# Public Works (1898) Department.

**G.O., No.** 3097 W

**DATED** 2nd Dec '98

8/12/98

[Despatch Abstract.]

Taluk office at Tirukkoyilur

Approving the recommendation of the Chief Engineer to build a wall in continuation of the existing hedge round the —— and stating that in the matter of enclosures to be provided for public buildings, local circumstances must determine the material to be used in each case.

280/15

2/13

Indexed 6/12

[P. W. 26.
1,000—12-1-98.]

## BACK PAPERS.

| G.O. | No. | Department. | Date. | G.O. | No. | Department. | Date. |
|---|---|---|---|---|---|---|---|
| 3575W | | 22.12.97 | | | | | |
| 4245C | | 22.10.97 | | | | | |
| | | Cbe | | | | | |

## FURTHER PAPERS.

| G.O. | No. | Department. | Date. | G.O. | No. | Department. | Date. |
|---|---|---|---|---|---|---|---|
| | | | | | | | |

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BUILDINGS AND ROADS.
CIVIL WORKS.

# Government {1898} of Madras.
## PUBLIC WORKS.

*Recd.* } 1898.
*Regd.*

*Enclosures*

*Spare copies*

## G.O., No. 3097 W., 2nd December 1898.

## DECEMBER.

### Taluk Office at Tirukkoyilur

Approving the recommendation of the Chief Engineer to build a wall in continuation of the existing hedge round the —, and stating that, in the matter of enclosures to be provided for public buildings, local circumstances must determine the material to be used in each case.

GOVERNMENT OF MADRAS.

## PUBLIC WORKS DEPARTMENT.

### Buildings and Roads.
### Civil Works.

Read—the following papers:—

From C. A. SMITH, Esq., Executive Engineer, South Arcot Division, to the Superintending Engineer, V Circle, dated 20th May 1898, No. 373 S.E.

[*Reference.*—Your No. 19 S.A. of 12th January 1898.]

I have the honour to point out that the site is a very exposed one and it is not likely that either a mud wall or a sun-dried brick in mud wall will prove satisfactory.

2. I, however, submit data for—

(1) Mud;
(2) Sun-dried bricks in mud;
(3) Burnt stone in mud;

and would strongly recommend the adoption of No. (3).

3. I have also to bring to your notice that, out of a length of 1,221 feet provided in the original estimate, a length of 421 feet is at present occupied by an excellent prickly-pear fence, and, as it is some distance from the cutcherry, it may, I think, be allowed to remain. This 421 feet as well as the remainder of the southern boundary, 321 feet in length, or altogether 742, is demarcated by a line of well grown Korakapalli saplings, which with a little attention would soon form a very good hedge, and I would recommend that, with a view to economy, no wall be provided for this part of the compound.

4. I enclose a comparative statement showing the cost of the various proposals.

5. I have also to remind you that an estimate has already been sanctioned for a compound wall for the adjoining Sub-Magistrate's cutcherry of the same design as that objected to for the Tahsildar's cutcherry (estimate Rs. 750, Register No. 36 of 1896-97) and that it is desirable to adopt the same design for both, as there will be a continuous wall round the two buildings.

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No. 388 W.

Submitted to the Chief Engineer, Public Works Department, with reference to G.O., No. 3575 W., dated 25th December 1897. An alternative design for a brick in mortar wall, 4½″ thick, with 9″ pilasters, is estimated for in the last column of statement.

(Signed) A. W. SMART, Colonel, R.E.,
15th June 1898. Offg. Superintending Engineer, V Circle.

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Note by the Chief Engineer, Public Works Department, dated 25th July 1898.

Order—No. 3097 W., dated 2nd December 1898.

With his letter, No. 254 M., dated 2nd September 1897, the Superintending Engineer, V Circle, submitted an estimate of Rs. 2,140 for constructing a masonry compound wall round the Taluk office at Tirukkóyilúr, in the South Arcot district, and this estimate was forwarded by the Collector to the Board of Revenue for the sanction of Government. The Board called upon the Collector to state whether a mud wall with tiled coping, which would be much cheaper, could not be substituted. The Collector reported that the erection of mud walls would prove less economical in the long run, as they would have to be repaired almost every year, and recommended that a wire fence at an estimated cost of Rs. 300 might be provided, and that the Korakapalli hedge which existed in some parts only be also completed. He also remarked that mud for erecting walls would have to be carted to the spot from a distance of a mile. The Board thereupon recommended the construction of a plain wire fence at a cost of Rs. 300. The Government, however, observed—*vide* Proceedings, No. 6355-Rev., dated 9th December 1897, that wire fencing was generally stolen, that the replacing of stolen wire would cost more than the repair of a mud wall, that the repairs to such a wall would afford excellent employment for the convicts in the sub-jail, and that a wall of sun-dried bricks or mud as originally suggested by the Board would therefore answer the purpose best. The Superintending Engineer was accordingly directed in G.O., No. 3575 W., dated 22nd December 1897, to submit an estimate for a wall of sun-dried bricks or mud with tiled coping.

2. The Executive Engineer, South Arcot Division, submits data for the following descriptions of wall and recommends the construction of a wall of burnt stone in mud:—

| | RS. |
|---|---|
| Mud wall with tiled coping ... ... ... ... ... ... | 537 |
| Wall of sun-dried bricks with tiled coping ... ... ... ... | 865 |
| Wall of burnt stone in mud ... ... ... ... ... ... | 1,042 |

He states that the site is a very exposed one and that it is not likely that either a mud wall or a wall of sun-dried bricks in mud will prove satisfactory. He also remarks that, for a portion of the compound measuring 742 feet which is well protected by prickly-pear and Korakapalli saplings, no wall need be provided. As a further reason for recommending the burnt stone wall, the Executive Engineer states that an estimate for this description of wall for the adjoining Sub-Magistrate's office has been sanctioned and that it is desirable to adopt the same design for both, as there will be a continuous wall round the two buildings. The Superintending Engineer submits another alternative design for a brick in mortar estimated to cost Rs. 490.

3. The Chief Engineer in his note quoted above recommends that, as it will be incongruous and unsightly to have walls of different descriptions adjacent to each other, the advice of the Executive Engineer be followed, *viz.*, to leave as it is the existing length of 742 feet already protected by prickly-pear and Korakapalli saplings and to build a burnt stone wall for the remaining 480 feet at an approximate cost of Rs. 400. This recommendation is approved.

4. The Chief Engineer also re-opens the question of the relative merits of wire fences, mud walls and walls of sun-dried bricks and compares the cost of eight kinds of enclosures. He argues that wire fencing is very economical, that walls of sun-dried bricks or mud walls are perishable and not necessarily economical even as compared with walls built of stone or brick in mortar, since the cost of repairs to these walls would soon make up for the difference in prime cost, and that if the use of wire fencing is to be abandoned, brick or stone walls must generally be substituted with the inevitable result of a large increase in the total cost of buildings without any corresponding advantage. He also states that wire fences, supplemented by a hedge—the wire fence affording protection for the hedge to grow—are suitable in cases where the cost of other materials is considerable, and where the unimportance of the building does not warrant outlay on an enclosure wall, and that if wire fences are properly secured and cared for, they are not easily stolen. He suggests therefore that there should be

no hard and fast rule in regard to the kind of enclosure to be provided for public buildings, and that each case should be decided on its own merits, local circumstances, and local prices of materials being the proper factors to determine what class of wall or other protection is both economical and advisable.

5. His Excellency the Governor in Council agrees with the Chief Engineer that it is inadvisable to lay down any hard and fast rule in regard to the kind of enclosure to be provided for public buildings. Local circumstances must determine the material to be used in each case.

(True Extract.)

Under Secretary to Government.

To the Superintending Engineer, V Circle.
,, other Superintending Engineers.
,, the Consulting Architect to Government.
,, the Superintendent of Works, Lighthouse Division.
,, the Revenue Department.
Judicial Deptt

Exd. Md. Pahilwan.

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Telephone

From
The Under Secretary
Judicial Deptt

To The Under Secretary
P. W. Deptt.

2

Will you please
have G.O. No: 3097 W
d/ 2nd December '98
Communicated to the
Jndl: Department.

V.E.M.
7.1.99.

Reply

The order will be
communicated to Jndl.
today 9/1/99
A&W
2-1-99.

RK The fair copy has
been sent for despatch

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P. W DEPARTMENT.

n Proceedings:—

189 , No.
189 , No.
June , from the S. E. V Circle.
; ”
P.W.D., d/ 25th July 1898.

R. No: 3097 W d/ 2.12.98

With his letter No. 254 dated 2nd September 1897,
he Superintending Engineer
Circle submitted an esti-
ate of Rs 2,140 for con-
structing a masonry com-
und wall round the Taluk
ice at Tirukkoyilur in
South Arcot District, and
is estimate was forwarded
the Collector to the Board
Revenue for the sanction of
ernment. The Board called
on the Collector to state
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tiled coping which would be much cheaper, could not
bstituted. The Collector reported that the erection of
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be repaired almost every
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wire fence at an estimate
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no hard and fast rule in rega
buildings, and that each case
and local prices of materials b
or other protection is both ec

5. His Excellency the G
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to be used in each case.

To the Superintending Engin
,, other Superintending Eng
,, the Consulting Architect t
,, the Superintendent of Wo
,, the Revenue Department.

judicial

Exd. Md. Pahilwan.

have a note made
in the regr. [illegible],

78
7.1.99

Arrangements

Please let me see
original after you
have made the
note

[illegible]
7.11.99

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1/

~~The Hon. Sir Henry Bliss, K.C.I.E.~~

P. W DEPARTMENT.

Papers to be read in Proceedings:—

Again G.O., dated 189 , No.

Again G.O., dated 189 , No.

Print/ Current No. 5076 of 1898, dated 16th June , from the S.E. V Circle.

,, ,, ,, 189 , ,, ; ,,

2 Issue/ ,, 189 , Note by the Chief Engineer, P.W.D., d/ 25th July 1898.

ORDER. No: 3097 W. 2.12.98

(The Revenue Department for favour of counter initials)

With his letter No. 254 dated 2nd September 1897, the Superintending Engineer V Circle submitted an estimate of Rs. 2,140 for constructing a masonry compound wall round the Taluk office at Tirukkoyilur in the South Arcot District, and this estimate was forwarded by the Collector to the Board of Revenue for the sanction of Government. The Board called upon the Collector to state whether a mud wall ~~would~~ with tiled coping, which would be much cheaper, could not be substituted; the Collector reported that the erection of mud walls would prove less economical in the long run, as they would have to be repaired almost every year, and recommended that a wire fence at an estimate

co

P. W. 4.
500—17-6-98.

cost of Rs 300 might be provided, and that the Korkapalle hedge which existed is some parts only be also completed. He also remarked that mud for erecting walls would have to be carted to the spot from a distance of a mile. The Board thereupon recommended the construction of a plain wire fence at a cost of Rs 300. The Government, however, observed, vide Pros: No. 6355 Rev. dated 9th December 1897, that wire fencing was generally stolen, that the replacing of stolen wire would cost more than the repair of a mud wall, that the repairs to such a wall would afford excellent employment for the convicts in the Subjail, and that a wall of sun dried bricks or mud as originally suggested by the Board would therefore answer the purpose best. The Superintending Engineer was accordingly directed in G.O. No. 3575 W. dated 22nd December 1897 to submit an Estimate for

for a wall of sundried briks or mud with tiled coping.

2. The Executive Engineer, South Arcot Division, submits data for the following descriptions of wall and recommends the construction of a wall of burnt stone in mud.

| | Rs |
|---|---|
| Mud wall with tiled coping .. | 537 |
| Wall of sundried bricks with tiled coping ... | 865 |
| Wall of burnt stone in mud .. | 1042 |

He states that the site is a very exposed one and that it is not likely that either a mud wall or a wall of sundried briks in mud will prove satisfactory. He also remarks that for a portion of the compound measuring 742 feet which is well protected by prickly pear and Korakapalli saplings, no wall need be provided. As a further reason for recommending

recommending the burnt stone wall, the Executive Engineer states that an estimate for this description of wall for the adjoining Sub magistrate's office has been sanctioned and that it is desirable to adopt the same design for both as there will be a continuous wall round the two buildings. The Superintending Engineer submits another alternative design for a brick in mortar estimated to cost Rs 490.

3. The Chief Engineer in his note quoted above recommends that, as it will be incongruous and unsightly to have walls of different descriptions adjacent to each other, the advice of the Executive Engineer be followed, viz, to leave as it is the existing length of 742 feet already protected by prickly pear and Kora-Kapalli saplings and to build a burnt stone wall
for

for the remaining 480 feet at an approximate cost of Rs 400. This recommendation is approved.

4. The Chief Engineer also reopens the question of the relative merits of wire fences, mud walls and walls of sundried bricks and compares the cost of 8 kinds of enclosures. He argues that wire fencing is very economical, that walls of sundried bricks or mud walls are perishable and not necessarily economical even as compared with walls built of stone or brick in mortar, since the cost of repairs to these walls would soon make up for the difference in prime cost, and that if the use of wire fencing is to be abandoned, brick or stone walls must generally be substituted with the inevitable result of a large increase in the
total

total cost of buildings without any corresponding advantage. He also states that wire fences, supplemented by a hedge — the wire fence affording protection for the hedge to grow — are suitable in cases where the cost of other materials is considerable, and where the unimportance of the building does not warrant outlay on an enclosure wall, and that if wire fences are properly secured and cared for they are not easily stolen. ~~The Chief Engineer~~ He suggests therefore that there should be no hard and fast rule in regard to the Kind of Enclosure to be provided for public buildings, and that each case should be decided on its own merits, local circumstances, and local prices of materials being the proper factors to determine what class of wall or other protection is both economical and

5. His Excellency the Governor in Council agrees with the Chief Engineer that it is inadvisable to lay down any hard and fast rule in regard to the kind of enclosure to be provided for public buildings. Local circumstances must determine the material to be used in each case.

23.11.98

25/11/98

The S. E. & circle
Other Supty Engrs.
The Consltg. Architect to Government
" Supt. of Works, Lighthouse Dept
" Revenue Department
Judicial dept &

15/11/98

7/11/99

~~and advisable.~~

~~6. In the circumstances explained by the Chief Engineer, His Excellency the Governor in Council has no objection to wire fences being used provided they are properly constructed, and considers that the particular material to be adopted for each public building should depend on local circumstances.~~

4.10.98

Mas

I have lately prohibited the use in the dept of Shaw's patent wire fencing, which is the description [illegible] & recommended Morton's instead, as being much stronger & more durable

& see

A.K. 2-12-98
D.W.

G.W.
Issue

1-12-98

No: 5268 C d/24th Novr: 98.

To

The Revenue Dept u.o.

Paras 5 of the draft G.O. has been altered with reference to your note. Please counter-initial it, if there is now no objection in the Revenue Dept.

A.K.R.
22-11-98.

22-11

W.

25/11/98

Rev. Dept.

Secy

Please see below the draft order sent to this Dept for acceptance in which the P.W.D. propose to sanction the construction of a wall round part of the Tirukoilur Taluq cutcherry & also to issue some general instructions on the subject of walls & wire fences round public buildings.

This Dept has already accepted the decision in the particular case of Tirukoilur (vide notes at page slipped Y)

On the general question the draft order does not appear, I submit, to represent the views of the Govt.

Please see

Hon Member's & H.E.'s notes at page (slipped G.) and His Excellency's further note on page slipped Y.

It seems clear that the views of Hon Mrs & H.E. are that while local circumstances must determine the material for a wall or fence in each case wire fences should be the exception not the rule.

The Hon Sir H Bliss wd apparently bar wire fences altogether but the Hon Mr Arundel & H.E. wd not go so far.

The draft order however, puts the matter the other way & wd apparently make wire fences, if not the rule, at least not the exception. Vide please para 5 of the draft.

28/x/98

7/11/98

D.P.W. wo.

Not nearly!

22.11.98

Para 2 of B.P. in G.O. 6355
9-12-97
7.

E

Rev Dept

P.W. Cus. 5076

To Under Secretary.

An estimate for Rs 2140 for constructing a masonry wall, 1221 ft long, on 3 sides of the Taluk office (including the Sub-jail) at Tirukoilur in the S. Arcot district was forwarded by the Supdg Engineer, V circle, through the Collector and the Board of Rev. The Board requested the Collector to state whether a mud wall with tiled coping which would be much cheaper might not be substituted. The Collector observed that the erection of mud walls would prove less economical in the long run as they would have to be repaired almost every year. He accordingly recommended that a wire fence (as at the Tindivanam taluk office) at an estimated cost of Rs 300 might be

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be provided and the Korkapalli fence now existing in parts only be also completed. He further stated that mud for erecting walls was not available anywhere near and that it would have to be carted to the place from a distance of a mile. The Board thereupon recommended the construction of a plain wire fence costing about Rs 300. When the paper came up to Govt, ~~the [illegible]~~ it was observed that wire fencing ~~is~~ was generally stolen, that the replacement of stolen wire would cost more than ~~such~~ the the repair of a mud wall, that ~~[illegible] and [illegible] therefore~~ the repair of such a wall would ~~[illegible] walls [illegible]~~ afford excellent employment ~~[illegible]~~ for the convicts in the sub-jail ~~[illegible] repairs~~ and that therefore a wall of ~~[illegible]~~ sun-dried bricks or mud as originally ~~[illegible]~~ proposed by the Board would ~~[illegible]~~ answer the purpose best. This ~~[illegible]~~ decision was arrived at by the H.M.'s ~~[illegible]~~ with the opinion ~~[illegible]~~ of the C.E. before them that a wall ~~[illegible]~~ of mud or sundried bricks was a mistake [illegible] infinitely better.

Flag E

Para 4 of B.P. in G.O. $\frac{6355}{9-12-97}$ 7.

G.O. $\frac{6355}{9-12-97}$.

Note by the C.E. "I consider a "wall of mud or sun dried bricks "a mistake; it is always untidy and "needs constant repairs. A wire fence "with stone supports and vertical "wire ties between them is infinitely "better, and with a Korkapilli hedge "planted simultaneously to eventually take its "place, is the best arrangement "possible. Wire fencing is not stolen "in my experience if properly fixed "and looked after" 26-11-97.

The Hon: Mr. Grose: "This is "contrary to my experience. Show the "Hon: Sir H. Bliss"

The Hon: Sir H. Bliss "I should "put up the mud wall. No doubt re- "pairs will be required, but that will "be excellent employment for the sub- "jail convicts. Brick in mud would "of course be better if it can be afforded. "The convicts could easily repair that also"

7-12-97

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(3

Flag. F

2

G.O. $\frac{6356}{9-12-97}$ F

Flag B.

~~[illegible]~~ ~~[illegible]~~. The P.W.D. was accordingly requested to issue orders for the preparation of an estimate for a wall of sundried bricks or mud. In pursuance of this order, the Executive Engineer, S. Arcot ~~Dn.~~ recommends the construction of a ~~[illegible]~~ wall of burnt stone in mud. He states that the site is a very exposed one and that it is not likely that either a mud wall or a wall of sundried bricks in mud will prove satisfactory. He also remarks that for a portion of the [illegible] ground measuring 742 ft which is well protected by prickly pear & Korkapalli saplings ~~and~~ ~~that~~ no wall need be provided. ~~[illegible]~~. As a further reason for recommending the burnt stone wall, the Ex: Engineer states that an estimate for this description of ~~the~~ wall for the for the adjoining Sub Magistrate's Cutchery has been Sanctioned and that it is desirable to adopt the same design for both as there will be a Continuous wall round the two buildings.

3. In para 8 of the P. W. note now sent for Counterinitials, that Dept recommends that, "as it will be incongruous "and unsightly to have "walls of different descriptions "adjacent to each other, the "Executive Engineer's advice "be followed, viz, to leave "as it is, the existing length "of 742 feet already pro- "tected by prickly pear and "Kodukapally saplings and "to build a burnt Stone wall," at a cost of nearly Rs 400. The compound wall of the Sub Magistrate's Cutchery is understood to have been Sanctioned by the Superintending Engineer, and it ~~[illegible]~~ appears from the last sentence of the P.W.D note ~~[illegible]~~ that the wall has already been built ~~[illegible]~~.

[illegible]

4 The P.W.D takes this opportunity to reopen the question of the relative merits of wire fences, mud walls, and ~~brick or stone walls~~ walls of sunfried bricks. It gives estimates for 3 kinds of enclosures, and argues that wire fencing is very economical, that walls of sun-dried bricks or mud are perishable and not necessarily economical even as compared with walls built of stone or of brick in mortar since the cost of repairs would soon make up for the difference in prime cost, and that if the use of wire fencing is to be abandoned brick or stone walls must generally be substituted with the inevitable result of a large increase in the total cost of buildings without any corresponding advantage. It also states that ~~[illegible]~~ the decision as to what kind of wall should be built – whether of mud, of sunbaked bricks, of burnt stone, ~~or~~ of bricks in mortar, — should be left to be decided by the Dept responsible for the construction of the building.

5 The P.W.D note also contains a repetition of the arguments in favour

of wire fencing (with Korkapilli hedge) contained in the ~~a his~~ P.W.D note of the 26th Nov last extracted on the margin of page 2 above. The ~~C.E.~~ P.W.D. contemplates that the Korkapilli hedge should eventually take the place of the wire-fencing, so that ~~the the~~ his proposal is really that Public offices should generally be enclosed by a live hedge of shrubs or trees. This proposal, it will be seen from the draft & the notes under P.W. Current 10683 &c in the linked file, has been accepted by H.E. who has directed that a note should be called for from the ~~P.W.D. that a~~ Forest Dept ~~note th~~ as to the best kind of shrub to be used

flag F

RS
11-8-98

Secy

The proposal to build a wall 480 feet long in continuation of the existing hedge of round the Tirukoilur Office, may it is submitted be accepted.

As to the general question ~~again~~ about [illegible] it [illegible]

Yes
A.24
12.9.98

A.24
12.9.98

that the Govt has twice already condemned the wire fence (Vide notes to G.O. 6355 d 9 Dec 97 Flagged F in this file & the notes to P.W.D memo 20259 C d 6-5-98 flagged E in the linked file above). There can be no objection to a rule that each case should be considered on its merits for in some places stone or brick may not be available or may be too costly and mud may be useless (as on the West Coast). But a wire fence is so generally useless for all practical purposes that Govt has decided that it would be a waste of money to erect it if any substitute cd be found. A Korkapillay hedge needs careful attention & watering until it comes to maturity and unless a special one is entertained for the [illegible] nobody will see to it.

But as the question has been settled there seems no reason to discuss it further.

30/8/8

2/9/8

D.P.W. No.

Noted

5. 9. 8

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## Design of the most economical form of Compound Wall

The first points to be decided are

(a) What is to be allowed for adhesion of country bricks to good hydraulic mortar?

(b) What max^m wind pressure is the wall to be designed to withstand?

Country bricks are rough, and, for purposes of adhesion, are better than the stock bricks made at Madras, which are very smooth. Rankine gives the tenacity of good common mortar at 50 lbs per sq. inch, & lays down that the adhesion may be taken as $\frac{2}{3}$rds of the tenacity, i.e 33 lbs per sq. inch. This is too high, I think, to take in this country. But I consider that 18 lbs per sq. inch may safely be taken, as it agrees with what is commonly allowed by other authorities & with actual experiments with country bricks & hydraulic mortar, as shewn below.

Trautwine gives the adhesion of common bricks to mortar at any age as about 2/4ths the cohesive strength at the same age, & states the average is 18 lbs per sq. inch, & the max^m 24 lbs per sq. inch

Wray (Applications of theory to construction) gives the adhesion of mortar to soft place bricks as 18 lbs per sq. inch.

The Roorkee treatise gives the adhesion of mortar to bricks as 15 to 30 lbs per sq. inch

From actual experiments made at the [illegible] Anicut, 28 lbs per sq. inch tension was obtained after

11 days, & $\frac{2}{3}$rds of this, viz 18 lbs per sq. inch, is the adhesion of the bricks to the mortar. In Trincomalee, a tensile strength of 28 lbs, with shell lime, was attained in 14 days, again representing 18 lbs per sq. inch adhesion. ~~(a) may be~~ Question (a) may therefore be answered by laying down that the adhesion of country bricks to good hydraulic mortar may safely be taken at 18 lbs per sq. inch.

## Wind pressure

We now come to a consideration of query (b).

Stephenson states wind pressure to be low up to a height of 15' from the ground, owing to its being so much lessened by ground friction. Above 20 ft. it gradually increases as the ordinates of a parabola with vertex 72' below ground, the wind pressure at 50' being less than one half of what it is at 200', & only $\frac{1}{3}$rd of what it is at 300'.

For a compound wall in an exposed situation, Scott Moncrieff, on the authority of Unwin, adopts a max^m wind pressure of 20 lbs per sq. ft. Now such a wind pressure is equivalent to a wind velocity of $\sqrt{285 \times 30} = 93$ miles per hour, which is ample for a low compound wall. I do not say that a compound wall, designed to stand only a wind pressure of 30 lbs to the sq. ft, is absolutely safe, but the occasions on which it is likely to be overturned (in portions) by wind pressure are so rare that it is not economical to generally design walls to withstand greater wind pressures. In very exposed situations, such as on the coast, where the force of the wind is not broken by trees or buildings, a max^m wind pressure of 50 lbs may be taken; but, as a general rule, 30 lbs is sufficient.

Beyond designing the wall to withstand wind pressure, it is not necessary to consider any other force to which it may be exposed. The danger of heavy animals, such as buffaloes, running up against it, can be guarded against by digging a trench on the outside. A horse, as I know from personal experience, will knock down a brick wall, 9" thick, if he strikes it in his jump. Again, as a question of economy, it is not worth while to consider such exceptional accidents, which are cheaper to repair, on the very few occasions they can occur, than to generally provide against.

Query (b) may therefore be answered by laying down that it is sufficient to design the compound wall to stand 20 lbs per sq. ft wind pressure, & merely to dig an outside trench to guard against the shocks of heavy animals coming in contact with it.

## Calculations for Compound Wall, 1 brick thick, as shown in Drawing A.

Consider a length from centre to centre of pilasters, 10½', and at a point 1'. 3" above ~~four~~ ground, the weakest point being about this point, & at ground level.

Contents of wall above point $= 9'.4\frac{1}{2}'' \times 2' \times 9'' + 1'.1\frac{1}{2}'' \times 1'.1\frac{1}{2}'' \times 2'$

$+ 10\frac{1}{2}' \times 1'.1\frac{1}{2}'' \times 6'' + 2' + 1'.1\frac{1}{2}'' \times 2\frac{1}{4}'' \times 6'' - 8\{4\frac{1}{2}'' \times 3'' + 1\frac{1}{2}' \times 9''\}9''$

$= \{14.06 + 2.53 + 5.91 + 0.28\} - 7.31$

$= 15.5$ cub. ft

Taking weight of brickwork at 112 lbs per cub. ft

Weight of above length of wall = 1736 lbs = W.

Area of joint $= 1'.1\frac{1}{2}'' \times 1'.1\frac{1}{2}'' + 9'' \times 4\frac{1}{2}'' \times 9''$

$= 1.26 + 2.53$

$= 3.79$ sq. ft

$= 546$ square inches

∴ Normal pressure = 3.18 lbs per sq. inch

Vertical area $= 10.5 \times 2.5 - 8\left\{\frac{3}{8} + \frac{1}{4} + 1\frac{1}{2} + \frac{3}{4}\right\}$

$= 26.25 - 9.75$

$= 16.50$ sq. ft

Wind pressure $= 16.5 \times 30 = 495$ lbs

Moment of wind pressure $= 495 \times 1.25 \times 12$

$= 7425$ inch lbs

$= P \times 247.5$

$\therefore P \times 247.5 = \frac{f_0}{y_0} I$, $f_0$ being safe adhesion of bricks to mortar

$= f_0 \times \dfrac{\frac{1}{6}\left\{\cancel{1.125}^4 + 9 \times 4.5 \times 9^3\right\}}{13.5}$

$= f_0 \times \frac{1}{6}\left(2460.375 + 2187\right)$

$= f_0 \times 774.5625$

$\therefore \frac{P}{f_0} = \frac{774.5625}{247.5} = 3.18$ lbs per sq. in

lbs per sq. ft (P) — lbs per sq. in ($f_0$)

∴ If $P = 30$, $f_0 = 9.7$. Tension $= 3.18 - 9.7$

$= -6.52$ lbs per sq. ~~ft~~ in

which makes the wall unnecessarily strong, since an adhesion of 18 lbs per sq. inch can be reckoned on.

If $P = 40$, $f_0 = 12.9$. Tension $= 3.18 - 12.49$

$= -9.72$ lbs per sq. inch

And if

$P = 50$, $f_0 = 16.1$. Tension $= 3.18 - 16.1$

$= -12.92$ lbs per sq. in

In other words, wall A will stand a wind pressure of as much as 50 lbs on the square foot, which is strong enough for the most exposed situations

Second. Consider a joint 9" above concrete.

Weight $= 112\left\{15.5 + 9.375 \times 0.5 + 0.75 \times 1.125^2 \times 0.5 - 8 \times \frac{3}{8} \times \frac{1}{4} \times 0.75\right\}$

$= 112\left\{15.5 + 3.516 + 0.633 - 0.56\right\}$

$= 112 \times 19.09$

$= 2138$ lbs

---

Area $= 9.375 \times 0.75 + 1.125^2 = 7.03 + 1.26$

$= 8.29$ sq. ft

$= 1183$ sq. inches

∴ Average normal pressure = 1.8 lbs per sq. in

Vert area $= 10.5 \times 3 = 31.5$ sq. ft

∴ Wind pressure $= P \times 31.5$ lbs, and centre of pressure is 18" above joint

∴ Moment of wind pressure $= 567\,P$ inch lbs

Moment of resistance $= \frac{f_0}{y_0} I$

$= f_0 \times \frac{1}{\cancel{12}\,6}\left\{\dfrac{13.5^4 + 112.5 \times 9^3}{\frac{13.5}{2}}\right\}$

$= f_0 \times 1422$

$\therefore \frac{P}{f_0} = \frac{1422}{567} = 2.5$ lbs per sq. in

| lbs per sq. ft | lbs per sq. in | |
|---|---|---|
| $P = 30$ | $f_0 = 12$ | & Tension $= 1.8 - 12 = -10.2$ |
| $P = 40$ | $f_0 = 16$ | $= 1.8 - 16 = -14.2$ |
| $P = 50$ | $f_0 = 20$ | $= 1.8 - 20 = 18.2$ |

Lastly, consider a joint at ground level

Weight $= 112\left\{19.09 + 9 \times \frac{3}{4} \times 1\frac{1}{8} + 1\frac{1}{2} \times 1\frac{1}{2} \times \frac{3}{4}\right\}$

$= 112\left(19.09 + 7.59 + 1.69\right)$

$= 3177.44$ lbs

Area $= 9 \times 1\frac{1}{8} + 1\frac{1}{2} \times 1\frac{1}{2} = 10.125 + 2.25$

$= 12.375$ sq. ft

$= 1782$ sq. in

∴ Average normal pressure = 1.78 lbs per sq. in

Area of wall $= 3.75 \times 10.5 = 39.375$ sq. ft

∴ Wind pressure $= 39.375\,P$, & centre of pressure is 1.875 ft above joint = 22.5 inches

∴ Moment of wind pressure = 866 P inch lbs

Moment of resistance = $\frac{f_0}{30}$ I

$$= f_0 \times \frac{\frac{1}{12}\left(\overset{8748}{\cancel{1049}} \div 6 + \overset{9}{\cancel{109}} \times 24\ 60\cdot375\right)}{0\cdot75}$$

$= f_0 \times 3432$ inch lbs

∴ $\frac{P}{f_0} = \frac{3432}{866} = 3\cdot96$ lbs per sq in

| lbs per sq. ft | lbs per sq. in | ~~& tension = 1·78 ~ 7·6 = 5·82 lbs~~ |
|---|---|---|
| P = 30 | $f_0$ = 7·6 | & tension = 1·78 ~ 7·6 = 5·82 |
| P = 40 | $f_0$ = 10·1 | = 1·78 ~ 10·1 = 8·32 |
| P = 50 | $f_0$ = 12·6 | = 1·78 ~ 12·6 = 10·82 |

Wall A will therefore stand 50 lbs wind pressure at every point, & is unnecessarily strong for sheltered situations.

~~Compound Wall. Type B.~~

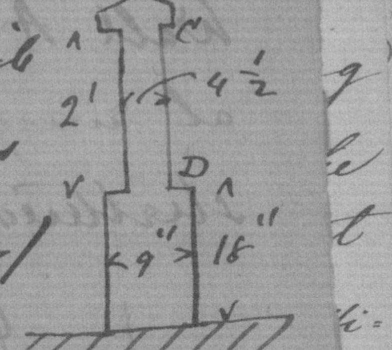
~~Consider joint at ground level.~~

~~Centre of wall~~

The results of the above, & the average cost of a compound Wall, such as shown in drawing A, is shown below:—

| Wind pressure in lbs per sq. ft | Maxm tension joint | | | Cost of Wall |
|---|---|---|---|---|
| | 1'3" above founds | 9" above founds | At ground level | |
| 30 | 6·52 | 10·2 | 5·82 | Average cost of wall, with cement in wind founds, is Rs 1½ per foot run |
| 40 | 9·72 | 14·2 | 8·32 | |
| 50 | 12·92 | 18·2 | 10·82 | |

As will be apparent from the above, the calculations for ascertaining the tensile strength of compound walls is of a very laborious character. A variety of sections of thinner walls have been tried, but if considerable perforations are allowed, as is necessary to reduce the wind force tending to overturn the wall, there is always a weak joint somewhere which fails to answer the conditions (a) and (b) laid down at the head of this paper. I am of opinion, from the calculations I have made (which I do not give here, as they cover pages of rough work, & are tedious to fair copy) that a compound wall, 4' high, of section shown in the margin is safe enough in towns where the wind force is broken by trees & buildings, but I am not prepared to recommend so thin a section as a standard design, as it is theoretically unsafe. Practically in Madras, Compound Walls of such a type have stood safely so far, but that is no reason they should continue to stand when a cyclone breaks in Madras. Secondly, the economy gained by such walls is not sufficient over the wall in drawing A, viz 3 or 4 as per foot run, ~~is not large~~



to justify the risk run by recommending them for general adoption. I should have no hesitation myself in building such walls in sheltered positions, but not elsewhere.

ACK
22.7.98.

N. B. It should be noted that the strength of the walls is in the pilasters, & that pilasters of 1 brick thick are insufficient. Secondly, the weakest point is a matter of calculation, & is not necessarily at ground level as in most structures subject to wind pressure.

ACK.

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P. W. Cl. 5076

W

Submitted for orders.

The Secretary to Govt, Revenue Department, has counterinitialled the Note for orders in the P. W. Dept. regarding the kind of enclosure to be put up for Govt. buildings. He has also initialled the note in his Department suggesting that the question need not be reopened and forwards that note to this Department unofficially.

5/9/8.

Seen
5-9-98

W

Orders are requested as to whether the Note for orders drafted in the P. W. D. may be sent to H. E. & the H. Ms.

5/9/8.

Do
6-9-98

P.W. DEPARTMENT.

C. No. 5076

(1) HIS EXCELLENCY THE GOVERNOR.
(2) THE HON'BLE SIR HENRY BLISS, K.C.I.E.
(3) THE HON'BLE MR. ~~GROSE, C.I.E.~~ Arundel

SUBJECT.

Enclosure wall to Tirukoilur taluq Cutcherry, and unsuitability of any general rule prescribing mud walls in place of wire fencing or other protections to compounds of buildings.

~~FOR ORDERS.~~ Note by E.W.

The Revenue Department for favour of counterinitials.

vide separate note flagged Z

The advisability of substituting mud compound walls for wire fences has recently been decided by Government in Departments other than the P.W.D. The latest G.O. on the subject (6355 of 9th December 1897) was sent to this Department for counterinitials, and issued in spite of my protest against such walls, and I wish to take this opportunity of showing how unsuitable is any hard and fast rule on the subject.

2. For the enclosure wall of Tirukoilur taluq Cutcherry the S.E. V circle submits with reference to the above G.O.* 4 estimates as follows:—

× Flag E

For

[P. W. 43. / 500—24-3-93.]

H.Mr. (1) & (2). 13.9.98 R 14.9.98
J. Bock 28.7.98 H.E. 6.9.98 R 13.9.98

For a length of 1221 feet.

| | Rs |
|---|---|
| (1) Wall of burnt stone in mud | 1042 |
| (2) Wall of sun dried ~~bridge~~ bricks with tiled Coping | 865 |
| (3) Mud wall with tiled Coping | 537 |
| (4) Wall of bricks in Mortar | 490 |

3. To these estimates can be added the following estimates prepared in this Office for a similar length of 1221 feet.

| | |
|---|---|
| (5) Wall similar to (4) but built of Stock bricks & best hydraulic lime | 825 |
| (6) Wall similar to (5) but built in Cement for half way from ground level | 1150 |
| (7) Wire fencing, 4 feet high, with 5 lines of wire, including cost of 100× miles of rail Carriage | 250 |
| (8) Wall, 1 brick thick, as shown in drawing A | 1068 |

× Rs 6 per mile

4. From the above 8 estimates it will be seen that wire fencing is very economical and the cost of Carriage small. Walls (2) & (3) of sun dried bricks or of mud, are however distinctly perishable & not necessarily economical at all, even as compared with walls built of stone or brick in mortar, since the cost of repairs would soon make up for the difference in prime cost.

5. It is surely possible to find more useful employment for Convicts than repairing walls which, if built of proper materials, would need no such repairs. In any district in the Presidency mud walls are liable to collapse in the monsoon rains. Suitable earth for making them is not always readily procurable, and their cost fluctuates greatly with the distance earth has to be carried, and may in certain cases amount to as much as the cost of brick or stone walls — a sufficient reason why any hard and fast rule in favour of their construction is opposed to the most elementary principles of economy. Owing to the uncertainty of their original cost, and to their want of durability, it is thus patent that, in the long run, mud walls are not economical. Local circumstances, and local prices of materials, are the

proper

factors to determine what class of wall, or other protection, is both economical and advisable in each particular case, and the decision should be left to the Department responsible for the construction of the ~~boundary~~ building.

6. Wire fences, supplemented by a hedge, — the wire fence affording protection for the hedge to grow — are suitable in cases where the cost of other materials is considerable, and where the unimportance of the building does not warrant outlay on an enclosure wall. If properly secured and cared for, they are not easily stolen, and this contingency is not a sufficient reason for abandoning them. Such fences are more largely used than ever in every civilised country, and if their use is to be abandoned in this Presidency, brick or stone walls must be generally substituted — the inevitable result being

This begs the whole question — wire fences will never, or hardly ever, be properly secured or cared for — once the P.W.D. has constructed them, they pass into the hands of the dept. using the building, i.e. of some Tahr. or Dt. Muff. who has no idea how to keep them up, whereas he does know how to keep a common wall in repair & can get the work done locally without troubling the P.W.D.

HS

But is this a civilized Country?

HS

a large increase, without any corresponding advantage, on the total cost of buildings.

7. With regard to the respective estimates submitted by Col. Smart wall (4) has been ~~passed~~ proved by calculations in this Office to be not safe against wind pressure, and wall (5) is too weak to be generally adopted. Walls (1) or (8) must therefore be built if wire fencing is to be abandoned.

8. In the particular case of the Tirukoilur taluq Cutcherry under reference, it is recommended that, as it will be incongruous and unsightly to have walls of different descriptions adjacent to each other, the Executive Engineer's advice be followed viz to leave, as it is, the existing length of 742 feet alread protected by prickly pear or Korakapully sapling, and to build a wall of the same description, as that alread

6

built, hard by, for the remaining 480 feet, the cost of so doing being approximately $\frac{1042 \times 479}{1221}$ = Rs 400.

ACK
22.7.98.

26.7

I have no objection – I quite agree that the particular material to be adopted must depend on local circs – all I bar are wire fences.

14/9/98

I agree to the proposed order.

I do not share my Hon. Colleague's objection to wire fences – provided they are properly constructed.

14. 9. 98

Submitted to His Excellency for orders, there being a diversity of opinion between the two Honourable Members.

16.9.98

[illegible] I concur with the Hon. Mr Arundel

A.E.H 17.9.98

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Drawing A

Compound Wall – Brick in Surki Mortar

30974

| Particulars | No | L | B | D | Contents |
|---|---|---|---|---|---|
| **Mud Concrete** foundations. Under pillasters | 2 | 2 | 2 | 1½ | 12 |
| Under walls | 1 | 8'8" | 1'7½" | 1½ | 21 |
| Total Mud Concrete – | | | | | 33 |
| **Brick in Surki Mortar.** Pillasters | 2 | 1½' | 1½' | 1¼' | 5.63 |
| – do – | 2 | 1-1½ | 1-1½ | 2½ | 6.31 |
| Coping to pillasters | 2 | 1½ | 1½ | ¼ | 0.56 |
| Caps | 2 | 1½ | 1½ | ⅓ | 1.50 |
| Walling | 1 | 9 | 1⅛ | 1¼ | 12.66 |
| " | 1 | 9'4½" | 9" | 2½ | 17.58 |
| Coping | 1 | 9'4½" | 1⅛ | ¼ | 2.63 |
| Cap | 1 | 9'-4½ | ¾ | ⅓ | 2.34 |
| Total Cub Ft. | | | | | 49.21 |
| **Deduction for Openings** | 8 | area 1.31 | ¾ | | 7.86 |
| Total Cub Ft. | | | | | 41.35 |
| **Pointing** | 1 | 10 | 10 | | 100 |
| **Excavation** | | | | | |

**Abstract.**

33 Cub Ft. of Mud concrete @ Rs 6-8-0 per 100 C.Ft. – Rs 2-2-4

| | |
|---|---|
| 41½ Cub Ft. of Brickwork @ Rs 16 per 100 C.Ft. | Rs 6-10-0 |
| Pointing | do 1-8-0 |
| Excavation | do 0-1-0 |
| | Rs 10-5-0 |

1 bay = 10½ Rs ft costs Rs 10-5-0

∴ 1 foot cost 1 Rupee.

20.7.98

ordinary method,
this is not possible.
AEK
22-7-98.

Noted — Are you quite sure that yr estimate for No 7 viz Rs 250 is correct? It seems to me unusually small & in estimates lately submitted by D.S. IV he makes a wire fence cost Rs 400 more than a mud wall with tiled coping.

Something wrong, I fancy.

[illegible] with [illegible]
26.7.98

W. Rs 250 for 1220 ft is quite right, including two miles of rail carriage. The cost of a mile of such wire fencing is only Rs 1050, see precis note attached.
AEK
27.7.98.

ch
ta

R.W. DEPARTMENT.

SUBJECT.

Enclosure wall to [illegible] taluq cutcherry, & unsuitability of any general rule prescribing mud walls in place of wire fencing or other protection to compounds of buildings.

ORDERS.

The advisability of substituting mud walls for wire fences has recently been decided by Govt in Depts other than R.W.D., ~~& opens up a large [illegible] which, as will be shown in memo, has not yet been sufficiently considered; has been referred to S.E.s for opinion; & will be [illegible] for final orders in due~~ a D.Wrk. to take this ~~Meanwhile an~~ opportunity ~~[illegible] in the case of the [illegible] taluq cutcherry~~, of showing [illegible] unsuitable is any hard & fast [illegible] on the subject.

For the enclosure wall of [illegible] taluq cutcherry, the S.E. & Circle submit, [illegible] reference to ~~G.O. No 35~~ the above G.O. of [illegible] the estimates as fol[illegible]

W.

With reference to your marks of 5-7-98. I submit further calculations for a compound wall, from which you will see that it is not advisable to issue a standard design. Walls one brick thick are of ample strength if only 6' high; but, on the other hand, the thickness cannot, even for only 2 ft between coping & base, be reduced with safety to 1/2 a brick.

2. It has thus been necessary to revise the Note for Orders, & I submit a new draft for approval.

3. I have been at considerable trouble to design a thin wall to suit all conditions, & therefore to answer as a standard design, but,

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note for orders drafted by D.W. having been initialled by you, orders are requested as to whether this note should be circulated to H. E. and the Members of Govt., before D. W. answers to your query whether the estimate of Rs 200 for No: 7 is correct.

(2) Instructions are also solicited as to whether the note for orders may be sent to the Revenue Department for counter-initials before being sent round in circulation -

Maj

25/7/98.

(1) No – Send to D. W. first –

(2) Yes

25-7-98

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R.W. DEPARTMENT.

SUBJECT.

Enclosure wall to Tirukoilur taluq cutcherry, & unsuitability of any general rule prescribing mud walls in place of wire fencing or other protection to compounds of buildings.

RDERS.

he advisability of substituting mud walls for wire fences has recently been ecided by Govt in Depts other than e R.W.D., ~~It opens up a large question which, as will be shown in the memo, has not yet been sufficiently considered; has been referred to S.E.s for opinion; & will be put up for final orders in due course. Meanwhile an~~ & I wish to take this opportunity ~~now arises, in the case of the Tirukoilur taluq cutchery~~, of showing how unsuitable is any hard & fast rule on the subject.

2. For the enclosure wall of ~~a building~~ Tkr. Taluq cutchery, the S.E. & Collector submit, with reference to ~~G.O. 65-35~~ the above G.O. of Dec/97, 4 estimates as follows: —

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ACK
27-7-98

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R.W. DEPARTMENT.

SUBJECT.
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P.W. DEPARTMENT.

C. No.

HIS EXCELLENCY THE GOVERNOR.
THE HON'BLE SIR HENRY BLISS, K.C.I.E.
THE HON'BLE MR. GROSE, C.I.E.

SUBJECT.

Enclosure wall to Tirukoilur taluq cutcherry, & unsuitability of any general rule prescribing mud walls in place of wire fencing or other protection, to compounds of buildings.

FOR ORDERS.

The advisability of substituting mud compound walls for wire fences has recently been decided by Govt in Depts other than the P.W.D., ~~It seems of a large practical which, as will be shown in this memo, has not yet been sufficiently considered; has been referred to S.E. for opinion; & will be put up for final orders in due course.~~ I wish to take this ~~Meanwhile an~~ opportunity ~~has now arisen, in the case of the Tirukoilur taluq cutcherry~~, of showing how unsuitable is any hard & fast rule on the subject.

The latest G.O. on the subject (6535 of 9 Dec 97) was sent to this Dept for countersignature, & I remarked in spite of my protest against ~~mud~~ ~~compound~~ such walls.

2. For the enclosure wall of ~~the building~~ Tirukoilur Taluq cutcherry + Mag C the S.E. & Circle submit, with reference to ~~G.O. 6535~~ the above G.O. of 9 Dec/97, 4 estimates as follows: —

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C. No.

HIS EXCELLENCY THE GOVERNOR.
THE HON'BLE SIR HENRY BLISS, K.C.I.E.
THE HON'BLE MR. GROSE, C.I.E.

SUBJECT.
Enclosure wall to Tirukoilur taluq cutcherry, & unsuitability of any general rule prescribing mud walls in place of wire fencing or other protection to compound of buildings.

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The latest G.O. on the subject (6535 of 9 Dec 97) was sent to this Dept for countersignature, & issued in spite of my protest against ~~most~~ such compound walls.

2. For the enclosure wall of ~~this building,~~ Tirukoilur Taluq cutchery the S.E. & Circle submits, with reference to ~~G.O. No 35~~ the above G.O. of 9 ~~Dec~~/97, 2 estimates as follows: —

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R.W. DEPARTMENT.

C. No.

SUBJECT.

HIS EXCELLENCY THE GOVERNOR.
THE HON'BLE SIR HENRY BLISS, K.C.I.E.
THE HON'BLE MR. GROSE, C.I.E.

Enclosure wall to Tirukoilur taluq cutcherry, & unsuitability of any general rule prescribing mud walls in place of wire fencing or other protection to compounds of buildings.

**FOR ORDERS.**

The advisability of substituting mud compound walls for wire fences has recently been decided by Govt in Depts other than the R.W.D., ~~it opens up a large practical matter, as will be shown in this memo, has not yet been sufficiently considered; has been referred to S.Es for opinion; & will be put up for final orders in due course. Meanwhile an~~ & I wish to take this opportunity ~~has now arisen, in the case of the Tirukoilur taluq cutchery~~, of showing how unsuitable is any hard & fast rule on this subject.

The latest G.O. on the subject (6535 of 9 Dec 97) was sent to this Dept for countersignature, & issued in spite of my protest against ~~mud~~ such compound walls.

2. For the enclosure wall of ~~this building~~ Tirukoilur Taluq cutchery, the S.E. & Circle submit, with reference to ~~G.O. 6535~~ the above G.O. of 9 Dec/97, 4 estimates as follows: —

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11 R.W. DEPARTMENT.

C. No.

HIS EXCELLENCY THE GOVERNOR.
THE HON'BLE SIR HENRY BLISS, K.C.I.E.
THE HON'BLE MR. GROSE, C.I.E.

SUBJECT.

Enclosure wall to Tirukoilur taluq cutcherry, & unsuitability of any general rule prescribing mud walls in place of wire fencing or other protection to compounds of buildings.

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The latest G.O on the subject (6535 of 9 Dec 97) was sent to this Dept for countersignature, & I noted in spite of my protest against such ~~mud compound~~ walls.

2. For the enclosure wall of ~~this building~~ Tirukoilur Taluq cutcherry, the S.E. & Circle submit with reference to ~~G.O. 6535 of 9 Dec 97~~ the above G.O. 4 estimates as follows: —

+ Map C

P. W. 43.
500—27-1-98.

For a length of 1221 ft

1

| | Rs |
|---|---|
| (1) Wall of burnt stone in mud. — | 1042 |
| (2) Wall of sun dried bricks with tiled coping } — | 865 |
| (3) Mud wall with tiled coping — | 537 |
| (4) Wall of brick in mortar — | 490 |

3. To these estimates can be added the following estimate prepared, in this office, for a similar length of 1221'

| | |
|---|---|
| (5) Wall similar to (4) but built of stock bricks & best hydraulic lime* } | 825 |
| (6) Wall similar to (5), but built in cement for half way from ground level } | 1150 |
| (7) Wire fencing, 4' high, with 5 lines of wire, including cost of 100× miles of rail carriage } | 250 |
| (8) Wall 1½ brick thick, as shown in drawing A, | Rs 1068 |

~~* See calculation sheet attached.~~

× Rs 6 per mile

4. From the above 8 estimates it will be seen that ~~while~~ wire fencing is very economical, & the cost of carriage is small. Walls (2) & (3) of sun dried bricks or of mud, however distinctly perishable, & are not necessarily economical at all, even as compared with walls built of ~~mud~~ stone or brick in mortar, since the cost of repairs, ~~the course of ... and ... in~~ would soon make up for the difference in prime cost, ~~(vide calculation sheet attached) that the latter can be built for ... them.~~ ~~& in many cases the cost of carriage of suitable earth for (3) would be prohibitive~~

5. ~~So much for the prime cost. Durability has now to be considered. Walls such as (2) & (3) are distinctly perishable, and require to be frequently attended to & repaired.~~ In any district in the presidency ~~they are liable~~ mud walls are liable

It is surely possible to find more useful employment for convicts than repairing walls which if built of proper material would need no such repairs

12

R.W. DEPARTMENT.

4

C. No.

SUBJECT.

HIS EXCELLENCY THE GOVERNOR.

THE HON'BLE SIR HENRY BLISS, K.C.I.E.

THE HON'BLE MR. GROSE, C.I.E.

FOR ORDERS.

to collapse in the monsoon rains. Suitable earth for making them is not always readily procurable, & their cost fluctuates greatly with the distance earth has to be carried, & may in certain cases amount to ~~more than~~ as much as the cost of brick or stone walls — a sufficient reason why any hard & fast rule in favour of their construction is opposed to the most elementary principles of economy ~~economical construction~~ Owing to the uncertainty of their original cost, & to their want of durability, it is thus patent that, in the long run, mud walls are not economical, & that it is radically unsound to attempt to lay down a cast iron rule prescribing their construction. Local circumstances and local prices of materials also con

P. W. 49.
500-27-1-08.

the proper factors to determine what class of wall or other protection is both economical & advisable in each particular case, & apart from such special ~~are an entire mistake~~s.

6. Wire fences, supplemented by a hedge – the wire fence affording protection for the hedge to grow – are suitable in cases where the cost of other materials is considerable, & where the unimportance of the building does not warrant outlay on an enclosure wall; ~~& should not be lightly abandoned on account of the thieving propensities of the people~~. Such fences are more largely used than are in any civilised country, & if their use is to be abandoned in this Presidency, brick or stone walls must be generally substituted – the inevitable results being a large increase, without any corresponding advantage, in the total cost of buildings.

7. If the accompanying calculation sheet is referred to, it will be seen that the wall (4) proposed by Col. Smart is not safe against wind pressure. Its foundations are quite strong

& the decision should be left to the Dept responsible for the construction of the building

If properly secured a cavel they are not easily stolen & this contingency is not a sufficient reason for abandoning them

7. With reference to the respective estimates submitted by Col Smart, wall (4) has been proved by calculations in this office.

---

2

R.W. DEPARTMENT.

1

C. No.

HIS EXCELLENCY THE GOVERNOR.
THE HON'BLE SIR HENRY BLISS, K.C.I.E.
THE HON'BLE MR. GROSE, C.I.E.

SUBJECT.

and walls (5) (5) is ~~somewhat~~ too weak to be generally adopted. Walls (6) or 8 must therefore be built if wire fencing is to be abandoned

FOR ORDERS.

Which is not safe against wind pressure. An improved design has been made in this Office, vide sketch B in margin, which fulfils this condition & will cost about Rs 650 per 1000 feet, built of stone in lime mortar. Where stone is cheap it may be substituted with advantage.

It is recommended that the above design be adopted (see above) as a standard whenever it is considered necessary to have a compound wall, local materials being used in each case unless pr. [illegible]

P. W. 4.
100–27–1–99

enough except in bad soil – the nature of the soil determining the nature of the foundations – but a wall which, while affording per unit at least equal weight above ground, & having considerably greater tensile resistance – the two counteracting agents to wind pressure – offers less area to wind pressure, would be far more stable. Such a wall can, if ordered, be designed in this Office, & should cost, on the average, about Rs 600 to 700 per every 1221 ft. Wall (5), on such an improved design, will be sufficient in all ordinary situations, & wall (6) in exposed sites. Where stone is cheap, it may of course be substituted with advantage.

8. In the particular case of

the Government orders totally withdrawing under reference, it is recommended that, as it will be incongruous & unsightly to have walls of different descriptions adjacent to each other, the Ex. Eng.'s advice be followed, viz to leave, as it is, the existing length of 742', already protected by prickly pear & korakapully saplings, & to build a wall of the same description, as that already built hard by, for the remaining 480', the cost of so doing being approximately $\frac{1042 \times 479}{1221}$ = Rs 400

AER
25. 6. 98.

A wall of type II is only suitable for ~~[illegible]~~ compound walls in towns where the force of the wind is broken by trees & buildings, and for very exposed situations a wall of type A. costing Rs 1 per ft run will be necessary.

5. 7. 98

---

X. Regr. Sent to Rev. Depts 1-7-98

G.O. Rev. 6355 of 9 Dec 97 has probably been sent to us for C.i. Did we not make any remarks on it? I should like to see the original.

30. 6. 98

W

G.O. No: 6355 d/9-12-97 has been obtained from the Rev. Depts and is submitted herewith. This G.O. was not sent to us for C.i. — yes it was
4/7/98.

+ Yes it was originally to & I objected strongly to mud walls.
W.H.D.

Dho

Please design a wall as referred to in para 7 ~~[illegible]~~ & note, and also its cost [illegible] are very

W

As you are aware, the Public & Revenue Depts have lately returned estimates for buildings with Orders that mud walls are to be substituted for wire fences. This is likely to give a great deal of trouble, and such orders ought not, in my opinion, to have been issued without the concurrence of the P.W. Secy being first obtained.

2. I have therefore been at considerable pains to prove that these Orders were issued under a misconception of the arguments which did determine what sort of protection should be given to the compounds of buildings.

3. My calculation sheet explains itself, & the arithmetical work has been checked by T. Walls as weak as Lt. Smart's are standing

the Limekoshee tally cutcherry under reference, it is recommended that, as it will be incongruous & unsightly to have walls of different descriptions adjacent to each other, the Ex. Engr's advice be followed, viz to leave, as it is, the existing length of 742', already protected by prickly pear & korakapully saplings, & to build a wall of the same description, as that already built hard by, for the remaining 480', the cost of so doing being approximately $\frac{104244 \times 28}{1221}$ = Rs 400

A.C.R.
25.6.98.

A wall of type ~~A~~ II is only suitable for ~~[illegible]~~ compound walls in towns where the force of the wind is broken by trees & buildings, and for any exposed situations a wall of type A, costing Rs 1 per ft. run will be necessary.

5.7.98

---

? Regn. Sent to Rev. Depts 1-7-98.

G.O. Rev. 6355 7
9 Dec 97 has probably been sent to us for C.i. Did we not make any remarks on it? I should like to see the original.

30.6.98

W

G.O. No: 6355 d/9-12-97 has been obtained from the Rev. Depts and is submitted herewith. This G.O. was+ not sent to us for C.i. — [illegible]
4/7/98.

+ Yes it was originally & I rejected [illegible] to [illegible]
W.A.L.

D.W.

Please design a wall as referred to in para 7 & note, [illegible] its cost. Tenders for [illegible] are [illegible]

W

As you are aware, the Public & Revenue Depts have lately returned estimates for buildings with Orders that mud walls are to be substituted for wire fences. This is likely to give a great deal of trouble, and such orders ought not, in my opinion, to have been issued without the consent of the P.W. Dept being first obtained.

2. I have therefore been at considerable pains to prove that these Orders were issued under a misconception of the argument which did determine what sort of protection should be given to the compounds of buildings.

3. My calculation sheet explains itself, & the arithmetical work has been checked by T. Walls as weak as Lt. Smart's are standing

7.9 Leg. 4½ or 5'

think: it should not be less than 9" thick

5.7.98

Madras, and I can find no instance of ~~not~~ such low walls, having ~~being~~ overturned by wind pressure. But I find, calculating that, 15' walls have been overturned, though 1½' thick, with a pressure of 55 lbs to the square ft. Col. Smart's wall is, however, quite unsafe unless very sheltered, and built of the best mortar, so far as calculations goes, & [illegible], I think, they generally built. A wall of improved section, & of better material, will, as I have shown, be practically safe.

4. I have looked up various authorities; and, so far as I can judge, a wind pressure of 30 lbs to the sq. ft is sufficient for a 4' wall, except in very exposed situations, where 50 lbs to the sq. ft may be allowed. APK

25.6.98.

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## Calculation sheet.

To find what wind pressure Col. Smart's proposed enclosure wall will resist, taking into account the tenacity of the mortar.

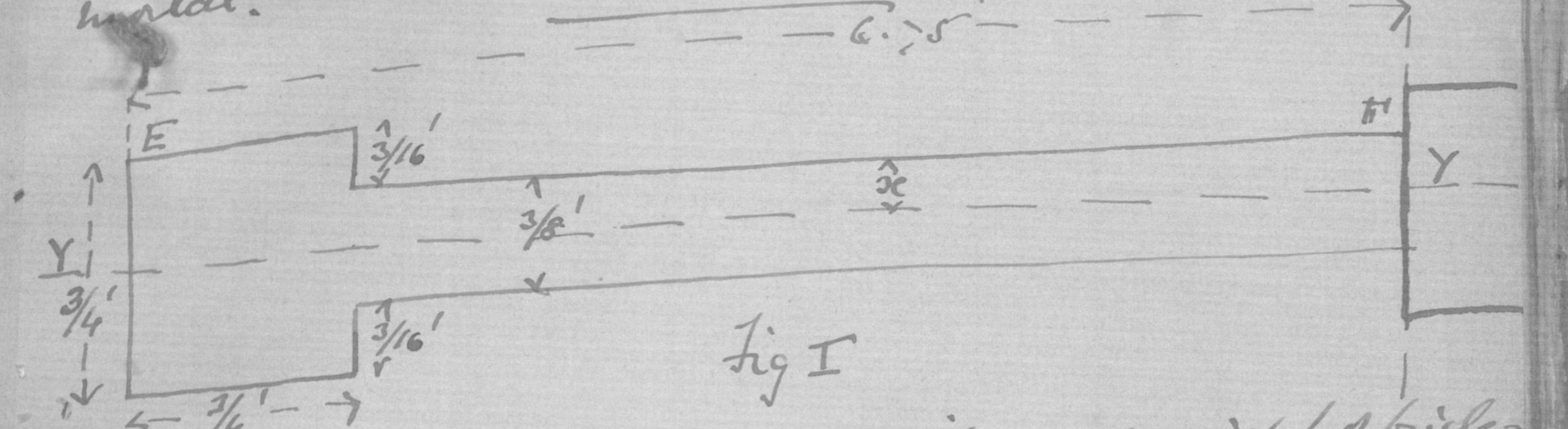


Fig I

Take portion EF of wall as a unit, and weight of brickwork as 1 cwt per cubic foot.

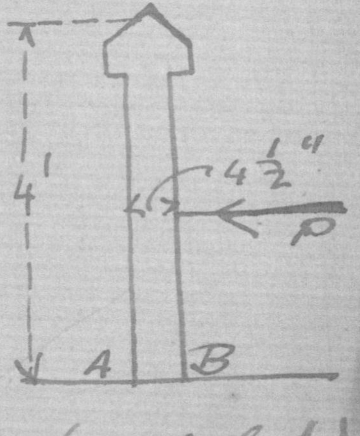
∴ Wt. of portion of wall EF = 12.01 cwts = W .. (1)

This weight is distributed uniformly over the whole of the unit EF, and

$$\text{Pressure due to weight of wall} = \frac{12.01}{405}$$

$$= 0.0296 \text{ cwt per sq. inch} \quad \ldots (2)$$

If P be the wind pressure per sq. ft required to be found then total wind pressure acting at the C of G of the unit EF of the wall $= 6\tfrac{3}{4}' \times 4' \times P = 27P$ the full height of the wall not being taken into account because of the inclination of the coping.



The wind pressure, which may be taken as a horizontal force blowing perpendicularly to the face of the wall & uniformly all over it, will produce tension on the windward side B, and compression on the lee side A, & can be found by considering the portion of the wall EF as a beam fixed at one end, viz at the joint AB.

It is clear that a wall of so thin a section as 4½" can only stand wind pressure by virtue of the C acity and adhesion of the mortar, and that it is a structure whose weight & form alone are quite insufficient to ensure stability against overturning, the tensile resistance ~~of the~~ being the main force opposed to the overturning action.

Assume (Fig. I) a neutral axis YY, distant x from EF, the extreme mean fibre in tension, & take moments about YY. Then

$$6.75\times x\times\frac{x}{2}+0.75\times\frac{3}{16}\left(\frac{3}{32}+x\right)=6.75\frac{\left(\frac{3}{8}-x\right)^2}{2}+0.75\times\frac{3}{16}\left(\frac{3}{8}-x+\frac{3}{32}\right)$$

$$\therefore x = 0.19\text{ ft} = 2.25\text{ inches}$$

a result that might be expected from the figure being symmetrical above & below YY.

I, the moment of inertia of the whole figure about YY
= moment of inertia of each strip about its own ~~axis~~ ~~vertical~~ neutral axis + its area × perp. distance from neutral axis of figure to that of strip

$$= \frac{9\times9^3}{12}+9\times9\times4.5^2-x+\frac{72\times4.5^3}{12}+72\times4.5\times x-2.25$$

$$= 1275.75\text{ inches}$$

If s be taken as the adhesion of the bricks to the mortar

moment of resistance $= \frac{s}{x}I$

But bending moment $= 27\,P\times 4\times\frac{1}{2}\times 12$

$$\therefore 27\,P\times 24 = \frac{s}{x}I$$

And $$P = \frac{50.8}{27\times24} = 0.078\text{ cwts}\times s \quad (3)$$

We have now to decide what value may be given to s. Allowing a sufficient factor of safety, the adhesion of ordinary bricks to a good hydraulic mortar may safely be taken as 0.06 cwt per sq. inch, and s is equal × 6.72 lbs per sq. inch – a very low estimate

ACK 22.7.

to this figure + the compression produced by the weight of the wall, since this compression relieves the tension.

Hence $s = 0.06 + 0.0296$ from (2)
$= 0.0896$ cwt per sq. inch

Substituting this value for s in (3)

$P = 9$ lbs

Thus even if the wall is built in good hydraulic lime, it cannot safely resist more than 9 ~~tto~~ lbs per sq. ft of wind pressure, and is consequently far too weak. As designed by Col. Smart, ~~about the wind pressure will be not over about $\frac{1}{4}$th~~ the openings in the wall occupy about $\frac{1}{4}$th of the surface of the unit EF, and with the same quantity of brickwork – the strength of the wall to resist overturning varying with the weight – a better wall can be designed, with a much larger area of opening, and having a heavier coping & basement, with the half brick thickness (which may be considered as a panel) between. Such an enclosure wall will, if required, be designed in this office, and will I think (from rough calculations I have made) be strong enough, if built of good bricks in best hydraulic mortar, ~~in~~ and in situations not exposed to the force of cyclones, to be considered as ~~be~~ practically safe, the adhesion being taken at 18 lbs per sq. inch.

Continuing the examination for the stability of Col. Smart's wall, it may be pointed out (1) that it would of course take a greater pressure than 9 lbs per sq. ft to cause the wall to fail if the full adhesion of the lime to the bricks is taken into account, and (2) that if we stock bricks & best hydraulic lime are used, the ~~strength~~ resistance of the wall to overturning is greatly increased.

The ultimate adhesion of best hydraulic lime to good stock bricks = 36 lbs per sq. in

= 0.32 cwt per sq. inch

∴ x = 0.32 + 0.0296 = 0.3496 cwts

And P = 34 lbs per sq. ft

With a low wall of 4' high, the wind pressure is greatly reduced by the friction of the wind against the ground, and, so far as experience goes, such a wall sh^d be safe in this country in all cases where it is not exposed to the force of cyclonic winds, i.e in towns & other situations where shelter is given by adjacent buildings, if it can stand 34 lbs per sq. ft of wind pressure. If a storm of wind were brought there when it while the brickwork ~~is~~ was green, it would probably collapse, but when the ultimate adhesion of the lime & mortar had been attained, say after a year, it would weather all ordinary storms. It is a known fact that wind never acts with its full force on a long length of low wall, & it is justifiable to calculate on the mortar having time to acquire a considerable proportion of its ultimate adhesion before the wall is subjected to the greatest pressure it can have to bear.

In very exposed situations such a wall can be very materially strengthened by building the first 8 or 10 courses in cement, say for 2 ft or half way up. In this case the ultimate adhesion can be taken at 0.5 cwt per sq. inch

∴ x = 0.5 + 0.0296 = 0.5296 cwt

And P = 52 lbs per sq. ft, which is ample to weather anything but a cyclone of max^m force.

A S K
28. 6. 98.

25. 6. 98.

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L

Weight of Compound wall per unit of length

4½" walling

wall 6.0 × 0.4½" × 3.6" = 7.87
coping 6.0 × 0.9" × 0.3" = 1.13
-do- 6.0 × 0.9" × 0.1½" = 0.56

Pillasters

Pillar 9" × 0.9" × 3.6" = 1.97
coping 1.1½" × 1.1½" × 0.3" = 0.32
-do- 1.1½" × 1.1½" × 0.1½" = 0.16

Total cft 12.01

W = 12.01 × 112 lbs = 1345.12 lbs
= 12.01 cwts

Surface area
= 9" × 9" = 81 inches
72 × 4½" = 324 -do-

Total sq inches 405 = A.

Pressure due to unit of wall

$= \frac{W}{A} = \frac{12.01}{405} = 0.0296$ cwts per sq inch

---

) Department.

CURRENT No. 5076

From The Supdg Engineer
5th Circle

No. 388 W.

Dated 15th June 1898.
Received 16. 6. 98
Enclosures ~~no~~ 6
Spare copies

SUBJECT.

Taluq Cutchery at Tiru-
kovilur.

Submitting Compara-
tive Statement for
different work for the
construction of Compou
wall of—

stock bricks & best hydraulic lime are used, the ~~strength~~ resistance of the wall to overturning is greatly increased.

The ultimate adhesion of best hydraulic lime to good stock bricks = 36 lbs per sq. in

= 0.32 cwt per sq. inch

∴ x = 0.32 + 0.0296 = 0.3496 cwts

And P = 34 lbs per sq. ft.

With a low wall of 4' high, the wind pressure is greatly reduced by the friction of the wind against the ground, and, so far as experience goes, such a wall would be safe in this country in all cases where it is not exposed to the force of cyclonic winds, i.e. in towns & other situations where shelter is given by adjacent buildings, if it can stand 34 lbs per sq. ft of wind pressure. If a storm of wind were brought thereon whilst the brickwork was green, it would probably collapse, but when the ultimate adhesion of the lime & mortar had been attained, say after a year, it would weather all ordinary storms. It is a known fact that wind never acts with its full force on a long length of low wall, & it is justifiable to calculate on the mortar having time to acquire a considerable proportion of its ultimate adhesion before the wall is subjected to the greatest pressure it can have to bear.

In very exposed situations such a wall can be very materially strengthened by building the first 8 or 10 courses in cement, say for 2 ft or half way up. In this case the ultimate adhesion can be taken at 0.5 cwt per sq. inch

x = 0.5 + 0.0296 = 0.5296 cwt

And P = 52 lbs per sq. ft, which is ample to weather anything but a cyclone of max^m force.

A.S.K.
28. 6. 98.

25. 6. 98.

---

L2

$6.75 \times \frac{x^2}{2} + 0.75 \times \frac{3}{16}\left(\frac{3}{32} + x\right)$

$= 6.75 \times \frac{\left(\frac{9}{64} - \frac{3}{4}x + x^2\right)}{2} + 0.75 \times \frac{3}{16} \times \left(\frac{3}{8} + \frac{3}{32} - x\right)$

$= \frac{15}{32}$

$= 6.75 \times \frac{x^2}{2} + 0.75 \times \frac{3}{16} \times \frac{3}{32} + 0.75 \times \frac{3}{16}x$

$= \frac{6.75 \times \frac{9}{64} - 6.75 \times \frac{3}{4}x + 6.75x^2}{2}$

$+ 6.75 \times \frac{3}{16} \times \frac{15}{32} - 0.75 \times \frac{3}{16} \times x$

$\cancel{\frac{6.75 \times x^2}{2}} + 0.75 \times \frac{3}{16} \times \frac{3}{32} + 0.75 \times \frac{3}{16}x$

$= 6.75 \times \frac{9}{128} - 6.75 \times \frac{3}{8}x + \cancel{\frac{6.75x^2}{2}}$

$+ 0.75 \times \frac{3}{16} \times \frac{15}{32} - 0.75 \times \frac{3}{16} \times x$

$0.75 \times \frac{3}{16}x + 6.75 \times \frac{3}{8}x + 0.75 \times \frac{3}{16}x$

$= 0.75 \times \frac{3}{16} \times \frac{15}{32} + 6.75 \times \frac{9}{128}$

$- 0.75 \times \frac{3}{16} \times \frac{3}{32}$

$= 0.75 \times \frac{3}{16} \times \frac{3}{8} + 6.75 \times \frac{9}{128}$

$= 7.5 \times \frac{9}{128}$

$\cancel{7.5} \times \frac{3}{8}x = \cancel{7.5} \times \frac{9}{128}$

$x = \cancel{\frac{9}{128} \times \frac{8}{3}} = \frac{3}{16}$

---

8) **Department.**

**CURRENT No.** 5076

**From** The Supg Engineer
5th Circle

**No.** 388 W.

**Dated** 15th June 1898.

**Received** 16. 6. 98

**Enclosures** ~~one~~ 6

**Spare copies**

**SUBJECT.**

Taluq Cutcherry at Tiru-
vottiur.

Submitting Compara-
tive Statement for
different work for the
onstruction of Compou
all of –

[illegible]

stock bricks & best hydraulic li
resi ne are used, the ~~strength~~
y is greatly increased.
load best hydraulic lime to
in
sq. inch
= 0.1576 cwts

With ed pressure is greatly
reduc against the ground,
and h a wall shd be
safe es where it is not
expose ds, i.e in towns &
other by adjacent build-
ings, ed pressure.
it which ught these where
ellapse , it would probably
& morta ecion of the lime
would tter a year. It
It is a known fact
that ce on a long length
of low wal ale on the mortars
having ti portion of its ulti-
mate adhe to the greatest pres-
sure it ca

He wall can be very
materially [illegible]
cement, this case, the ulti-
mate adhe per sq. inch

r =

And P = able to weather
nything but

ASK
23. 6. 98.

---

Cost of Compound wall
of table moulded brick
in lime mortar.

| | Rs |
|---|---|
| 1547 cft of concrete at 13 Rs = | 201 |
| 2106 do. of brick 18.8.. = | 390 |
| 10245 sft of Pointing 1-8.. = | 154 |
| Excavation of foundation | 5 |
| | 750 |
| Contingency & P. Estt at 10% | 75 |
| Total Rs | 825 |

Cost of wall of brick with
table moulded bricks in cement
for 2 feet in height & the re-
maining height in lime mortar.

1547 cft of concrete at Rs 13 .. = 201.

Brick in cement
Pillars 182 × 9" × 9" × 2'0" = 205
Walling 181 × 6'0" × 4½" × 2'0" = 815
1,020

1020 cft of brick in cement at 48.8.0 — 495

Brick in mortar (lime)
Pillars 182 × 9" × 9" × 1'6" = 154.
Walling 181 × 6' × 4½" × 1'6" = 611
Coping P. 182 × 11½" × 11½" × 3" = 29
do. W. 181 × 6' × 9" × 3" = 204
998

| | |
|---|---|
| 998 cft of brick in lime mortar at Rs 18.8.. | 185 |
| 10245 sft of Pointing 1-8.. | 154 |
| Excavation | 5 |
| Contingency & P. Estt. 10% | 110 |
| Total Rs | 1,150 |

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98) **Department.**

**CURRENT No.** 5076

**From** The Supdg Engineer
5th Circle

**No.** 388 W.

**Dated** 15th June 1898.
**Received** 16. 6. 98
**Enclosures** ~~six~~ 6
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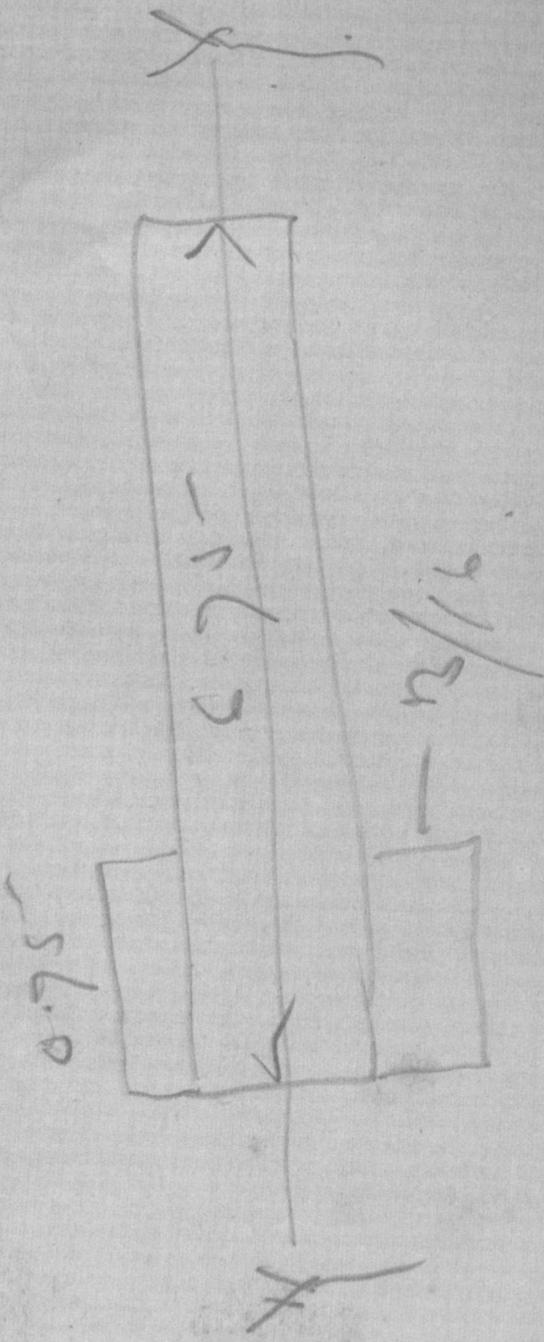
SUBJECT.

Taluq Cutcherry at Tiru-
vitur.

Submitting Compara-
tive Statement for
different work for the
Construction of Compound
wall of —

stock



I = moment of inertia

$$\frac{9\times9^3}{12} + 9\times9\times4.5 - x +$$

$$\frac{72\times4.5}{12} + 72\times4.5\times x - 2.25.$$

$$= \frac{9\times729}{12} + 9\times9\times4.5 - 2.25 +$$

$$\frac{72\times91.13}{12} + 72\times4.5\times x - 2.25$$

$$= \frac{6561}{12} + 81\times2.25 + \frac{6561}{12}$$

$$= 546.71 + 182.25 + 546.71$$

= 1275.95 inches.

Bending moment $= 27\,P \times 4 \times \tfrac{1}{2} \times 12$

$$= 27\,P \times 24 = \frac{r_0}{x} I$$

$$r_0 = \overset{\text{cwts}}{0.06} + \frac{W}{A} = 0.06 + 0296$$

$$= 0.0896$$

$$\therefore \frac{r_0}{x} I = \frac{0.0896}{\cancel{2.25}} \times \overset{567}{\cancel{1275.75}}$$

$$= 50.8.$$

$$\& P = \frac{50.8}{27\times24}\ \text{cwts} = \overset{\text{cwts}}{.078}$$

$$= \frac{50.8}{27\times24} \times \overset{14}{\cancel{112}} = \overset{\text{lbs}}{8.8}$$

Say $9\ \overset{3}{\text{lbs}}$

Department.

RRENT No. 5076

The Supdg Engineer
5th Circle

No. 388 W.

ted 15th June 1898.

ceived 16.6.98

closures ~~[illegible]~~ 6

are copies

SUBJECT.

Talug Cutcherry at Tiru-
thuram.

Submitting Comparative Statement for different work for the construction of Compound wall of—

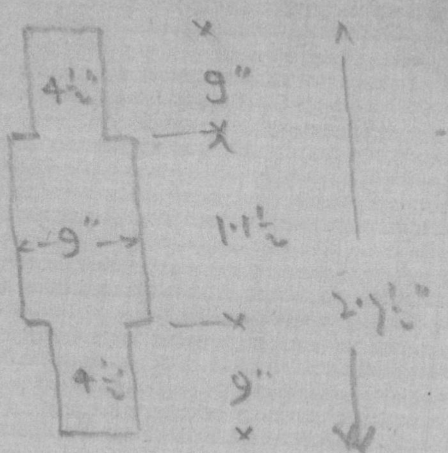
Reduction of wind pressure
in openings per sq ft.

Centre opening = 1' 1½" × 9" sq inches
= 13½" × 9" = —— 121.5

Upper & lower
2 × 9" × 4½" = —— 81.0

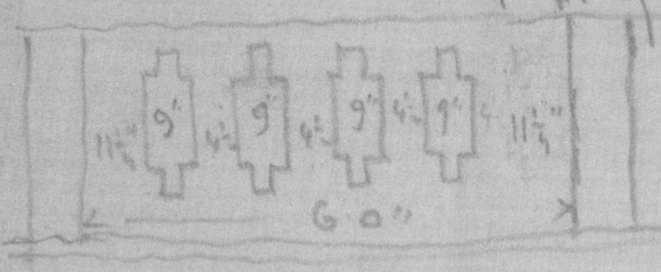
Total sq inch for one opening 202.5

This is only approximate taking dimensions as under



202.5 sq inches = 1.41 sq ft.

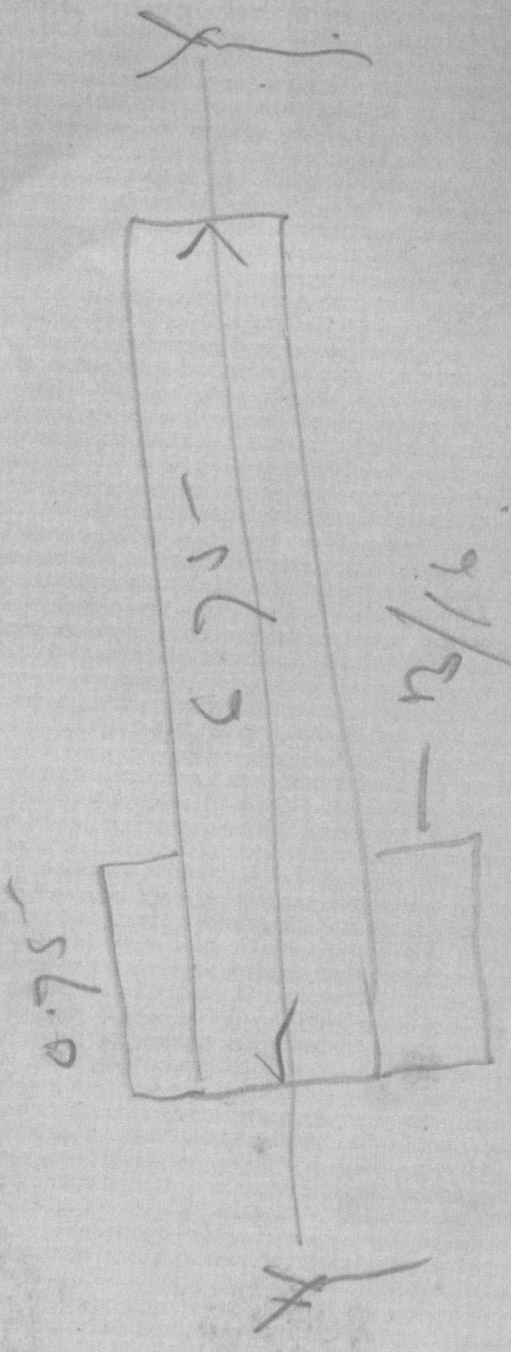
Reduction in area by each opening is approximately 1.41 sq ft



1.41 × 52 = 73.32 lbs per sq ft

6 × 4 = 24

1.4 × 5 = 7



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# Public Works (1898) Department.

CURRENT No. 5076

Order

From The Supdg Engineer
5th Circle

No. 388 W.

Dated 15th June 1898.

Received 16.6.98

Enclosures ~~no~~ 6

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SUBJECT.

Taluq Cutchery at Tiru-vottur.

Submitting Comparative Statement for different work for the Construction of Compound wall of—

O.L.S. ~~200~~ 255

0
22/7/98

29.1.0

[illegible]

**BACK PAPERS.**

| No. | Date. |
|---|---|
| 3575 W | 22-12-97 |
| 42650 | 22-10-97 |
| 3939 C | 22-9-97 |
| 32960 | 24-7-97 |

**FURTHER PAPERS.**

| No. | Date. |
|---|---|
| | |

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## Data Sheet

### Sun dried Brick in clay per 100 cfeet:—

| | Rs. as. P |
|---|---|
| 1500 Bricks including cartage to workspot at Rs 1-8-0 per 1000 | 2-4-0 |
| 3 Bricklayers at 0-10-0 each | 1-14-0 |
| 4 Men coolies at 0-3-0 each | 0-12-0 |
| 8 Boys at 0-2-0 each | 1-0-0 |
| 4 cartloads of clay at 0-1-3 each | 0-5-0 |
| Sundries for Rot do | 0-0-3 |
| Total | Rs 6.3.3 ✓ |

To these rates 2as 0 per 100 sqft must be allowed for mud plastering.
J.G.S.
Mud must be carted.

### Dried wall per 100 cfeet

| | |
|---|---|
| 3 3/4 Danchkar at 0-4-0 each | Rs 0-15-0 |
| 3 3/4 Men coolies at 0-3-0 each | 0-11-3 ✓ |
| 3 3/4 Women do at 0-2-0 each | 0-7-6 ✓ |
| 8 Carts clay at 0-1-3 each | 0-10-0 ✓ |
| Sundries | 0-0-3 |
| Total | 2.12.0 ✓ |

### Tile coping per Rft

| | |
|---|---|
| 75 Tiles at Rs 3-0-0 per 1000 | Rs 0.3.7 |
| 1/8 Bricklayer at 0-10-0 each | 0-1-3 |
| Sundries | 0-0-2 |
| Total | 0-5-0 ✓ |

### Burnt Stone in clay per 100 cft

| | |
|---|---|
| 11 Carts burnt stone including cartage & quarrying 0-~~4~~5-0 each | 3-7-0<br>~~2-12-0~~ |
| Forest compensation | 0-11-0 |
| 3 Bricklayers at 0-10-0 each | 1-14-0 ✓ |
| 2 Wodders at 0-4-0 each | 0-8-0 |
| ~~4~~ 9 Men coolies at 0-3-0 each | 1-11-0<br>~~2-1-0~~ |
| 4 Boys at 0-2-0 each | 0-8-0 |
| 3 cartloads clay at 0-1-3 each | 0-3-9 |
| Sundries | 0-1-3<br>0-0-3 |
| Total | ~~8-10-0~~<br>9-0-0 |

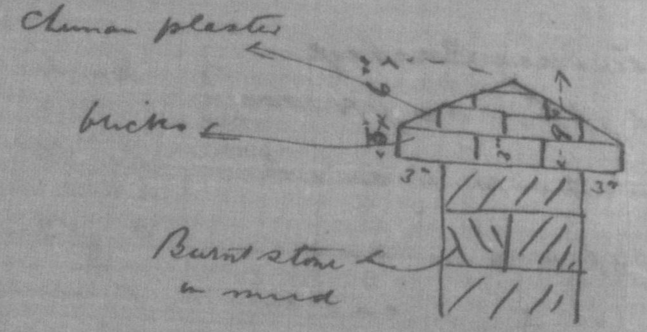
To this pointing with mortar at Rs 1½ per 100 sqft will have to be allowed

M. Duraisivamani
Sub-overseer

29.1.9

PTO

If burnt stone in mud is built a[illegible] as shewn in sketch may be better than a tile coping



RS.

Cost per 100 running feet

Brick in Mud.

~~100 × 2' × 3/4 = 150 cft~~

100 × 2 × 1/2 = 100 cfeet = 11-8-0 ✓

Plastering

100 × 3¼ = 325 sft

@ 2-8-0 = 8. 2. 0

19. 10. 0 ✓

or say per running foot 0-3-3 ✓

G. E. Evans Supt
S.D.O
31/1/98

EXECUTIVE ENGINEER'S
Register No. 1/3735
-7 FEB. 98
P.W.D.
SOUTH ARCOT DIVISION.

E. E.

2/5

OWE 1 / 5076/98

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Burnt stone in mud

ESTIMATE FORM.—Detail Measurements.

| Detail of Work. | Number. | Measurements in Feet. Length. | Breadth. | Depth. | Area or Contents. | Total Quantity of each description of Work. |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Compound Wall for Taluk Cutcherry, Tirukoilore | | | | | | |
| Burnt stone in mud | | | | | | |
| Foundation | 1 | 1221 | 2 | 1½ | 3663 | |
| Superstructure | 1 | 1221 | 1½ | 4½ | 8242 | |
| Total Cft of Burnt stone in mud | | | | | | 11905 |
| Coping | | | | | | |
| Coping stone (2'×½) | 1 | 1221 | | | 1221 | |
| Total Rft of Coping stone | | | | | | 1221 |
| Excavating foundation | | | | | | L.S. |
| Pointing with mortar | | | | | | L.S. |
| Petty Supervision | | | | | | 1 |
| Contingencies | | | | | | 1 |

E. 120.
50,000—14-5-95.

ESTIMATE FORM.—Detail Measurements.

| Detail of Work. | Number. | MEASUREMENTS IN FEET. Length. | Breadth. | Depth. | Area or Contents. | Total Quantity of each description of Work. |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

[illegible] / 5076/58

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Sundried brick in mud &
Tile Coping

E. 120.
50,000—14-5-95.

ESTIMATE FORM.—Detail Measurements.

| Detail of Work. | Number. | MEASUREMENTS IN FEET. Length. | Breadth. | Depth. | Area or Contents. | Total Quantity of each description of Work. |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Compound wall for Tahsil Cutchery [illegible] | | | | | | |
| Sundried brick in mud | | | | | | |
| Foundation | 1 | 1221 | 2 | 1½ | 3663 | |
| Superstructure | 1 | 1221 | 1½ | 4½ | 8242 | |
| Projection for Tile flooring | 1 | 1221 | 2 | ½ | 1221 | |
| Total Cft Sundried brick in mud | | | | | | 13126 |
| Tile Coping - | | | | | | |
| Over walls | 1 | 1221 | - | - | 1221 | |
| Total Rft of Tile Coping | | | | | | 1221 |
| Mud Plastering | | | | | | |
| To walls | 2 | 1221 | 5-0 | " | 12210 | |
| Total Sft of Mud Plastering | | | | | | 12210. |
| Excavating foundation | | | | | | S.S. |
| Petty Supervision | | | | | | 1 |
| Contingencies | | | | | | 1 |

E. 120.
50,000—14-5-95.

## ESTIMATE FORM.—Detail Measurements.

| Detail of Work. | Number. | Measurements in Feet. | | | Area or Contents. | Total Quantity of each description of Work. |
|---|---|---|---|---|---|---|
| | | Length. | Breadth. | Depth. | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

0352/5076/58

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Sundried brick in mud &
Tile Coping

E. 120.
50,000—14-5-95.

## ESTIMATE FORM.—Detail Measurements.

| Detail of Work. | Number. | Measurements in Feet. | | | Area or Contents. | Total Quantity of each description of Work. |
|---|---|---|---|---|---|---|
| | | Length. | Breadth. | Depth. | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Compound wall for [illegible] Veterinary [illegible] | | | | | | |
| Sundried brick in mud | | | | | | |
| Foundation | 1 | 1221 | 2 | 1½ | 3663 | |
| Superstructure | 1 | 1221 | 1½ | 4½ | 8242 | |
| Projection for Tile flooring | 1 | 1221 | 2 | ½ | 1221 | |
| Total Cft Sundried brick in mud | | | | | | 13126 |
| Tile Coping - | | | | | | |
| Outer walls | 1 | 1221 | - | - | 1221 | |
| Total Rft of Tile Coping | | | | | | 1221 |
| Mud Plastering | | | | | | |
| To walls | 2 | 1221 | 5-0 | " | 12210 | |
| Total Sft of Mud Plastering | | | | | | 12210. |
| Excavating foundation | | | | | | L.S. |
| Petty Supervision | | | | | | 1 |
| Contingencies | | | | | | 1 |

ESTIMATE FORM.—Detail Measurements.

| Detail of Work. | Number. | Measurements in Feet. |  |  | Area or Contents. | Total Quantity of each description of Work. |
|---|---|---|---|---|---|---|
|  |  | Length. | Breadth. | Depth. |  |  |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

PWS.B
5026/58

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Mud wall with Tile Coping

ESTIMATE FORM.—Detail Measurements.

| Detail of Work. | Number. | Measurements in Feet. |  |  | Area or Contents. | Total Quantity of each description of Work. |
|---|---|---|---|---|---|---|
|  |  | Length. | Breadth. | Depth. |  |  |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Compound Wall for [illegible] Cutchery - Tirukoilore |  |  |  |  |  |  |
| Mud wall. |  |  |  |  |  |  |
| Foundation | 1 | 1221 | 2 | 1½ | 3663 |  |
| Superstructure | 1 | 1221 | 1½ | 5 | 9158 |  |
| Total Cft of Mud wall |  |  |  |  |  | 12821 |
| Tile Coping |  |  |  |  |  |  |
| To wall | 1 | 1221 | – | – | 1221 |  |
| Total Rft of Tile Coping |  |  |  |  |  | 1221 |
| Mud plastering |  |  |  |  |  |  |
| To wall | 2 | 1221 | 5 | " | 12210 |  |
| Total Sft of Mud Plastering |  |  |  |  |  | 12210 |
| Excavating foundation |  |  |  |  |  | L.S |
| Petty supervision |  |  |  |  |  | 1 |
| Contingencies |  |  |  |  |  | 1 |

No. 4457 23 MAY 1898

F. 120.
10,000—14-4-98.

ESTIMATE FORM.—Detail Measurements.

| Detail of Work. | Number. | Measurements in Feet. Length. | Breadth. | Depth. | Area or Contents. | Total Quantity of each description of Work. |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

[illegible]
5076/98

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ESTIMATE FORM.—Detail Measurements

| Detail of Work. | Number. | Measurements in Feet. Length. | Breadth. | Depth. | Area or Contents. | Total Quantity of each description of Work. |
|---|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Taluq Cutcherry at Thirucoilore – Constructing Compound wall with brick in chunam. | | | | | | |
| Excavation for foundation. | | | | | | |
| Pillars — — | 182 | 1·3" | 1·3" | 1·6" | 427 | |
| walls between pillars | 181 | 5·6" | ·9" | 1·6" | 1120 | |
| Total Cft. of Excavation — | | | | | | 1547 |
| Concrete – in foundation — | | | | | | |
| Pillars — — | 182 | 1·3" | 1·3" | 1·6" | 427 | |
| walls between pillars | 181 | 5·6" | ·9" | 1·6" | 1120 | |
| Total Cft. of Concrete — | | | | | | 1547 |
| Brick work in chunam | | | | | | |
| Pillars — — | 182 | ·9" | ·9" | 3·6" | 358 | |
| walls between pillars | 181 | 6·0" | ·4½" | 3·6" | 1425 | |
| Coping over pillars | 182 | ·9" | ·9" | ·6" | 51 | |
| Do. — Do. walls | 181 | 6·0" | ·6" | ·6" | 272 | |
| Total Cft. of brick work in chunam | | | | | | 2106 |
| Black pointing | | | | | | |
| Pillars all round | 182 | 2·3" | - | 3·6" | 1433 | |
| walls between pillars | 181 | 12·0" | - | 3·6" | 7602 | |
| Coping to pillars — | 182 | 3·0" | - | 1·0" | 546 | |
| Do. to walls — | 181 | 5·6" | - | ·8" | 664 | |
| Total Sft. of Black pointing — | | | | | | 10245 |

E 127.
49,494—13-3-17.

## ESTIMATE FORM.—Detail Measurements.

| Detail of Work. | Number. | Measurements in Feet. | | | Area or Contents. | Total Quantity of each description of Work. |
|---|---|---|---|---|---|---|
| | | Length. | Breadth. | Depth. | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 |

PWS.5
5076/58

gineer
V Circle.

Comparative Statement for different works for the Construction of Compound wall for the Taluq Cutcherry at Thirukoilore.

Pwc-6
507/98

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Copy of a letter from C.A. Smith, Esqre, Executive Engineer, South Arcot Division, to the Superintending Engineer, 5 Circle, No. 373 S2, dated 20 May 1898.

Reference your No. 19 S.A. of 12 January 1898.

I have the honour to point out that the site is a very exposed one and it is not likely that either a mud wall or a sun dried brick in mud wall will prove satisfactory.

2. I however, submit data for

(1) Mud

(2) Sundried bricks in -do-

(3) Burnt stone in -do-

and would strongly recommend the adoption of No. (3).

3. I have also to bring to your notice ~~that one~~ out of a length of 1221 ft provided in the original estimate, a length of 421 ft is at present occupied by an excellent prickly-pear fence, and as it is some distance from the cutcherry it may, I think, be allowed to remain. This 421 feet as well as the remainder of the southern boundary 321 feet in length, or altogether 742, is demarcated by a line of well grown Korukapilly saplings, which with a little attention would soon form a very good hedge, and I would recommend that with a view to economy no wall be provided for this part of the compound.

4. I enclose a comparative statement showing the cost of the various proposals

5. I have also to remind you that an estimate has already been sanctioned for a compound wall for the adjoining Sub Magistrate's Cutcherry of the same design as that objected to for the Tahsildar's Cutcherry (estimate Rs 750 Reg. No. $\frac{36}{76-77}$) and that it is desirable to adopt the same design for both as there will be a continuous wall round the two buildings.

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No 388 W.

Submitted to the Chief Engineer, P.W. Department with reference to G.O. No. 3575 W. dated 25 December 1897. An alternative design for a brick in mortar wall 4 1/2" thick, with 9" pilasters, is estimated for in the last column of statements.

Encls. [illegible]
1 Statement
4 Detailed Estim.
1 Data Sheet

Colonel R.E.
Offg. Supg. Engineer 5 Circle

15th June 1898.