used by the Orphanage at present from the existing drinking-water well was then chemically analysed by Messrs. W. E. Smith & Co., Madras, and pronounced fit for drinking purposes.

9. There are other wells in the large area, over 166 acres, belonging to the Orphanage, but the surface soil shows the same indications of brick earth and all these wells in the area contain water of doubtful quality and quantity.

10. The problem therefore seemed to resolve itself into constructing a new well at the first boring site to make use of the ample quantity of water found at this site for washing purposes and all other purposes except drinking and cooking, and to continue to rely on the existing drinking-water well for drinking-water for the Orphanage population. To avoid the use of two pumping stations it was after very careful consideration decided to place an oil-engine pumping installation at the new well to supply the water for washing and other purposes except for drinking, and to place in this engine-house a second pump to be driven by the same oil-engine to pump water from the existing water well for the Orphanage. This proposal necessitates the provision of a long suction pipe to the drinking-water well but if the joints of this suction pipe are carefully attended to so as to ensure their being air tight and the pipe is laid at an ascending gradient from the well to the pump as shown in plan No. 5 there will be no difficulty in obtaining a satisfactory result from the pumping operations.

11. It is proposed to pump water and the rate of 25 gallons a minute from the new well to two tanks located on the Orphanage buildings for distribution by pipes for washing and other sanitary purposes and to pump 15 gallons a minute from the existing drinking-water well to one tank on the roof of the Orphanage and distribute the water to the dormitory and public rooms and to the kitchen where taps will be provided. To ensure improved quality to the water it is proposed to instal Berkfeld pressure filters at each connexion.

12. The water from the existing drinking-water well is now supplied by means of barrel carts for both drinking and washing and all other purposes. When water for washing and other purposes is supplied from the new well it is expected that the supply from the existing drinking-water well will be sufficient for drinking and cooking purposes for the consumption of St. Patrick's Orphanage population. The number of boys in the Orphanage is 170 at present but the buildings are capable of taking in 250 boys. The number of staff and servants in residence is 14 and 16 respectively.

Detailed description of works proposed.

13. *New well.*—At the site of the new boring a new well will be sunk to a depth of 46 feet below ground which will be to rock level. The bottom part of the well to a height of 9 feet will be provided with weep holes as shown in the plan.

But if the quantity of water met with below 35 feet from ground level is found to be ample, the well sinking may be stopped at this level or just below it. The well proposed is 10 feet in diameter of brick in surki mortar with 18-inch staining and the usual substantial well curb and holding down bolts as provided in the estimate. The well will be constructed from a depth of 33 feet by the open excavation method and below this level the well will be sunk by divers.

14. *Engine and pump house.*—An engine and pump house will be constructed of three compartments, an engine room 13' x 10', a pump chamber 14' x 8' and a store room 10' x 7'.

These will be built of brick in chunam in foundation, basement, archwork, etc., and brick in clay generally in superstructure and plastered with chunam mortar except the pump chamber which being below ground will be plastered with cement. The depth of the floor of the pump chamber below ground level is 7 feet this depth being required to permit of a sufficient depth for the suction pipe as the static water levels of the new well and the existing drinking water well are about 16 feet below ground level in dry weather.

The engine and pump houses are roofed with Mangalore tiles and the store room is provided with wooden racks for storing spares and oil and other articles required for the engine and pumps.

15. *Engine and pumps.*—An oil-engine of the Blackstone type as used at Kumbakonam and Kurnool municipal pumping stations is provided in the estimate.

The power of this engine provided in the estimate is three brake horse-power but the suppliers must guarantee that the engine supplied will drive the pumps and pump the required quantity of water to the tanks on the roof of the Orphanage new building. Appendix No. 1 shows the calculations for the size of engine required. The pumps provided in the estimate are two 2-inch centrifugal pumps. These pumps shall be guaranteed by the suppliers to do the work efficiently required of them and to be capable of being driven by the oil-engine to be provided in the engine-house by the suppliers. In the pump chamber there is also a small semi-rotary pump for pumping out spill water from a sump in the floor and two iron ladders are provided for entrance into the pump chamber from the engine room. A neat iron fence is carried forward from the ladders to the beginning of the belt slope to prevent accidents to the drivers of the plant.

16. *Suction pipe.*—The suction pipe from the new well will be of ordinary length and 2½ inches in diameter of cast iron flanged pipes. The suction pipe from the existing drinking water well will be 3 inches in diameter and 655 feet long.

This pipe will be of cast iron spigot and socket and carefully lead-jointed so as to have air-tight joints. At the drinking water well end there will be a masonry block surrounding the pipe at the first joint near the well to prevent drawing of suction pipe by the strain caused by the vertical overhanging suction pipe. In laying this suction pipe it shall be carefully laid at an ascending gradient from the well to the pump of 1 in 437 feet and the filling in shall be of clay (from the excavation) and carefully tamped around the pipe to make it thoroughly air-tight.

At the highest part of the pipe nearest the pump there shall be a small petcock to allow of the escape of air when opened during the running of the pump. At the well end there will be the usual vertical suction pipe with flanged joints and rubber insertion washers and an efficient suction valve shall be provided.

To enable the long suction pipe to be charged with water, provision is made for a by-pass 1½ inches pipe from the discharge pipe to the suction pipe beyond the pump.

17. *Discharge pipes from pumps.*—The discharge pipes from both pumps will be 2½ inches spigot and socket cast iron pipes lead-jointed, and will be laid under ground as far as the new building of the Orphanage and then taken vertically to the tanks on the roof of the new dormitory building. The pipes where they are placed vertically against walls shall be suitably clamped to the walls where required. The discharge pipe of the drinking water-supply shall enter the supply tank near the bottom so as to provide water for charging the suction pipe of the pumps and there shall be a relief valve on the discharge pipe between the charging pipe and the pump.

18. *Tanks and distribution pipes.*—There shall be two tanks for the washing and sanitary supply. One of these tanks is shown on the new dormitory building connected to the discharge pipe from the pump, and the other is shown on the school building supplied from the distribution pipe. The latter is intended for bathrooms in this building and as it will be located at a lower level than the tank on the new dormitory building it shall be provided with an automatic ball valve arrangement from the distribution supply pipe to cut off supply when it is full.

The distribution pipes from the washing water tanks will supply the dormitory requirements and the school building requirements, the bathroom, latrine, kitchen and covedish. In the latter the water will only be used for washing purposes.

The drinking water shall be placed on the new dormitory building and the distribution pipes therefrom shall supply Berkfeld pressure filters in the dormitory school building and the kitchen. In the latter the water will be used for cooking purposes.

19. *Cost of the scheme.*—The total cost of the scheme is Rs. 16,850. This includes the expenditure already incurred by the correspondent of the Orphanage, Rs. 1,025 for the three borings which were carried out by the boring party lent by the Agricultural department. The cost of the scheme is higher than it would have been, due to the exceptional conditions which required two separate installations—one for washing and other sanitary purposes and the other for a drinking-water supply.

This duplex scheme requires separate suction pipes one of long length and separate discharge and distribution pipes and two pumps are also required.

20. *Conclusion.*—The St. Patrick's Orphanage is an important one carried on by the Brothers of St. Patrick. A large number of boys are in residence and it is of the utmost importance to the health of the inmates that the water-supply arrangements should be protected and improved.

The water from the existing drinking well is proposed to be protected by supplying it through pipes under pressure with Berkefeld pressure filters at each tap. The well itself will have silt removed, petty repairs done and a barbed wire fence with gate put up around the well at a distance of 50 feet from it. This will remove present source of contamination by the use of barrel carts and the presence of puddles of spill water.

The washing, bathroom and sanitary arrangements of a large Orphanage require more water than is possible with the present system of barrel carts and the arrangements generally require to be modernised by provision of a piped supply of ample quantity.

From a prolonged study of the water-supply problem of St. Patrick's Orphanage the undersigned does not consider that any better supply than the one contemplated in the scheme described above can be formulated and consequently the present scheme is recommended for sanction.

List of plans and estimates to accompany the above—

- (1) Map showing St. Patrick's Orphanage, Adyar.
- (2) Sections showing boring results.
- (3) Plan of wells.
- (4) Plan of engine-house.
- (5) Hydraulic sections.
- (6) Estimate amounting to Rs. 16,850.

W. HUTTON,
Superintending Engineer,
Sanitary Engineer to Government.

III

Note by the Chief Engineer, Public Works Department, No. 419-C,
dated 19th January 1918.

The scheme prepared by the Sanitary Engineer has been examined in the Chief Engineer's office and his proposals are approved. The instructions contained in the Sanitary Engineer's report dated 17th September 1917, which accompanied the letter from the Director of Public Instruction R.C. No. 1862/16, dated 23rd October 1917, should be carefully observed in carrying out the scheme.

S. B. MURRAY,
Chief Engineer, P.W.D.

Order—No. 100, Home (Education), dated 29th January 1918.

In supersession of G.O. No. 831, Educational, dated the 31st July 1916, the Government are pleased to sanction a grant not exceeding two-thirds of the actual expenditure, nor Rs. 11,233 towards the cost of the water-supply scheme for St. Patrick's Orphanage, Adyar, subject to the following conditions:—

- (1) that in carrying out the work the suggestions of the Sanitary Engineer in his report, dated the 17th September 1917, are adopted; and
- (2) that all the conditions prescribed in the Code of Regulations for European schools have been duly complied with.

2. On the above conditions being fulfilled the grant will be paid as funds become available.

(True extract)

R. RAMACHANDRA RAO,
Secretary to Government.

To the Director of Public Instruction with plans, estimates and Chief Engineer's note.
" Accountant-General.
" Public Works Department.
" Collector of Madras. *Ching Lepet.*
Editors' Table (Order only).

CURRENT No.

PUBLIC WORKS DEPARTMENT

Subject:—

Gono 100 Home (Ed)
29-1-18
Not to be printed
NOTES.

Edm. no. 1524 B-1

6-12-17

PUBLIC WORKS DEPARTMENT.

C. No. 2930 W. K. S. B.

DATE 5-12-1917.

PW no. 2930 12/17

19-1-18

with a note of having

[The plans have not yet been recd.
The P.W.D. has been telephoned for
them.]
PP
22-1-18

MAS
6/12

Th.

1.12.17

Note by the Chief Engineer P.W.D. no. 4190

By Secy

The Chief Engineer has Scrutinized the proposals and approves of the scheme - vide file of. The file may be returned to Home (Edm.).

Mo
18/12
Pb
18.12
C. W. S.

Home (Edm.) co.



19-1-18

us

(A)

In G.O. No. 831 dated the 31-7-16 order was sanctioned towards the cost of the now recommends the payment of In view of the undertaking given to G.O. no. 1 submitted that his recommendation

(K)

vide art. 57 of the Code of Regulations for Europe
which allows a two-thirds grant in special cases
2. A draft order is submitted for approval

PP
25.1.18.
25.1.18.

S. J. S.
28.

Wm. B.
29/1/18

where $w = 120 \text{ lb}$

$$h^2 = 7.5 \times 7.5 = 56.25 \text{ ft}$$

$$\frac{1 - \sin \phi}{1 + \sin \phi} \text{ for } 1\frac{1}{2}:1 \text{ slope} = 0.287$$

Grant

EDUCATIONAL DEPARTMENT.

(a) supersession of the previous orders on this subject.)
 Sanctioning for a — of Rs 11,233 towards the cost of the water supply scheme for St Patrick's Orphanage, Adyar.

READ AGAIN G.O., No. 838 Sd, dated the 31-7-1916. (L)

" " " " 1027 Home (Sd), " " 8-8-1917. (K)

READ ALSO:-

C. No. 1524 G, From the 280, No. 1862/16, dated the 23.11.1917.

" " " " " " " " 191.

" " " " " " " " 191.

Note by the Chief Engineer PWD, " 419 C, " " 19-1-1918.

ORDER.

No. 100, dated 191.

P.S.

(L)

In supersession of G.O. No. 831 Sd, the 31-7-16
 THE Government are pleased to sanction a

grant not exceeding ^{two} ~~one~~ thirds of the actual ex-

penditure, nor Rs. 11,233/-

towards the cost of the water supply scheme
 for St Patrick's Orphanage, Adyar,

subject to the following conditions:-

(1) that in carrying out the work the suggestions of the ^{Sanitary} ~~Chief~~ Engineer in his ^{note} ~~report~~ ^{of the 17-2-17} ~~read above~~ are adopted; and

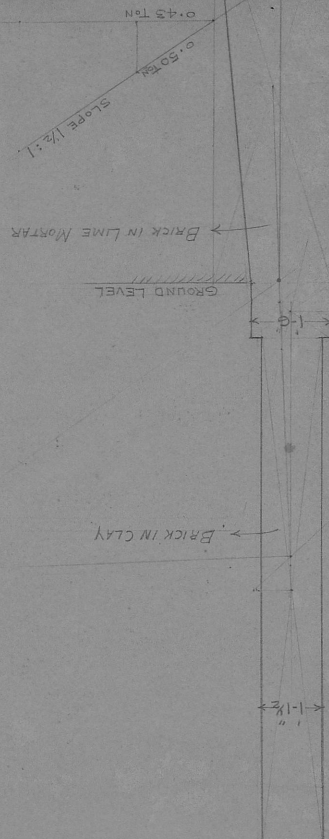
(2) that all the conditions prescribed in the Grant-in-Aid Code ^{of Regulations for Engineers} have been duly complied with.

2. On the above conditions being fulfilled the grant will be paid as funds become available.

28.1.18
 CR
 25.1.18

To The Director of Public Instruction with plans
 estimated and Chief Engineer's Note
 " Accountant-General
 " PWD with the sketch at (M)
 " Collector of Madras District

R.T. (order only)



for drawing = 1/2" = 1/2 a Ton

for drawing = 1/2" = 1/2 a Ton

Engineer's house

and of Pump Chamber wall of the

Adyar, Madras.

in connection to St. Patrick's Orphanage

G.O. No. 100, 29th January 1918 Grant

Sanctioning in supersession of the previous orders on the subject, a — of Rs. 11,233 towards the cost of the water-supply scheme for St. Patrick's Orphanage, Adyar.
REED—the following papers:—

G.O. No. 831, Home (Educational), dated 31st July 1917.
G.O. No. 1027, Home (Educational), dated 8th August 1917.

Letter—from the Hon'ble Mr. J. H. STONE, M.A., F.R.H.S., C.I.E., Director of Public Instruction.
To—the Secretary to Government, Home (Education) Department.
Dated—Madras, the 23rd November 1917.
No.—R.C. 1862/16.

With reference to G.O. No. 1027, Home (Education), dated 8th August 1917, regarding the water-supply scheme for St. Patrick's Orphanage, Adyar, I have the honour to submit revised plans (Nos. 21 E/1 to 21 E/5) and estimates amounting to Rs. 16,850 and a report from the Sanitary Engineer to Government received from the correspondent. The correspondent states that the considerable rise in the estimates which has been accounted for in the Sanitary Engineer's report makes it absolutely impossible for the management to meet half the cost, and requests therefore that a two-thirds grant may be sanctioned as a very special case. In the circumstances stated, I beg to recommend the request for sanction.

2. The grant, if sanctioned, may be paid when funds are available.

ENCLOSURE

Water-supply for St. Patrick's Orphanage, Adyar.

St. Patrick's Orphanage is located on the right bank of the Adyar river near its mouth and between the Buckingham canal and the Adyar Bridge Road.

2. The area of the compound is large the surface soil being generally brick earth with alluvial clay and sand underneath and syenitic rock at a depth of about 45 feet. Good water in quantity is remarkable for its absence. Investigation by boring has shown that this is due to the fact that the estate occupies what must have been in ancient days part of a backwater or the bed of the river Adyar. Consequently except in the upper layers there is no fresh water as the alluvial clay deposited on the site when the area was a backwater or part of the Adyar river bed, which at this place is under tidal influence, contain salts either alkaline or acid which render the water contained in the deeper layers of the subsoil either alkaline or brackish.

3. Investigation for a water-supply by the Orphanage authorities has been going on for many years and the undersigned has given advice from time to time.

4. Lately three borings have been put down. Two of these were put down inside existing wells, i.e., the present drinking-water well and a well in the mango tops to the south-east of the Orphanage buildings and the third at a selected point between the drinking-water well and the Orphanage buildings. All these borings show the existence of fresh water in limited quantity in the upper layers and alkaline water at greater depths.

5. The third boring referred to above (called first boring on the plans) was put down to a depth of 108 feet 10 inches, rock being met with at a depth of 46 feet. The water from the clay, sand and pebble layer above the rock level at 46 feet, while ample in quantity and artesian in character, was unfortunately found on being analysed to be alkaline and unfit for drinking purposes. It is however considered suitable for washing and other sanitary purposes. In this boring there is a layer of brick earth 7 feet thick, then a layer of black clay 5 feet thick and below this a layer of sand 4 feet thick. These dimensions are shown on the plan of proposed new well and were checked on the spot by the undersigned. The description of soils and depths met with on the boring plan are those given by the master of the Agricultural Department. The water in the upper sand layer was found to be fresh and it appears to be the same layer of sand which provides fresh water for the existing drinking water well in which the second boring was put down.

Abstract I

Sanctioning a grant not exceeding one-half of the actual expenditure or Rs. 2750 towards the cost of providing water supply arrangements for St. Patrick's Orphanage, Adyar.

Abstract II

Declining to allow the free use of boring tools by the St. Patrick's Orphanage, Adyar but promising to consider any application for the enhancement of the grant as a broadly sanctioned.

43
4200
16 Dec
2m
156.

6. In the first boring underneath the sand layer containing fresh water there is clay to a depth of 19 feet and below this a second water bearing stratum of clay and sand mixed. In this layer there is a relatively large quantity of water which on the superincumbent layer of clay being pierced rises to a depth of 13 feet below ground. Unfortunately this water was discovered on analysis at the King Institute to be alkaline and unfit for drinking purposes. The quantity of water from the deep boring in the rock below this water bearing layer was found to be exceedingly small.

7. After the first boring was made the undersigned recommended a boring in the existing drinking-water well 655 feet to the south of the first boring. The results showed practically the same strata as met with in the first boring and also showed that the reason why the existing drinking water well contained fresh water was because its depth was limited to the upper sand layer which as in the first boring contained fresh water. As the quantity of water in the existing drinking-water well was limited, it was hoped to obtain a better supply elsewhere and consequently a third boring was put down in an old masonry well in the mango tops to the south-east.

This boring was taken down to 70 feet and disclosed the same upper strata as in the other borings. The water when analysed from the deeper layers was condemned.

8. The water used by the Orphanage at present from the existing drinking-water well was then chemically analysed by Messrs. W. E. Smith & Co., Madras, and pronounced fit for drinking purposes.

9. There are other wells in the large area, over 166 acres, belonging to the Orphanage, but the surface soil shows the same indications of brick earth and all these wells in the area contain water of doubtful quality and quantity.

10. The problem therefore seemed to resolve itself into constructing a new well at the first boring site to make use of the ample quantity of water found at this site for washing purposes and all other purposes except drinking and cooking, and to continue to rely on the existing drinking water well for drinking-water for the Orphanage population. To avoid the use of two pumping stations it was after very careful consideration decided to place an oil-engine/pumping installation at the new well to supply the water for washing and other purposes except for drinking (and to place in this engine-house a second pump to be driven by the same oil-engine to pump water from the existing water well for the Orphanage. This proposal necessitates the provision of a long suction pipe to the drinking-water well but if the joints of this suction pipe are carefully attended to so as to ensure their being air tight and the pipe is laid at an ascending gradient from the well to the pump as shown in plan No. 5 there will be no difficulty in obtaining a satisfactory result from the pumping operations.

11. It is proposed to pump water and the rate of 25 gallons a minute from the new well to two tanks located on the Orphanage buildings for distribution by pipes for washing and other sanitary purposes and to pump 15 gallons a minute from the existing drinking-water well to one tank on the roof of the Orphanage and distribute the water to the dormitory and public rooms and to the kitchen where taps will be provided. To ensure improved quality to the water it is proposed to install Berkefeld pressure filters at each connexion.

12. The water from the existing drinking-water well is now supplied by means of barrel carts for both drinking and washing and all other purposes. When water for washing and other purposes is supplied from the new well it is expected that the supply from the existing drinking-water well will be sufficient for drinking and cooking purposes for the consumption of St. Patrick's Orphanage population. The number of boys in the Orphanage is 170 at present but the buildings are capable of taking in 250 boys. The number of staff and servants in residence is 14 and 18 respectively.

Detailed description of works proposed.

13. *New well.*—At the site of the new boring a new well will be sunk to a depth of 46 feet below ground which will be to rock level. The bottom part of the well to a height of 9 feet will be provided with weep holes as shown in the plan.

But if the quantity of water met with below 35 feet from ground level is found to be ample, the well sinking may be stopped at this level or just below it. The well proposed is 10 feet in diameter of brick in surki mortar with 18-inch stoning and the usual substantial well curb and holding down bolts as provided in the estimate. The well will be constructed from a depth of 33 feet by the open excavation method and below this level the well will be sunk by divers.

14. *Engine and pump house.*—An engine and pump house will be constructed of three compartments, an engine room 13' ... 10', a pump chamber 14' ... 8' and a store room 10' ... 7'.

These will be built of brick in chunam foundation, basement, archwork, etc., and brick in clay generally in superstructure and plastered with chunam mortar except the pump chamber which being below ground will be plastered with cement. The depth of the floor of the pump chamber below ground level is 7 feet this depth being required to permit of a sufficient depth for

the suction pipe as the static water levels of the new well and the existing drinking water well are about 16 feet below ground level in dry weather.

The engine and pump houses are roofed with Mangalore tiles and the store room is provided with wooden racks for storing spares and oil and other articles required for the engine and pumps.

15. *Engine and pumps.*—An oil-engine of the Blackstone type as used at Kumbakonam and Kurumbal municipal pumping stations is provided in the estimate.

The power of this engine provided in the estimate is three brake horse-power but the suppliers must guarantee that the engine supplied will drive the pumps and pump the required quantity of water to the tanks on the roof of the Orphanage new building. Appendix No. 1 shows the calculations for the size of engine required. The pumps provided in the estimate are two 2-inch centrifugal pumps. These pumps shall be guaranteed by the suppliers to do the work efficiently required of them and to be capable of being driven by the oil-engine to be provided in the engine house by the suppliers. In the pump chamber there is also a small semi-rotary pump for pumping out still water from a sump in the floor and two iron ladders are provided for entrance into the pump chamber from the engine room. A neat iron fence is carried forward from the ladders to the beginning of the belt slope to prevent accidents to the drivers of the plant.

16. *Suction pipe.*—The suction pipe from the new well will be of ordinary length and 2½ inches in diameter of cast iron flanged pipes. The suction pipe from the existing drinking water well will be 3 inches in diameter and 655 feet long.

This pipe will be of cast iron spigot and socket and carefully lead-jointed so as to have airtight joints. At the drinking water well end there will be a masonry block surrounding the pipe at the first joint near the well to prevent drawing of suction pipe by the strain caused by the vertical overhanging suction pipe. In laying this suction pipe it shall be carefully laid at an ascending gradient from the well to the pump of 1 in 437 feet and the filling in shall be of clay (from the excavation) and carefully tamped around the pipe to make it thoroughly airtight.

At the highest part of the pipe nearest the pump there shall be a small petcock to allow of the escape of air when opened during the running of the pump. At the well end there will be the usual vertical suction pipe with flanged joints and rubber insertion washers and an efficient suction valve shall be provided.

To enable the long suction pipe to be charged with water, provision is made for a by-pass 1½ inches pipe from the discharge pipe to the suction pipe beyond the pump.

17. *Discharge pipes from pumps.*—The discharge pipes from both pumps will be 2½ inches spigot and socket cast iron pipes lead-jointed, and will be laid under ground as far as the new building of the Orphanage and then taken vertically to the tanks on the roof of the new dormitory building. The pipes where they are placed vertically against walls shall be suitably clamped to the walls where required. The discharge pipe of the drinking water-supply shall enter the supply tank near the bottom so as to provide water for charging the suction pipe of the pumps and there shall be a relief valve on the discharge pipe between the charging pipe and the pump.

18. *Tanks and distribution pipes.*—There shall be two tanks for the washing and sanitary supply. One of these tanks is shown on the new dormitory building connected to the discharge pipe from the pump, and the other is shown on the school building supplied from the distribution pipe. The latter is intended for bathrooms in this building and as it will be located at a lower level than the tank on the new dormitory building it shall be provided with an automatic ball valve arrangement from the distribution supply pipe to cut off supply when it is full.

The distribution pipes from the washing water tanks will supply the dormitory requirements and the school building requirements, the bathroom, latrine kitchen and cowlshed. In the latter the water will only be used for washing purposes.

The drinking water shall be placed on the new dormitory building and the distribution pipes therefrom shall supply Berkfeld pressure filters in the dormitory school building and the kitchen. In the latter the water will be used for cooking purposes.

19. *Cost of the scheme.*—The total cost of the scheme is Rs. 16,850. This includes the expenditure already incurred by the correspondent of the Orphanage, Rs. 1,025 for the three borings which were carried out by the boring party lent by the Agricultural department. The cost of the scheme is higher than it would have been, due to the exceptional conditions which required two separate installations—one for washing and other sanitary purposes and the other for drinking-water supply.

This duplex scheme requires separate suction pipes one of long length and separate discharge and distribution pipes and two pumps are also required.

20. *Conclusion.*—The St. Patrick's Orphanage is an important one carried on by the Brothers of St. Patrick. A large number of boys are in residence and it is of the utmost importance to the health of the inmates that the water-supply arrangements should be protected and improved.

The water from the existing drinking well is proposed to be protected by supplying it through pipes under pressure with Berkefeld pressure filters at each tap. The well itself will have silt removed, petty repairs done and a barbed wire fence with gate put up around the well at a distance of 50 feet from it. This will remove present source of contamination by the use of barrel carts and the presence of puddles of spill water.

The washing, bathroom and sanitary arrangements of a large Orphanage require more water than is possible with the present system of barrel carts and the arrangements generally require to be modernised by provision of a piped supply of ample quantity.

From a prolonged study of the water-supply problem of St. Patrick's Orphanage the undersigned does not consider that any better supply than the one contemplated in the scheme described above can be formulated and consequently the present scheme is recommended for sanction.

List of plans and estimates to accompany the above—

- (1) Map showing St. Patrick's Orphanage, Adyar.
- (2) Sections showing boring results.
- (3) Plan of wells.
- (4) Plan of engine-house.
- (5) Hydraulic sections.
- (6) Estimate amounting to Rs. 16,850.

W. HUTTON,
Superintending Engineer
Sanitary Engineer to Government.

III

**Note by the Chief Engineer, Public Works Department, No. 419-C,
dated 19th January 1918.**

The scheme prepared by the Sanitary Engineer has been examined in the Chief Engineer's office and his proposals are approved. The instructions contained in the Sanitary Engineer's report dated 17th September 1917, which accompanied the letter from the Director of Public Instruction R.C. No. 1862/16, dated 23rd October 1917, should be carefully observed in carrying out the scheme.

S. B. MURRAY,
Chief Engineer, P.W.D.

Order—No. 100, HOME (Education), dated 29th January 1918.

In supersession of G.O. No. 831, Educational, dated the 31st July 1916, the Government are pleased to sanction a grant not exceeding two-thirds of the actual expenditure, nor Rs. 11,233 towards the cost of the water-supply scheme for St. Patrick's Orphanage, Adyar, subject to the following conditions:—

(1) that in carrying out the work the suggestions of the Sanitary Engineer in his report, dated the 17th September 1917, are adopted; and
(2) that all the conditions prescribed in the Code of Regulations for European schools have been duly complied with.

2. On the above conditions being fulfilled the grant will be paid as funds become available.

(True extract)

B. RAMACHANDRA RAO,
Secretary to Government.

To the Director of Public Instruction with plans, estimates and Chief Engineer's note.

.. Accountant-General.
.. Public Works Department, with the sketch at M.
.. Collector of Revenue.
Editor's Table (Order only).

Rao

Current No. dated 191 ..

G.O. No. 100, dated 29. 1. 1918.

Number of MS. pages sent {
 (b) Correspondence
 (b1) Notes
 (b)

Brief subject

(a) Number of copies required when struck off (not including copies for volumes and editors' table which are retained in the Press).	E. 1. copies to supply requisitions for purchase by the public.	Complete correspondence and orders.	Notes
FOR RECORD.			
Madras Records	4	20	
Ooty Records		5	
For filing with original		7	
Total ..		26	
FOR ISSUE.			

	Letter only	Complete G.O.	(b) Special issue copies of G.O.		Notes
			No.	Papers.	
Signature copies.....					
India Office.....		4			
Govt. of India.....					
Revenue Department.....					
Public Works Department.....					
Local and Municipal Department.....					
Educational Department.....					
.....					
Public Dept.....					
Judicial Dept.....					
Political.....					
Financial Dept.....					
Marine Dept.....					
Ecclesiastical Dept.....					
Total ..					
Spare copies					
The.....		4			
The.....		4			
The.....		2			
The.....					
The.....					
The.....					
The.....					
The.....					
The.....					
The.....					
The.....					
The.....					
The.....					
The.....					
Total ..					

* Copies distributed on (Press Clerk).

* Copies distributed on (Press Despatcher).

* To be initialled and dated.

INSTRUCTIONS FOR THE SECRETARIAT.

(a) If a paper is marked to be printed urgently, the Superintendent of the section concerned should sign the Press slip. The Superintendent should exercise a careful discretion in the matter.

(b) Each letter, memorandum, or order, or set of orders, in the file of correspondence should be headed in succession with the Roman numeral I, II, III, etc., the number being written in red ink or blue chalk above the item. The particular papers to be printed in the special issue-copies should be indicated by the Roman numeral (I, II, etc.) by which that item has been headed in the correspondence file. All matter, including marginal remarks or references, to be printed should be written in ink and matter which should not be printed should be encircled. Initials and signatures that are not quite legible should be re-written distinctly.

(b1) For rules regarding printing of notes, see rule 315 of the office Manual.

(c) The number of copies and the details of distribution should be filled in by the Superintendent or Referencer concerned.

(d) In the absence of special instructions to the Press to keep matter standing for a specified period, ordinary papers of 8 pages and under will be kept standing for one week, and larger papers for two weeks only. The type of notes and of all confidential papers is distributed immediately after striking.

(e) This slip, properly and completely filled in, should accompany every paper sent to Press; it will be returned by the Press when proofs are furnished; it should be sent to the Press when a call is made for revised proofs or when a corrected proof is sent for striking. When finally returned by Press it should be filed with the original order or letter.

INSTRUCTIONS FOR THE PRESS.

(a) If, in the opinion of the Superintendent of the Press, a paper has been marked urgent unnecessarily, he should send the Press slip to the Registrar with a remark to that effect.

(b) Unless a note to the contrary is made against the matter, pencil entries should not be printed. The Superintendent of the Press may bring to the notice of the Registrar any instance of incomplete or careless editing.

(c) Signature copies of letters to the Secretary of State or to the Government of India should be printed on hand-made paper.

(d) This slip should be returned by the Press to the Secretariat when proofs are furnished; it will be sent back to the Press when proofs are returned corrected and should be finally returned to the Secretariat when struck-off copies are supplied.

(e) The names of the Secretary and Members should be printed in full when they occur on the right hand side, only the first time when they appear on the left side, the initials alone being printed later.

A
 Please send proof in duplicate. The
 papers have been carefully edited.

B
 Proof returned corrected. Please strike
 off and send number of copies as indicated.
 Type may be released after usual interval.
 at once.

As the matter is clear
 has been carefully edited, (b) pro
 not be sent. Please print and supply
 number of copies as indicated.
 Type may be released after usual interval.

Referencer.
 Clerk.

Referencer.
 Clerk.

P. N. M. M. M.
 Referencer.
 Clerk.
 8/11/18

Supdt.

Supdt.

Supdt.

SPECIAL INSTRUCTIONS.

TO BE FILLED IN BY THE PRESS.

Diary.		Initials of Press official.		
Received in Press on.....				
First proof furnished on.....				
Call for revised proof received on.....				
Revised proof furnished on.....				
Corrected proof received for striking on.....				
Final copies supplied on.....				

Account of copies.	Complete copies.	Notes.	Issue copies.	Special E.T. edition.
Supplied to Secretariat for Record.....				
" " " Issue.....				
" " " for Extra E.T. copies to supply requisitions for sale to the public.				4
For Volumes.....				
For supply to newspapers and institutions admitted to the privileges of the E.T.				
Total ...				