

GOVERNMENT OF GOA  
QUALITY CONTROL LABORATORY  
WATER RESOURCES DEPARTMENT

Test Report No.: WRD/QC/F.6-2/Cube -T : 6918 To 6932, 6940 To 6949 / Lab / **155** / 2019 - 20 Dated:- 03 / 06 / 2019

Laboratory : Bicholim -Goa / Sub Division V (QC)/WRD/ Bicholim -Goa.

**Name of Work: - Construction of Barrage and up gradation of Raw water pumping station at Ganjem on Mhadei River for Augmentation of Raw water for OPA water works Reg..Construction of Barrage , providing and laying 1000 mm dia. D.I. pipe Rising main and Break Pressure Tank at Ganjem in Sattari Taluka.**

Ref. to Requisition No.: WRD/WDVI/SD I /F.W.215/2019-20/ **170** Dated :- 01-06-2019

Qty. Recived. : 25 Sets of cube Date of Receipt: - 01/06/2019. Tested on: - 01, 02/06/2019 Ref to CPWD :2002, Vol. I

Sample: PCC/RCC 1 : 2 : 4 & 1 : 1.5 : 3 Mix O.S No. : 562/SP To 576/ SP,584/SP To 593/SP. Lab. Sample No.: 4994 To 5018. Tested By: - Mr. S. M. Patri. A.E.

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| SR.NO. | DISCRIPTION OF SAMPLE  | TESTED FOR                          | RESULTS       |                          | Max./Min.Value<br>permissable | % above or<br>below | REMARK                     |
|--------|--|-------------------------------------|---------------|--------------------------|-------------------------------|---------------------|----------------------------|
| 1      | Plain Cement concrete cube of mix<br>1 : 2 : 4, cast on 04 / 05 /2019, PCC for<br>plum concrete below barrage floor from<br>Ch. 50 - 95 m. | 28th day<br>compressive<br>strength | 231.06        | Kg/Cm <sup>2</sup>       | 210.00 Kg/Cm <sup>2</sup>     | 21.89               | Represents Qty. 20.00 Cum. |
|        |  |                                     | 265.04        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  |                                     | 271.83        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  | <b>Average</b>                      | <b>255.97</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 2      | Plain Cement concrete cube of mix<br>1 : 2 : 4, cast on 04 / 05 /2019, PCC for<br>plum concrete below barrage floor from<br>Ch. 50 - 95 m. | 28th day<br>compressive<br>strength | 253.71        | Kg/Cm <sup>2</sup>       | 210.00 Kg/Cm <sup>2</sup>     | 20.45               | --- do---                  |
|        |  |                                     | 260.51        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  |                                     | 244.65        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  | <b>Average</b>                      | <b>252.95</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 3      | Plain Cement concrete cube of mix<br>1 : 2 : 4, cast on 04 / 05 /2019, PCC for<br>plum concrete below barrage floor from<br>Ch. 50 - 95 m. | 28th day<br>compressive<br>strength | 217.47        | Kg/Cm <sup>2</sup>       | 210.00 Kg/Cm <sup>2</sup>     | 16.50               | --- do---                  |
|        |  |                                     | 262.77        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  |                                     | 253.71        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  | <b>Average</b>                      | <b>244.65</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 4      | Plain Cement concrete cube of mix<br>1 : 2 : 4, cast on 04 / 05 /2019, PCC for<br>plum concrete below barrage floor from<br>Ch. 50 - 95 m. | 28th day<br>compressive<br>strength | 265.04        | Kg/Cm <sup>2</sup>       | 210.00 Kg/Cm <sup>2</sup>     | 20.09               | --- do---                  |
|        |  |                                     | 219.73        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  |                                     | 271.83        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  | <b>Average</b>                      | <b>252.20</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 5      | Plain Cement concrete cube of mix<br>1 : 2 : 4, cast on 04 / 05 /2019, PCC for<br>plum concrete below barrage floor from<br>Ch. 50 - 95 m. | 28th day<br>compressive<br>strength | 231.06        | Kg/Cm <sup>2</sup>       | 210.00 Kg/Cm <sup>2</sup>     | 14.34               | --- do---                  |
|        |  |                                     | 242.38        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  |                                     | 246.91        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  | <b>Average</b>                      | <b>240.12</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |

Junior Engineer

Assistant Engineer

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| SR.NO. | DISCRIPTION OF SAMPLE  | TESTED FOR                          | RESULTS       |                          | Max./Min.Value<br>permissable | % above or<br>below | REMARK                     |
|--------|--|-------------------------------------|---------------|--------------------------|-------------------------------|---------------------|----------------------------|
|        |  |                                     |               |                          |                               |                     |                            |
| 6      | Plain Cement concrete cube of mix<br>1 : 2 : 4, cast on 04 / 05 /2019, PCC for<br>plum concrete below barrage floor from<br>Ch. 50 - 95 m. | 28th day<br>compressive<br>strength | 242.38        | Kg/Cm <sup>2</sup>       | 210.00 Kg/Cm <sup>2</sup>     | 14.70               | Represents Qty. 20.00 Cum. |
|        |  |                                     | 251.44        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  |                                     | 228.79        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  | <b>Average</b>                      | <b>240.87</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 7      | Plain Cement concrete cube of mix<br>1 : 2 : 4, cast on 04 / 05 /2019, PCC for<br>plum concrete below barrage floor from<br>Ch. 50 - 95 m. | 28th day<br>compressive<br>strength | 237.85        | Kg/Cm <sup>2</sup>       | 210.00 Kg/Cm <sup>2</sup>     | 9.31                | --- do---                  |
|        |  |                                     | 217.47        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  |                                     | 233.32        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  | <b>Average</b>                      | <b>229.55</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 8      | Plain Cement concrete cube of mix<br>1 : 2 : 4, cast on 04 / 05 /2019, PCC for<br>plum concrete below barrage floor from<br>Ch. 50 - 95 m. | 28th day<br>compressive<br>strength | 255.97        | Kg/Cm <sup>2</sup>       | 210.00 Kg/Cm <sup>2</sup>     | 16.50               | --- do---                  |
|        |  |                                     | 244.65        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  |                                     | 233.32        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  | <b>Average</b>                      | <b>244.65</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 9      | Plain Cement concrete cube of mix<br>1 : 2 : 4, cast on 04 / 05 /2019, PCC for<br>plum concrete below barrage floor from<br>Ch. 50 - 95 m. | 28th day<br>compressive<br>strength | 231.06        | Kg/Cm <sup>2</sup>       | 210.00 Kg/Cm <sup>2</sup>     | 13.62               | --- do---                  |
|        |  |                                     | 249.18        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  |                                     | 235.59        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  | <b>Average</b>                      | <b>238.61</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 10     | Plain Cement concrete cube of mix<br>1 : 2 : 4, cast on 04 / 05 /2019, PCC for<br>plum concrete below barrage floor from<br>Ch. 50 - 95 m. | 28th day<br>compressive<br>strength | 265.04        | Kg/Cm <sup>2</sup>       | 210.00 Kg/Cm <sup>2</sup>     | 16.86               | --- do---                  |
|        |  |                                     | 240.12        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  |                                     | 231.06        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  | <b>Average</b>                      | <b>245.40</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 11     | Reinforced Cement concrete cube of mix<br>1 : 1.5 : 3, cast on 04 / 05 /2019, RCC for<br>floor of barrage from Ch. 00 - 55 m.              | 28th day<br>compressive<br>strength | 294.48        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 7.14                | --- do---                  |
|        |  |                                     | 294.48        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  |                                     | 262.77        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  | <b>Average</b>                      | <b>283.91</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 12     | Reinforced Cement concrete cube of mix<br>1 : 1.5 : 3, cast on 04 / 05 /2019, RCC for<br>floor of barrage from Ch. 00 - 55 m.              | 28th day<br>compressive<br>strength | 308.08        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 13.12               | --- do---                  |
|        |  |                                     | 305.81        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  |                                     | 285.42        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |  | <b>Average</b>                      | <b>299.77</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |

Junior Engineer

Assistant Engineer

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| SR.NO. | DISCRIPTION OF SAMPLE   | TESTED FOR                    | RESULTS       |                          | Max./Min.Value<br>permissable | % above or<br>below | REMARK                     |
|--------|---|-------------------------------|---------------|--------------------------|-------------------------------|---------------------|----------------------------|
| 13     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 04 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 294.48        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 10.56               | Represents Qty. 20.00 Cum. |
|        |   |                               | 274.10        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 310.34        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>292.97</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 14     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 04 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 287.69        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 10.84               | --- do---                  |
|        |   |                               | 283.16        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 310.34        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>293.73</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 15     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 04 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 278.63        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 9.42                | --- do---                  |
|        |   |                               | 289.95        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 301.28        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>289.95</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 16     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 05 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 289.95        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 11.70               | --- do---                  |
|        |   |                               | 319.40        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 278.63        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>295.99</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 17     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 05 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 280.89        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 9.99                | --- do---                  |
|        |   |                               | 299.01        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 294.48        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>291.46</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 18     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 05 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 278.63        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 7.42                | --- do---                  |
|        |   |                               | 292.22        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 283.16        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>284.67</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 19     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 05 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 303.55        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 12.27               | --- do---                  |
|        |   |                               | 305.81        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 283.16        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>297.50</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |

Junior Engineer

Assistant Engineer

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| SR.NO. | DISCRIPTION OF SAMPLE   | TESTED FOR                    | RESULTS       |                          | Max./Min.Value<br>permissable | % above or<br>below | REMARK                     |
|--------|---|-------------------------------|---------------|--------------------------|-------------------------------|---------------------|----------------------------|
| 20     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 05 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 269.57        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 7.42                | Represents Qty. 20.00 Cum. |
|        |   |                               | 287.69        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 296.75        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>284.67</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 21     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 05 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 267.30        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 6.57                | --- do---                  |
|        |   |                               | 278.63        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 301.28        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>282.40</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 22     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 05 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 280.89        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 8.85                | --- do---                  |
|        |   |                               | 289.95        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 294.48        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>288.44</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 23     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 05 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 292.22        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 12.55               | --- do---                  |
|        |   |                               | 321.67        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 280.89        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>298.26</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 24     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 05 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 301.28        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 12.84               | --- do---                  |
|        |   |                               | 310.34        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 285.42        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>299.01</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |
| 25     | Reinforced Cement concrete cube of mix 1 : 1.5 : 3, cast on 05 / 05 /2019, RCC for floor of barrage from Ch. 00 - 55 m. | 28th day compressive strength | 292.22        | Kg/Cm <sup>2</sup>       | 265.00 Kg/Cm <sup>2</sup>     | 12.55               | --- do---                  |
|        |   |                               | 321.67        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   |                               | 280.89        | Kg/Cm <sup>2</sup>       |                               |                     |                            |
|        |   | <b>Average</b>                | <b>298.26</b> | <b>Kg/Cm<sup>2</sup></b> |                               |                     |                            |

Copy to: 1. The Assistant Engineer SD I , WD VI , WRD , Bicholim Goa.

2. Copy submitted to the Superintending Engineer ,CPO,WRD, Sinchai Bhavan, Porvorim Goa. For kind Information.

3. Copy submitted to the Executive Engineer ,WDVI,WRD, Bicholim-Goa.

4. QC Lab File.      5. Bill File.

Junior Engineer

Assistant Engineer