

# **GOVERNMENT OF ODISHA**

## **WORKS DEPARTMENT**

### **ODISHA STATE ROAD PROJECT ( UNDER WORLD BANK ASSISTANCE )**

**BHADRAK-PIRAHAT (SH-09)  
KM.0/000 TO KM.27/500**

**VOLUME - IV**  
**DRAWINGS**













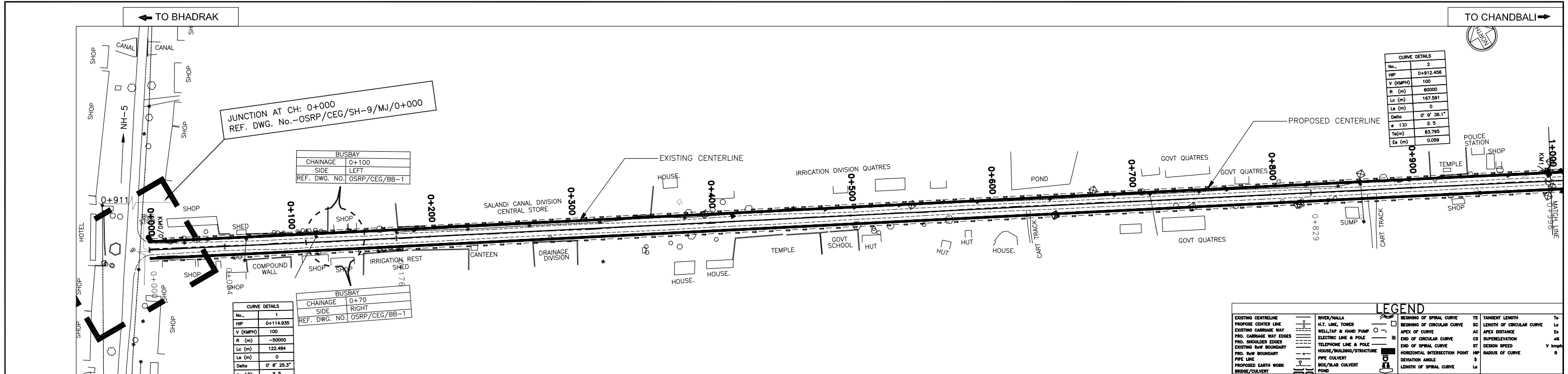


**VERTICAL CURVE DETAILS**

| Curve No. | Curve Type | VIP Details |       | Curve Length<br>m. | k       | Curve Start |       | Curve End |       | Start Gradient<br>(%) | End Gradient<br>(%) | Grade Difference<br>(%) | Remarks |
|-----------|------------|-------------|-------|--------------------|---------|-------------|-------|-----------|-------|-----------------------|---------------------|-------------------------|---------|
|           |            | Chainage    | Level |                    |         | Chainage    | Level | Chainage  | Level |                       |                     |                         |         |
| 64        | Valley     | 23140       | 8.15  | 60                 | 619.545 | 23110       | 8.172 | 23170     | 8.157 | -0.074                | 0.022               | -0.096                  |         |
| 65        | Summit     | 23374.27    | 8.202 | 60                 | 561.376 | 23344.27    | 8.196 | 23404.27  | 8.177 | 0.022                 | -0.084              | 0.106                   |         |
| 66        | Valley     | 24143.201   | 7.553 | 60                 | 591.195 | 24113.201   | 7.578 | 24173.201 | 7.558 | -0.084                | 0.017               | -0.101                  |         |
| 67        | Summit     | 24562.312   | 7.624 | 60                 | 836.768 | 24532.312   | 7.619 | 24592.312 | 7.608 | 0.017                 | -0.055              | 0.072                   |         |
| 68        | Valley     | 25041.046   | 7.362 | 60                 | 631.364 | 25011.046   | 7.379 | 25071.046 | 7.374 | -0.055                | 0.04                | -0.095                  |         |
| 69        | Summit     | 25430.303   | 7.519 | 60                 | 1977.78 | 25400.303   | 7.507 | 25460.303 | 7.522 | 0.04                  | 0.01                | 0.030                   |         |
| 70        | Valley     | 25730       | 7.549 | 60                 | 1040.11 | 25700       | 7.546 | 25760     | 7.569 | 0.01                  | 0.068               | -0.058                  |         |
| 71        | Summit     | 25989.623   | 7.725 | 60                 | 1375.5  | 25959.623   | 7.704 | 26019.623 | 7.732 | 0.068                 | 0.024               | 0.044                   |         |
| 72        | Summit     | 26302.676   | 7.8   | 60                 | 1871.6  | 26272.676   | 7.793 | 26332.676 | 7.798 | 0.024                 | -0.008              | 0.032                   |         |
| 73        | Summit     | 26664.99    | 7.771 | 60                 | 2458.7  | 26634.99    | 7.773 | 26694.99  | 7.761 | -0.008                | -0.032              | 0.024                   |         |
| 74        | Valley     | 27217.336   | 7.592 | 60                 | 2750.25 | 27187.336   | 7.602 | 27247.336 | 7.589 | -0.032                | -0.011              | -0.021                  |         |

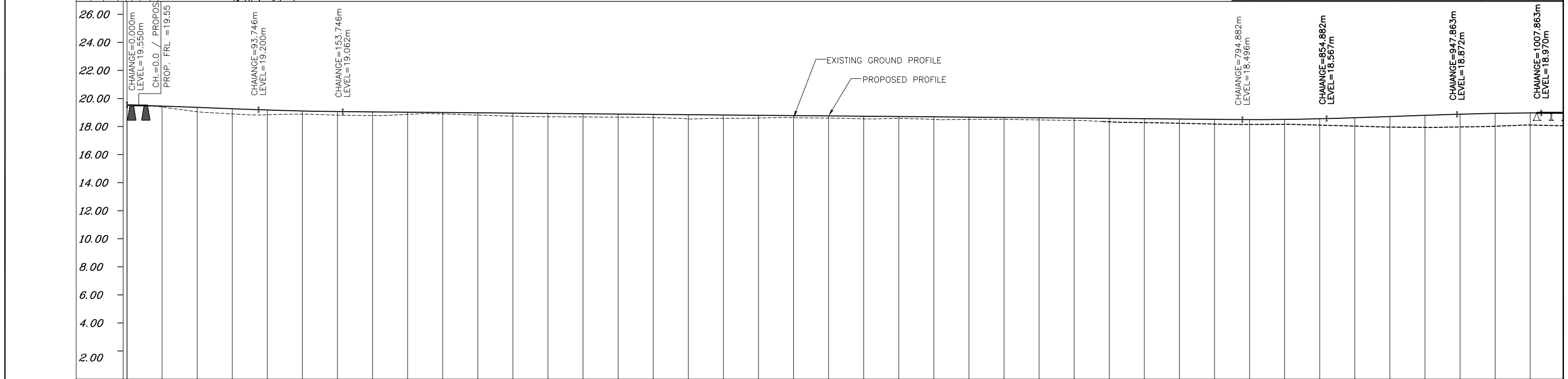
|     |      |           |                 |        |             |                 |                 |  |   |   |   |                  |   |                  |
|-----|------|-----------|-----------------|--------|-------------|-----------------|-----------------|--|---|---|---|------------------|---|------------------|
| R2  |      | SEP-2015  | SECOND REVISION | LASA   | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT :<br><b>CEG</b><br>CONSULTING ENGINEERS GROUP LTD.<br>E-12,MOJI COLONY,MALVIYA NAGAR<br>JAIPUR-17 Tel:<br>+91-141-2520899,2521899,2520556 Fax:<br>2521348, e-mail: ceg@cegindia.com | DESIGN REVIEW CONSULTANT :<br><br>LEA Associates South Asia Pvt. Ltd., India<br>B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE<br>INDUSTRIAL ESTATE, MATHURA ROAD, NEW<br>DELHI-110044 . | CLIENT :<br><br>ODISHA WORKS<br>DEPARTMENT | PROJECT :<br>CONSTRUCTION FOR WIDENING AND<br>STRENGTHENING OF EXISTING CARRIAGEWAY<br>TO 2 LANE ROAD FROM BHADRAK TO PIRHAT -<br>KM 0+000 TO KM 27+500 OF SH-09 (BALANCE<br>WORK) PACKAGE - P02A | SCALE :<br>N.T.S | DRAWING TITLE :<br>VERTICAL CURVE DETAILS<br>(SHEET 2 OF 2) |                  |
| R1  |      | JAN-2013  | FIRST REVISION  | OWD    | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |  |   |   |   |                  |   | N.K PRADHAN (CE) |
| -   |      | JUNE 2008 | ORIGINAL        | CEG    |             |                 |                 |  |   |   |   |                  |   |                  |
| NO. | DATE | REVISION  | BY              | DRAWN: | PREPARED :  | CHECKED:        | APPROVED:       |  |   |   |   |                  | DWG. NUMBER : OSRP/CEG/SH09/P02A/VC/2                       | REV. R2          |





**LEGEND**

|                         |                          |                               |                             |
|-------------------------|--------------------------|-------------------------------|-----------------------------|
| EXISTING CENTERLINE     | RIVER/WALLA              | BEGINNING OF SPIRAL CURVE     | TS TANGENT LENGTH           |
| PROPOSED CENTERLINE     | H.T. LINE, TOWER         | END OF SPIRAL CURVE           | LC LENGTH OF CIRCULAR CURVE |
| EXISTING CARRIAGE WAY   | WELL/TAP & HAND PUMP     | APEX OF CURVE                 | AC APEX DISTANCE            |
| PRO. CARRIAGE WAY EDGES | ELECTRIC LINE & POLE     | END OF CIRCULAR CURVE         | CS SUPERELEVATION           |
| PRO. SHOULDER EDGES     | TELEPHONE LINE & POLE    | END OF SPIRAL CURVE           | ST SUPERELEVATION           |
| EXISTING ROW BOUNDARY   | HOUSE/BUILDING/STRUCTURE | HORIZONTAL INTERSECTION POINT | HP                          |
| PRO. ROW BOUNDARY       | PIPE CULVERT             | DEVIATION ANGLE               | Δ                           |
| PIPE LINE               | BOX/SLAB CULVERT         | LENGTH OF SPIRAL CURVE        | Ls                          |
| PROPOSED EARTH WORK     | POND                     |                               |                             |
| BRIDGE/CULVERT          |                          |                               |                             |



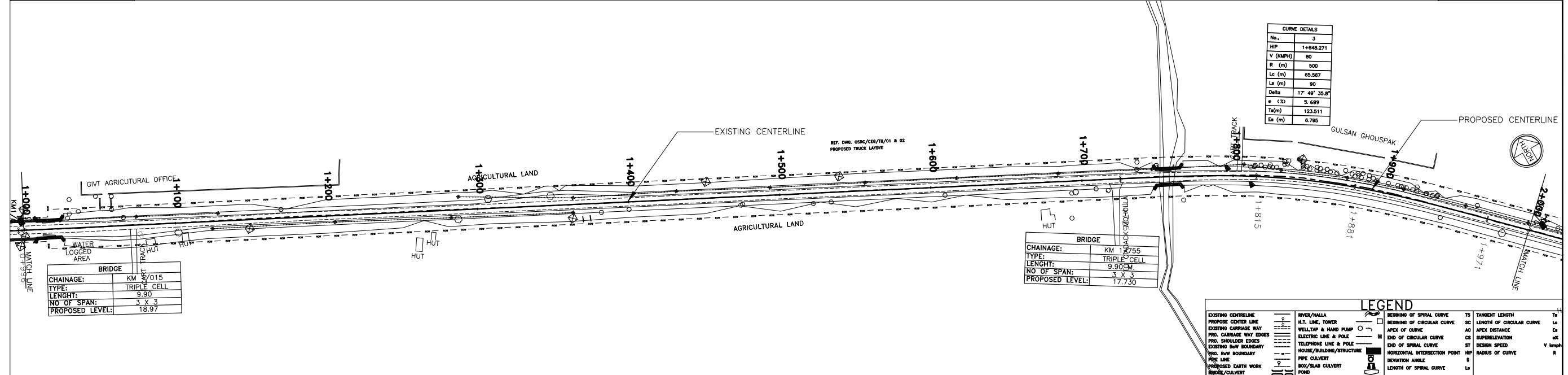
|                                  |                       |        |                            |        |                        |         |         |         |         |         |         |         |            |         |           |         |                      |         |           |         |         |         |                            |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |
|----------------------------------|-----------------------|--------|----------------------------|--------|------------------------|---------|---------|---------|---------|---------|---------|---------|------------|---------|-----------|---------|----------------------|---------|-----------|---------|---------|---------|----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|----------|
| <b>DATUM = 0.00</b>              |                       |        |                            |        |                        |         |         |         |         |         |         |         |            |         |           |         |                      |         |           |         |         |         |                            |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |
| <b>PROPOSED ROAD LEVEL (m)</b>   | 19.550                | 19.457 | 19.364                     | 19.270 | 19.178                 | 19.107  | 19.066  | 19.043  | 19.021  | 18.999  | 18.977  | 18.955  | 18.933     | 18.911  | 18.889    | 18.867  | 18.844               | 18.822  | 18.800    | 18.778  | 18.756  | 18.734  | 18.712                     | 18.690  | 18.668  | 18.646  | 18.624  | 18.602  | 18.579  | 18.557  | 18.535  | 18.513  | 18.492  | 18.501  | 18.552  | 18.633  | 18.715  | 18.797  | 18.879  | 18.941  | 18.968   |
| <b>EXISTING LEVEL (m)</b>        | 19.489                | 19.388 | 19.054                     | 18.901 | 18.841                 | 18.885  | 18.809  | 18.784  | 18.869  | 18.899  | 18.814  | 18.737  | 18.698     | 18.685  | 18.666    | 18.642  | 18.540               | 18.581  | 18.610    | 18.629  | 18.600  | 18.549  | 18.573                     | 18.503  | 18.505  | 18.506  | 18.472  | 18.435  | 18.336  | 18.281  | 18.233  | 18.176  | 18.148  | 18.161  | 18.099  | 18.032  | 17.959  | 17.940  | 17.970  | 18.023  | 18.108   |
| <b>HORIZONTAL ALIGNMENT</b>      | L=53.693m             |        | R=50000.000m<br>L=122.484m |        |                        |         |         |         |         |         |         |         | L=652.483m |         |           |         |                      |         |           |         |         |         | R=60000.000m<br>L=167.591m |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |
| <b>VERTICAL PROFILE</b>          | L=93.746m<br>G=-0.373 |        | L=60.000m                  |        | L=641.135m<br>G=-0.088 |         |         |         |         |         |         |         |            |         | L=60.000m |         | G=0.327<br>L=92.981m |         | L=60.000m |         |         |         |                            |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |
| <b>SUPERELEVATION /CROSSFALL</b> | Q=2.500               |        |                            |        |                        |         |         |         |         |         |         |         |            |         |           |         |                      |         |           |         |         |         |                            |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |         |          |
| <b>CHAINAGE</b>                  | 0.000                 | 25.000 | 50.000                     | 75.000 | 100.000                | 125.000 | 150.000 | 175.000 | 200.000 | 225.000 | 250.000 | 275.000 | 300.000    | 325.000 | 350.000   | 375.000 | 400.000              | 425.000 | 450.000   | 475.000 | 500.000 | 525.000 | 550.000                    | 575.000 | 600.000 | 625.000 | 650.000 | 675.000 | 700.000 | 725.000 | 750.000 | 775.000 | 800.000 | 825.000 | 850.000 | 875.000 | 900.000 | 925.000 | 950.000 | 975.000 | 1000.000 |

|     |           |                 |      |             |                 |                 |   |  |  |  |                  |  |                  |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|---|--|--|--|------------------|--|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT :<br><b>CONSULTING ENGINEERS GROUP LTD.</b><br>E-12, MOJI COLONY, MALVIYA NAGAR<br>JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com | DESIGN REVIEW CONSULTANT :<br><b>LEA Associates</b> South Asia Pvt. Ltd., India<br>B-1, E-27, 1st FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . | CLIENT :<br><b>ODISHA WORKS DEPARTMENT</b> | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | SCALE :<br>N.T.S | DRAWING TITLE :<br><b>PLAN AND LONGITUDINAL SECTION (SH-9) KM 0/000 TO KM 1/000</b><br>(SHEET 1 OF 28) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |   |  |  |  |                  |  | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |   |  |  |  |                  |  |                  |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:   |  |  |  |                  | DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/01   | REV. R2          |



← TO BHADRAK

TO CHANDBALI →

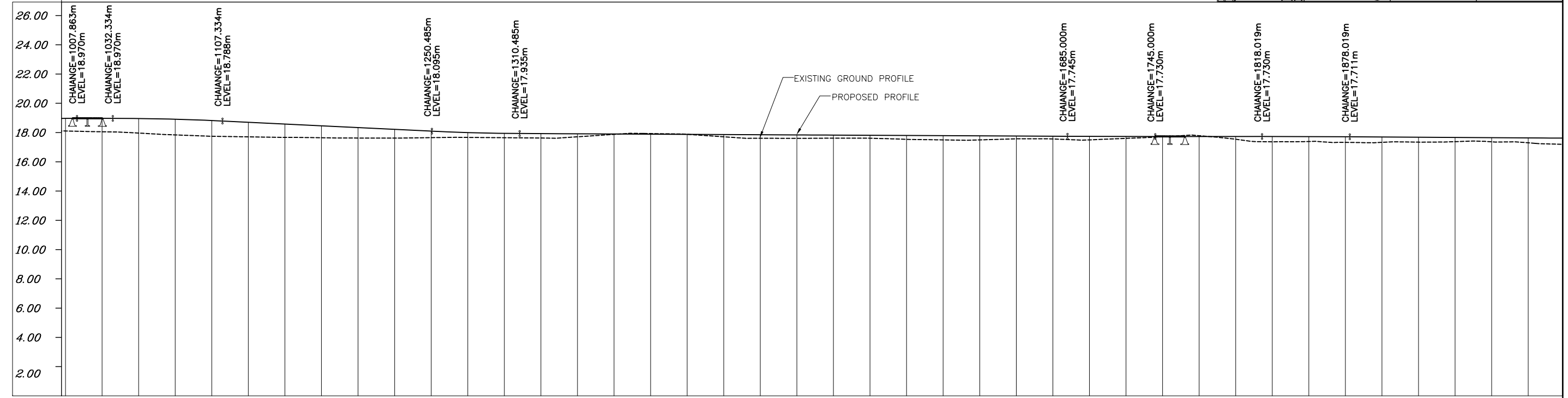


| CURVE DETAILS |               |
|---------------|---------------|
| No.           | 3             |
| HP            | 1+848.271     |
| V (KMPH)      | 80            |
| R (m)         | 500           |
| Lc (m)        | 65.567        |
| La (m)        | 80            |
| Delta         | 17° 49' 35.8" |
| # CD          | 5.689         |
| Ts(m)         | 123.511       |
| Es (m)        | 6.795         |

| BRIDGE          |             |
|-----------------|-------------|
| CHAINAGE:       | KM 12/015   |
| TYPE:           | TRIPLE CELL |
| LENGTH:         | 9.90        |
| NO OF SPAN:     | 3 X 3       |
| PROPOSED LEVEL: | 18.97       |

| BRIDGE          |             |
|-----------------|-------------|
| CHAINAGE:       | KM 12/755   |
| TYPE:           | TRIPLE CELL |
| LENGTH:         | 9.90M       |
| NO OF SPAN:     | 3 X 3       |
| PROPOSED LEVEL: | 17.730      |

| LEGEND                  |                          |                               |                             |
|-------------------------|--------------------------|-------------------------------|-----------------------------|
| EXISTING CENTERLINE     | RIVER/NALLA              | BEGINNING OF SPIRAL CURVE     | TS TANGENT LENGTH           |
| PROPOSED CENTERLINE     | H.T. LINE, TOWER         | ENDING OF SPIRAL CURVE        | SL LENGTH OF CIRCULAR CURVE |
| EXISTING CARRIAGE WAY   | WELL/TAP & HAND PUMP     | APEX OF CURVE                 | AS APEX DISTANCE            |
| PRO. CARRIAGE WAY EDGES | ELECTRIC LINE & POLE     | END OF CIRCULAR CURVE         | CS SUPERELEVATION           |
| PRO. SHOULDER EDGES     | TELEPHONE LINE & POLE    | END OF SPIRAL CURVE           | ST DESIGN SPEED             |
| EXISTING ROW BOUNDARY   | HOUSE/BUILDING/STRUCTURE | HORIZONTAL INTERSECTION POINT | HP RADIUS OF CURVE          |
| PRO. ROW BOUNDARY       | PIPE CULVERT             | DEFLECTION ANGLE              | Δ                           |
| PIPE LINE               | BOX/SLAB CULVERT         | LENGTH OF SPIRAL CURVE        | La                          |
| PROPOSED EARTH WORK     | POUND                    |                               |                             |
| BRIDGE/CULVERT          |                          |                               |                             |

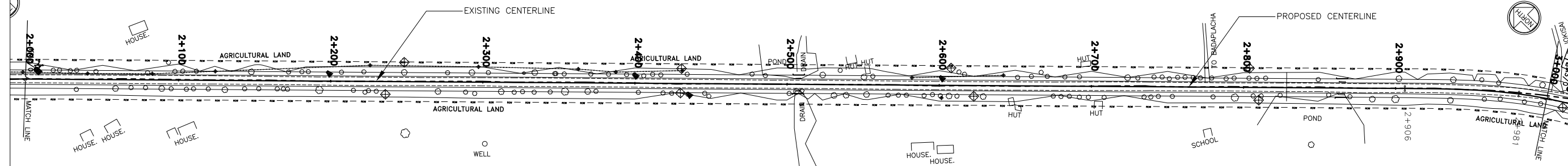


| DATUM = 0.00              |  |
|---------------------------|--|
| PROPOSED ROAD LEVEL (m)   | 18.968, 18.970, 18.960, 18.911, 18.822, 18.703, 18.582, 18.461, 18.340, 18.218, 18.097, 17.998, 17.944, 17.927, 17.915, 17.902, 17.889, 17.877, 17.864, 17.851, 17.839, 17.826, 17.813, 17.801, 17.788, 17.776, 17.763, 17.750, 17.739, 17.732, 17.730, 17.730, 17.730, 17.730, 17.730, 17.725, 17.713, 17.697, 17.682, 17.666, 17.651, 17.635   |
| EXISTING LEVEL (m)        | 18.108, 18.055, 17.966, 17.840, 17.746, 17.706, 17.672, 17.645, 17.625, 17.621, 17.653, 17.668, 17.648, 17.628, 17.711, 17.877, 17.930, 17.880, 17.711, 17.608, 17.607, 17.618, 17.612, 17.536, 17.500, 17.498, 17.572, 17.562, 17.500, 17.604, 17.710, 17.786, 17.545, 17.368, 17.389, 17.328, 17.330, 17.347, 17.379, 17.369, 17.302   |
| HORIZONTAL ALIGNMENT      | L=729.189m, L=90.000m, R=500.000m, L=65.567m, L=90.000m  |
| VERTICAL PROFILE          | L=75.000m, L=143.151m, G=-0.484, L=60.000m, L=374.515m, G=-0.051, L=60.000m, L=73.019m, G=-0.000, L=60.000m, L=245.728m, G=-0.063  |
| SUPERELEVATION /CROSSFALL | Q=2.500, Q=2.500, Q=2.500, Q=5.690   |
| CHAINAGE                  | 1000.000, 1025.000, 1050.000, 1075.000, 1100.000, 1125.000, 1150.000, 1175.000, 1200.000, 1225.000, 1250.000, 1275.000, 1300.000, 1325.000, 1350.000, 1375.000, 1400.000, 1425.000, 1450.000, 1475.000, 1500.000, 1525.000, 1550.000, 1575.000, 1600.000, 1625.000, 1650.000, 1675.000, 1700.000, 1725.000, 1750.000, 1775.000, 1800.000, 1825.000, 1850.000, 1875.000, 1900.000, 1925.000, 1950.000, 1975.000, 2000.000 |

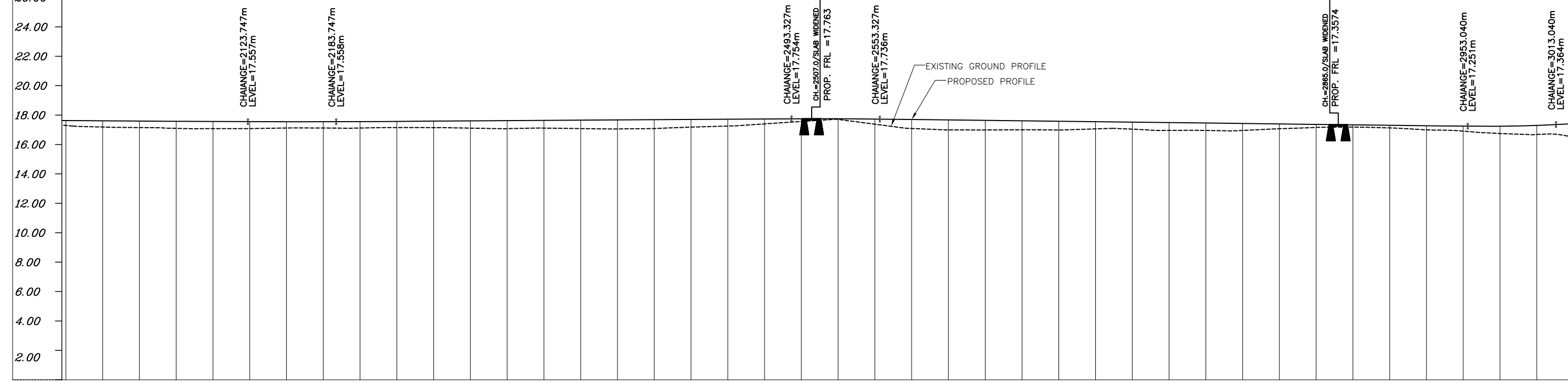
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|-----|-----------|-----------------|------|-------------|------------------|------------------|-------------------|---|--|---|--|------------------|---|---------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R. MISHRA (EE) | O.P. PATEL (CE)  | DPR CONSULTANT :  | <b>CEG</b><br>CONSULTING ENGINEERS GROUP LTD.<br>E-12, MOJI COLONY, MALVIYA NAGAR<br>JAIPUR-17<br>Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com | <b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India<br>B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . | CLIENT :<br><br>ODISHA WORKS DEPARTMENT | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | SCALE :<br>N.T.S | DRAWING TITLE :<br>PLAN AND LONGITUDINAL SECTION (SH-9) KM 0/000 TO KM 1/000<br>(SHEET 2 OF 28) |         |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)   | M.R. MISHRA (EE) | N.K. PRADHAN (CE) |   |  |   |  |                  |   |         |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                  |                  |                   |   |  |   |  |                  |   |         |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :       | CHECKED:         | APPROVED:         |   |  |   |  |                  | DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/02  | REV. R2 |

← TO BHADRAK

TO CHANDBALI →



| LEGEND                        |    |
|-------------------------------|----|
| EXISTING CENTERLINE           | —  |
| PROPOSED CENTERLINE           | —  |
| EXISTING CARRIAGE WAY         | —  |
| PRO. CARRIAGE WAY EDGES       | —  |
| PRO. SHOULDER EDGES           | —  |
| EXISTING ROW BOUNDARY         | —  |
| PRO. ROW BOUNDARY             | —  |
| PIPE LINE                     | —  |
| PROPOSED EARTH WORK           | —  |
| BRIDGE/CULVERT                | —  |
| RIVER/WALLA                   | —  |
| H.T. LINE, TOWER              | —  |
| WELL/TAP & HAND PUMP          | —  |
| ELECTRIC LINE & POLE          | —  |
| TELEPHONE LINE & POLE         | —  |
| HOUSE/BUILDING/STRUCTURE      | —  |
| PIPE CULVERT                  | —  |
| BOX/SLAB CULVERT              | —  |
| POD                           | —  |
| BEGINNING OF SPIRAL CURVE     | TS |
| END OF SPIRAL CURVE           | SC |
| APEX OF CURVE                 | AC |
| END OF CIRCULAR CURVE         | CS |
| DESIGN SPEED                  | ST |
| HORIZONTAL INTERSECTION POINT | HP |
| DEVIATION ANGLE               | S  |
| LENGTH OF SPIRAL CURVE        | LS |
| TANGENT LENGTH                | Ts |
| LENGTH OF CIRCULAR CURVE      | Lc |
| APEX DISTANCE                 | As |
| SUPERELEVATION                | SE |
| Y BENCH                       | Y  |
| RADIUS OF CURVE               | R  |



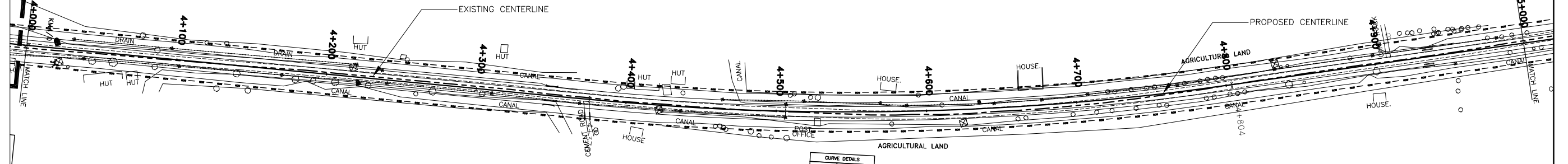
|                           |  |
|---------------------------|--|
| DATUM = 0.00              |  |
| PROPOSED ROAD LEVEL (m)   | 17.635, 17.619, 17.604, 17.588, 17.572, 17.557, 17.548, 17.553, 17.568, 17.584, 17.600, 17.615, 17.631, 17.647, 17.663, 17.679, 17.694, 17.710, 17.726, 17.742, 17.757, 17.758, 17.740, 17.710, 17.679, 17.649, 17.619, 17.588, 17.558, 17.528, 17.497, 17.467, 17.436, 17.406, 17.376, 17.345, 17.315, 17.285, 17.254, 17.249, 17.308   |
| EXISTING LEVEL (m)        | 17.302, 17.195, 17.159, 17.104, 17.089, 17.090, 17.129, 17.128, 17.127, 17.161, 17.155, 17.120, 17.081, 17.123, 17.090, 17.065, 17.091, 17.191, 17.262, 17.409, 17.575, 17.714, 17.387, 17.096, 17.000, 16.995, 17.007, 16.991, 17.069, 17.051, 16.967, 16.960, 16.963, 17.079, 17.171, 17.192, 17.134, 17.001, 16.917, 16.756, 16.688   |
| HORIZONTAL ALIGNMENT      | L=935.048m, L=75.000m  |
| VERTICAL PROFILE          | G=0.063, L=309.579m, G=-0.121, L=399.714m, L=60.000m   |
| SUPERELEVATION /CROSSFALL | Q=2.500  |
| CHAINAGE                  | 2000.000, 2025.000, 2050.000, 2075.000, 2100.000, 2125.000, 2150.000, 2175.000, 2200.000, 2225.000, 2250.000, 2275.000, 2300.000, 2325.000, 2350.000, 2375.000, 2400.000, 2425.000, 2450.000, 2475.000, 2500.000, 2525.000, 2550.000, 2575.000, 2600.000, 2625.000, 2650.000, 2675.000, 2700.000, 2725.000, 2750.000, 2775.000, 2800.000, 2825.000, 2850.000, 2875.000, 2900.000, 2925.000, 2950.000, 2975.000, 3000.000 |

|  |  |   |   |   |  |                  |   |
|--|--|---|---|---|--|------------------|---|
| R2 SEP-2015 SECOND REVISION LASA RAJU MATHUR M.R MISHRA (EE) O.P. PATEL (CE)<br>R1 JAN-2013 FIRST REVISION OWD VINAY PK.MISHRA (AE) M.R MISHRA (EE) N.K PRADHAN (CE)<br>- JUNE 2008 ORIGINAL CEG |  | DPR CONSULTANT :<br><b>CEG</b><br>CONSULTING ENGINEERS GROUP LTD.<br>E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com | DESIGN REVIEW CONSULTANT :<br><b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . | CLIENT :<br><br>ODISHA WORKS DEPARTMENT | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | SCALE :<br>N.T.S | DRAWING TITLE :<br>PLAN AND LONGITUDINAL SECTION (SH-9) KM 2/000 TO KM 3/000<br>(SHEET 3 OF 28) |
| NO. DATE REVISION BY DRAWN: PREPARED : CHECKED: APPROVED:  |  | DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/3   |   | REV. R2                                 |  |                  |   |



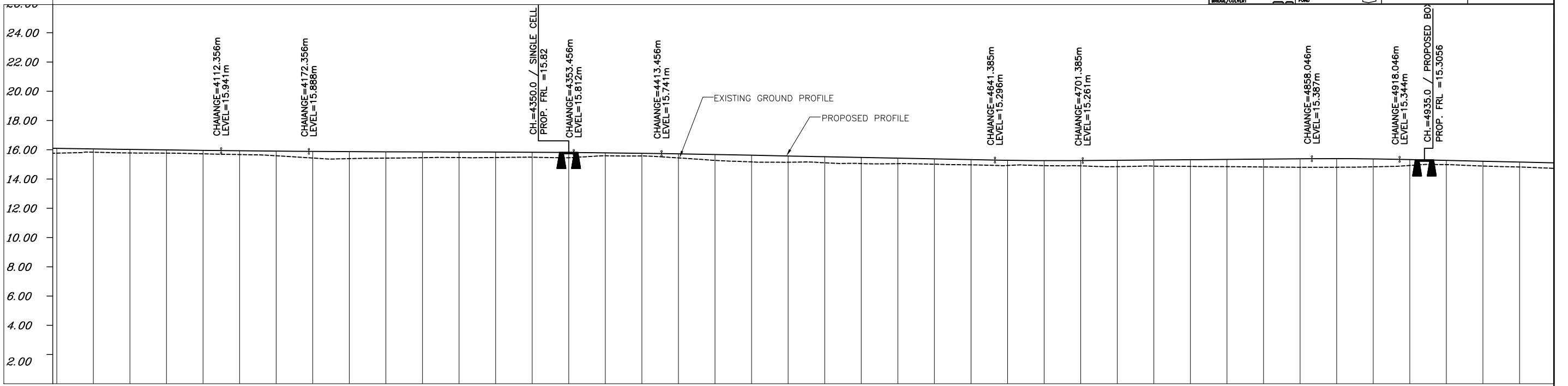
← TO BHADRAK

TO CHANDBALI →



| CURVE DETAILS |               |
|---------------|---------------|
| No.           | 6             |
| HP            | 44590.704     |
| V (KMPH)      | 100           |
| R (m)         | -1800         |
| Lc (m)        | 428.280       |
| La (m)        | 0             |
| Delta         | 13° 37' 57.3" |
| α (°)         | 2.3           |
| Ts (m)        | 215.156       |
| Es (m)        | 12.813        |

| LEGEND                  |                          |                               |                             |
|-------------------------|--------------------------|-------------------------------|-----------------------------|
| EXISTING CENTERLINE     | RIVER/WALLA              | BEGINNING OF SPIRAL CURVE     | TS TANGENT LENGTH           |
| PROPOSED CENTERLINE     | H.T. LINE, TOWER         | END OF SPIRAL CURVE           | SC LENGTH OF CIRCULAR CURVE |
| EXISTING CARRIAGE WAY   | WELL/TAP & HAND PUMP     | APEX OF CURVE                 | AC APEX DISTANCE            |
| PRO. CARRIAGE WAY EDGES | ELECTRIC LINE & POLE     | END OF CIRCULAR CURVE         | CS SUPERELEVATION           |
| PRO. SHOULDER EDGES     | TELEPHONE LINE & POLE    | END OF SPIRAL CURVE           | ST DESIGN SPEED             |
| EXISTING ROW BOUNDARY   | HOUSE/BUILDING/STRUCTURE | HORIZONTAL INTERSECTION POINT | HP RADIUS OF CURVE          |
| PRO. ROW BOUNDARY       | PIPE CULVERT             | DEVIATION ANGLE               | S                           |
| PROPOSED EARTH WORK     | BOX/RISER CULVERT        | LENGTH OF SPIRAL CURVE        | La                          |
| BRIDGE/CULVERT          | POND                     |                               |                             |



|                           |              |          |                            |          |          |          |          |          |                        |          |          |          |          |          |            |          |          |          |          |          |                        |          |          |          |          |          |                                    |          |          |          |          |          |           |          |                     |          |          |          |          |          |          |
|---------------------------|--------------|----------|----------------------------|----------|----------|----------|----------|----------|------------------------|----------|----------|----------|----------|----------|------------|----------|----------|----------|----------|----------|------------------------|----------|----------|----------|----------|----------|------------------------------------|----------|----------|----------|----------|----------|-----------|----------|---------------------|----------|----------|----------|----------|----------|----------|
| DATUM = 0.00              | 16.095       | 16.061   | 16.026                     | 15.992   | 15.958   | 15.925   | 15.901   | 15.886   | 15.876                 | 15.866   | 15.855   | 15.845   | 15.835   | 15.824   | 15.814     | 15.798   | 15.765   | 15.719   | 15.670   | 15.621   | 15.572                 | 15.523   | 15.474   | 15.425   | 15.376   | 15.328   | 15.280                             | 15.256   | 15.260   | 15.280   | 15.300   | 15.320   | 15.340    | 15.361   | 15.381              | 15.394   | 15.376   | 15.328   | 15.272   | 15.216   | 15.160   |
| PROPOSED ROAD LEVEL (m)   | 15.768       | 15.832   | 15.781                     | 15.771   | 15.722   | 15.672   | 15.590   | 15.435   | 15.395                 | 15.429   | 15.460   | 15.467   | 15.470   | 15.490   | 15.453     | 15.590   | 15.576   | 15.444   | 15.272   | 15.170   | 15.147                 | 15.107   | 15.057   | 15.050   | 15.011   | 14.968   | 14.925                             | 14.915   | 14.899   | 14.849   | 14.882   | 14.863   | 14.849    | 14.822   | 14.802              | 14.805   | 14.836   | 14.925   | 14.984   | 14.887   | 14.820   |
| EXISTING LEVEL (m)        | L=623.414m   |          | R=-1800.000m<br>L=428.280m |          |          |          |          |          |                        |          |          |          |          |          | L=318.659m |          |          |          |          |          |                        |          |          |          |          |          |                                    |          |          |          |          |          |           |          |                     |          |          |          |          |          |          |
| HORIZONTAL ALIGNMENT      | 356m<br>.137 |          | L=60.000m                  |          |          |          |          |          | L=181.100m<br>G=-0.041 |          |          |          |          |          | L=60.000m  |          |          |          |          |          | L=227.929m<br>G=-0.196 |          |          |          |          |          | L=60.000m<br>G=0.081<br>L=156.661m |          |          |          |          |          | L=60.000m |          | L=190.35<br>G=-0.22 |          |          |          |          |          |          |
| VERTICAL PROFILE          | Q=2.500      |          |                            |          |          |          |          |          |                        |          |          |          |          |          |            |          |          |          |          |          |                        |          |          |          |          |          |                                    |          |          |          |          |          |           |          |                     |          |          |          |          |          |          |
| SUPERELEVATION /CROSSFALL |              |          |                            |          |          |          |          |          |                        |          |          |          |          |          |            |          |          |          |          |          |                        |          |          |          |          |          |                                    |          |          |          |          |          |           |          |                     |          |          |          |          |          |          |
| CHAINAGE                  | 4000.000     | 4025.000 | 4050.000                   | 4075.000 | 4100.000 | 4125.000 | 4150.000 | 4175.000 | 4200.000               | 4225.000 | 4250.000 | 4275.000 | 4300.000 | 4325.000 | 4350.000   | 4375.000 | 4400.000 | 4425.000 | 4450.000 | 4475.000 | 4500.000               | 4525.000 | 4550.000 | 4575.000 | 4600.000 | 4625.000 | 4650.000                           | 4675.000 | 4700.000 | 4725.000 | 4750.000 | 4775.000 | 4800.000  | 4825.000 | 4850.000            | 4875.000 | 4900.000 | 4925.000 | 4950.000 | 4975.000 | 5000.000 |

|     |           |                 |      |             |                  |                                    |           |
|-----|-----------|-----------------|------|-------------|------------------|------------------------------------|-----------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R. MISHRA (EE) | O.P. PATEL (CE)                    |           |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)   | M.R. MISHRA (EE) N.K. PRADHAN (CE) |           |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                  |                                    |           |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :       | CHECKED:                           | APPROVED: |

DPR CONSULTANT :  
**CEG**  
 CONSULTING ENGINEERS GROUP LTD.  
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 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
  
 ODISHA WORKS DEPARTMENT

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

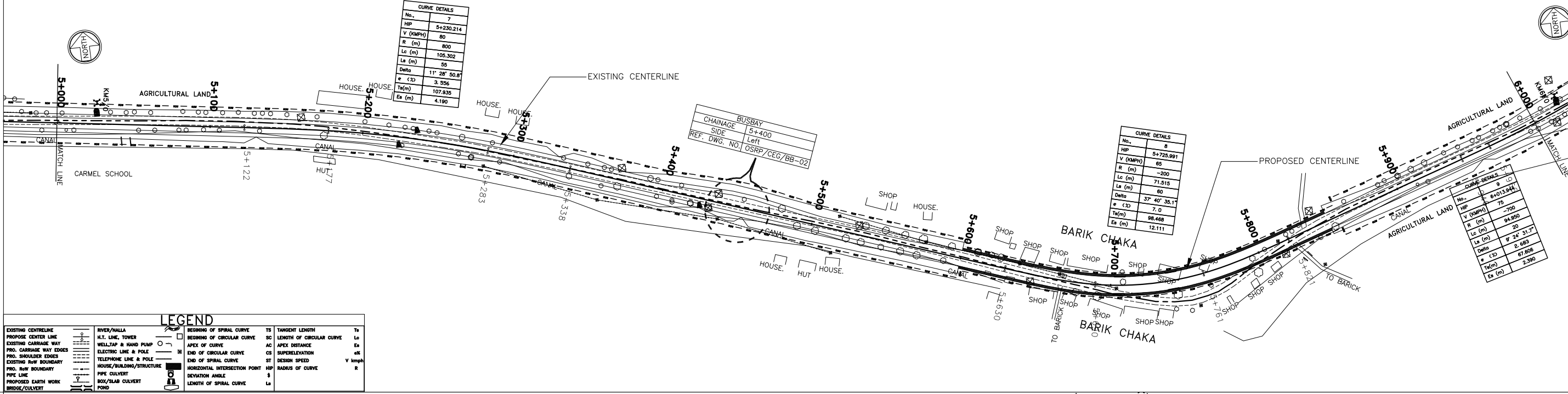
SCALE :  
 N.T.S

DRAWING TITLE :  
**PLAN AND LONGITUDINAL SECTION (SH-9) KM 4/000 TO KM 5/000**  
 (SHEET 5 OF 28)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/5  
 REV. R2



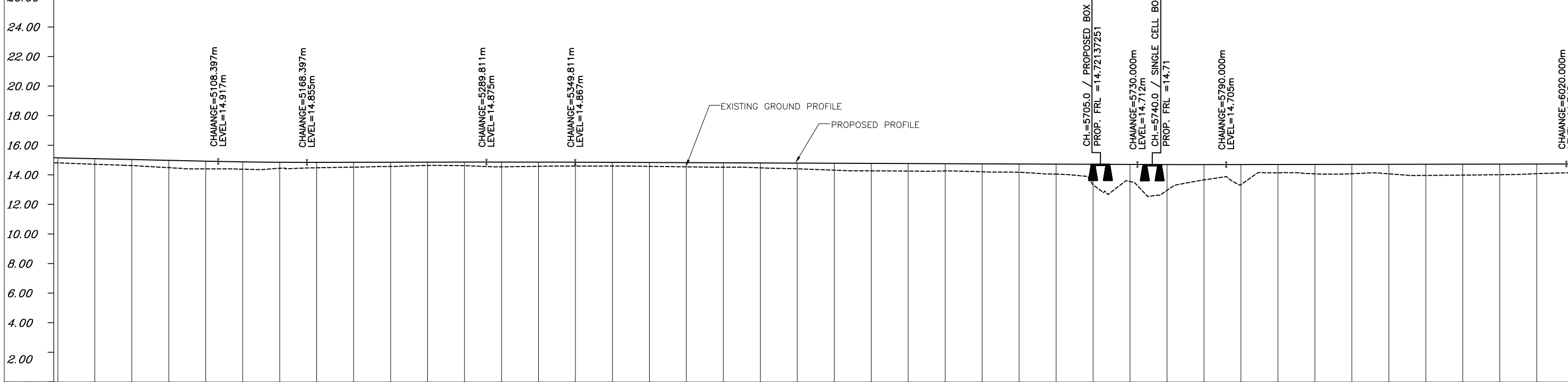
← TO BHADRAK

→ TO CHANDBALI



**LEGEND**

|                       |                     |                         |                       |                       |                          |                               |                  |                        |                |
|-----------------------|---------------------|-------------------------|-----------------------|-----------------------|--------------------------|-------------------------------|------------------|------------------------|----------------|
| EXISTING CENTERLINE   | PROPOSED CENTERLINE | EXISTING CARRIAGE WAY   | PROG. SHOULDER EDGES  | PROG. SHOULDER EDGES  | EXISTING ROW BOUNDARY    | PROG. ROW BOUNDARY            | PIPE LINE        | PROPOSED EARTH WORK    | BRIDGE/CULVERT |
| RIVER/NALLA           | H.T. LINE, TOWER    | WELL/TAP & HAND PUMP    | ELECTRIC LINE & POLE  | TELEPHONE LINE & POLE | HOUSE/BUILDING/STRUCTURE | PIPE CULVERT                  | BOX/SLAB CULVERT | POND                   |                |
| START OF SPIRAL CURVE | END OF SPIRAL CURVE | START OF CIRCULAR CURVE | END OF CIRCULAR CURVE | APEX OF CURVE         | END OF SPIRAL CURVE      | HORIZONTAL INTERSECTION POINT | DEVIATION ANGLE  | LENGTH OF SPIRAL CURVE | TANGENT LENGTH |
| START OF SPIRAL CURVE | END OF SPIRAL CURVE | START OF CIRCULAR CURVE | END OF CIRCULAR CURVE | APEX OF CURVE         | END OF SPIRAL CURVE      | HORIZONTAL INTERSECTION POINT | DEVIATION ANGLE  | LENGTH OF SPIRAL CURVE | TANGENT LENGTH |
| START OF SPIRAL CURVE | END OF SPIRAL CURVE | START OF CIRCULAR CURVE | END OF CIRCULAR CURVE | APEX OF CURVE         | END OF SPIRAL CURVE      | HORIZONTAL INTERSECTION POINT | DEVIATION ANGLE  | LENGTH OF SPIRAL CURVE | TANGENT LENGTH |
| START OF SPIRAL CURVE | END OF SPIRAL CURVE | START OF CIRCULAR CURVE | END OF CIRCULAR CURVE | APEX OF CURVE         | END OF SPIRAL CURVE      | HORIZONTAL INTERSECTION POINT | DEVIATION ANGLE  | LENGTH OF SPIRAL CURVE | TANGENT LENGTH |
| START OF SPIRAL CURVE | END OF SPIRAL CURVE | START OF CIRCULAR CURVE | END OF CIRCULAR CURVE | APEX OF CURVE         | END OF SPIRAL CURVE      | HORIZONTAL INTERSECTION POINT | DEVIATION ANGLE  | LENGTH OF SPIRAL CURVE | TANGENT LENGTH |
| START OF SPIRAL CURVE | END OF SPIRAL CURVE | START OF CIRCULAR CURVE | END OF CIRCULAR CURVE | APEX OF CURVE         | END OF SPIRAL CURVE      | HORIZONTAL INTERSECTION POINT | DEVIATION ANGLE  | LENGTH OF SPIRAL CURVE | TANGENT LENGTH |
| START OF SPIRAL CURVE | END OF SPIRAL CURVE | START OF CIRCULAR CURVE | END OF CIRCULAR CURVE | APEX OF CURVE         | END OF SPIRAL CURVE      | HORIZONTAL INTERSECTION POINT | DEVIATION ANGLE  | LENGTH OF SPIRAL CURVE | TANGENT LENGTH |
| START OF SPIRAL CURVE | END OF SPIRAL CURVE | START OF CIRCULAR CURVE | END OF CIRCULAR CURVE | APEX OF CURVE         | END OF SPIRAL CURVE      | HORIZONTAL INTERSECTION POINT | DEVIATION ANGLE  | LENGTH OF SPIRAL CURVE | TANGENT LENGTH |

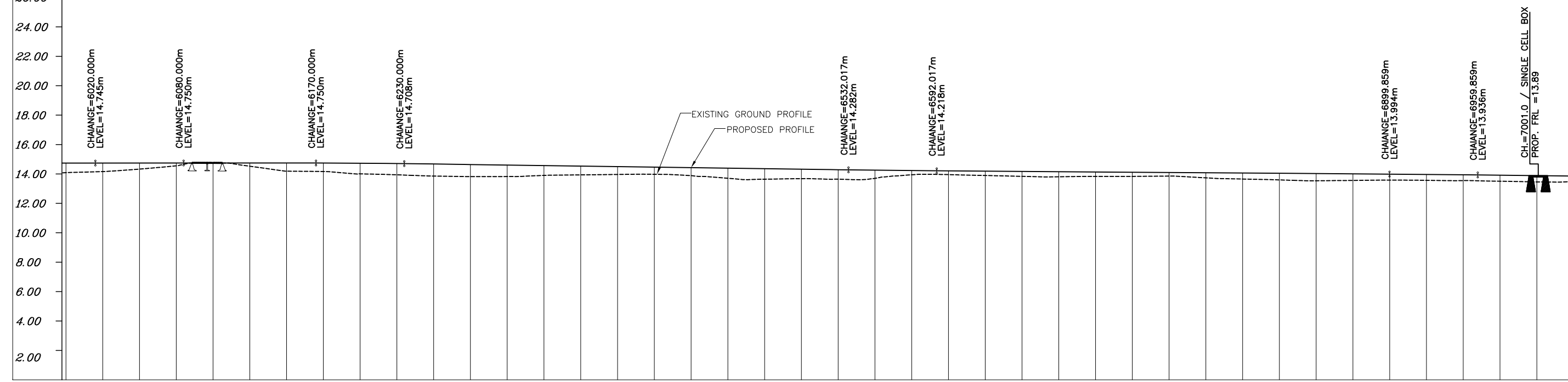
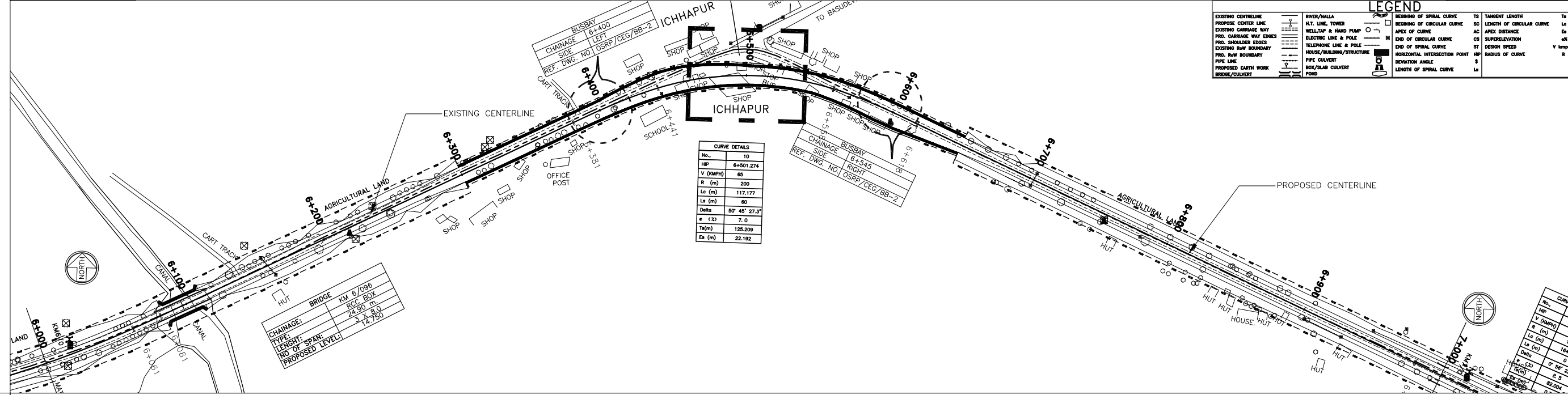


|                            |                       |          |           |          |           |          |           |          |            |          |          |          |                        |          |          |          |            |          |          |          |           |          |          |          |          |          |             |          |                       |          |           |          |          |          |            |          |          |          |          |          |          |        |
|----------------------------|-----------------------|----------|-----------|----------|-----------|----------|-----------|----------|------------|----------|----------|----------|------------------------|----------|----------|----------|------------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|-------------|----------|-----------------------|----------|-----------|----------|----------|----------|------------|----------|----------|----------|----------|----------|----------|--------|
| DATUM = 0.00               | 15.160                | 15.104   | 15.048    | 14.992   | 14.936    | 14.886   | 14.859    | 14.856   | 14.860     | 14.864   | 14.868   | 14.872   | 14.876                 | 14.875   | 14.867   | 14.857   | 14.847     | 14.837   | 14.827   | 14.816   | 14.806    | 14.796   | 14.786   | 14.776   | 14.765   | 14.755   | 14.745      | 14.735   | 14.724                | 14.714   | 14.706    | 14.704   | 14.707   | 14.711   | 14.716     | 14.720   | 14.724   | 14.728   | 14.733   | 14.737   | 14.741   |        |
| PROPOSED ROAD LEVEL (m)    | 14.820                | 14.725   | 14.638    | 14.496   | 14.413    | 14.394   | 14.458    | 14.488   | 14.532     | 14.581   | 14.646   | 14.634   | 14.554                 | 14.590   | 14.604   | 14.609   | 14.584     | 14.553   | 14.528   | 14.485   | 14.420    | 14.327   | 14.280   | 14.268   | 14.275   | 14.221   | 14.184      | 14.059   | 13.331                | 13.563   | 12.965    | 13.671   | 13.345   | 14.150   | 14.184     | 14.079   | 14.088   | 14.078   | 13.973   | 13.994   | 14.021   | 14.092 |
| EXISTING LEVEL (m)         |                       |          |           |          |           |          |           |          | R=800.000m |          |          |          |                        |          |          |          | L=292.058m |          |          |          |           |          |          |          |          |          | R=-200.000m |          |                       |          |           |          |          |          |            |          |          |          |          |          | R=-700.0 |        |
| HORIZONTAL ALIGNMENT       |                       |          |           |          | L=55.000m |          |           |          | L=105.302m |          |          |          | L=55.000m              |          |          |          |            |          |          |          |           |          |          |          |          |          | L=60.000m   |          | L=71.515m             |          | L=60.000m |          |          |          | L=125.033m |          |          |          | L=94.950 |          |          |        |
| VERTICAL PROFILE           | G=0.016<br>L=121.414m |          | L=60.000m |          |           |          | L=60.000m |          |            |          |          |          | L=380.189m<br>G=-0.041 |          |          |          |            |          |          |          | L=60.000m |          |          |          |          |          |             |          | G=0.017<br>L=230.000m |          |           |          |          |          |            |          |          |          |          |          |          |        |
| SUPERELEVATION / CROSSFALL | Q=3.560               |          |           |          |           |          |           |          | Q=2.500    |          |          |          |                        |          |          |          |            |          |          |          | Q=7.000   |          |          |          |          |          |             |          | Q=2.500               |          |           |          |          |          |            |          |          |          | Q=2.68   |          |          |        |
| CHAINAGE                   | 5000.000              | 5025.000 | 5050.000  | 5075.000 | 5100.000  | 5125.000 | 5150.000  | 5175.000 | 5200.000   | 5225.000 | 5250.000 | 5275.000 | 5300.000               | 5325.000 | 5350.000 | 5375.000 | 5400.000   | 5425.000 | 5450.000 | 5475.000 | 5500.000  | 5525.000 | 5550.000 | 5575.000 | 5600.000 | 5625.000 | 5650.000    | 5675.000 | 5700.000              | 5725.000 | 5750.000  | 5775.000 | 5800.000 | 5825.000 | 5850.000   | 5875.000 | 5900.000 | 5925.000 | 5950.000 | 5975.000 | 6000.000 |        |

|     |           |                 |      |              |                 |                 |  |            |   |                                |   |                         |   |  |                |                  |
|-----|-----------|-----------------|------|--------------|-----------------|-----------------|--|------------|---|--------------------------------|---|-------------------------|---|--|----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJUJ MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | <b>CONSULTING ENGINEERS GROUP LTD.</b><br>E-12, MOJI COLONY, MALVIYA NAGAR<br>JAIPUR-17 Tel:<br>+91-141-2520899, 2521899, 2520556 Fax:<br>2521348, e-mail: ceg@ceginidia.com | <b>CEG</b> | <b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India<br>B-1, E-27, 1 <sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 | <b>ODISHA WORKS DEPARTMENT</b> | <b>PROJECT :</b><br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | <b>SCALE :</b><br>N.T.S | <b>DRAWING TITLE :</b><br>PLAN AND LONGITUDINAL SECTION (SH-9) KM 5/000 TO KM 6/000 (SHEET 6 OF 28) | <b>DWG. NUMBER :</b> OSRP/CEG/SH9/P02A/P&P/6 | <b>REV. R2</b> |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY        | PK.MISHRA (AE)  | M.R MISHRA (EE) |  |            |   |                                |   |                         |   |  |                | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |              |                 |                 |  |            |   |                                |   |                         |   |  |                |                  |
| NO. | DATE      | REVISION        | BY   | DRAWN:       | PREPARED :      | CHECKED:        |  |            |   |                                |   |                         |   |  |                | APPROVED:        |

← TO BHADRAK

→ TO CHANDBALI



|                           |             |          |                       |          |            |          |                        |          |          |          |          |          |          |          |           |          |            |          |                        |          |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
|---------------------------|-------------|----------|-----------------------|----------|------------|----------|------------------------|----------|----------|----------|----------|----------|----------|----------|-----------|----------|------------|----------|------------------------|----------|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| DATUM =0.00               | 14.741      | 14.746   | 14.749                | 14.750   | 14.750     | 14.750   | 14.750                 | 14.750   | 14.739   | 14.714   | 14.680   | 14.644   | 14.609   | 14.574   | 14.539    | 14.503   | 14.468     | 14.433   | 14.398                 | 14.363   | 14.327     | 14.292   | 14.259   | 14.232   | 14.212   | 14.194   | 14.176   | 14.158   | 14.139   | 14.121   | 14.103   | 14.085   | 14.067   | 14.048   | 14.030   | 14.012   | 13.994   | 13.973   | 13.947   | 13.918   | 13.888   |
| PROPOSED ROAD LEVEL (m)   | 14.092      | 14.166   | 14.336                | 14.555   | 14.745     | 14.531   | 14.193                 | 14.172   | 14.012   | 13.946   | 13.861   | 13.822   | 13.828   | 13.905   | 13.941    | 13.970   | 13.981     | 13.892   | 13.711                 | 13.647   | 13.684     | 13.649   | 13.706   | 13.949   | 13.959   | 13.899   | 13.841   | 13.811   | 13.839   | 13.839   | 13.859   | 13.740   | 13.658   | 13.599   | 13.539   | 13.563   | 13.586   | 13.570   | 13.553   | 13.509   | 13.462   |
| EXISTING LEVEL (m)        | = -700.000m |          | L                     |          | L=299.604m |          |                        |          |          |          |          |          |          |          | L=60.000m |          | R=200.000m |          | L=60.000m              |          | L=362.738m |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| HORIZONTAL ALIGNMENT      | L=60.000m   |          | L=90.000m<br>G=-0.000 |          | L=60.000m  |          | L=302.017m<br>G=-0.141 |          |          |          |          |          |          |          |           |          | L=60.000m  |          | L=307.842m<br>G=-0.073 |          |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| VERTICAL PROFILE          | Q=2.680     |          | Q=2.500               |          | Q=2.501    |          |                        |          |          |          |          |          |          |          | Q=7.000   |          |            |          |                        |          |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| SUPERELEVATION /CROSSFALL | CHAINAGE    |          |                       |          |            |          |                        |          |          |          |          |          |          |          |           |          |            |          |                        |          |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
|                           | 6000.000    | 6025.000 | 6050.000              | 6075.000 | 6100.000   | 6125.000 | 6150.000               | 6175.000 | 6200.000 | 6225.000 | 6250.000 | 6275.000 | 6300.000 | 6325.000 | 6350.000  | 6375.000 | 6400.000   | 6425.000 | 6450.000               | 6475.000 | 6500.000   | 6525.000 | 6550.000 | 6575.000 | 6600.000 | 6625.000 | 6650.000 | 6675.000 | 6700.000 | 6725.000 | 6750.000 | 6775.000 | 6800.000 | 6825.000 | 6850.000 | 6875.000 | 6900.000 | 6925.000 | 6950.000 | 6975.000 | 7000.000 |

|     |           |                 |      |             |                 |                 |  |   |  |  |                  |  |                  |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|--|---|--|--|------------------|--|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT :<br><b>CEG CONSULTING ENGINEERS GROUP LTD.</b><br>E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com | DESIGN REVIEW CONSULTANT :<br><b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India B-1, E-27, 1Ind FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . | CLIENT :<br><b>ODISHA WORKS DEPARTMENT</b> | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | SCALE :<br>N.T.S | DRAWING TITLE :<br><b>PLAN AND LONGITUDINAL SECTION (SH-9) KM 6/000 TO KM 7/000</b><br>(SHEET 1 OF 30) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |  |   |  |  |                  |  | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |  |   |  |  |                  |  |                  |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:  |   |  |  |                  | DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/1  | REV. R2          |

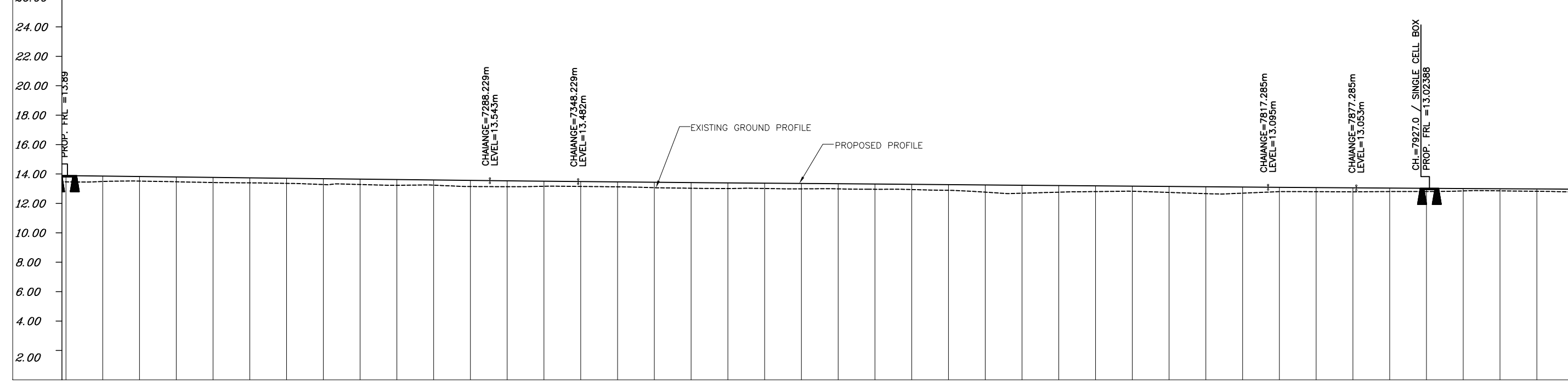
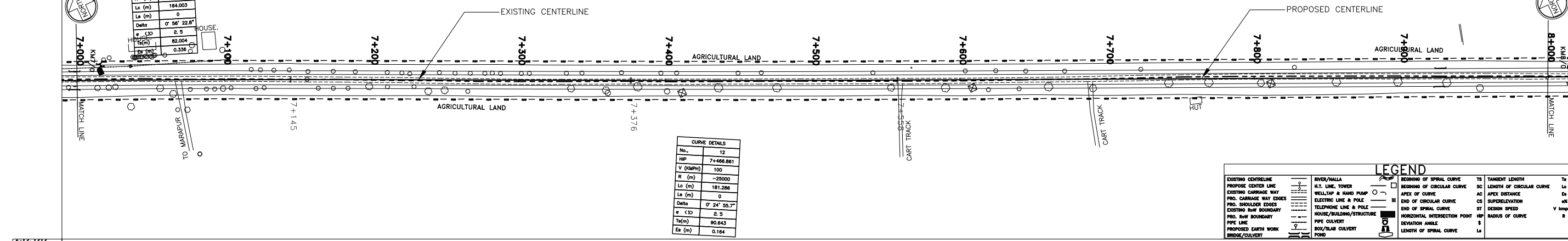
← TO BHADRAK

TO CHANDBALI →

| CURVE DETAILS |              |
|---------------|--------------|
| No.           | 11           |
| HP            | 7+062.868    |
| V (KMPH)      | 100          |
| R (m)         | 10000        |
| Lc (m)        | 164.003      |
| La (m)        | 0            |
| Delta         | 0° 56' 22.8" |
| e (m)         | 2.5          |
| Ts (m)        | 82.004       |
| Es (m)        | 0.336        |

| CURVE DETAILS |              |
|---------------|--------------|
| No.           | 12           |
| HP            | 7+468.861    |
| V (KMPH)      | 100          |
| R (m)         | -25000       |
| Lc (m)        | 181.286      |
| La (m)        | 0            |
| Delta         | 0° 24' 55.7" |
| e (m)         | 2.5          |
| Ts (m)        | 90.643       |
| Es (m)        | 0.164        |

| LEGEND                 |                          |                               |                             |
|------------------------|--------------------------|-------------------------------|-----------------------------|
| EXISTING CENTERLINE    | RIVER/WALL               | BEGINNING OF SPIRAL CURVE     | TS TANGENT LENGTH           |
| PROPOSED CENTERLINE    | H.T. LINE, TOWER         | END OF SPIRAL CURVE           | SC LENGTH OF CIRCULAR CURVE |
| EXISTING CARRIAGE WAY  | WELL/TAP & HAND PUMP     | APEX OF CURVE                 | AC APEX DISTANCE            |
| PRO. CARRIAGE WAY EDGE | ELECTRIC LINE & POLE     | END OF CIRCULAR CURVE         | CS SUPERELEVATION           |
| PRO. SHOULDER EDGES    | TELEPHONE LINE & POLE    | END OF SPIRAL CURVE           | ST DESIGN SPEED             |
| EXISTING ROW BOUNDARY  | HOUSE/BUILDING/STRUCTURE | HORIZONTAL INTERSECTION POINT | HP RADIUS OF CURVE          |
| PRO. ROW BOUNDARY      | PIPE CULVERT             | DEVIATION ANGLE               | S                           |
| PROPOSED EARTH WORK    | BOX/R/LAB CULVERT        | LENGTH OF SPIRAL CURVE        | La                          |
| BRIDGE/CULVERT         | POND                     |                               |                             |

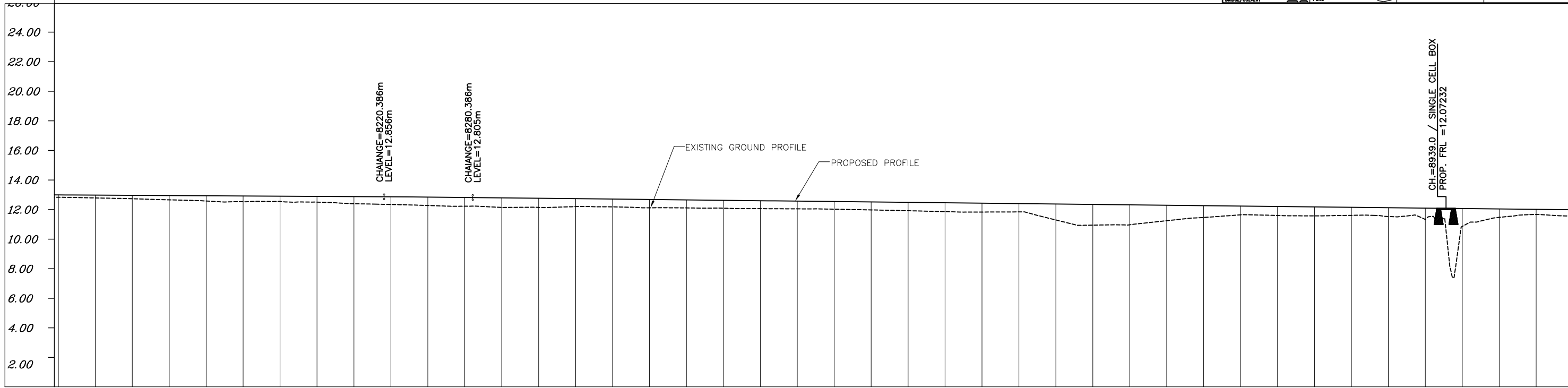
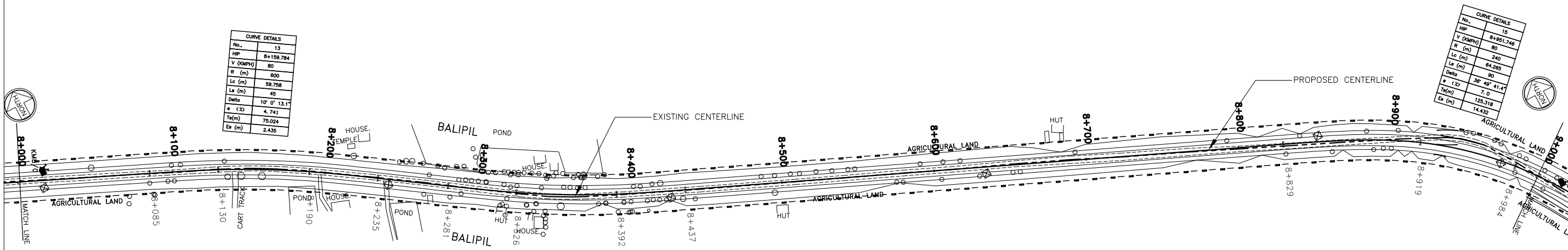


|                           |  |
|---------------------------|--|
| DATUM =0.00               |  |
| PROPOSED ROAD LEVEL (m)   | 13.888 13.858 13.828 13.798 13.768 13.738 13.708 13.678 13.648 13.618 13.588 13.559 13.529 13.503 13.481 13.460 13.439 13.419 13.398 13.377 13.357 13.336 13.315 13.295 13.274 13.254 13.233 13.212 13.192 13.171 13.150 13.130 13.109 13.089 13.070 13.054 13.040 13.025 13.011 12.997 12.982   |
| EXISTING LEVEL (m)        | 13.482 13.488 13.515 13.468 13.419 13.395 13.361 13.279 13.284 13.250 13.239 13.146 13.135 13.164 13.152 13.126 13.065 13.029 13.012 13.013 12.989 12.987 12.959 12.940 12.888 12.763 12.690 12.762 12.801 12.824 12.744 12.663 12.695 12.799 12.796 12.785 12.804 12.807 12.848 12.853 12.822   |
| HORIZONTAL ALIGNMENT      | R=10000.000m L=164.003m      L=231.350m      R=-25000.000m L=181.286m      L=527.376m  |
| VERTICAL PROFILE          | L=328.370m G=-0.120      L=60.000m      L=469.056m G=-0.083      L=60.000m   |
| SUPERELEVATION /CROSSFALL | Q=2.500  |
| CHAINAGE                  | 7000.000 7025.000 7050.000 7075.000 7100.000 7125.000 7150.000 7175.000 7200.000 7225.000 7250.000 7275.000 7300.000 7325.000 7350.000 7375.000 7400.000 7425.000 7450.000 7475.000 7500.000 7525.000 7550.000 7575.000 7600.000 7625.000 7650.000 7675.000 7700.000 7725.000 7750.000 7775.000 7800.000 7825.000 7850.000 7875.000 7900.000 7925.000 7950.000 7975.000 8000.000 |

|     |           |                 |      |             |                 |                 |                  |  |  |   |  |                  |   |         |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|--|--|---|--|------------------|---|---------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT : | <b>CEG</b><br>CONSULTING ENGINEERS GROUP LTD.<br>E-12, MOJI COLONY, MALVIYA NAGAR<br>JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com | <b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India<br>B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . | CLIENT :<br><br>ODISHA WORKS DEPARTMENT | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | SCALE :<br>N.T.S | DRAWING TITLE :<br>PLAN AND LONGITUDINAL SECTION (SH-9) KM 7/000 TO KM 8/000<br>(SHEET 8 OF 28) |         |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |  |  |   |  |                  |   |         |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |  |  |   |  |                  |   |         |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |  |  |   |  |                  | DWG. NUMBER : OSRP/CEG/SH9/P02A/P&F/8   | REV. R2 |

← TO BHADRAK

TO CHANDBALI →



|                           |                        |          |          |          |          |          |          |          |          |          |            |          |          |          |          |                        |          |          |          |          |             |          |          |          |          |           |          |          |          |          |            |          |          |          |          |           |          |          |          |          |          |
|---------------------------|------------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|------------|----------|----------|----------|----------|------------------------|----------|----------|----------|----------|-------------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|------------|----------|----------|----------|----------|-----------|----------|----------|----------|----------|----------|
| DATUM = 0.00              |                        |          |          |          |          |          |          |          |          |          |            |          |          |          |          |                        |          |          |          |          |             |          |          |          |          |           |          |          |          |          |            |          |          |          |          |           |          |          |          |          |          |
| PROPOSED ROAD LEVEL (m)   | 12.982                 | 12.968   | 12.953   | 12.939   | 12.925   | 12.910   | 12.896   | 12.882   | 12.867   | 12.853   | 12.835     | 12.811   | 12.783   | 12.755   | 12.728   | 12.700                 | 12.672   | 12.644   | 12.616   | 12.589   | 12.561      | 12.533   | 12.505   | 12.477   | 12.450   | 12.422    | 12.394   | 12.366   | 12.338   | 12.311   | 12.283     | 12.255   | 12.227   | 12.199   | 12.172   | 12.144    | 12.116   | 12.088   | 12.060   | 12.033   | 12.005   |
| EXISTING LEVEL (m)        | 12.822                 | 12.777   | 12.722   | 12.648   | 12.569   | 12.521   | 12.542   | 12.495   | 12.384   | 12.334   | 12.266     | 12.217   | 12.137   | 12.136   | 12.188   | 12.172                 | 12.111   | 12.101   | 12.083   | 12.050   | 12.039      | 12.015   | 11.967   | 11.912   | 11.850   | 11.824    | 11.832   | 11.286   | 10.938   | 10.961   | 11.237     | 11.455   | 11.633   | 11.591   | 11.564   | 11.599    | 11.520   | 11.330   | 10.851   | 11.465   | 11.661   |
| HORIZONTAL ALIGNMENT      | L=45.000m              |          |          |          |          |          |          |          |          |          | R=600.000m |          |          |          |          | L=45.000m              |          |          |          |          | R=-600.000m |          |          |          |          | L=90.000m |          |          |          |          | R=240.000m |          |          |          |          | L=90.000m |          |          |          |          |          |
| VERTICAL PROFILE          | L=343.101m<br>G=-0.057 |          |          |          |          |          |          |          |          |          | L=60.000m  |          |          |          |          | L=783.922m<br>G=-0.111 |          |          |          |          |             |          |          |          |          |           |          |          |          |          |            |          |          |          |          |           |          |          |          |          |          |
| SUPERELEVATION /CROSSFALL | Q=4.740                |          |          |          |          |          |          |          |          |          | Q=2.500    |          |          |          |          | Q=4.740                |          |          |          |          |             |          |          |          |          |           |          |          |          |          | Q=2.500    |          |          |          |          | Q=7.000   |          |          |          |          |          |
| CHAINAGE                  | 8000.000               | 8025.000 | 8050.000 | 8075.000 | 8100.000 | 8125.000 | 8150.000 | 8175.000 | 8200.000 | 8225.000 | 8250.000   | 8275.000 | 8300.000 | 8325.000 | 8350.000 | 8375.000               | 8400.000 | 8425.000 | 8450.000 | 8475.000 | 8500.000    | 8525.000 | 8550.000 | 8575.000 | 8600.000 | 8625.000  | 8650.000 | 8675.000 | 8700.000 | 8725.000 | 8750.000   | 8775.000 | 8800.000 | 8825.000 | 8850.000 | 8875.000  | 8900.000 | 8925.000 | 8950.000 | 8975.000 | 9000.000 |

|     |           |                 |                                       |             |                 |                 |   |  |  |   |                  |  |                  |
|-----|-----------|-----------------|---------------------------------------|-------------|-----------------|-----------------|---|--|--|---|------------------|--|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA                                  | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT :<br><b>CEG</b><br>CONSULTING ENGINEERS GROUP LTD.<br>E-12,MOJI COLONY,MALVIYA NAGAR<br>JAIPUR-17 Tel:<br>+91-141-2520899,2521899,2520556 Fax:<br>2521348, e-mail: ceg@ceginia.com | DESIGN REVIEW CONSULTANT :<br><b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India<br>B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE<br>INDUSTRIAL ESTATE, MATHURA ROAD, NEW<br>DELHI-110044 . | CLIENT :<br><br>ODISHA WORKS<br>DEPARTMENT | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING<br>OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM<br>BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF<br>SH-09 (BALANCE WORK) PACKAGE - P02A | SCALE :<br>N.T.S | DRAWING TITLE :<br>PLAN AND LONGITUDINAL SECTION<br>(SH-9) KM 8/000 TO KM 9/000<br>(SHEET 9 OF 28) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD                                   | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |   |  |  |   |                  |  | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG                                   |             |                 |                 |   |  |  |   |                  |  |                  |
| NO. | DATE      | REVISION        | BY                                    | DRAWN:      | PREPARED :      | CHECKED:        |   |  |  |   |                  |  | APPROVED:        |
|     |           |                 | DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/9 |             |                 | REV. R2         |   |  |  |   |                  |  |                  |



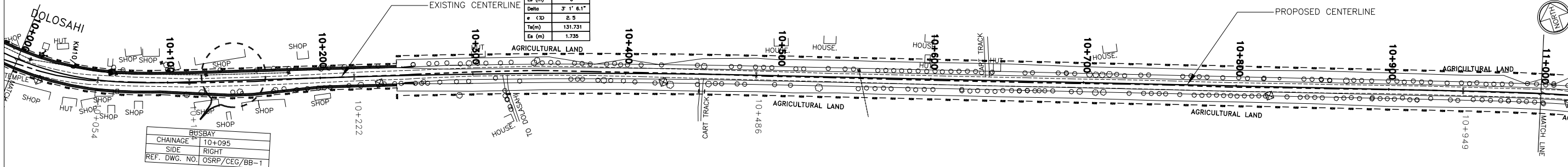


TO BHADRAK

TO CHANDBALI

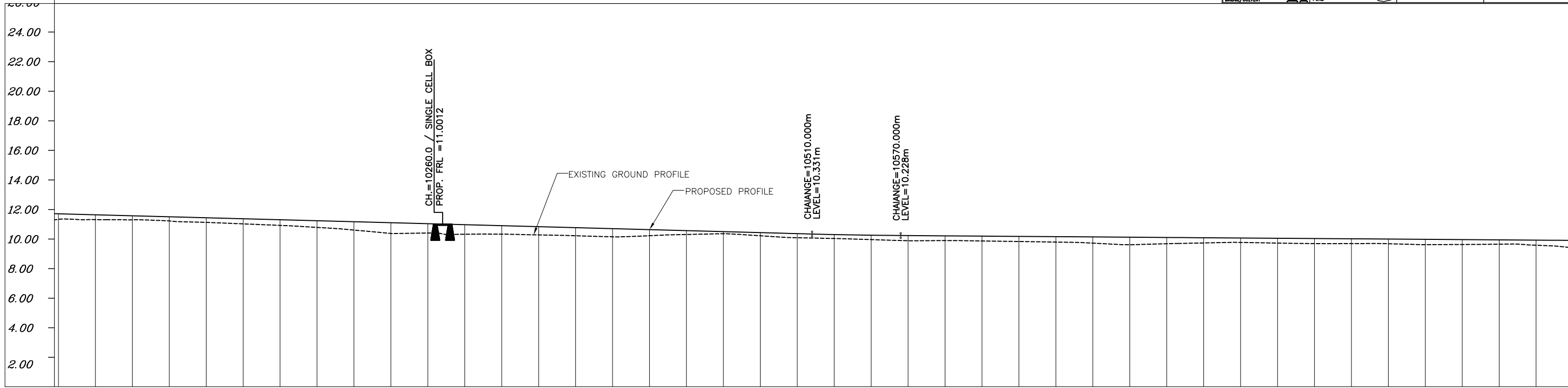
|         |
|---------|
| DETAILS |
| 17      |
| PERMITS |
| 250     |
| 462     |
| 3.31    |

| CURVE DETAILS |            |
|---------------|------------|
| No.           | 18         |
| HP            | 10+353.846 |
| V (KMPH)      | 100        |
| R (m)         | 5000       |
| Lc (m)        | 263.402    |
| La (m)        | 0          |
| Delta         | 3° 1' 6.1" |
| e CD          | 2.5        |
| Ta(m)         | 131.731    |
| Ea (m)        | 1.735      |



| BUSBAY        |               |
|---------------|---------------|
| CHAINAGE      | 10+095        |
| SIDE          | RIGHT         |
| REF. DWG. NO. | OSRP/CEG/BB-1 |

| LEGEND                    |  |                               |  |
|---------------------------|--|-------------------------------|--|
| EXISTING CENTERLINE       |  | RIVER/HALLA                   |  |
| PROPOSED CENTERLINE       |  | ALT. LINE, TOWER              |  |
| EXISTING CARRIAGE WAY     |  | WELL/TAP & HAND PUMP          |  |
| PRO. SHOULDER EDGES       |  | ELECTRIC LINE & POLE          |  |
| EXISTING ROW BOUNDARY     |  | TELEPHONE LINE & POLE         |  |
| PRO. ROW BOUNDARY         |  | HOUSE/BUILDING/STRUCTURE      |  |
| PIPE LINE                 |  | HOUSE/BUILDING/STRUCTURE      |  |
| PROPOSED EARTH WORK       |  | BOX/SLAB CULVERT              |  |
| BRIDGE/CULVERT            |  | POND                          |  |
| BEGINNING OF SPIRAL CURVE |  | HORIZONTAL INTERSECTION POINT |  |
| END OF SPIRAL CURVE       |  | DEVIATION ANGLE               |  |
| APEX OF CURVE             |  | LENGTH OF SPIRAL CURVE        |  |
| TANGENT LENGTH            |  | TANGENT LENGTH                |  |
| LENGTH OF CIRCULAR CURVE  |  | LENGTH OF CIRCULAR CURVE      |  |
| APEX DISTANCE             |  | APEX DISTANCE                 |  |
| SUPERELEVATION            |  | SUPERELEVATION                |  |
| DESIGN SPEED              |  | DESIGN SPEED                  |  |
| RADIUS OF CURVE           |  | RADIUS OF CURVE               |  |



|                           |                        |           |           |           |           |           |           |           |           |           |                           |           |           |           |           |           |           |           |           |           |                        |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|---------------------------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|---------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| DATUM = 0.00              |                        |           |           |           |           |           |           |           |           |           |                           |           |           |           |           |           |           |           |           |           |                        |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| PROPOSED ROAD LEVEL (m)   | 11.699                 | 11.632    | 11.565    | 11.498    | 11.431    | 11.364    | 11.297    | 11.230    | 11.163    | 11.096    | 11.028                    | 10.961    | 10.894    | 10.827    | 10.760    | 10.693    | 10.626    | 10.559    | 10.492    | 10.424    | 10.357                 | 10.294    | 10.249    | 10.225    | 10.207    | 10.188    | 10.170    | 10.152    | 10.134    | 10.116    | 10.098    | 10.080    | 10.062    | 10.044    | 10.026    | 10.008    | 9.989     | 9.971     | 9.953     | 9.935     | 9.917     |
| EXISTING LEVEL (m)        | 11.323                 | 11.306    | 11.291    | 11.216    | 11.117    | 11.017    | 10.914    | 10.778    | 10.598    | 10.371    | 10.398                    | 10.315    | 10.322    | 10.271    | 10.214    | 10.143    | 10.218    | 10.299    | 10.352    | 10.424    | 10.082                 | 10.027    | 9.953     | 9.876     | 9.888     | 9.861     | 9.824     | 9.785     | 9.714     | 9.603     | 9.675     | 9.727     | 9.761     | 9.719     | 9.683     | 9.684     | 9.675     | 9.611     | 9.623     | 9.643     | 9.573     |
| HORIZONTAL ALIGNMENT      | L=60.000m              |           |           |           |           |           |           |           |           |           | R=5000.000m<br>L=263.402m |           |           |           |           |           |           |           |           |           | L=463.107m             |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| VERTICAL PROFILE          | L=554.705m<br>G=-0.268 |           |           |           |           |           |           |           |           |           | L=60.000m                 |           |           |           |           |           |           |           |           |           | L=669.112m<br>G=-0.072 |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| SUPERELEVATION /CROSSFALL | Q=2.500                |           |           |           |           |           |           |           |           |           |                           |           |           |           |           |           |           |           |           |           |                        |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| CHAINAGE                  | 10000.000              | 10025.000 | 10050.000 | 10075.000 | 10100.000 | 10125.000 | 10150.000 | 10175.000 | 10200.000 | 10225.000 | 10250.000                 | 10275.000 | 10300.000 | 10325.000 | 10350.000 | 10375.000 | 10400.000 | 10425.000 | 10450.000 | 10475.000 | 10500.000              | 10525.000 | 10550.000 | 10575.000 | 10600.000 | 10625.000 | 10650.000 | 10675.000 | 10700.000 | 10725.000 | 10750.000 | 10775.000 | 10800.000 | 10825.000 | 10850.000 | 10875.000 | 10900.000 | 10925.000 | 10950.000 | 10975.000 | 11000.000 |

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginia.com

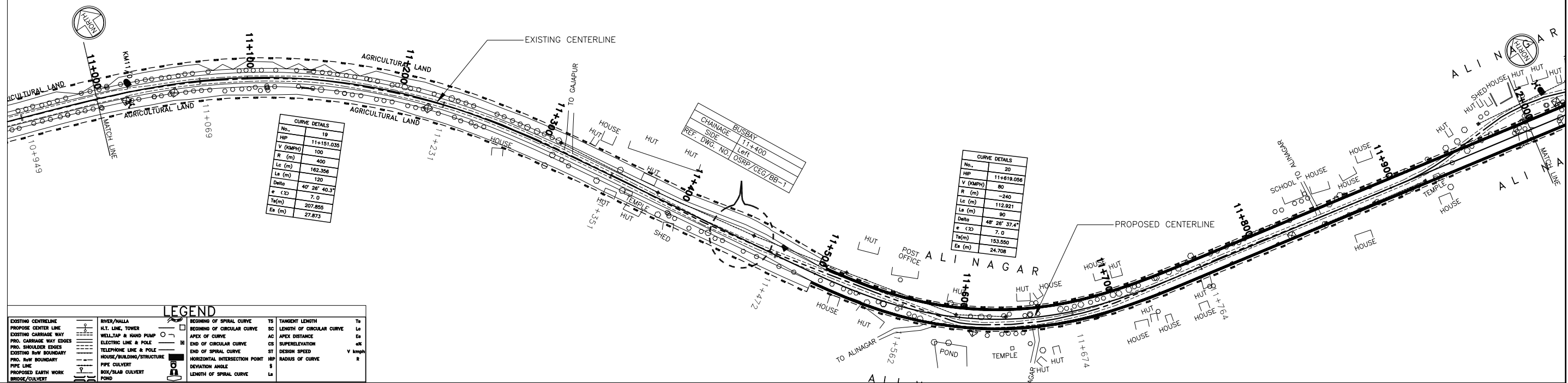
DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

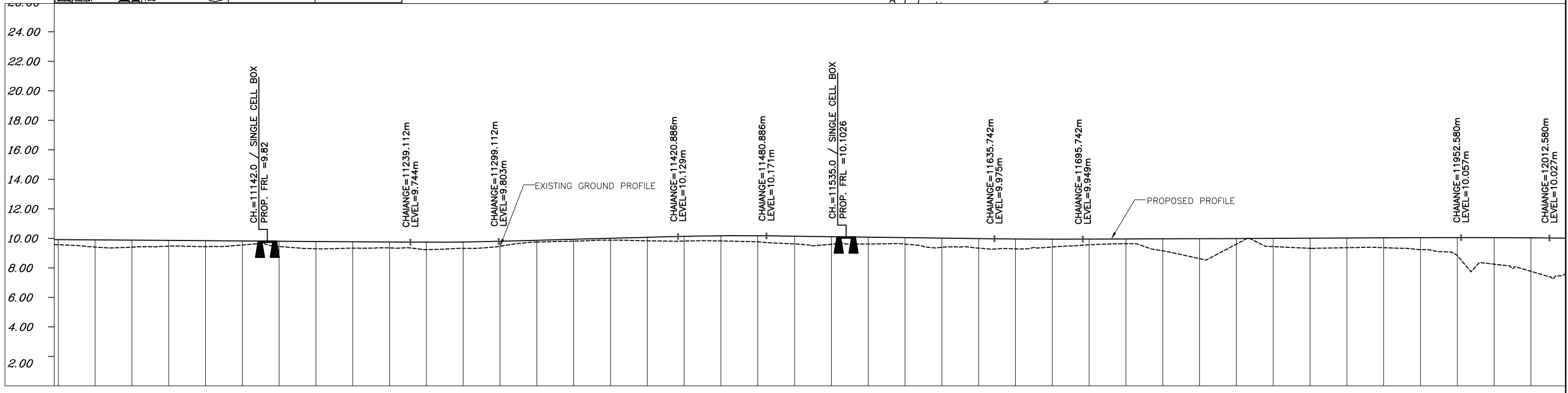
SCALE :  
 N.T.S

DRAWING TITLE :  
**PLAN AND LONGITUDINAL SECTION (SH-9) KM 10/000 TO KM 11/000**  
 (SHEET 11 OF 28)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/11 REV. R2



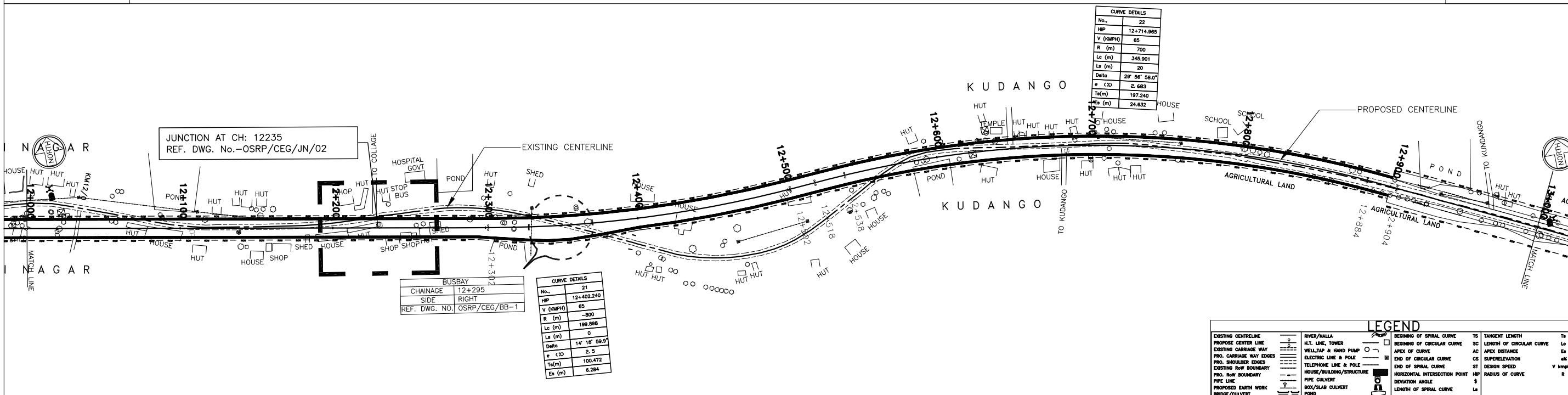
**LEGEND**

|                       |                          |    |                          |          |
|-----------------------|--------------------------|----|--------------------------|----------|
| EXISTING CENTERLINE   | RIVER/MALLA              | TS | TANGENT LENGTH           | Ta       |
| PROPOSED CENTERLINE   | ALT. LINE, TOWER         | SC | LENGTH OF CIRCULAR CURVE | Lc       |
| EXISTING CARRIAGE WAY | WELL/TAP & HAND PUMP     | AC | APEX DISTANCE            | Es       |
| PRO. SHOULDER EDGES   | ELECTRIC LINE & POLE     | CS | SUPERELEVATION           | SE       |
| EXISTING ROW BOUNDARY | TELEPHONE LINE & POLE    | ST | DESIGN SPEED             | V design |
| PRO. ROW BOUNDARY     | HOUSE/BUILDING/STRUCTURE | HP | RADIUS OF CURVE          | R        |
| PIPE LINE             | HOUSE/BUILDING/STRUCTURE | SI | DEVIATION ANGLE          | Δ        |
| PROPOSED EARTH WORK   | PIPE CULVERT             | SI | LENGTH OF SPIRAL CURVE   | La       |
| BRIDGE/CULVERT        | BOX/SLAB CULVERT         | SI |                          |          |
|                       | POND                     |    |                          |          |



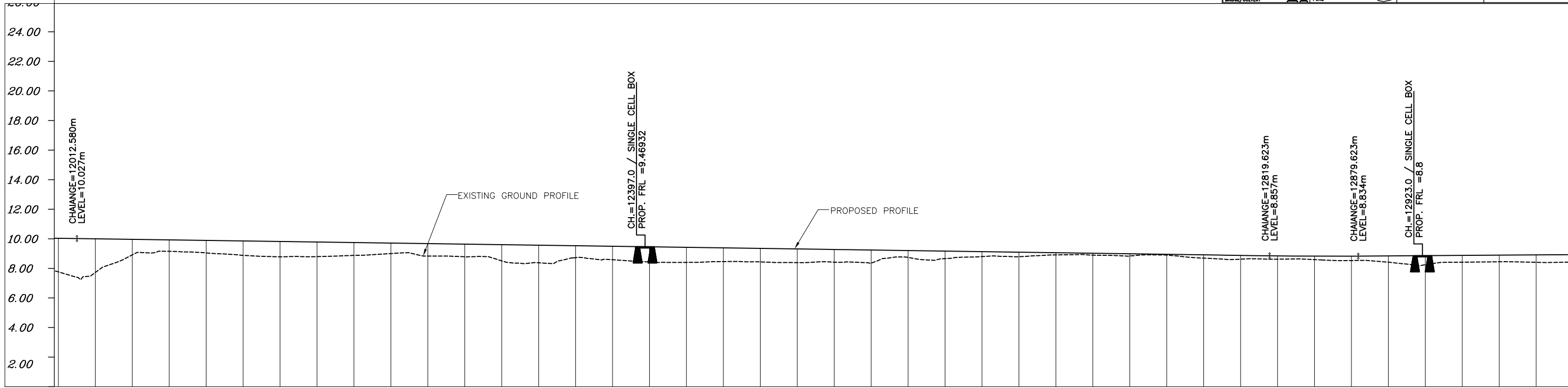
|                            |           |           |            |           |           |           |                       |           |           |           |            |           |           |           |                        |           |           |           |             |           |           |           |                       |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |        |
|----------------------------|-----------|-----------|------------|-----------|-----------|-----------|-----------------------|-----------|-----------|-----------|------------|-----------|-----------|-----------|------------------------|-----------|-----------|-----------|-------------|-----------|-----------|-----------|-----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|--------|
| DATUM = 0.00               |           |           |            |           |           |           |                       |           |           |           |            |           |           |           |                        |           |           |           |             |           |           |           |                       |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |        |
| PROPOSED ROAD LEVEL (m)    | 9.917     | 9.899     | 9.881      | 9.863     | 9.845     | 9.827     | 9.809                 | 9.790     | 9.772     | 9.754     | 9.740      | 9.755     | 9.805     | 9.872     | 9.939                  | 10.006    | 10.073    | 10.140    | 10.179      | 10.178    | 10.147    | 9.604     | 9.622                 | 10.084    | 10.052    | 10.020    | 9.988     | 9.959     | 9.946     | 9.951     | 9.961     | 9.972     | 9.982     | 9.993     | 10.004    | 10.014    | 10.025    | 10.035    | 10.046    | 10.056    | 10.059    | 10.042 |
| EXISTING LEVEL (m)         | 9.573     | 9.415     | 9.402      | 9.479     | 9.441     | 9.554     | 9.448                 | 9.300     | 9.340     | 9.352     | 9.240      | 9.328     | 9.467     | 9.754     | 9.814                  | 9.881     | 9.838     | 9.820     | 9.826       | 9.769     | 9.625     | 9.604     | 9.622                 | 9.614     | 9.399     | 9.341     | 9.290     | 9.420     | 9.567     | 9.638     | 9.160     | 8.629     | 9.612     | 9.441     | 9.327     | 9.371     | 9.370     | 9.239     | 8.837     | 8.253     | 7.769     |        |
| HORIZONTAL ALIGNMENT       | 120.000m  |           | R=400.000m |           |           |           | L=120.000m            |           |           |           | L=120.451m |           |           |           | L=90.000m              |           |           |           | R=-240.000m |           |           |           | L=112.921m            |           |           |           | L=90.000m |           |           |           | L=90.000m |           |           |           |           |           |           |           |           |           |           |        |
| VERTICAL PROFILE           |           |           | L=60.000m  |           |           |           | G=0.268<br>L=121.774m |           |           |           | L=60.000m  |           |           |           | L=154.855m<br>G=-0.127 |           |           |           | L=60.000m   |           |           |           | G=0.042<br>L=256.838m |           |           |           | L=60.000m |           |           |           |           |           |           |           |           |           |           |           |           |           |           |        |
| SUPERELEVATION / CROSSFALL | Q=7.000   |           |            |           |           |           |                       |           |           |           | Q=2.500    |           |           |           |                        |           |           |           |             |           | Q=7.000   |           |                       |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |        |
| CHAINAGE                   | 11000.000 | 11025.000 | 11050.000  | 11075.000 | 11100.000 | 11125.000 | 11150.000             | 11175.000 | 11200.000 | 11225.000 | 11250.000  | 11275.000 | 11300.000 | 11325.000 | 11350.000              | 11375.000 | 11400.000 | 11425.000 | 11450.000   | 11475.000 | 11500.000 | 11525.000 | 11550.000             | 11575.000 | 11600.000 | 11625.000 | 11650.000 | 11675.000 | 11700.000 | 11725.000 | 11750.000 | 11775.000 | 11800.000 | 11825.000 | 11850.000 | 11875.000 | 11900.000 | 11925.000 | 11950.000 | 11975.000 | 20000.000 |        |

|     |           |                 |      |             |                 |                 |                  |   |  |                         |   |         |  |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|---|--|-------------------------|---|---------|--|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT : | CONSULTING ENGINEERS GROUP LTD.   | DESIGN REVIEW CONSULTANT :   | CLIENT :                | PROJECT :   | SCALE : | DRAWING TITLE :  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | C E G            | E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginia.com | LEA Associates South Asia Pvt. Ltd., India B-1, E-27, 1st FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . | ODISHA WORKS DEPARTMENT | CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | N.T.S   | PLAN AND LONGITUDINAL SECTION (SH-9) KM 11/000 TO KM 12/000 (SHEET 12 OF 28) |
|     | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |   |  |                         |   |         | DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/12                                       |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |   |  |                         |   |         | REV. R2  |



**LEGEND**

|                         |   |                          |   |                               |    |                          |        |
|-------------------------|---|--------------------------|---|-------------------------------|----|--------------------------|--------|
| EXISTING CENTERLINE     | — | RIVER/HALLA              | — | BEGINNING OF SPIRAL CURVE     | TS | TANGENT LENGTH           | Ts     |
| PROPOSED CENTERLINE     | — | ALT. LINE, TOWER         | — | END OF SPIRAL CURVE           | TE | LENGTH OF CIRCULAR CURVE | Lc     |
| EXISTING CARRIAGE WAY   | — | WELL, TAP & HAND PUMP    | — | APEX OF CURVE                 | AC | APEX DISTANCE            | Es     |
| PRO. CARRIAGE WAY EDGES | — | ELECTRIC LINE & POLE     | — | END OF CIRCULAR CURVE         | CS | SUPERELEVATION           | es     |
| PRO. SHOULDER EDGES     | — | TELEPHONE LINE & POLE    | — | END OF SPIRAL CURVE           | ST | DESIGN SPEED             | V kmph |
| EXISTING ROW BOUNDARY   | — | HOUSE/BUILDING/STRUCTURE | — | HORIZONTAL INTERSECTION POINT | HP | RADIUS OF CURVE          | R      |
| PRO. ROW BOUNDARY       | — | PIPE CULVERT             | — | DEVIATION ANGLE               | Δ  |                          |        |
| PROPOSED EARTH WORK     | — | BOX/SLAB CULVERT         | — | LENGTH OF SPIRAL CURVE        | La |                          |        |
| BRIDGE/CULVERT          | — | POND                     | — |                               |    |                          |        |



|                                   |                       |          |          |          |          |          |          |          |          |          |          |          |                           |          |          |          |          |          |                          |          |          |          |          |          |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
|-----------------------------------|-----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|---------------------------|----------|----------|----------|----------|----------|--------------------------|----------|----------|----------|----------|----------|------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| <b>PROPOSED ROAD LEVEL (m)</b>    | 10.042                | 10.009   | 9.972    | 9.936    | 9.900    | 9.864    | 9.827    | 9.791    | 9.755    | 9.719    | 9.682    | 9.646    | 9.610                     | 9.574    | 9.538    | 9.501    | 9.465    | 9.429    | 9.393                    | 9.356    | 9.320    | 9.284    | 9.248    | 9.211    | 9.175      | 9.139    | 9.103    | 9.067    | 9.030    | 8.994    | 8.958    | 8.922    | 8.885    | 8.850    | 8.829    | 8.831    | 8.848    | 8.866    | 8.883    | 8.900    | 8.918    |
| <b>EXISTING LEVEL (m)</b>         | 7.769                 | 7.729    | 8.919    | 9.160    | 9.055    | 8.888    | 8.789    | 8.804    | 8.886    | 9.009    | 8.841    | 8.791    | 8.514                     | 8.385    | 8.732    | 8.592    | 8.437    | 8.412    | 8.467                    | 8.444    | 8.398    | 8.428    | 8.363    | 8.748    | 8.668      | 8.806    | 8.797    | 8.919    | 8.902    | 8.844    | 8.907    | 8.699    | 8.628    | 8.629    | 8.599    | 8.536    | 8.426    | 8.253    | 8.426    | 8.453    | 8.419    |
| <b>HORIZONTAL ALIGNMENT</b>       | L=537.317m            |          |          |          |          |          |          |          |          |          |          |          | R=-800.000m<br>L=199.898m |          |          |          |          |          | R=700.000m<br>L=345.901m |          |          |          |          |          | L=157.526m |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| <b>VERTICAL PROFILE</b>           | G=0.069<br>L=208.956m |          |          |          |          |          |          |          |          |          |          |          | L=807.043m<br>G=-0.145    |          |          |          |          |          | L=60.000m                |          |          |          |          |          |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| <b>SUPERELEVATION / CROSSFALL</b> | Q=2.500               |          |          |          |          |          |          |          |          |          |          |          | Q=2.680                   |          |          |          |          |          | Q=2.500                  |          |          |          |          |          |            |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |          |
| <b>CHAINAGE</b>                   | 2000.000              | 2025.000 | 2050.000 | 2075.000 | 2100.000 | 2125.000 | 2150.000 | 2175.000 | 2200.000 | 2225.000 | 2250.000 | 2275.000 | 2300.000                  | 2325.000 | 2350.000 | 2375.000 | 2400.000 | 2425.000 | 2450.000                 | 2475.000 | 2500.000 | 2525.000 | 2550.000 | 2575.000 | 2600.000   | 2625.000 | 2650.000 | 2675.000 | 2700.000 | 2725.000 | 2750.000 | 2775.000 | 2800.000 | 2825.000 | 2850.000 | 2875.000 | 2900.000 | 2925.000 | 2950.000 | 2975.000 | 3000.000 |

|  |  |  |  |   |  |  |  |  |  |                  |  |   |  |
|--|--|--|--|---|--|--|--|--|--|------------------|--|---|--|
| R2 SEP-2015 SECOND REVISION LASA RAJU MATHUR M.R MISHRA (EE) O.P. PATEL (CE)<br>R1 JAN-2013 FIRST REVISION OWD VINAY PK.MISHRA (AE) M.R MISHRA (EE) N.K PRADHAN (CE)<br>- JUNE 2008 ORIGINAL CEG |  | DPR CONSULTANT :<br><b>CONSULTING ENGINEERS GROUP LTD.</b><br>E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com |  | DESIGN REVIEW CONSULTANT :<br><b>LEA Associates South Asia Pvt. Ltd., India</b><br>B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 |  | CLIENT :<br><b>ODISHA WORKS DEPARTMENT</b> |  | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A |  | SCALE :<br>N.T.S |  | DRAWING TITLE :<br>PLAN AND LONGITUDINAL SECTION (SH-9) KM 12/000 TO KM 13/000 (SHEET 13 OF 28) |  |
| DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/13   |  |  |  |   |  |  |  |  |  | REV. R2          |  |   |  |





← TO BHADRAK

TO CHANDBALI →

**LEGEND**

|                         |       |                          |   |                               |    |                          |        |
|-------------------------|-------|--------------------------|---|-------------------------------|----|--------------------------|--------|
| EXISTING CENTRELINE     | —     | RIVER/WALL               | — | BEGINNING OF SPIRAL CURVE     | TS | TANGENT LENGTH           | Ta     |
| PROPOSED CENTRELINE     | - - - | H.T. LINE, TOWER         | — | BEGINNING OF CIRCULAR CURVE   | SC | LENGTH OF CIRCULAR CURVE | Lc     |
| EXISTING CARRIAGE WAY   | —     | WELL/TAP & HAND PUMP     | — | APEX OF CURVE                 | AC | APEX DISTANCE            | Ac     |
| PRO. CARRIAGE WAY EDGES | —     | ELECTRIC LINE & POLE     | — | END OF CIRCULAR CURVE         | CS | SUPERELEVATION           | SE     |
| PRO. SHOULDER EDGES     | —     | TELEPHONE LINE & POLE    | — | END OF SPIRAL CURVE           | ST | DESIGN SPEED             | V kmph |
| EXISTING ROW BOUNDARY   | —     | HOUSE/BUILDING/STRUCTURE | — | HORIZONTAL INTERSECTION POINT | HP | RADIUS OF CURVE          | R      |
| PRO. ROW BOUNDARY       | - - - | PIPE CULVERT             | — | DEVIATION ANGLE               | Δ  |                          |        |
| PIPE LINE               | —     | BOX/SLAB CULVERT         | — | LENGTH OF SPIRAL CURVE        | La |                          |        |
| PROPOSED EARTH WORK     | —     | POND                     | — |                               |    |                          |        |
| BRIDGE/CULVERT          | —     |                          |   |                               |    |                          |        |

**CURVE DETAILS**

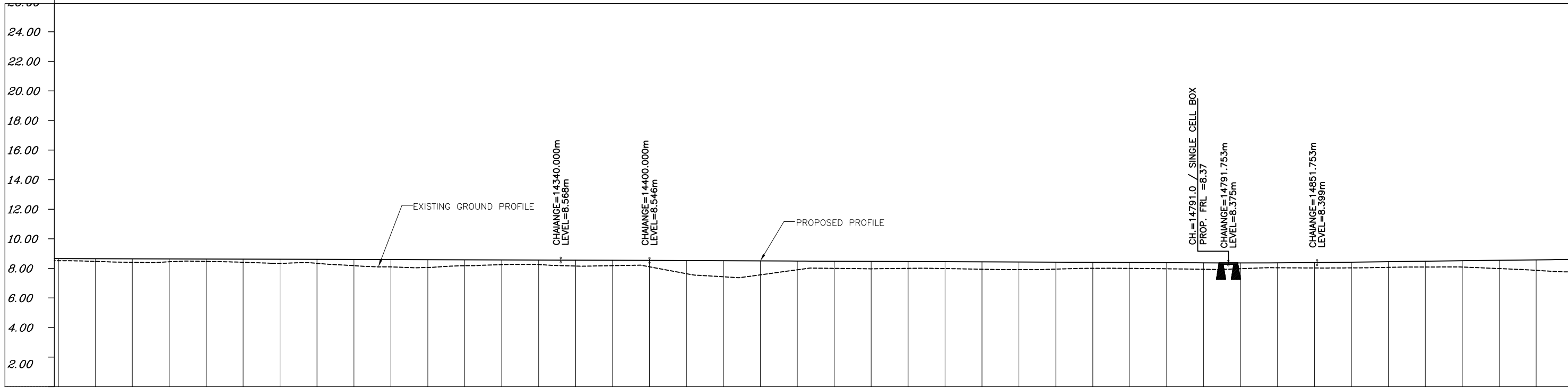
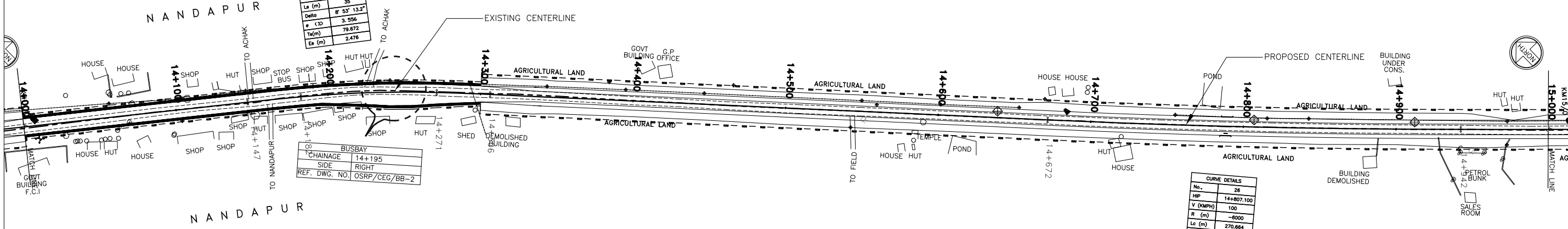
|          |              |
|----------|--------------|
| No.      | 25           |
| HP       | 14+226.782   |
| V (KMPH) | 80           |
| R (m)    | 800          |
| Lc (m)   | 89.086       |
| La (m)   | 35           |
| Delta    | 8° 53' 13.2" |
| Δ (°)    | 3.556        |
| Ta(m)    | 79.672       |
| Ac (m)   | 2.476        |

**CHAINAGE**

|               |               |
|---------------|---------------|
| CHAINAGE      | 14+195        |
| SIDE          | RIGHT         |
| REF. DWG. NO. | OSRP/CEG/BB-2 |

**CURVE DETAILS**

|          |             |
|----------|-------------|
| No.      | 26          |
| HP       | 14+807.100  |
| V (KMPH) | 100         |
| R (m)    | -6000       |
| Lc (m)   | 270.664     |
| La (m)   | 0           |
| Delta    | 2° 35' 4.7" |
| Δ (°)    | 2.5         |
| Ta(m)    | 130.355     |
| Ac (m)   | 1.527       |



|                           |                        |           |           |           |           |           |           |           |           |           |                         |           |           |           |           |           |           |           |           |           |                        |           |           |           |           |           |           |           |           |           |                                    |           |           |           |           |           |           |           |           |           |           |
|---------------------------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| DATUM = 0.00              |                        |           |           |           |           |           |           |           |           |           |                         |           |           |           |           |           |           |           |           |           |                        |           |           |           |           |           |           |           |           |           |                                    |           |           |           |           |           |           |           |           |           |           |
| PROPOSED ROAD LEVEL (m)   | 8.670                  | 8.662     | 8.655     | 8.647     | 8.640     | 8.632     | 8.625     | 8.617     | 8.610     | 8.602     | 8.595                   | 8.587     | 8.580     | 8.572     | 8.565     | 8.556     | 8.546     | 8.535     | 8.524     | 8.513     | 8.502                  | 8.491     | 8.481     | 8.470     | 8.459     | 8.448     | 8.437     | 8.426     | 8.415     | 8.404     | 8.393                              | 8.382     | 8.372     | 8.376     | 8.397     | 8.428     | 8.459     | 8.490     | 8.521     | 8.552     | 8.583     |
| EXISTING LEVEL (m)        | 8.525                  | 8.479     | 8.417     | 8.452     | 8.477     | 8.418     | 8.352     | 8.350     | 8.191     | 8.108     | 8.068                   | 8.188     | 8.259     | 8.269     | 8.165     | 8.191     | 8.112     | 7.648     | 7.439     | 7.568     | 7.911                  | 8.008     | 7.975     | 8.008     | 7.994     | 7.949     | 7.926     | 7.959     | 8.011     | 8.007     | 7.978                              | 7.947     | 7.986     | 8.048     | 8.034     | 8.041     | 8.077     | 8.100     | 8.098     | 7.993     | 7.873     |
| HORIZONTAL ALIGNMENT      | L                      |           |           |           |           |           |           |           |           |           | R=800.000m<br>L=89.086m |           |           |           |           |           |           |           |           |           | L=365.486m             |           |           |           |           |           |           |           |           |           | R=-6000.000m<br>L=270.664m         |           |           |           |           |           |           |           |           |           |           |
| VERTICAL PROFILE          | L=410.000m<br>G=-0.030 |           |           |           |           |           |           |           |           |           | L=60.000m               |           |           |           |           |           |           |           |           |           | L=391.753m<br>G=-0.044 |           |           |           |           |           |           |           |           |           | L=60.000m<br>L=264.923m<br>G=0.124 |           |           |           |           |           |           |           |           |           |           |
| SUPERELEVATION /CROSSFALL | Q=3.560                |           |           |           |           |           |           |           |           |           |                         |           |           |           |           |           |           |           |           |           |                        |           |           |           |           |           |           |           |           |           |                                    |           |           |           |           |           |           |           |           |           |           |
| CHAINAGE                  | 14000.000              | 14025.000 | 14050.000 | 14075.000 | 14100.000 | 14125.000 | 14150.000 | 14175.000 | 14200.000 | 14225.000 | 14250.000               | 14275.000 | 14300.000 | 14325.000 | 14350.000 | 14375.000 | 14400.000 | 14425.000 | 14450.000 | 14475.000 | 14500.000              | 14525.000 | 14550.000 | 14575.000 | 14600.000 | 14625.000 | 14650.000 | 14675.000 | 14700.000 | 14725.000 | 14750.000                          | 14775.000 | 14800.000 | 14825.000 | 14850.000 | 14875.000 | 14900.000 | 14925.000 | 14950.000 | 14975.000 | 15000.000 |

|     |           |                 |      |             |                 |                 |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

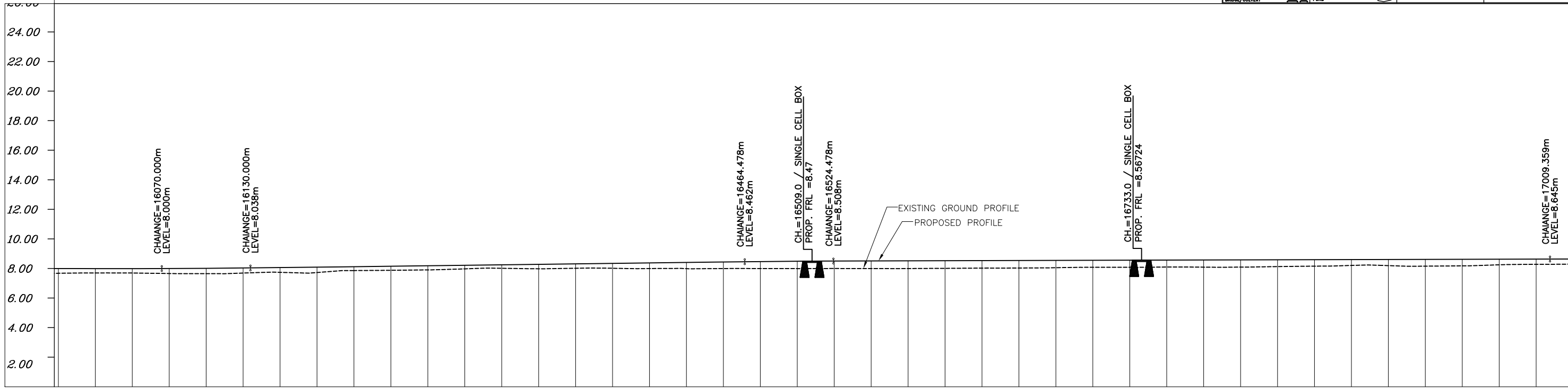
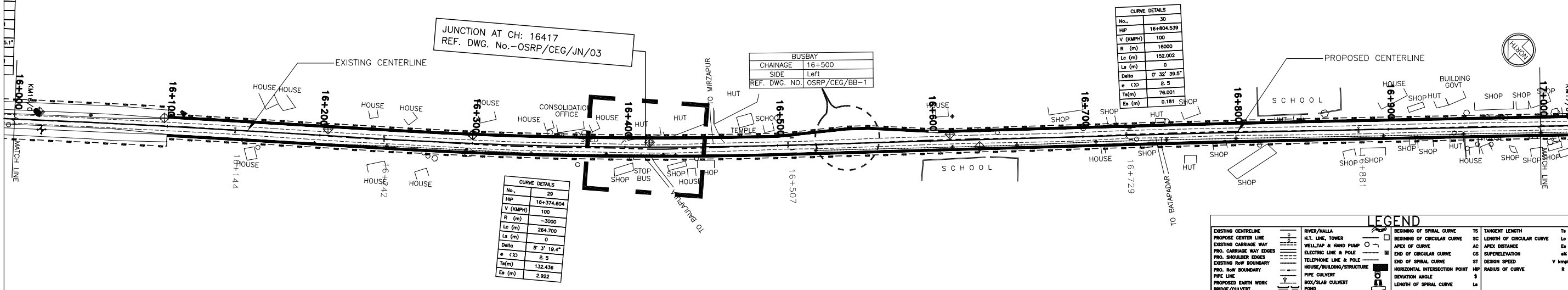
SCALE :  
 N.T.S

DRAWING TITLE :  
**PLAN AND LONGITUDINAL SECTION (SH-9) KM 14/000 TO KM 15/000**  
 (SHEET 15 OF 28)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/15  
 REV. R2



← TO BHADRAK

TO CHANDBALI →



|                           |   |
|---------------------------|---|
| DATUM =0.00               |   |
| PROPOSED ROAD LEVEL (m)   | 8.000 8.000 8.000 8.000 8.010 8.032 8.063 8.095 8.127 8.158 8.190 8.222 8.253 8.285 8.317 8.349 8.380 8.412 8.444 8.474 8.497 8.509 8.516 8.523 8.530 8.537 8.544 8.551 8.558 8.565 8.572 8.579 8.586 8.593 8.600 8.607 8.614 8.621 8.628 8.635 8.642   |
| EXISTING LEVEL (m)        | 7.681 7.701 7.699 7.663 7.654 7.695 7.744 7.732 7.865 7.882 7.909 7.980 8.017 7.985 8.019 8.020 8.000 7.992 8.000 8.000 7.997 8.004 7.999 8.000 8.014 8.029 8.035 8.057 8.086 8.084 8.102 8.095 8.096 8.133 8.162 8.212 8.198 8.162 8.182 8.253 8.288   |
| HORIZONTAL ALIGNMENT      | R=8000.000m L=254.241m L=97.673m R=-3000.000m L=264.700m L=221.669m R=16000.000m L=152.002m L=160.011m  |
| VERTICAL PROFILE          | G=0.127 L=334.478m G=0.028 L=484.881m L=60.000m   |
| SUPERELEVATION /CROSSFALL |   |
| CHAINAGE                  | 16000.000 16025.000 16050.000 16075.000 16100.000 16125.000 16150.000 16175.000 16200.000 16225.000 16250.000 16275.000 16300.000 16325.000 16350.000 16375.000 16400.000 16425.000 16450.000 16475.000 16500.000 16525.000 16550.000 16575.000 16600.000 16625.000 16650.000 16675.000 16700.000 16725.000 16750.000 16800.000 16825.000 16850.000 16875.000 16900.000 16925.000 16950.000 16975.000 17000.000 |

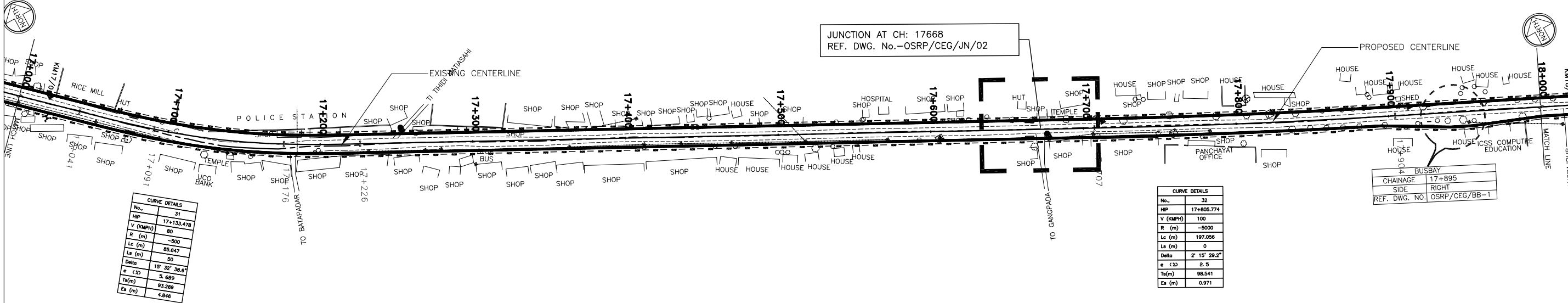
|     |           |                 |      |             |                 |                 |   |   |  |   |                         |  |                   |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|---|---|--|---|-------------------------|--|-------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | <b>CONSULTING ENGINEERS GROUP LTD.</b><br>E-12, MOJI COLONY, MALVIYA NAGAR<br>JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com | <b>DESIGN REVIEW CONSULTANT :</b><br>LEA Associates South Asia Pvt. Ltd., India<br>B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 | <b>CLIENT :</b><br>ODISHA WORKS DEPARTMENT | <b>PROJECT :</b><br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | <b>SCALE :</b><br>N.T.S | <b>DRAWING TITLE :</b><br>PLAN AND LONGITUDINAL SECTION (SH-9) KM 16/000 TO KM 17/000 (SHEET 17 OF 28) |                   |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |   |   |  |   |                         |  | N.K. PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |   |   |  |   |                         |  |                   |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        |   |   |  |   |                         |  | APPROVED:         |



← TO BHADRAK

TO CHANDBALI →

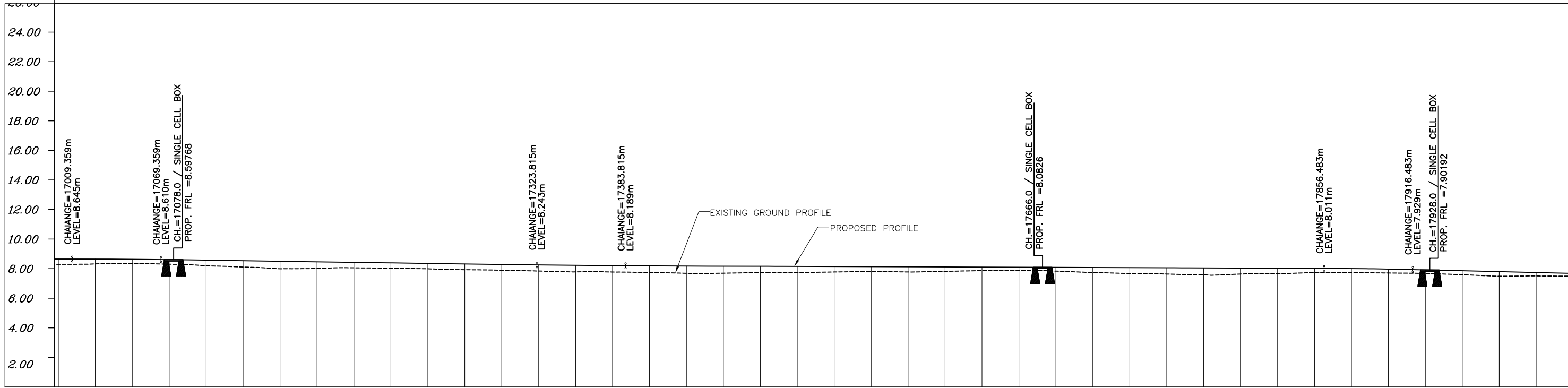
| LEGEND                  |       |                          |   |                               |    |                          |        |
|-------------------------|-------|--------------------------|---|-------------------------------|----|--------------------------|--------|
| EXISTING CENTERLINE     | —     | RIVER/WALL               | — | BEGINNING OF SPIRAL CURVE     | TS | TANGENT LENGTH           | Ta     |
| PROPOSED CENTERLINE     | - - - | H.T. LINE, TOWER         | — | BEGINNING OF CIRCULAR CURVE   | SC | LENGTH OF CIRCULAR CURVE | Lc     |
| EXISTING CARRIAGE WAY   | —     | WELL/TAP & HAND PUMP     | — | APEX OF CURVE                 | AC | APEX DISTANCE            | Ac     |
| PRO. CARRIAGE WAY EDGES | —     | ELECTRIC LINE & POLE     | — | END OF CIRCULAR CURVE         | CS | SUPERELEVATION           | SE     |
| PRO. SHOULDER EDGES     | —     | TELEPHONE LINE & POLE    | — | END OF SPIRAL CURVE           | ST | DESIGN SPEED             | V kmph |
| EXISTING ROW BOUNDARY   | —     | HOUSE/BUILDING/STRUCTURE | — | HORIZONTAL INTERSECTION POINT | HP | RADIUS OF CURVE          | R      |
| PRO. ROW BOUNDARY       | —     | PIPE CULVERT             | — | DEVIATION ANGLE               | Δ  |                          |        |
| PIPE LINE               | —     | BOX/SLAB CULVERT         | — | LENGTH OF SPIRAL CURVE        | La |                          |        |
| PROPOSED EARTH WORK     | —     | POND                     | — |                               |    |                          |        |
| BRIDGE/CULVERT          | —     |                          |   |                               |    |                          |        |



| CURVE DETAILS |               |
|---------------|---------------|
| No.           | 31            |
| HP            | 17+133.478    |
| V (KM/H)      | 80            |
| R (m)         | -500          |
| Lc (m)        | 85.647        |
| La (m)        | 50            |
| Delta         | 15° 32' 38.8" |
| e (CD)        | 5.689         |
| Ta(m)         | 93.269        |
| Es (m)        | 4.846         |

| CURVE DETAILS |              |
|---------------|--------------|
| No.           | 32           |
| HP            | 17+805.774   |
| V (KM/H)      | 100          |
| R (m)         | -5000        |
| Lc (m)        | 197.056      |
| La (m)        | 0            |
| Delta         | 2° 15' 29.2" |
| e (CD)        | 2.5          |
| Ta(m)         | 98.541       |
| Es (m)        | 0.971        |

|               |               |
|---------------|---------------|
| CHAINAGE      | 17+895        |
| SIDE          | RIGHT         |
| REF. DWG. NO. | OSRP/CEG/BB-1 |



| PROPOSED ROAD LEVEL (m)   | 8.642     | 8.645     | 8.632                    | 8.602     | 8.566     | 8.530     | 8.494     | 8.458      | 8.422     | 8.386     | 8.350     | 8.314     | 8.278     | 8.242     | 8.212                  | 8.193     | 8.183     | 8.173                      | 8.164     | 8.154     | 8.145     | 8.136     | 8.126     | 8.117     | 8.108     | 8.098     | 8.089                  | 8.079     | 8.070     | 8.061     | 8.051     | 8.042     | 8.032     | 8.023     | 8.014     | 7.999     | 7.964     | 7.909     | 7.850     | 7.791     | 7.732     |
|---------------------------|-----------|-----------|--------------------------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|-----------|-----------|-----------|------------------------|-----------|-----------|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| EXISTING LEVEL (m)        | 8.288     | 8.313     | 8.346                    | 8.295     | 8.188     | 8.104     | 7.981     | 8.005      | 8.050     | 8.021     | 7.980     | 7.921     | 7.887     | 7.832     | 7.775                  | 7.767     | 7.736     | 7.679                      | 7.686     | 7.712     | 7.723     | 7.768     | 7.800     | 7.768     | 7.810     | 7.862     | 7.874                  | 7.827     | 7.735     | 7.664     | 7.629     | 7.575     | 7.629     | 7.658     | 7.730     | 7.721     | 7.698     | 7.666     | 7.584     | 7.481     | 7.499     |
| HORIZONTAL ALIGNMENT      | L=50.000m |           | R=-500.000m<br>L=85.647m |           |           | L=50.000m |           | L=481.036m |           |           |           |           |           |           |                        |           |           | R=-5000.000m<br>L=197.056m |           |           |           |           |           |           |           |           |                        |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| VERTICAL PROFILE          | L=60.000m |           | L=254.456m<br>G=-0.144   |           |           |           |           |            |           |           |           |           | L=60.000m |           | L=472.668m<br>G=-0.038 |           |           |                            |           |           |           |           |           |           | L=60.000m |           | L=134.077m<br>G=-0.236 |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| SUPERELEVATION /CROSSFALL | Q=5.690   |           |                          |           |           |           |           |            |           |           |           |           |           |           |                        |           |           |                            |           |           |           |           |           |           |           |           |                        |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| CHAINAGE                  | 77000.000 | 77025.000 | 77050.000                | 77075.000 | 77100.000 | 77125.000 | 77150.000 | 77175.000  | 77200.000 | 77225.000 | 77250.000 | 77275.000 | 77300.000 | 77325.000 | 77350.000              | 77375.000 | 77400.000 | 77425.000                  | 77450.000 | 77475.000 | 77500.000 | 77525.000 | 77550.000 | 77575.000 | 77600.000 | 77625.000 | 77650.000              | 77675.000 | 77700.000 | 77725.000 | 77750.000 | 77775.000 | 77800.000 | 77825.000 | 77850.000 | 77875.000 | 77900.000 | 77925.000 | 77950.000 | 77975.000 | 80000.000 |

|  |  |  |  |   |  |  |  |  |  |                  |  |   |  |
|--|--|--|--|---|--|--|--|--|--|------------------|--|---|--|
| R2 SEP-2015 SECOND REVISION LASA RAJU MATHUR M.R MISHRA (EE) O.P. PATEL (CE)<br>R1 JAN-2013 FIRST REVISION OWD VINAY PK.MISHRA (AE) M.R MISHRA (EE) N.K PRADHAN (CE)<br>- JUNE 2008 ORIGINAL CEG |  | DPR CONSULTANT :<br><b>CEG</b><br>CONSULTING ENGINEERS GROUP LTD.<br>E-12, MOJI COLONY, MALVIYA NAGAR<br>JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com |  | DESIGN REVIEW CONSULTANT :<br><b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India<br>B-1, E-27, 1st FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 |  | CLIENT :<br><b>ODISHA WORKS DEPARTMENT</b> |  | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A |  | SCALE :<br>N.T.S |  | DRAWING TITLE :<br>PLAN AND LONGITUDINAL SECTION (SH-9) KM 17/000 TO KM 18/000 (SHEET 18 OF 28) |  |
| DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/18   |  |  |  |   |  |  |  |  |  | REV. R2          |  |   |  |

TO BHADRAK

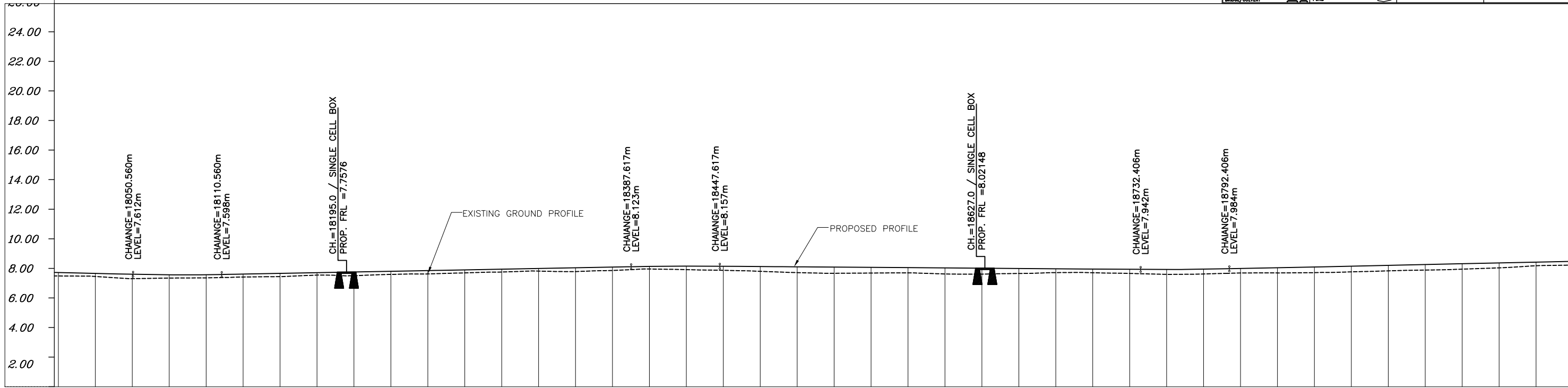
TO CHANDBALI

| CURVE DETAILS |              |
|---------------|--------------|
| No.           | 33           |
| HP            | 18+335.118   |
| V (KMPH)      | 100          |
| R (m)         | 35000        |
| Lc (m)        | 171.638      |
| La (m)        | 0            |
| Delta         | 0° 16' 51.5" |
| e (CD)        | 2.5          |
| Ts(m)         | 85.819       |
| Ea (m)        | 0.105        |

JUNCTION AT CH: 18425  
REF. DWG. No.-OSRP/CEG/JN/02

| CURVE DETAILS |              |
|---------------|--------------|
| No.           | 34           |
| HP            | 18+705.267   |
| V (KMPH)      | 100          |
| R (m)         | -30000       |
| Lc (m)        | 154.635      |
| La (m)        | 0            |
| Delta         | 0° 17' 43.2" |
| e (CD)        | 2.5          |
| Ts(m)         | 77.318       |
| Ea (m)        | 0.100        |

| LEGEND                        |  |                          |                          |
|-------------------------------|--|--------------------------|--------------------------|
| EXISTING CENTRELINE           |  | RIVER/HALLA              |                          |
| PROPOSED CENTER LINE          |  | A.T. LINE, TOWER         |                          |
| EXISTING CARRIAGE WAY         |  | WELL, TAP & HAND PUMP    |                          |
| PRO. SHOULDER EDGES           |  | ELECTRIC LINE & POLE     |                          |
| EXISTING ROW BOUNDARY         |  | TELEPHONE LINE & POLE    |                          |
| PRO. ROW BOUNDARY             |  | HOUSE/BUILDING/STRUCTURE |                          |
| PIPE LINE                     |  | PIPE CULVERT             |                          |
| PROPOSED EARTH WORK           |  | BOX/SLAB CULVERT         |                          |
| BRIDGE/CULVERT                |  | POND                     |                          |
| BEGINNING OF SPIRAL CURVE     |  | TS                       | TANGENT LENGTH           |
| END OF SPIRAL CURVE           |  | SC                       | LENGTH OF CIRCULAR CURVE |
| APEX OF CURVE                 |  | AC                       | APEX DISTANCE            |
| END OF CIRCULAR CURVE         |  | CS                       | SUPERELEVATION           |
| HORIZONTAL INTERSECTION POINT |  | ST                       | DESIGN SPEED             |
| DEVIATION ANGLE               |  | HP                       | RADIUS OF CURVE          |
| LENGTH OF SPIRAL CURVE        |  | Lc                       |                          |



| DATUM =0.00               |  |
|---------------------------|--|
| PROPOSED ROAD LEVEL (m)   | 7.732 7.672 7.613 7.575 7.582 7.625 7.673 7.720 7.767 7.815 7.862 7.910 7.957 8.004 8.052 8.099 8.143 8.163 8.155 8.137 8.118 8.099 8.080 8.061 8.042 8.023 8.004 7.985 7.966 7.947 7.936 7.954 8.000 8.054 8.108 8.162 8.216 8.270 8.324 8.378 8.432  |
| EXISTING LEVEL (m)        | 7.499 7.465 7.314 7.357 7.370 7.426 7.453 7.557 7.514 7.604 7.635 7.707 7.766 7.828 7.793 7.869 7.971 7.925 7.880 7.812 7.724 7.680 7.694 7.705 7.633 7.622 7.666 7.725 7.716 7.670 7.608 7.633 7.699 7.703 7.722 7.775 7.844 7.897 7.959 8.048 8.192  |
| HORIZONTAL ALIGNMENT      | L=345.009m R=35000.000m L=171.638m L=207.012m R=-30000.000m L=154.635m L=257.213m  |
| VERTICAL PROFILE          | G=0.190 L=60.000m L=277.057m L=60.000m G=-0.076 L=284.789m G=-0.076 L=60.000m G=0.216 L=315.549m   |
| SUPERELEVATION /CROSSFALL |  |
| CHAINAGE                  | 8000.000 8025.000 8050.000 8075.000 8100.000 8125.000 8150.000 8175.000 8200.000 8225.000 8250.000 8275.000 8300.000 8325.000 8350.000 8375.000 8400.000 8425.000 8450.000 8475.000 8500.000 8525.000 8550.000 8575.000 8600.000 8625.000 8650.000 8675.000 8700.000 8725.000 8750.000 8775.000 8800.000 8825.000 8850.000 8875.000 8900.000 8925.000 8950.000 8975.000 9000.000 |

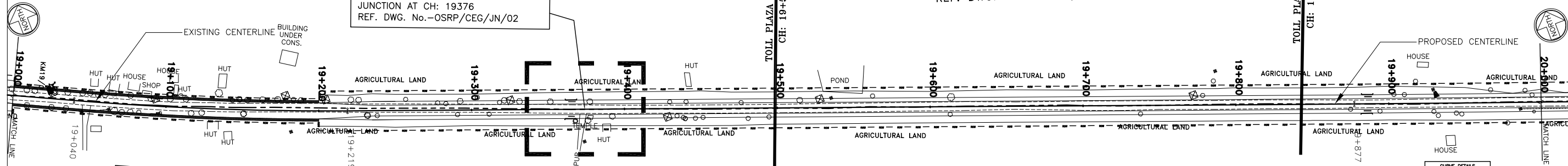
|     |          |                 |      |             |                 |                 |                  |   |   |                         |   |         |  |
|-----|----------|-----------------|------|-------------|-----------------|-----------------|------------------|---|---|-------------------------|---|---------|--|
| R2  | SEP-2015 | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT : | CONSULTING ENGINEERS GROUP LTD.   | DESIGN REVIEW CONSULTANT :  | CLIENT :                | PROJECT :   | SCALE : | DRAWING TITLE :  |
| R1  | JAN-2013 | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | CEG              | E-12,MOJI COLONY,MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899,2521899,2520556 Fax: 2521348, e-mail: ceg@ceginia.com | LEA Associates South Asia Pvt. Ltd., India B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . | ODISHA WORKS DEPARTMENT | CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | N.T.S   | PLAN AND LONGITUDINAL SECTION (SH-9) KM 18/000 TO KM 19/000 (SHEET 19 OF 28) |
| NO. | DATE     | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |   |   |                         |   |         | DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/19                                       |

← TO BHADRAK

TO CHANDBALI →

PROPOSED TOLL PLAZA  
REF. DWG. NO.- OSRP/CEG/TP 01 TO 07

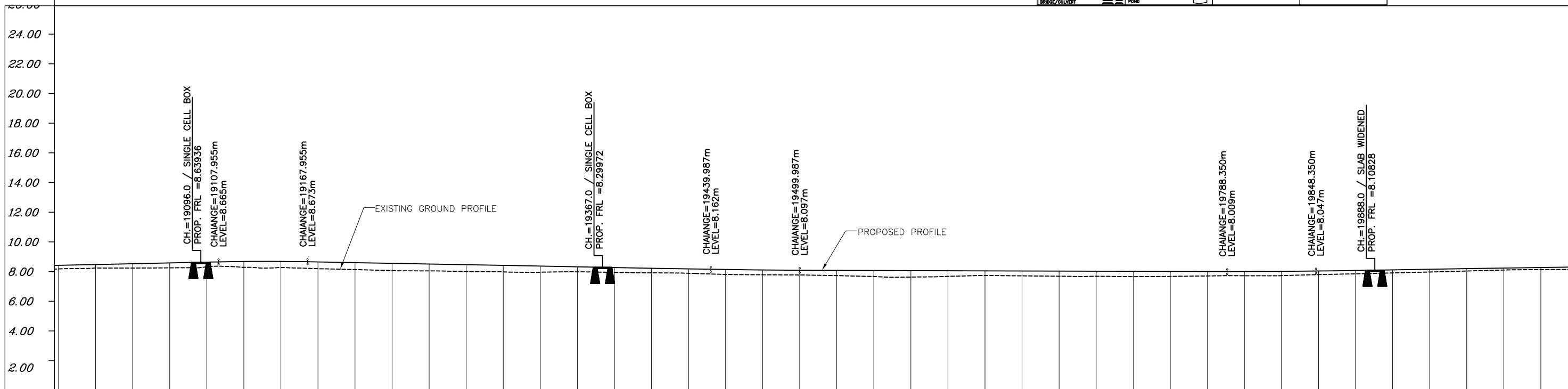
JUNCTION AT CH: 19376  
REF. DWG. No.-OSRP/CEG/JN/02



| CURVE DETAILS |            |
|---------------|------------|
| No.           | 35         |
| HP            | 19+129.378 |
| V (KMPH)      | 100        |
| R (m)         | -2000      |
| Lc (m)        | 179.042    |
| Ls (m)        | 0          |
| Delta         | 7° 45.1'   |
| e (m)         | 2.5        |
| Ts (m)        | 89.581     |
| Es (m)        | 2.005      |

| CURVE DETAILS |              |
|---------------|--------------|
| No.           | 36           |
| HP            | 19+985.785   |
| V (KMPH)      | 100          |
| R (m)         | -20000       |
| Lc (m)        | 216.603      |
| Ls (m)        | 0            |
| Delta         | 0° 37' 13.9" |
| e (m)         | 2.5          |
| Ts (m)        | 108.303      |
| Es (m)        | 0.293        |

| LEGEND                        |                          |
|-------------------------------|--------------------------|
| EXISTING CENTERLINE           | —                        |
| PROPOSED CENTERLINE           | —                        |
| PRO. CARRIAGE WAY EDGES       | —                        |
| PRO. SHOULDER EDGES           | —                        |
| EXISTING ROW BOUNDARY         | —                        |
| PRO. ROW BOUNDARY             | —                        |
| PIPE LINE                     | —                        |
| PROPOSED EARTH WORK           | —                        |
| BRIDGE/CULVERT                | —                        |
| RIVER/MALLA                   | —                        |
| H.T. LINE, TOWER              | —                        |
| WELL/TAP & HAND PUMP          | —                        |
| ELECTRIC LINE & POLE          | —                        |
| TELEPHONE LINE & POLE         | —                        |
| HOUSE/BUILDING/STRUCTURE      | —                        |
| PIPE CULVERT                  | —                        |
| BOX/SLAB CULVERT              | —                        |
| POND                          | —                        |
| BEGINNING OF SPIRAL CURVE     | —                        |
| END OF SPIRAL CURVE           | —                        |
| HORIZONTAL INTERSECTION POINT | —                        |
| ELEVATION ANGLE               | —                        |
| LENGTH OF SPIRAL CURVE        | —                        |
| Ts                            | TANGENT LENGTH           |
| Lc                            | LENGTH OF CIRCULAR CURVE |
| Ac                            | APEX DISTANCE            |
| Cs                            | SUPERELEVATION           |
| St                            | DESIGN SPEED             |
| V                             | VELOCITY                 |
| R                             | RADIUS OF CURVE          |



| DATUM =0.00               |   |
|---------------------------|---|
| PROPOSED ROAD LEVEL (m)   | 8.432 8.486 8.540 8.594 8.648 8.692 8.696 8.660 8.613 8.566 8.519 8.472 8.425 8.378 8.331 8.285 8.238 8.191 8.145 8.113 8.097 8.089 8.082 8.074 8.066 8.059 8.051 8.044 8.036 8.028 8.021 8.013 8.008 8.019 8.049 8.088 8.127 8.166 8.205 8.244 8.282   |
| EXISTING LEVEL (m)        | 8.192 8.252 8.249 8.263 8.325 8.301 8.284 8.207 8.147 8.075 8.060 8.013 7.988 7.967 7.996 7.958 7.926 7.896 7.819 7.796 7.783 7.739 7.678 7.641 7.687 7.748 7.724 7.697 7.693 7.668 7.686 7.716 7.732 7.738 7.804 7.860 7.921 7.982 8.050 8.116 8.149   |
| HORIZONTAL ALIGNMENT      | R=-2000.000m L=179.042m L=658.643m R=-20000.000m L=216.603m   |
| VERTICAL PROFILE          | L=60.000m L=272.032m G=-0.188 L=60.000m L=288.363m G=-0.030 L=60.000m G=0.155 L=261.628m  |
| SUPERELEVATION /CROSSFALL |   |
| CHAINAGE                  | 9000.000 9025.000 9050.000 9075.000 9100.000 9125.000 9150.000 9175.000 9200.000 9225.000 9250.000 9275.000 9300.000 9325.000 9350.000 9375.000 9400.000 9425.000 9450.000 9475.000 9500.000 9525.000 9550.000 9575.000 9600.000 9625.000 9650.000 9675.000 9700.000 9725.000 9750.000 9775.000 9800.000 9825.000 9850.000 9875.000 9900.000 9925.000 9950.000 9975.000 20000.000 |

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

DRAWING TITLE :  
**PLAN AND LONGITUDINAL SECTION (SH-9) KM 19/000 TO KM 20/000**  
 (SHEET 20 OF 28)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/20 REV. R2





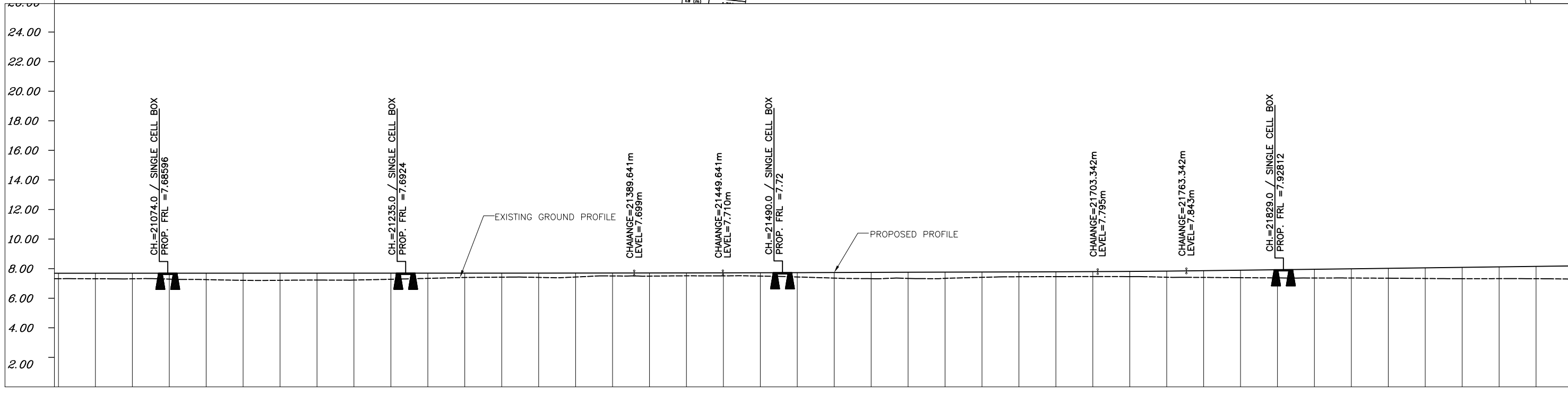
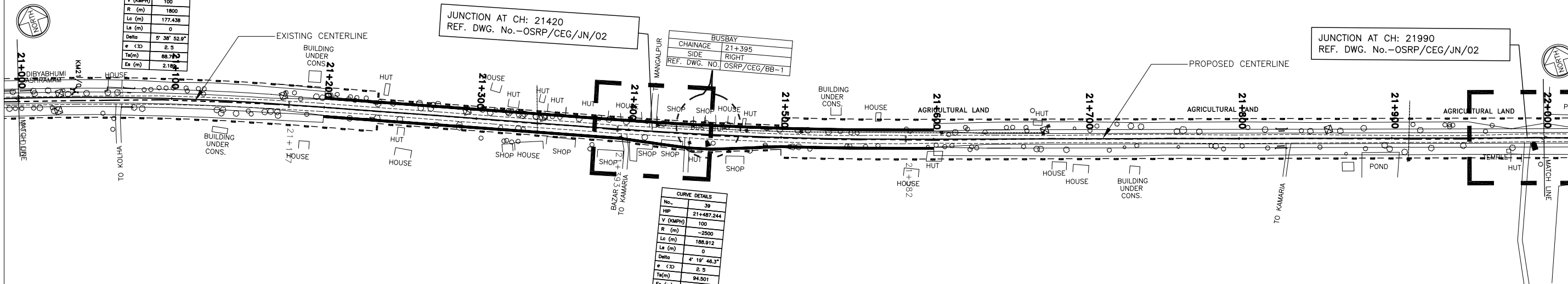
TO BHADRAK

TO CHANDBALI

| LEGEND                        |                          |
|-------------------------------|--------------------------|
| EXISTING CENTERLINE           | RIVER/WALL               |
| PROPOSED CENTERLINE           | H.T. LINE, TOWER         |
| EXISTING CARRIAGE WAY         | WELL/TAP & HAND PUMP     |
| PRO. CARRIAGE WAY EDGES       | ELECTRIC LINE & POLE     |
| PRO. SHOULDER EDGES           | TELEPHONE LINE & POLE    |
| EXISTING ROW BOUNDARY         | HOUSE/BUILDING/STRUCTURE |
| PRO. ROW BOUNDARY             | PIPE CULVERT             |
| PROPOSED EARTH WORK           | BOX/S&B CULVERT          |
| BRIDGE/CULVERT                | POND                     |
| BEGINNING OF SPIRAL CURVE     | TS                       |
| BEGINNING OF CIRCULAR CURVE   | SC                       |
| APEX OF CURVE                 | AC                       |
| END OF CIRCULAR CURVE         | CS                       |
| END OF SPIRAL CURVE           | ST                       |
| HORIZONTAL INTERSECTION POINT | HP                       |
| DEVIATION ANGLE               | Δ                        |
| LENGTH OF SPIRAL CURVE        | LS                       |
| TANGENT LENGTH                | Ts                       |
| LENGTH OF CIRCULAR CURVE      | Lc                       |
| APEX DISTANCE                 | Ac                       |
| SUPERELEVATION                | SE                       |
| DESIGN SPEED                  | V                        |
| RADIUS OF CURVE               | R                        |

| CURVE DETAILS |              |
|---------------|--------------|
| No.           | 38           |
| HP            | 21+088.364   |
| V (KM/H)      | 100          |
| R (m)         | 1800         |
| Lc (m)        | 177.438      |
| La (m)        | 0            |
| Delta         | 5° 38' 52.9" |
| e (CD)        | 2.5          |
| Ts(m)         | 88.752       |
| Es (m)        | 2.182        |

| CURVE DETAILS |              |
|---------------|--------------|
| No.           | 39           |
| HP            | 21+487.244   |
| V (KM/H)      | 100          |
| R (m)         | 2500         |
| Lc (m)        | 188.912      |
| La (m)        | 0            |
| Delta         | 4° 19' 46.3" |
| e (CD)        | 2.5          |
| Ts(m)         | 94.501       |
| Es (m)        |              |



| PROPOSED ROAD LEVEL (m) | EXISTING LEVEL (m) | HORIZONTAL ALIGNMENT       | VERTICAL PROFILE      | SUPERELEVATION /CROSSFALL | CHAINAGE  |
|-------------------------|--------------------|----------------------------|-----------------------|---------------------------|-----------|
| 7.684                   | 7.319              | R=1800.000m<br>L=177.438m  | G=0.004<br>L=444.526m |                           | 21000.000 |
| 7.685                   | 7.312              |                            |                       |                           | 21025.000 |
| 7.685                   | 7.310              | L=215.733m                 |                       |                           | 21050.000 |
| 7.686                   | 7.290              |                            |                       |                           | 21075.000 |
| 7.687                   | 7.254              | R=-2500.000m<br>L=188.912m | L=60.000m             |                           | 21100.000 |
| 7.688                   | 7.208              |                            |                       |                           | 21125.000 |
| 7.689                   | 7.208              | G=0.033<br>L=253.701m      |                       |                           | 21150.000 |
| 7.690                   | 7.225              |                            |                       |                           | 21175.000 |
| 7.691                   | 7.223              | L=60.000m                  |                       |                           | 21200.000 |
| 7.692                   | 7.279              |                            |                       |                           | 21225.000 |
| 7.693                   | 7.340              |                            |                       |                           | 21250.000 |
| 7.694                   | 7.400              |                            |                       |                           | 21275.000 |
| 7.695                   | 7.422              |                            |                       |                           | 21300.000 |
| 7.696                   | 7.404              |                            |                       |                           | 21325.000 |
| 7.697                   | 7.432              |                            |                       |                           | 21350.000 |
| 7.698                   | 7.503              |                            |                       |                           | 21375.000 |
| 7.699                   | 7.491              |                            |                       |                           | 21400.000 |
| 7.703                   | 7.510              |                            |                       |                           | 21425.000 |
| 7.710                   | 7.507              |                            |                       |                           | 21450.000 |
| 7.718                   | 7.495              |                            |                       |                           | 21475.000 |
| 7.727                   | 7.435              |                            |                       |                           | 21500.000 |
| 7.735                   | 7.358              |                            |                       |                           | 21525.000 |
| 7.744                   | 7.320              |                            |                       |                           | 21550.000 |
| 7.752                   | 7.337              |                            |                       |                           | 21575.000 |
| 7.760                   | 7.343              |                            |                       |                           | 21600.000 |
| 7.769                   | 7.409              |                            |                       |                           | 21625.000 |
| 7.777                   | 7.448              |                            |                       |                           | 21650.000 |
| 7.785                   | 7.456              |                            |                       |                           | 21675.000 |
| 7.794                   | 7.463              |                            |                       |                           | 21700.000 |
| 7.806                   | 7.458              |                            |                       |                           | 21725.000 |
| 7.828                   | 7.415              |                            |                       |                           | 21750.000 |
| 7.858                   | 7.403              |                            |                       |                           | 21775.000 |
| 7.890                   | 7.385              |                            |                       |                           | 21800.000 |
| 7.923                   | 7.370              |                            |                       |                           | 21825.000 |
| 7.955                   | 7.365              |                            |                       |                           | 21850.000 |
| 7.987                   | 7.364              |                            |                       |                           | 21875.000 |
| 8.019                   | 7.349              |                            |                       |                           | 21900.000 |
| 8.051                   | 7.332              |                            |                       |                           | 21925.000 |
| 8.083                   | 7.316              |                            |                       |                           | 21950.000 |
| 8.115                   | 7.321              |                            |                       |                           | 21975.000 |
| 8.148                   | 7.317              |                            |                       |                           | 22000.000 |

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, 1st FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044

CLIENT :  
**ODISHA WORKS DEPARTMENT**

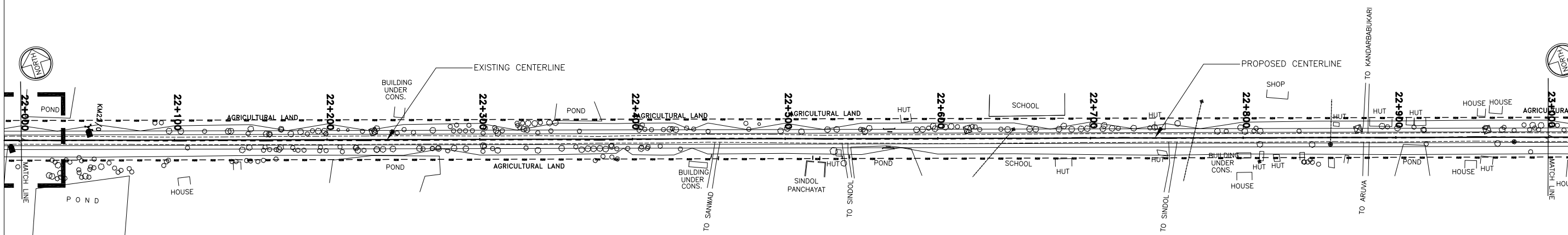
PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

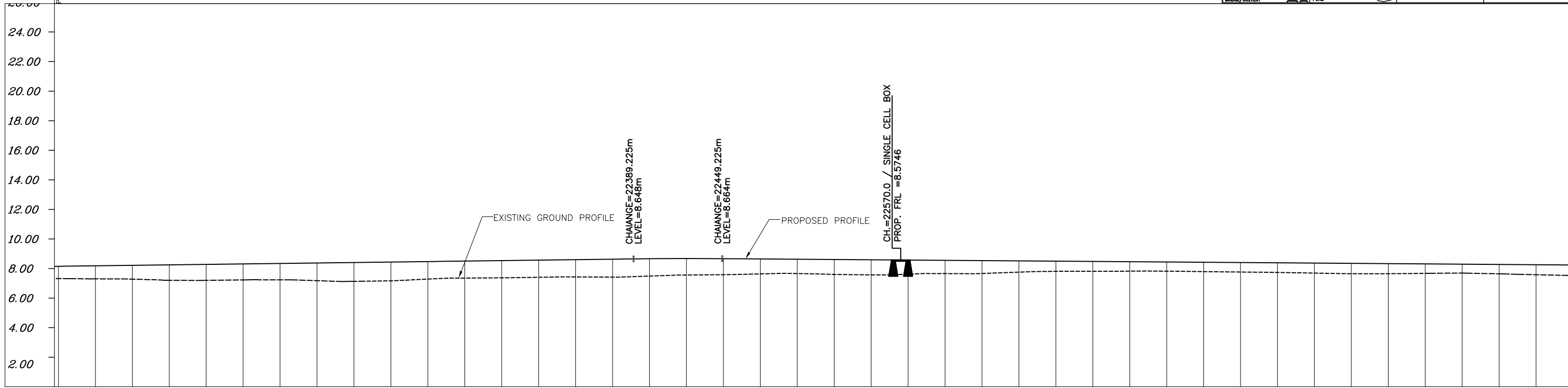
DRAWING TITLE :  
**PLAN AND LONGITUDINAL SECTION (SH-9) KM 21/000 TO KM 22/000**  
 (SHEET 22 OF 28)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/22 REV. R2

← TO BHADRAK

TO CHANDBALI →



| LEGEND                        |       |
|-------------------------------|-------|
| EXISTING CENTERLINE           | —     |
| PROPOSED CENTERLINE           | - - - |
| EXISTING CARRIAGE WAY         | ===== |
| PRO. CARRIAGE WAY EDGES       | ===== |
| PRO. SHOULDER EDGES           | ===== |
| EXISTING ROW BOUNDARY         | ===== |
| PRO. ROW BOUNDARY             | ===== |
| PIPE LINE                     | ===== |
| PROPOSED EARTH WORK           | ===== |
| BRIDGE/CULVERT                | ===== |
| RIVER/HALLA                   | ===== |
| HT. LINE, TOWER               | ===== |
| WELL/TAP & HAND PUMP          | ===== |
| ELECTRIC LINE & POLE          | ===== |
| TELEPHONE LINE & POLE         | ===== |
| HOUSE/BUILDING/STRUCTURE      | ===== |
| PIPE CULVERT                  | ===== |
| BOX/SLAB CULVERT              | ===== |
| POND                          | ===== |
| BEGINNING OF SPIRAL CURVE     | ===== |
| END OF SPIRAL CURVE           | ===== |
| APEX OF CURVE                 | ===== |
| BEGINNING OF CIRCULAR CURVE   | ===== |
| END OF CIRCULAR CURVE         | ===== |
| HORIZONTAL INTERSECTION POINT | ===== |
| DEVIATION ANGLE               | ===== |
| LENGTH OF SPIRAL CURVE        | ===== |
| TANGENT LENGTH                | ===== |
| LENGTH OF CIRCULAR CURVE      | ===== |
| APEX DISTANCE                 | ===== |
| SUPERELEVATION                | ===== |
| DESIGN SPEED                  | ===== |
| RADIUS OF CURVE               | ===== |



|                           |                       |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |                        |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|---------------------------|-----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| DATUM =0.00               |                       |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |                        |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| PROPOSED ROAD LEVEL (m)   | 8.148                 | 8.180     | 8.212     | 8.244     | 8.276     | 8.308     | 8.340     | 8.373     | 8.405     | 8.437     | 8.469     | 8.501     | 8.533     | 8.566     | 8.598     | 8.630     | 8.660     | 8.672     | 8.664     | 8.645     | 8.627                  | 8.608     | 8.589     | 8.571     | 8.552     | 8.533     | 8.515     | 8.496     | 8.478     | 8.459     | 8.440     | 8.422     | 8.403     | 8.385     | 8.366     | 8.347     | 8.329     | 8.310     | 8.291     | 8.273     | 8.254     |
| EXISTING LEVEL (m)        | 7.317                 | 7.298     | 7.279     | 7.201     | 7.194     | 7.227     | 7.231     | 7.177     | 7.130     | 7.164     | 7.282     | 7.351     | 7.370     | 7.407     | 7.428     | 7.414     | 7.487     | 7.558     | 7.579     | 7.634     | 7.656                  | 7.596     | 7.569     | 7.613     | 7.655     | 7.663     | 7.753     | 7.810     | 7.813     | 7.821     | 7.819     | 7.789     | 7.761     | 7.732     | 7.689     | 7.649     | 7.648     | 7.670     | 7.689     | 7.638     | 7.578     |
| HORIZONTAL ALIGNMENT      | L=1537.556m           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |                        |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| VERTICAL PROFILE          | G=0.129<br>L=625.882m |           |           |           |           |           |           |           |           |           | L=60.000m |           |           |           |           |           |           |           |           |           | L=660.775m<br>G=-0.074 |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| SUPERELEVATION /CROSSFALL |                       |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |                        |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| CHAINAGE                  | 22000.000             | 22025.000 | 22050.000 | 22075.000 | 22100.000 | 22125.000 | 22150.000 | 22175.000 | 22200.000 | 22225.000 | 22250.000 | 22275.000 | 22300.000 | 22325.000 | 22350.000 | 22375.000 | 22400.000 | 22425.000 | 22450.000 | 22475.000 | 22500.000              | 22525.000 | 22550.000 | 22575.000 | 22600.000 | 22625.000 | 22650.000 | 22675.000 | 22700.000 | 22725.000 | 22750.000 | 22775.000 | 22800.000 | 22825.000 | 22850.000 | 22875.000 | 22900.000 | 22925.000 | 22950.000 | 22975.000 | 23000.000 |

|     |           |                 |      |             |                 |                 |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        |

DPR CONSULTANT :  
**CEG**  
 CONSULTING ENGINEERS GROUP LTD.  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

DRAWING TITLE :  
**PLAN AND LONGITUDINAL SECTION (SH-9) KM 22/000 TO KM 23/000**  
 (SHEET 23 OF 28)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/23  
 REV. R2

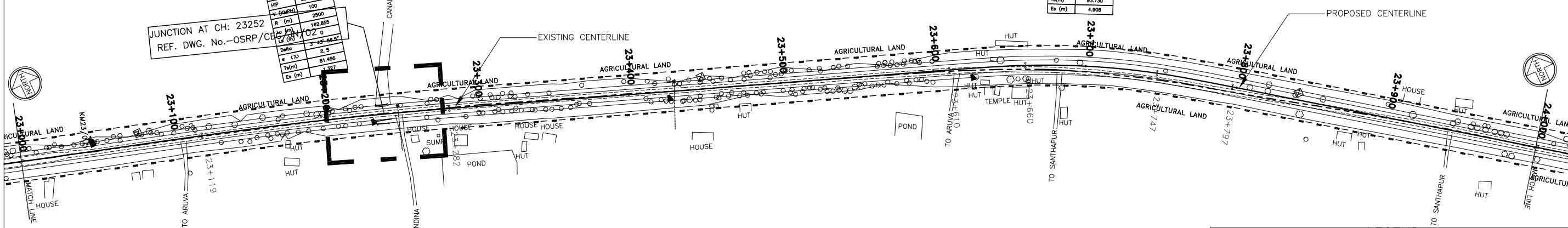
← TO BHADRAK

TO CHANDBALI →

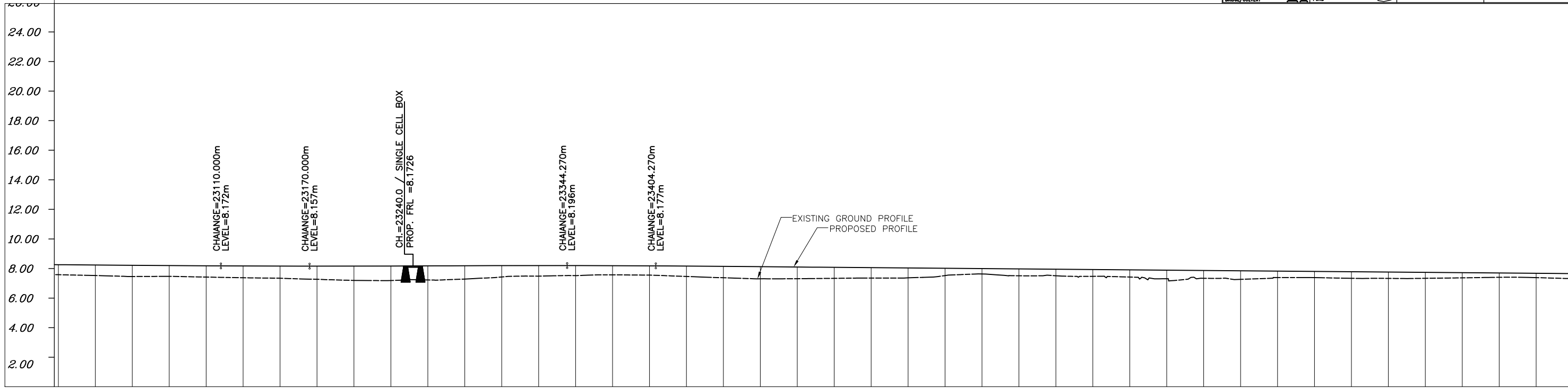
| CURVE DETAILS |               |
|---------------|---------------|
| No.           | 41            |
| HP            | 23+703.881    |
| V (KMPH)      | 80            |
| R (m)         | 500           |
| Lc (m)        | 86.553        |
| La (m)        | 50            |
| Delta         | 15° 38' 52.0" |
| e (%)         | 5.689         |
| Ta(m)         | 93.730        |
| Ea (m)        | 4.908         |

| CURVE DETAILS |              |
|---------------|--------------|
| No.           | 40           |
| HP            | 23+200.867   |
| V (KMPH)      | 100          |
| R (m)         | 2500         |
| Lc (m)        | 162.855      |
| La (m)        | 102.0        |
| Delta         | 7° 49' 56.5" |
| e (%)         | 2.5          |
| Ta(m)         | 81.456       |
| Ea (m)        | 1.327        |

JUNCTION AT CH: 23252  
REF. DWG. No.-OSRP/CEG/SH-9/P&P/24



| LEGEND                        |   |                          |        |
|-------------------------------|---|--------------------------|--------|
| EXISTING CENTRELINE           | — | RIVER/HALLA              | —      |
| PROPOSED CENTERLINE           | — | ALT. LINE, TOWER         | —      |
| EXISTING CARRIAGE WAY         | — | WELL, TAP & HAND PUMP    | —      |
| PRO. SHOULDER EDGES           | — | ELECTRIC LINE & POLE     | —      |
| EXISTING ROW BOUNDARY         | — | TELEPHONE LINE & POLE    | —      |
| PRO. ROW BOUNDARY             | — | HOUSE/BUILDING/STRUCTURE | —      |
| PIPE LINE                     | — | PIPE CULVERT             | —      |
| PROPOSED EARTH WORK           | — | BOX/SLAB CULVERT         | —      |
| BRIDGE/CULVERT                | — | POND                     | —      |
| BEGINNING OF SPIRAL CURVE     | — | TANGENT LENGTH           | Ta     |
| END OF SPIRAL CURVE           | — | LENGTH OF CIRCULAR CURVE | Lc     |
| APEX OF CURVE                 | — | AC APEX DISTANCE         | Ac     |
| END OF CIRCULAR CURVE         | — | CS SUPERELEVATION        | cs     |
| HORIZONTAL INTERSECTION POINT | — | ST DESIGN SPEED          | V kmph |
| DEVIATION ANGLE               | — | RADIUS OF CURVE          | R      |
| LENGTH OF SPIRAL CURVE        | — |                          |        |

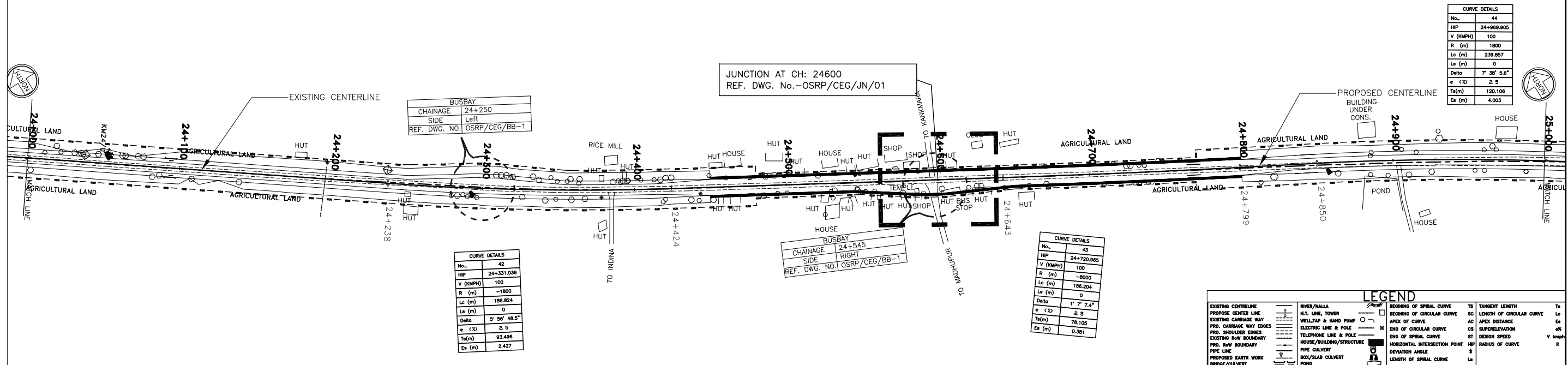


| DATUM = 0.00               |   |
|----------------------------|---|
| PROPOSED ROAD LEVEL (m)    | 8.254, 8.236, 8.217, 8.198, 8.180, 8.163, 8.155, 8.158, 8.163, 8.169, 8.175, 8.180, 8.186, 8.191, 8.197, 8.194, 8.181, 8.160, 8.138, 8.117, 8.096, 8.075, 8.054, 8.033, 8.012, 7.991, 7.969, 7.948, 7.927, 7.906, 7.885, 7.864, 7.843, 7.822, 7.800, 7.779, 7.758, 7.737, 7.716, 7.695, 7.674   |
| EXISTING LEVEL (m)         | 7.578, 7.522, 7.456, 7.465, 7.418, 7.372, 7.340, 7.268, 7.191, 7.184, 7.224, 7.284, 7.425, 7.481, 7.515, 7.570, 7.551, 7.461, 7.371, 7.300, 7.307, 7.332, 7.350, 7.365, 7.519, 7.629, 7.505, 7.506, 7.468, 7.418, 7.305, 7.335, 7.264, 7.388, 7.381, 7.334, 7.328, 7.334, 7.366, 7.402, 7.381   |
| HORIZONTAL ALIGNMENT       | R=2500.000m, L=162.855m; L=328.431m; L=50.000m; R=500.000m, L=86.553m; L=50.000m; L=440.4   |
| VERTICAL PROFILE           | G=0.022, L=174.270m; L=60.000m; L=60.000m; L=708.930m, G=-0.084   |
| SUPERELEVATION / CROSSFALL | Q=5.690   |
| CHAINAGE                   | 23000.000, 23025.000, 23050.000, 23075.000, 23100.000, 23125.000, 23150.000, 23175.000, 23200.000, 23225.000, 23250.000, 23275.000, 23300.000, 23325.000, 23350.000, 23375.000, 23400.000, 23425.000, 23450.000, 23475.000, 23500.000, 23525.000, 23550.000, 23575.000, 23600.000, 23625.000, 23650.000, 23675.000, 23700.000, 23725.000, 23750.000, 23775.000, 23800.000, 23825.000, 23850.000, 23875.000, 23900.000, 23925.000, 23950.000, 23975.000, 24000.000 |

|    |          |                 |      |             |                 |                 |                  |   |                            |   |          |                         |           |   |         |       |                 |  |  |
|----|----------|-----------------|------|-------------|-----------------|-----------------|------------------|---|----------------------------|---|----------|-------------------------|-----------|---|---------|-------|-----------------|--|--|
| R2 | SEP-2015 | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT : | <b>CONSULTING ENGINEERS GROUP LTD.</b><br>E-12, MOJI COLONY, MALVIYA NAGAR<br>JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com | DESIGN REVIEW CONSULTANT : | LEA Associates South Asia Pvt. Ltd., India<br>B-1, E-27, 1st FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 | CLIENT : | ODISHA WORKS DEPARTMENT | PROJECT : | CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | SCALE : | N.T.S | DRAWING TITLE : | PLAN AND LONGITUDINAL SECTION (SH-9) KM 23/000 TO KM 24/000 (SHEET 24 OF 28) |  |
| R1 | JAN-2013 | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |   |                            |   |          |                         |           |   |         |       |                 |  |  |

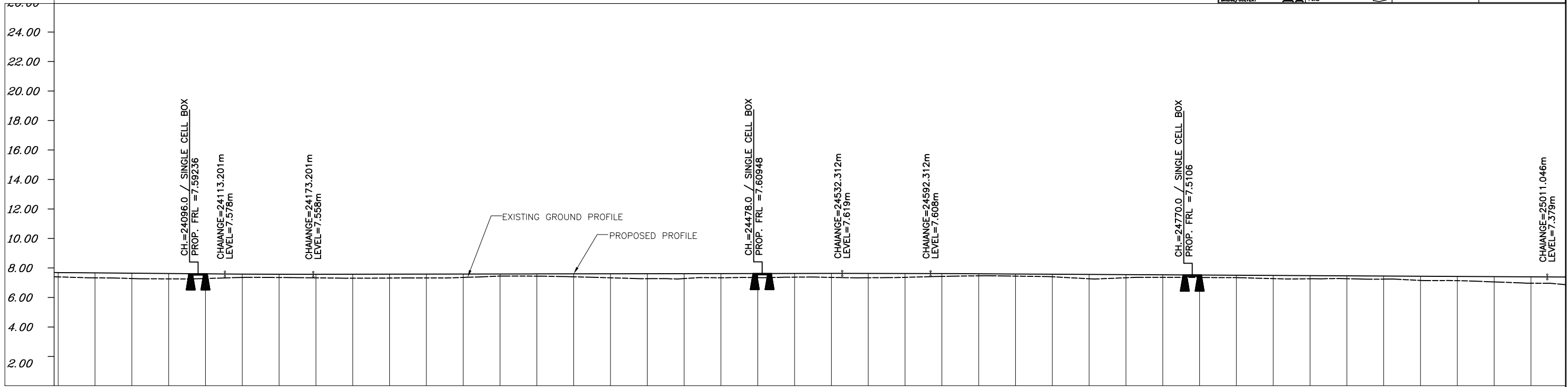
TO BHADRAK

TO CHANDBALI



**LEGEND**

|                       |                          |                               |                          |
|-----------------------|--------------------------|-------------------------------|--------------------------|
| EXISTING CENTERLINE   | RIVER/HALLA              | BEGINNING OF SPIRAL CURVE     | TANGENT LENGTH           |
| PROPOSED CENTER LINE  | ALT. LINE, TOWER         | END OF SPIRAL CURVE           | LENGTH OF CIRCULAR CURVE |
| EXISTING CARRIAGE WAY | WELL, TAP & HAND PUMP    | APEX OF CURVE                 | AC APEX DISTANCE         |
| PRO. SHOULDER EDGES   | ELECTRIC LINE & POLE     | END OF CIRCULAR CURVE         | CS SUPERELEVATION        |
| PRO. ROW BOUNDARY     | TELEPHONE LINE & POLE    | END OF SPIRAL CURVE           | ST DESIGN SPEED          |
| EXISTING ROW BOUNDARY | HOUSE/BUILDING/STRUCTURE | HORIZONTAL INTERSECTION POINT | HP                       |
| PRO. ROW BOUNDARY     | PIPE CULVERT             | DEVIATION ANGLE               | δ                        |
| PROPOSED EARTH WORK   | BOX/SLAB CULVERT         | LENGTH OF SPIRAL CURVE        | La                       |
| BRIDGE/CULVERT        | POND                     |                               |                          |



|                           |   |
|---------------------------|---|
| DATUM = 0.00              |   |
| PROPOSED ROAD LEVEL (m)   | 7.674 7.653 7.632 7.610 7.589 7.569 7.558 7.562 7.567 7.571 7.575 7.579 7.584 7.588 7.592 7.596 7.601 7.605 7.609 7.613 7.618 7.620 7.615 7.603 7.590 7.576 7.562 7.549 7.535 7.521 7.508 7.494 7.480 7.467 7.453 7.439 7.426 7.412 7.398 7.385   |
| EXISTING LEVEL (m)        | 7.381 7.319 7.271 7.248 7.270 7.345 7.340 7.317 7.291 7.303 7.312 7.348 7.435 7.433 7.388 7.319 7.261 7.268 7.320 7.331 7.364 7.347 7.323 7.352 7.416 7.456 7.434 7.390 7.323 7.350 7.340 7.331 7.264 7.254 7.259 7.230 7.142 7.124 7.041 6.953   |
| HORIZONTAL ALIGNMENT      | L=440.490m R=-1800.000m L=186.824m L=218.497m R=-8000.000m L=156.204m L=50.734m R=1800.000m L=239.857m  |
| VERTICAL PROFILE          | G=0.017 L=359.111m G=-0.055 L=418.734m  |
| SUPERELEVATION /CROSSFALL | L=60.000m   |
| CHAINAGE                  | 24000.000 24025.000 24050.000 24075.000 24100.000 24125.000 24150.000 24175.000 24200.000 24225.000 24250.000 24275.000 24300.000 24325.000 24350.000 24375.000 24400.000 24425.000 24450.000 24475.000 24500.000 24525.000 24550.000 24575.000 24600.000 24625.000 24650.000 24675.000 24700.000 24725.000 24750.000 24775.000 24800.000 24825.000 24850.000 24875.000 24900.000 24925.000 24950.000 24975.000 25000.000 |

|     |           |                 |      |             |                 |                    |
|-----|-----------|-----------------|------|-------------|-----------------|--------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE)    |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE)    |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                    |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED: APPROVED: |

DPR CONSULTANT : **CEG** CONSULTING ENGINEERS GROUP LTD. E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT : **LEA** LEA Associates South Asia Pvt. Ltd., India B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT : **ODISHA WORKS DEPARTMENT**

PROJECT : CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE : N.T.S

DRAWING TITLE : **PLAN AND LONGITUDINAL SECTION (SH-9) KM 24/000 TO KM 25/000** (SHEET 25 OF 28)

DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/25 REV. R2



← TO BHADRAK

TO CHANDBALI →

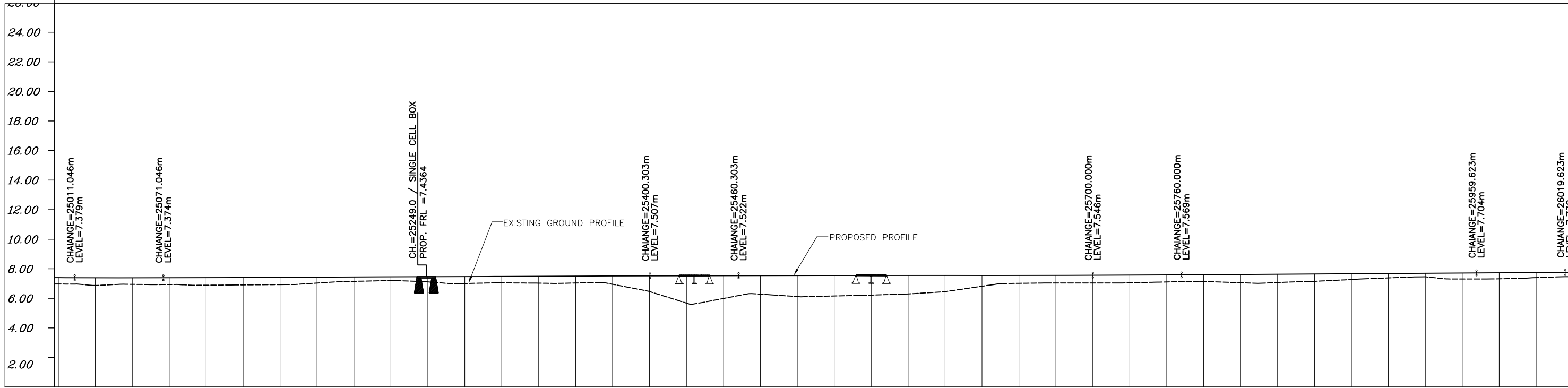
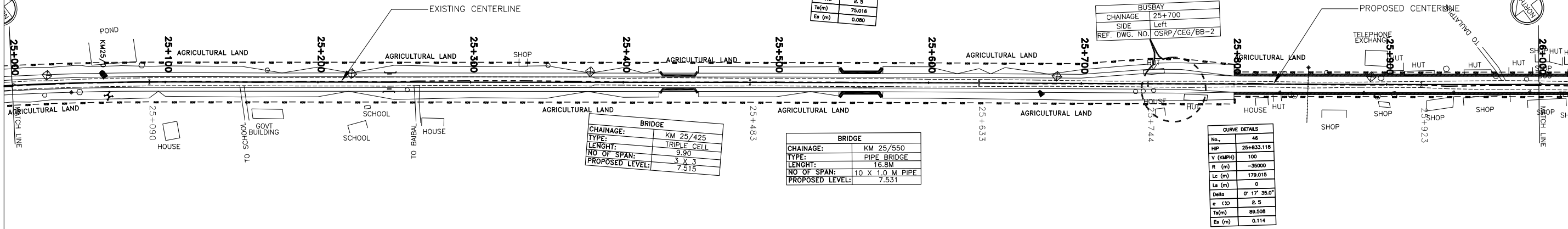
| LEGEND                  |       | LEGEND                   |   |
|-------------------------|-------|--------------------------|---|
| EXISTING CENTERLINE     | —     | RIVER/WALLA              | — |
| PROPOSED CENTERLINE     | - - - | H.T. LINE, TOWER         | — |
| EXISTING CARRIAGE WAY   | —     | WELL/TAP & HAND PUMP     | — |
| PRO. CARRIAGE WAY EDGES | —     | ELECTRIC LINE & POLE     | — |
| PRO. SHOULDER EDGES     | —     | TELEPHONE LINE & POLE    | — |
| EXISTING ROW BOUNDARY   | —     | HOUSE/BUILDING/STRUCTURE | — |
| PRO. ROW BOUNDARY       | —     | PIPE CULVERT             | — |
| PIPE LINE               | —     | BOX/SLAB CULVERT         | — |
| PROPOSED EARTH WORK     | —     | POND                     | — |
| BRIDGE/CULVERT          | —     |                          |   |

| CURVE DETAILS |              |
|---------------|--------------|
| No.           | 45           |
| HP            | 25+558.046   |
| V (KMPH)      | 100          |
| R (m)         | 35000        |
| Lc (m)        | 150.033      |
| La (m)        | 0            |
| Delta         | 0° 14' 44.2" |
| e (3d)        | 2.5          |
| Ta(m)         | 75.016       |
| Ea (m)        | 0.080        |

| CURVE DETAILS |              |
|---------------|--------------|
| No.           | 46           |
| HP            | 25+833.118   |
| V (KMPH)      | 100          |
| R (m)         | -35000       |
| Lc (m)        | 179.015      |
| La (m)        | 0            |
| Delta         | 0° 17' 35.0" |
| e (3d)        | 2.5          |
| Ta(m)         | 89.508       |
| Ea (m)        | 0.114        |

| BRIDGE          |             |
|-----------------|-------------|
| CHAINAGE:       | KM 25/425   |
| TYPE:           | TRIPLE CELL |
| LENGTH:         | 9.90        |
| NO OF SPAN:     | 3 X 3       |
| PROPOSED LEVEL: | 7.515       |

| BRIDGE          |                 |
|-----------------|-----------------|
| CHAINAGE:       | KM 25/550       |
| TYPE:           | PIPE BRIDGE     |
| LENGTH:         | 16.8M           |
| NO OF SPAN:     | 10 X 1.0 M PIPE |
| PROPOSED LEVEL: | 7.531           |



| PROPOSED ROAD LEVEL (m)    | 7.385     | 7.372     | 7.369     | 7.376     | 7.386     | 7.396     | 7.406     | 7.416     | 7.426     | 7.436     | 7.446                 | 7.456     | 7.467     | 7.477     | 7.487     | 7.497     | 7.507     | 7.515     | 7.521     | 7.524     | 7.526                      | 7.529     | 7.531     | 7.534     | 7.536     | 7.539     | 7.541     | 7.544     | 7.546     | 7.552     | 7.563                 | 7.579     | 7.596     | 7.613     | 7.630     | 7.647     | 7.664     | 7.681     | 7.698     | 7.714     | 7.726                       |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------------------------|--|--|--|--|--|--|--|--|--|-----------------------|--|--|--|--|--|--|--|--|--|-----------|--|--|--|--|--|--|--|--|--|
| EXISTING LEVEL (m)         | 6.953     | 6.857     | 6.931     | 6.920     | 6.875     | 6.893     | 6.915     | 7.018     | 7.134     | 7.187     | 7.098                 | 6.990     | 7.031     | 7.012     | 7.020     | 6.937     | 6.444     | 5.662     | 5.974     | 6.267     | 6.105                      | 6.143     | 6.203     | 6.281     | 6.436     | 6.803     | 7.002     | 7.025     | 7.024     | 7.037     | 7.093                 | 7.126     | 7.040     | 7.052     | 7.134     | 7.256     | 7.366     | 7.441     | 7.294     | 7.303     | 7.387                       |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |
| HORIZONTAL ALIGNMENT       |           |           |           |           |           |           |           |           |           |           | L=393.374m            |           |           |           |           |           |           |           |           |           | R=35000.000m<br>L=150.033m |           |           |           |           |           |           |           |           |           | L=110.548m            |           |           |           |           |           |           |           |           |           | R=-35000.000m<br>L=179.015m |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |
| VERTICAL PROFILE           | L=60.000m |           |           |           |           |           |           |           |           |           | G=0.040<br>L=329.257m |           |           |           |           |           |           |           |           |           | L=60.000m                  |           |           |           |           |           |           |           |           |           | G=0.010<br>L=239.697m |           |           |           |           |           |           |           |           |           | L=60.000m                   |  |  |  |  |  |  |  |  |  | G=0.068<br>L=199.623m |  |  |  |  |  |  |  |  |  | L=60.000m |  |  |  |  |  |  |  |  |  |
| SUPERELEVATION / CROSSFALL | Q=2.500   |           |           |           |           |           |           |           |           |           |                       |           |           |           |           |           |           |           |           |           |                            |           |           |           |           |           |           |           |           |           |                       |           |           |           |           |           |           |           |           |           |                             |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |
| CHAINAGE                   | 25000.000 | 25025.000 | 25050.000 | 25075.000 | 25100.000 | 25125.000 | 25150.000 | 25175.000 | 25200.000 | 25225.000 | 25250.000             | 25275.000 | 25300.000 | 25325.000 | 25350.000 | 25375.000 | 25400.000 | 25425.000 | 25450.000 | 25475.000 | 25500.000                  | 25525.000 | 25550.000 | 25575.000 | 25600.000 | 25625.000 | 25650.000 | 25675.000 | 25700.000 | 25725.000 | 25750.000             | 25775.000 | 25800.000 | 25825.000 | 25850.000 | 25875.000 | 25900.000 | 25925.000 | 25950.000 | 25975.000 | 26000.000                   |  |  |  |  |  |  |  |  |  |                       |  |  |  |  |  |  |  |  |  |           |  |  |  |  |  |  |  |  |  |

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
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 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginia.com

DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

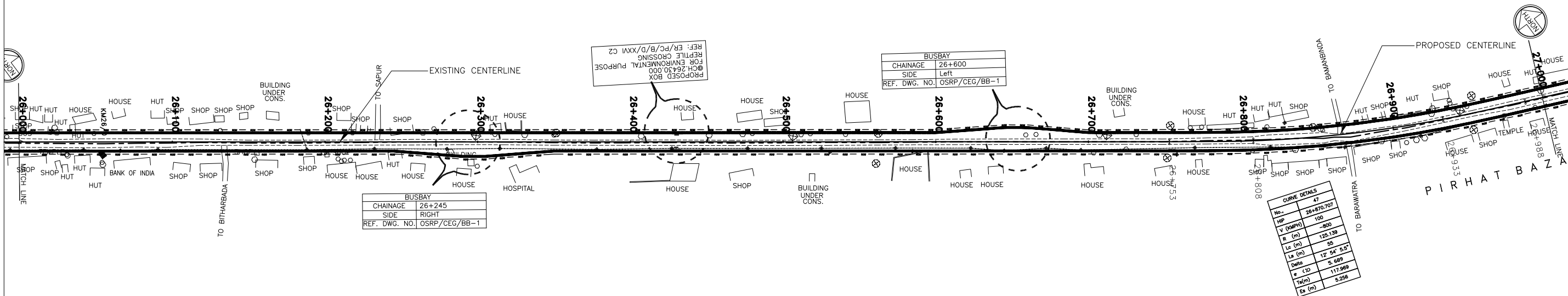
DRAWING TITLE :  
**PLAN AND LONGITUDINAL SECTION (SH-9) KM 25/000 TO KM 26/000**  
 (SHEET 26 OF 28)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/26 REV. R2

TO BHADRAK

TO CHANDBALI

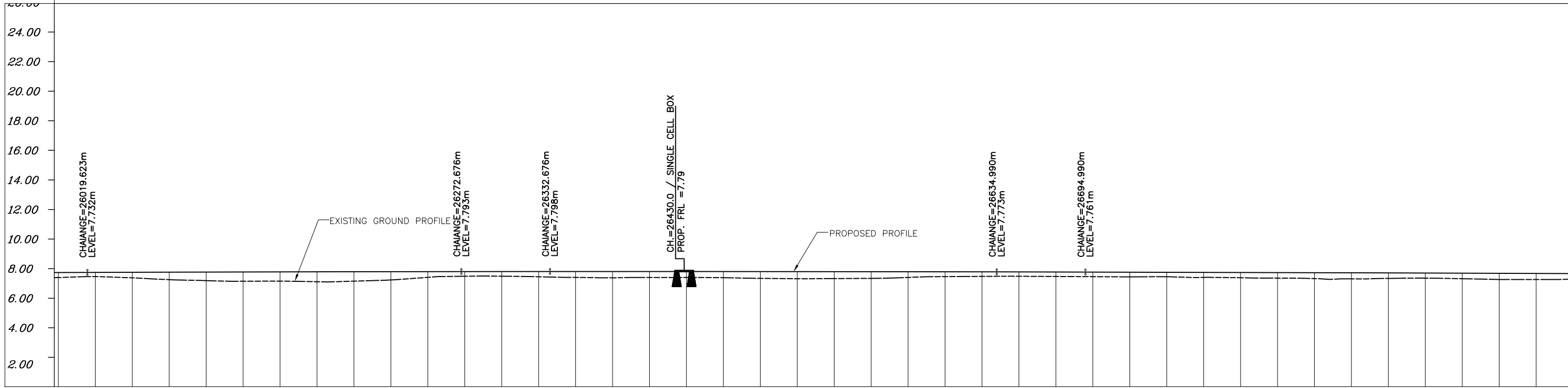
**LEGEND**

|                     |                     |                             |                         |                       |                       |           |                     |                |             |                  |                      |                      |                       |                          |              |                  |      |                           |                     |                |    |  |
|---------------------|---------------------|-----------------------------|-------------------------|-----------------------|-----------------------|-----------|---------------------|----------------|-------------|------------------|----------------------|----------------------|-----------------------|--------------------------|--------------|------------------|------|---------------------------|---------------------|----------------|----|--|
| EXISTING CENTERLINE | PROPOSED CENTERLINE | PROPOSED CARRIAGE WAY EDGES | PROPOSED SHOULDER EDGES | EXISTING ROW BOUNDARY | PROPOSED ROW BOUNDARY | PIPE LINE | PROPOSED EARTH WORK | BRIDGE/CULVERT | RIVER/HALLA | H.T. LINE, TOWER | WELL/TAP & HAND PUMP | ELECTRIC LINE & POLE | TELEPHONE LINE & POLE | HOUSE/BUILDING/STRUCTURE | PIPE CULVERT | BOX/SLAB CULVERT | POND | BEGINNING OF SPIRAL CURVE | END OF SPIRAL CURVE | TANGENT LENGTH | TS |  |
|                     |                     |                             |                         |                       |                       |           |                     |                |             |                  |                      |                      |                       |                          |              |                  |      |                           |                     |                |    |  |
|                     |                     |                             |                         |                       |                       |           |                     |                |             |                  |                      |                      |                       |                          |              |                  |      |                           |                     |                |    |  |
|                     |                     |                             |                         |                       |                       |           |                     |                |             |                  |                      |                      |                       |                          |              |                  |      |                           |                     |                |    |  |
|                     |                     |                             |                         |                       |                       |           |                     |                |             |                  |                      |                      |                       |                          |              |                  |      |                           |                     |                |    |  |



**CURVE DETAILS**

|           |              |
|-----------|--------------|
| No.       | 47           |
| HP        | 26+870.707   |
| V (M/MPI) | -800         |
| R (m)     | 125.139      |
| Lc (m)    | 55           |
| Delta     | 12° 54' 5.5" |
| e (m)     | 5.689        |
| Ts (m)    | 117.989      |
| La (m)    | 8.256        |



|                           |   |
|---------------------------|---|
| DATUM =0.00               |   |
| PROPOSED ROAD LEVEL (m)   | 7.726 7.733 7.739 7.745 7.751 7.757 7.763 7.769 7.775 7.781 7.787 7.793 7.797 7.798 7.796 7.794 7.792 7.790 7.788 7.786 7.784 7.782 7.780 7.778 7.776 7.774 7.772 7.767 7.760 7.752 7.743 7.735 7.727 7.719 7.711 7.703 7.695 7.687 7.679 7.671 7.662   |
| EXISTING LEVEL (m)        | 7.387 7.451 7.366 7.242 7.176 7.136 7.146 7.102 7.142 7.221 7.399 7.473 7.476 7.438 7.396 7.367 7.391 7.393 7.376 7.332 7.306 7.318 7.330 7.394 7.448 7.465 7.472 7.459 7.445 7.431 7.444 7.396 7.373 7.347 7.314 7.296 7.327 7.347 7.307 7.256 7.251   |
| HORIZONTAL ALIGNMENT      | L=830.384m R=-800.000m L=55.000m L=125.139m L=55.000m   |
| VERTICAL PROFILE          | G=0.024 L=253.053m L=60.000m L=302.314m G=-0.008 L=60.000m L=492.346m G=-0.032  |
| SUPERELEVATION /CROSSFALL | Q=5.560   |
| CHAINAGE                  | 26000.000 26025.000 26050.000 26075.000 26100.000 26125.000 26150.000 26175.000 26200.000 26225.000 26250.000 26275.000 26300.000 26325.000 26350.000 26375.000 26400.000 26425.000 26450.000 26475.000 26500.000 26525.000 26550.000 26575.000 26600.000 26625.000 26650.000 26675.000 26700.000 26725.000 26750.000 26775.000 26800.000 26825.000 26850.000 26875.000 26900.000 26925.000 26950.000 26975.000 27000.000 |

|     |           |                 |      |             |                 |                    |
|-----|-----------|-----------------|------|-------------|-----------------|--------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE)    |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE)    |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                    |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED: APPROVED: |

DPR CONSULTANT :

**CONSULTING ENGINEERS GROUP LTD.**

E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginia.com

DESIGN REVIEW CONSULTANT :

**LEA Associates South Asia Pvt. Ltd., India**

B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

**CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A**

SCALE :

N.T.S

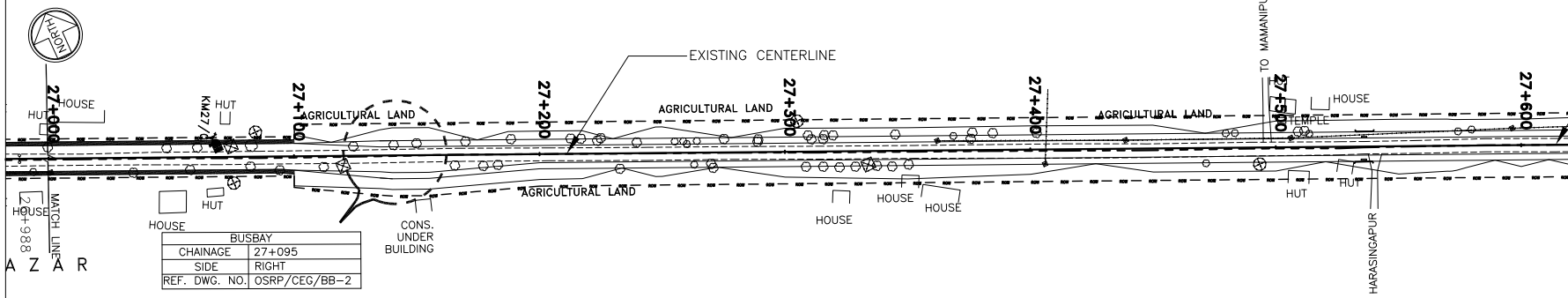
DRAWING TITLE :

**PLAN AND LONGITUDINAL SECTION (SH-9) KM 26/000 TO KM 27/000**

(SHEET 27 OF 28)

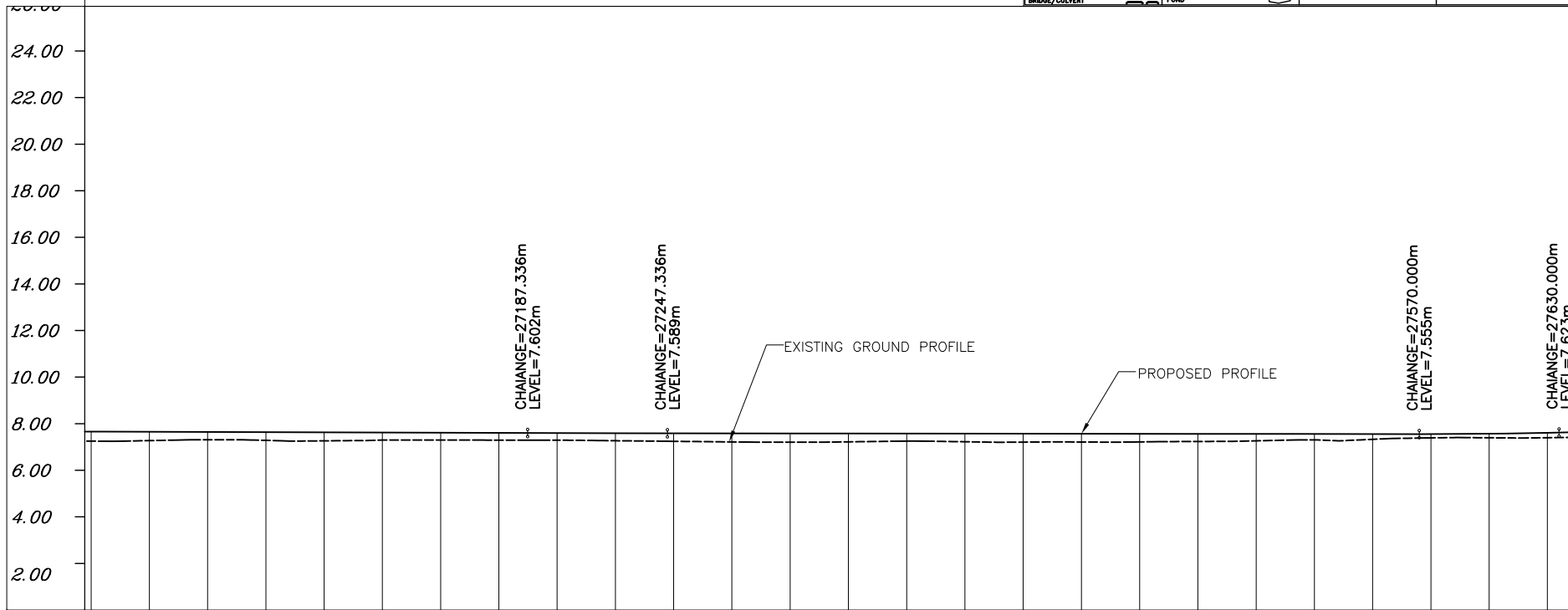
DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/27 REV. R2

← TO BHADRAK TO CHANDBALI →



|               |               |
|---------------|---------------|
| CHAINAGE      | 27+095        |
| SIDE          | RIGHT         |
| REF. DWG. NO. | OSRP/CEG/BB-2 |

| LEGEND                        |        |
|-------------------------------|--------|
| EXISTING CENTERLINE           | —      |
| PROPOSED CENTERLINE           | —      |
| EXISTING CARRIAGE WAY         | —      |
| PRO. CARRIAGE WAY EDGES       | —      |
| PRO. SHOULDER EDGES           | —      |
| EXISTING ROW BOUNDARY         | —      |
| PRO. ROW BOUNDARY             | —      |
| PIPE LINE                     | —      |
| PROPOSED EARTH WORK           | —      |
| BRIDGE/CULVERT                | —      |
| RIVER/MALLA                   | —      |
| H.T. LINE, TOWER              | —      |
| WELL/TAP & HAND PUMP          | —      |
| ELECTRIC LINE & POLE          | —      |
| TELEPHONE LINE & POLE         | —      |
| HOUSE/BUILDING/STRUCTURE      | —      |
| PIPE CULVERT                  | —      |
| BOX/SLAB CULVERT              | —      |
| POND                          | —      |
| BEGINNING OF SPIRAL CURVE     | TS     |
| END OF SPIRAL CURVE           | TE     |
| APEX OF CURVE                 | AC     |
| HORIZONTAL INTERSECTION POINT | HI     |
| DEVIATION ANGLE               | Δ      |
| LENGTH OF SPIRAL CURVE        | LS     |
| TANGENT LENGTH                | Ta     |
| LENGTH OF CIRCULAR CURVE      | Lc     |
| APEX DISTANCE                 | EA     |
| SUPERELEVATION                | CS     |
| DESIGN SPEED                  | V kmph |
| RADIUS OF CURVE               | R      |



|                           |            |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
|---------------------------|------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| DATUM = 0.00              |            |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| PROPOSED ROAD LEVEL (m)   | 7.662      | 7.654     | 7.646     | 7.638     | 7.630     | 7.622     | 7.614     | 7.606     | 7.598     | 7.592     | 7.589     | 7.586     | 7.583     | 7.581     | 7.578     | 7.575     | 7.573     | 7.570     | 7.567     | 7.565     | 7.562     | 7.559     | 7.557     | 7.555     | 7.570     | 7.611     |
| EXISTING LEVEL (m)        | 7.251      | 7.275     | 7.311     | 7.286     | 7.264     | 7.300     | 7.300     | 7.296     | 7.293     | 7.270     | 7.245     | 7.217     | 7.209     | 7.222     | 7.254     | 7.225     | 7.210     | 7.215     | 7.219     | 7.237     | 7.266     | 7.305     | 7.330     | 7.393     | 7.396     | 7.400     |
| HORIZONTAL ALIGNMENT      | L=804.354m |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| VERTICAL PROFILE          |            |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| SUPERELEVATION /CROSSFALL | Q=2.500    |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |           |
| CHAINAGE                  | 27000.000  | 27025.000 | 27050.000 | 27075.000 | 27100.000 | 27125.000 | 27150.000 | 27175.000 | 27200.000 | 27225.000 | 27250.000 | 27275.000 | 27300.000 | 27325.000 | 27350.000 | 27375.000 | 27400.000 | 27425.000 | 27450.000 | 27475.000 | 27500.000 | 27525.000 | 27550.000 | 27575.000 | 27600.000 | 27625.000 |

|     |           |                 |      |              |                 |                 |
|-----|-----------|-----------------|------|--------------|-----------------|-----------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJUJ MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY        | PK.MISHRA (AE)  | M.R MISHRA (EE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |              |                 |                 |
| NO. | DATE      | REVISION        | BY   | DRAWN:       | PREPARED :      | CHECKED:        |

DPR CONSULTANT :  
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DESIGN REVIEW CONSULTANT :  
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CLIENT :  
**ODISHA WORKS DEPARTMENT**

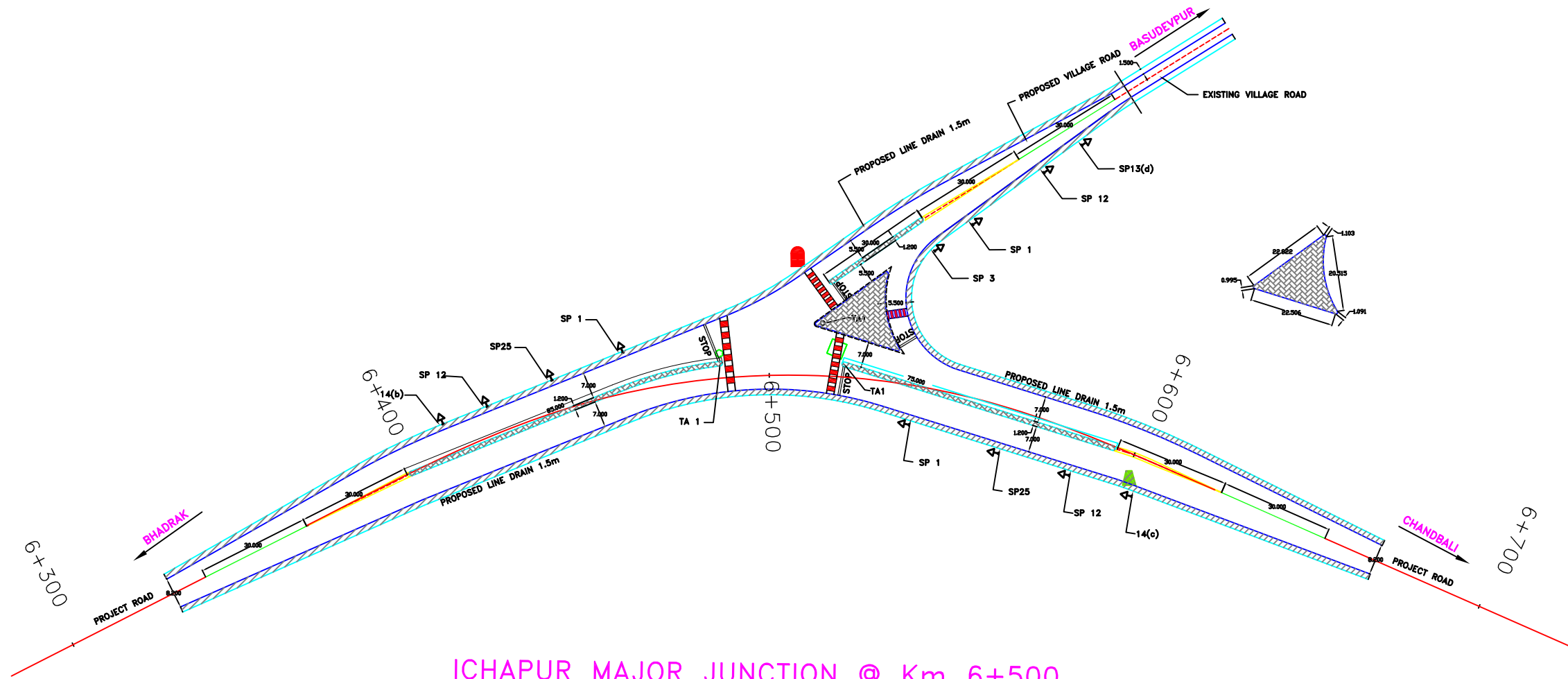
PROJECT :  
**CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A**

SCALE :  
 N.T.S

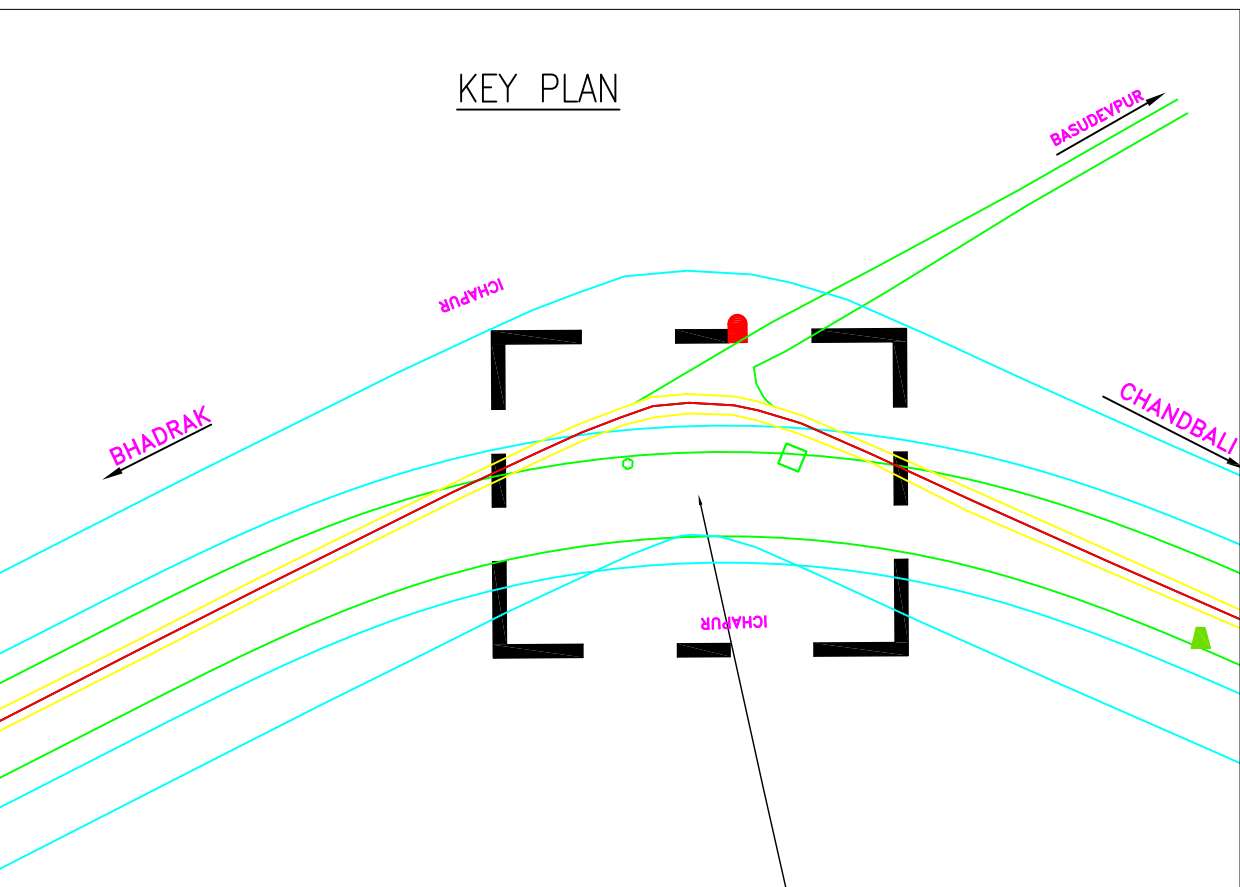
DRAWING TITLE :  
**PLAN AND LONGITUDINAL SECTION (SH-9) KM 27/000 TO KM 27/500**  
 (SHEET 28 OF 28)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/P&P/28 REV. R2







**ICHAPUR MAJOR JUNCTION @ Km 6+500**



**NOTES:**

1. ALL DIMENSION ARE IN METER.
2. FOR DETAILS OF ROAD SIGNS NUMBERED SP-1, SP-3, SP-14(b), SP-17, ETC., SEE DRAWING NO.
3. FOR PAVEMENT MARKING AT INTERSECTIONS & BEYOND INTERSECTIONS REFER DRAWING OSRP/CEG/RS/01 - 03
4. KERBS OF DIRECTIONAL ISLANDS SHALL BE PAINTED BLACK AND WHITE ALTERNATIVELY No. OSRP/CEG/RM/01 & 02 REFER DRAWING No. OSRP/CEG/DR
5. KERBS OF DIRECTIONAL ISLANDS AND CENTRAL ISLANDS SHALL BE OF TYPE I

| LEGEND                            |                              |
|-----------------------------------|------------------------------|
| EXISTING CENTRELINE               | --- RIVER/MALLA              |
| PROPOSED CENTER LINE              | --- H.T. LINE, TOWER         |
| EXISTING CARRIAGE WAY             | --- WELL/TAP & HAND PUMP     |
| PRO. CARRIAGE WAY EDGES           | --- ELECTRIC LINE & POLE     |
| PRO. SHOULDER EDGES               | --- TELEPHONE LINE & POLE    |
| EXISTING ROW BOUNDARY             | --- HOUSE/BUILDING/STRUCTURE |
| PRO. ROW BOUNDARY                 | --- PIPE CULVERT             |
| PIPE LINE                         | --- BOX/SLAB CULVERT         |
| PROPOSED EARTH WORK               | --- POND                     |
| BRIDGE/CULVERT                    |                              |
| --- BEGINNING OF SPIRAL CURVE     | --- TANGENT LENGTH           |
| --- BEGINNING OF CIRCULAR CURVE   | --- LENGTH OF CIRCULAR CURVE |
| --- APEX OF CURVE                 | --- APEX DISTANCE            |
| --- END OF CIRCULAR CURVE         | --- SUPERELEVATION           |
| --- END OF SPIRAL CURVE           | --- DESIGN SPEED             |
| --- HORIZONTAL INTERSECTION POINT | --- DEVIATION ANGLE          |
| --- DEVIATION ANGLE               | --- RADIUS OF CURVE          |
| --- LENGTH OF SPIRAL CURVE        |                              |

| NO. | DATE      | REVISION        | BY   | DRAWN: | PREPARED :     | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|--------|----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA |        | RAJU MATHUR    | M.R MISHRA (EE) | O.P. PATEL (CE)  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY  | PK.MISHRA (AE) | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |        |                |                 |                  |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginia.com

DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
**CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH09(BALANCE WORK) PACKAGE - PO2A**

SCALE :  
 N.T.S

DRAWING TITLE :  
**PLAN FOR MAJOR JUNCTION AT KM. 6+500**  
 (SHEET 1 OF 1)  
 DWG. NUMBER : OSRP/CEG/P02A/SH9/MJ/ 02 REV. R2






## SCHEDULE OF SIGN POSTS

| SIGN POST ID | DESCRIPTION OF SIGN BOARD | CHAINAGE | LOCATION |    |        |        | REMARKS |
|--------------|---------------------------|----------|----------|----|--------|--------|---------|
|              |                           |          | LL       | LR | CR (L) | CR (R) |         |
| SP-12        | PEDESTRIAN CROSSING       | 12730    | ✓        |    |        |        |         |
|              |                           | 12830    |          | ✓  |        |        |         |
|              |                           | 13170    | ✓        |    |        |        |         |
|              |                           | 13270    |          | ✓  |        |        |         |
|              |                           | 16442    | ✓        |    |        |        |         |
|              |                           | 16542    |          | ✓  |        |        |         |
|              |                           | 16800    | ✓        |    |        |        |         |
|              |                           | 16900    |          | ✓  |        |        |         |
|              |                           | 17858    | ✓        |    |        |        |         |
|              |                           | 17958    |          | ✓  |        |        |         |
|              |                           | 20142    | ✓        |    |        |        |         |
|              |                           | 20242    |          | ✓  |        |        |         |
|              |                           | 21358    | ✓        |    |        |        |         |
|              |                           | 21458    |          | ✓  |        |        |         |
|              |                           | 24192    | ✓        |    |        |        |         |
|              |                           | 24292    |          | ✓  |        |        |         |
|              |                           | 24508    | ✓        |    |        |        |         |
|              |                           | 24608    |          | ✓  |        |        |         |
|              |                           | 25160    | ✓        |    |        |        |         |
|              |                           | 25260    |          | ✓  |        |        |         |
|              |                           | 26208    | ✓        |    |        |        |         |
|              |                           | 26308    |          | ✓  |        |        |         |
|              |                           | 26542    | ✓        |    |        |        |         |
|              |                           | 26642    |          | ✓  |        |        |         |
| SP-14 B      | Y-INTERSECTION            | 6380     | ✓        |    |        |        |         |
| SP-14 C      | Y-INTERSECTION            | 4060     |          | ✓  |        |        |         |
|              |                           | 16527    |          | ✓  |        |        |         |
| SP-13 D      | MAJOR ROAD AHEAD          | 120      |          | ✓  |        |        |         |
| SP-16 A      | HUMP OR ROUGH ROAD        | 6500     |          |    | ✓      |        |         |
|              |                           | 12235    |          |    | ✓      |        |         |
|              |                           | 21420    |          |    | ✓      |        |         |
|              |                           | 21990    |          |    | ✓      |        |         |
|              |                           | 23252    |          |    | ✓      |        |         |

| SIGN POST ID | DESCRIPTION OF SIGN BOARD | CHAINAGE | LOCATION |    |        |        | REMARKS |
|--------------|---------------------------|----------|----------|----|--------|--------|---------|
|              |                           |          | LL       | LR | CR (L) | CR (R) |         |
| SP-16 A      | HUMP OR ROUGH ROAD        | 3950     |          |    |        | ✓      |         |
|              |                           | 16417    |          |    |        | ✓      |         |
|              |                           | 17668    |          |    |        | ✓      |         |
|              |                           | 18425    |          |    |        | ✓      |         |
|              |                           | 19376    |          |    |        | ✓      |         |
| SP-17        | STATE ROUTE               | 0        | ✓        |    |        |        |         |
|              |                           | 27000    | ✓        |    |        |        |         |
|              |                           | 25000    |          | ✓  |        |        |         |
| SP-20        | REASSURANCE SIGN          | 4500     | ✓        |    |        |        |         |
|              | MARKER SIGN               | 6000     |          | ✓  |        |        |         |
|              |                           | 16000    | ✓        |    |        |        |         |
| SP-22        | PETROL BUNK               | 14900    | ✓        |    |        |        |         |
|              |                           | 15000    |          | ✓  |        |        |         |
| SP-23        | HOSPITAL                  | 13250    | ✓        |    |        |        |         |
|              |                           | 13350    |          | ✓  |        |        |         |
| SP-27        | TRUCK LAYBY               | 1250     | ✓        |    |        |        |         |
|              |                           | 1750     |          | ✓  |        |        |         |
|              | ENVIRONMENTAL SIGNAGE     |          |          |    |        |        |         |
| SP-40        | ENVIRONMENTAL SIGNAGE     | 26380    | ✓        |    |        |        |         |
|              |                           | 26480    |          | ✓  |        |        |         |
| SP-49        | ENVIRONMENTAL SIGNAGE     | 26400    | ✓        |    |        |        |         |
|              |                           | 26460    |          | ✓  |        |        |         |
|              | SIGNAGE AT NH JN          |          |          |    |        |        |         |
| SP-1         | STOP Sign                 | 0        | ✓        | ✓  |        | ✓      |         |
| SP-2         | Compulsory Keep Left      | 35       | ✓        | ✓  |        |        |         |
| SP-3         | Give Way                  | 0        | ✓        | ✓  |        |        |         |
| SP-13(d)     | Major Road Ahead          | 35       |          | ✓  |        |        |         |
| SP-15(b)     | Dual Carriageway Begins   | 50       |          | ✓  |        |        |         |
| SP-15(c)     | Dual Carriageway Ends     | 100      | ✓        |    |        |        |         |

**NOTE :**

1. LL = LEFT LANE
2. RL = RIGHT LANE
3. CR(L) = CROSS ROAD LEFT
4. CR(R) = CROSS ROAD RIGHT
5. SIGN POST SHALL BE INSTALLED AT AN OFFSET DISTANCE OF 2M FROM THE EDGE OF CARRIAGE WAY
6. FOR DETAILS OF ROAD SIGNS REFER DWG. IN STANDARD DRAWINGS

|     |      |           |                 |        |             |                 |                 |                  |  |  |  |   |  |  |  |  |  |                  |    |   |  |
|-----|------|-----------|-----------------|--------|-------------|-----------------|-----------------|------------------|--|--|--|---|--|--|--|--|--|------------------|----|---|--|
| R2  |      | SEP-2015  | SECOND REVISION | LASA   | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT : |  |  <b>C CONSULTING ENGINEERS GROUP LTD.</b><br>E-12, MOJI COLONY, MALVIYA NAGAR<br>JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com |  | DESIGN REVIEW CONSULTANT :<br> <b>LEA Associates South Asia Pvt. Ltd., India</b><br>B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 |  | CLIENT :<br> <b>ODISHA WORKS DEPARTMENT</b> |  | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A |  | SCALE :<br>N.T.S |    | DRAWING TITLE :<br>SCHEDULE OF SIGN POSTS<br>(SHEET 2 OF 5) |  |
| R1  |      | JAN-2013  | FIRST REVISION  | OWD    | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |  |  |  |   |  |  |  |  |  |                  |    |   |  |
| -   |      | JUNE 2008 | ORIGINAL        | CEG    |             |                 |                 |                  |  |  |  |   |  |  |  |  |  |                  |    |   |  |
| NO. | DATE | REVISION  | BY              | DRAWN: | PREPARED :  | CHECKED:        | APPROVED:       |                  |  |  |  |   |  |  |  | DWG. NUMBER : OSRP/CEG/SH09/P02A/SCH/02  |  | REV.             | R2 |   |  |

SCHEDULE OF PEDESTRIAN CROSSING

| SCHEDULE OF PEDESTRIAN CROSSING |               |          |       |
|---------------------------------|---------------|----------|-------|
| SCHOOL ZONE                     | HOSPITAL ZONE | BUS BAYS |       |
| CHAINAGE                        |               |          |       |
| 510                             | 13270         | 1342     | 1078  |
| 6460                            | —             | 9842     | 10158 |
| 12830                           | —             | 11442    | 12358 |
| 16900                           | —             | 16542    | 17958 |
| 25260                           | —             | 20242    | 21458 |
|                                 | —             | 24292    | 24608 |
|                                 | —             | 26642    | 26308 |

NOTE:—




- FOR DETAILS OF PEDESTRIAN CROSSING REFER ROAD MARKINGS
- FOR DETAILS OF RPMs AT PEDESTRIAN CROSSING REFER STANDARD DRAWINGS
- THE LOCATION OF THE PEDESTRIAN CROSSING ARE TENTATIVE ONLY.  
THE EXACT LOCATION SHALL BE FINALISED IN CONSULTATION WITH THE ENGINEER PRIOR TO START OF EXECUTION.

SCHEDULE OF EXTRA WIDENNING

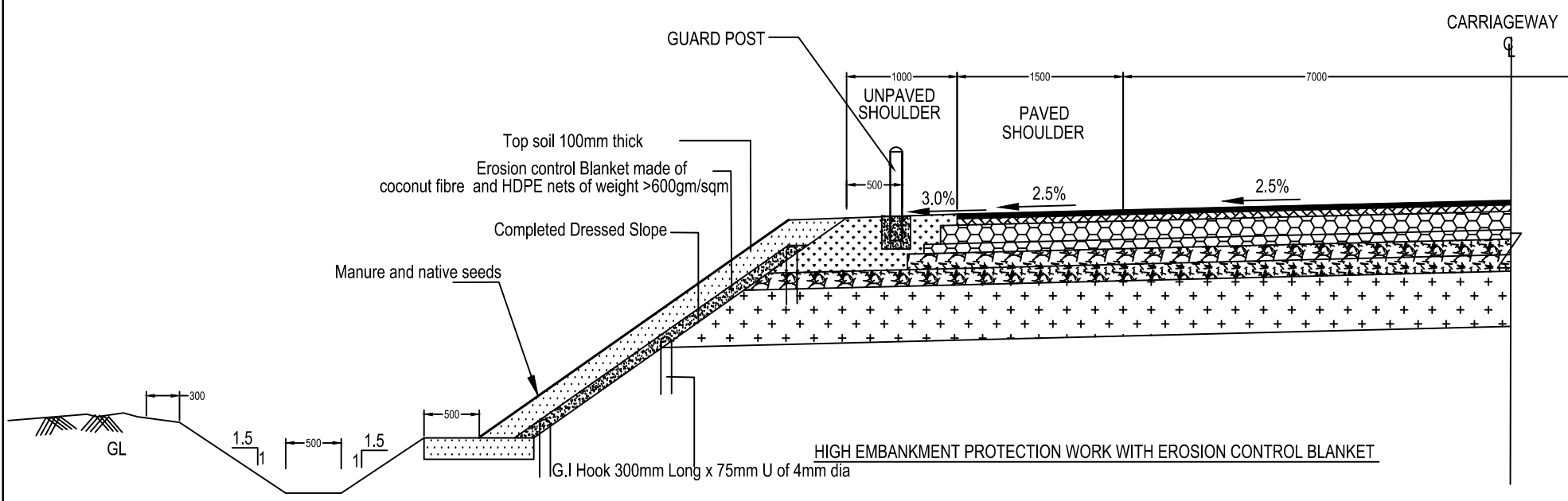
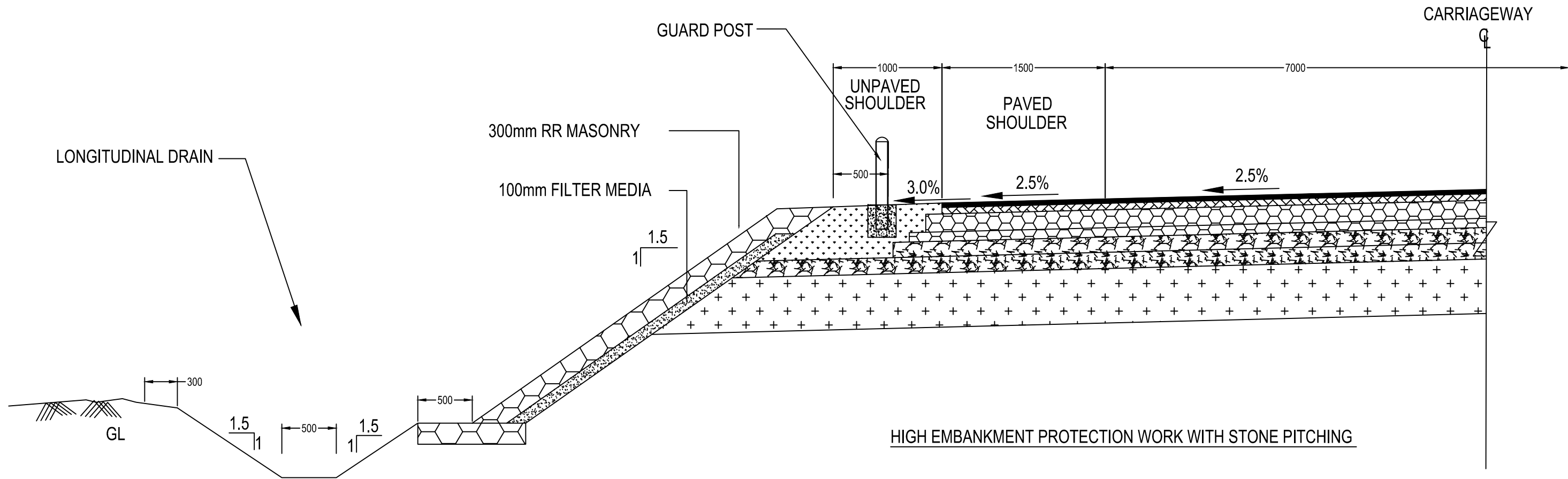
| SL NO | CURVE START | CURVE END  | RADIUS | CURVE LENGTH | TRANSITION | EXTRA WIDENNING |
|-------|-------------|------------|--------|--------------|------------|-----------------|
| 1     | 2+981.056   | 3+099.208  | 300    | 935.048      | 75         | 0.6 M           |
| 2     | 5+704.254   | 5+737.754  | 155    | 296.465      | 70         | 0.6 M           |
| 3     | 6+462.920   | 6+530.241  | 155    | 271.01       | 70         | 0.6 M           |
| 4     | 8+922.135   | 8+986.401  | 240    | 392.782      | 90         | 0.6 M           |
| 5     | 9+915.435   | 10+056.917 | 200    | 416.008      | 60         | 0.6 M           |
| 6     | 11+564.245  | 11+677.166 | 240    | 120.451      | 90         | 0.6 M           |

NOTE:

- EXTRA WIDENNING HAS BEEN DONE AS PER THE GUIDLINES DETAILED IN IRC:73-1980
- WIDENNING SHALL BE DONE EQUALLY ON BOTH THE INNER AND OUTER CURVES
- THE SLOPE OF THE CARRIAGEWAY SHALL EXTEND IN TH WIDENING SECTIONS

|     |           |                 |      |             |                 |                 |                  |   |   |  |   |                         |   |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|---|---|--|---|-------------------------|---|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT : |  <b>C CONSULTING ENGINEERS GROUP LTD.</b><br>E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com |  <b>LEA Associates South Asia Pvt. Ltd., India</b><br>B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 |  <b>ODISHA WORKS DEPARTMENT</b> | <b>PROJECT :</b><br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | <b>SCALE :</b><br>N.T.S | <b>DRAWING TITLE :</b><br>SCHEDULE OF PEDESTRIAN - CROSSING & EXTRA WIDENNING<br>(SHEET 3 OF 5) |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |   |   |  |   |                         |   |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |   |   |  |   |                         |   |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        | DWG. NUMBER :   | OSRP/CEG/SH09/P02A/SCH/03   | REV.   | R2  |                         |   |





**NOTES:-**

1. THE LOCATION OF HIGH EMBANKMENT PROTECTION WORK SHALL BE FINALIZED IN CONSULTATION WITH THEENGINEER PRIOR TO START OF EXECUTION.

|     |           |                 |      |             |                 |                    |
|-----|-----------|-----------------|------|-------------|-----------------|--------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE)    |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | N.K PRADHAN (CE)   |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                    |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED: APPROVED: |

DPR CONSULTANT :

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DESIGN REVIEW CONSULTANT :

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SCALE :

N.T.S

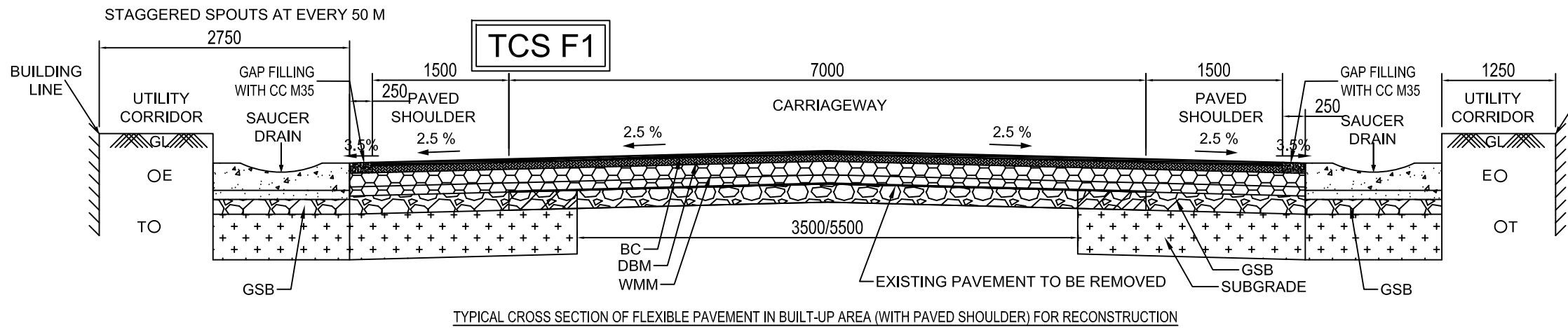
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STANDARD DRAWINGS PROTECTION WORK & WITH EROSION BLANKET

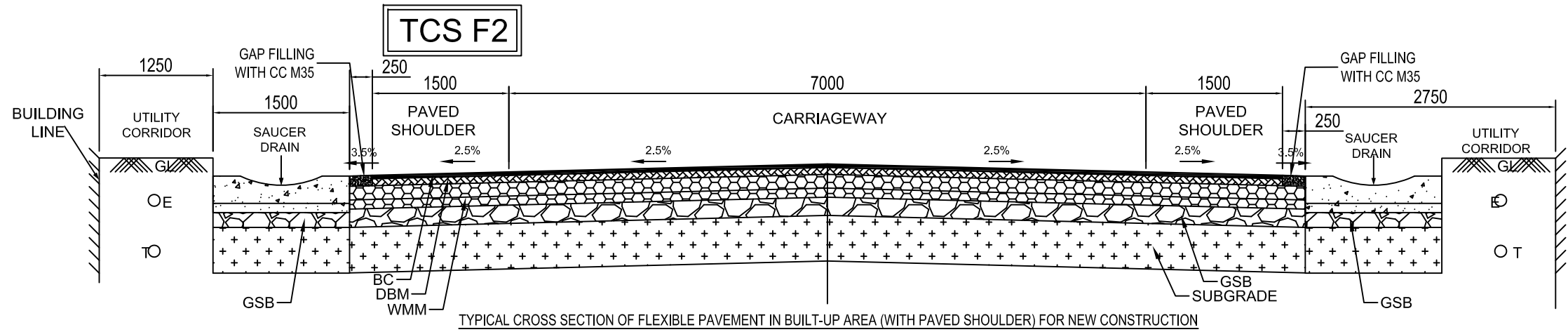
(SHEET 1 OF 1)

DWG. NUMBER : OSRP/CEG/SH09/P02A/01

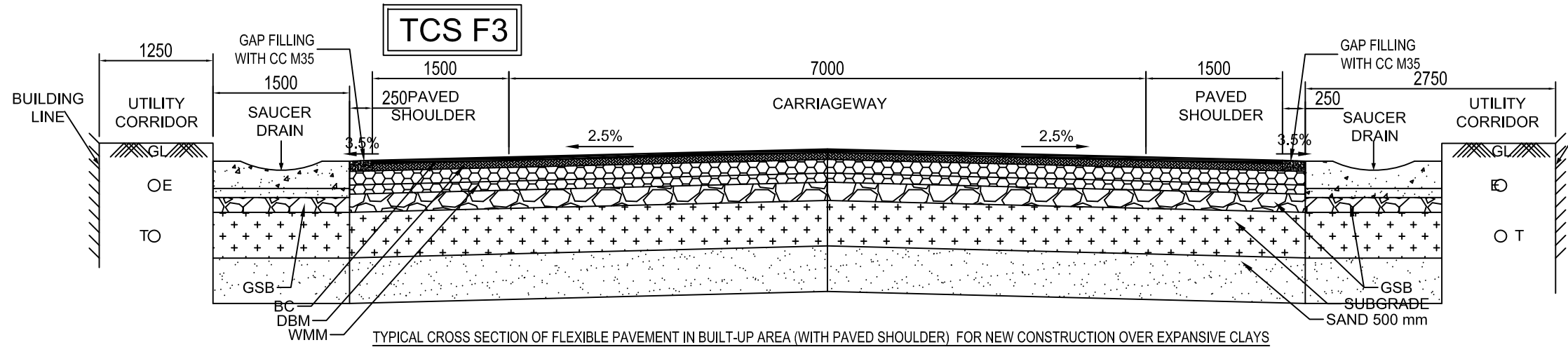
REV. R2



TYPICAL CROSS SECTION OF FLEXIBLE PAVEMENT IN BUILT-UP AREA (WITH PAVED SHOULDER) FOR RECONSTRUCTION



TYPICAL CROSS SECTION OF FLEXIBLE PAVEMENT IN BUILT-UP AREA (WITH PAVED SHOULDER) FOR NEW CONSTRUCTION



TYPICAL CROSS SECTION OF FLEXIBLE PAVEMENT IN BUILT-UP AREA (WITH PAVED SHOULDER) FOR NEW CONSTRUCTION OVER EXPANSIVE CLAYS

LEGENDS

|              |  |                         |  |
|--------------|--|-------------------------|--|
| 1) BC        |  | 9) EMBANKMENT           |  |
| 2) DBM       |  | 10) PC                  |  |
| 3) WMM       |  | 11) BM                  |  |
| 4) GSB       |  | 12) E-Electrical Cable  |  |
| 5) SUBGRADE  |  | 13) T-Telecom Cable     |  |
| 6) DLC       |  | 14) W-Water Supply Line |  |
| 7) PCC       |  | 15) G-Gas Line          |  |
| 8) EARTHFILL |  | 16) S-Sewer             |  |

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS
2. FOR DRAIN DETAILS REFER DRAWING NO.OSRP/CEG/DR
3. FOR LAYER THICKNESS DETAILS REFER 'SCHEDULE OF WIDENING AND LAYER THICKNESS DETAILS'
4. THE CROSS SECTIONS SHALL BE READ WITH DETAILS OF TRANSITION BETWEEN RIGID AND FLEXIBLE REFER DRAWING NO.OSRP/CEG/RIGID 02.
5. FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/OD
6. PCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
7. IN CASE THE UTILITIES/TREES OBSTRUCTING THE LONGITUDINAL DRAINS, THE DRAINS MAY BE DIVERTED AS PER ENGINEERS DIRECTIONS

|     |           |                 |      |             |                 |                 |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        |
|     |           |                 |      |             |                 | APPROVED:       |

DPR CONSULTANT :

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2521348, e-mail: ceg@cegindia.com

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SCALE :

N.T.S

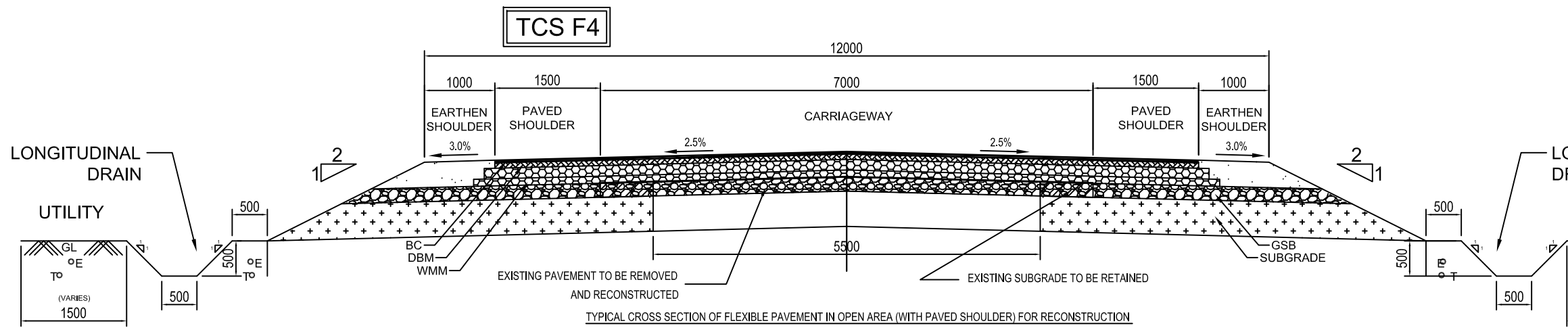
DRAWING TITLE :

TYPICAL CROSS SECTION - F1,F2 & F3

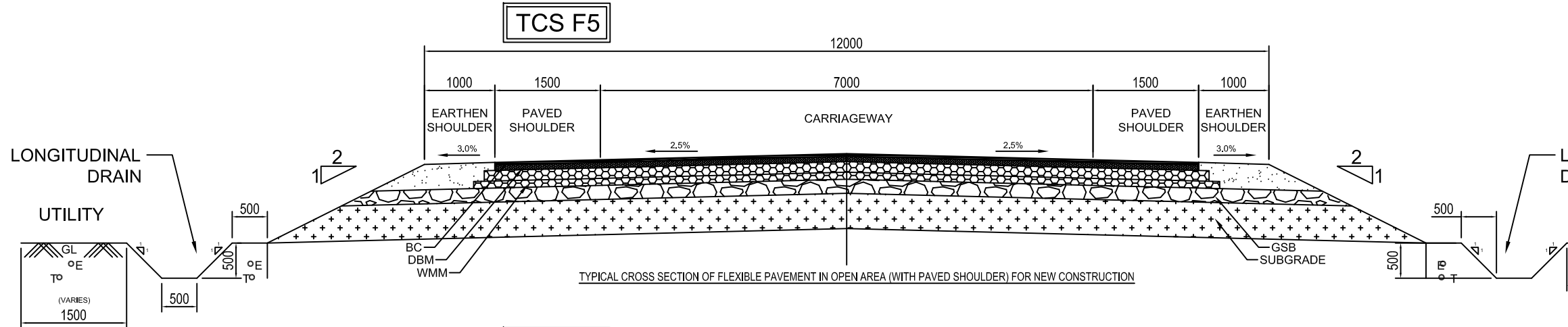
(SHEET 1 OF 5)

DWG. NUMBER : OSRP/CEG/SH9/P02A/TCS/ 01

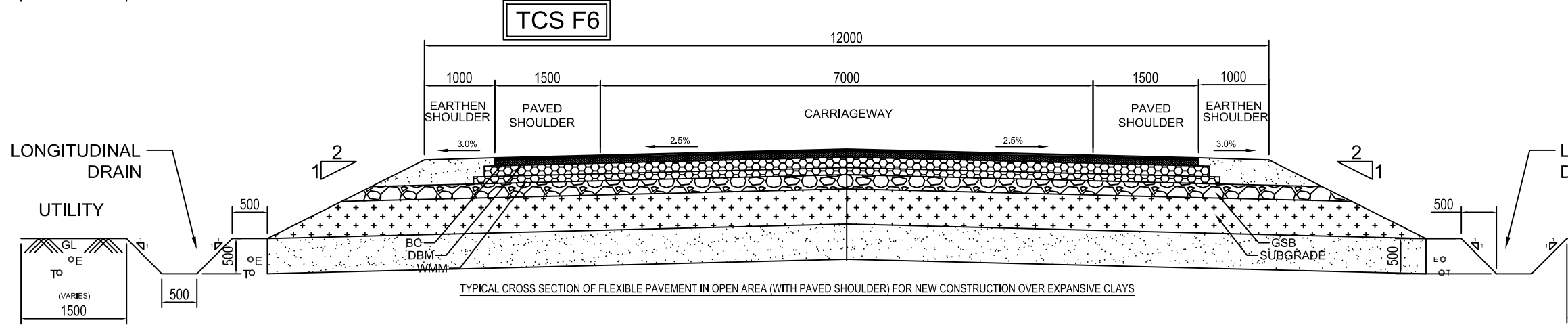
REV. R2



TYPICAL CROSS SECTION OF FLEXIBLE PAVEMENT IN OPEN AREA (WITH PAVED SHOULDER) FOR RECONSTRUCTION



TYPICAL CROSS SECTION OF FLEXIBLE PAVEMENT IN OPEN AREA (WITH PAVED SHOULDER) FOR NEW CONSTRUCTION



TYPICAL CROSS SECTION OF FLEXIBLE PAVEMENT IN OPEN AREA (WITH PAVED SHOULDER) FOR NEW CONSTRUCTION OVER EXPANSIVE CLAYS

**LEGENDS**

- |              |  |                         |  |
|--------------|--|-------------------------|--|
| 1) BC        |  | 9) EMBANKMENT           |  |
| 2) DBM       |  | 10) PC                  |  |
| 3) WMM       |  | 11) BM                  |  |
| 4) GSB       |  | 12) E-Electrical Cable  |  |
| 5) SUBGRADE  |  | 13) T-Telecom Cable     |  |
| 6) DLC       |  | 14) W-Water Supply Line |  |
| 7) PCC       |  | 15) G-Gas Line          |  |
| 8) EARTHFILL |  | 16) S-Sewer             |  |

**NOTES:**

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- FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/OD
- PCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
- IN CASE THE UTILITIES/TREES OBSTRUCTING THE LONGITUDINAL DRAINS, THE DRAINS MAY BE DIVERTED AS PER ENGINEERS DIRECTIONS

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

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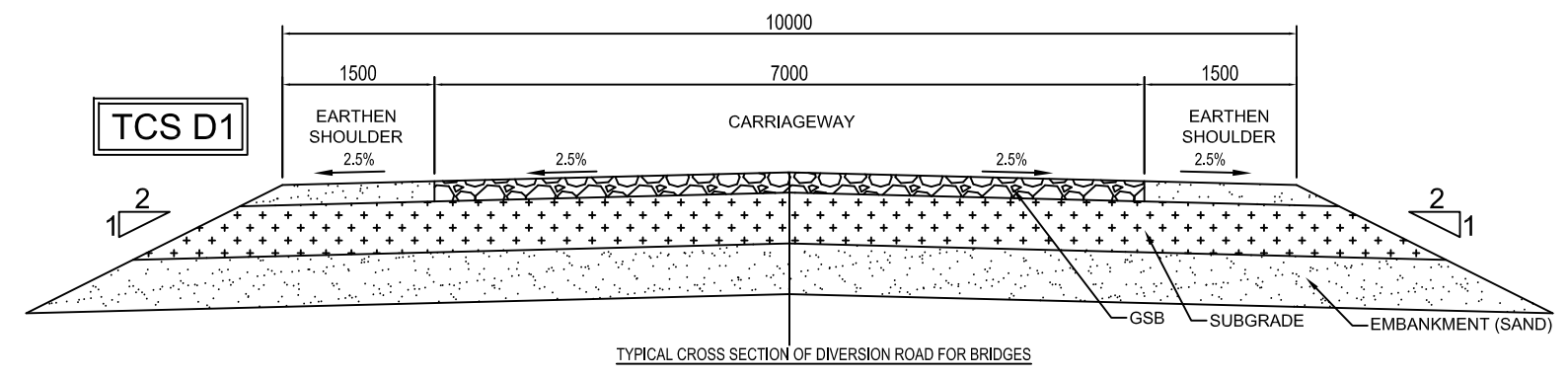
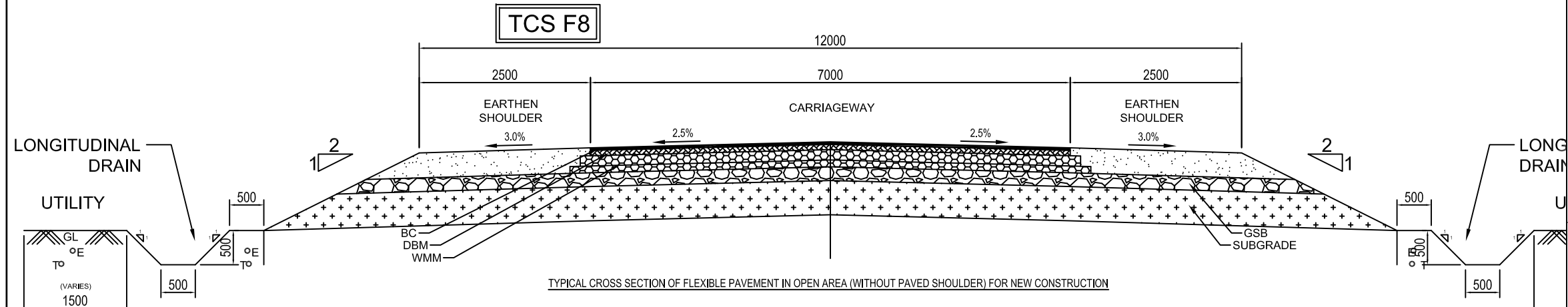
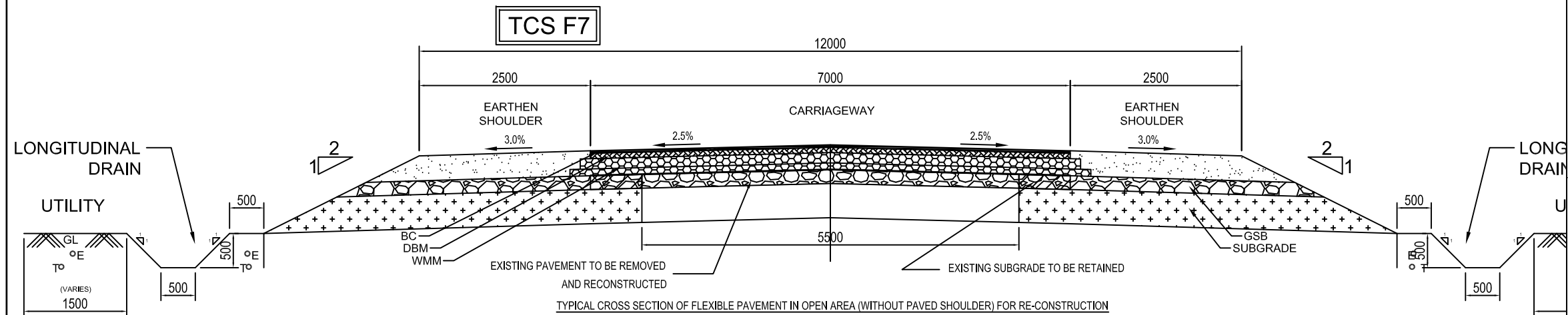
DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE  
 INDUSTRIAL ESTATE, MATHURA ROAD, NEW  
 DELHI-110044 .

CLIENT :  
  
 ODISHA WORKS  
 DEPARTMENT

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING  
 OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM  
 BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF  
 SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

DRAWING TITLE :  
**TYPICAL CROSS SECTION - F4, F5 & F6**  
 (SHEET 2 OF 5)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/TCS/ 02  
 REV. R2



**LEGENDS**

- |              |  |                         |  |
|--------------|--|-------------------------|--|
| 1) BC        |  | 9) EMBANKMENT           |  |
| 2) DBM       |  | 10) PC                  |  |
| 3) WMM       |  | 11) BM                  |  |
| 4) GSB       |  | 12) E-Electrical Cable  |  |
| 5) SUBGRADE  |  | 13) T-Telecom Cable     |  |
| 6) DLC       |  | 14) W-Water Supply Line |  |
| 7) PCC       |  | 15) G-Gas Line          |  |
| 8) EARTHFILL |  | 16) S-Sewer             |  |

**NOTES:**

- ALL DIMENSIONS ARE IN MILLIMETERS
- FOR DRAIN DETAILS REFER DRAWING NO.OSRP/CEG/DR
- FOR LAYER THICKNESS DETAILS REFER 'SCHEDULE OF WIDENING AND LAYER THICKNESS DETAILS'
- THE CROSS SECTIONS SHALL BE READ WITH DETAILS OF TRANSITION BETWEEN RIGID AND FLEXIBLE REFER DRAWING NO.OSRP/CEG/RIGID 02.
- FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/OD
- PCC-PROFILE CORRECTIVE COURSE WITH THE MATERIAL SAME AS THAT OF OVERLAYING LAYER ABOVE IT.
- IN CASE THE UTILITIES/TREES OBSTRUCTING THE LONGITUDINAL DRAINS, THE DRAINS MAY BE DIVERTED AS PER ENGINEERS DIRECTIONS

|     |           |                 |      |             |                 |                 |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        |

DPR CONSULTANT :

**CEG**

CONSULTING ENGINEERS GROUP LTD.  
E-12,MOJI COLONY,MALVIYA NAGAR  
JAIPUR-17 Tel:  
+91-141-2520899,2521899,2520556 Fax:  
2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :

**LEA**

LEA Associates South Asia Pvt. Ltd., India  
B-1, E-27, 1Ind FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

ODISHA WORKS DEPARTMENT

PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

N.T.S

DRAWING TITLE :

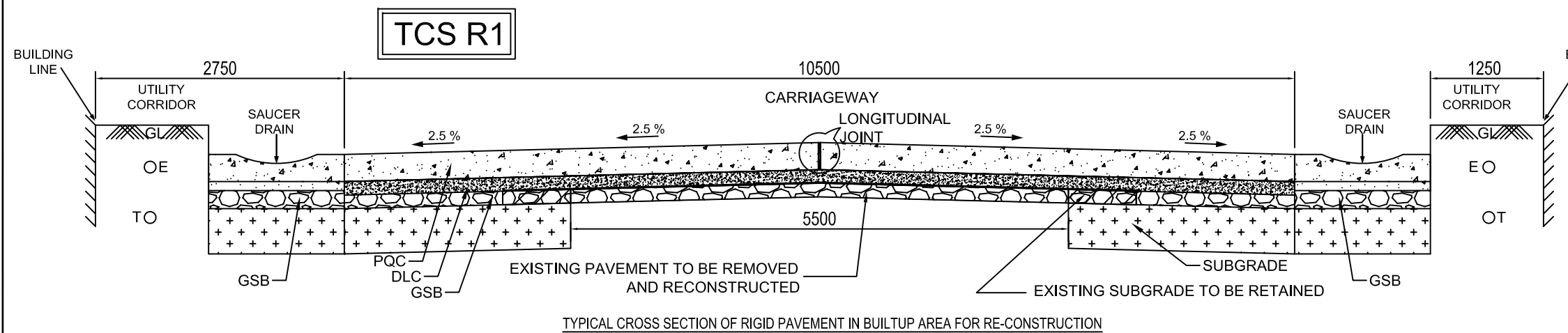
TYPICAL CROSS SECTION - F7,F8 & D1

(SHEET 3 OF 5)

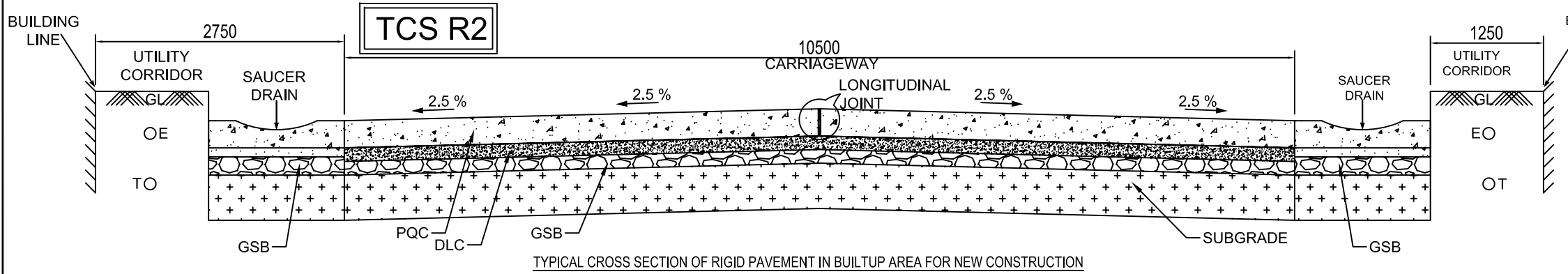
DWG. NUMBER : OSRP/CEG/SH9/P02A/TCS/ 03

REV. R2

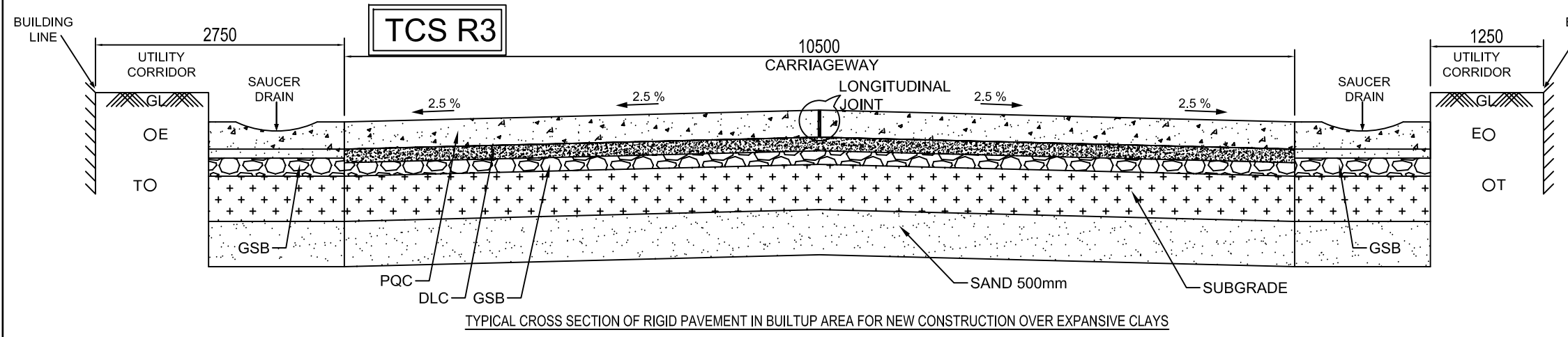




TYPICAL CROSS SECTION OF RIGID PAVEMENT IN BUILTUP AREA FOR RE-CONSTRUCTION



TYPICAL CROSS SECTION OF RIGID PAVEMENT IN BUILTUP AREA FOR NEW CONSTRUCTION



TYPICAL CROSS SECTION OF RIGID PAVEMENT IN BUILTUP AREA FOR NEW CONSTRUCTION OVER EXPANSIVE CLAYS

| LEGENDS      |  |                         |  |
|--------------|--|-------------------------|--|
| 1) BC        |  | 9) EMBANKMENT           |  |
| 2) DBM       |  | 10) PC                  |  |
| 3) WMM       |  | 11) BM                  |  |
| 4) GSB       |  | 12) E-Electrical Cable  |  |
| 5) SUBGRADE  |  | 13) T-Telecom Cable     |  |
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- FOR PAVEMENT EDGE DETAILS REFER DRAWING NO. OSRP/CEG/OD
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- IN CASE THE UTILITIES/TREES OBSTRUCTING THE LONGITUDINAL DRAINS, THE DRAINS MAY BE DIVERTED AS PER ENGINEERS DIRECTIONS

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

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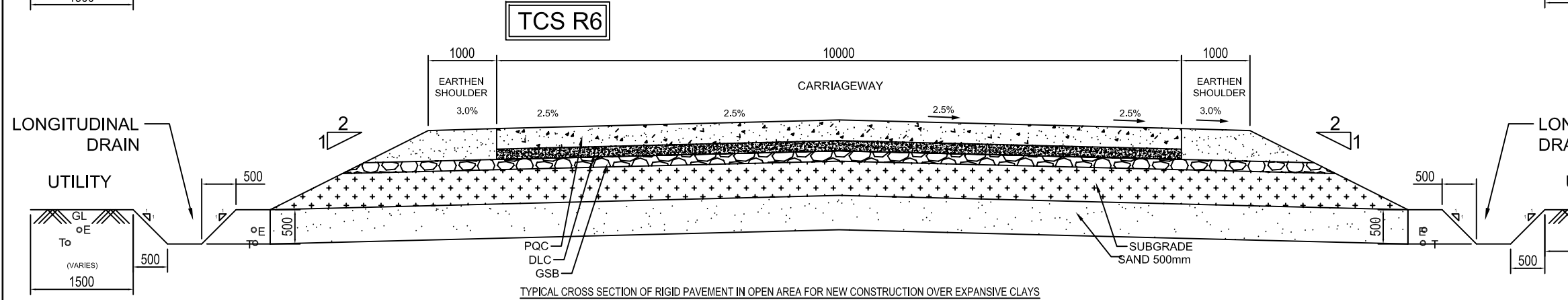
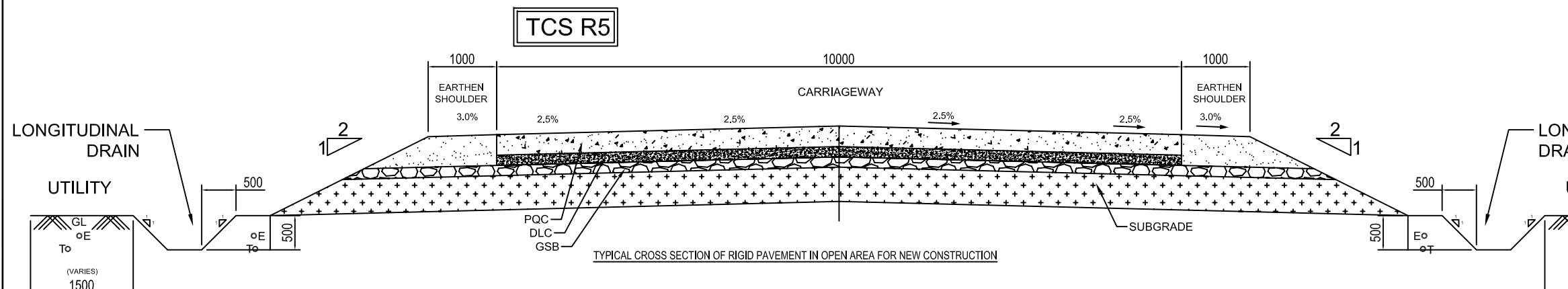
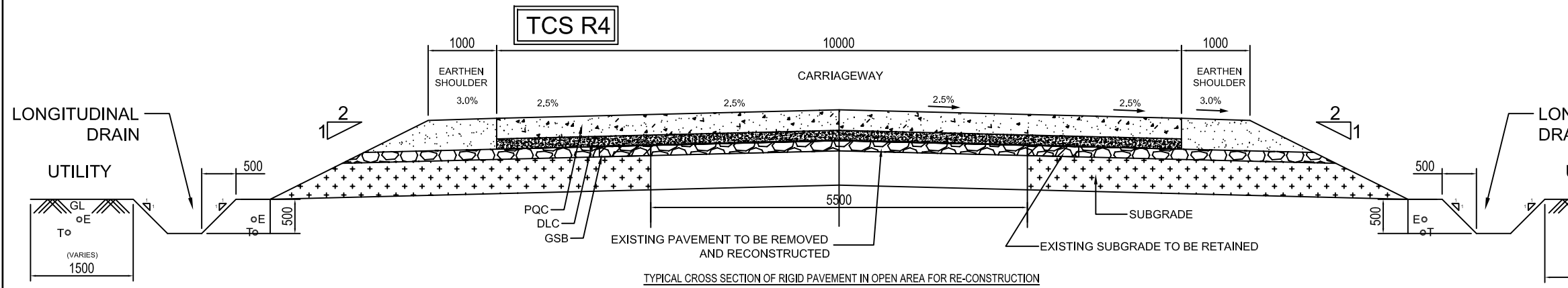
DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE  
 INDUSTRIAL ESTATE, MATHURA ROAD, NEW  
 DELHI-110044

CLIENT :  
  
 ODISHA WORKS  
 DEPARTMENT

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 BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF  
 SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

DRAWING TITLE :  
**TYPICAL CROSS SECTION - R1, R2 & R3**  
 (SHEET 4 OF 5)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/TCS/ 04  
 REV. R2



**LEGENDS**

- |              |  |                         |  |
|--------------|--|-------------------------|--|
| 1) BC        |  | 9) EMBANKMENT           |  |
| 2) DBM       |  | 10) PC                  |  |
| 3) WMM       |  | 11) BM                  |  |
| 4) GSB       |  | 12) E-Electrical Cable  |  |
| 5) SUBGRADE  |  | 13) T-Telecom Cable     |  |
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| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
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| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

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CLIENT :

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PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

N.T.S

DRAWING TITLE :

**TYPICAL CROSS SECTION - R4, R5 & R6**

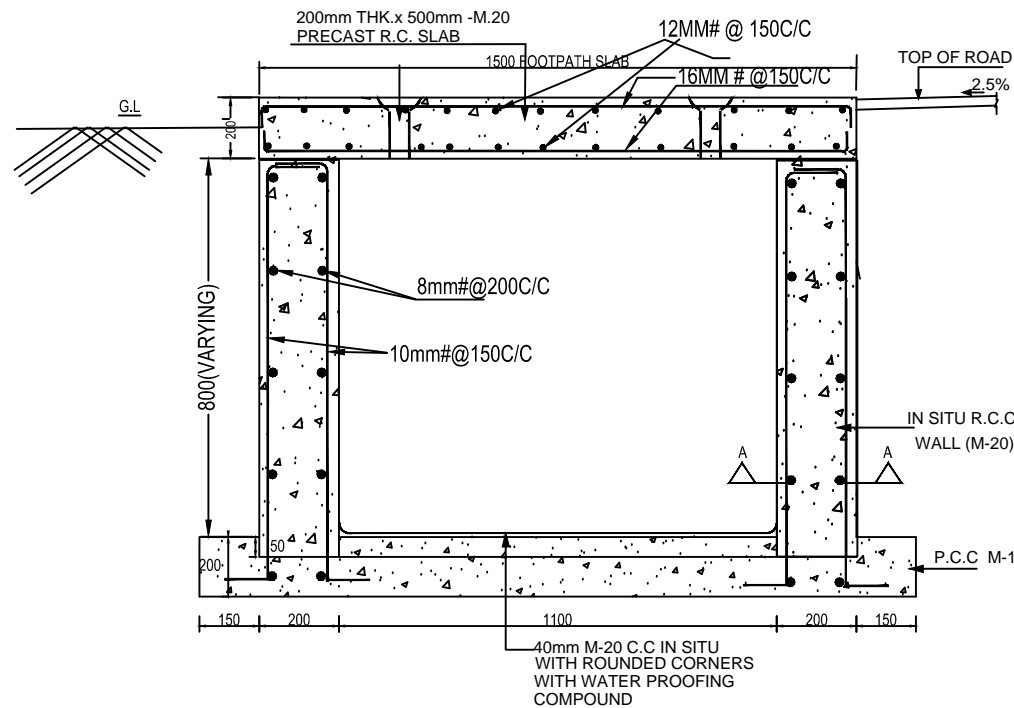
(SHEET 5 OF 5)

DWG. NUMBER : OSRP/CEG/SH9/P02A/TCS/ 05 REV. R2

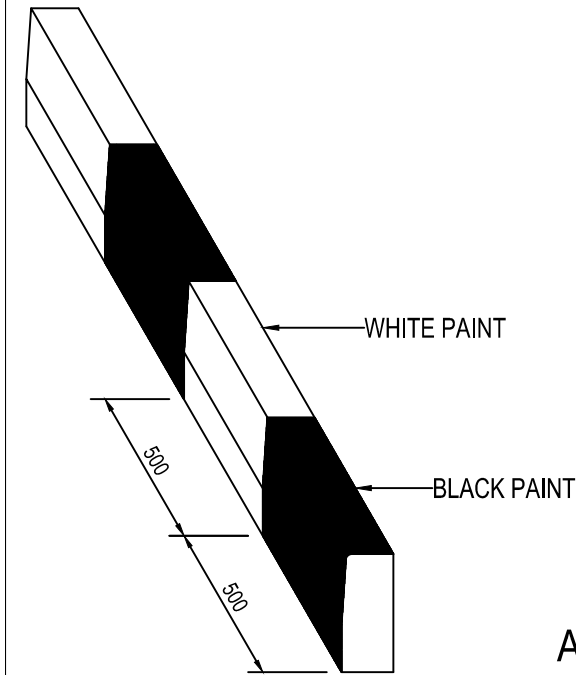
| SCHEDULE OF LINED DRAIN |       |        |         |
|-------------------------|-------|--------|---------|
| FROM                    | TO    | LENGTH | LHS/RHS |
| 0                       | 1200  | 1200   | BOTH    |
| 5600                    | 5880  | 280    | BOTH    |
| 6300                    | 6650  | 350    | BOTH    |
| 9600                    | 10250 | 650    | BOTH    |
| 11500                   | 12900 | 1400   | BOTH    |
| 14000                   | 14300 | 300    | BOTH    |
| 16100                   | 18500 | 2400   | BOTH    |
| 21200                   | 21600 | 400    | BOTH    |
| 24450                   | 24800 | 350    | BOTH    |
| 25800                   | 27100 | 1300   | BOTH    |

**NOTE:**

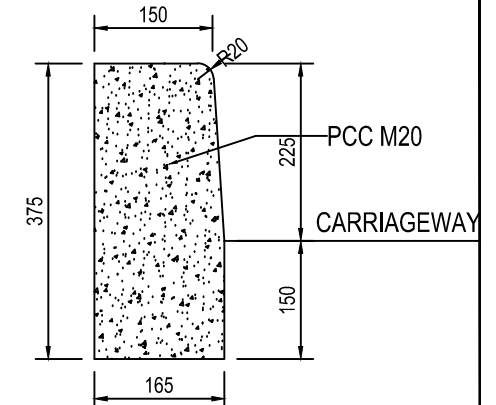
- FOR DETAILS OF LINED DRAINS REFER DWG NO. OSRP/CEG/DR
- THE PROVISION AND LENGTH OF THE LINED DRAIN SHALL BE REASSESSED DURING THE TIME OF CONSTRUCTION
- FOOTPATH BARRIERS SHALL BE PROVIDED AS PER DWG. NO OSRP/CEG/FB
- FOR BARRICADES OPENNING SHALL BE PROVIDED
- LINED DRAIN SCHEDULE SUPERSEED THE PLAN
- ALL REINFORCEMENTS SHALL BE CONFIRMED TO FE-500
- THE LOCATION OF LINED DRAIN ARE TENTATIVE ONLY. IT MAY BE CHANGED AS PER SITE REQUIREMENT/CONDITION.



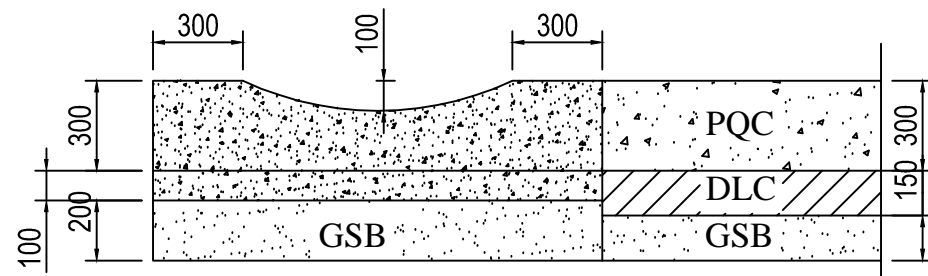
**DETAIL OF BOX DRAIN**



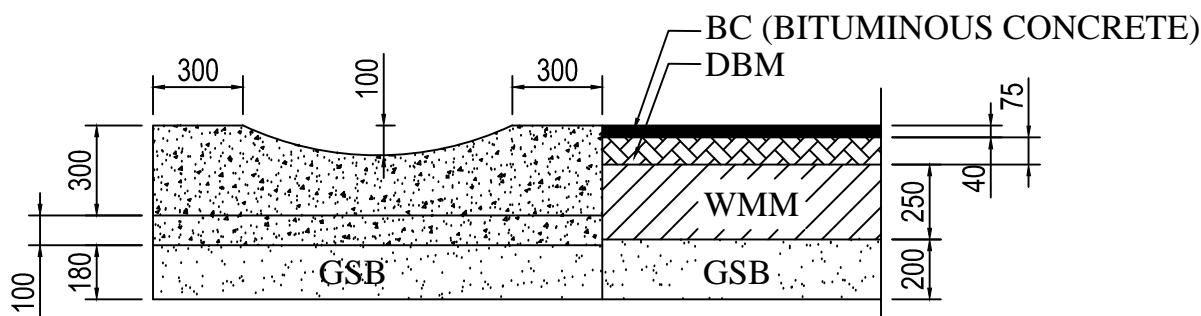
**KERB MARKING**



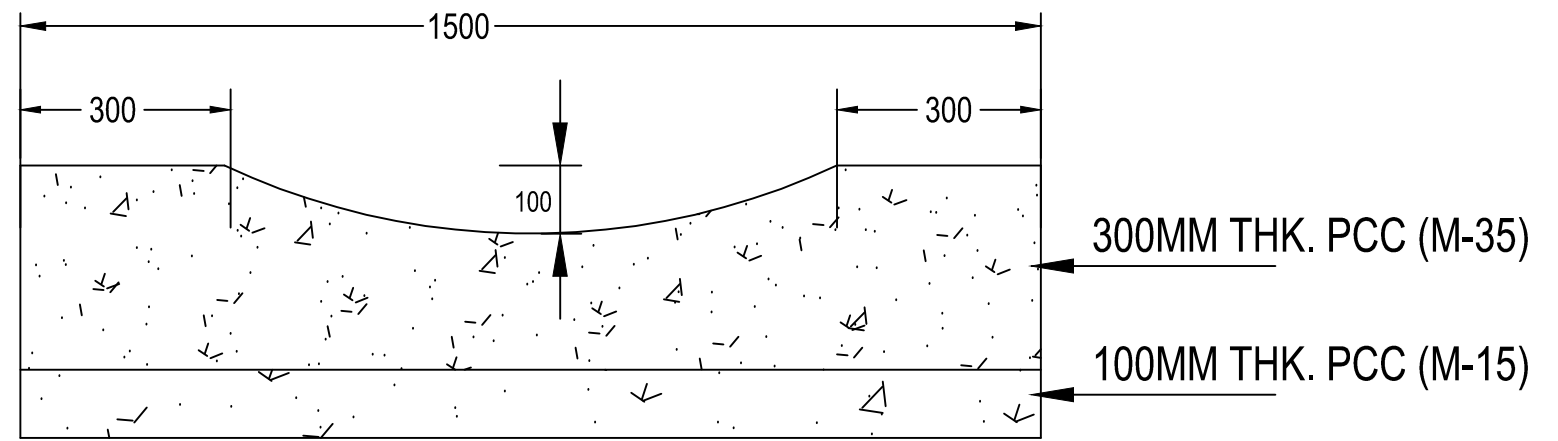
**TYPE - I  
KERB FOR CENTRAL  
AND DIRECTIONAL ISLAND**



**PRECAST SAUCER DRAIN IN RIGID PAVEMENT  
(Scale 1:20)**



**PRECAST SAUCER DRAIN IN FLEXIBLE PAVEMENT  
(Scale 1:20)**



**PRECAST SAUCER DRAIN**

| NO. | DATE      | REVISION        | BY   | DRAWN: | PREPARED :     | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|--------|----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA |        | RAJU MATHUR    | M.R MISHRA (EE) | O.P. PATEL (CE)  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY  | PK.MISHRA (AE) | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |        |                |                 |                  |

DPR CONSULTANT :  
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 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

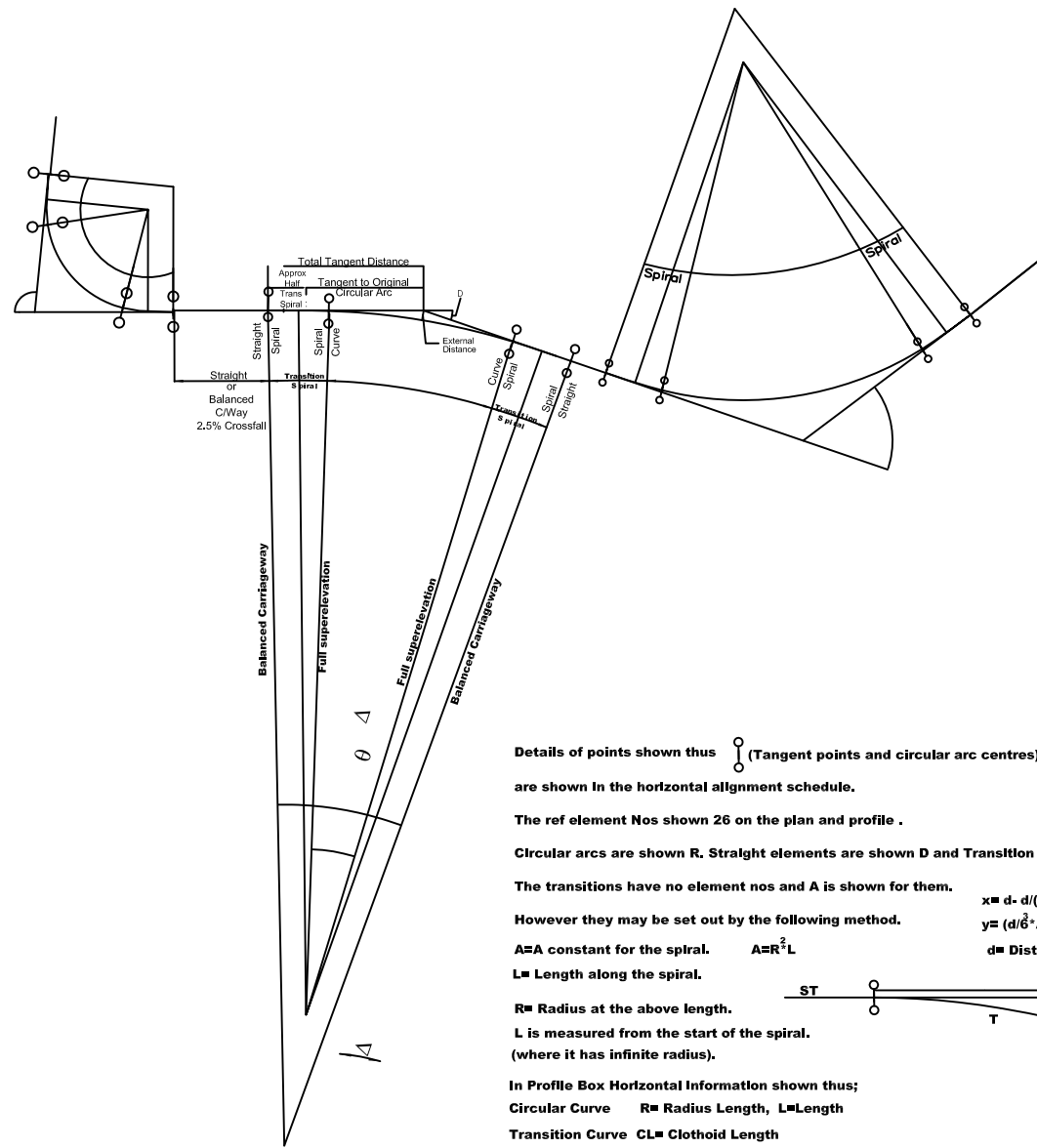
DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

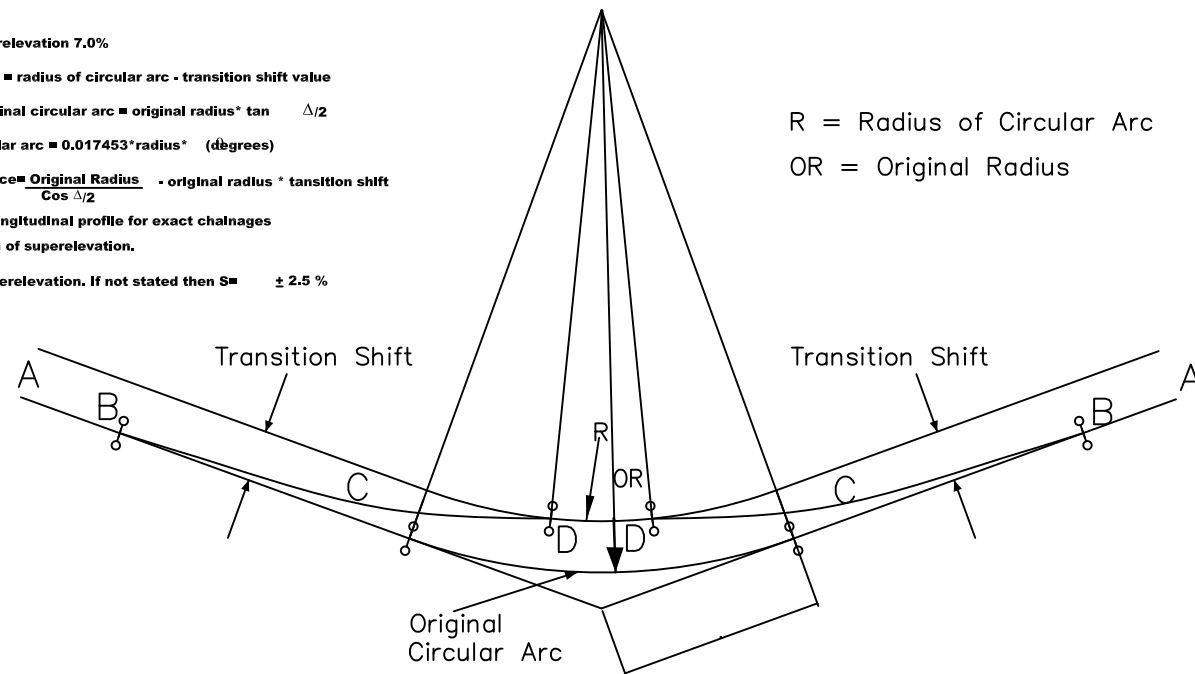
SCALE :  
 N.T.S

DRAWING TITLE :  
**STANDARD DRAWINGS DETAILS OF DRAIN AND KERB**  
 DWG. NUMBER : OSRP/CEG/SH09/P02A/DR  
 REV. R2

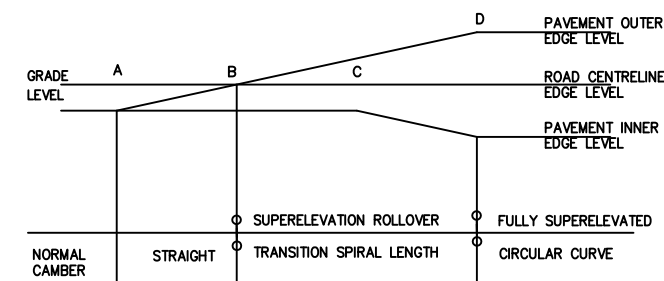


**NOTES:**

1. Maximum superelevation 7.0%
2. Original Radius = radius of circular arc - transition shift value
3. Tangent of original circular arc = original radius \* tan  $\Delta/2$
4. Length to circular arc =  $0.017453 \cdot \text{radius} \cdot (\text{degrees})$
5. External distance =  $\frac{\text{Original Radius}}{\cos \Delta/2} - \text{original radius} + \text{transition shift}$
6. See Plan and longitudinal profile for exact chainages for application of superelevation.
7. S = value of superelevation. If not stated then S =  $\pm 2.5\%$



**APPLICATION OF SUPERELEVATION**



**LONGITUDINAL SECTION THROUGH HORIZONTAL CURVE**

ROTATION ABOUT PAVEMENT CENTRELINE

| UNPAVED SHOULDER                                 | PAVED SHOULDER | RUNNING SURFACE | RUNNING SURFACE | PAVED SHOULDER | UNPAVED SHOULDER |
|--|----------------|-----------------|-----------------|----------------|------------------|
|  |                | GRADE LEVEL     |                 |                |                  |
| 3.0 %  | 2.5 %          | 2.5 %           | 2.5 %           | 2.5 %          | 3.0 %            |
| CROSS SECTION AT A<br>NORMAL CAMBER              |                |                 |                 |                |                  |
| 3.0 %  |                |                 | 2.5 %           | 2.5 %          | 3.0 %            |
| CROSS SECTION AT B                               |                |                 |                 |                |                  |
| 3.0 %  |                |                 | 2.5 %           | 2.5 %          | 3.0 %            |
| CROSS SECTION AT C<br>REVERSE CAMBER             |                |                 |                 |                |                  |
| 3.0 %  |                | e %             | e %             |                | 3.0 %            |
| CROSS SECTION AT D<br>FULLY SUPERELEVATED CAMBER |                |                 |                 |                |                  |

Details of points shown thus (Tangent points and circular arc centres)

are shown in the horizontal alignment schedule.

The ref element Nos shown 26 on the plan and profile.

Circular arcs are shown R. Straight elements are shown D and Transition spirals are shown CL.

The transitions have no element nos and A is shown for them.

However they may be set out by the following method.

$$x = d - \frac{d^2}{40^2 \cdot A^2} + \frac{d^3}{3456 \cdot A^3} - \frac{d^4}{5999040 \cdot A^4}$$

$$y = \frac{d^2}{6 \cdot A^2} - \frac{d^3}{336 \cdot A^3} + \frac{d^4}{42240 \cdot A^4}$$

d = Distance along spiral from origin to point where x and y are measured.

A = A constant for the spiral.  $A = R^2 \cdot L$

L = Length along the spiral.

R = Radius at the above length.

L is measured from the start of the spiral.

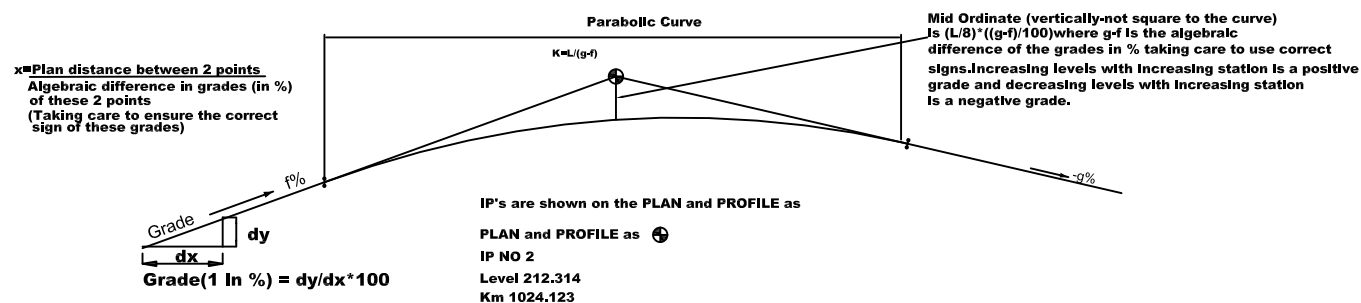
(where it has infinite radius).

In Profile Box Horizontal Information shown thus;

Circular Curve R = Radius Length, L = Length

Transition Curve CL = Clothoid Length

Straight D = Length



x = Plan distance between 2 points  
Algebraic difference in grades (in %) of these 2 points  
(Taking care to ensure the correct sign of these grades)

Mid Ordinate (vertically-not square to the curve) is  $(L/8) \cdot ((g-f)/100)$  where g & f is the algebraic difference of the grades in % taking care to use correct signs. Increasing levels with increasing station is a positive grade and decreasing levels with increasing station is a negative grade.

IP's are shown on the PLAN and PROFILE as

PLAN and PROFILE as

IP NO 2  
Level 212.314  
Km 1024.123

| NO. | DATE      | REVISION        | BY   | DRAWN: | PREPARED :     | CHECKED:         | APPROVED:         |
|-----|-----------|-----------------|------|--------|----------------|------------------|-------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA |        | RAJU MATHUR    | M.R. MISHRA (EE) | O.P. PATEL (CE)   |
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| -   | JUNE 2008 | ORIGINAL        | CEG  |        |                |                  |                   |

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SCALE :

N.T.S

DRAWING TITLE :

DETAILS OF APPLICATION OF SUPERELEVATION

(SHEET 1 OF 1)

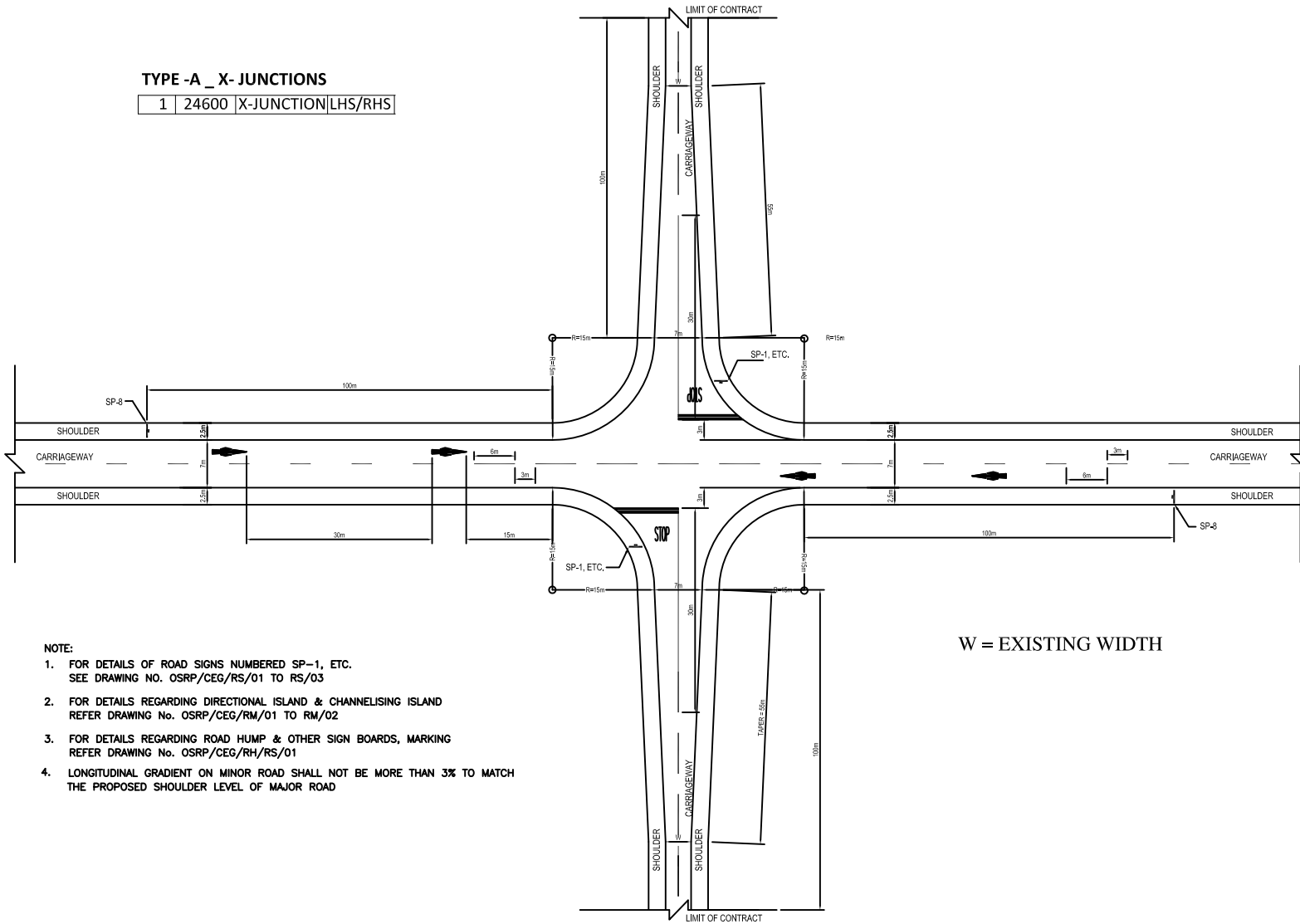
DWG. NUMBER : OSRP/CEG/SH09/P02A/ SE

REV. R2



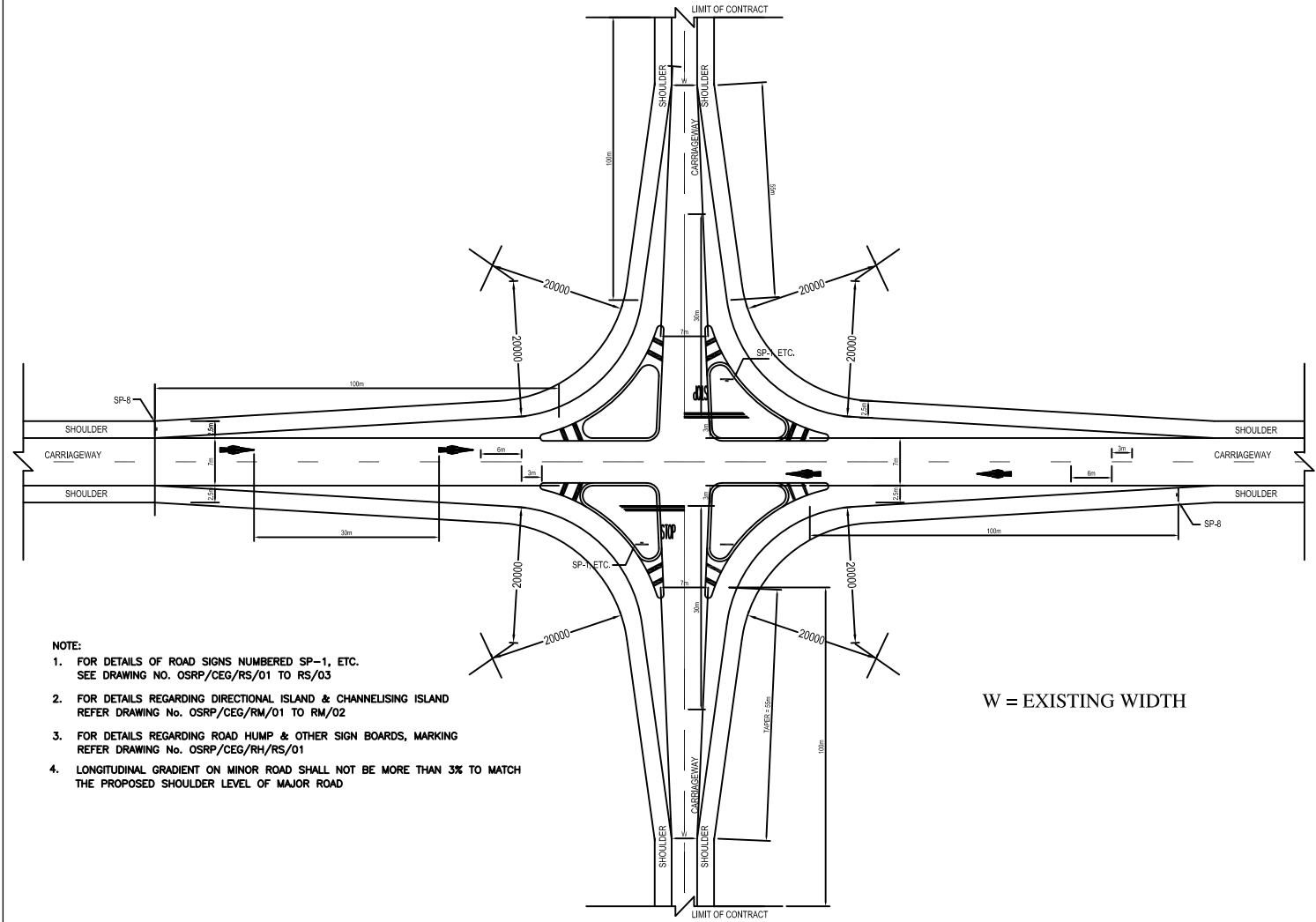
**TYPE -A\_ X- JUNCTIONS**

1 | 24600 | X-JUNCTION|LHS/RHS



- NOTE:**
1. FOR DETAILS OF ROAD SIGNS NUMBERED SP-1, ETC. SEE DRAWING NO. OSRP/CEG/RS/01 TO RS/03
  2. FOR DETAILS REGARDING DIRECTIONAL ISLAND & CHANNELISING ISLAND REFER DRAWING No. OSRP/CEG/RM/01 TO RM/02
  3. FOR DETAILS REGARDING ROAD HUMPS & OTHER SIGN BOARDS, MARKING REFER DRAWING No. OSRP/CEG/RH/RS/01
  4. LONGITUDINAL GRADIENT ON MINOR ROAD SHALL NOT BE MORE THAN 3% TO MATCH THE PROPOSED SHOULDER LEVEL OF MAJOR ROAD

W = EXISTING WIDTH



- NOTE:**
1. FOR DETAILS OF ROAD SIGNS NUMBERED SP-1, ETC. SEE DRAWING NO. OSRP/CEG/RS/01 TO RS/03
  2. FOR DETAILS REGARDING DIRECTIONAL ISLAND & CHANNELISING ISLAND REFER DRAWING No. OSRP/CEG/RM/01 TO RM/02
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  4. LONGITUDINAL GRADIENT ON MINOR ROAD SHALL NOT BE MORE THAN 3% TO MATCH THE PROPOSED SHOULDER LEVEL OF MAJOR ROAD

W = EXISTING WIDTH

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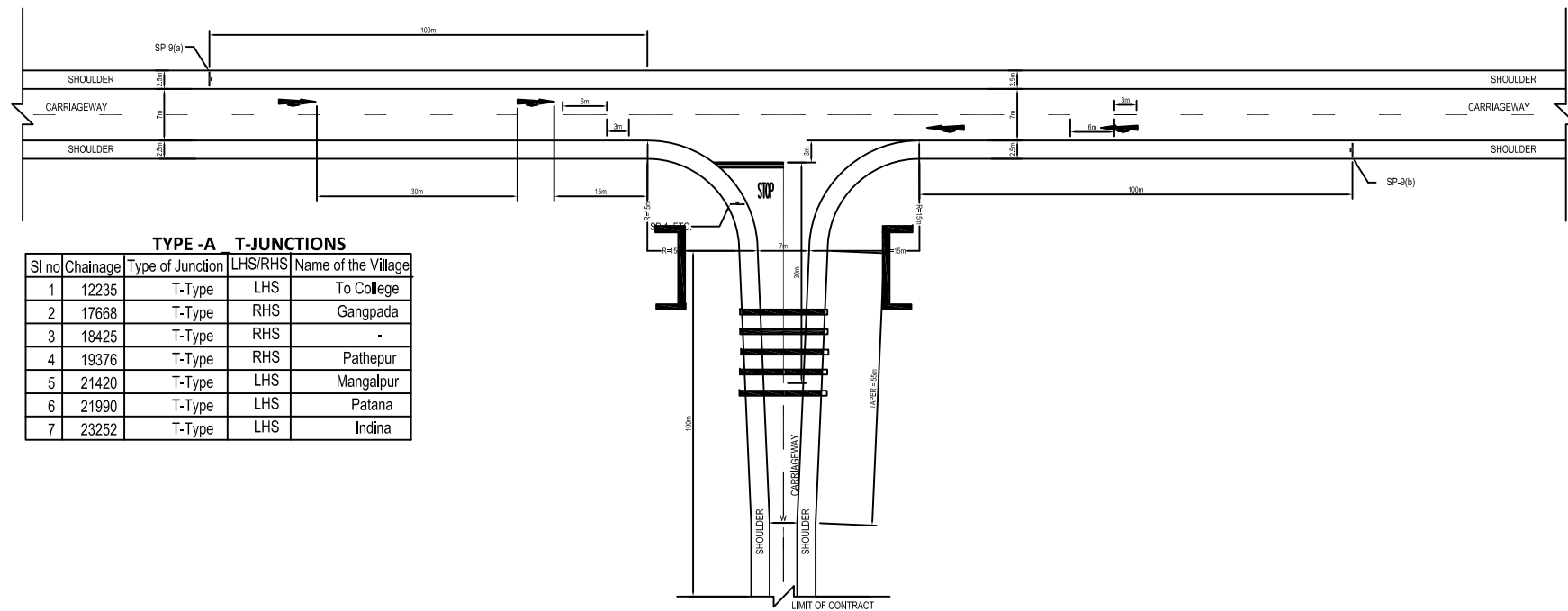
DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

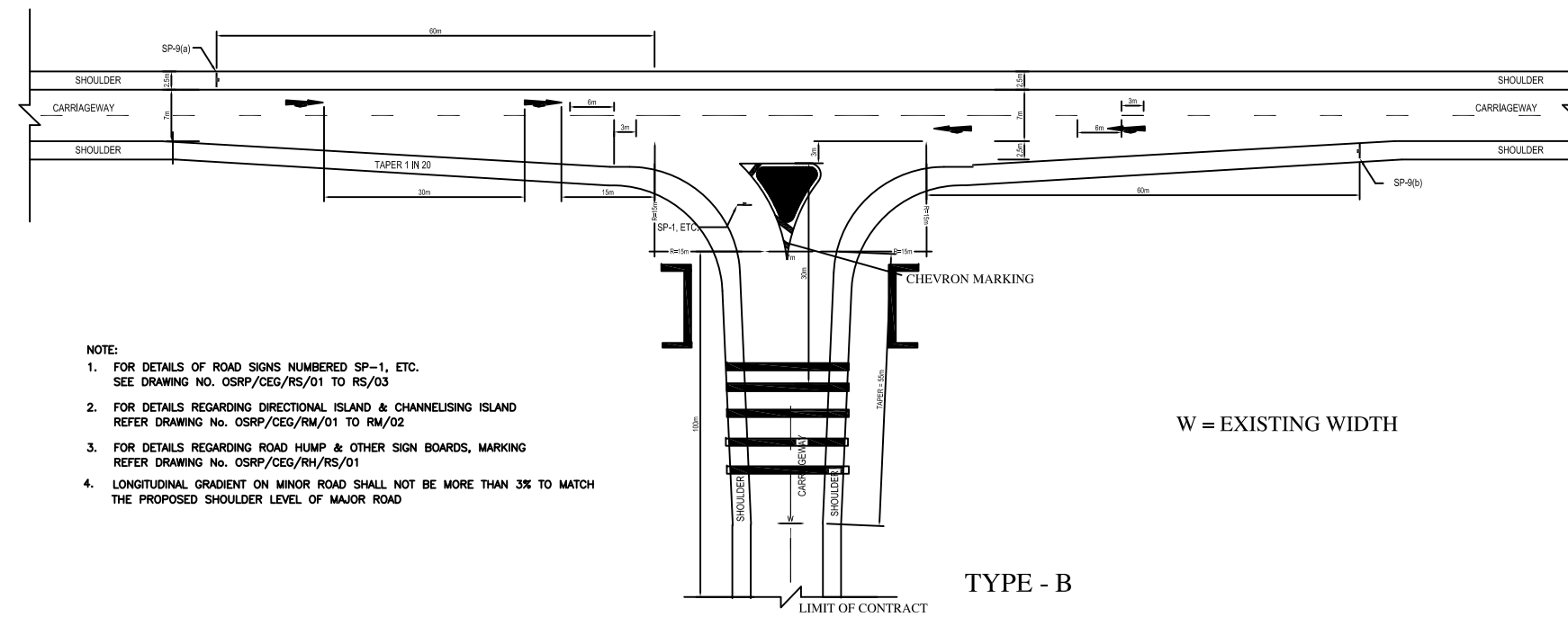
DRAWING TITLE :  
**STANDARD DRAWINGS TYPICAL 4-LEGGED INTERSECTION WITH SINGLE LANE BT ROAD**  
 (SHEET 1 OF 4)  
 DWG. NUMBER : OSRP/CEG/SH09/P02A/ JN /01  
 REV. R2



**TYPE -A T-JUNCTIONS**

| Sl no | Chainage | Type of Junction | LHS/RHS | Name of the Village |
|-------|----------|------------------|---------|---------------------|
| 1     | 12235    | T-Type           | LHS     | To College          |
| 2     | 17668    | T-Type           | RHS     | Gangpada            |
| 3     | 18425    | T-Type           | RHS     | -                   |
| 4     | 19376    | T-Type           | RHS     | Pathepur            |
| 5     | 21420    | T-Type           | LHS     | Mangalpur           |
| 6     | 21990    | T-Type           | LHS     | Patana              |
| 7     | 23252    | T-Type           | LHS     | Indina              |

TYPE - A



- NOTE:**
- FOR DETAILS OF ROAD SIGNS NUMBERED SP-1, ETC. SEE DRAWING NO. OSRP/CEG/RS/01 TO RS/03
  - FOR DETAILS REGARDING DIRECTIONAL ISLAND & CHANNELISING ISLAND REFER DRAWING No. OSRP/CEG/RM/01 TO RM/02
  - FOR DETAILS REGARDING ROAD HUMP & OTHER SIGN BOARDS, MARKING REFER DRAWING No. OSRP/CEG/RH/RS/01
  - LONGITUDINAL GRADIENT ON MINOR ROAD SHALL NOT BE MORE THAN 3% TO MATCH THE PROPOSED SHOULDER LEVEL OF MAJOR ROAD

W = EXISTING WIDTH

TYPE - B

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :

**CONSULTING ENGINEERS GROUP LTD.**

E-12, MOJI COLONY, MALVIYA NAGAR  
JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginia.com

DESIGN REVIEW CONSULTANT :

**LEA**

LEA Associates South Asia Pvt. Ltd., India  
B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

N.T.S

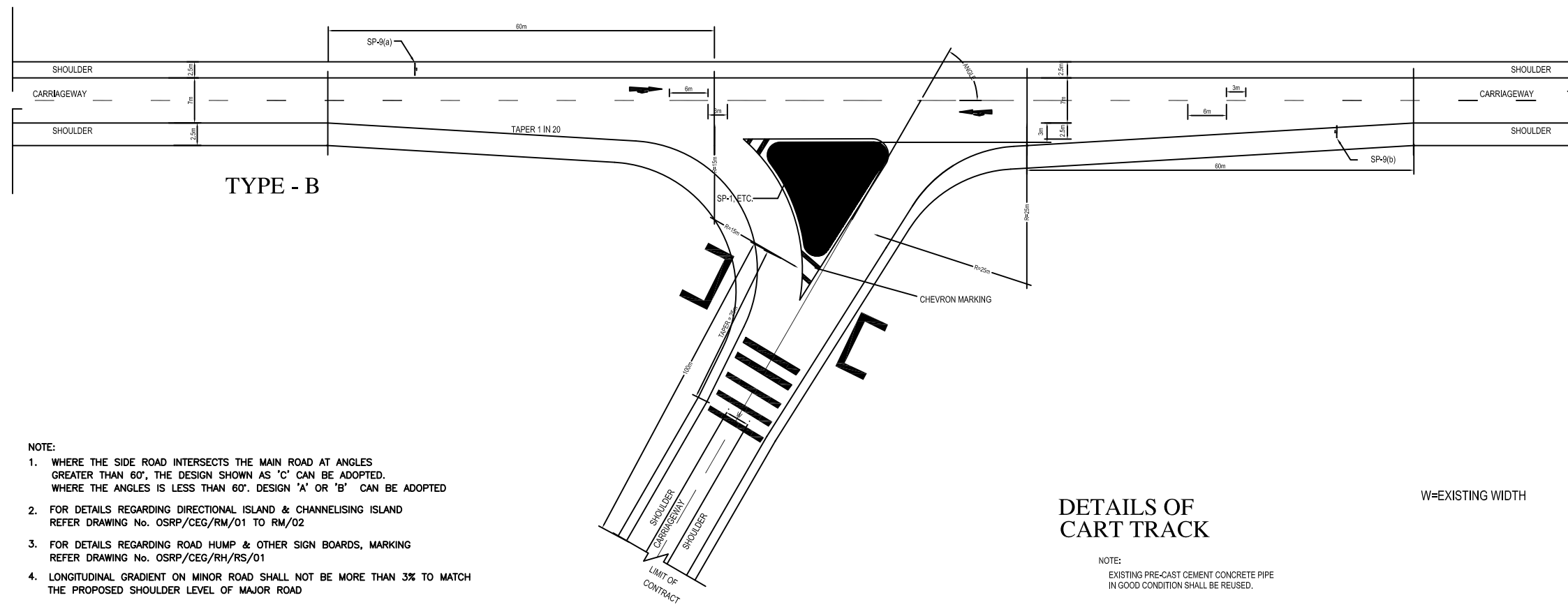
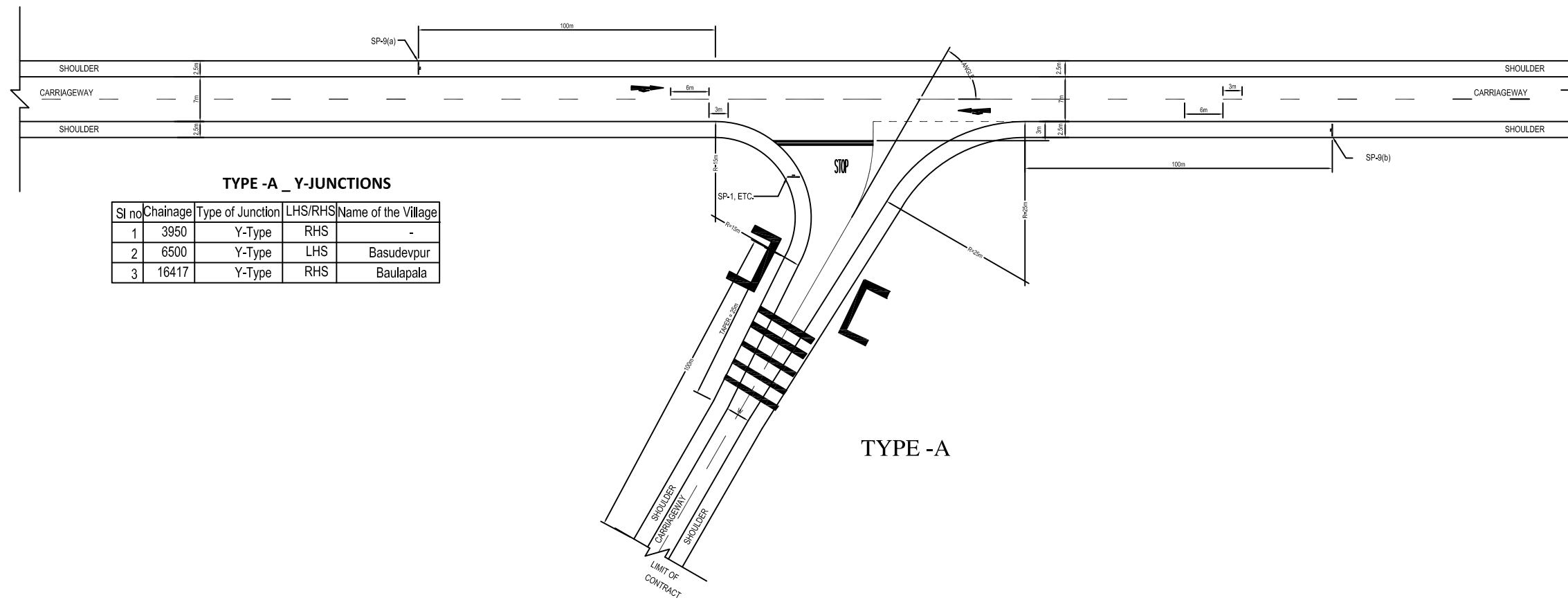
DRAWING TITLE :

**STANDARD DRAWINGS TYPICAL T-JUNCTION WITH SINGLE LANE BT ROAD**

(SHEET 2 OF 4)

DWG. NUMBER : OSRP/CEG/SH09/P02A/JN/02

REV. R2



**NOTE:**

- WHERE THE SIDE ROAD INTERSECTS THE MAIN ROAD AT ANGLES GREATER THAN 60°, THE DESIGN SHOWN AS 'C' CAN BE ADOPTED. WHERE THE ANGLES IS LESS THAN 60°. DESIGN 'A' OR 'B' CAN BE ADOPTED
- FOR DETAILS REGARDING DIRECTIONAL ISLAND & CHANNELISING ISLAND REFER DRAWING No. OSRP/CEG/RM/01 TO RM/02
- FOR DETAILS REGARDING ROAD HUMP & OTHER SIGN BOARDS, MARKING REFER DRAWING No. OSRP/CEG/RH/RS/01
- LONGITUDINAL GRADIENT ON MINOR ROAD SHALL NOT BE MORE THAN 3% TO MATCH THE PROPOSED SHOULDER LEVEL OF MAJOR ROAD

**DETAILS OF  
CART TRACK**

W=EXISTING WIDTH

NOTE:  
EXISTING PRE-CAST CEMENT CONCRETE PIPE  
IN GOOD CONDITION SHALL BE REUSED.

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
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+91-141-2520899, 2521899, 2520556 Fax:  
2521348, e-mail: ceg@ceginia.com

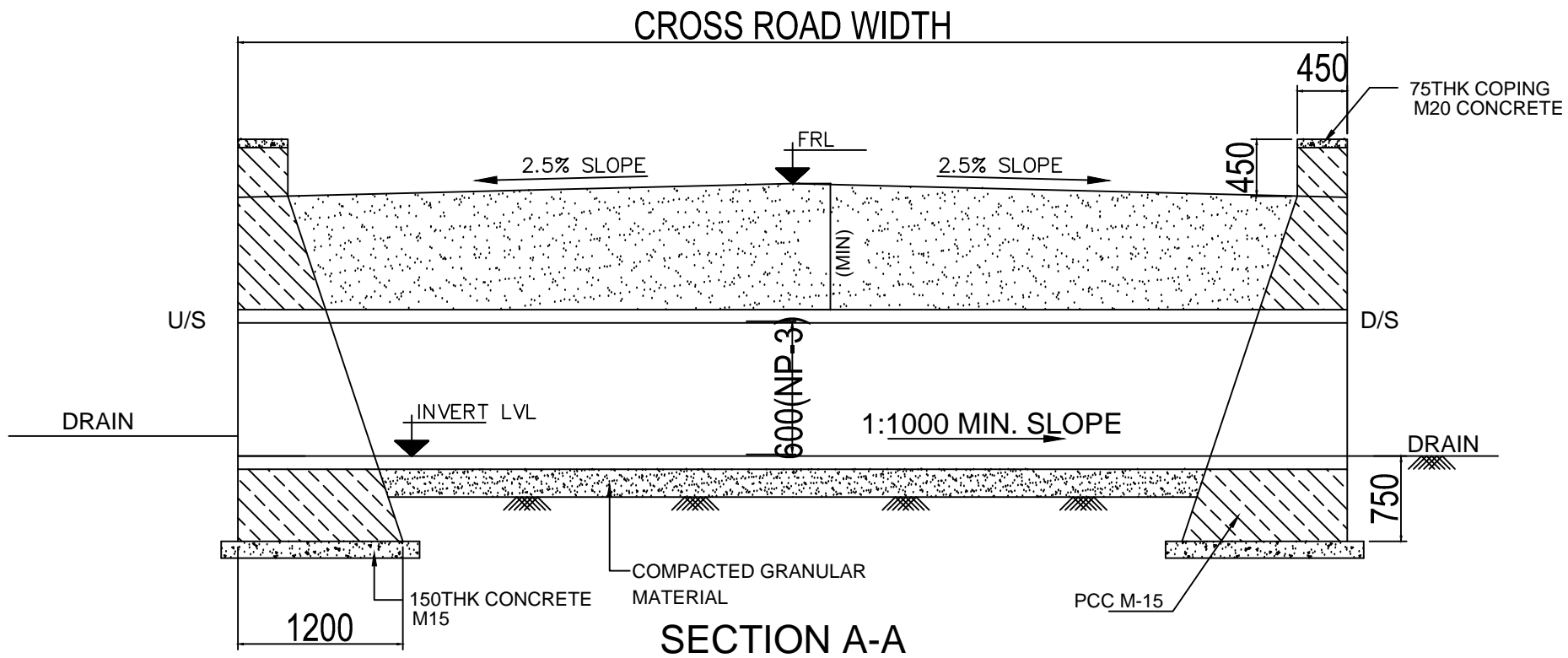
DESIGN REVIEW CONSULTANT :  
**LEA**  
LEA Associates South Asia Pvt. Ltd., India  
B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE  
INDUSTRIAL ESTATE, MATHURA ROAD, NEW  
DELHI-110044 .

CLIENT :  
**ODISHA WORKS  
DEPARTMENT**

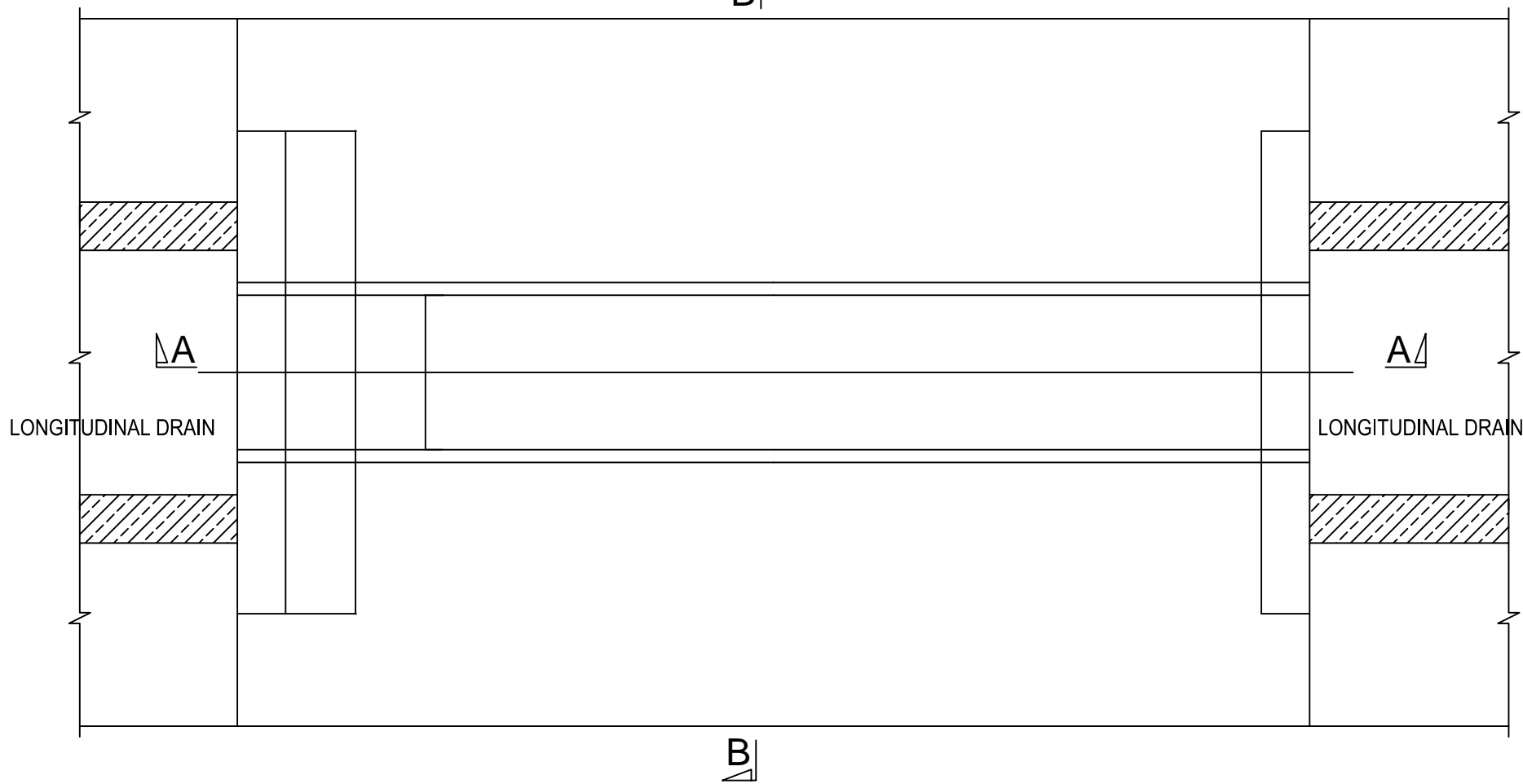
PROJECT :  
CONSTRUCTION FOR WIDENING AND STRENGTHENING  
OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM  
BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF  
SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
N.T.S

DRAWING TITLE :  
**STANDARD DRAWINGS TYPICAL Y-  
JUNCTION WITH SINGLE LANE BT  
ROAD**  
(SHEET 3 OF 4)  
DWG. NUMBER : OSRP/CEG/SH09/P02A/JN/03  
REV. R2



SECTION A-A



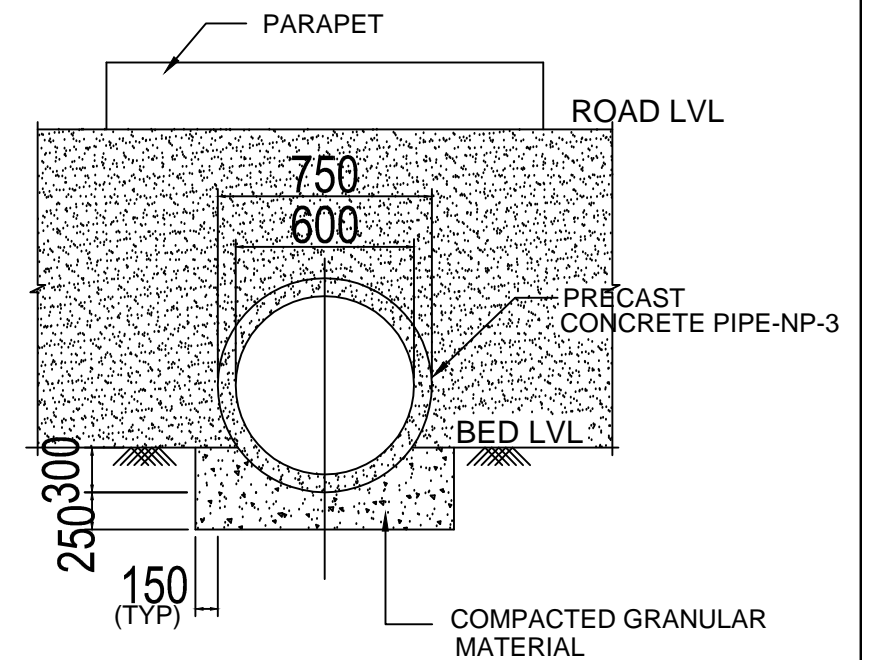
TYPICAL PLAN FOR PIPE CULVERT ON CROSS ROAD

SCHEDULE OF MINOR JUNCTIONS

| SL. NO. | CHAINAGE | TYPE OF JUNCTION | SIDE |
|---------|----------|------------------|------|
| 1       | 3950     | Y-TYPE           | RHS  |
| 2       | 12235    | T-TYPE           | LHS  |
| 3       | 16417    | Y-TYPE           | RHS  |
| 4       | 17668    | T-TYPE           | RHS  |
| 5       | 18425    | T-TYPE           | RHS  |
| 6       | 19376    | T-TYPE           | RHS  |
| 7       | 21420    | T-TYPE           | LHS  |
| 8       | 21990    | T-TYPE           | LHS  |
| 9       | 23252    | T-TYPE           | LHS  |
| 10      | 24600    | Cross Junction   | BOTH |

SCHEDULE OF MAJOR JUNCTIONS

| Sl no | Chainage | Type of Junction | Direction | Nos. |
|-------|----------|------------------|-----------|------|
| 1     | 0+000    | Major-Jn         |           | 01   |



SECTION B-B

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
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DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

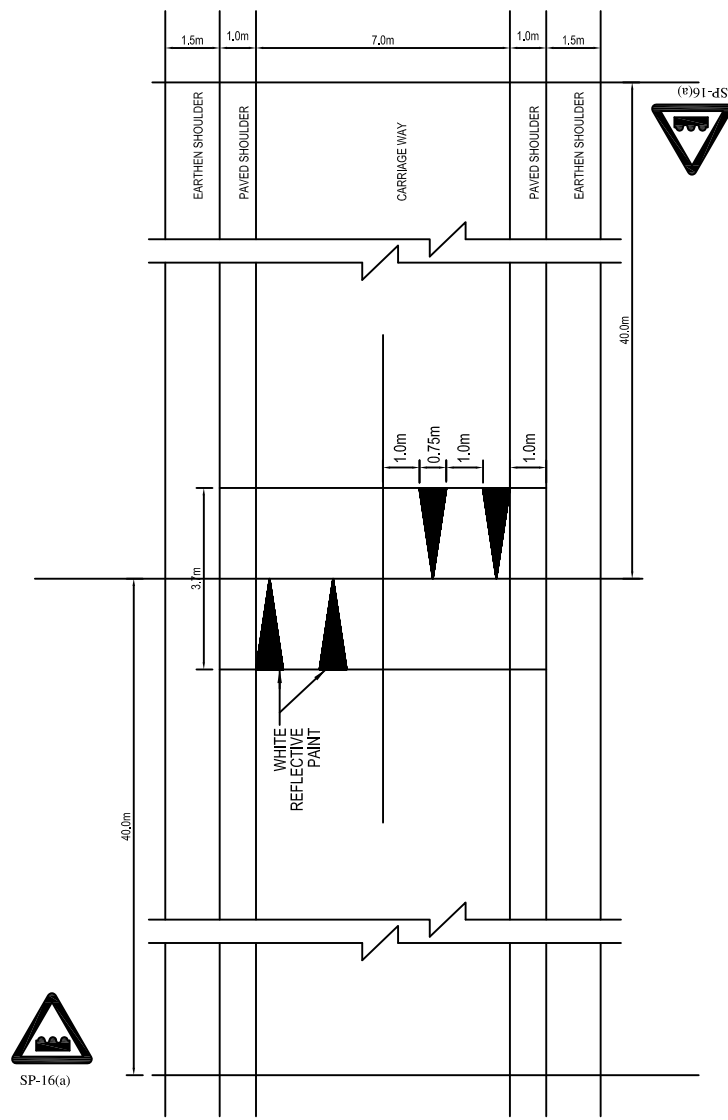
CLIENT :  
  
 ODISHA WORKS DEPARTMENT

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

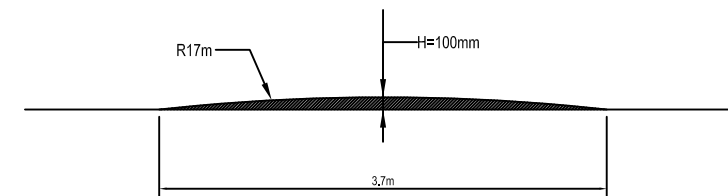
SCALE :  
 N.T.S

DRAWING TITLE :  
 STANDARD DRAWINGS TYPICAL - CROSS DRAIN ROAD SINGLE LANE BT ROAD/EARTHEN ROAD (SHEET 4 OF 4)  
 DWG. NUMBER : OSRP/CEG/SH09/P02A/CD-JN REV. R2

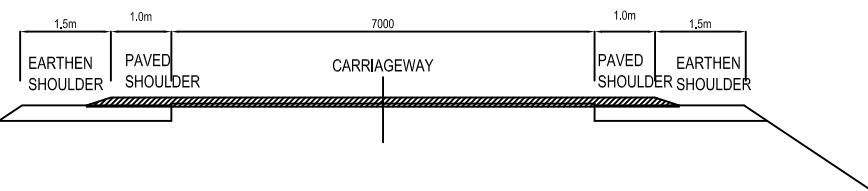




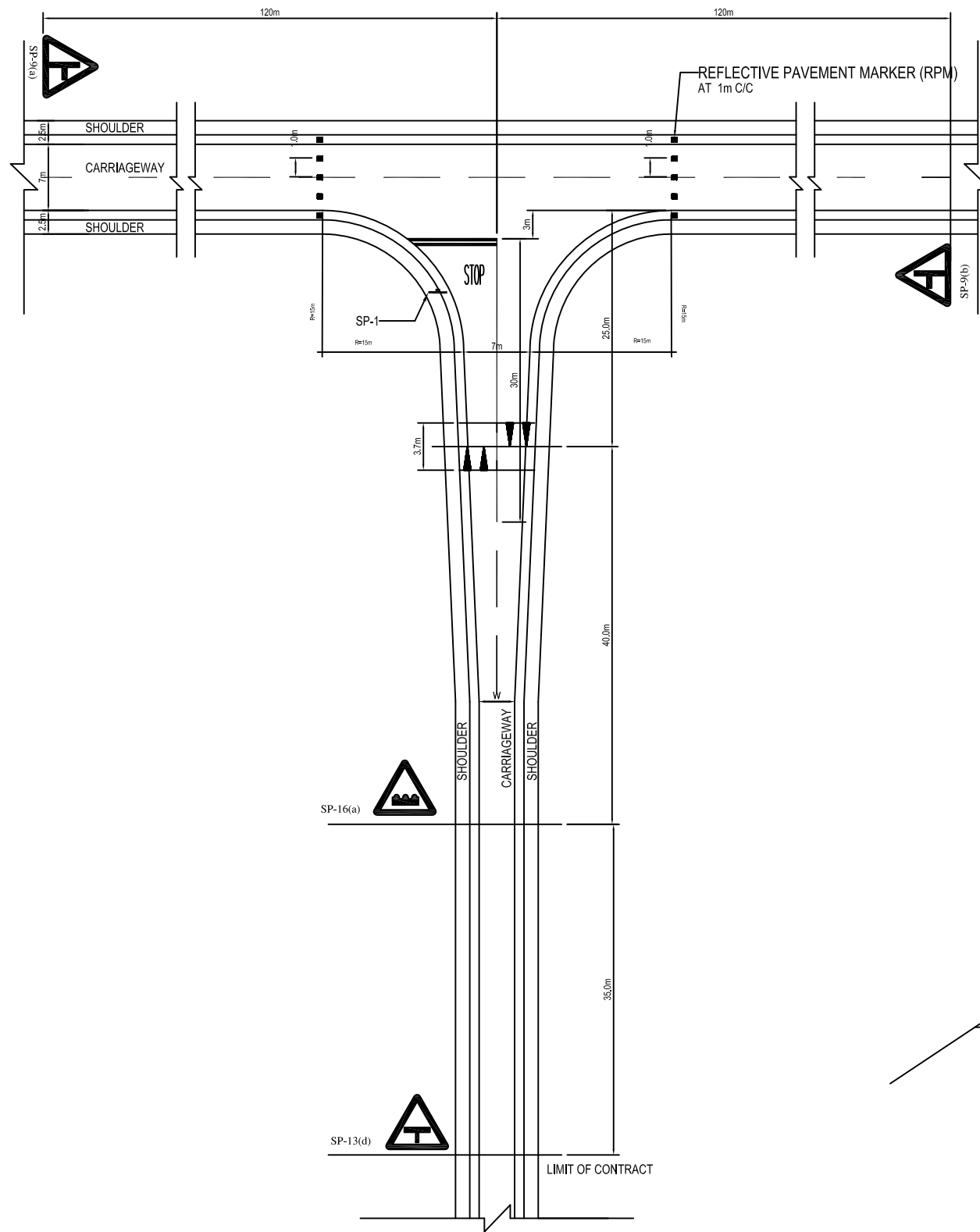
DETAILS OF ROAD HUMPS



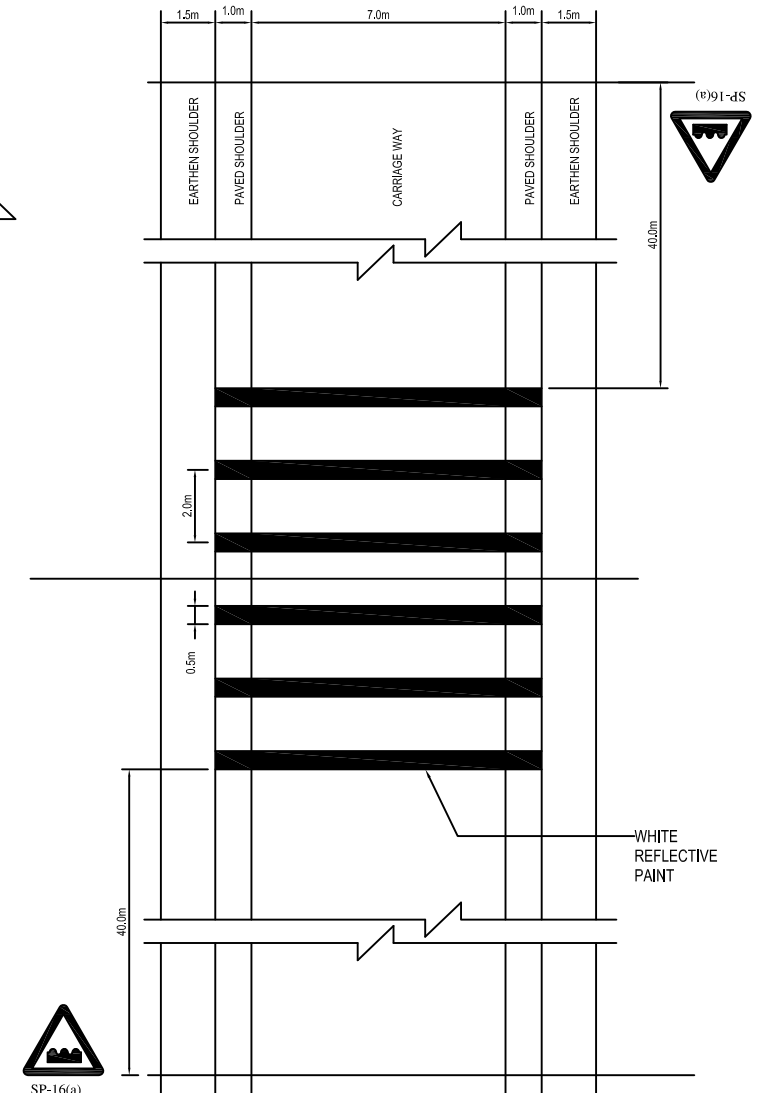
LONGITUDINAL SECTION



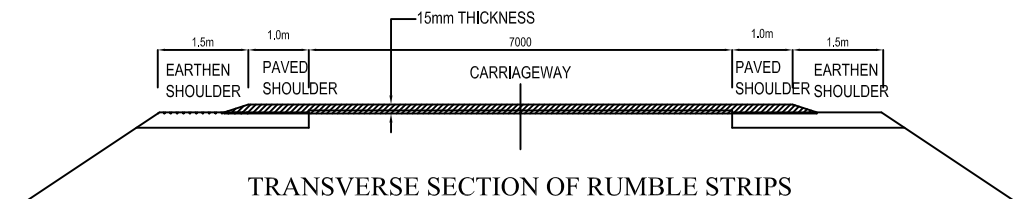
TRANSVERSE SECTION OF ROAD HUMPS



LOCATION OF ROADHUMP AT MINORROAD INTERSECTIONS



DETAILS OF RUMBLE STRIPS



TRANSVERSE SECTION OF RUMBLE STRIPS

NOTES:-

1. THE DESIGN OF ROAD HUMPS IS IN ACCORDANCE WITH IRC: 99-1988 GUIDE LINES.
2. ROAD HUMPS IS PROPOSED AT UNCONTROLLED INTERSECTIONS OF MINOR ROADS WITH MAJOR ROADS ON THE MINOR ARMS.
3. THE WARNING SIGNS SHOULD BE OF THE DESIGN 'HUMP OR ROUGH ROAD' DETAILED IN IRC: 67-2001 SHOULD BE INSTALLED AT SPECIFIED DISTANCE AHEAD OF RUMBLE STRIP/ ROAD HUMPS AS GIVEN IN DWG No. OSRP/CEG/RS/01 TO 03
4. REFLECTIVE PAINT SHALL BE HOT APPLIED THERMOPLASTIC MATERIAL CONFORMING TO M.O.R.T & H SPEC. CL.803.4
5. RUMBLE STRIPS ARE PROVIDED ON ALL SHARP CURVES WITH RADIUS LESS THAN 170m AND AT VILLAGE AND URBAN APPROACHES.
6. HEIGHT OF RUMBLE STRIP IS 15mm
7. MATERIAL OF CONSTRUCTION FOR RUMBLE STRIP IS OPEN GRADED PREMIX BITUMINOUS SURFACING (TYPE-B) AS PER TECH.SPEC. CL 512
8. MATERIAL OF CONSTRUCTION FOR ROAD HUMPS IS BITUMINOUS CONCRETE AS PER TECH.SPEC. CL 509
9. REFLECTIVE PAVEMENT MARKERS ARE PROVIDED AS SHOWN IN DRAWING No. OSRP/CEG/RPM BEFORE AND AFTER RUMBLE STRIPS/ROAD HUMPS.

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

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DESIGN REVIEW CONSULTANT :

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CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

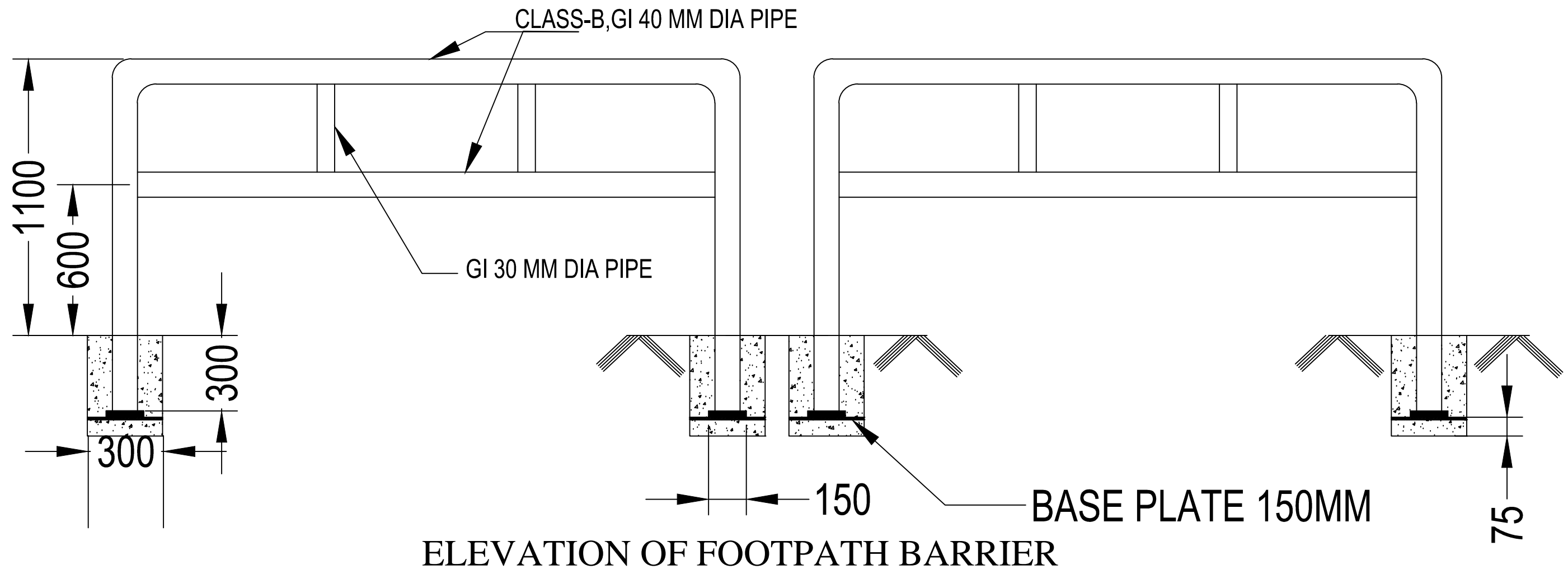
N.T.S

DRAWING TITLE :

**STANDARD DRAWINGS DETAILS OF ROAD HUMPS AND RUMBLE STRIPS**

(SHEET 1 OF 1)

DWG. NUMBER : OSRP/CEG/SH09/P02A/ RH & RS REV. R2



**NOTES:-**

1. LENGTH OF FOOTPATH BARRIER AT EACH BUSBAY SHALL BE 15 M(MIN.).
2. TOTAL LENGTH OF FOOTPATH BARRIER AT BUITUP/VILLAGE AREA SHALL BE 3498 M.
3. THE LOCATION OF FOOTPATH BARRIER AT BULITUP/VILLAGE AREA SHALL BE FINALIZED IN CONSULTATION WITH THE ENGINEER PRIOR TO START OF EXECUTION.

|     |           |                 |      |             |                 |                                  |
|-----|-----------|-----------------|------|-------------|-----------------|----------------------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE)                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                                  |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED: APPROVED:               |

DPR CONSULTANT :  
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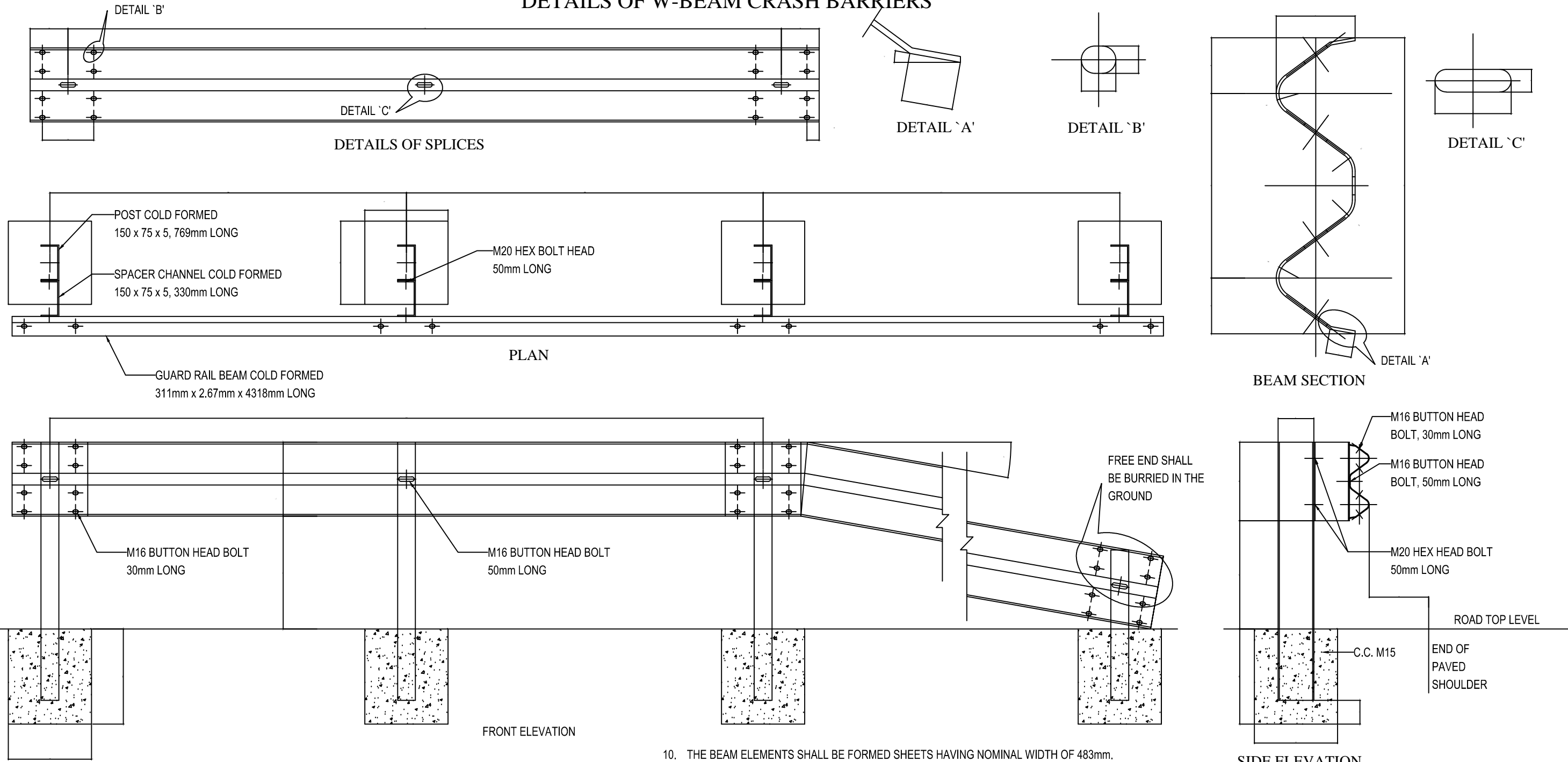
CLIENT :  
  
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PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

DRAWING TITLE :  
 STANDARD DRAWINGS DETAILS OF FOOTPATH BARRIERS  
 (SHEET 1 OF 1)  
 DWG. NUMBER : OSRP/CEG/SH09/P02A/ FB  
 REV. R2

# DETAILS OF W-BEAM CRASH BARRIERS



**NOTE:**

1. HEIGHT OF POSTS SHOULD BE 785mm LONG ABOVE THE FINISHED ROAD LEVEL.
2. SPACING OF POSTS SHOULD BE 2.0m C/C.
3. 1 No. SPACER CHANNEL SHOULD BE PLACED AT EACH POST.
4. W-PROFILE FORMED CORRUGATED BEAMS (EFFECTIVE LENGTH OF 4318mm), 311mm x 83mm.
5. POST CONSISTS OF FORMED CHANNEL OF SIZE 150 x 75 x 5, 785mm LONG ABOVE GROUND LVL.
6. SPACER CONSISTS OF FORMED CHANNEL OF SIZE 150 x 75 x 5, 330mm LONG.
7. BUTTON HEAD BOLTS M16 x 30mm LONG, 8 Nos FOR THE SPLICING OF THE W PROFILE AT EACH LOCATION.
8. BUTTON HEAD BOLTS M16 x 50mm LONG, 1 Nos AT THE CONNECTION OF THE W BEAM TO SPACER.
9. HEX HEAD BOLTS M20 x 50mm LONG, 2 Nos AT THE CONNECTION OF THE SPACER TO POST.

10. THE BEAM ELEMENTS SHALL BE FORMED SHEETS HAVING NOMINAL WIDTH OF 483mm.
11. THE BASE MATERIAL OF THE CORRUGATED BEAM SHALL COMPLY TO FOLLOWING MECHANICAL PROPERTIES:-
  - I. TENSILE STRENGTH, MIN=483 MPA.
  - II. ELONGATION, in 2 inches, MIN = 12%
  - III. YIELD, MIN=345 MPA.
12. ALL MEMBERS OF THE SYSTEM SHOULD BE HOT DIPPED GALVANIZED AND TO HAVE A MINIMUM COATING OF 550g/Sq m, EACH FACE IN CONFORMANCE TO M.O.R.T & H. SPECIFICATIONS (CLAUSE 810).
13. BEAMS TO BE ERECTED ON A RADIUS OF 46m (150') OR LESS SHALL BE SHAPE CURVED TO APPROPRIATE CURVATURE.
14. CRASH BARRIERS ARE POSTED ON ALL SECTION OF EMBANKMENT WHOSE HEIGHT IS >= TO 3m, HORIZONTAL CURVES OF RADIUS < 170m AND ALSO AT ALL BRIDGE APPROACHES FOR LENGTH OF 20m ON BOTH SIDES.
15. BEAM SURFACE FACING THE TRAFFIC IS PAINTED WITH ALTERNATE BANDS (500mm WIDE) OF BLACK & YELLOW COLOR REFLECTORIED PAINT CONFORMING CL.803.5 OF M.O.R.T & H SPEC.

**SCHEDULE :**

THE LOCATION OF THE METAL BEAM CRASH BARRIER ARE TENTATIVE ONLY. THE EXACT LOCATION SHALL BE FINALIZED IN CONSULTATION WITH THE ENGINEER PRIOR TO START OF EXECUTION.

|     |           |                 |      |             |                 |                    |
|-----|-----------|-----------------|------|-------------|-----------------|--------------------|
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| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE)    |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 | N.K PRADHAN (CE)   |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED: APPROVED: |

DPR CONSULTANT :

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SCALE :

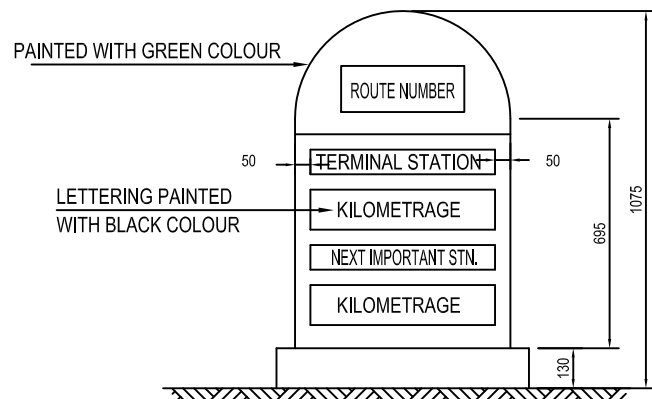
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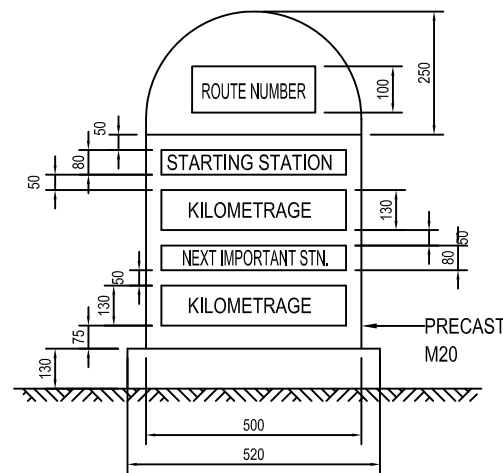
**STANDARD DRAWINGS METAL BEAM CRASH BARRIER DETAILS**

(SHEET 1 OF 1)

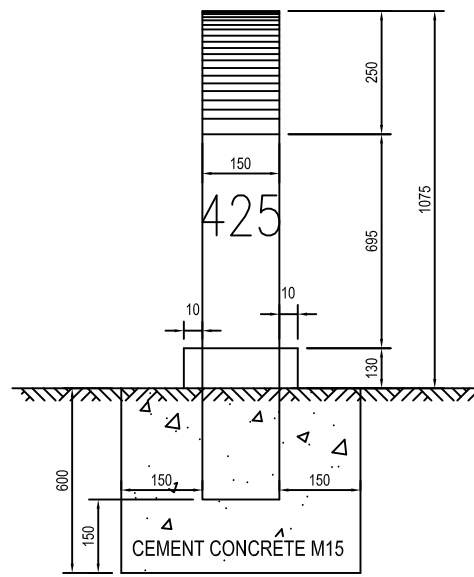
DWG. NUMBER : OSRP/CEG/SH09/P02A/ CB      REV. R2



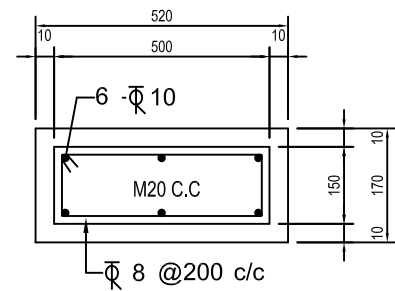
FACE 1



FACE 2

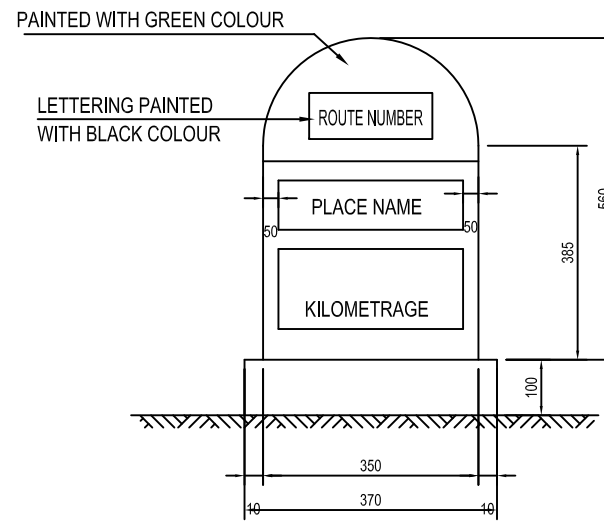


SIDE ELEVATION

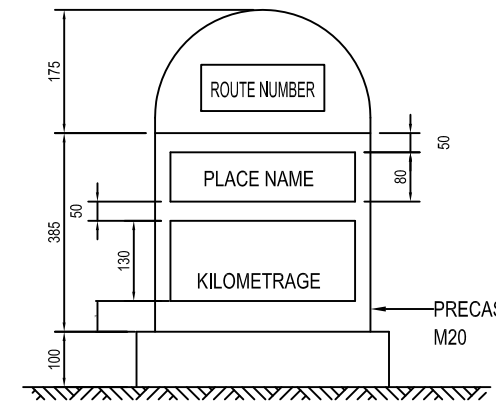


SECTIONAL PLAN

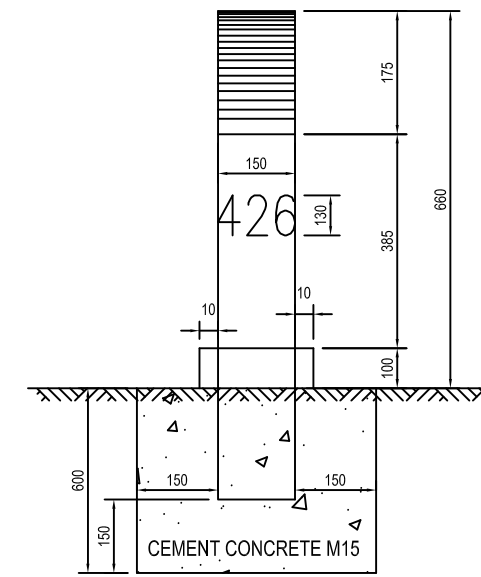
### TYPICAL DESIGN FOR THE 5TH KILOMETRE STONE



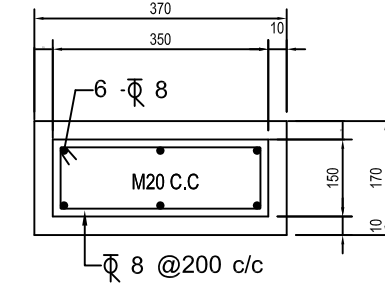
FACE 1



FACE 2



SIDE ELEVATION



SECTIONAL PLAN

### TYPICAL DESIGN FOR ORDINARY KILOMETRE STONE

| INDEX FOR KILOMETRE STONES             |                           |   |
|--|---------------------------|---|
| Km No.                                 | SCRIPT FOR PLACE NAMES    | PLACE TO BE SHOWN                                 |
| 0                                      | ROMAN                     | TERMINAL/STARTING STATION AND NEXT IMPORTANT TOWN |
| 1                                      | HINDI (DEVANAGARI SCRIPT) | NEXT IMPORTANT TOWN                               |
| 2                                      | LOCAL LANGUAGE (ORIYA)    | NEXT IMPORTANT TOWN                               |
| 3                                      | HINDI (DEVANAGARI SCRIPT) | TERMINAL / STARTING STATION                       |
| 4                                      | LOCAL LANGUAGE (ORIYA)    | TERMINAL / STARTING STATION                       |
| 5                                      | ROMAN                     | TERMINAL/STARTING STATION AND NEXT IMPORTANT TOWN |
| 6                                      | HINDI (DEVANAGARI SCRIPT) | NEXT IMPORTANT TOWN                               |
| .....TO BE REPEATED IN THE SAME ORDER. |                           |   |

#### NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFLECTORISED PAINT SHALL BE IN ACCORDANCE WITH CL.803.5 OF M.O.R.T & H SPEC.
3. FOR TYPE & STYLE SIZE OF LETTERING RELEVANT IRC CODE OF PRATICE SHALL BE REFERED.
4. LETTERING IS DONE WITH APPROVED QUALITY BLACK ENAMEL PAINT USING STENCIL

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CEG**  
 CONSULTING ENGINEERS GROUP LTD.  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044

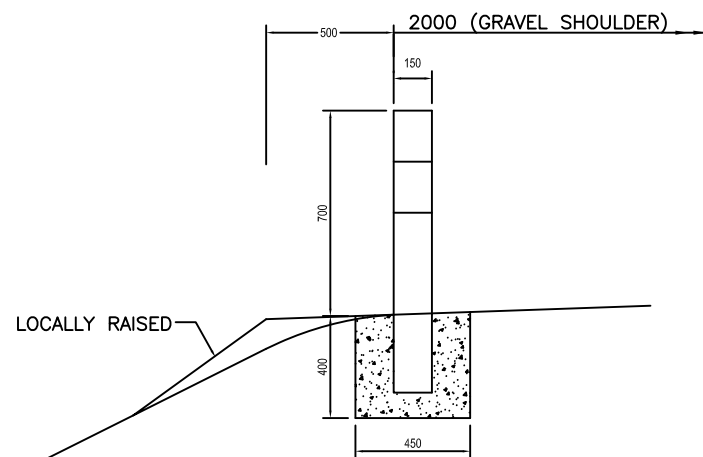
CLIENT :  
  
 ODISHA WORKS DEPARTMENT

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

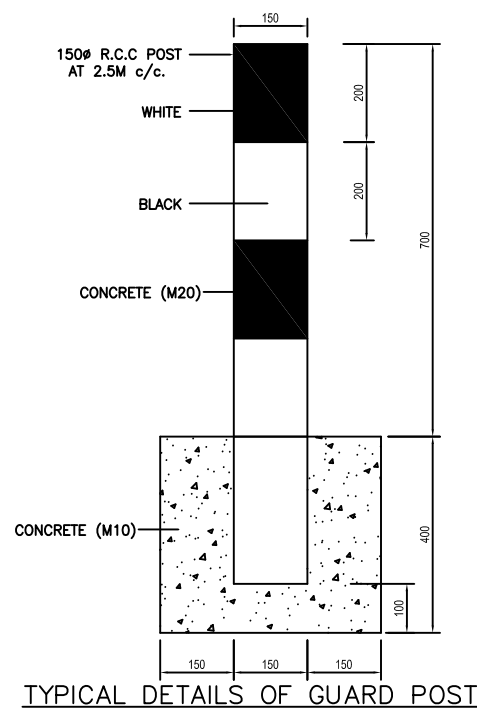
SCALE :  
 N.T.S

DRAWING TITLE :  
 STANDARD DRAWINGS TYPICAL KM STONE & 5TH KM STONE  
 (SHEET 1 OF 1)  
 DWG. NUMBER : OSRP/CEG/SH09/P02A/ KM/01  
 REV. R2

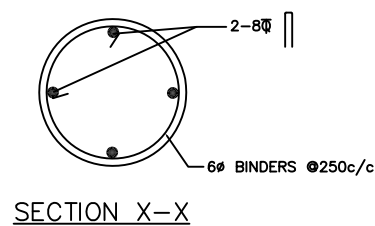




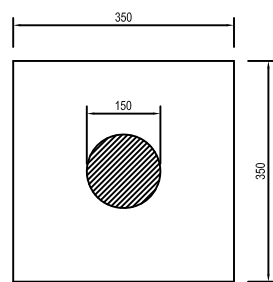
FIXING DETAILS OF GUARD POST



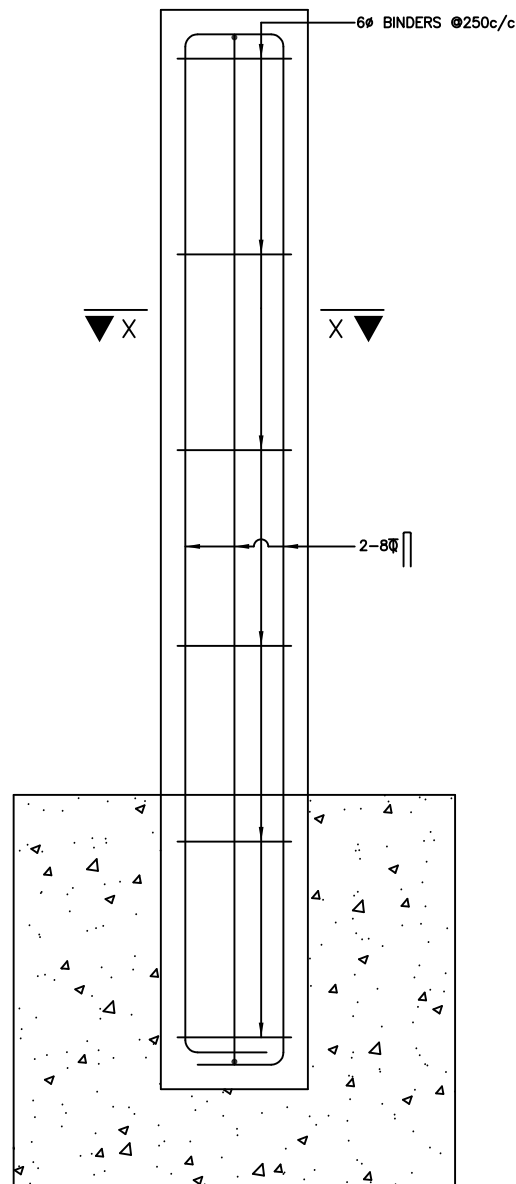
TYPICAL DETAILS OF GUARD POST



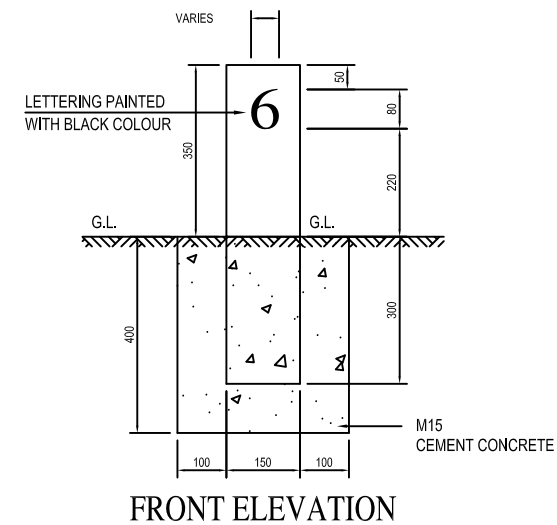
SECTION X-X



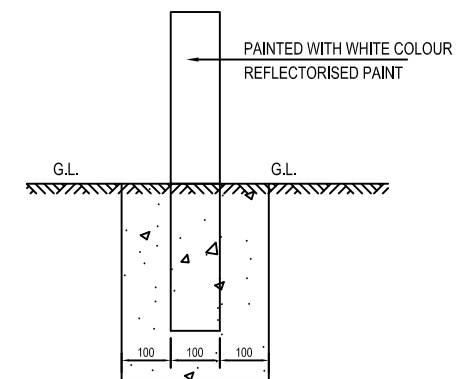
PLAN OF GUARD POST



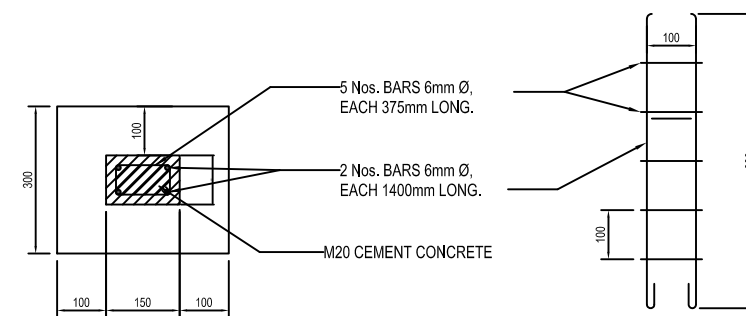
REINFORCEMENT DETAIL OF GUARD POST



FRONT ELEVATION



SIDE VIEW



SCHEDULE OF REINFORCEMENT

PLAN

## TYPICAL DESIGN FOR 200m STONES

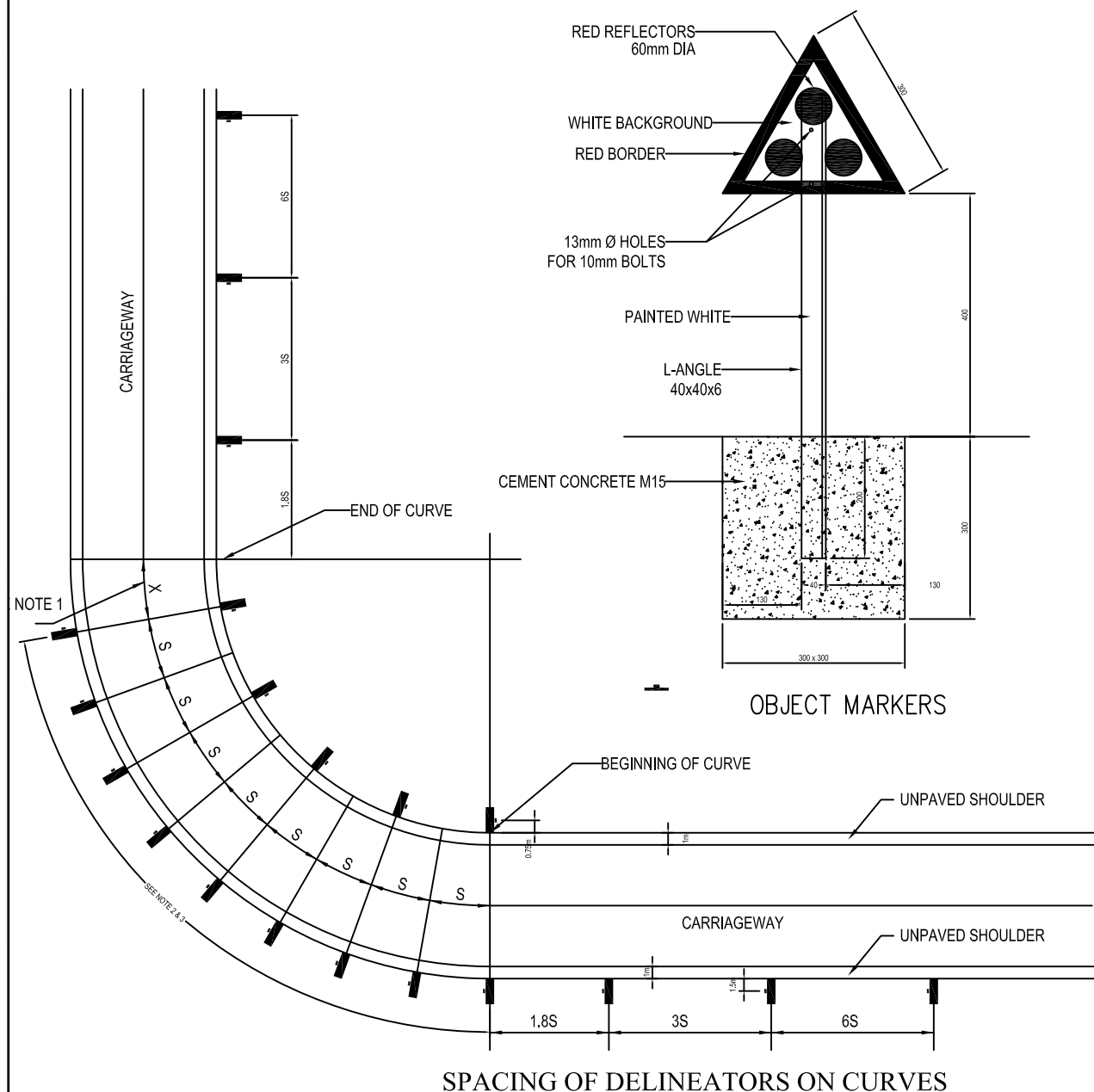
### NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES.
2. REFLECTORISED PAINT SHALL BE IN ACCORDANCE WITH CL.803.5 OF M.O.R.T & H SPEC.
3. FOR TYPE & STYLE SIZE OF LETTERING RELEVANT IRC CODE OF PRATICE SHALL BE REFERED.
4. LETTERING IS DONE WITH APPROVED QUALITY BLACK ENAMEL PAINT USING STENCIL

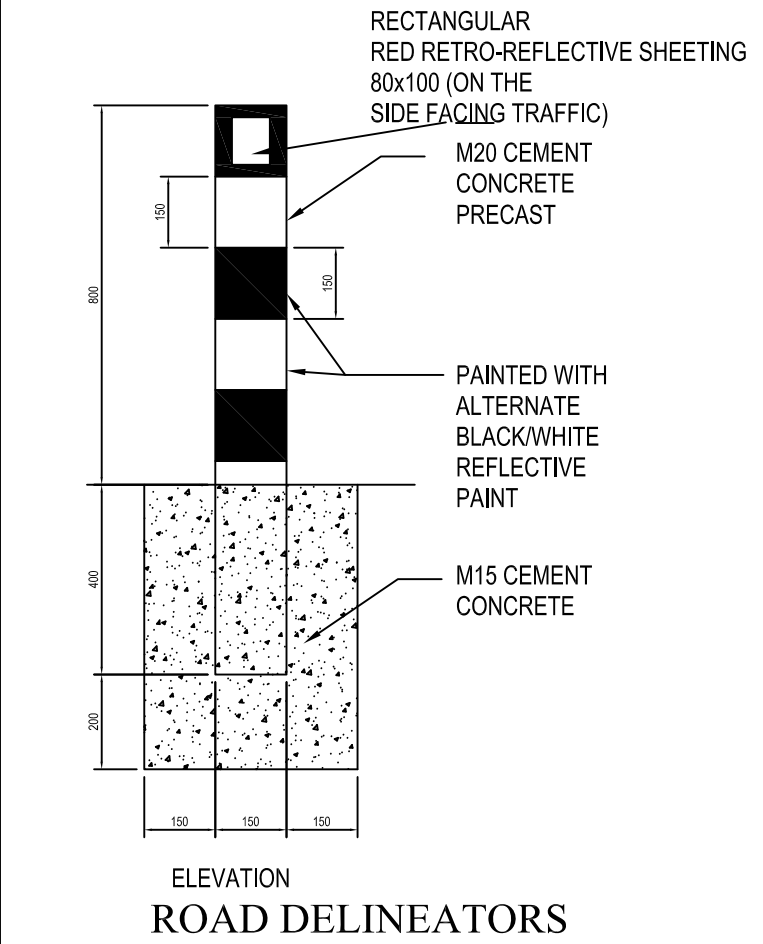
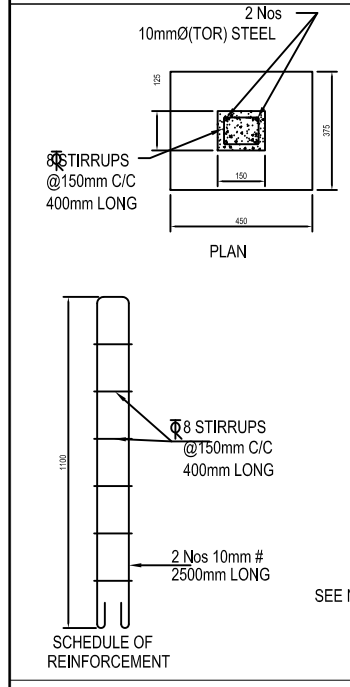
### NOTES:

1. ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE MENTIONED.
2. R.C.C. GUARD POSTS IS INSTALLED WHERE EMBANKMENT HEIGHT IS GREATER THAN 3 M AT OTHER HAZARD LOCATIONS.
3. FOR SCHEDULE REFER DRAWING NO. OSRP/CEG/SH9A&SH-9/SCH-GP

|  |           |                 |      |              |                 |                 |  |   |  |   |    |  |  |                  |  |   |  |
|--|-----------|-----------------|------|--------------|-----------------|-----------------|--|---|--|---|----|--|--|------------------|--|---|--|
| DPR CONSULTANT :<br><b>CEG</b><br>CONSULTING ENGINEERS GROUP LTD.<br>E-12, MOJI COLONY, MALVIYA NAGAR<br>JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com |           |                 |      |              |                 |                 | DESIGN REVIEW CONSULTANT :<br><b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India<br>B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . |   |  | CLIENT :<br><br>ODISHA WORKS DEPARTMENT |    | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A |  | SCALE :<br>N.T.S |  | DRAWING TITLE :<br>STANDARD DRAWINGS TYPICAL DETAILS OF 200M STONE & GUARD POST<br>(SHEET 1 OF 1) |  |
| NO.  | DATE      | REVISION        | BY   | DRAWN:       | PREPARED :      | CHECKED:        | APPROVED:  | DWG. NUMBER : OSRP/CEG/SH09/P02A/ KM & GP |  | REV.                                    | R2 |  |  |                  |  |   |  |
| R2   | SEP-2015  | SECOND REVISION | LASA | RAJUJ MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |  |   |  |   |    |  |  |                  |  |   |  |
| R1   | JAN-2013  | FIRST REVISION  | OWD  | VINAY        | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE)   |   |  |   |    |  |  |                  |  |   |  |
| -  | JUNE 2008 | ORIGINAL        | CEG  |              |                 |                 |  |   |  |   |    |  |  |                  |  |   |  |



SPACING OF DELINEATORS ON CURVES



ELEVATION ROAD DELINEATORS

| SL. No. | RADIUS OF CURVE (METRES) | SPACING ON CURVE, S (METRES) |
|---------|--------------------------|------------------------------|
| 1       | 30                       | 6                            |
| 2       | 50                       | 8                            |
| 3       | 100                      | 12                           |
| 4       | 200                      | 20                           |
| 5       | 300                      | 25                           |
| 6       | 400                      | 30                           |
| 7       | 500                      | 35                           |
| 8       | 600                      | 38                           |
| 9       | 700                      | 42                           |
| 10      | 800                      | 45                           |
| 11      | 900                      | 48                           |
| 12      | 1000                     | 50                           |

SCHEDULE OF ROAD DELINEATORS AT CURVES UPTO 1000m

| ARC        |            | RADIUS | ARC LENGTH | SPACING | TOTAL |
|------------|------------|--------|------------|---------|-------|
| START      | END        |        |            |         |       |
| 1+815.441  | 1+881.008  | 500    | 729.189    | 35      | 37    |
| 2+981.056  | 3+099.208  | 300    | 935.048    | 25      | 62    |
| 3+331.928  | 3+692.134  | 400    | 97.72      | 30      | 11    |
| 5+177.487  | 5+282.789  | 800    | 318.659    | 45      | 17    |
| 5+704.254  | 5+737.754  | 155    | 296.465    | 15      | 36    |
| 6+462.920  | 6+530.241  | 155    | 271.01     | 15      | 33    |
| 8+132.595  | 8+192.353  | 600    | 527.376    | 30      | 32    |
| 8+328.670  | 8+394.354  | 600    | 46.317     | 30      | 8     |
| 8+922.135  | 8+986.401  | 240    | 392.782    | 20      | 35    |
| 9+323.140  | 9+389.427  | 500    | 196.739    | 35      | 14    |
| 9+915.435  | 10+056.917 | 200    | 416.008    | 20      | 37    |
| 11+071.438 | 11+233.795 | 400    | 463.107    | 30      | 29    |
| 11+564.245 | 11+677.166 | 240    | 120.451    | 20      | 15    |
| 12+307.623 | 12+501.274 | 775    | 540.457    | 42      | 25    |
| 12+511.100 | 12+916.206 | 775    | 9.827      | 42      | 6     |
| 13+113.677 | 13+174.092 | 500    | 147.472    | 35      | 12    |
| 14+184.015 | 14+273.102 | 800    | 421.361    | 45      | 20    |
| 17+092.392 | 17+178.039 | 500    | 160.011    | 30      | 14    |
| 23+662.339 | 23+748.892 | 500    | 328.431    | 30      | 22    |
| 26+809.852 | 26+934.992 | 800    | 830.384    | 45      | 34    |

NOTE:

- ROAD DELINEATORS SHALL BE PROVIDED AS PER THE GUIDELINES IN IRC:79-1981
- FOR THE DETAILS OF ROAD DELINEATORS REFER DWG NO OSRP/CEG/RD

- NOTES:
- ALL DIMENSIONS ARE IN mm UNLESS OTHERWISE SPECIFIED.
  - ADJUST DISTANCE 'X' SUITABLY SO THAT THE LAST ROADWAY DELINEATOR IS AT THE END OF THE CURVE.
  - INSTALL ALL DELINEATORS AT EDGE AS SHOWN IN THE DRAWING PERPENDICULAR TO THE ONCOMING TRAFFIC. SEE TABLE FOR VALUE OF 'S' i.e. SPACING OF DELINEATORS ON THE CURVE.
  - ON STRAIGHT SECTIONS DELINEATORS SHOULD BE SPACED UNIFORMLY 50m FROM EACH OTHER, THE POSTS BEING IN PAIRS, ONE ON EACH SIDE OF THE ROADWAY.
  - LOCATIONS OF OBJECT MARKERS
    - TRAFFIC ISLANDS AT APPROACHES TO INTERSECTIONS
    - MEDIAN OPENINGS
    - ON MEDIANS & ISLANDS ON FAR SIDE OF THE INTERSECTIONS
    - FACING APPROACHING TRAFFIC AT ISLANDS FORMING LEFT INFILTRATION LANES
  - OBJECT MARKERS SHOULD BE SET BACK FROM THE FACE OF THE KERB A DISTANCE OF ATLEAST 500mm
  - REQUIREMENT OF REFLECTORS SHALL BE IN ACCORDANCE WITH IRC:79-1981 CODE OF PRACTICE.
  - ON EMBANKMENTS WITH HEIGHT MORE THAN 2m CLEAR SPACING OF DELINEATORS SHALL BE 25m.
  - DELINEATORS ARE NOT PROVIDED AT LOCATIONS WHERE CHEVRON SIGN BOARDS ARE PROPOSED
  - GAURD POSTS ARE PROVIDED ON EMBANKMENTS OF HEIGHT >2m AND <3m AT 5m INTERVAL
  - DELINEATORS ARE PROVIDED BEFORE AND AFTER PARAPET WALL ON BOTH SIDES AT ALL BRIDGE LOCATIONS AND ALSO AT CULVERT LOCATIONS WHOSE WIDTH IS LESS THAN 12m AND MORE THAN 10m.
  - REFLECTIVE PAINT SHALL BE IN ACCORDANCE WITH CL803.5 OF M.O.R.T & H SPEC.

| NO. | DATE      | REVISION        | BY   | DRAWN:       | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|--------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJUJ MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
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| -   | JUNE 2008 | ORIGINAL        | CEG  |              |                 |                 |                  |

DPR CONSULTANT :

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DESIGN REVIEW CONSULTANT :

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PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

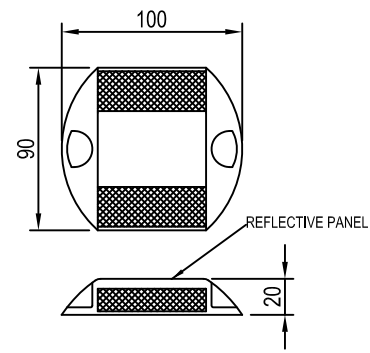
N.T.S

DRAWING TITLE :

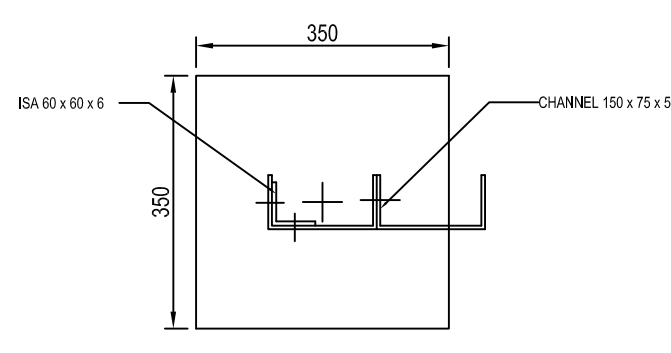
**STANDARD DRAWINGS DETAILS OF ROAD DELINEATORS**

(SHEET 1 OF 1)

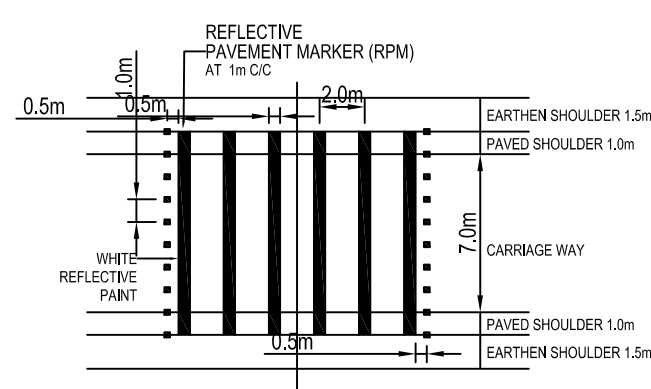
DWG. NUMBER : OSRP/CEG/SH09/P02A/ RD REV. R2



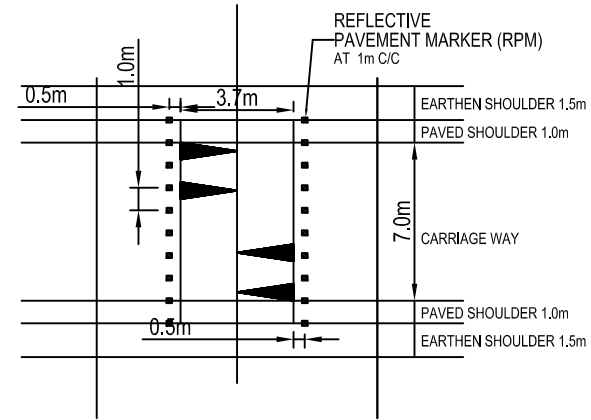
REFLECTIVE PAVEMENT MARKERS (RPM)



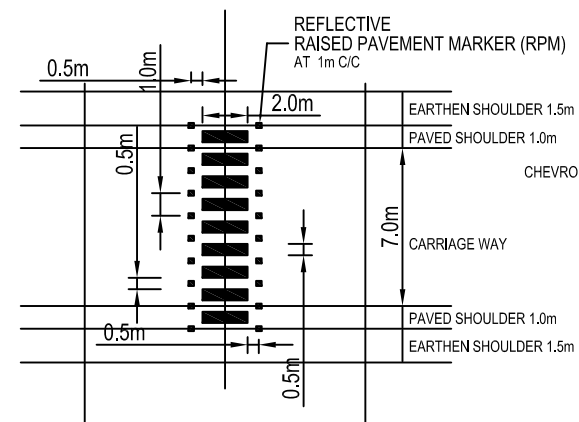
SECTION 'A-A'



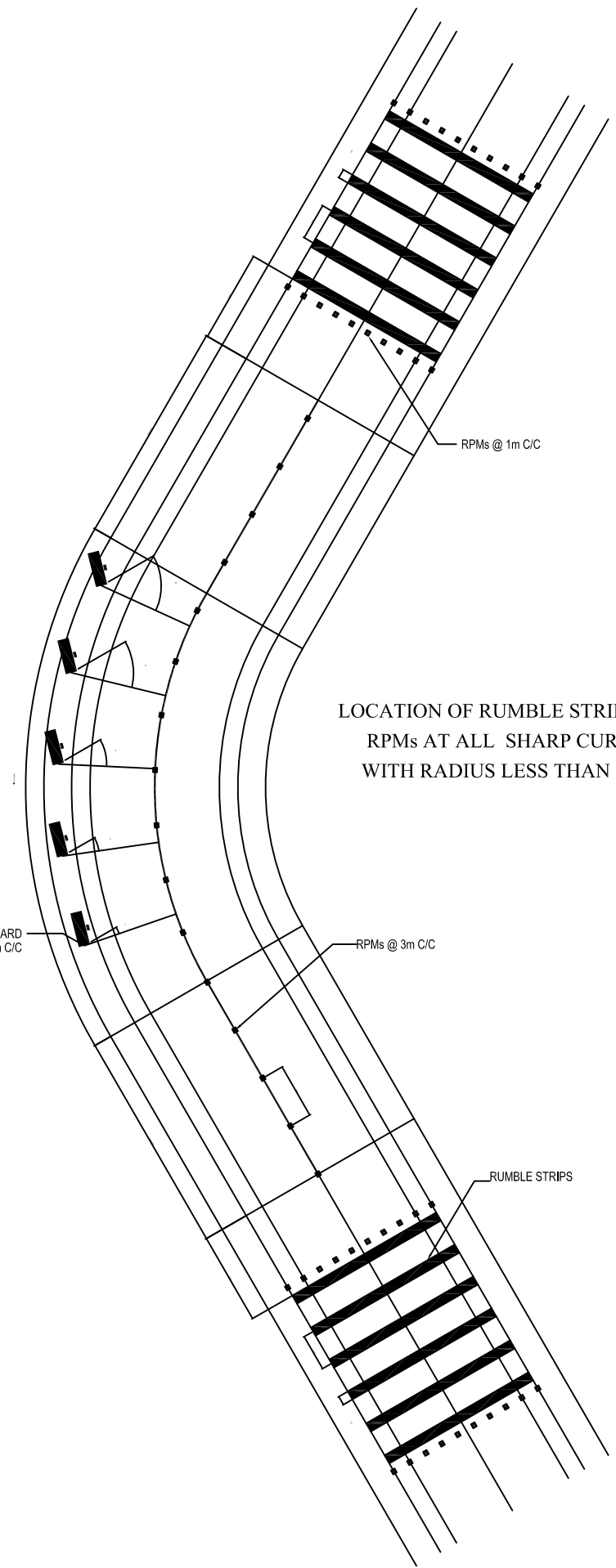
LOCATION OF RPM BEFORE RUMBLE STRIPS



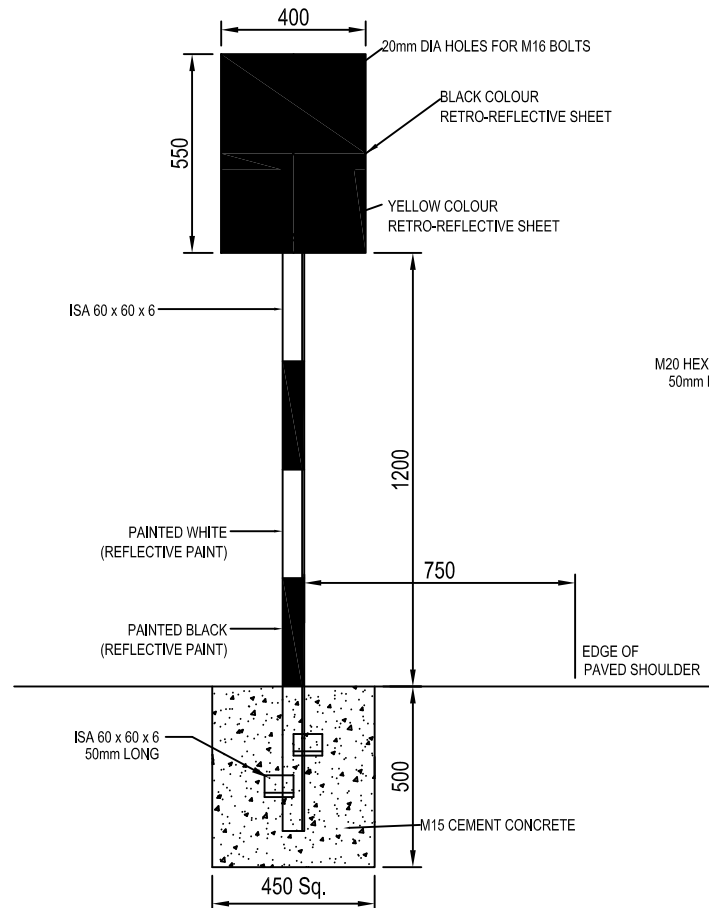
LOCATION OF RPM BEFORE ROAD HUMP



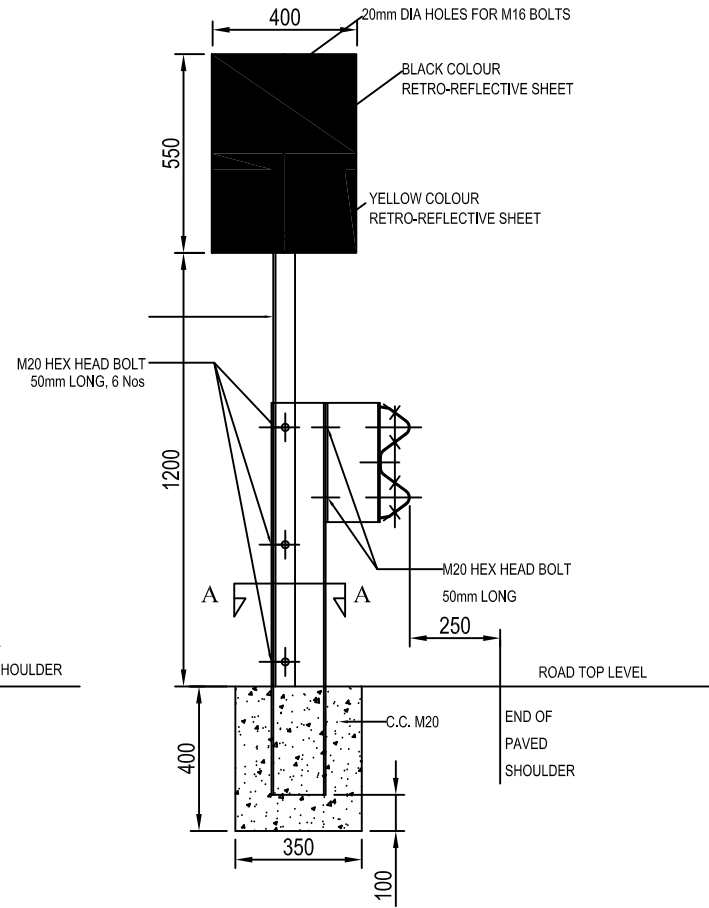
LOCATION OF RPM BEFORE PEDESTRIAN CROSSING



LOCATION OF RUMBLE STRIPS AND RPMs AT ALL SHARP CURVES WITH RADIUS LESS THAN 170m



(FOR CURVES > 170m & < 200m RADIUS) CHEVRON DIRECTION SIGN BOARD



(FOR CURVES < 170m RADIUS) CHEVRON DIRECTION SIGN BOARD WITH CRASH BARRIER

REFLECTIVE PAVEMENT MARKERS

- SPECIFICATION OF MATERIAL, DESIGN, OPTICAL PERFORMANCE, TESTS AND FIXING OF RPM SHALL BE IN ACCORDANCE WITH TECH.SPEC. CL.812.
- LOCATIONS OF RPM

| COLOUR OF RPM | LOCATION   | SPACING |
|---------------|--|---------|
| WHITE         | RUMBLE STRIP & ROAD HUMP AS SHOWN IN DRG.  | 1m C/C  |
| AMBER         | CURVES < 600m RADIUS ALONG CENTERLINE  | 3m C/C  |
| RED           | BEFORE AND AFTER PEDESTRAIN CROSSING AS SHOWN IN DRG. AND AT APPROACHES TO ROAD INTERSECTION AS SHOWN IN DRG. U/T/6/11 | 1m C/C  |

- RPM SHOULD MEET MINIMUM CIL VALUES EQUIVALENT TO CATEGORY 'A' STUDS AS PER CLAUSE 812 OF TECH.SPEC.

CHEVRON SIGN BOARD

- The size of 'Chevron' Signboard is 400mm x 550mm.
- The sign board should be wide-angle micro-prismatic lens conforming to tech.spec. CL.801.3.2.2
- The retro - reflective surface after cleaning with soap and water in dry condition should have the minimum coefficient of retro-reflection (MORT&H wide 801.3.2 clause & Ministry's letter No. RW/NH-33023/31/88-DO III) as indicated below for encapsulated lens.
- Chevron sign boards shall be installed at 10m c/c as shown in the drawings at all curves of radius less than 200m along the outer edge facing the traffic of nearby lane.

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
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SCALE :

N.T.S

DRAWING TITLE :

STANDARD DRAWINGS DETAILS OF RPPMs & CHEVRON MARKERS

(SHEET 1 OF 1)

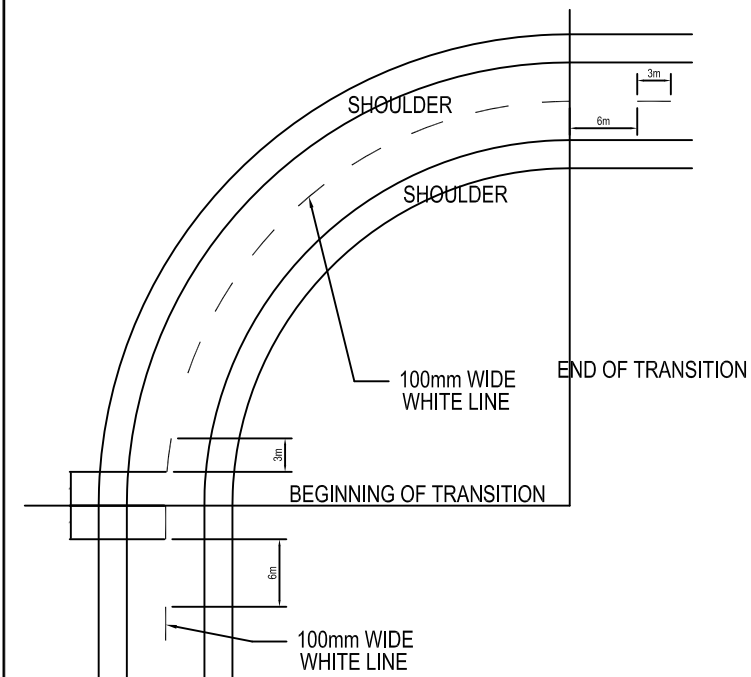
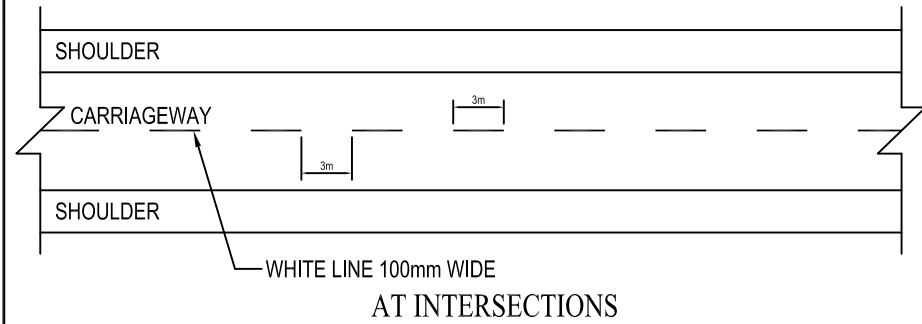
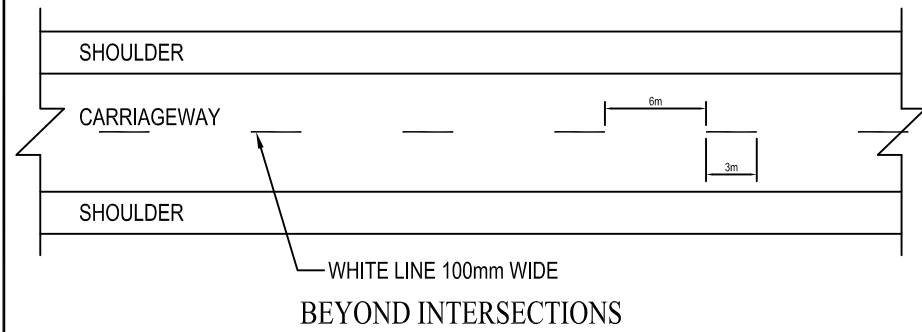
DWG. NUMBER : OSRP/CEG/SH09/P02A/ RPM REV. R2



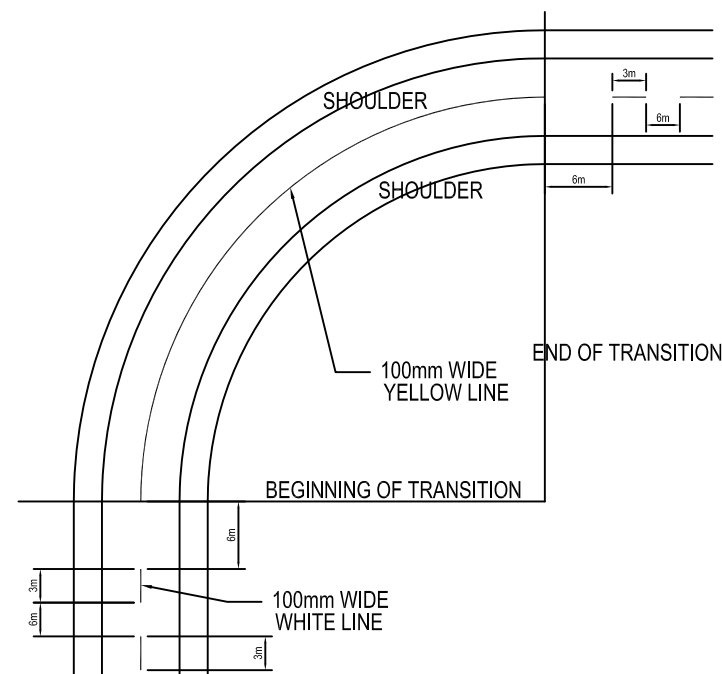


# LONGITUDINAL MARKING

## DETAILS OF CENTRE LINE

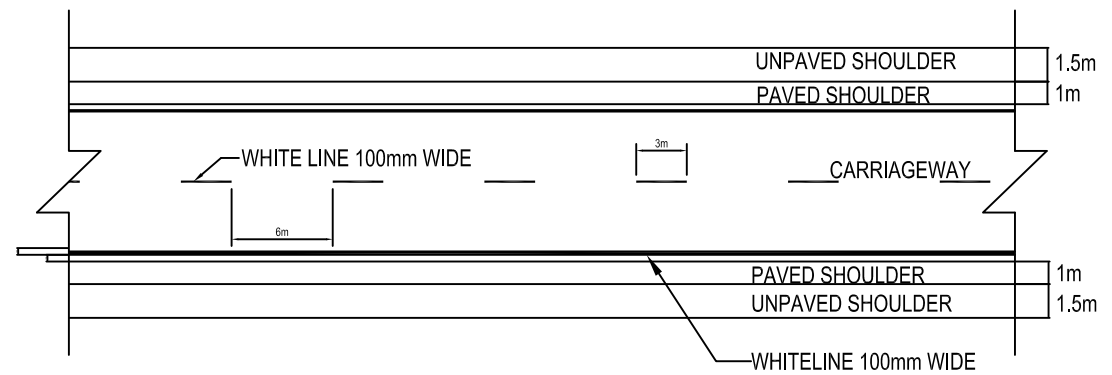


DETAILS AT CURVES

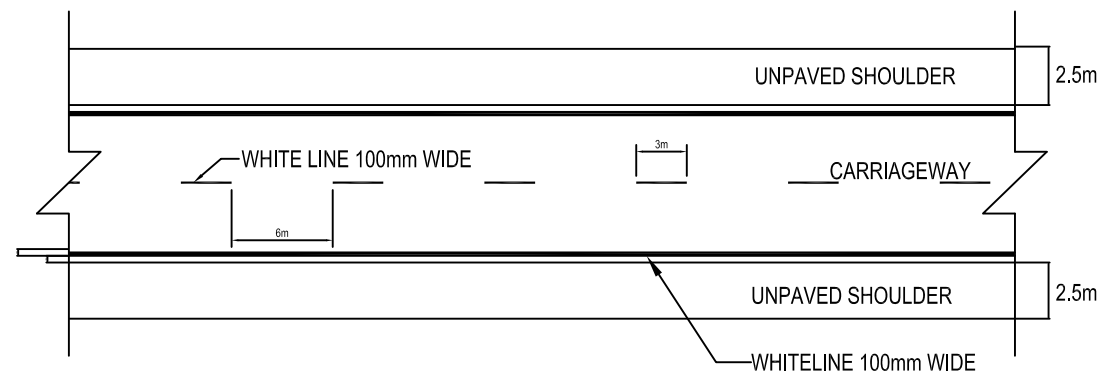


DETAILS AT SHARP CURVES (NO-OVERTAKING ZONE)

## DETAILS OF EDGE LINE MARKING



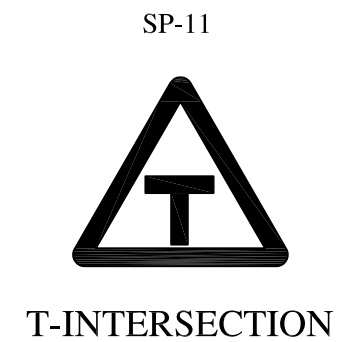
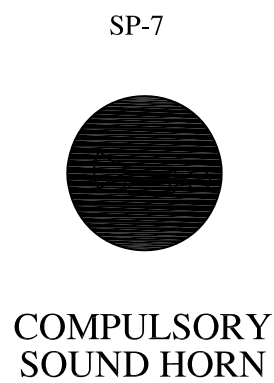
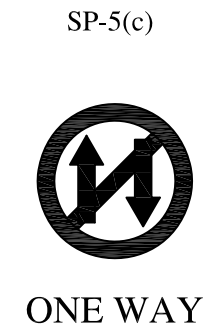
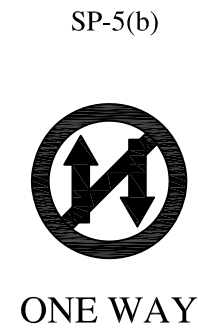
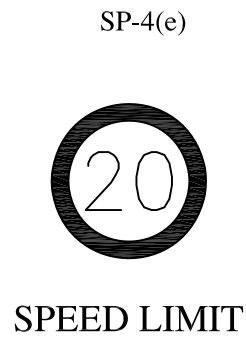
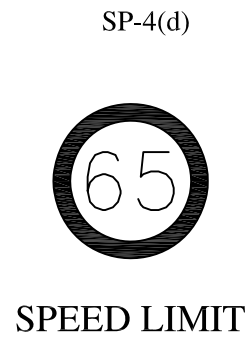
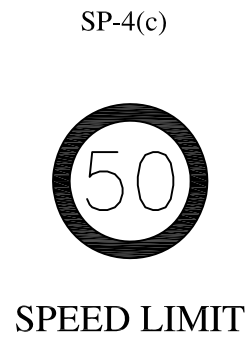
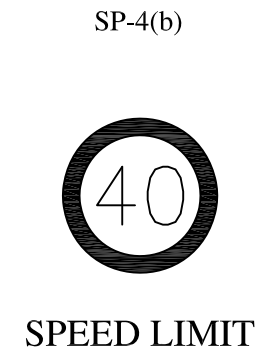
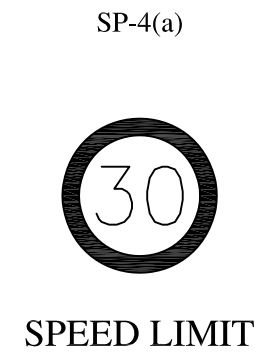
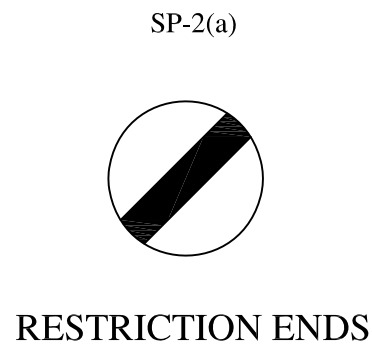
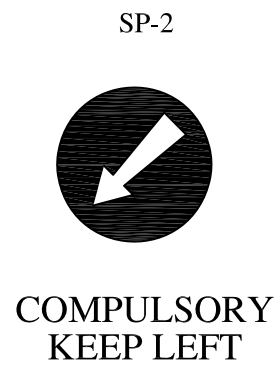
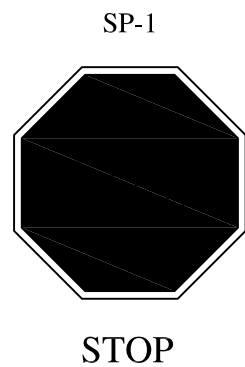
## DETAILS OF EDGE LINE MARKING



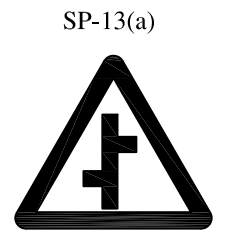
### NOTE:

- EDGE LINE MARKINGS SHOULD NOT BE CARRIED ACROSS THE MOUTHS OF SIDE ROADS
- CENTRE LINE & EDGE MARK SHALL END AT THE STOP LINE & SHALL NOT BE CONTINUED.
- ROAD MARKING SHOULD BE DONE WITH THERMOPLASTIC PAINT CONFORMING TO CL. 803.4 OF M.O.R.T & H SPECIFICATIONS
- DETAILS OF ROAD MARKING ARE AS PER IRC: 35-1997, CODE OF PRACTICE FOR ROAD MARKINGS

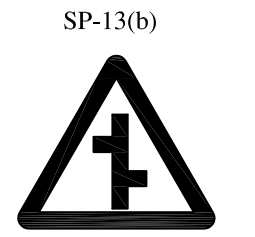
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|-----|------|-----------|-----------------|--------|-------------|-----------------|-----------------|--|---------------------------------|--|----------------------------|-------------------------|----------|---|-----------|-------|---------|--|-----------------|---------|
| R2  |      | SEP-2015  | SECOND REVISION | LASA   | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT :   | CONSULTING ENGINEERS GROUP LTD. |  | DESIGN REVIEW CONSULTANT : |                         | CLIENT : |   | PROJECT : |       | SCALE : |  | DRAWING TITLE : |         |
| R1  |      | JAN-2013  | FIRST REVISION  | OWD    | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | E-12,MOJI COLONY,MALVIYA NAGAR   |                                 | LEA Associates South Asia Pvt. Ltd., India   |                            | ODISHA WORKS DEPARTMENT |          | CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A |           | N.T.S |         | STANDARD DRAWINGS TYPICAL ROAD MARKING DETAILS |                 |         |
| -   |      | JUNE 2008 | ORIGINAL        | CEG    |             |                 |                 | E-12,MOJI COLONY,MALVIYA NAGAR   |                                 | B-1, E-27, 1Ind FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . |                            |                         |          |   |           |       |         |  |                 |         |
| NO. | DATE | REVISION  | BY              | DRAWN: | PREPARED :  | CHECKED:        | APPROVED:       | +91-141-2520899,2521899,2520556 Fax: 2521348, e-mail: ceg@cegindia.com |                                 |  |                            |                         |          |   |           |       |         | DWG. NUMBER : OSRP/CEG/SH09/P02A/ RM/01        |                 | REV. R2 |



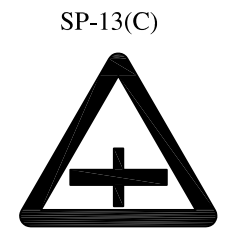
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|-----|------|-----------|-----------------|--------|-------------|-----------------|-----------------|--|--|---|--|------------------|--|--------------------------------------|------|
| R2  |      | SEP-2015  | SECOND REVISION | LASA   | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT :<br><b>CEG</b><br>CONSULTING ENGINEERS GROUP LTD.<br>E-12, MOJI COLONY, MALVIYA NAGAR<br>JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com | DESIGN REVIEW CONSULTANT :<br><b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India<br>B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . | CLIENT :<br><br>ODISHA WORKS DEPARTMENT | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | SCALE :<br>N.T.S | DRAWING TITLE :                        |                                      |      |
| R1  |      | JAN-2013  | FIRST REVISION  | OWD    | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |  |  |   |  |                  | N.K PRADHAN (CE)                       | STANDARD DRAWINGS TYPICAL ROAD SIGNS |      |
| -   |      | JUNE 2008 | ORIGINAL        | CEG    |             |                 |                 |  |  |   |  |                  |  | (SHEET 1 OF 4)                       |      |
| NO. | DATE | REVISION  | BY              | DRAWN: | PREPARED :  | CHECKED:        | APPROVED:       |  |  |   |  |                  | DWG. NUMBER : OSRP/CEG/SH09/P02A/RS/01 |                                      | REV. |



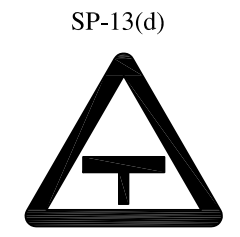
STAGGERED INTERSECTION



STAGGERED INTERSECTION



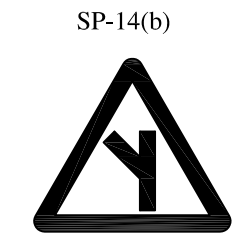
MAJOR ROAD AHEAD



MAJOR ROAD AHEAD



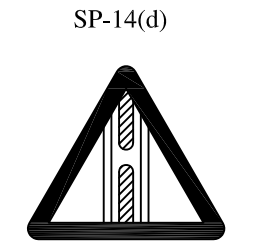
Y-INTERSECTION



Y-INTERSECTION



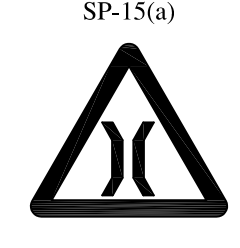
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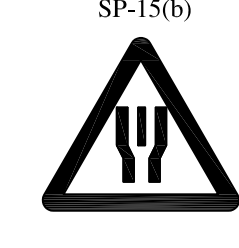
GAP IN MEDIAN



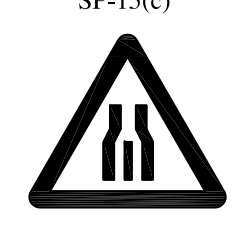
OVERHEAD CABLE



NARROW BRIDGE



DUAL C' WAY STARTS



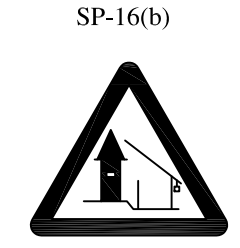
DUAL C' WAY ENDS



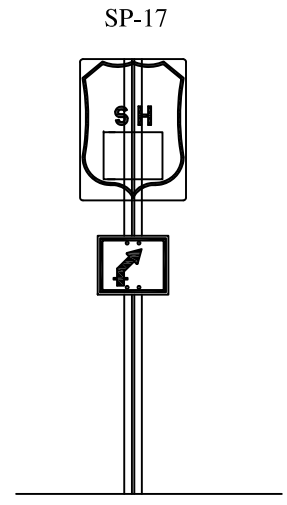
SERIES OF BENDS



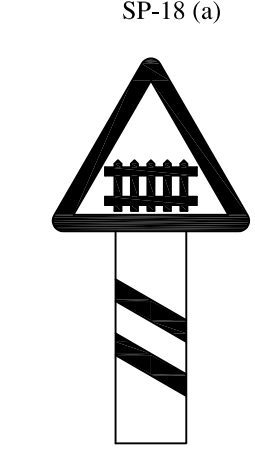
HUMP OR ROUGH ROAD



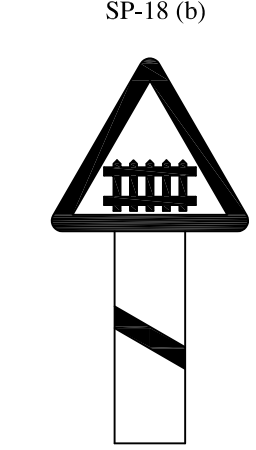
BARRIER AHEAD



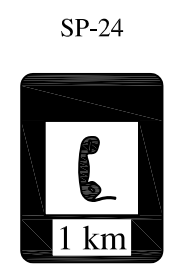
STATE ROUTE MARKER SIGN



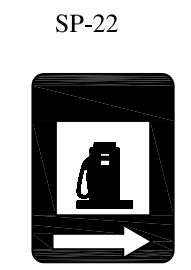
GUARDED RAILWAY CROSSING AT 200m



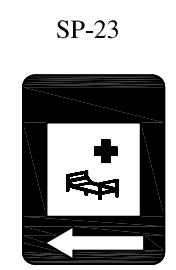
GUARDED RAILWAY CROSSING AT 50-100m



PUBLIC TELEPHONE



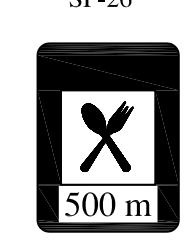
PETROL BUNK



HOSPITAL



DISPENSARY



EATING PLACE

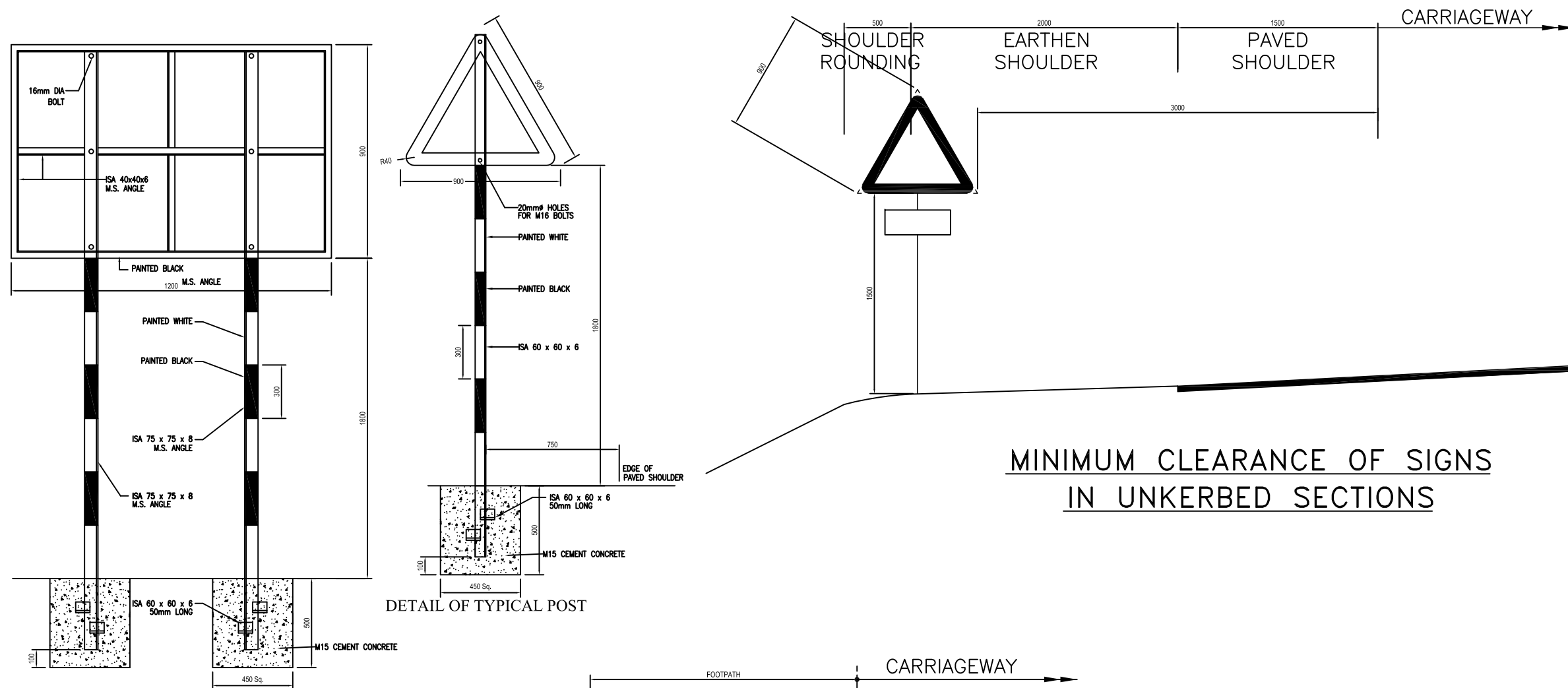
**NOTE:**

1. DETAILS OF ROAD SIGNS ARE AS PER IRC: 67-2001.
2. DETAIL OF STATEROUTE MARKER SIGN IS AS PER IRC: 31-1969.
3. ALL MANDATORY AND CAUTIONARY SIGNS SHOULD BE HIGH INTENSITY WIDE ANGLE MICRO PRISMATIC SHEETING CONFORMING TO CL-801 OF TECH. SPECIFICATION
4. ALL INFORMATORY SIGNS SHOULD CONFIRM TO STANDARDS OF HIGH INTENSITY ENCAPSULATED TYPE RETRO REFLECTIVE SHEETING AS PER CL. 801.OF TECH. SPECIFICATION

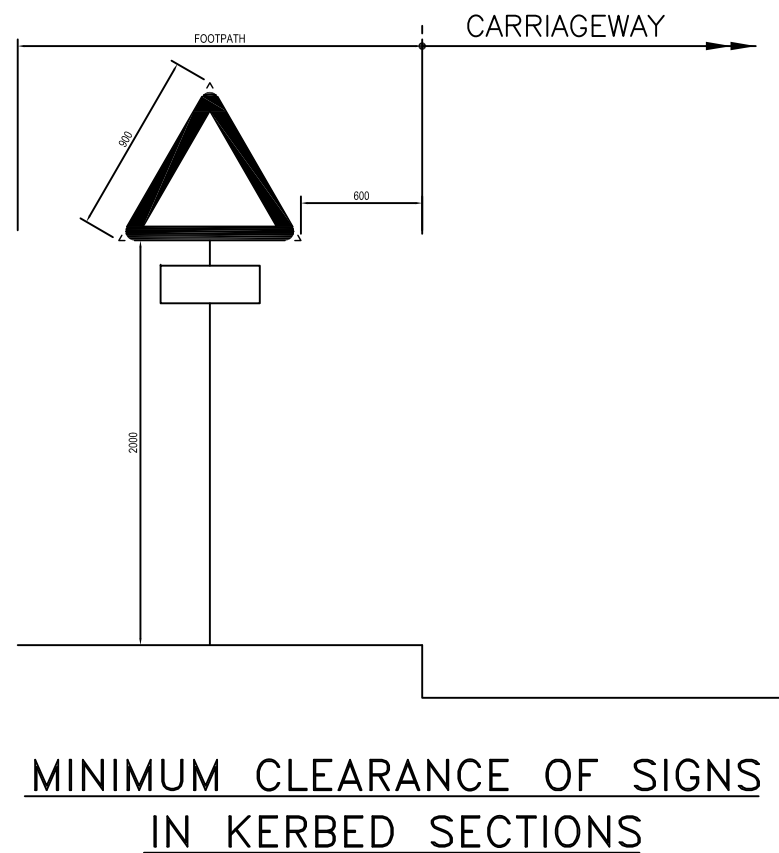
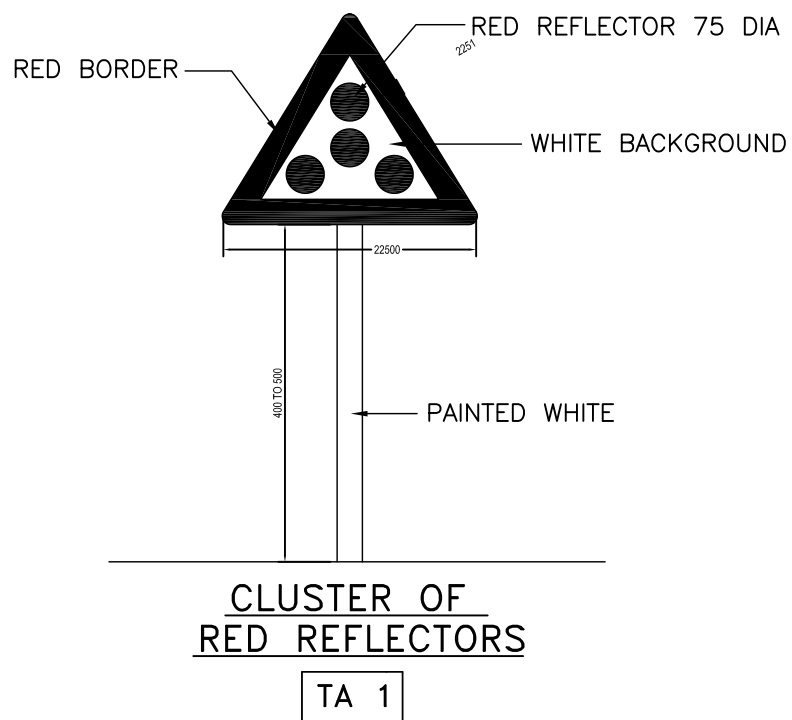
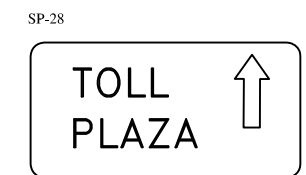
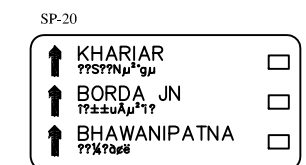
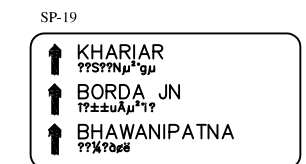
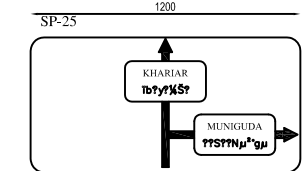
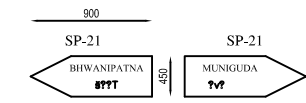
**LEGEND**

|  |             |
|--|-------------|
|  | WHITE SHEET |
|  | BLACK SHEET |
|  | RED SHEET   |
|  | BLUE SHEET  |

|     |      |           |                 |        |             |                 |                 |  |                                 |  |                            |                         |          |   |           |       |         |   |                 |         |
|-----|------|-----------|-----------------|--------|-------------|-----------------|-----------------|--|---------------------------------|--|----------------------------|-------------------------|----------|---|-----------|-------|---------|---|-----------------|---------|
| R2  |      | SEP-2015  | SECOND REVISION | LASA   | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT :   | CONSULTING ENGINEERS GROUP LTD. |  | DESIGN REVIEW CONSULTANT : |                         | CLIENT : |   | PROJECT : |       | SCALE : |   | DRAWING TITLE : |         |
| R1  |      | JAN-2013  | FIRST REVISION  | OWD    | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | C E G  |                                 | LEA Associates South Asia Pvt. Ltd., India   |                            | ODISHA WORKS DEPARTMENT |          | CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A |           | N.T.S |         | STANDARD DRAWINGS TYPICAL ROAD SIGNS    |                 |         |
| -   |      | JUNE 2008 | ORIGINAL        | CEG    |             |                 |                 | E-12,MOJI COLONY,MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899,2521899,2520556 Fax: 2521348, e-mail: ceg@cegindia.com |                                 | B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . |                            |                         |          |   |           |       |         | (SHEET 2 OF 4)                          |                 |         |
| NO. | DATE | REVISION  | BY              | DRAWN: | PREPARED :  | CHECKED:        | APPROVED:       |  |                                 |  |                            |                         |          |   |           |       |         | DWG. NUMBER : OSRP/CEG/SH09/P02A/ RS/02 |                 | REV. R2 |



**MINIMUM CLEARANCE OF SIGNS  
IN UNKERBED SECTIONS**



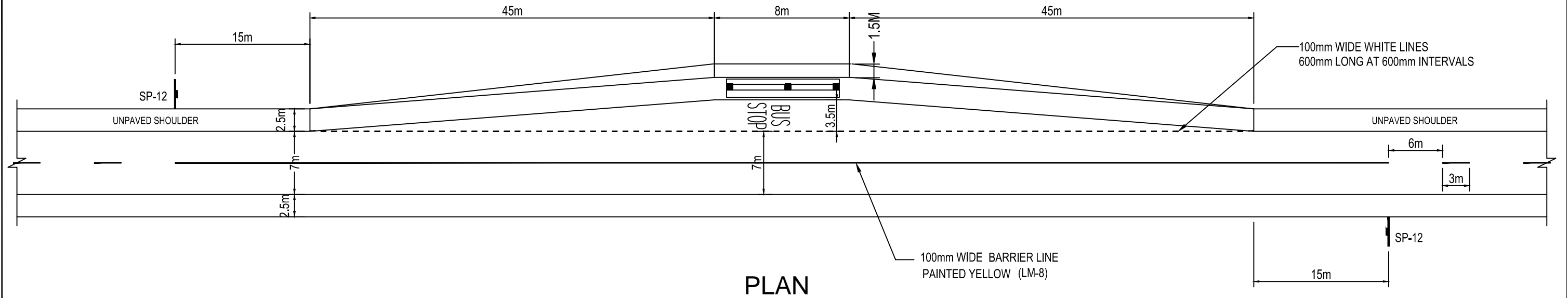
**NOTES**

1. ALL DIMENSIONS ARE IN mm UNLESS INDICATED OTHERWISE.
2. ROAD SIGNS, SIZES OF ARROWS, LETTERS & NUMERALS IS AS PER IRC:67-2001.
3. ALL ROAD SIGNS ARE NORMALLY BE PLACED AT RIGHT ANGLES TO THE LINE OF TRAVEL OF THE APPROACHING TRAFFIC.
4. ALL WARNING SIGNS ARE NORMALLY BE LOCATED AT 120m IN ADVANCE OF THE HAZARD WARNED AGAINST IN NON-URBAN LOCATIONS. IN URBAN LOCATIONS, THE WARNING SIGNS ARE LOCATED AT ABOUT 50m AWAY FROM THE POINT OF HAZARD.
5. ALL ROAD SIGNS ARE RETRO-REFLECTIVE SHEET OF HIGH INTENSITY GRADE WITH ENCAPSULATED LENSE FIXED OVER ALUMINIUM SHEET AS PER MORT&H SPECIFICATIONS.
6. ROUTE MARKER SIGN FOR NH IS AS PER IRC :2-1968.
7. SIGNS WITH AN AREA UPTO 0.9sq. m. SHALL BE MOUNTED ON A SINGLE POST, AND FOR GREATER AREA TWO OR MORE SUPPORTS SHALL BE PROVIDED.
8. POST ANGLES USED TO SUPPORT THE SIGN BOARD SHALL BE PAINTED WITH (2-COATS) APPROVED QUALITY (ANTI-CORROSIVE) ENAMEL PAINT OVER TWO COATS OF GOOD QUALITY PRIMER

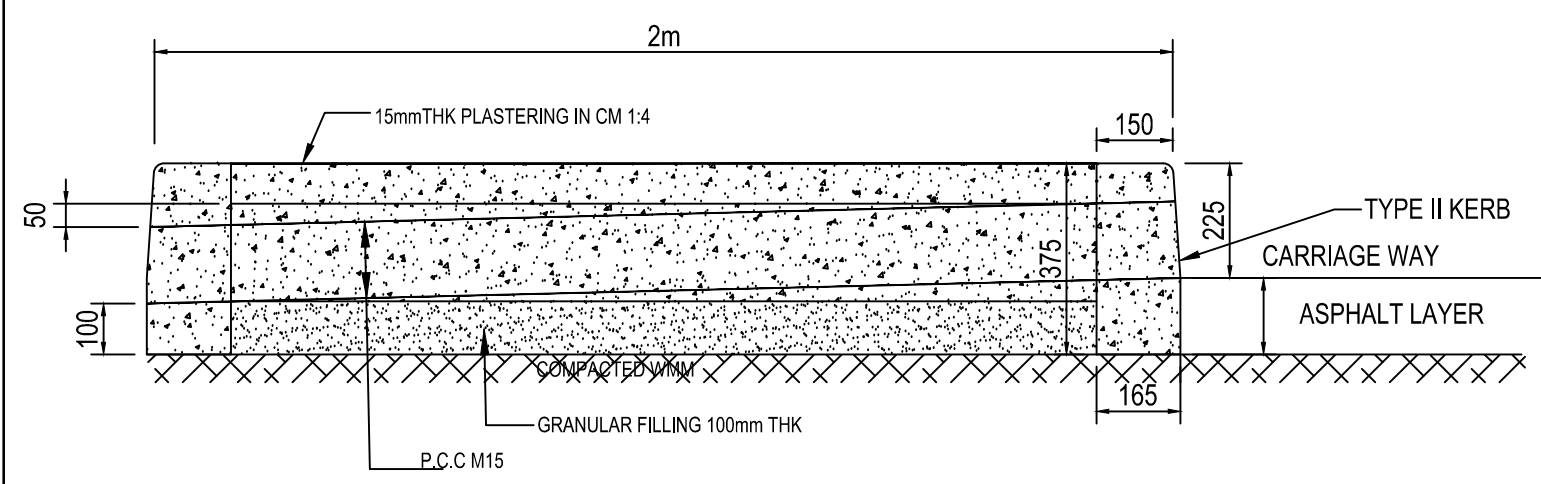
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|--|--|--|--|--|--|--|--|--|--|---|--|--|---|--|--|--|--|--|------------------|--|--|--|--|--|
| R2 SEP-2015 SECOND REVISION LASA RAJU MATHUR M.R MISHRA (EE) O.P. PATEL (CE)<br>R1 JAN-2013 FIRST REVISION OWD VINAY PK.MISHRA (AE) M.R MISHRA (EE) N.K PRADHAN (CE)<br>- JUNE 2008 ORIGINAL CEG<br>NO. DATE REVISION BY DRAWN: PREPARED: CHECKED: APPROVED: |  |  |  |  |  |  | DPR CONSULTANT :<br><b>CEG</b><br>CONSULTING ENGINEERS GROUP LTD.<br>E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginia.com |  |  | DESIGN REVIEW CONSULTANT :<br><b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . |  |  | CLIENT :<br><br>ODISHA WORKS DEPARTMENT |  |  | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A |  |  | SCALE :<br>N.T.S |  |  | DRAWING TITLE :<br><b>STANDARD DRAWINGS TYPICAL ROAD SIGNS</b><br>(SHEET 3 OF 4) |  |  |
| DWG. NUMBER : OSRP/CEG/SH09/P02A/ RS/03 REV. R2  |  |  |  |  |  |  |  |  |  |   |  |  |   |  |  |  |  |  |                  |  |  |  |  |  |



# BUS BAY DETAILS



# BUS BAY DETAILS



## NOTE:-

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE SPECIFIED.
2. PAVEMENT LAYERS OF CARRIAGEWAY SHALL BE EXTENDED IN THE BUS BAY AREA AS PER THE CONTINUING TCS.
3. REFER IRC-35 FOR BUS STOP DRAWING AND DETAILS.
4. THE LOCATION OF THE BUSBAY ARE THE TENTATIVE ONLY. THE EXACT LOCATION SHALL BE FINALISED IN CONSULTATION WITH THE ENGINEER PRIOR TO START OF EXECUTION.

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CEG**  
 CONSULTING ENGINEERS GROUP LTD.  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
  
 ODISHA WORKS DEPARTMENT

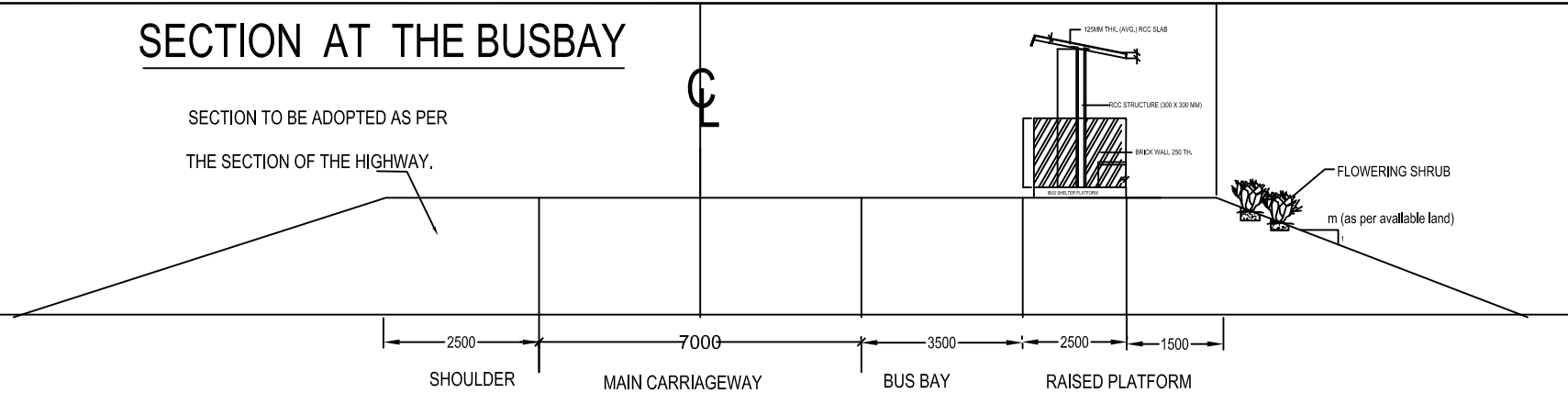
PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

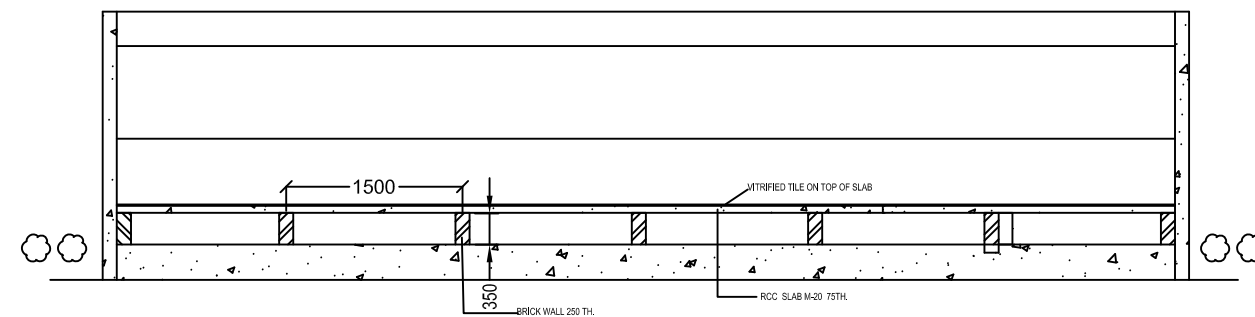
DRAWING TITLE :  
 TYPICAL BUS BAY  
 DWG. NUMBER : OSRP/CEG/SH09/P02A/ BB/01  
 REV. (SHEET 1 OF 1)

# SECTION AT THE BUSBAY

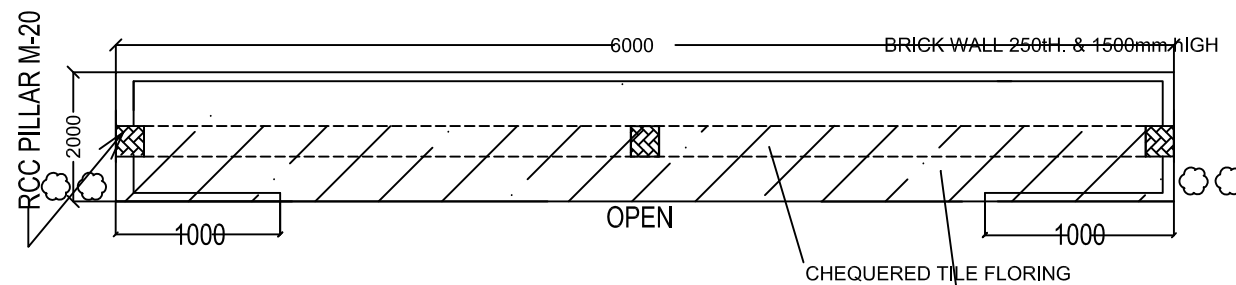
SECTION TO BE ADOPTED AS PER THE SECTION OF THE HIGHWAY.



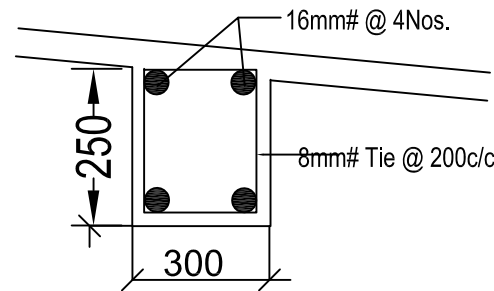
| SCHEDULE OF BUSBAYS |       |       |      |
|---------------------|-------|-------|------|
| SL. NO.             | START | END   | SIDE |
| 1                   | 1015  | 1120  | RHS  |
| 2                   | 1300  | 1405  | LHS  |
| 3                   | 3595  | 3700  | RHS  |
| 4                   | 3600  | 3705  | LHS  |
| 5                   | 5400  | 5505  | LHS  |
| 6                   | 6400  | 6505  | LHS  |
| 7                   | 6545  | 6650  | RHS  |
| 8                   | 9800  | 9905  | LHS  |
| 9                   | 10095 | 10200 | RHS  |
| 10                  | 11400 | 11505 | LHS  |
| 11                  | 12295 | 12400 | RHS  |
| 12                  | 13800 | 13905 | LHS  |
| 13                  | 14195 | 14300 | RHS  |
| 14                  | 16500 | 16605 | LHS  |
| 15                  | 17895 | 18000 | RHS  |
| 16                  | 20200 | 20305 | LHS  |
| 17                  | 21395 | 21500 | RHS  |
| 18                  | 24250 | 24355 | LHS  |
| 19                  | 24545 | 24650 | RHS  |
| 20                  | 25700 | 25805 | LHS  |
| 21                  | 26245 | 26350 | RHS  |
| 22                  | 26600 | 26705 | LHS  |
| 23                  | 27095 | 27200 | RHS  |



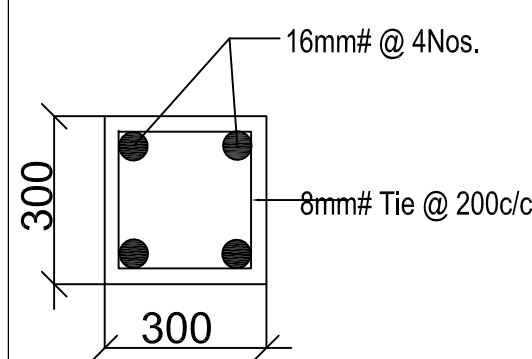
SECTION OF BUS SHELTER



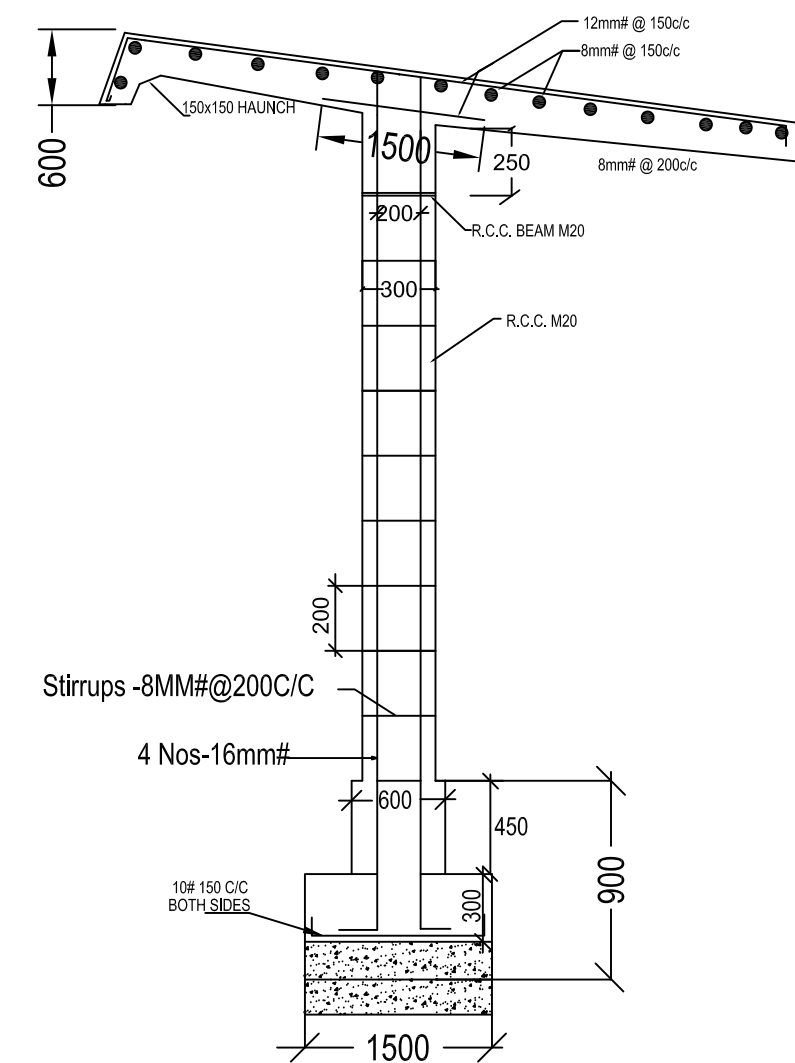
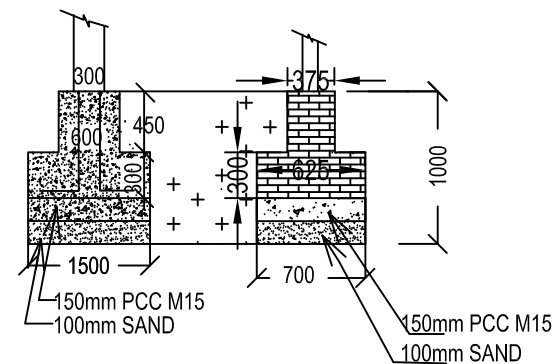
PLAN FOR BUS SHELTER



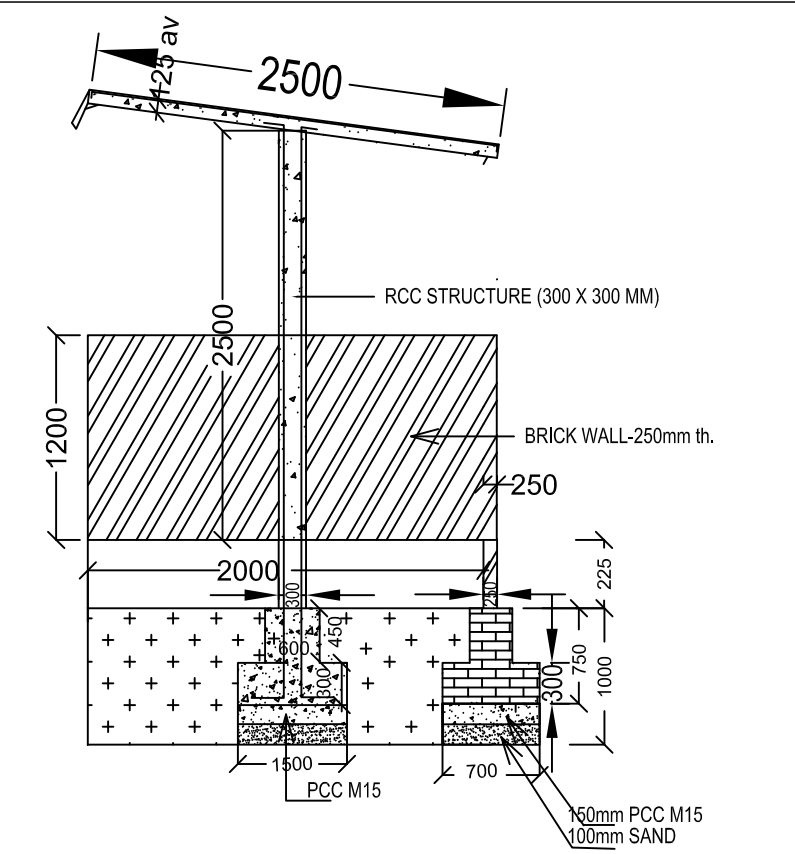
REINFORCEMENT of BEAM



REINFORCEMENT PLAN of COLUMN

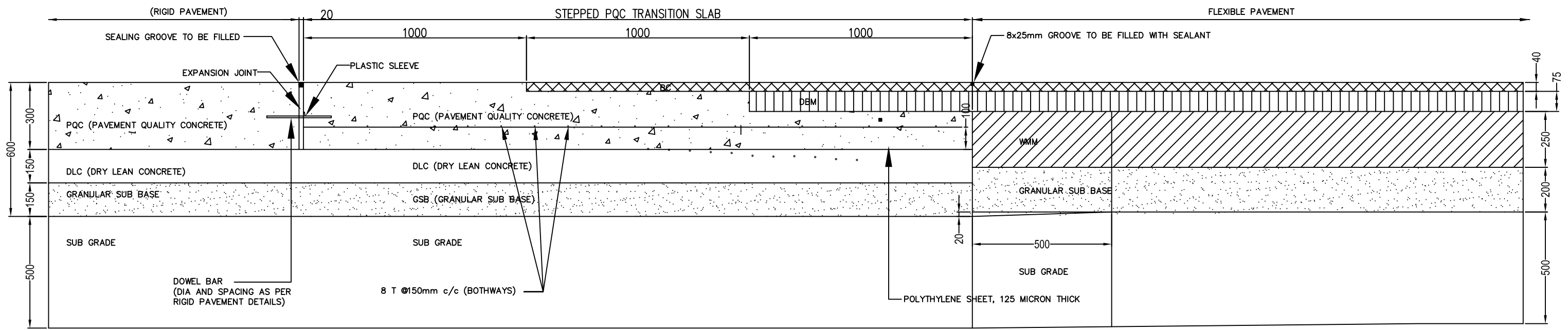


CROSS SECTION



- NOTE:**
- FOR DETAILS OF BUS BAYS REFER DWG NO. OSRP/CEG/BB/01 AND 02
  - LOCATIONS OF THE BUS BAYS MAY BE CHANGED AT SITE AS PER THE REQUIREMENTS
  - LOWER BUS BAYS STANDARDS SHALL BE ADOPTED AS PER THE REQUIREMENTS
  - REQUIRED SLOPE PROTECTION/ RETAINING WALL SHALL BE ADOPTED AT STAND.
  - THE REINFORCEMENTS MODIFIED BY ENGINEER MUST BE ADHERED TO.
  - ALL REINFORCEMENTS SHALL BE CONFIRMED TO FE-500





TYP. DETAILS OF TRANSITION SLAB BETWEEN RIGID & FLEXIBLE PAVEMENT

(SCALE : NTS)

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :

**CEG**

CONSULTING ENGINEERS GROUP LTD.  
E-12, MOJI COLONY, MALVIYA NAGAR  
JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :

**LEA**

LEA Associates South Asia Pvt. Ltd., India  
B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

N.T.S.

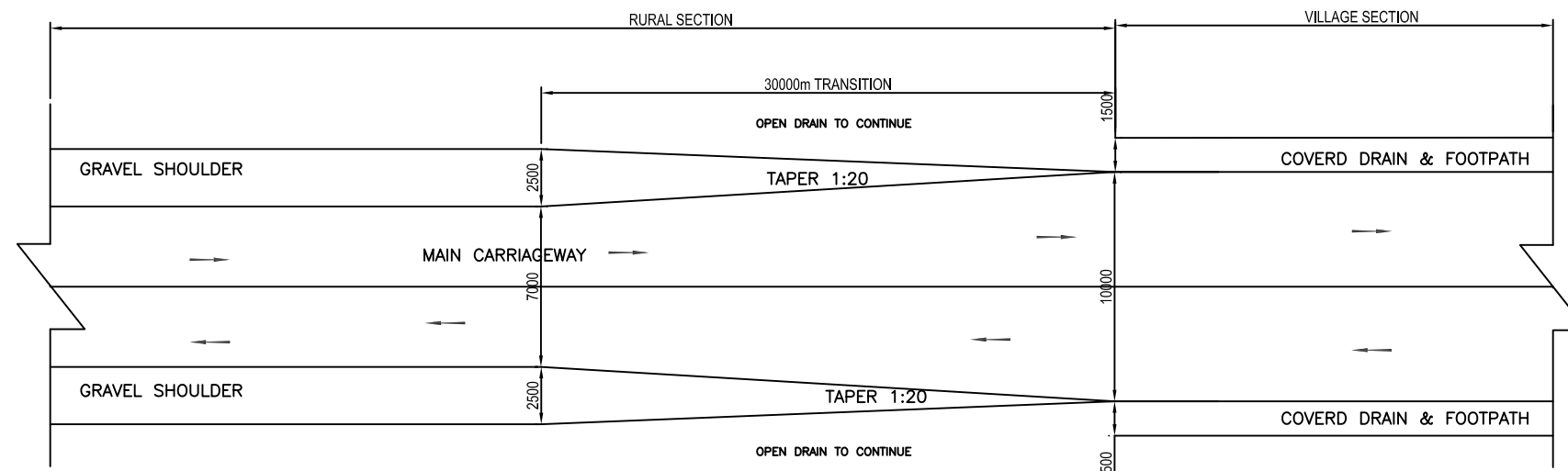
DRAWING TITLE :

TYPICAL DETAILS OF TRANSITION SLAB BETWEEN RIGID AND FLEXIBLE PAVEMENT

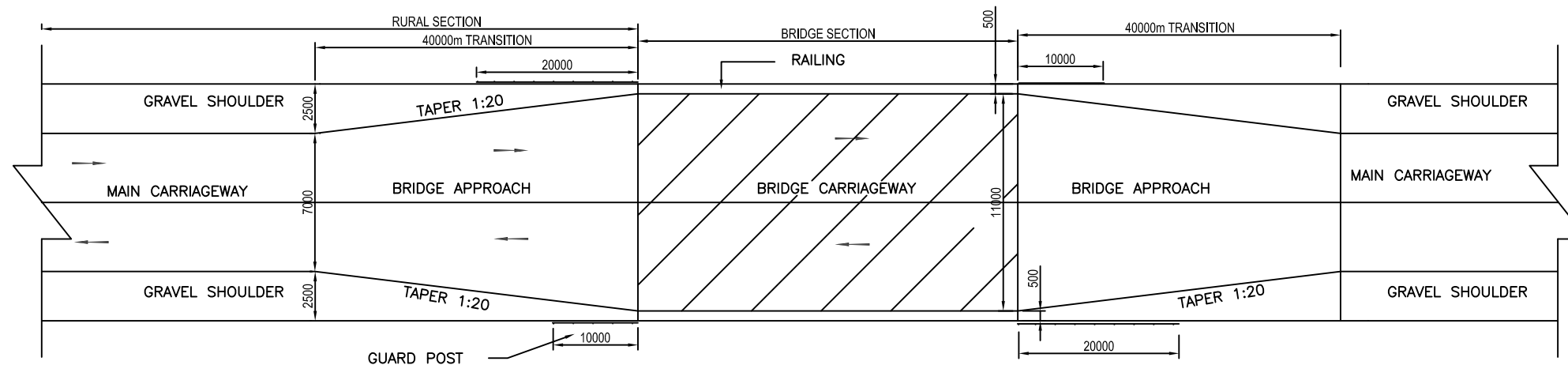
(SHEET 2 OF 2)

DWG. NUMBER : OSRP/CEG/SH09/P02A/ RIGID/02      REV. R2

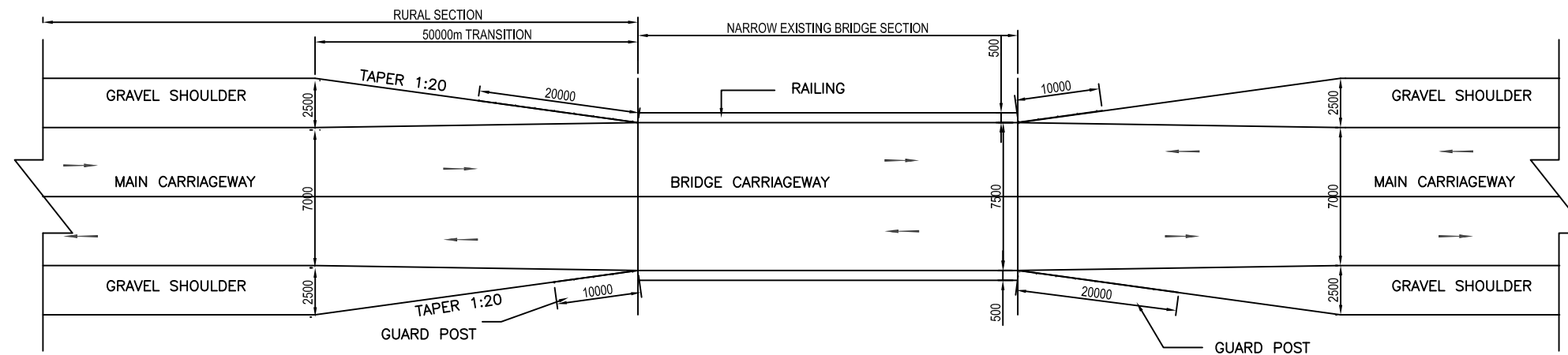




TRANSITION BETWEEN RURAL 12m SECTION TO VILLAGE 10m WITH DRAIN SECTION 10m



TRANSITION BETWEEN RURAL 12m SECTION TO BRIDGES WITH 11m CLEAR CARRIAGEWAY



TRANSITION BETWEEN RURAL 12m SECTION TO NARROW EXISTING BRIGES SECTION

- NOTES**
1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS INDICATED OTHERWISE.
  2. FOR DETAILS OF STRUCTURES REFER STRUCTURAL DRGS.
  3. GUARD POSTS ARE INSTALLED WHERE EMBANKMENT HEIGHT IS MORE THAN 3 METRES & AT BRIDGE APPROACHES.
  4. FOR GUARD POST DETAIL REFER DWG. NO. OSRP/CEG/KM & GP
  5. FOR HAZARD MARKER DETAIL REFER TYPICAL ROAD SIGN & DETAILS OF ROAD DELINEATORS
  6. DRAWING TO BE READ WITH TCS- 1 TO TCS-16 AND DWG. NO. OSRP/CEG/RIGID/02

|     |           |                 |      |             |                 |                    |
|-----|-----------|-----------------|------|-------------|-----------------|--------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE)    |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE)    |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                    |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED: APPROVED: |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginidia.com

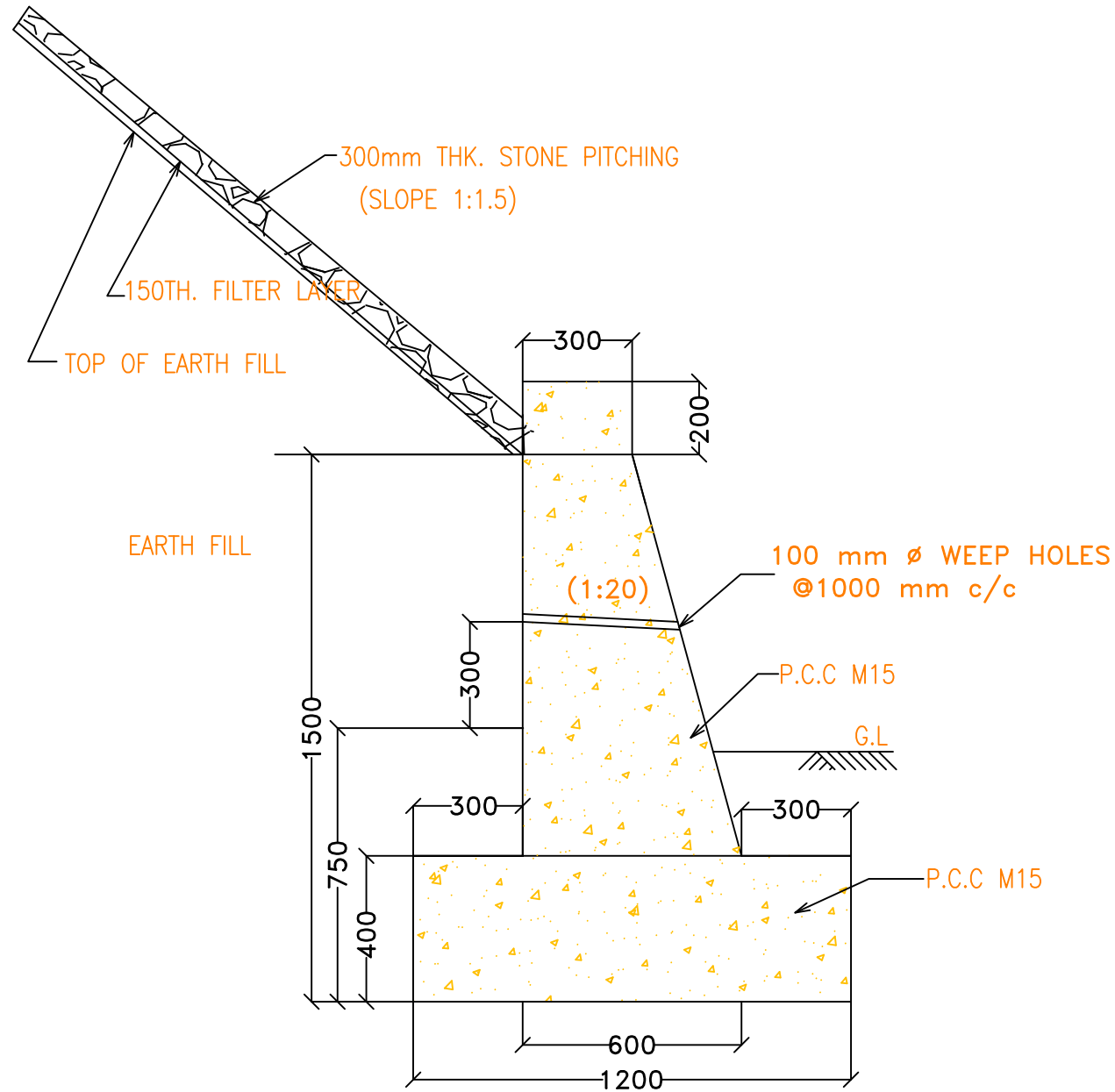
DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

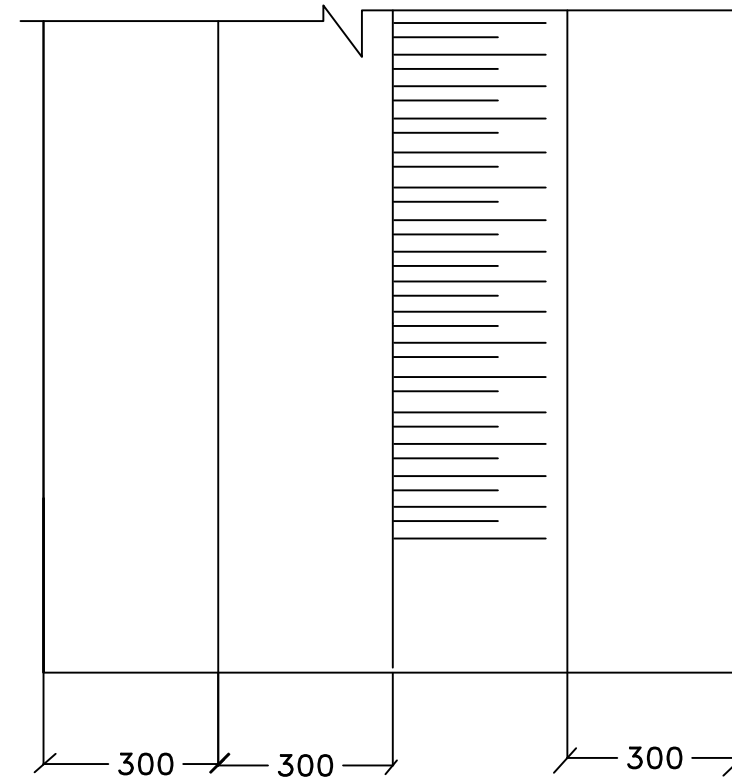
PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

DRAWING TITLE :  
**TYPICAL DETAILS OF TRANSITION OF DIFFERENT ROAD SECTION**  
 (SHEET 1 OF 1)  
 DWG. NUMBER : OSRP/CEG/SH09/P02A/ TR REV. R2



TOE WALL FOR POND  
( CROSS SECTION )



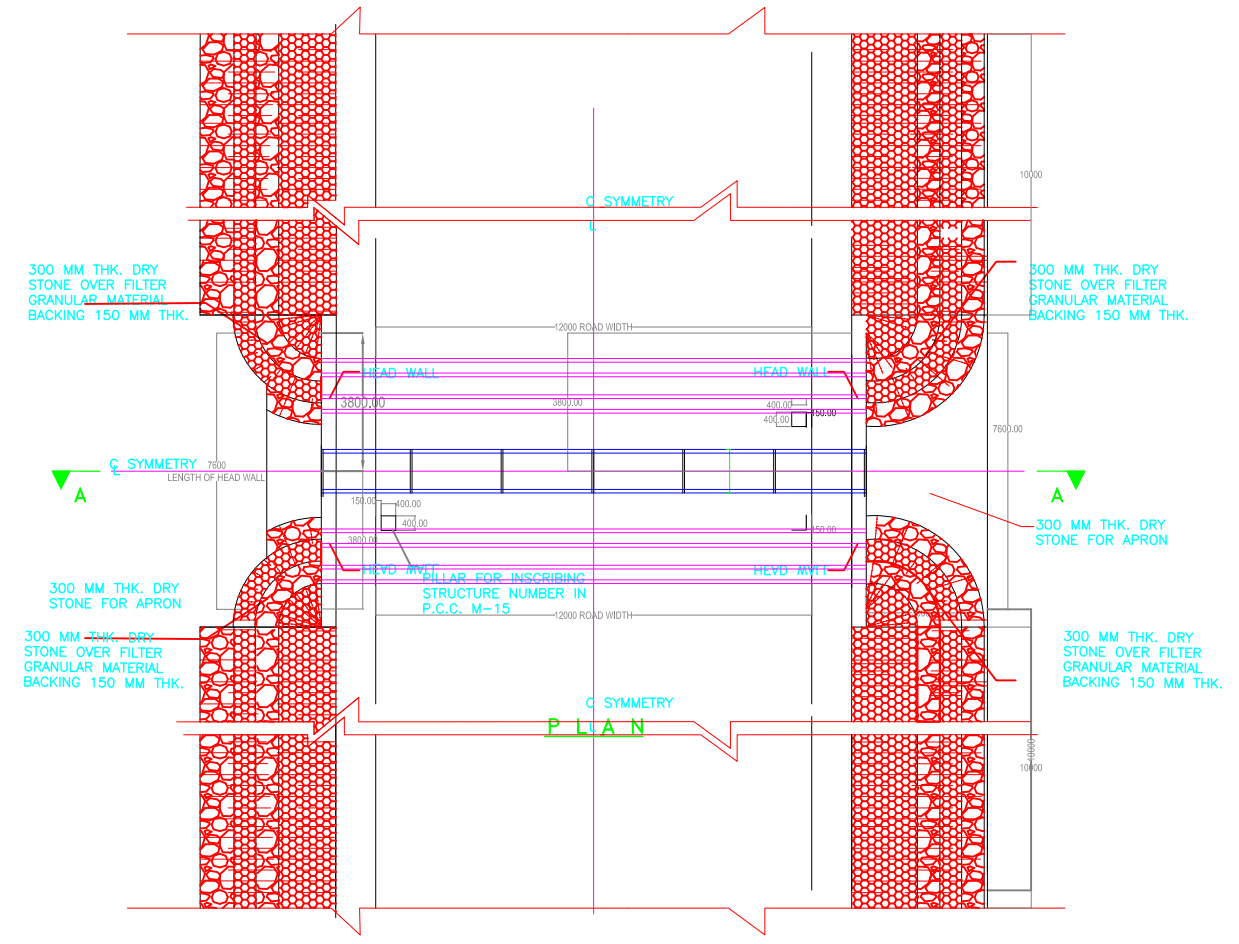
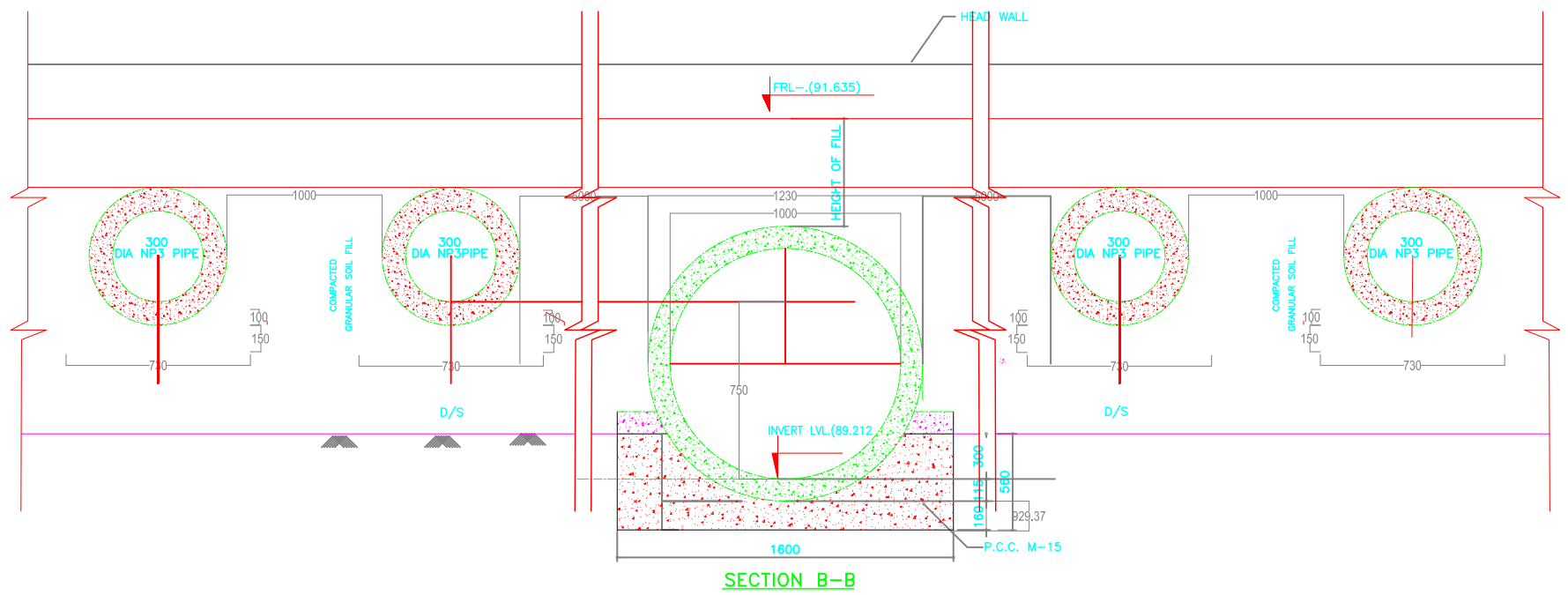
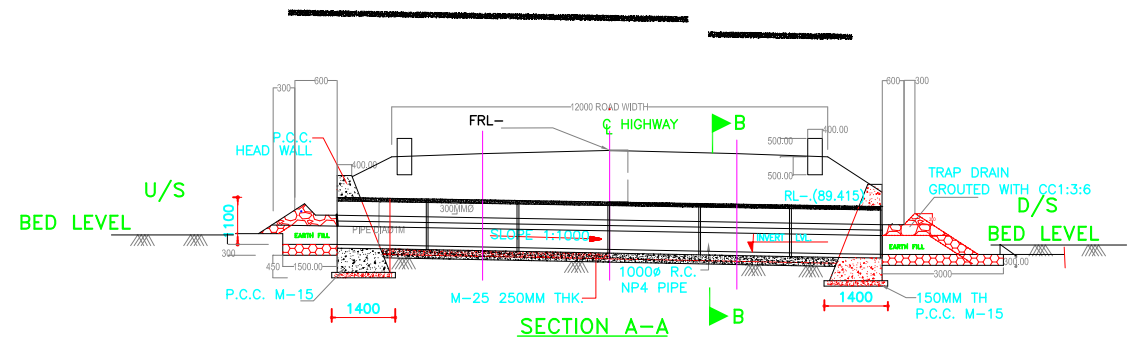
PLAN OF TOE WALL FOR WATER BODY

| Sl No. | Items | Chainage at km | Location left /right | Length of toe wall in Mtrs. |
|--------|-------|----------------|----------------------|-----------------------------|
| 1      | Pond  | 1.017          | R                    | 15                          |
| 2      | Pond  | 2.485          | L                    | 25                          |
| 3      | Pond  | 2.822          | R                    | 55                          |
| 4      | Canal | 4.424          | R                    | 1180                        |
| 5      | Canal | 4.47           | L                    | 430                         |
| 6      | Canal | 5.83           | R                    | 255                         |
| 7      | Pond  | 8.19           | R                    | 20                          |
| 8      | Pond  | 9.28           | L                    | 100                         |
| 9      | Pond  | 6.9            | L                    | 40                          |
| 10     | Pond  | 12.302         | R                    | 20                          |
| 11     | Pond  | 12.58          | R                    | 24                          |
| 12     | Pond  | 12.9           | L                    | 34                          |
| 13     | Pond  | 13.112         | R                    | 20                          |
| 14     | Pond  | 11.78          | L                    | 15                          |
| 15     | Pond  | 19.555         | L                    | 30                          |
| 16     | Pond  | 20.4           | R                    | 55                          |
| 17     | Pond  | 20.47          | L                    | 25                          |
| 18     | Pond  | 20.6           | L                    | 20                          |
| 19     | Pond  | 20.67          | L                    | 15                          |
| 20     | Pond  | 20.725         | R                    | 10                          |
| 21     | Pond  | 20.758         | R                    | 5                           |
| 22     | Pond  | 20.9           | L                    | 25                          |
| 23     | Pond  | 21.9           | R                    | 25                          |
| 24     | Pond  | 22.2           | R                    | 70                          |
| 25     | Pond  | 22.348         | L                    | 30                          |
| 26     | Pond  | 22.542         | R                    | 45                          |
| 27     | Pond  | 22.9           | R                    | 20                          |
| 28     | Pond  | 24.9           | R                    | 25                          |
| 29     | Pond  | 25.05          | L                    | 30                          |

TO MINIMISE IMPACT ON STORAGE CAPACITY & WATER SPREAD OF PONDS, WATER BODY, NALA BED, TOE WALLS TO BE ERECTED SUCH THAT IT PREVENTS ACCIDENTAL FALL INTO THE DEPRESSION AND WASHING OF VEHICLES/BATHING/ WASHING ON THE ROAD SIDE

|     |      |           |                 |        |             |                 |                 |  |  |   |  |                  |                  |  |    |
|-----|------|-----------|-----------------|--------|-------------|-----------------|-----------------|--|--|---|--|------------------|------------------|--|----|
| R2  |      | SEP-2015  | SECOND REVISION | LASA   | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT :<br><b>CEG</b><br>CONSULTING ENGINEERS GROUP LTD.<br>E-12, MOJI COLONY, MALVIYA NAGAR<br>JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com | DESIGN REVIEW CONSULTANT :<br><b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India<br>B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . | CLIENT :<br><br>ODISHA WORKS DEPARTMENT | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | SCALE :<br>N.T.S | DRAWING TITLE :  |  |    |
| R1  |      | JAN-2013  | FIRST REVISION  | OWD    | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |  |  |   |  |                  | N.K PRADHAN (CE) | TYPICAL PCC TOE WALL WITH STONE PITCHING FOR WATER BODIES AS ENVIRONMENTAL MITIGATION (SHEET 1 OF 1) |    |
| -   |      | JUNE 2008 | ORIGINAL        | CEG    |             |                 |                 |  |  |   |  |                  |                  | DWG. NUMBER : OSRP/CEG/SH09/P02A/ENV/03  |    |
| NO. | DATE | REVISION  | BY              | DRAWN: | PREPARED :  | CHECKED:        | APPROVED:       |  |  |   |  |                  |                  | REV.   | R2 |

# REPTILE UNDER PASS



## SCHEDULE

| Sl. No | Proposed Chainage |
|--------|-------------------|
| 1      | 26+430            |

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :

**CEG**

CONSULTING ENGINEERS GROUP LTD.  
E-12, MOJI COLONY, MALVIYA NAGAR  
JAIPUR-17  
Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :

**LEA**

LEA Associates South Asia Pvt. Ltd., India  
B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

N.T.S

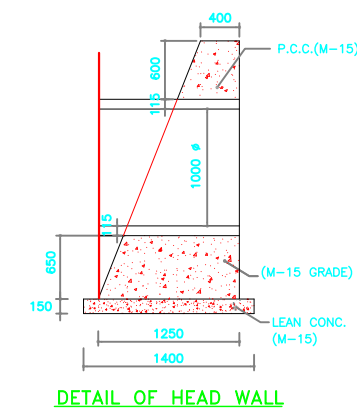
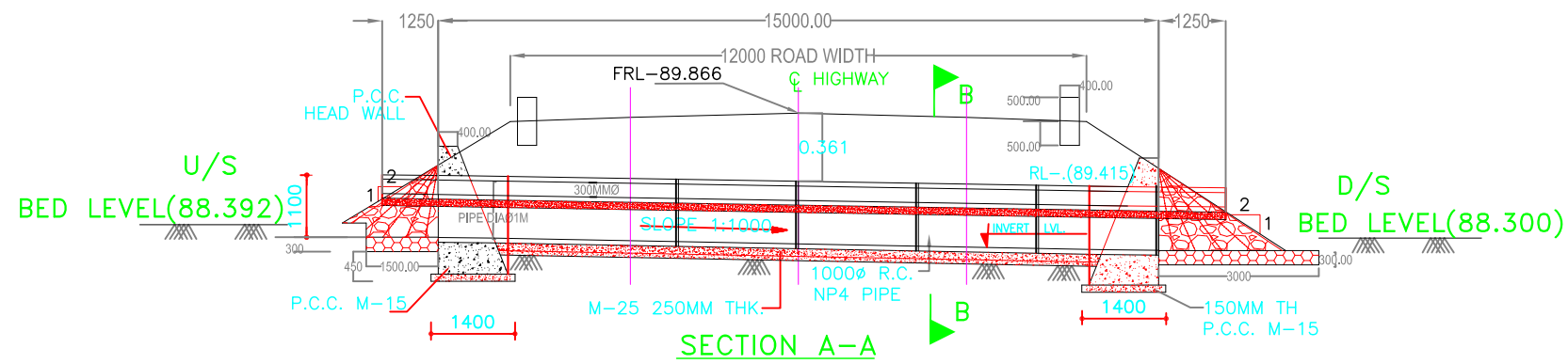
DRAWING TITLE :

REPTILE UNDER PASS+PIPE CULVERT (GEN.)

(SHEET 1 OF 1)

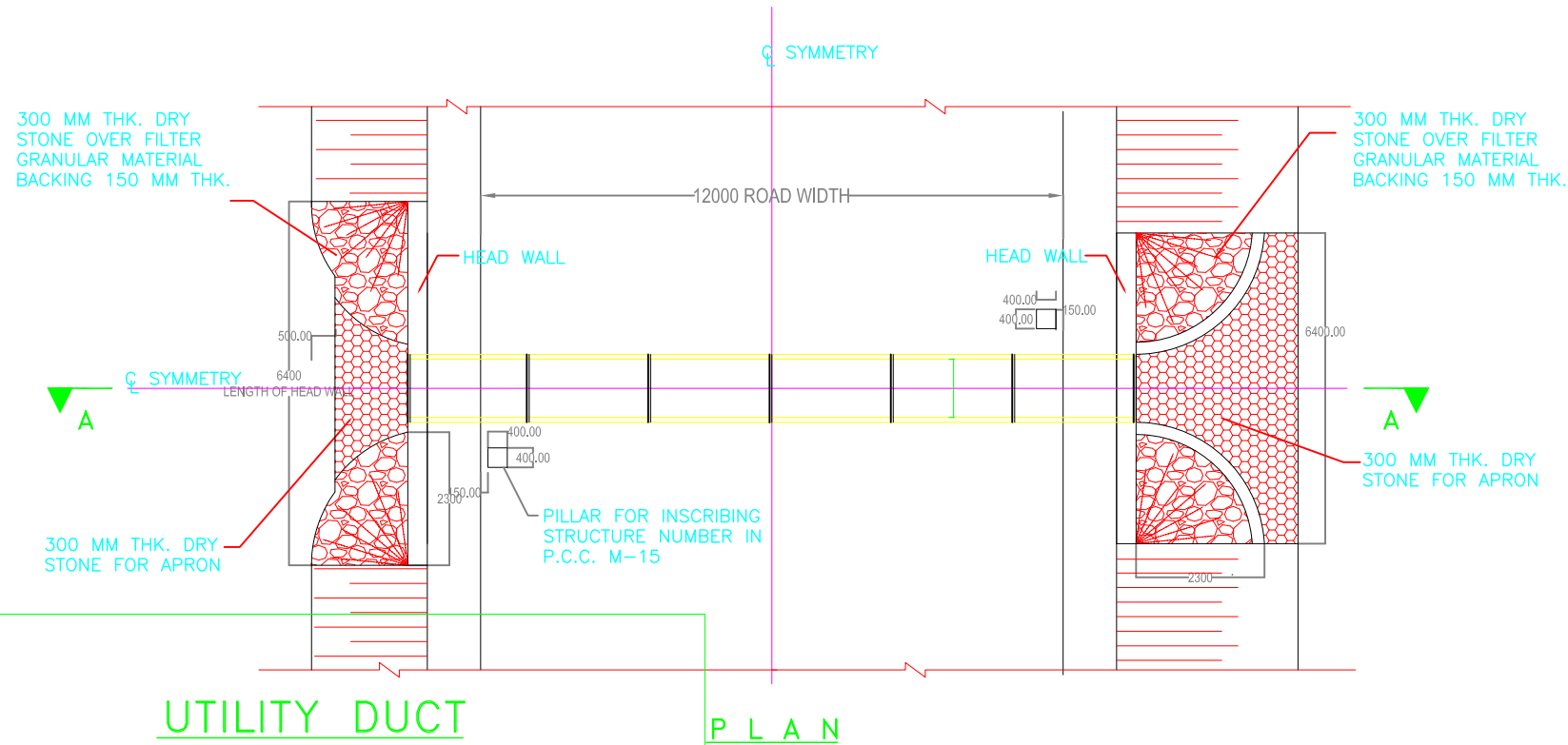
DWG. NUMBER : OSRP/CEG/SH09/P02A/ENV/14

REV. R2

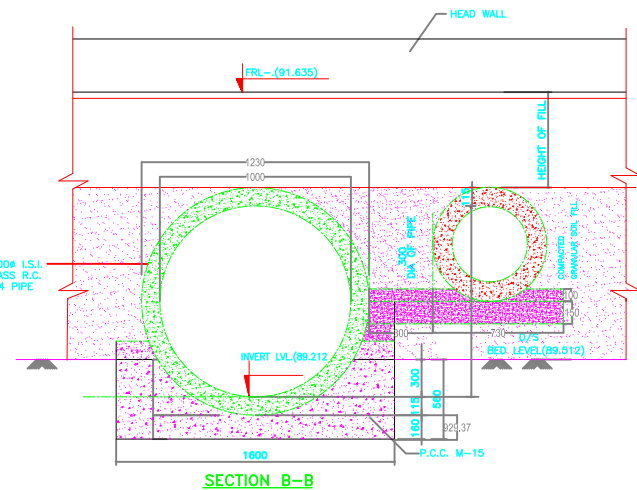


**NOTES:**

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
2. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
3. LOOSE / UNSUITABLE SOIL BELOW CULVERTS IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
4. CHAINAGE / FORMATION LEVEL IS PROVIDED AS PER APPROVED PLAN & PROFILE.
5. FOR CULVERTS SKEW TO THE TRAFFIC DIRECTION LENGTH OF CULVERT SHALL BE ADJUSTED AS PER SITE CONDITION.
6. LONGITUDINAL SLOPE OF PIPE SHALL BE MIN. 1 IN 1000.
7. FIRST CLASS BEDDING CAN BE USED FOR MAXIMUM HEIGHT OF FILL OF 4.0 M.
8. THE FINISHED ROAD LEVEL SHALL BE VERIFIED WITH ALIGNMENT DRAWING & GROUND LEVEL WITH SITE CONDITIONS BEFORE EXECUTION.



| SCHEDULE OF UTILITY DUCT |          |         |          |
|--------------------------|----------|---------|----------|
| Sl. No.                  | Chainage | Sl. No. | Chainage |
| 1                        | 0+980    | 12      | 16+050   |
| 2                        | 5+525    | 13      | 18+550   |
| 3                        | 5+925    | 14      | 18+950   |
| 4                        | 6+250    | 15      | 19+250   |
| 5                        | 6+700    | 16      | 20+050   |
| 6                        | 9+500    | 17      | 20+250   |
| 7                        | 10+300   | 18      | 21+150   |
| 8                        | 11+475   | 19      | 21+700   |
| 9                        | 12+950   | 20      | 24+425   |
| 10                       | 13+925   | 21      | 24+825   |
| 11                       | 14+350   | 22      | 25+750   |
|                          |          | 23      | 27+150   |



| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :

**CONSULTING ENGINEERS GROUP LTD.**

E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :

**LEA Associates South Asia Pvt. Ltd., India**

B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

N.T.S

DRAWING TITLE :

UTILITY DUCT+CULVERT (GEN.)  
BHADRAK-CHANDBALI-BALANCE WORK

(SHEET 1 OF 1)

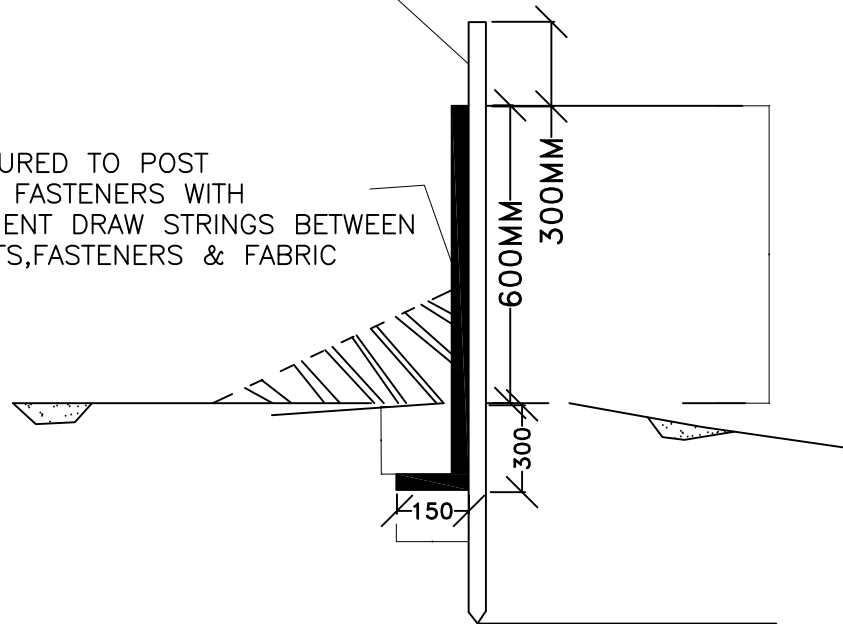
DWG. NUMBER : OSRP/CEG/SH09/P02A/ MISC/01

REV. R2

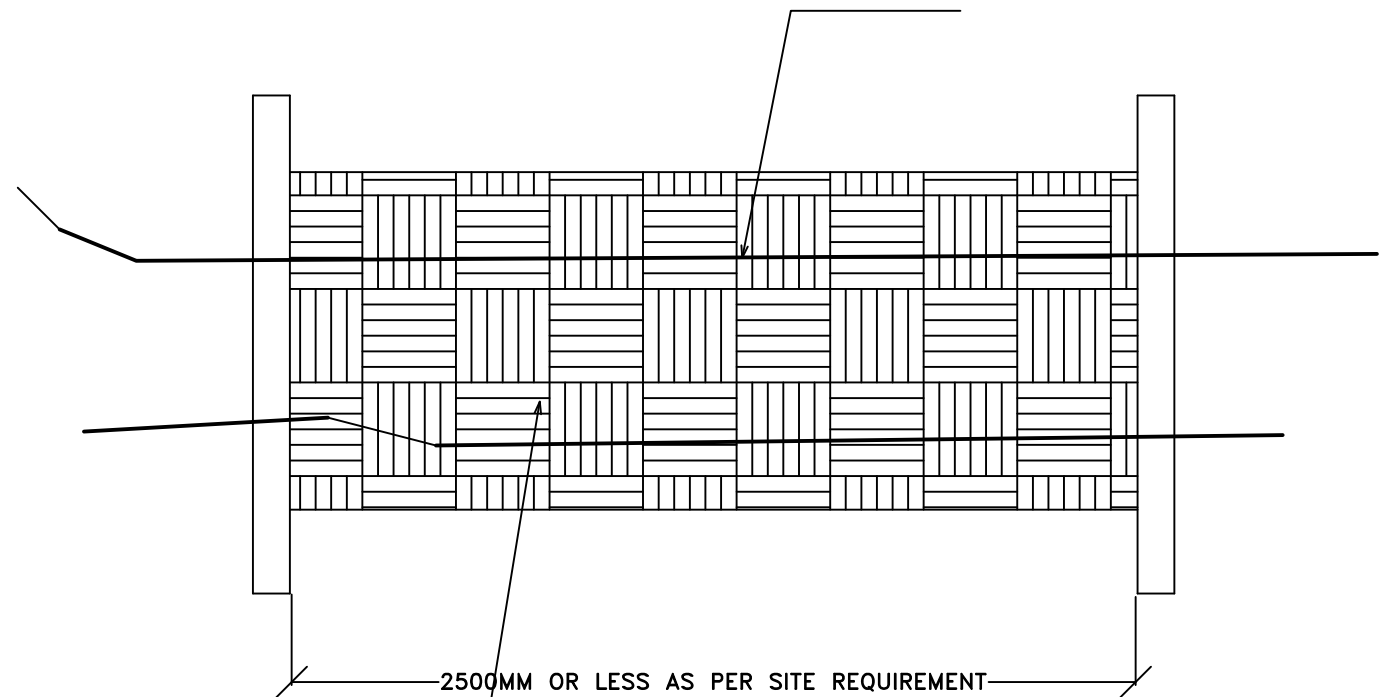


FENCE POST 75MM DIA @ 2500MM C/C

FABRIC SECURED TO POST WITH METAL FASTENERS WITH REINFORCEMENT DRAW STRINGS BETWEEN FENCE POSTS, FASTENERS & FABRIC



DRAW STRING RUNNING THROUGH FABRIC



SHEET MADE OF COCONUT




FIBER WITH HDPE NETS OF WEIGHT > 600GM/SQM

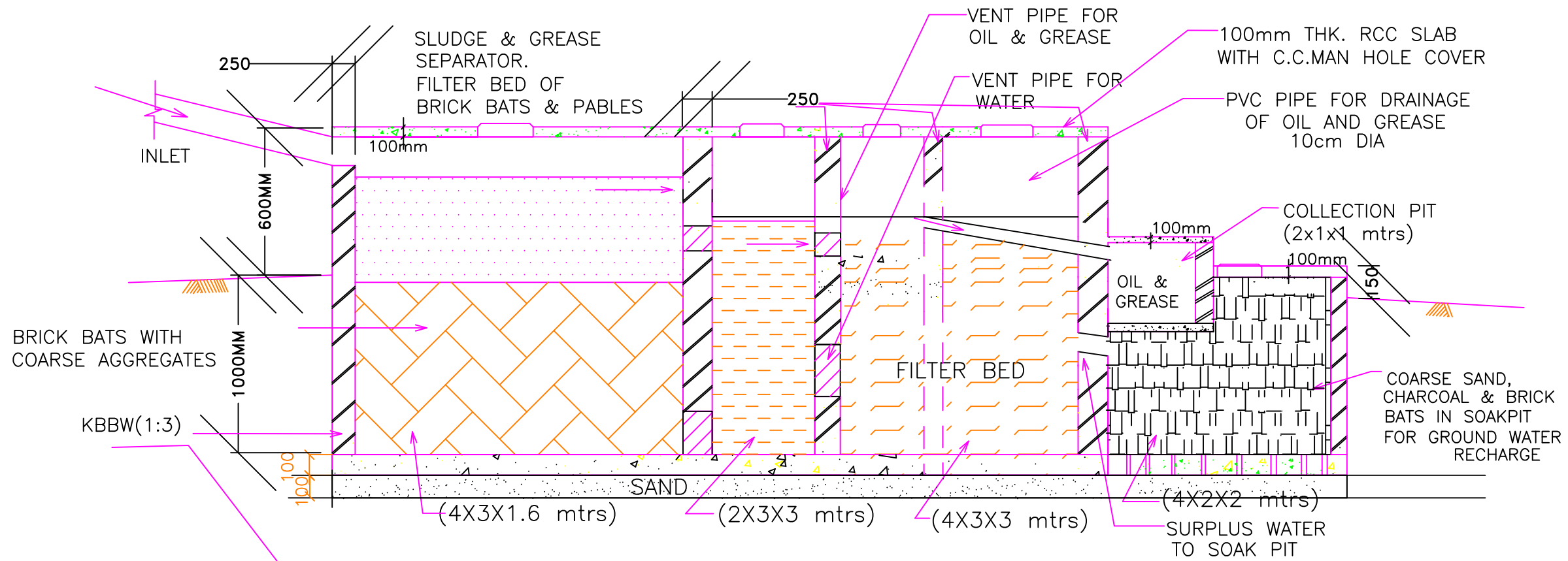
## SILT FENCE SEDIMENT BARRIER

NO SCALE

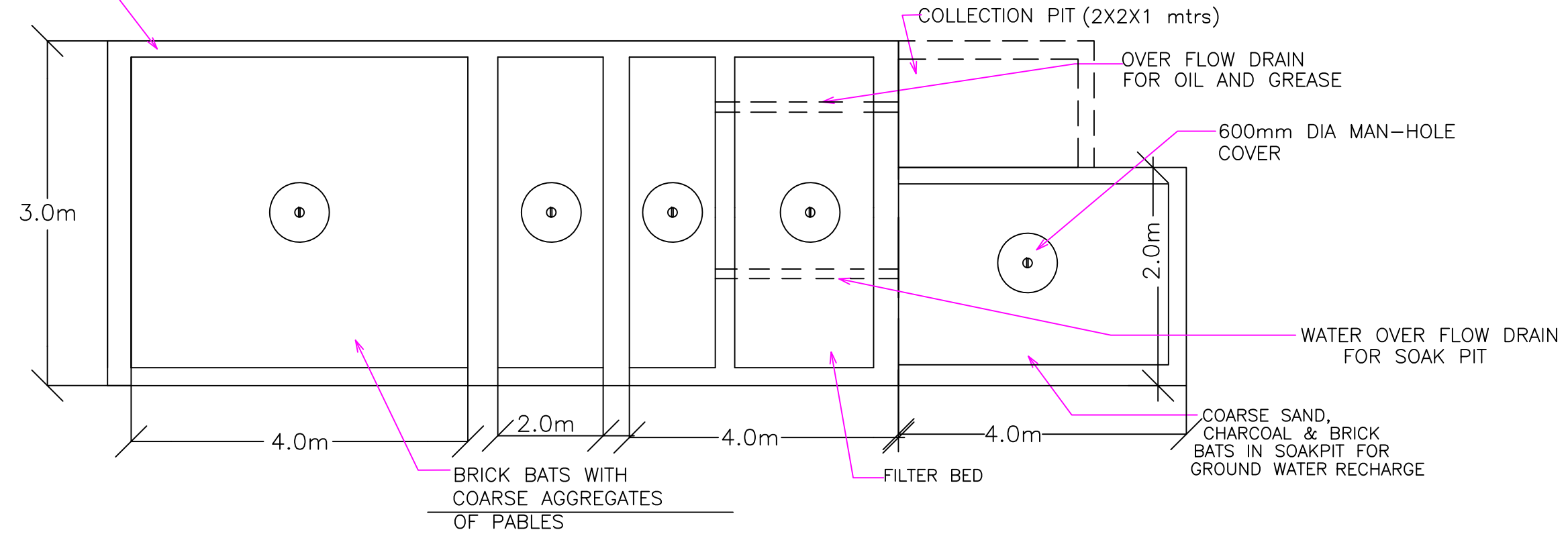
SCHEDULE:

LENGTH :- LUMP SUM QNTY - 2000M

|  |           |                 |      |             |                 |                 |   |   |  |  |    |  |  |                  |  |  |
|--|-----------|-----------------|------|-------------|-----------------|-----------------|---|---|--|--|----|--|--|------------------|--|--|
| DPR CONSULTANT :<br>CONSULTING ENGINEERS GROUP LTD. <br>E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com |           |                 |      |             |                 |                 | DESIGN REVIEW CONSULTANT :<br><br>LEA Associates South Asia Pvt. Ltd., India B-1, E-27, 1st FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . |   |  | CLIENT :<br><br>ODISHA WORKS DEPARTMENT |    | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A |  | SCALE :<br>N.T.S | DRAWING TITLE :<br>TYPICAL STANDARD DRAWING FOR SILT FENCE<br>(SHEET 1 OF 1) |  |
| NO.  | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:   | DWG. NUMBER : OSRP/CEG/SH09/P02A/ENV/01 |  | REV.   | R2 |  |  |                  |  |  |
| R2   | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |   |   |  |  |    |  |  |                  |  |  |
| R1   | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE)  |   |  |  |    |  |  |                  |  |  |
| -  | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |   |   |  |  |    |  |  |                  |  |  |



**SECTION OF SOAK PIT**



**PLAN OF SOAK PIT**

NOTE: PROVIDE AT CONTRACTOR'S PLANT SITE.

|     |      |           |                 |        |             |                 |                 |  |   |  |  |                  |                  |                                  |         |
|-----|------|-----------|-----------------|--------|-------------|-----------------|-----------------|--|---|--|--|------------------|------------------|----------------------------------|---------|
| R2  |      | SEP-2015  | SECOND REVISION | LASA   | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) | DPR CONSULTANT :<br><b>CEG</b><br>CONSULTING ENGINEERS GROUP LTD.<br>E-12, MOJI COLONY, MALVIYA NAGAR<br>JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com | DESIGN REVIEW CONSULTANT :<br><b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India<br>B-1, E-27, 1 <sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . | CLIENT :<br><br><b>ODISHA WORKS DEPARTMENT</b> | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A | SCALE :<br>N.T.S | DRAWING TITLE :  |                                  |         |
| R1  |      | JAN-2013  | FIRST REVISION  | OWD    | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |  |   |  |  |                  | N.K PRADHAN (CE) | OIL & GREASE TRAP FOR PLANT SITE |         |
| -   |      | JUNE 2008 | ORIGINAL        | CEG    |             |                 |                 |  |   |  |  |                  |                  | (SHEET 1 OF 1)                   |         |
| NO. | DATE | REVISION  | BY              | DRAWN: | PREPARED :  | CHECKED:        | APPROVED:       |  |   |  |  |                  | DWG. NUMBER :    | OSRP/CEG/SH09/P02A/ENV/06        | REV. R2 |

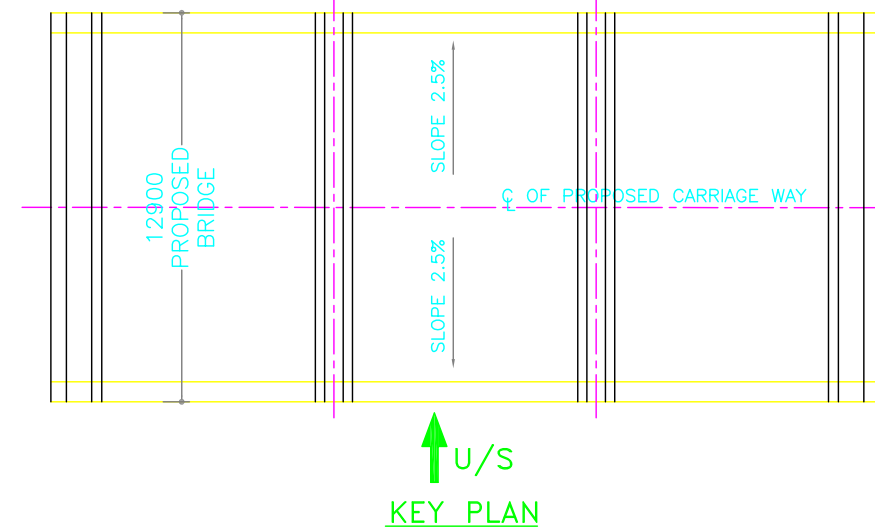
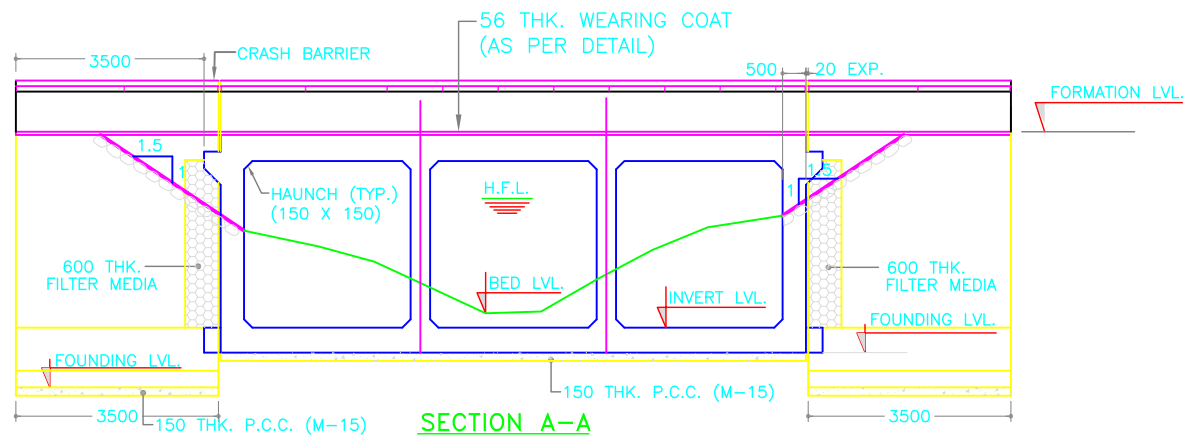
← TO BHADRAK

TO CHANDBALI →

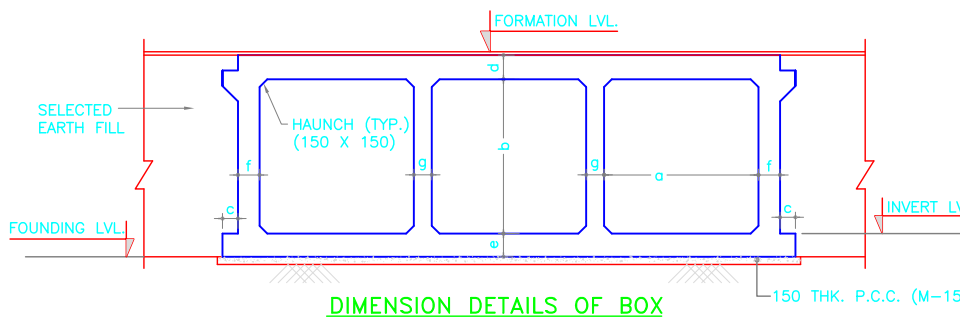
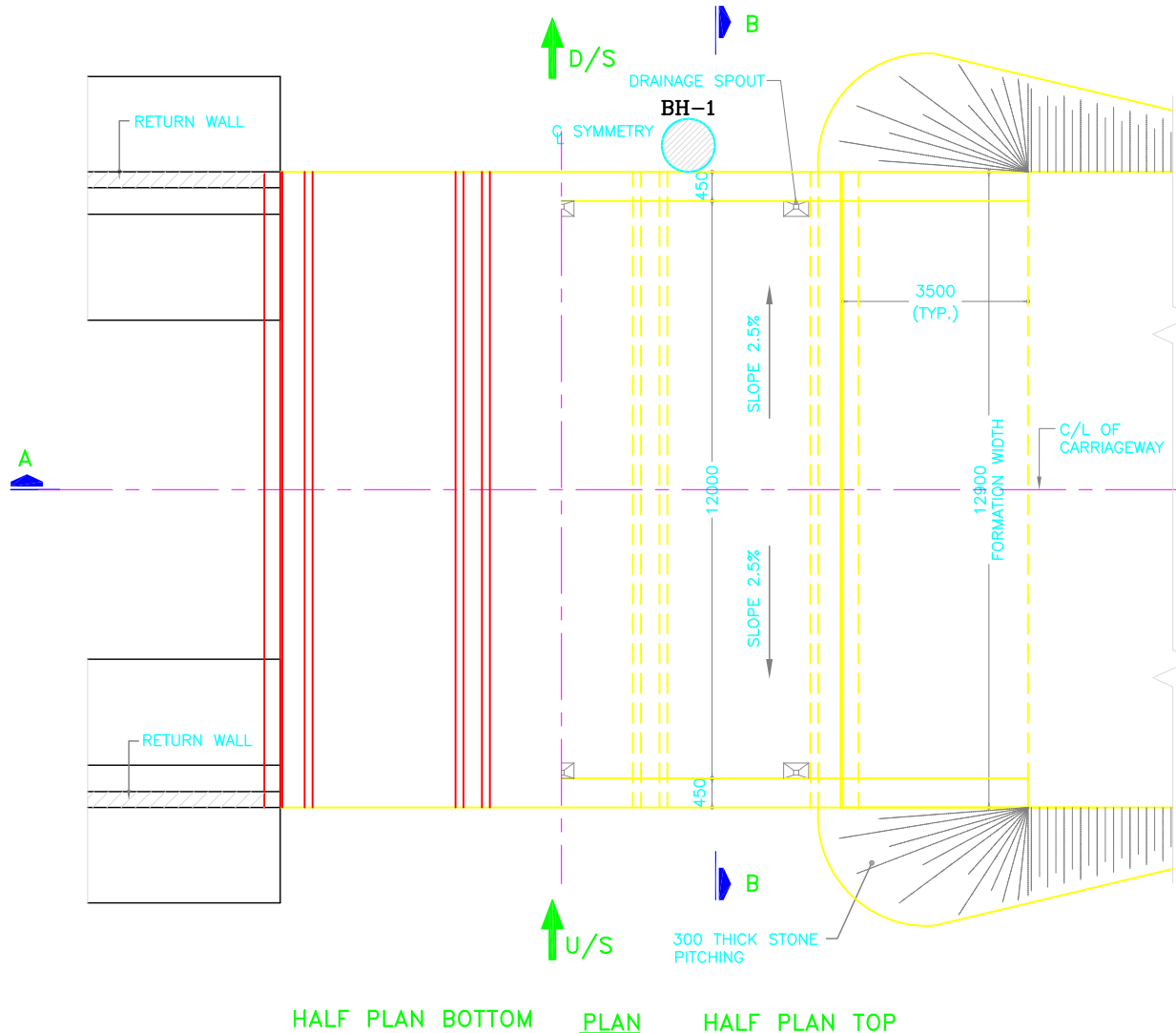
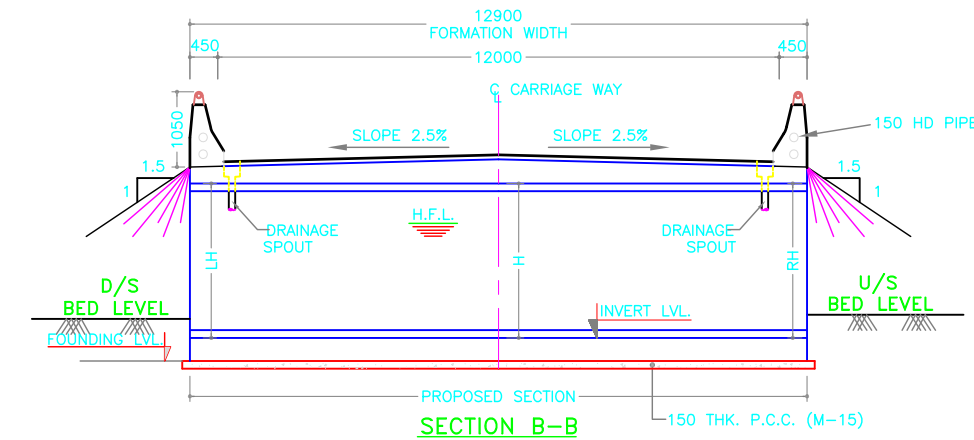
← TO BHADRAK

↑ D/S

TO CHANDBALI →



|                     |          |         |          |
|---------------------|----------|---------|----------|
| FORMATION LEVEL (m) | 18.970   | 18.970  | 18.970   |
| BED LEVEL (m)       | 17.756   | 16.061  | 18.474   |
| CHAINAGE (m)        | 1+009.63 | 1+005.0 | 1+020.37 |



DIMENSION DETAILS OF BOX

| BOX TYPE | WIDTH a (mm) | HEIGHT b (mm) | c (mm) | THICKNESS d (mm) | THICKNESS e (mm) | THICKNESS f (mm) | THICKNESS g (mm) | BEARING CAPACITY    |
|----------|--------------|---------------|--------|------------------|------------------|------------------|------------------|---------------------|
| 3/33/0   | 3000         | 3000          | 300    | 450              | 500              | 470              | 400              | 10 T/M <sup>2</sup> |

| BOX TYPE | EXISTING LOCATION (m) | PROPOSED CHAINAGE (m) | FORMATION LEVEL (m) | DESIGN HFL (m) | BED LVL (m) | INVERT LEVEL (m) | FOUNDING LVL (m) | CLEAR HEIGHT (MAX) |       |        | DIRECTION OF FLOW |
|----------|-----------------------|-----------------------|---------------------|----------------|-------------|------------------|------------------|--------------------|-------|--------|-------------------|
|          |                       |                       |                     |                |             |                  |                  | LH (m)             | H (m) | RH (m) |                   |
| 3/33/0   | 1+005                 | 1+015.0               | 18.97               | 17.77          | 16.061      | 15.761           | 15.261           | 2.553              | 2.703 | 2.553  | R TO L            |

HYDROLOGICAL DATA

| Design Discharge in (cum/sec) | Max. scour Level in (mts) | Depth of Curtain Wall in (mts) |                  | Length of Rigid Apron in (mts) |                  | Length of Flexible Apron in (mts) |                  |
|-------------------------------|---------------------------|--------------------------------|------------------|--------------------------------|------------------|-----------------------------------|------------------|
|                               |                           | u/s                            | d/s              | u/s                            | d/s              | u/s                               | d/s              |
|                               |                           | DCW <sub>1</sub>               | DCW <sub>2</sub> | LRA <sub>1</sub>               | LRA <sub>2</sub> | LFA <sub>1</sub>                  | LFA <sub>2</sub> |
| 6.17                          | 15.829                    | 2.0                            | 2.5              | 3.0                            | 5.0              | 3.0                               | 6.0              |

NOTES:-

- SOIL BELOW FOUNDING LEVEL UPTO DEPTH OF 2.0 M SHALL BE REPLACED BY SUITABLE COARSE RIVER SAND TO GET THE REQUIRED S.B.C.

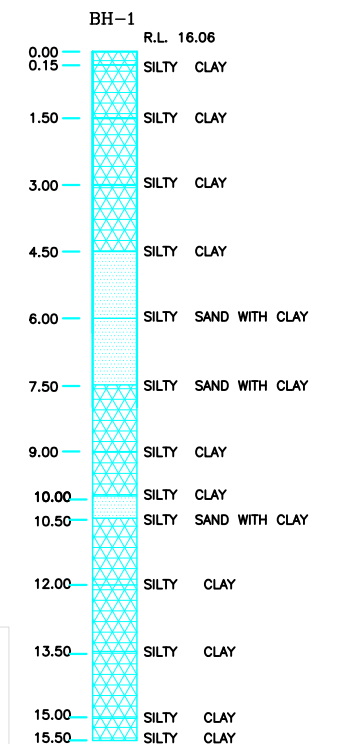
NOTES:-

- ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
- ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
- LOOSE / UNSUITABLE SOIL BELOW BOX STRUCTURES IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
- GRADE OF CONCRETE:-  
BOX - M-25  
RETURN WALL - M-35  
P.C.C. LEAN CONC. - M-15
- CHAINAGE / FORMATION LEVEL IS PROVIDED AS PER APPROVED PLAN & PROFILE DRAWING.
- FOR REINF. DETAILS OF RETURN WALL REFER SEPERATE DRAWING. GRADE OF STEEL SHALL BE Fe500 AS PER IS-1786:2008.
- IN CASES WHERE INVERT LEVEL IS HIGHER THAN GROUND LEVEL AT ENDS OF STRUCTURE OR WHERE UNSUITABLE SOIL IS TO BE REPLACED BY GRANULAR MATERIAL, PROVIDE ADEQUATE CUT OFF WALLS AT ENDS OF STRUCTURE TO PREVENT SCOUR/EROSION.
- ASPHALTIC PLUG TYPE EXPANSION JOINT SHALL BE PROVIDED AS PER DRG.NO. OSRP/CEG/BR/MISC-02.
- SITE PLAN ON SEPERATE SHEET.
- FOR FLOOR PROTECTION DETAILS REFER SEPERATE DRAWING.

REFERENCE DRAWING:-

- FOR DIMENSION & REINFORCEMENT DETAILS REFER MOST STANDARD DRAWING OF CULVERTS NO. SD/106, SD/112 (SHEET 1 OF 2), SD/112 (SHEET 2 OF 2).
- FOR GENERAL NOTES, MISCELLANEOUS DETAILS APPROACH SLAB, RCC RAILING, DRAINAGE SPOUT FLOOR PROTECTION WORKS REFER MOST STANDARD DRAWING OF CULVERTS NO. SD/101, SD/115(SHEET 1 OF 4), (SHEET 2 OF 4), (SHEET 3 OF 4), (SHEET 4 OF 4) & SD/111.
- OSRP/CEG/SH-9/BR/1+005/02
- OSRP/CEG/RW/MISC-01
- OSRP/CEG/SH-9/BR/FPW/01
- OSRP/CEG/SH-9/BR/SCW
- OSRP/CEG/BR/MISC-02

LOCATION PLAN OF BORE HOLE AT BRIDGE NO. 1/005



| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CEG**  
 CONSULTING ENGINEERS GROUP LTD.  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginia.com

DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

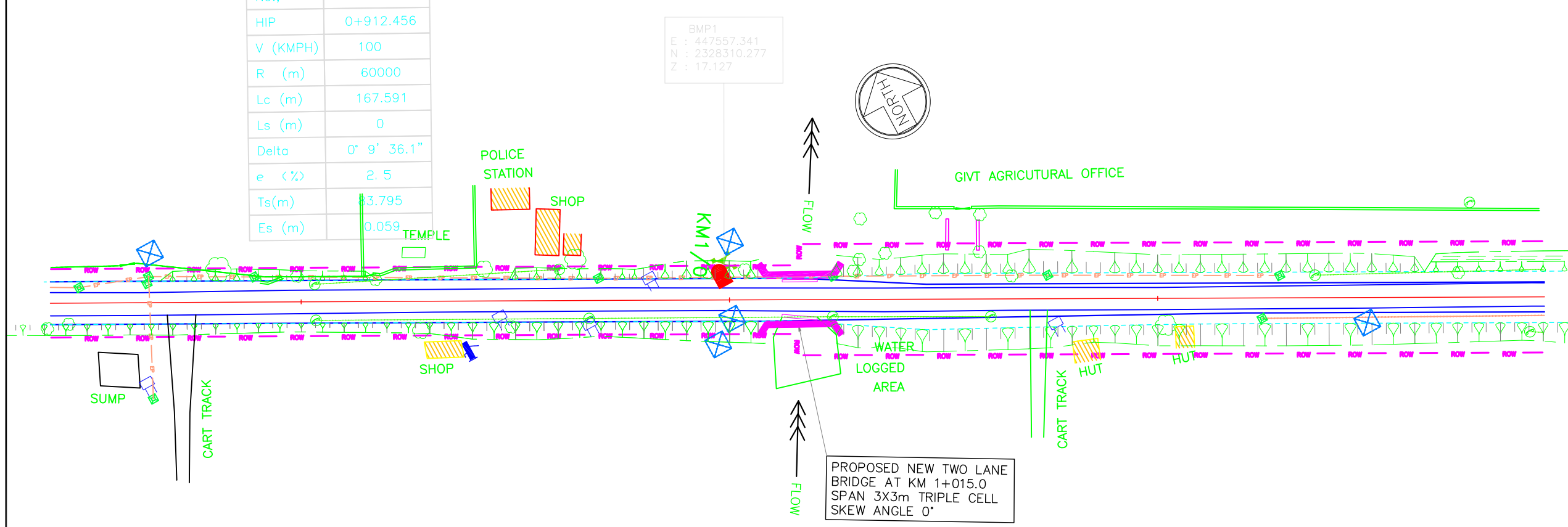
DRAWING TITLE :  
**BRIDGE AT PROPOSED CH. 1+015.0 (2 NO POLO SALANDI BYPASS)**  
 (SHEET 1 OF 2)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/BR/1+015/1 REV. R2

TO BHADARK

TO CHANDBALI

| CURVE DETAILS |             |
|---------------|-------------|
| No.,          | 2           |
| HIP           | 0+912.456   |
| V (KMPH)      | 100         |
| R (m)         | 60000       |
| Lc (m)        | 167.591     |
| Ls (m)        | 0           |
| Delta         | 0° 9' 36.1" |
| e (%)         | 2.5         |
| Ts(m)         | 3.795       |
| Es (m)        | 0.059       |

BMP1  
E : 447557.341  
N : 2328310.277  
Z : 17.127



PROPOSED NEW TWO LANE  
BRIDGE AT KM 1+015.0  
SPAN 3X3m TRIPLE CELL  
SKEW ANGLE 0°

SITE PLAN

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
E-12,MOJI COLONY,MALVIYA NAGAR  
JAIPUR-17 Tel:  
+91-141-2520899,2521899,2520556 Fax:  
2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

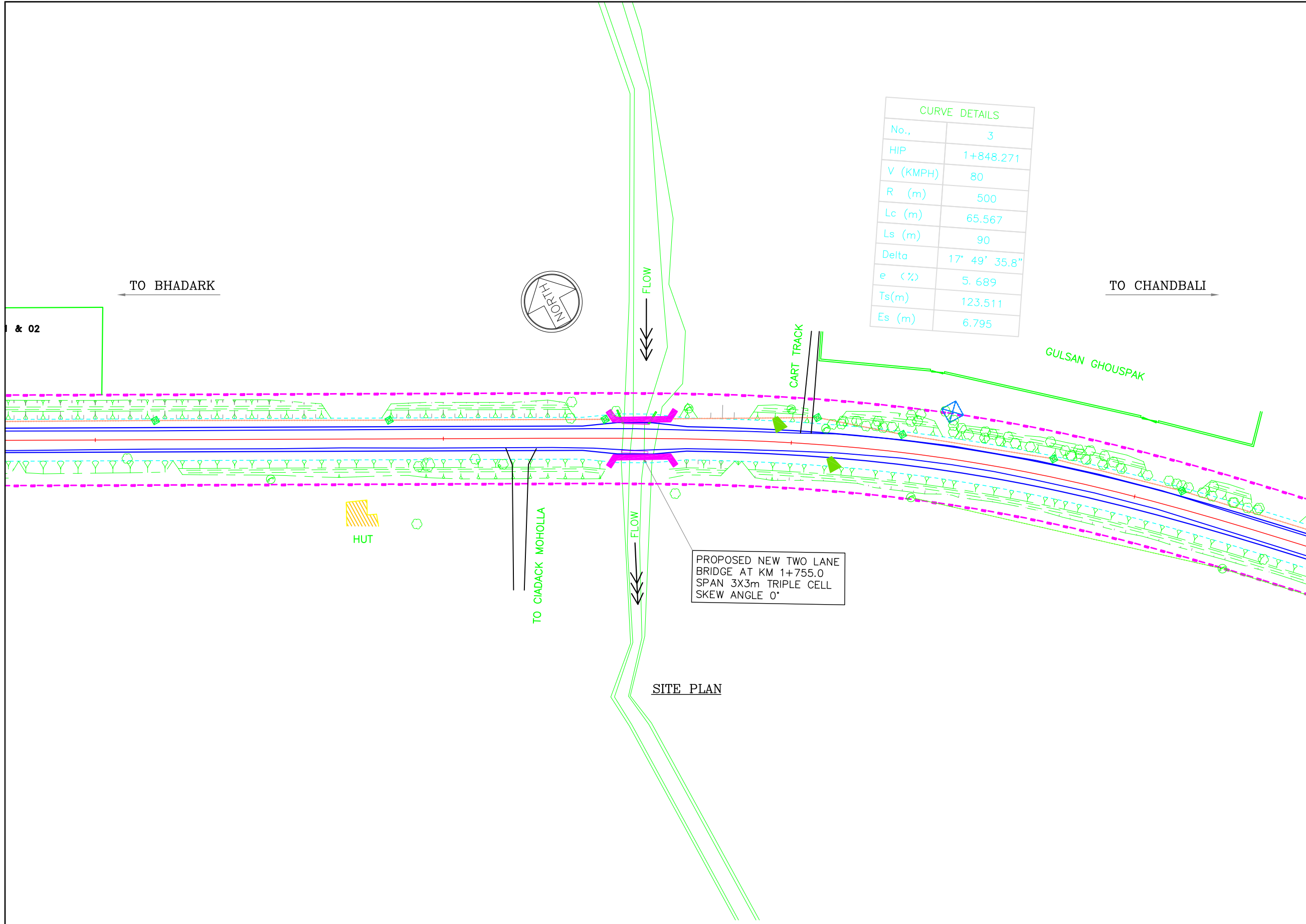
PROJECT :  
CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
N.T.S

DRAWING TITLE :  
**BRIDGE AT PROPOSED CH. 1+015.0 (2 NO POLO SALANDI BYPASS)**  
(SHEET 2 OF 2)  
DWG. NUMBER : OSRP/CEG/SH9/P02A/BR/1+015/2 REV. R2



NOTES:-



| CURVE DETAILS |               |
|---------------|---------------|
| No.,          | 3             |
| HIP           | 1+848.271     |
| V (KMPH)      | 80            |
| R (m)         | 500           |
| Lc (m)        | 65.567        |
| LS (m)        | 90            |
| Delta         | 17° 49' 35.8" |
| e (%)         | 5.689         |
| Ts(m)         | 123.511       |
| Es (m)        | 6.795         |

PROPOSED NEW TWO LANE  
BRIDGE AT KM 1+755.0  
SPAN 3X3m TRIPLE CELL  
SKEW ANGLE 0°

SITE PLAN

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

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B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

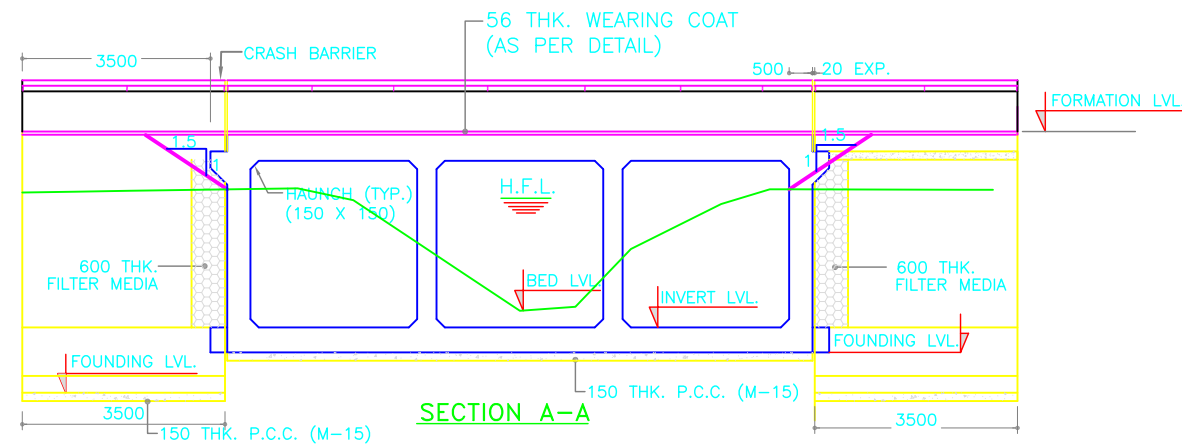
PROJECT :  
CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
N.T.S

DRAWING TITLE :  
SITE PLAN BRIDGE AT PROPOSED CH. 1+755.0 (TRIPLE CELL BOX)  
(SHEET 2 OF 2)  
DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/02  
REV. R2

← TO BHADRAK

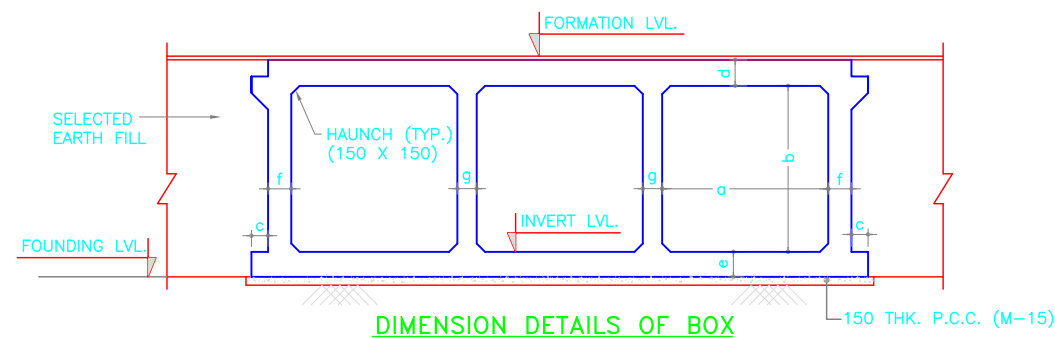
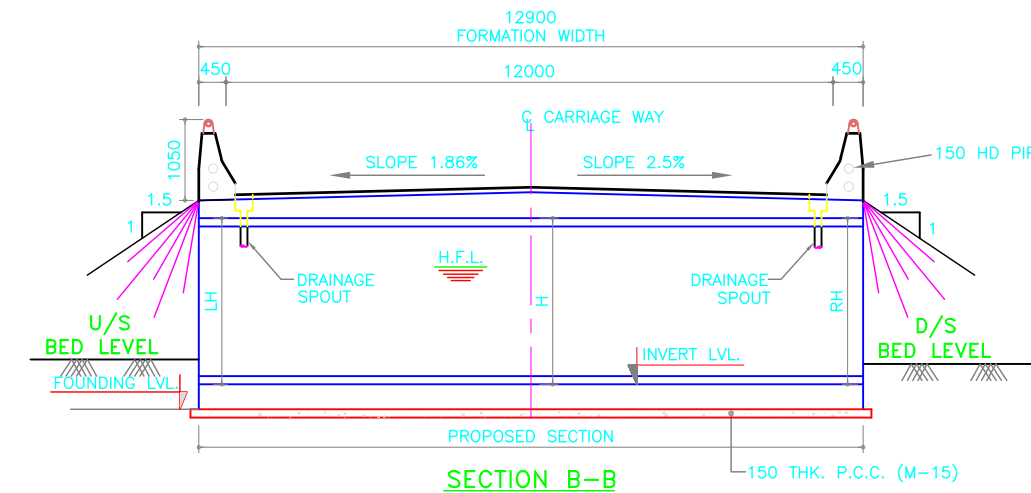
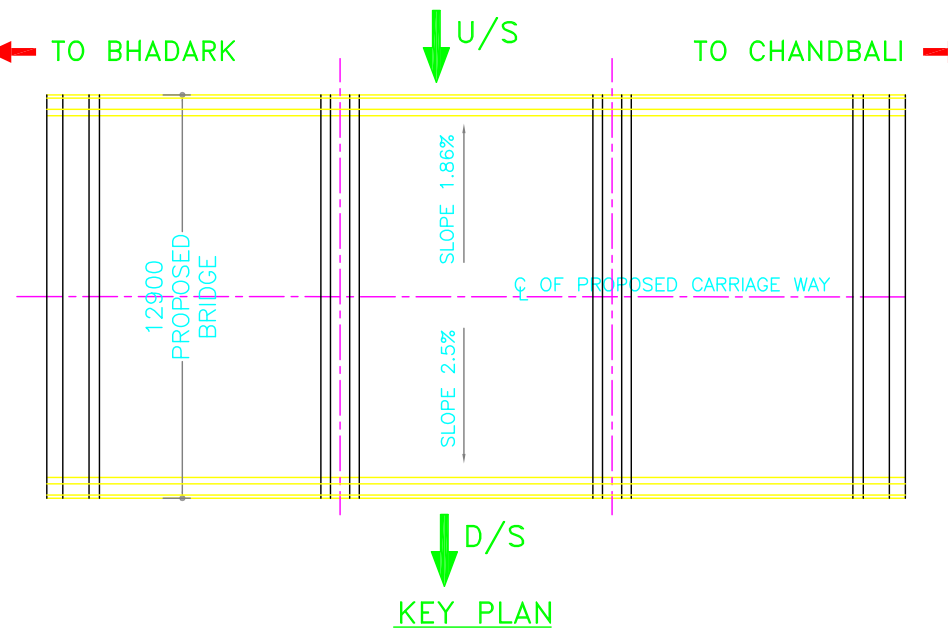
TO CHANDBALI →



|                     |          |         |          |
|---------------------|----------|---------|----------|
| FORMATION LEVEL (m) | 17.730   | 17.730  | 17.730   |
| BED LEVEL (m)       | 17.267   | 14.700  | 17.263   |
| CHAINAGE (m)        | 1+749.63 | 1+755.0 | 1+760.37 |

← TO BHADARK

TO CHANDBALI →



DIMENSION DETAILS OF BOX

| BOX TYPE | WIDTH a (mm) | HEIGHT b (mm) | c (mm) | THICKNESS d (mm) | THICKNESS e (mm) | THICKNESS f (mm) | THICKNESS g (mm) | BEARING CAPACITY    |
|----------|--------------|---------------|--------|------------------|------------------|------------------|------------------|---------------------|
| 3/33/0   | 3000         | 3000          | 300    | 450              | 500              | 470              | 400              | 10 T/M <sup>2</sup> |

| BOX TYPE | EXISTING LOCATION (m) | PROPOSED CHAINAGE (m) | FORMATION LEVEL (m) | DESIGN HFL (m) | BED LVL (m) | INVERT LEVEL (m) | FOUNDING LVL. (m) | CLEAR HEIGHT (MAX) |       |        | DIRECTION OF FLOW |
|----------|-----------------------|-----------------------|---------------------|----------------|-------------|------------------|-------------------|--------------------|-------|--------|-------------------|
|          |                       |                       |                     |                |             |                  |                   | LH (m)             | H (m) | RH (m) |                   |
| 3/33/0   | 1+005                 | 1+755.0               | 17.730              | 16.306         | 14.700      | 14.400           | 13.900            | 2.712              | 2.824 | 2.674  | L TO R            |

HYDROLOGICAL DATA

| Design Discharge in (cum/sec) | Max. scour Level in (mts) | Depth of curtain Wall in (mts) |                  | Length of Rigid Apron in (mts) |                  | Length of Flexible Apron in (mts) |                  |
|-------------------------------|---------------------------|--------------------------------|------------------|--------------------------------|------------------|-----------------------------------|------------------|
|                               |                           | u/s                            | d/s              | u/s                            | d/s              | u/s                               | d/s              |
|                               |                           | DCW <sub>1</sub>               | DCW <sub>2</sub> | LRA <sub>1</sub>               | LRA <sub>2</sub> | LFA <sub>1</sub>                  | LFA <sub>2</sub> |
| 6.03                          | 14.277                    | 2.0                            | 2.5              | 3.0                            | 5.0              | 3.0                               | 6.0              |

NOTE:

SOIL BELOW FOUNDING LEVEL UPTO DEPTH OF 2.0 M. SHALL BE REPLACED BY SUITABLE COARSE RIVER SAND TO GET THE REQUIRED S.B.C.

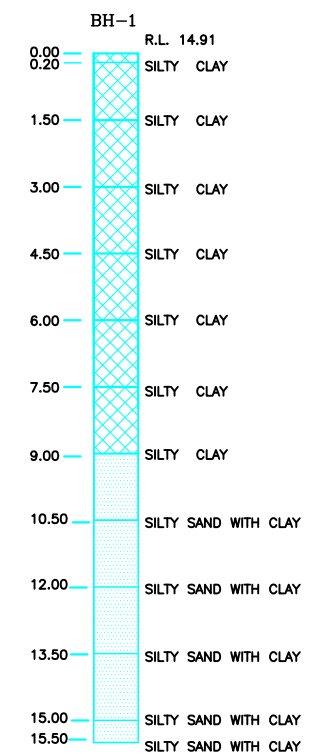
NOTES:

- ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
- ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
- LOOSE / UNSUITABLE SOIL BELOW BOX STRUCTURES IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
- GRADE OF CONCRETE:-  
BOX - M-25  
RETURN WALL - M-25  
APPROACH SLAB - M-30  
P.C.C. LEAN CONC. - M-15
- CHAINAGE / FORMATION LEVEL IS PROVIDED AS PER APPROVED PLAN & PROFILE DRAWING.
- FOR REINF. DETAILS OF RETURN WALL REFER SEPERATE DRAWING. GRADE OF STEEL SHALL BE Fe500 AS PER IS-1786
- IN CASES WHERE INVERT LEVEL IS HIGHER THAN GROUND LEVEL AT ENDS OF STRUCTURE OR WHERE UNSUITABLE SOIL IS TO BE REPLACED BY GRANULAR MATERIAL, PROVIDE ADEQUATE CUT OFF WALLS AT ENDS OF STRUCTURE TO PREVENT SCOUR/EROSION.
- ASPHALTIC PLUG TYPE EXPANSION JOINT SHALL BE PROVIDED AS PER DRG.NO. OSRP/CEG/BR/MISC-02
- SITE PLAN ON SEPERATE SHEET.
- FOR FLOOR PROTECTION DETAILS REFER SEPERATE DRAWING.

REFERENCE DRAWING:-

- FOR DIMENSION & REINFORCEMENT DETAILS REFER MOST STANDARD DRAWING OF CULVERTS NO. SD/106, SD/112 (SHEET 1 OF 2), SD/112 (SHEET 2 OF 2).
- FOR GENERAL NOTES, MISCELLANEOUS DETAILS APPROACH SLAB, RCC RAILING, DRAINAGE SPOUT FLOOR PROTECTION WORKS REFER MOST STANDARD DRAWING OF CULVERTS NO. SD/101, SD/115 (SHEET 1 OF 4), (SHEET 2 OF 4), (SHEET 3 OF 4), (SHEET 4 OF 4) & SD/111.
- OSRP/CEG/SH-9/BR/1+800/02
- OSRP/CEG/RW/MISC-01
- OSRP/CEG/SH-9/BR/FPW/01
- OSRP/CEG/SH-9/BR/SCW
- OSRP/CEG/BR/MISC-02

LOCATION PLAN OF BORE HOLE AT BRIDGE NO.1/800



HALF PLAN BOTTOM PLAN HALF PLAN TOP

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CEG**  
 CONSULTING ENGINEERS GROUP LTD.  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginia.com

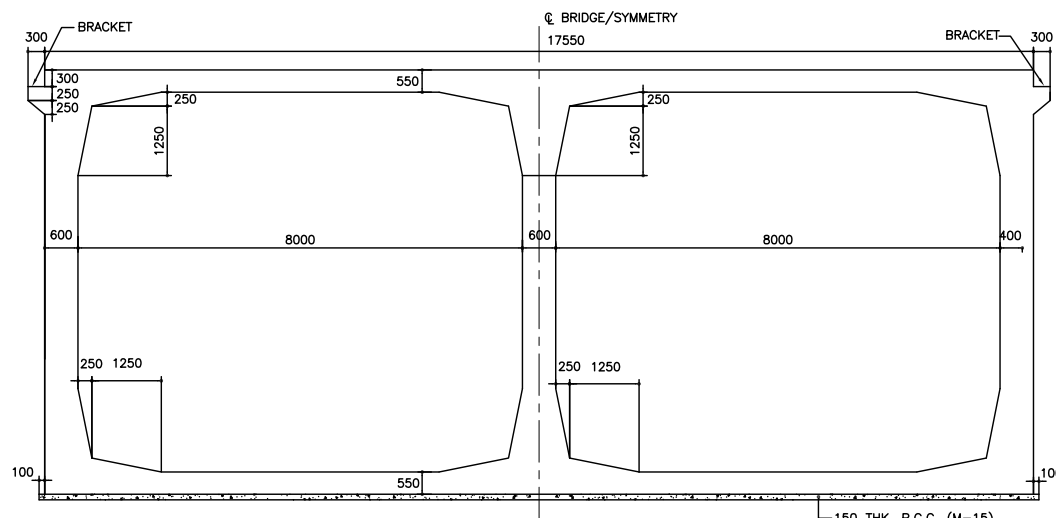
DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

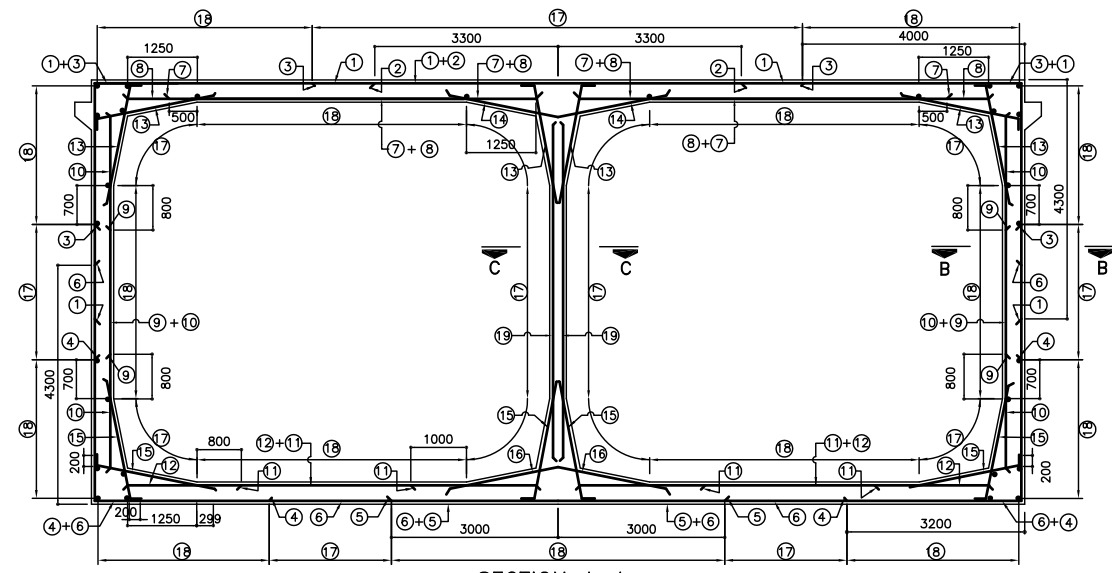
PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

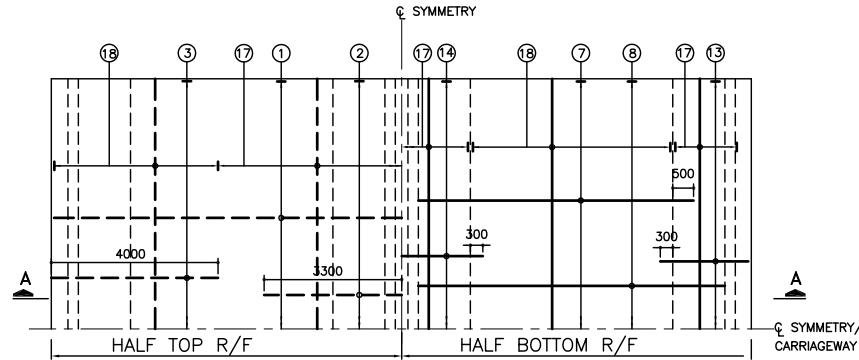
DRAWING TITLE :  
**GENERAL ARRANGEMENT DRAWING BRIDGE AT PROPOSED CH. 1+755.0 (TRIPLE CELL BOX)**  
 (SHEET 1 OF 2)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/01 REV. R2



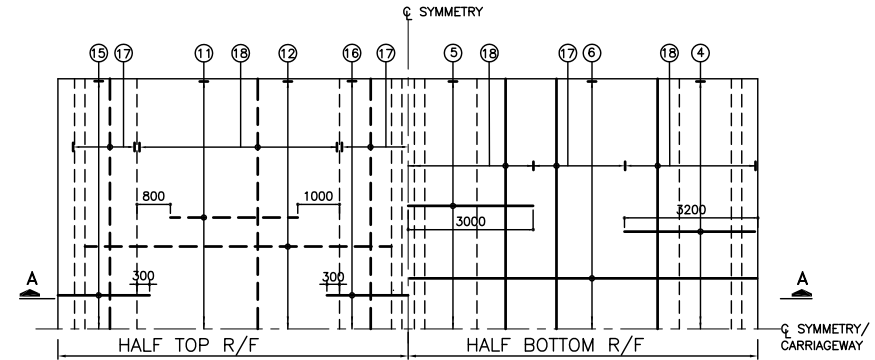
CROSS SECTION AT C CARRIAGEWAY



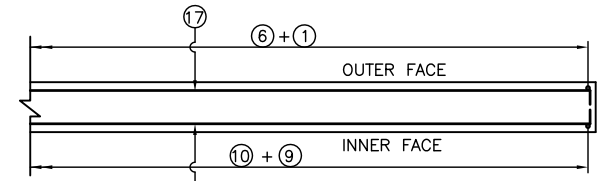
SECTION A-A



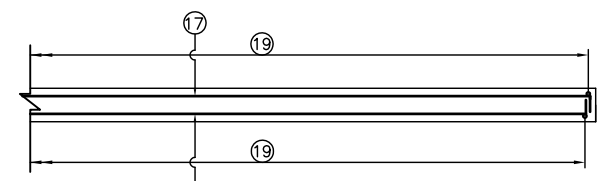
TOP SLAB R/F PLAN



BOTTOM SLAB R/F PLAN



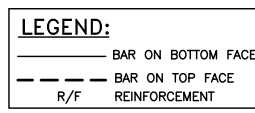
SECTION B-B



SECTION C-C

REINF. DETAILS

| BAR NO. | BAR DIA. | SPACING | SHAPE |
|---------|----------|---------|-------|
| 1       | 12       | 200 C/C | 4300  |
| 2       | 20       | 200 C/C | —     |
| 3       | 20       | 200 C/C | 4000  |
| 4       | 20       | 200 C/C | 3200  |
| 5       | 20       | 200 C/C | —     |
| 6       | 16       | 200 C/C | 4300  |
| 7       | 12       | 200 C/C | —     |
| 8       | 20       | 200 C/C | —     |
| 9       | 12       | 200 C/C |       |
| 10      | 20       | 200 C/C |       |
| 11      | 12       | 200 C/C | —     |
| 12      | 20       | 200 C/C | —     |
| 13      | 16       | 200 C/C | 200   |
| 14      | 16       | 200 C/C | 200   |
| 15      | 12       | 200 C/C | 200   |
| 16      | 12       | 200 C/C | —     |
| 17      | 10       | 200 C/C | 1200  |
| 18      | 12       | 200 C/C | 1200  |
| 19      | 12       | 200 C/C |       |



NOTES:

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METERS.
2. DO NOT SCALE THE DIMENSIONS. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OF CONC. FOR R.C.C. WORKS. = M-35  
GRADE OF CONC. FOR LEAN CONC. = M-15
4. HYSD REINFORCEMENT IS CONFORMED TO IS:1786 GRADE Fe 415.
5. ANTI CORROSIVE REINFORCING BAR SHALL BE PROVIDE.
6. CLEAR COVER TO ANY REINFORCEMENT:  
(a) BASE SLAB =75mm  
(b) ALL OTHER COMPONENTS =50mm.
7. NOT MORE THAN 50% OF BAR IS LAPPED AT A SECTION AND LAPPING IS STAGGERED. AND MINIMUM LAP LENGTH IS 63X DIA OF BAR FOR MAIN BARS AND 30 TIMES DIA OF BAR FOR ALL OTHER BARS.
8. FOR DETAILS OF CRASH BARRIER, EXPANSION JOINT, BRACKET, APPROACH SLAB AND WEARING COAT REFER DRAWING No. OSRP/CEG/BR/MISC-02

REFERENCE DRAWINGS:

- (I) OSRP/CEG/SH-9/BR/3+200/01 G. A. D.
- (II) OSRP/CEG/BR/MISC-02 MISC DETAILS

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

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B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

N.T.S

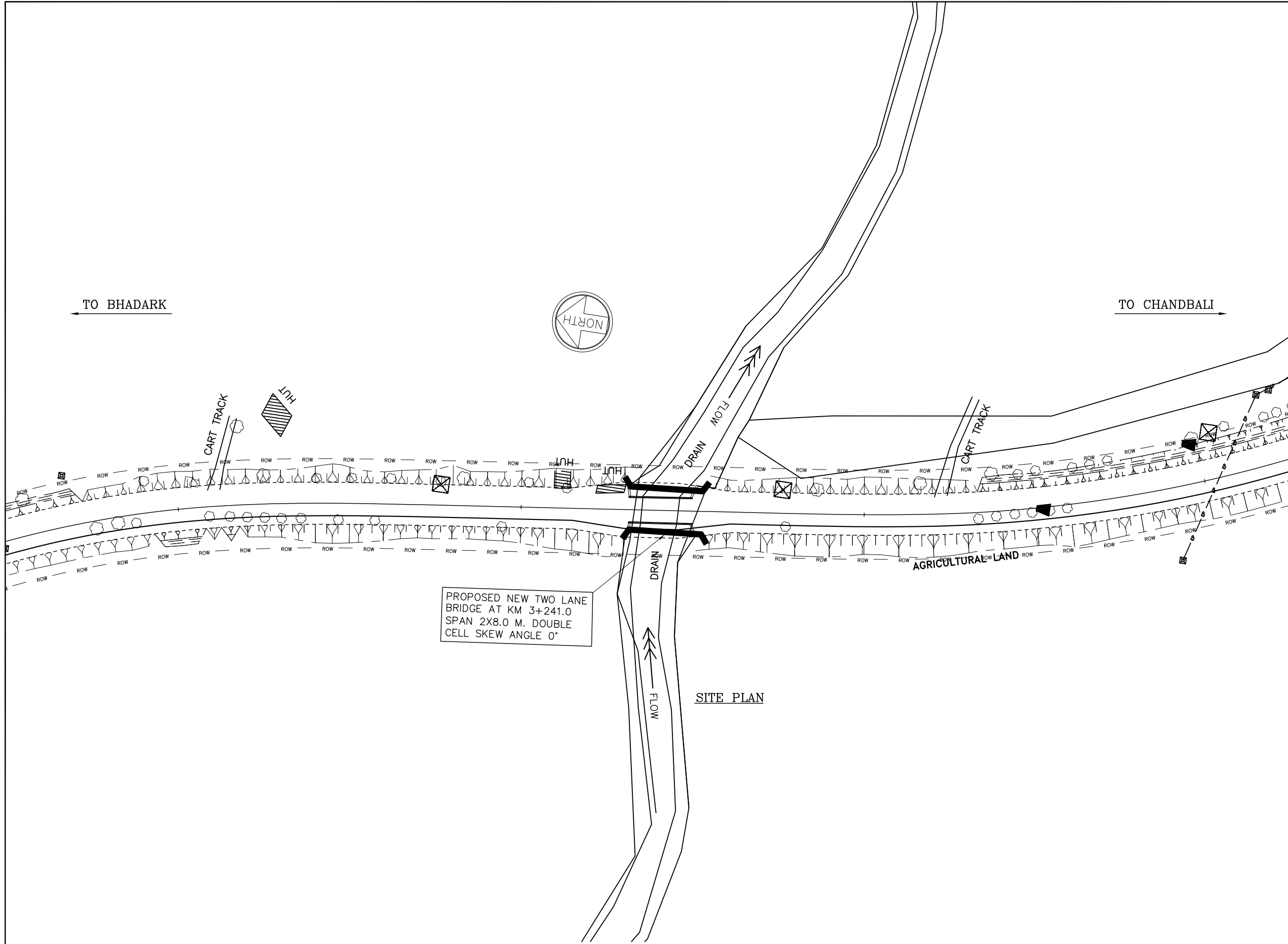
DRAWING TITLE :

**DIMENSION AND REINFORCEMENT DETAILS BRIDGE AT PROPOSED CH. 3+241.0 (MIRJAPUR VILLAGE)**

(SHEET 1 OF 2)

DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/ 3 REV. R2

NOTES: -



PROPOSED NEW TWO LANE  
BRIDGE AT KM 3+241.0  
SPAN 2X8.0 M. DOUBLE  
CELL SKEW ANGLE 0°

SITE PLAN

|     |           |                 |      |             |                 |                 |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        |
|     |           |                 |      |             | APPROVED:       |                 |

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SCALE :  
N.T.S

DRAWING TITLE :  
SITE PLAN BRIDGE AT PROPOSED CH. 3+241.0 (MIRJAPUR VILLAGE)  
DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/3  
REV. R2



← TO BHADRAK

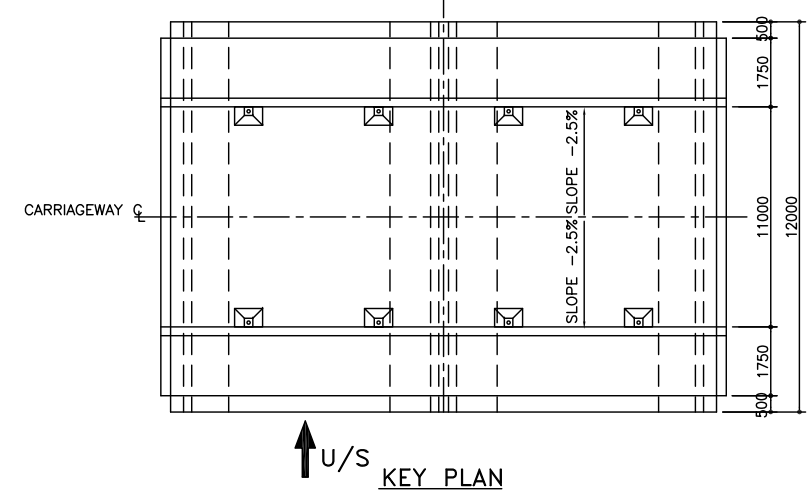
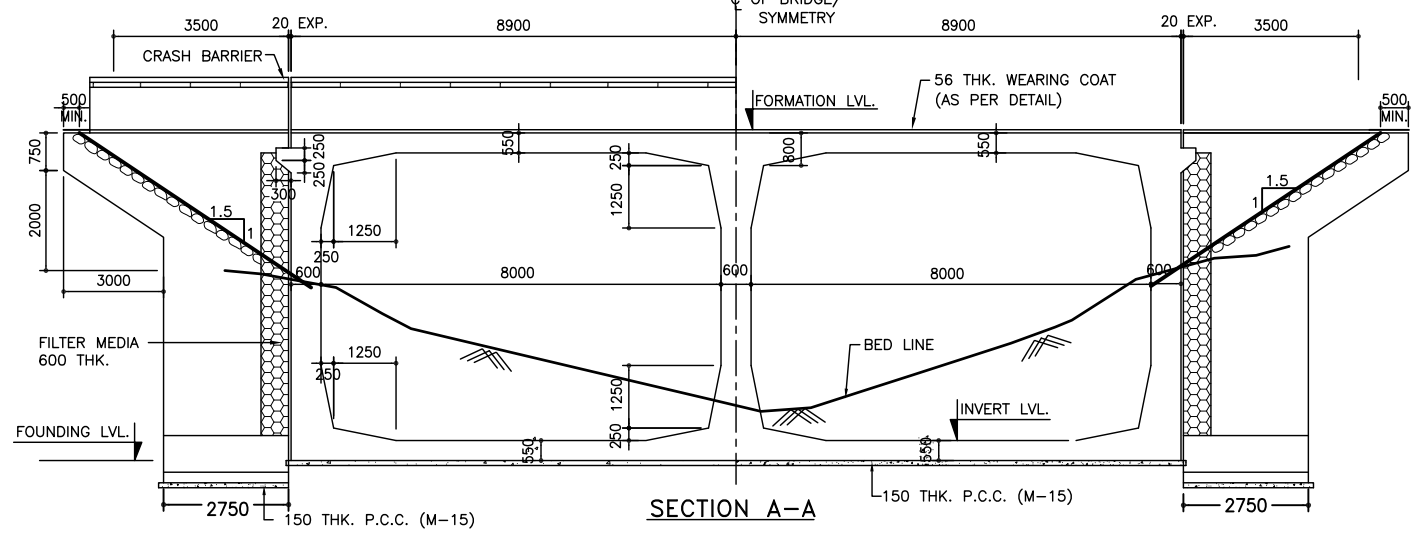
TO CHANDBALI →

← TO BHADRAK

↑ D/S

← BRIDGE/SYMMETRY

TO CHANDBALI →



**NOTES:**

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METERS.
2. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
3. CHAINAGES SHOWN ARE C/L OF PROPOSED ROAD.
4. LOOSE / UNSUITABLE SOIL BELOW BOX STRUCTURES IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
5. FORMATION LEVEL & SUPERELEVATION IS PROVIDED AS PER THE APPROVED 'PLAN & PROFILE' DRAWING.
6. ASPHALTIC PLUG TYPE EXPANSION JOINT IS PROVIDED AS PER DRAWING NO. OSRP/CEG/BR/MISC-02
7. **GRADE OF CONCRETE:**  
 P.C.C. LEAN CONC. ----- M-15  
 BOX STRUCTURE ----- M-35  
 APPROACH SLAB ----- M-30  
 RETURN WALL ----- M-30  
 CRASH BARRIER ----- M-40
8. FOR FLOOR PROTECTION DETAILS REFER SEPERATE DRAWING.

**REFERENCE DRAWINGS**

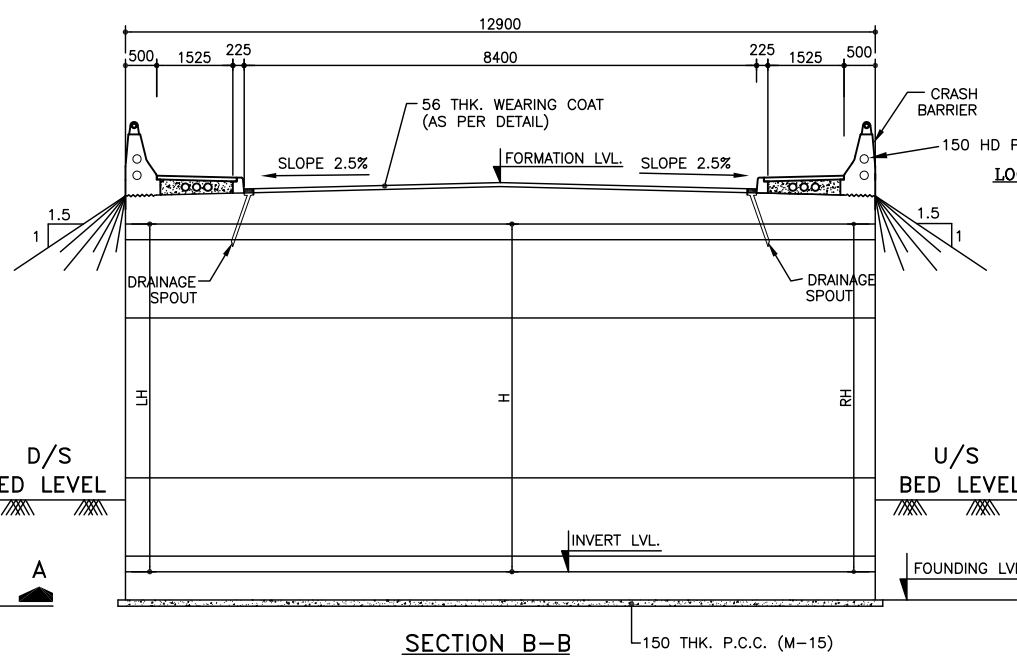
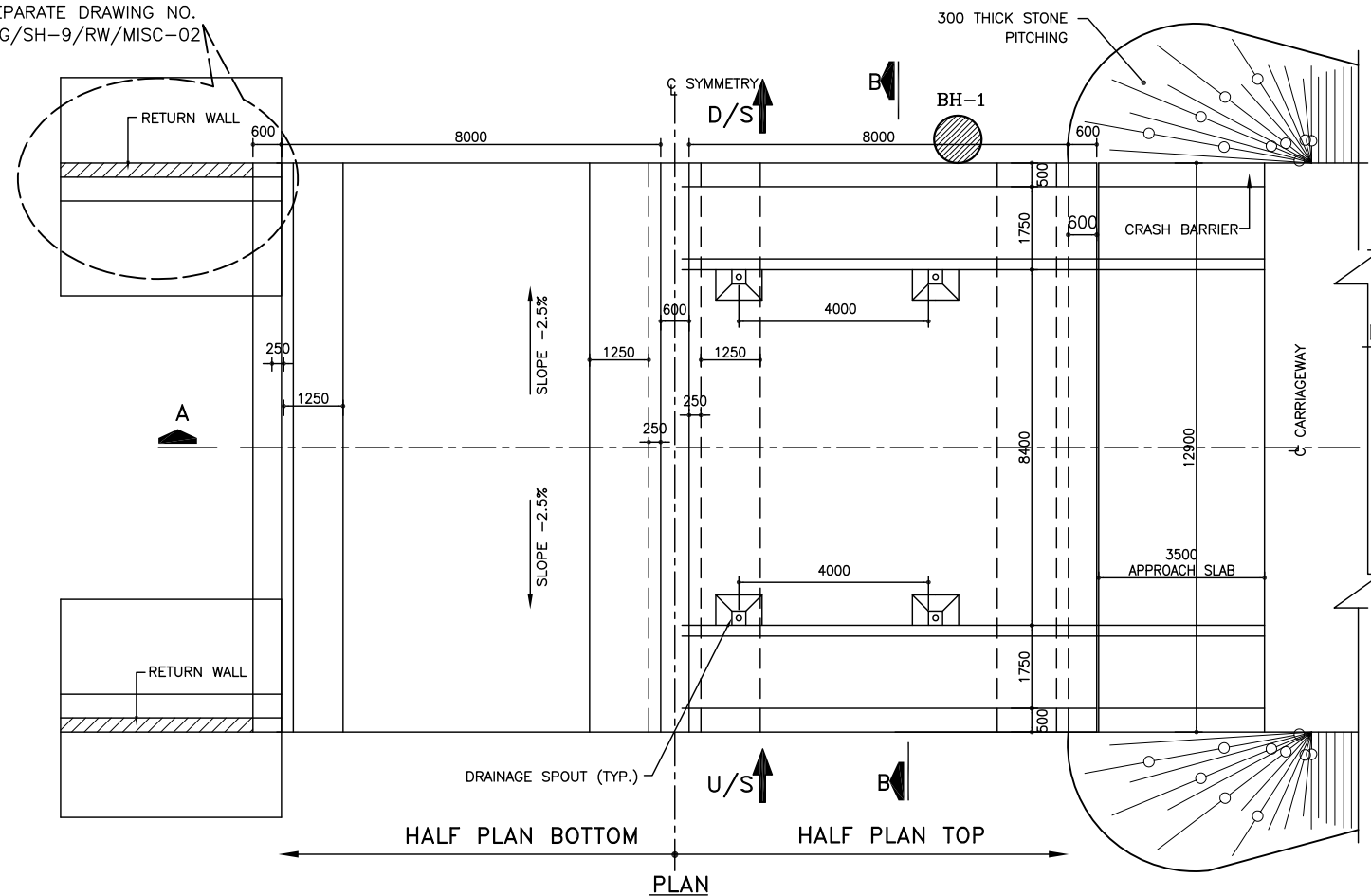
1. OSRP/CEG/SH-9/BR/3+200/02
2. OSRP/CEG/SH-9/BR/3+200/03
3. OSRP/CEG/BR/MISC-02
4. OSRP/CEG/SH-9/BR/FPW/01
5. OSRP/CEG/SH-9/BR/SCW
6. OSRP/CEG/SH-9/RW/MISC-02

**BOX LEVELS DETAILS**

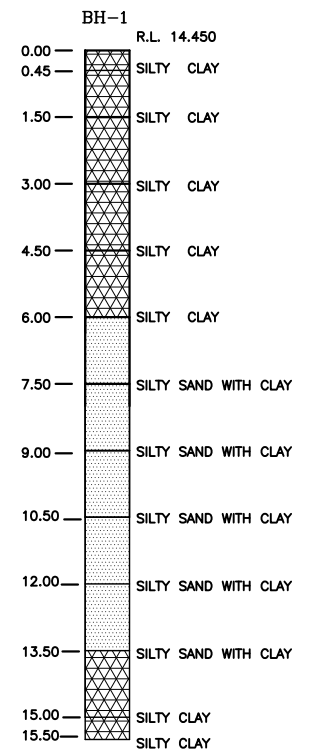
| EXISTING LOCATION (m) | PROPOSED CHAINAGE (m) | FORMATION LEVEL (m) | DESIGN HFL (m) | BED LVL (m) | INVERT LVL (m) | FOUNDING LVL (m) | CLEAR HEIGHT (MAX) |       |        | DIRECTION OF FLOW |
|-----------------------|-----------------------|---------------------|----------------|-------------|----------------|------------------|--------------------|-------|--------|-------------------|
|                       |                       |                     |                |             |                |                  | LH (m)             | H (m) | RH (m) |                   |
| 3+200                 | 3+241                 | 18.240              | 16.770         | 13.844      | 12.89          | 12.340           | 4.7                | 4.8   | 4.7    | R TO L            |

|                     |          |         |          |
|---------------------|----------|---------|----------|
| FORMATION LEVEL (m) | 18.240   | 18.240  | 18.240   |
| BED LEVEL (m)       | 14.775   | 13.844  | 14.932   |
| CHAINAGE (m)        | 3+232.25 | 3+241.0 | 3+249.75 |

FOR RETURN WALL REFER SEPERATE DRAWING NO. OSRP/CEG/SH-9/RW/MISC-02



**LOCATION PLAN OF BORE HOLE AT BRIDGE NO.3/200**



**HYDROLOGICAL DATA**

| Design Discharge in (cum/sec) | Max. scour Level in (mts) | Depth of curtain Wall in (mts) |                  | Length of Rigid Apron in (mts) |                  | Length of Flexible Apron in (mts) |                  |
|-------------------------------|---------------------------|--------------------------------|------------------|--------------------------------|------------------|-----------------------------------|------------------|
|                               |                           | u/s                            | d/s              | u/s                            | d/s              | u/s                               | d/s              |
|                               |                           | DCW <sub>1</sub>               | DCW <sub>2</sub> | LRA <sub>1</sub>               | LRA <sub>2</sub> | LFA <sub>1</sub>                  | LFA <sub>2</sub> |
| 43.1                          | 11.562                    | 3.0                            | 3.5              | 3.0                            | 5.0              | 5.0                               | 6.0              |

**NOTE:**

SOIL BELOW FOUNDING LEVEL UPTO DEPTH OF 2.0 M. SHALL BE REPLACED BY SUITABLE COARSE RIVER SAND TO GET THE REQUIRED S.B.C.

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :

**CONSULTING ENGINEERS GROUP LTD.**

E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginia.com

DESIGN REVIEW CONSULTANT :

**LEA Associates South Asia Pvt. Ltd., India**

B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

**CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+00 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A**

SCALE :

**N.T.S**

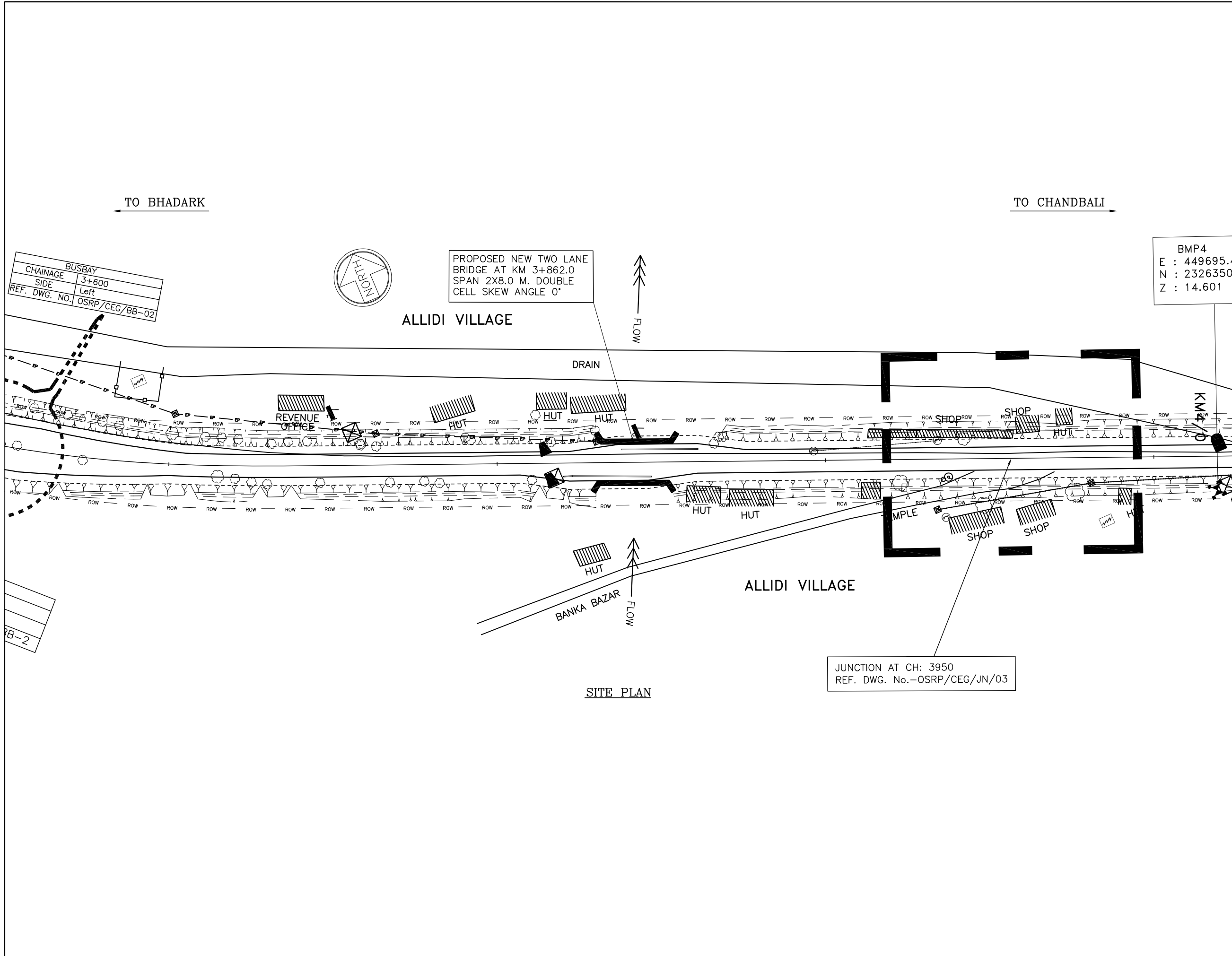
DRAWING TITLE :

**GENERAL ARRANGEMENT DRAWING BRIDGE AT PROPOSED CH. 3+241.0 (MIRJAPUR VILLAGE)**

(SHEET 1 OF 2)

DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/3 REV. R2

NOTES:-



BUSBAY  
CHAINAGE 3+600  
SIDE Left  
REF. DWG. NO. OSRP/CEG/BB-02

PROPOSED NEW TWO LANE  
BRIDGE AT KM 3+862.0  
SPAN 2X8.0 M. DOUBLE  
CELL SKEW ANGLE 0°

BMP4  
E : 449695.4  
N : 2326350.  
Z : 14.601

JUNCTION AT CH: 3950  
REF. DWG. No.-OSRP/CEG/JN/03

SITE PLAN

BB-2

|     |           |                 |      |             |                 |                 |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |
| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        |
|     |           |                 |      |             | APPROVED:       |                 |

DPR CONSULTANT :  
**CEG**  
CONSULTING ENGINEERS GROUP LTD.  
E-12, MOJI COLONY, MALVIYA NAGAR  
JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

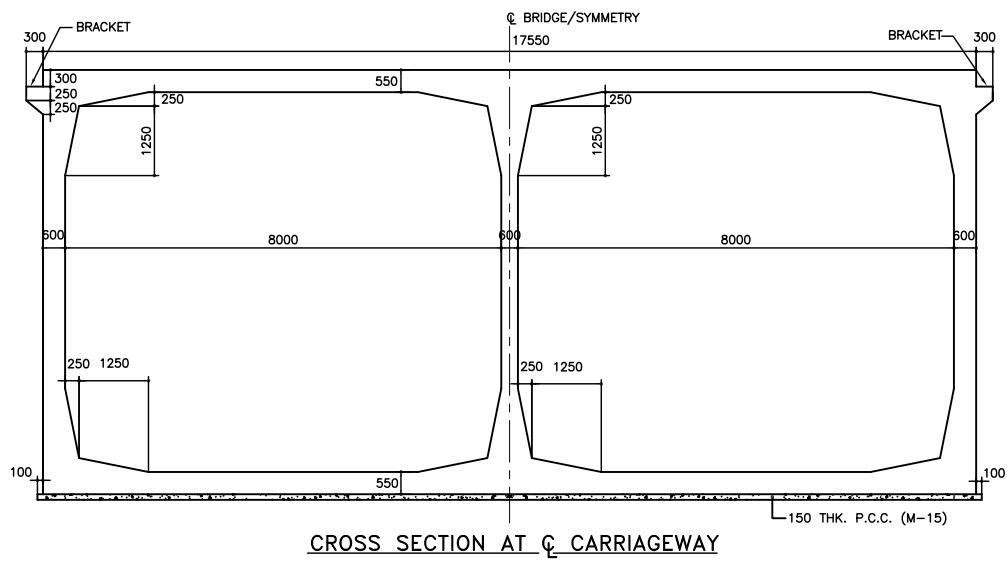
DESIGN REVIEW CONSULTANT :  
**LEA**  
LEA Associates South Asia Pvt. Ltd., India  
B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

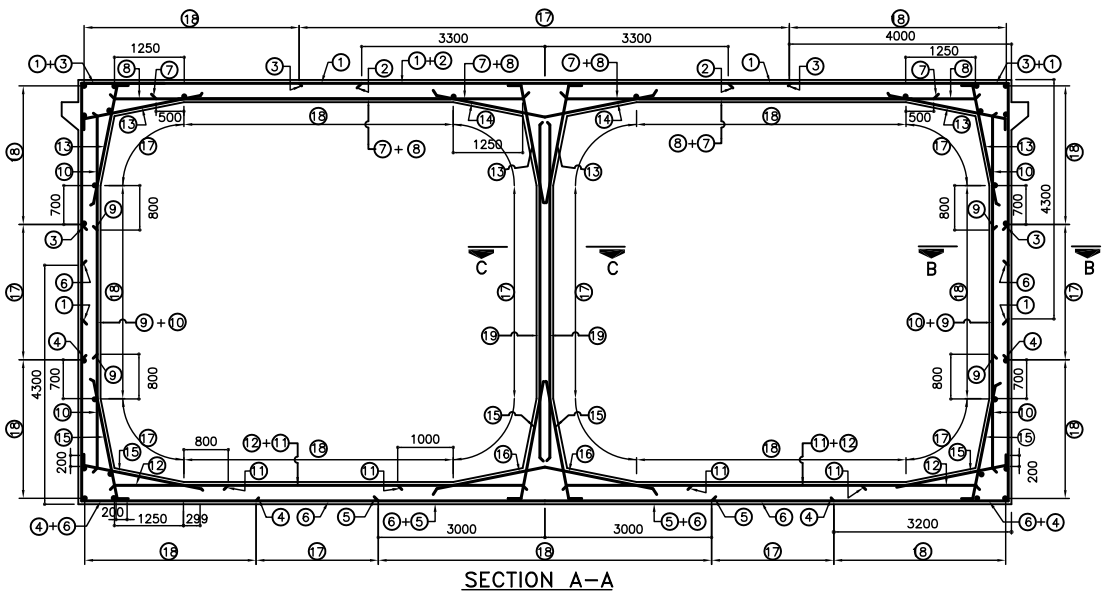
PROJECT :  
CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
N.T.S

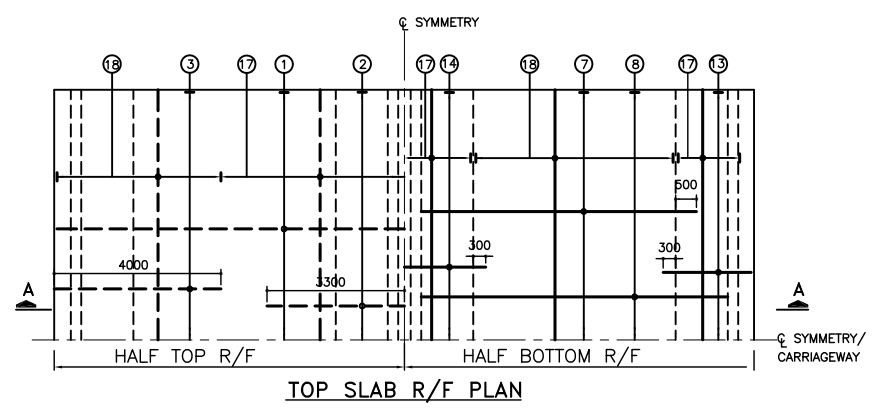
DRAWING TITLE :  
SITE PLAN BRIDGE AT PROPOSED CH. 3+862 (HALADIHA BYPASS)  
DWG. NUMBER : OSRP/CEG/SH9/P02A/03  
REV. R2



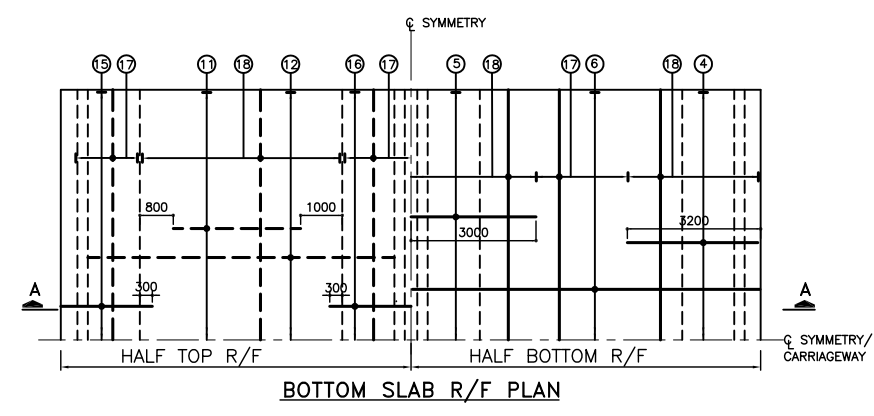
CROSS SECTION AT C CARRIAGEWAY



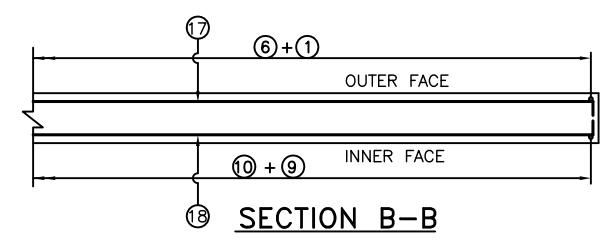
SECTION A-A



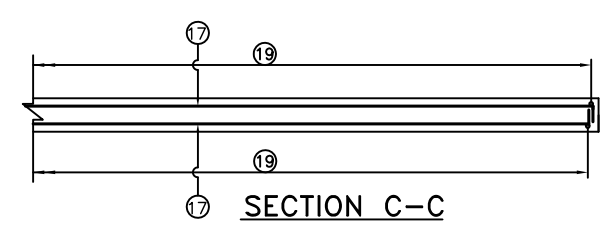
TOP SLAB R/F PLAN



BOTTOM SLAB R/F PLAN



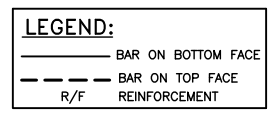
SECTION B-B



SECTION C-C

REINF. DETAILS

| BAR NO. | BAR DIA. | SPACING | SHAPE |
|---------|----------|---------|-------|
| 1       | 12       | 200 C/C | □     |
| 2       | 20       | 200 C/C | —     |
| 3       | 20       | 200 C/C | □     |
| 4       | 20       | 200 C/C | □     |
| 5       | 20       | 200 C/C | —     |
| 6       | 16       | 200 C/C | □     |
| 7       | 12       | 200 C/C | —     |
| 8       | 20       | 200 C/C | —     |
| 9       | 12       | 200 C/C |       |
| 10      | 20       | 200 C/C |       |
| 11      | 12       | 200 C/C | —     |
| 12      | 20       | 200 C/C | —     |
| 13      | 16       | 200 C/C | □     |
| 14      | 16       | 200 C/C | □     |
| 15      | 12       | 200 C/C | □     |
| 16      | 12       | 200 C/C | □     |
| 17      | 10       | 200 C/C | □     |
| 18      | 12       | 200 C/C | □     |
| 19      | 12       | 200 C/C |       |



NOTES:

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METERS.
2. DO NOT SCALE THE DIMENSIONS. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OF CONC. FOR R.C.C. WORKS. = M-35  
GRADE OF CONC. FOR LEAN CONC. = M-15
4. HYSD REINFORCEMENT IS CONFORMED TO IS:1786 GRADE Fe 415.
5. ANTI CORROSIVE REINFORCING BAR SHALL BE PROVIDE.
6. CLEAR COVER TO ANY REINFORCEMENT:  
(a) BASE SLAB =75mm  
(b) ALL OTHER COMPONENTS =50mm.
7. NOT MORE THAN 50% OF BAR IS LAPPED AT A SECTION AND LAPPING IS STAGGERED. AND MINIMUM LAP LENGTH IS 63X DIA OF BAR FOR MAIN BARS AND 30 TIMES DIA OF BAR FOR ALL OTHER BARS.
8. FOR DETAILS OF CRASH BARRIER, EXPANSION JOINT, BRACKET, APPROACH SLAB AND WEARING COAT REFER DRAWING No. OSRP/CEG/BR/MISC-02

REFERENCE DRAWINGS:

- (I) OSRP/CEG/SH-9/BR/3+900/02 G. A. D.
- (II) OSRP/CEG/BR/MISC-02 MISC DETAILS

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

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E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginidia.com

DESIGN REVIEW CONSULTANT :

**LEA Associates South Asia Pvt. Ltd., India**

B-1, E-27, 1st FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

N.T.S

DRAWING TITLE :

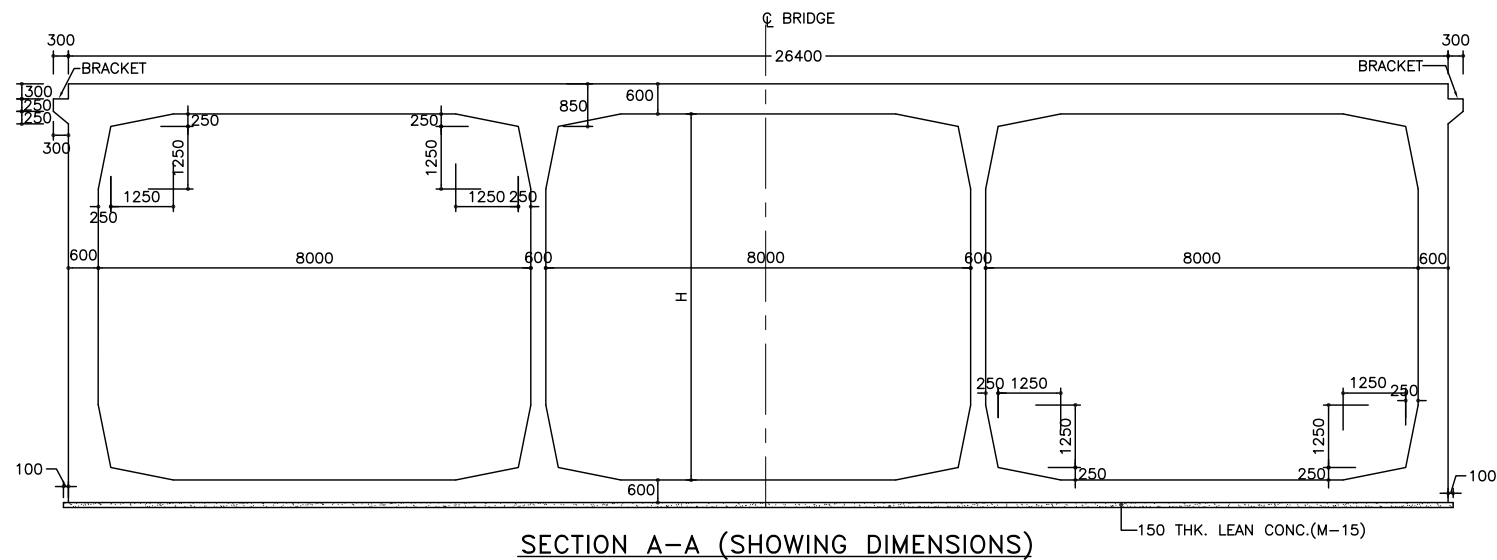
**DIMENSION AND REINFORCEMENT DETAILS BRIDGE AT PROPOSED CH. 3+862 (HALADIHA BYPASS)**

(SHEET 1 OF 2)

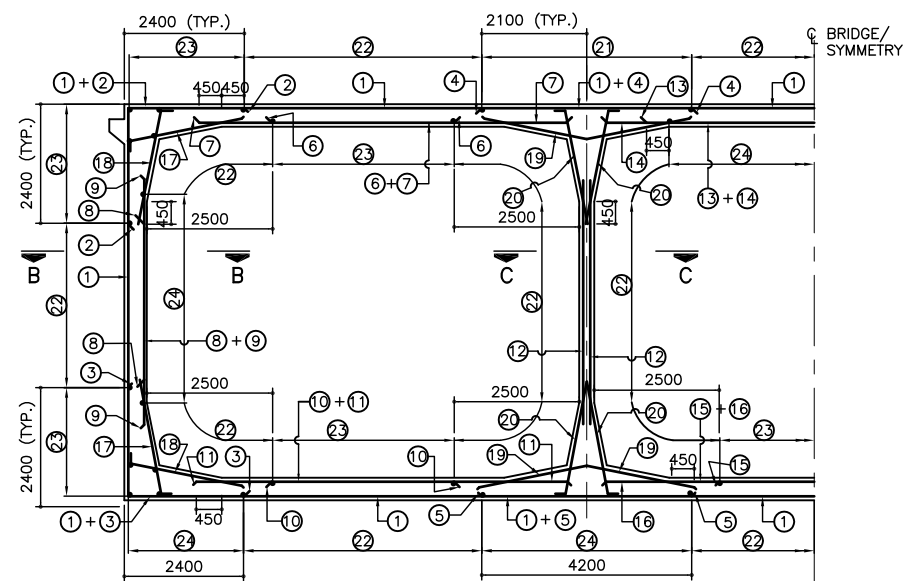
DWG. NUMBER : OSRP/CEG/SH9/P02A/03 REV. R2



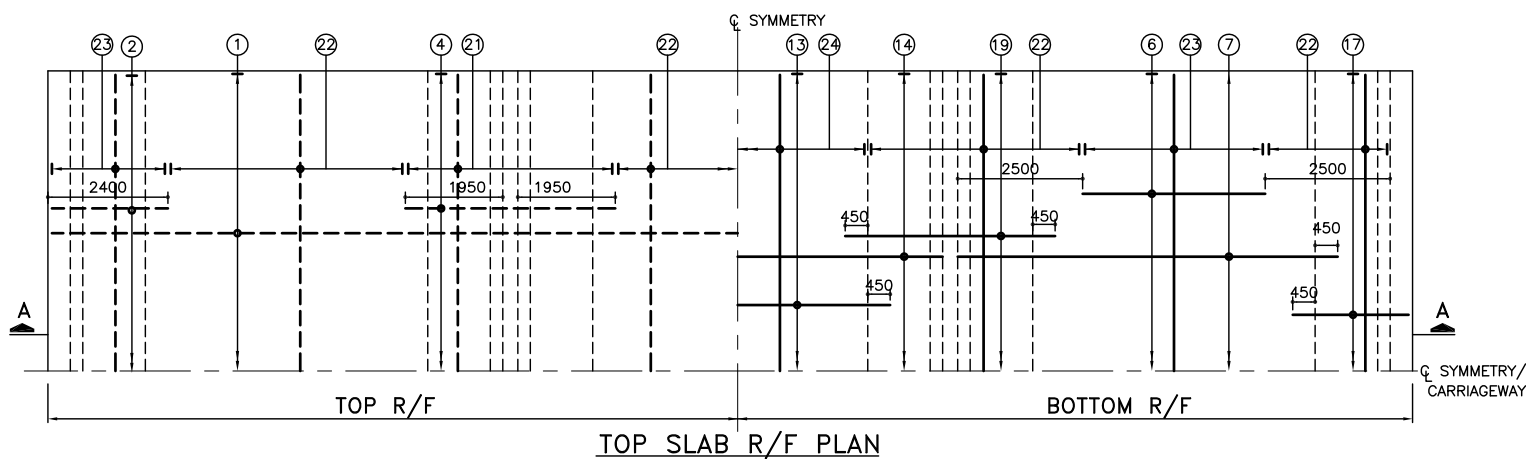




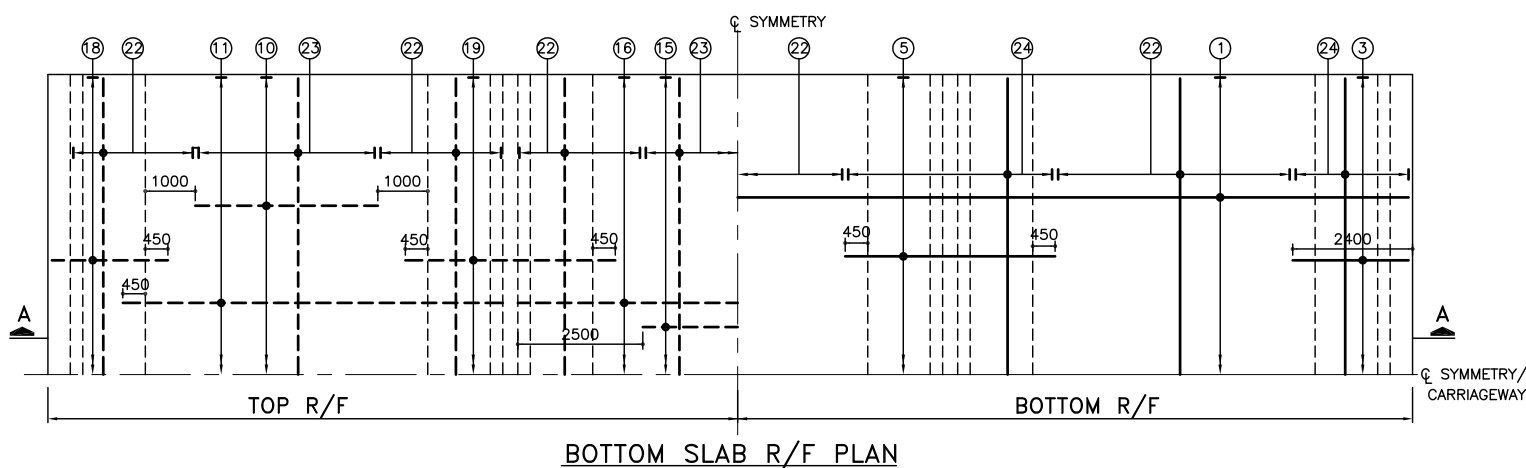
SECTION A-A (SHOWING DIMENSIONS)



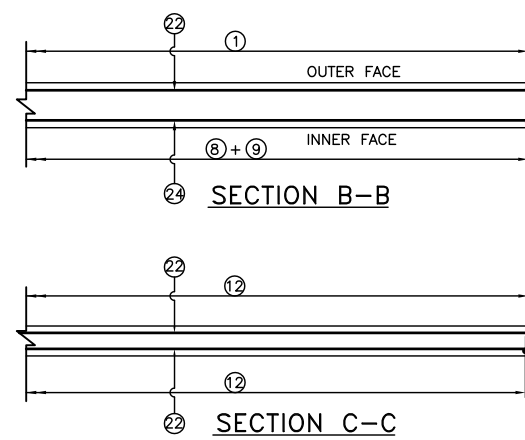
SECTION A-A (SHOWING REINFORCEMENT)



TOP SLAB R/F PLAN



BOTTOM SLAB R/F PLAN



REINF. DETAILS

| BAR NO. | BAR DIA. | SPACING | SHAPE |
|---------|----------|---------|-------|
| 1       | 16       | 150 C/C | □     |
| 2       | 16       | 150 C/C | □     |
| 3       | 20       | 150 C/C | □     |
| 4       | 12       | 150 C/C | □     |
| 5       | 20       | 150 C/C | □     |
| 6       | 32       | 300 C/C | □     |
| 7       |          |         |       |
| 8       | 32       | 300 C/C | □     |
| 9       |          |         |       |
| 10      | 32       | 300 C/C | □     |
| 11      |          |         |       |
| 12      | 12       | 150 C/C | □     |
| 13      | 32       | 600 C/C | □     |
|         | 25       | 600 C/C | □     |
| 14      | 16       | 150 C/C | □     |
| 15      | 16       | 150 C/C | □     |
| 16      | 12       | 150 C/C | □     |
| 17      | 16       | 150 C/C | □     |
| 18      | 16       | 150 C/C | □     |
| 19      | 12       | 150 C/C | □     |
| 20      | 12       | 150 C/C | □     |
| 21      | 10       | 150 C/C | □     |
| 22      | 10       | 150 C/C | □     |
| 23      | 12       | 180 C/C | □     |
| 24      | 12       | 150 C/C | □     |

**LEGEND:**  
 — BAR ON BOTTOM FACE  
 - - - BAR ON TOP FACE  
 R/F REINFORCEMENT

**NOTES:**

- ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METERS.
- DO NOT SCALE THE DIMENSIONS. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
- GRADE OF CONC. FOR R.C.C. WORKS. = M-35  
GRADE OF CONC. FOR LEAN CONC. = M-15
- HYSR REINFORCEMENT IS CONFORMED TO IS:1786 GRADE Fe 415.
- ANTI CORROSIVE REINFORCING BAR SHALL BE PROVIDE.
- CLEAR COVER TO ANY REINFORCEMENT:  
(a) BASE SLAB =75mm  
(b) ALL OTHER COMPONENTS =50mm.
- NOT MORE THAN 50% OF BAR IS LAPPED AT A SECTION AND LAPPING IS STAGGERED. AND MINIMUM LAP LENGTH IS 63X DIA OF BAR FOR MAIN BARS AND 30 TIMES DIA OF BAR FOR ALL OTHER BARS.
- FOR DETAILS OF CRASH BARRIER, EXPANSION JOINT, BRACKET, APPROACH SLAB AND WEARING COAT REFER DRAWING No. OSRP/CEG/BR/MISC-02

**REFERENCE DRAWINGS:**

- OSRP/CEG/SH-9/BR/6+050/01 G. A. D.
- OSRP/CEG/BR/MISC-02 MISC DETAILS

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegroupindia.com

DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

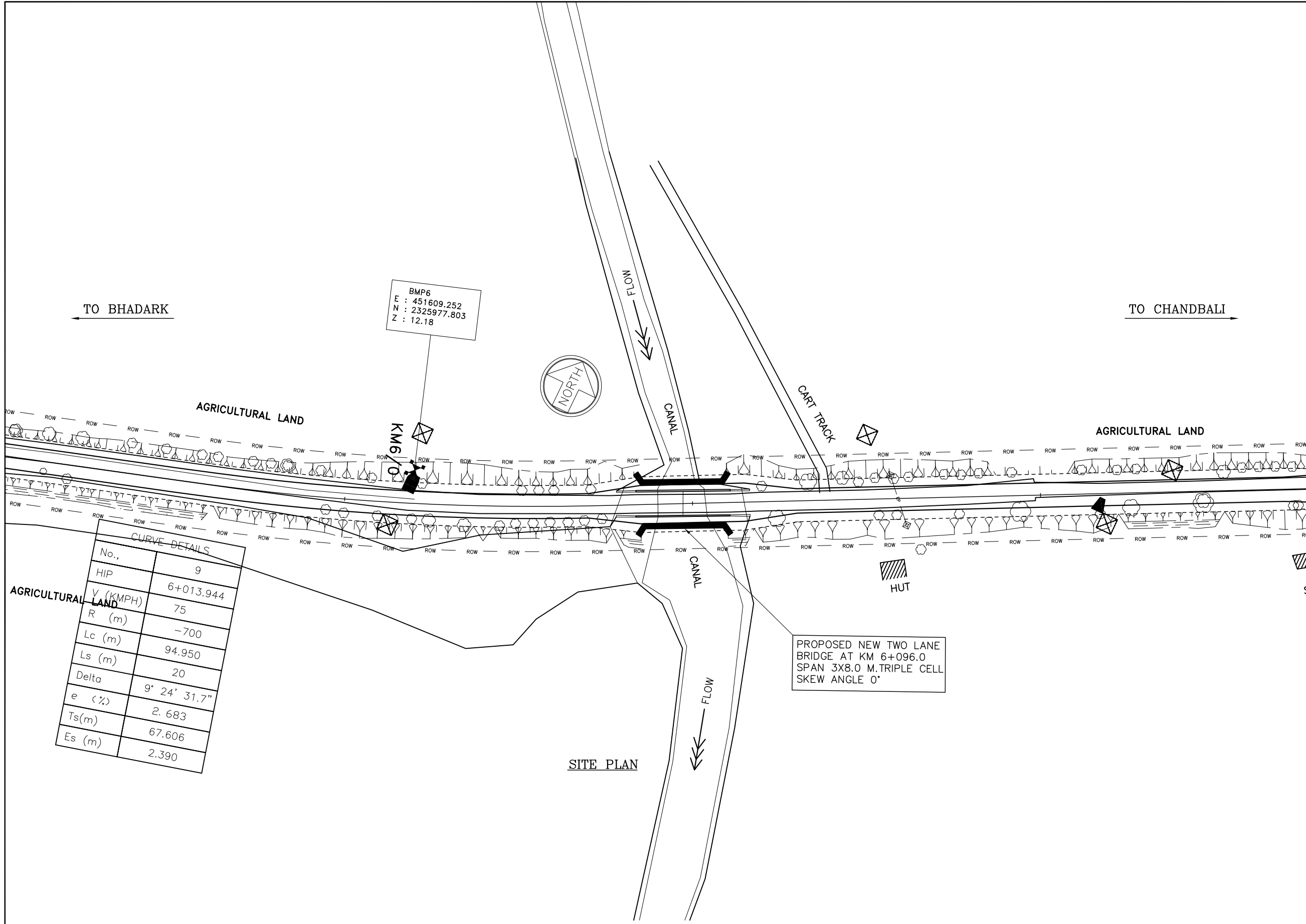
CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
**CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A**

SCALE :  
**N.T.S**

DRAWING TITLE :  
**DIMENSION AND REINFORCEMENT DETAILS BRIDGE AT PROPOSED CH. 6+096 (KALA POLO)**  
 (SHEET 1 OF 2)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/3 REV. R2

NOTES:—



PROPOSED NEW TWO LANE  
BRIDGE AT KM 6+096.0  
SPAN 3X8.0 M. TRIPLE CELL  
SKEW ANGLE 0°

BMP6  
E : 451609.252  
N : 2325977.803  
Z : 12.18



| CURVE DETAILS |              |
|---------------|--------------|
| No.,          | 9            |
| HIP           | 6+013.944    |
| V (KMPH)      | 75           |
| R (m)         | -700         |
| Lc (m)        | 94.950       |
| Ls (m)        | 20           |
| Delta         | 9° 24' 31.7" |
| e (%)         | 2.683        |
| Ts(m)         | 67.606       |
| Es (m)        | 2.390        |

SITE PLAN

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CEG**  
CONSULTING ENGINEERS GROUP LTD.  
E-12, MOJI COLONY, MALVIYA NAGAR  
JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

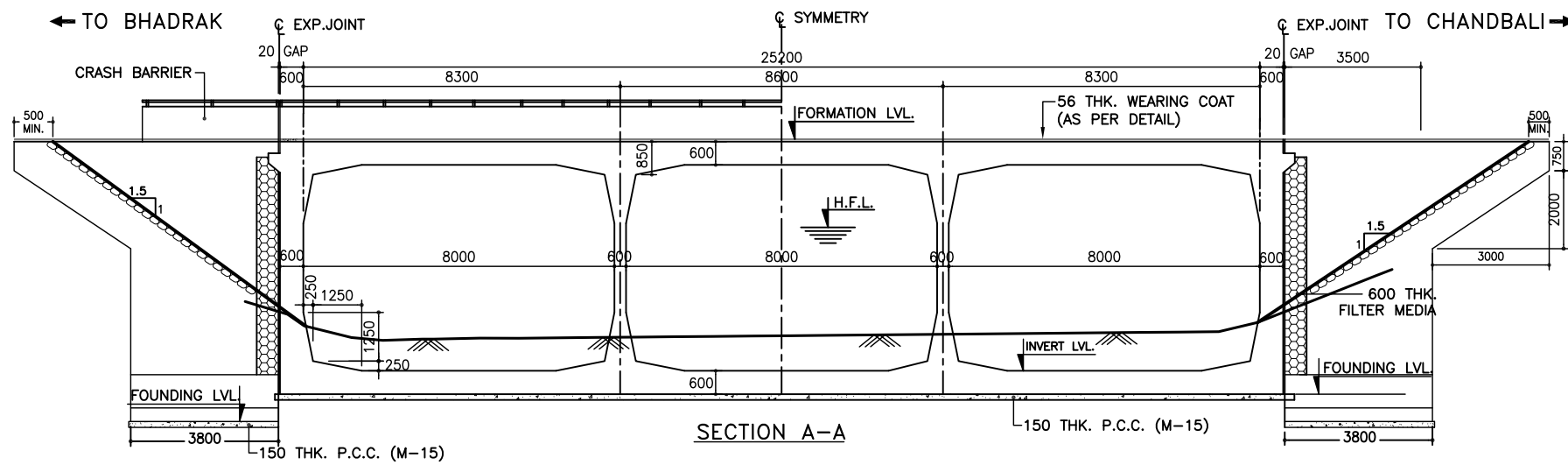
DESIGN REVIEW CONSULTANT :  
**LEA**  
LEA Associates South Asia Pvt. Ltd., India  
B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

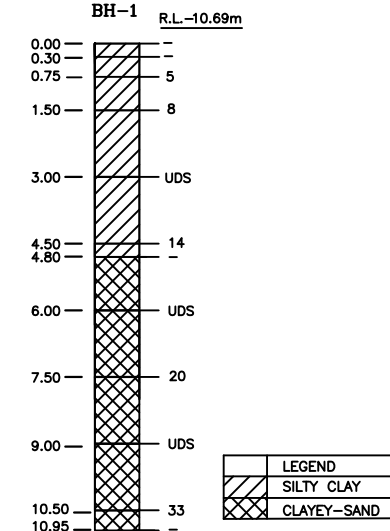
PROJECT :  
CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
N.T.S

DRAWING TITLE :  
SITE PLAN BRIDGE AT PROPOSED CH. 6+096 (KALA POLO)  
DWG. NUMBER : OSRP/CEG/SH9/P02A/03  
REV. R2



LOCATION PLAN OF BORE HOLE AT BRIDGE NO.6/050



**NOTES:**

- ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METERS.
- ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
- CHAINAGES SHOWN ARE C/L OF PROPOSED ROAD.
- LOOSE / UNSUITABLE SOIL BELOW BOX STRUCTURES IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
- FORMATION LEVEL & SUPERELEVATION IS PROVIDED AS PER THE APPROVED 'PLAN & PROFILE' DRAWING.
- ASPHALTIC PLUG TYPE EXPANSION JOINT IS PROVIDED AS PER DRAWING NO. OSRP/CEG/BR/MISC-02
- GRADE OF CONCRETE:**  
 P.C.C. LEAN CONC. ----- M-15  
 BOX STRUCTURE ----- M-35  
 APPROACH SLAB ----- M-30  
 RETURN WALL ----- M-30  
 CRASH BARRIER ----- M-40
- FOR FLOOR PROTECTION DETAILS REFER SEPERATE DRAWING.

**REFERENCE DRAWINGS**

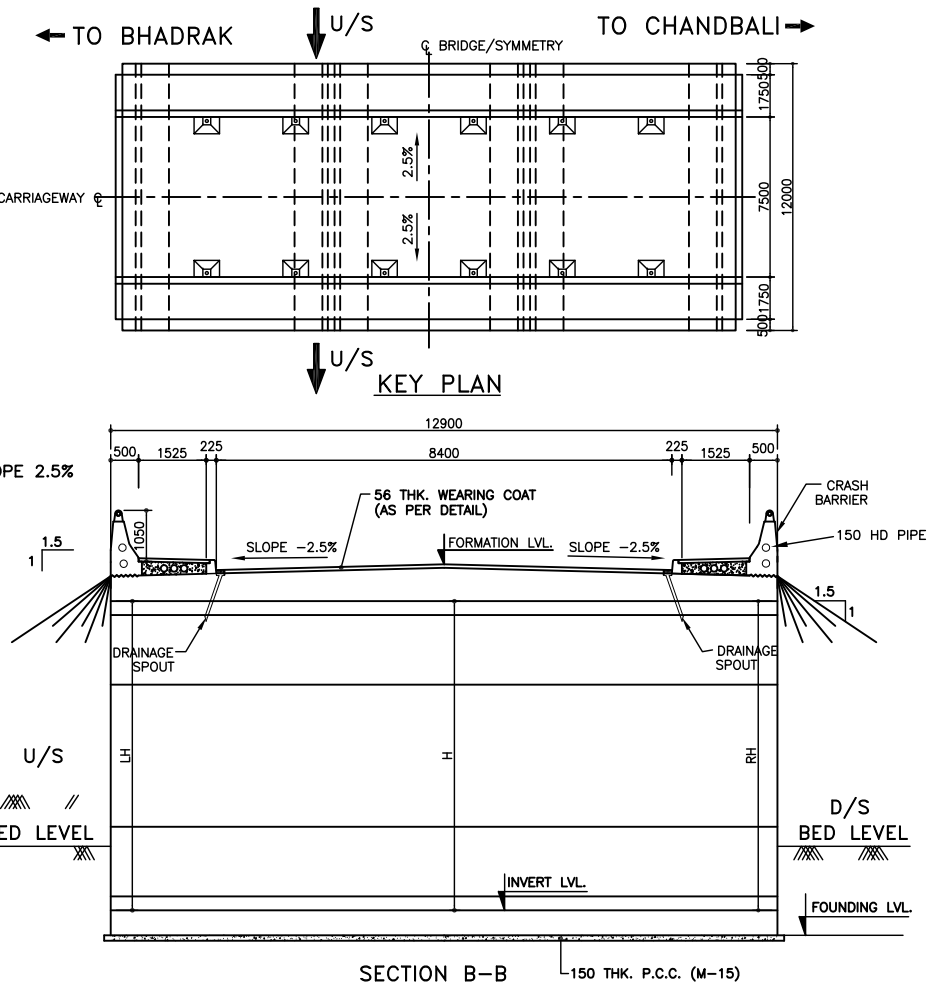
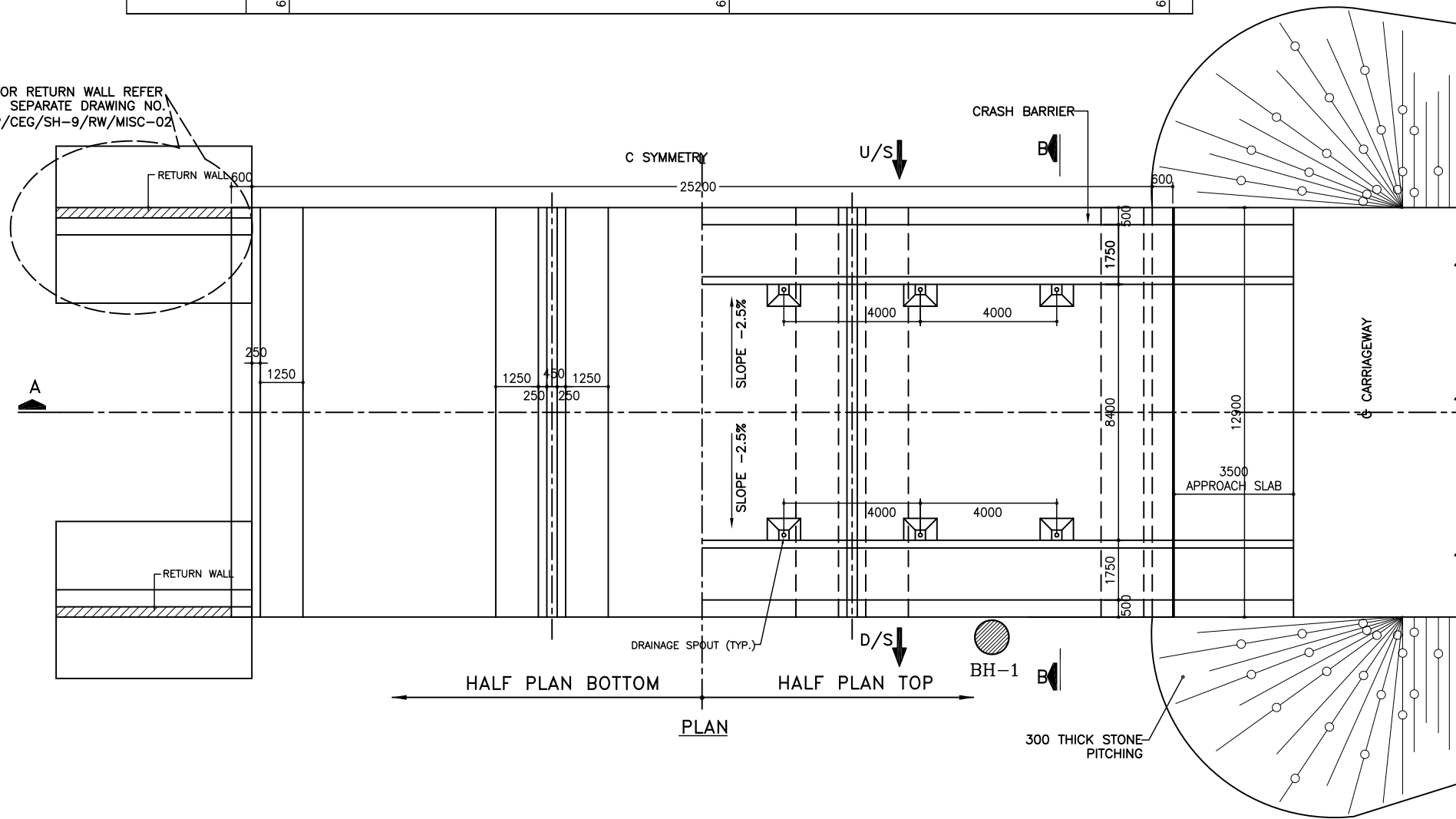
- OSRP/CEG/SH-9/BR/6+050/02
- OSRP/CEG/SH-9/BR/6+050/03
- OSRP/CEG/BR/MISC-02
- OSRP/CEG/SH-9/BR/FPW/01
- OSRP/CEG/SH-9/BR/SCW
- OSRP/CEG/SH-9/RW/MISC-02

|                     |          |         |          |
|---------------------|----------|---------|----------|
| FORMATION LEVEL (m) | 14.75    | 14.75   | 14.75    |
| BED LEVEL (m)       | 10.453   | 10.520  | 10.645   |
| CHAINAGE (m)        | 6+083.55 | 6+096.0 | 6+108.45 |

**BOX LEVELS DETAILS**

| EXISTING LOCATION (m) | PROPOSED CHAINAGE (m) | FORMATION LEVEL (m) | DESIGN HFL (m) | BED LVL (m) | INVERT LVL (m) | FOUNDING LVL (m) | CLEAR HEIGHT (MAX) |       |        | DIRECTION OF FLOW |
|-----------------------|-----------------------|---------------------|----------------|-------------|----------------|------------------|--------------------|-------|--------|-------------------|
|                       |                       |                     |                |             |                |                  | LH (m)             | H (m) | RH (m) |                   |
| 6+050                 | 6+096                 | 14.75               | 12.57          | 10.45       | 9.55           | 8.95             | 4.5                | 4.7   | 4.5    | L TO R            |

FOR RETURN WALL REFER SEPERATE DRAWING NO. OSRP/CEG/SH-9/RW/MISC-02



**NOTE:**  
 SOIL BELOW FOUNDING LEVEL UPTO DEPTH OF 2.0 M. SHALL BE REPLACED BY SUITABLE COARSE RIVER SAND TO GET THE REQUIRED S.B.C.

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginia.com

DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, 1st FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
**N.T.S**

DRAWING TITLE :  
**GENERAL ARRANGEMENT DRAWING BRIDGE AT PROPOSED CH. 6+096 (KALA POLO)**  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/03  
 REV. R2

NOTES:-

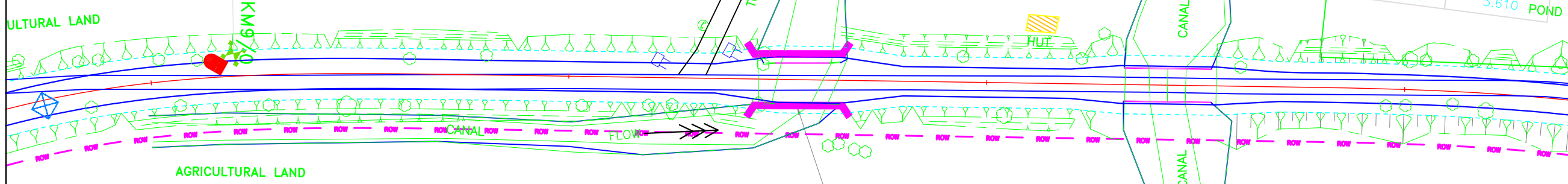
BMP9  
E : 454316.851  
N : 2325092.528  
Z : 10.236

TO BHADARK



TO CHANDBALI

| CURVE DETAILS |               |
|---------------|---------------|
| No.,          | 16            |
| HIP           | 9+353.617     |
| V (KMPH)      | 80            |
| R (m)         | 500           |
| Lc (m)        | 66.287        |
| Ls (m)        | 50            |
| Delta         | 13° 19' 31.8" |
| e (%)         | 5.689         |
| Ts(m)         | 83.429        |
| Es (m)        | 3.610         |



PROPOSED NEW TWO LANE  
BRIDGE AT KM 9+159.0  
SPAN 3X3m TRIPLE CELL  
SKEW ANGLE 0°

SITE PLAN

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CEG**  
CONSULTING ENGINEERS GROUP LTD.  
E-12, MOJI COLONY, MALVIYA NAGAR  
JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :  
**LEA**  
LEA Associates South Asia Pvt. Ltd., India  
B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

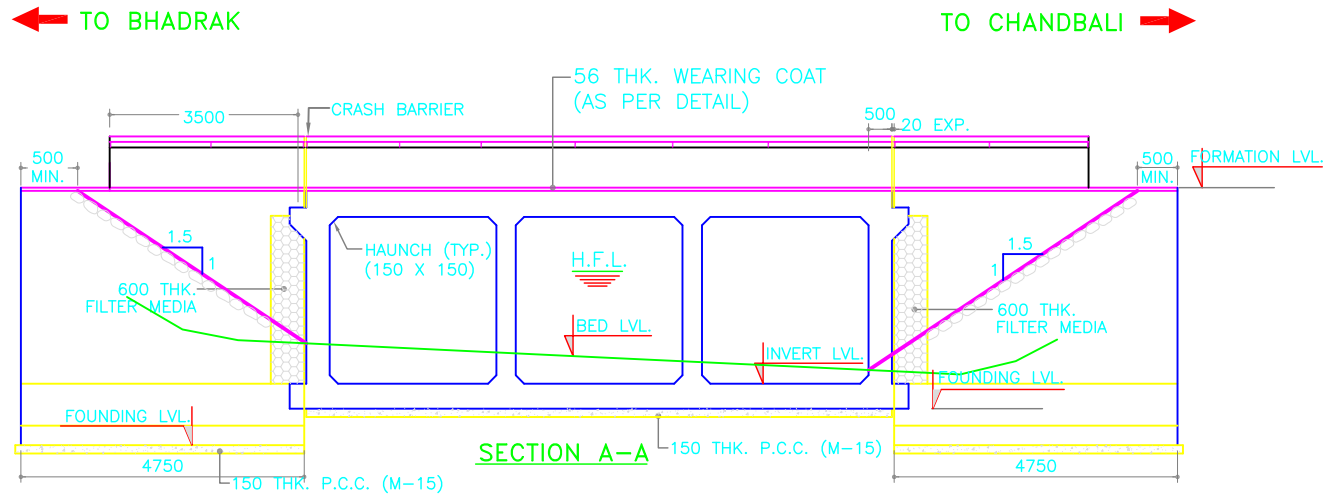
CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

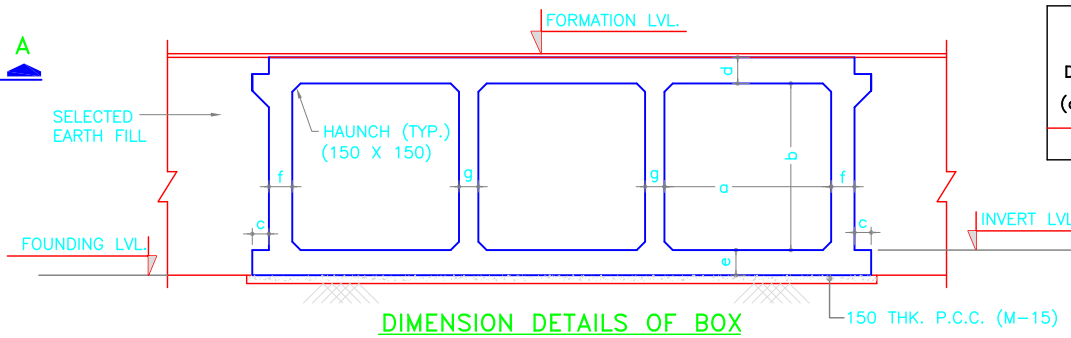
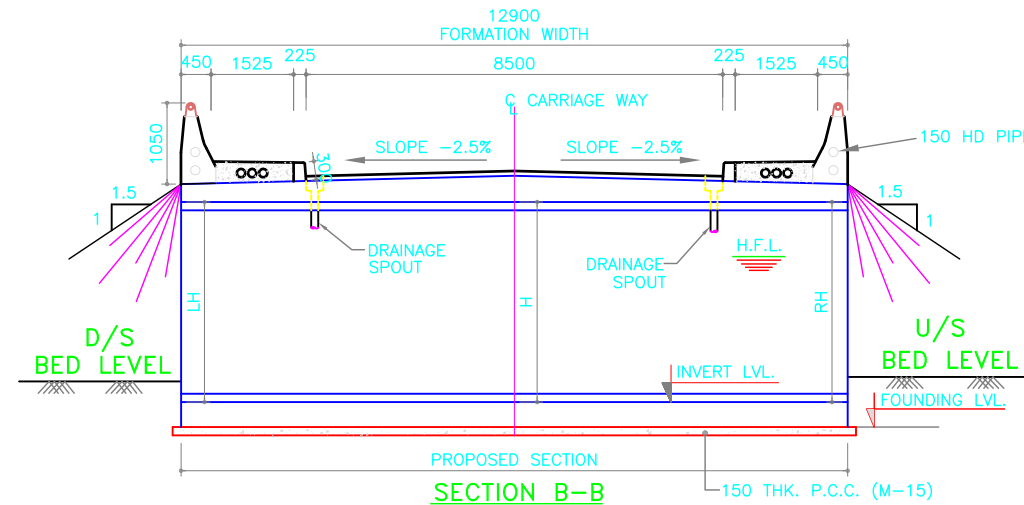
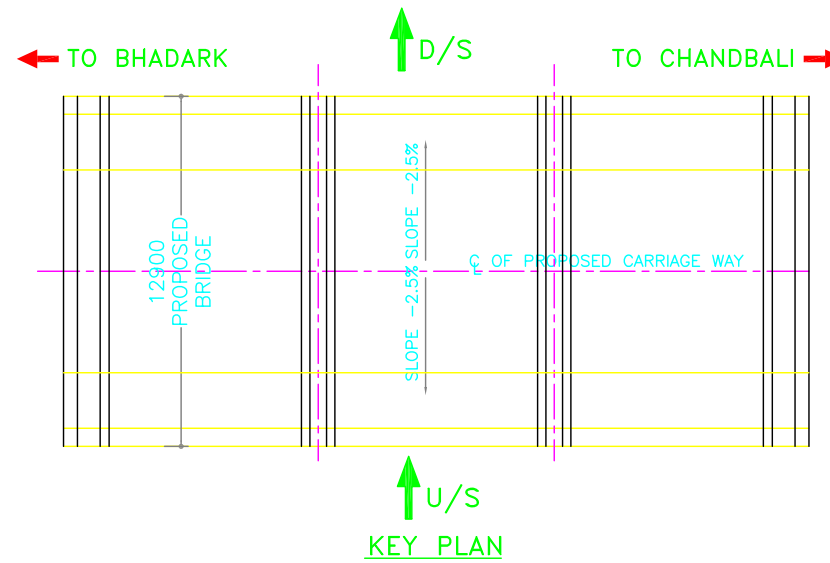
SCALE :  
N.T.S

DRAWING TITLE :  
**SITE PLAN BRIDGE AT PROPOSED CH. 9+159 (KUNDI POLO-1)**  
(SHEET 2 OF 2)  
DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/02  
REV. R2





|                     |          |         |          |
|---------------------|----------|---------|----------|
| FORMATION LEVEL (m) | 11.900   | 11.900  | 11.900   |
| BED LEVEL (m)       | 9.096    | 9.071   | 9.059    |
| CHAINAGE (m)        | 9+153.63 | 9+159.0 | 9+164.37 |



**DIMENSION DETAILS OF BOX**

| BOX TYPE | WIDTH a (mm) | HEIGHT b (mm) | c (mm) | THICKNESS d (mm) | THICKNESS e (mm) | THICKNESS f (mm) | THICKNESS g (mm) | BEARING CAPACITY    |
|----------|--------------|---------------|--------|------------------|------------------|------------------|------------------|---------------------|
| 3/33/0   | 3000         | 3000          | 300    | 450              | 500              | 470              | 400              | 10 T/M <sup>2</sup> |

| BOX TYPE | EXISTING LOCATION (m) | PROPOSED CHAINAGE (m) | FORMATION LEVEL (m) | DESIGN HFL (m) | BED LVL (m) | INVERT LEVEL (m) | FOUNDING LVL. (m) | CLEAR HEIGHT (MAX) |       |        | DIRECTION OF FLOW |
|----------|-----------------------|-----------------------|---------------------|----------------|-------------|------------------|-------------------|--------------------|-------|--------|-------------------|
|          |                       |                       |                     |                |             |                  |                   | LH (m)             | H (m) | RH (m) |                   |
| 3/33/0   | 9+200                 | 9+159.0               | 11.900              | 10.294         | 9.059       | 8.759            | 8.259             | 2.485              | 2.635 | 2.485  | R TO L            |

**NOTES:**

- ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
- ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
- LOOSE / UNSUITABLE SOIL BELOW BOX STRUCTURES IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
- GRADE OF CONCRETE:-  
 BOX - M-25  
 RETURN WALL - M-25  
 APPROACH SLAB - M-30  
 P.C.C. LEAN CONC. - M-15
- CHAINAGE / FORMATION LEVEL IS PROVIDED AS PER APPROVED PLAN & PROFILE DRAWING.
- FOR REINF. DETAILS OF RETURN WALL REFER SEPERATE DRAWING. GRADE OF STEEL SHALL BE Fe-500 AND AS PER IS-1786
- IN CASES WHERE INVERT LEVEL IS HIGHER THAN GROUND LEVEL AT ENDS OF STRUCTURE OR WHERE UNSUITABLE SOIL IS TO BE REPLACED BY GRANULAR MATERIAL, PROVIDE ADEQUATE CUT OFF WALLS AT ENDS OF STRUCTURE TO PREVENT SCOUR/EROSION.
- ASPHALTIC PLUG TYPE EXPANSION JOINT SHALL BE PROVIDED AS PER DRG.NO. OSRP/CEG/BR/MISC-02
- SITE PLAN ON SEPERATE SHEET.
- FOR FLOOR PROTECTION DETAILS REFER SEPERATE DRAWING.

**REFERENCE DRAWING:-**

- FOR DIMENSION & REINFORCEMENT DETAILS REFER MOST STANDARD DRAWING OF CULVERTS NO. SD/106, SD/112 (SHEET 1 OF 2), SD/112 (SHEET 2 OF 2).
- FOR GENERAL NOTES, MISCELLANEOUS DETAILS APPROACH SLAB, RCC RAILING, DRAINAGE SPOUT FLOOR PROTECTION WORKS REFER MOST STANDARD DRAWING OF CULVERTS NO. SD/101, SD/115(SHEET 1 OF 4), (SHEET 2 OF 4), (SHEET 3 OF 4), (SHEET 4 OF 4) & SD/111.
- OSRP/CEG/SH-9/BR/9+200/02
- OSRP/CEG/RW/MISC-01
- OSRP/CEG/SH-9/BR/FPW/01
- OSRP/CEG/SH-9/BR/SCW
- OSRP/CEG/BR/MISC-02

**HYDROLOGICAL DATA**

| Design Discharge In (cum/sec) | Max. scour Level in (mts) | Depth of curtain Wall in (mts) |                  | Length of Rigid Apron in (mts) |                  | Length of Flexible Apron in (mts) |                  |
|-------------------------------|---------------------------|--------------------------------|------------------|--------------------------------|------------------|-----------------------------------|------------------|
|                               |                           | u/s                            | d/s              | u/s                            | d/s              | u/s                               | d/s              |
|                               |                           | DCW <sub>1</sub>               | DCW <sub>2</sub> | LRA <sub>1</sub>               | LRA <sub>2</sub> | LFA <sub>1</sub>                  | LFA <sub>2</sub> |
| 20.06                         | 4.847                     | 5.0                            | 5.5              | 3.0                            | 5.0              | 8.5                               | 8.5              |

**HALF PLAN BOTTOM**

**HALF PLAN TOP**

**PLAN**

| NO. | DATE      | REVISION        | BY   | DRAWN: | PREPARED:      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|--------|----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA |        | RAJU MATHUR    | M.R MISHRA (EE) | O.P. PATEL (CE)  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY  | PK.MISHRA (AE) | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |        |                |                 |                  |

DPR CONSULTANT :  
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DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

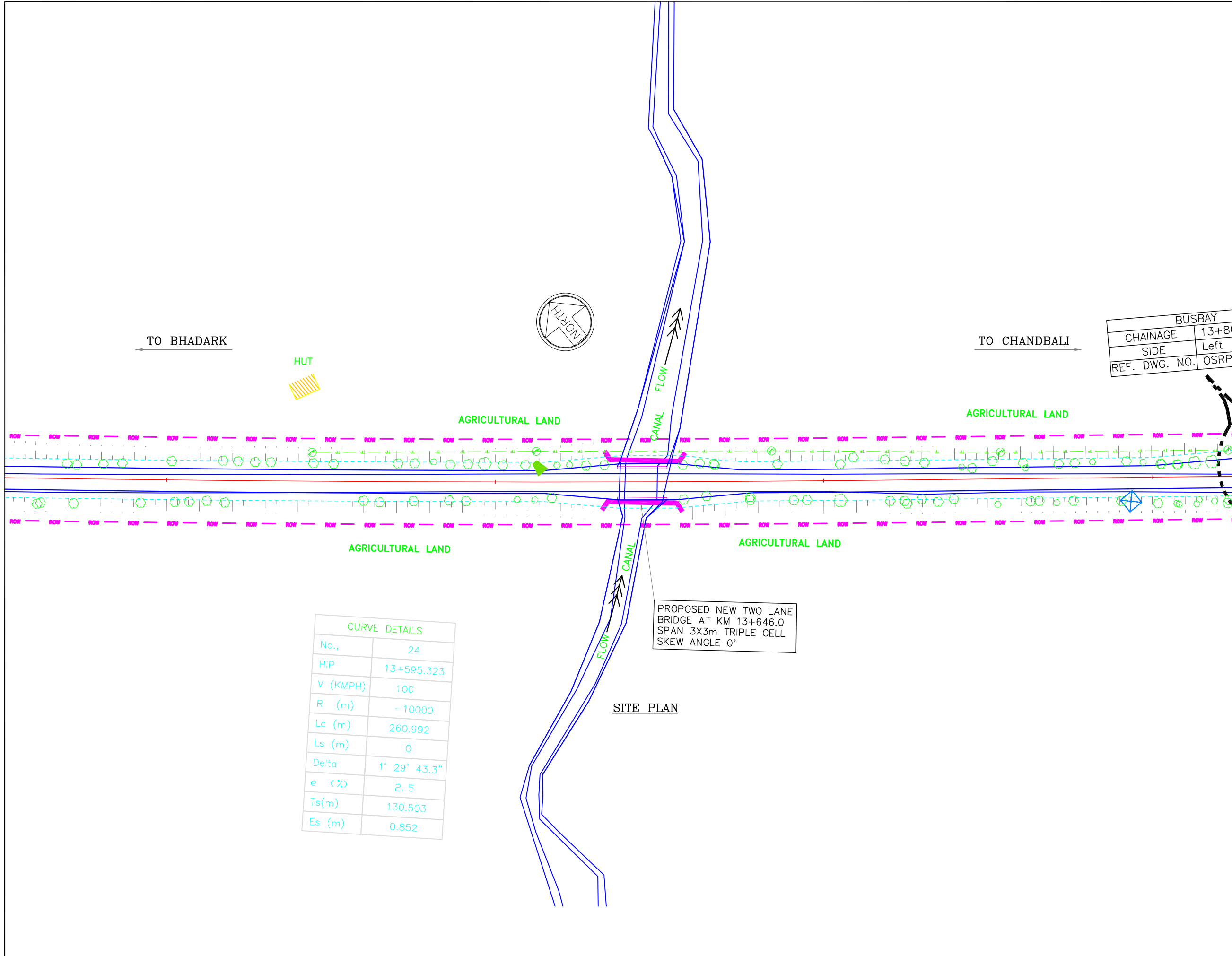
CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
**CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A**

SCALE :  
**N.T.S**

DRAWING TITLE :  
**GENERAL ARRANGEMENT DRAWING BRIDGE AT PROPOSED CH. 9+159 (KUNDI POLO-1)**  
 (SHEET 1 OF 2)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/01 REV. R2

NOTES:-



|               |       |
|---------------|-------|
| BUSBAY        |       |
| CHAINAGE      | 13+80 |
| SIDE          | Left  |
| REF. DWG. NO. | OSRP  |

| CURVE DETAILS |              |
|---------------|--------------|
| No.,          | 24           |
| HIP           | 13+595.323   |
| V (KMPH)      | 100          |
| R (m)         | -10000       |
| Lc (m)        | 260.992      |
| Ls (m)        | 0            |
| Delta         | 1° 29' 43.3" |
| e (%)         | 2.5          |
| Ts(m)         | 130.503      |
| Es (m)        | 0.852        |

PROPOSED NEW TWO LANE BRIDGE AT KM 13+646.0  
SPAN 3X3m TRIPLE CELL  
SKEW ANGLE 0°

SITE PLAN

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CEG**  
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JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

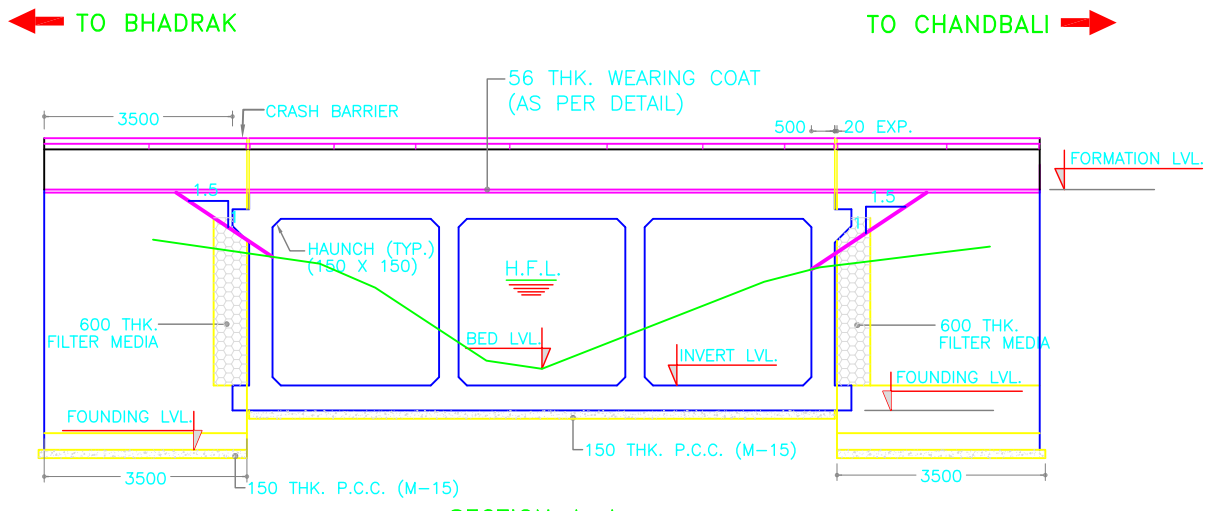
DESIGN REVIEW CONSULTANT :  
**LEA**  
LEA Associates South Asia Pvt. Ltd., India  
B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

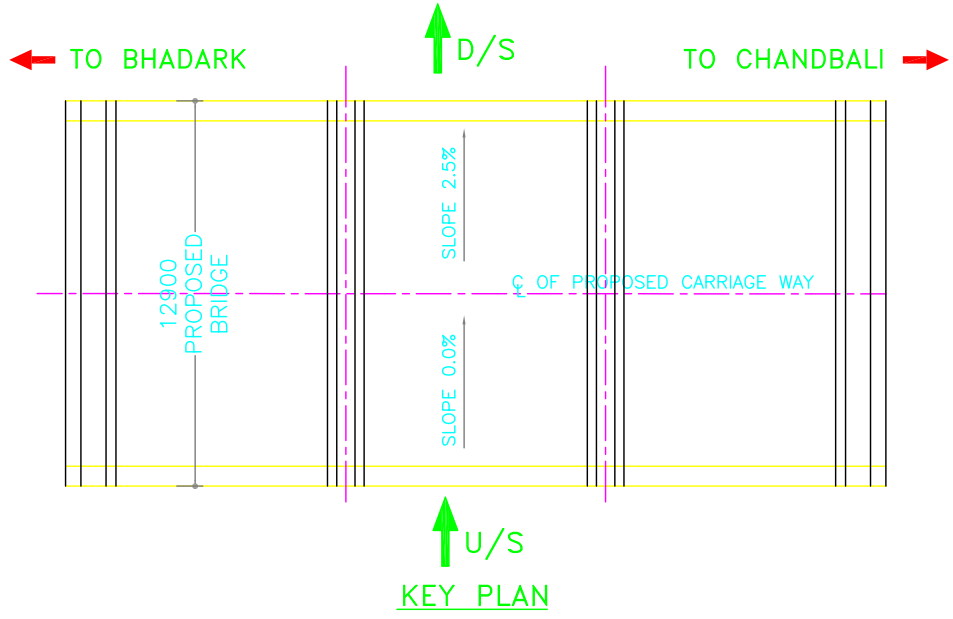
SCALE :  
N.T.S

DRAWING TITLE :  
**INDEX PLAN BRIDGE AT PROPOSED CH. 13+646 (NANDAPUR POLO)**  
(SHEET 1 OF 3)  
DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/ REV. R2

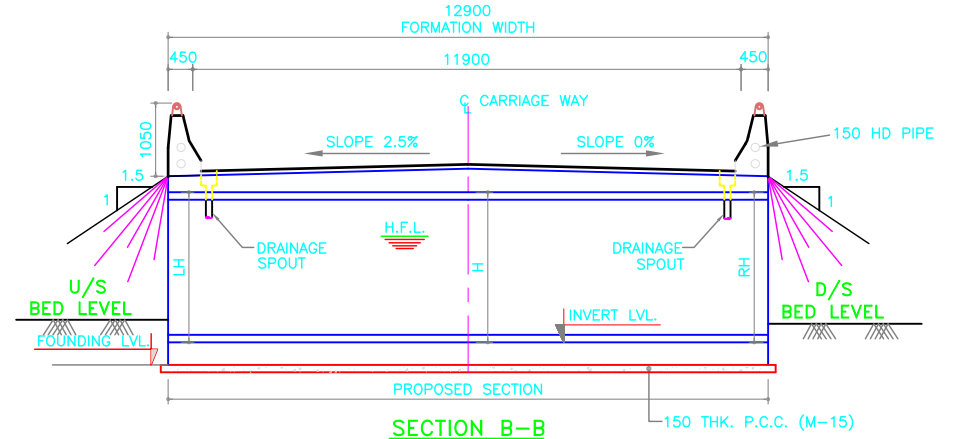


SECTION A-A

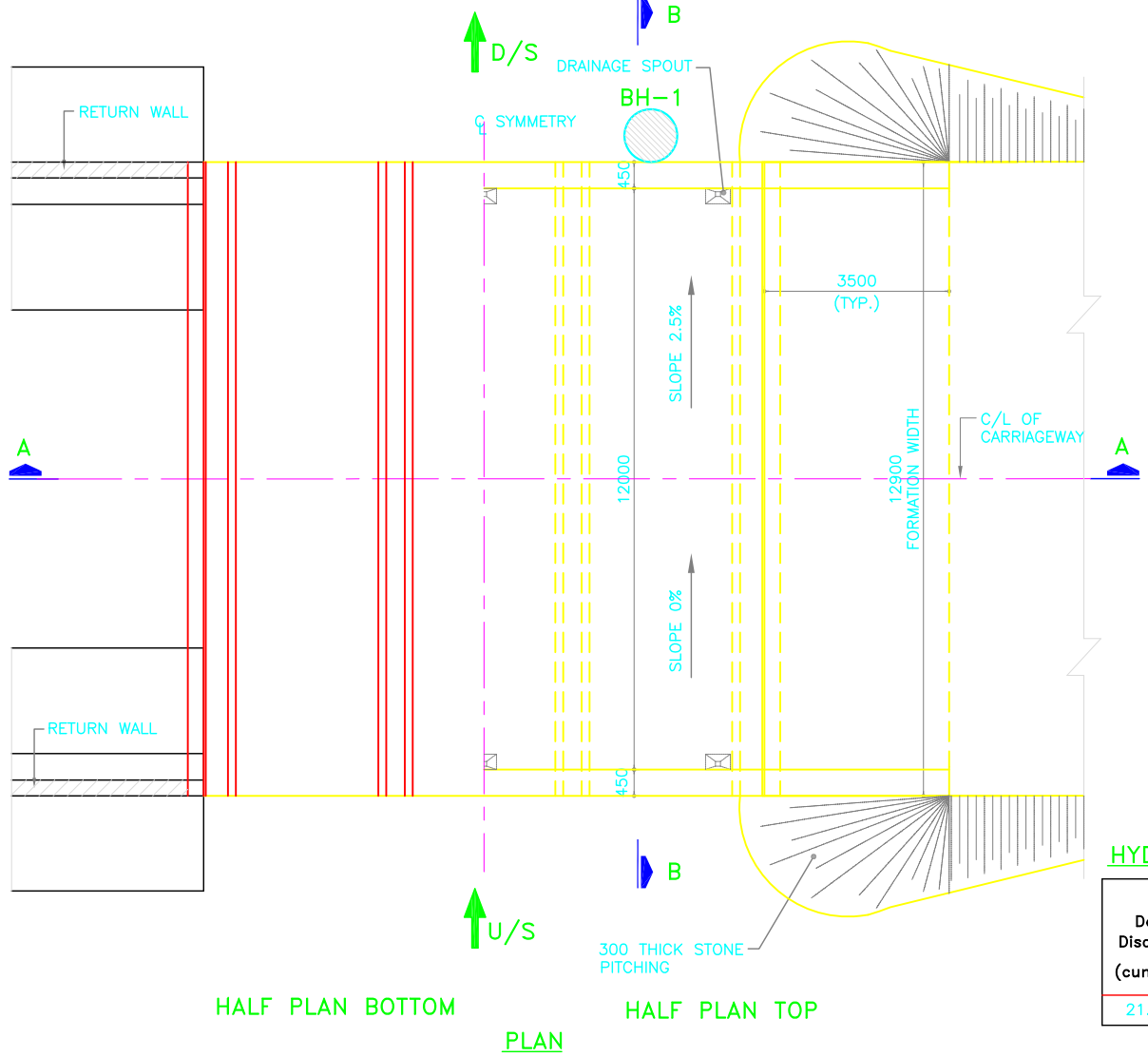
|                     |           |          |           |
|---------------------|-----------|----------|-----------|
| FORMATION LEVEL (m) | 8.700     | 8.700    | 8.700     |
| BED LEVEL (m)       | 8.293     | 6.313    | 7.940     |
| CHAINAGE (m)        | 13+640.63 | 13+646.0 | 13+651.37 |



KEY PLAN



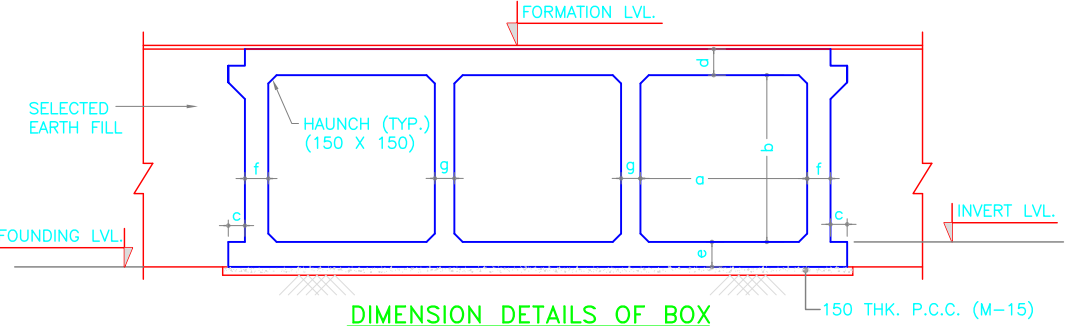
SECTION B-B



HALF PLAN BOTTOM

HALF PLAN TOP

PLAN



DIMENSION DETAILS OF BOX

DIMENSION DETAILS OF BOX

| BOX TYPE | WIDTH a (mm) | HEIGHT b (mm) | c (mm) | THICKNESS d (mm) | THICKNESS e (mm) | THICKNESS f (mm) | THICKNESS g (mm) | BEARING CAPACITY    |
|----------|--------------|---------------|--------|------------------|------------------|------------------|------------------|---------------------|
| 3/33/0   | 3000         | 3000          | 300    | 450              | 500              | 470              | 400              | 10 T/M <sup>2</sup> |

| BOX TYPE | EXISTING LOCATION (m) | PROPOSED CHAINAGE (m) | FORMATION LEVEL (m) | DESIGN HFL (m) | BED LVL (m) | INVERT LEVEL (m) | FOUNDING LVL. (m) | CLEAR HEIGHT (MAX) |       |        | DIRECTION OF FLOW |
|----------|-----------------------|-----------------------|---------------------|----------------|-------------|------------------|-------------------|--------------------|-------|--------|-------------------|
|          |                       |                       |                     |                |             |                  |                   | LH (m)             | H (m) | RH (m) |                   |
| 3/33/0   | 13+600                | 13+646.0              | 8.700               | 7.269          | 6.313       | 6.013            | 5.513             | 2.031              | 2.181 | 2.181  | R TO L            |

HYDROLOGICAL DATA

| Design Discharge in (cum/sec) | Max.scour Level in (mts) | Depth of curtain Wall in (mts) |                  | Length of Rigid Apron in (mts) |                  | Length of Flexible Apron in (mts) |                  |
|-------------------------------|--------------------------|--------------------------------|------------------|--------------------------------|------------------|-----------------------------------|------------------|
|                               |                          | u/s                            | d/s              | u/s                            | d/s              | u/s                               | d/s              |
|                               |                          | DCW <sub>1</sub>               | DCW <sub>2</sub> | LRA <sub>1</sub>               | LRA <sub>2</sub> | LFA <sub>1</sub>                  | LFA <sub>2</sub> |
| 21.69                         | 4.089                    | 3.0                            | 3.5              | 3.0                            | 5.0              | 4.5                               | 6.0              |

NOTE:

SOIL BELOW FOUNDING LEVEL UPTO DEPTH OF 2.0 M. SHALL BE REPLACED BY SUITABLE COARSE RIVER SAND TO GET THE REQUIRED S.B.C.

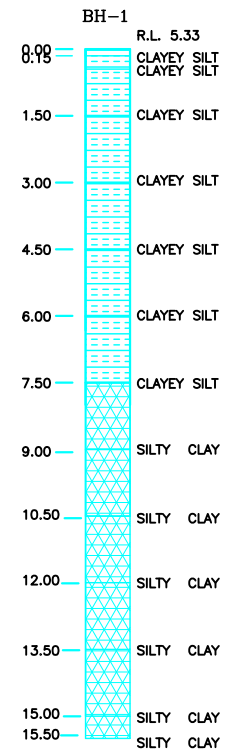
NOTES:

- ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
- ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
- LOOSE / UNSUITABLE SOIL BELOW BOX STRUCTURES IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
- GRADE OF CONCRETE:-  
BOX - M-25  
RETURN WALL - M-25  
APPROACH SLAB - M-30  
P.C.C. LEAN CONC. - M-15
- CHAINAGE / FORMATION LEVEL IS PROVIDED AS PER APPROVED PLAN & PROFILE DRAWING.
- FOR REINF. DETAILS OF RETURN WALL REFER SEPERATE DRAWING. GRADE OF STEEL SHALL BE Fe500 AS PER IS-1786
- IN CASES WHERE INVERT LEVEL IS HIGHER THAN GROUND LEVEL AT ENDS OF STRUCTURE OR WHERE UNSUITABLE SOIL IS TO BE REPLACED BY GRANULAR MATERIAL, PROVIDE ADEQUATE CUT OFF WALLS AT ENDS OF STRUCTURE TO PREVENT SCOUR/EROSION.
- ASPHALTIC PLUG TYPE EXPANSION JOINT SHALL BE PROVIDED AS PER DRG.NO. OSRP/CEG/BR/MISC-02
- SITE PLAN ON SEPERATE SHEET.
- FOR FLOOR PROTECTION DETAILS REFER SEPERATE DRAWING.

REFERENCE DRAWING:-

- FOR DIMENSION & REINFORCEMENT DETAILS REFER MOST STANDARD DRAWING OF CULVERTS NO. SD/106, SD/112 (SHEET 1 OF 2), SD/112 (SHEET 2 OF 2).
- FOR GENERAL NOTES,MISCELLANEOUS DETAILS APPROACH SLAB, RCC RAILING, DRAINAGE SPOUT FLOOR PROTECTION WORKS REFER MOST STANDARD DRAWING OF CULVERTS NO. SD/101, SD/115(SHEET 1 OF 4), (SHEET 2 OF 4), (SHEET 3 OF 4),(SHEET 4 OF 4) & SD/111.
- OSRP/CEG/SH-9/BR/13+600/02
- OSRP/CEG/RW/MISC-01
- OSRP/CEG/SH-9/BR/FPW/01
- OSRP/CEG/SH-9/BR/SCW
- OSRP/CEG/BR/MISC-02

LOCATION PLAN OF BORE HOLE AT BRIDGE NO.13/600



| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
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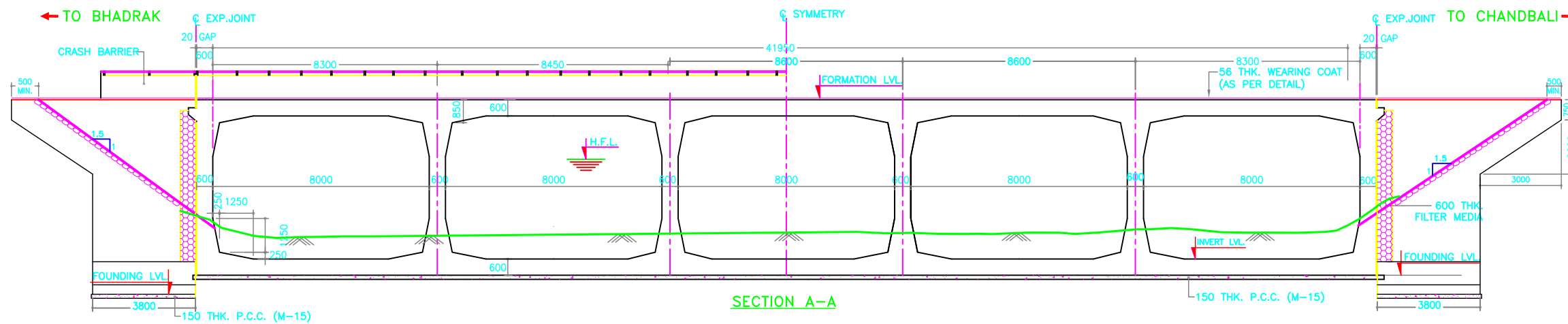
DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
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PROJECT :  
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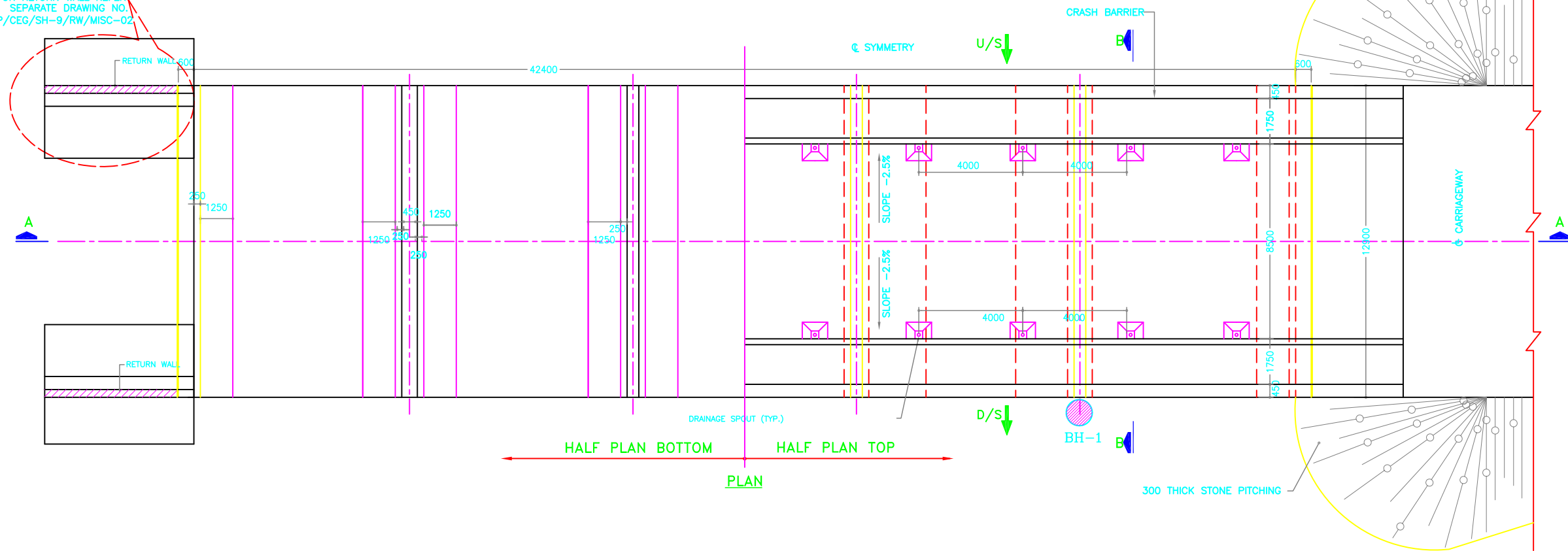
SCALE :  
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DRAWING TITLE :  
**GENERAL ARRANGEMENT DRAWING BRIDGE AT PROPOSED CH. 13+646 (NANDAPUR POLO)**  
 (SHEET 1 OF 3)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/  
 REV. R2

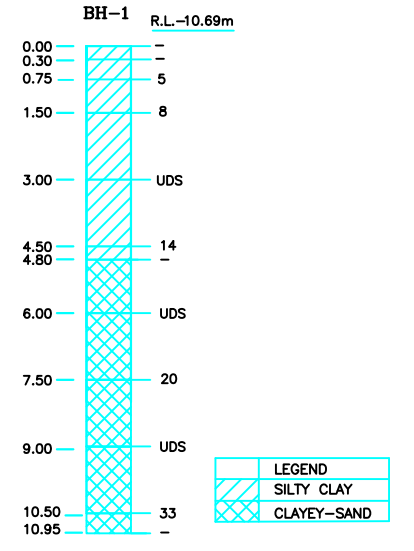


|                     |           |          |          |
|---------------------|-----------|----------|----------|
| FORMATION LEVEL (m) | 14.75     | 14.75    | 14.75    |
| BED LEVEL (m)       | 10.453    | 10.520   | 10.645   |
| CHAINAGE (m)        | 28+100.55 | 28+113.0 | 6+108.45 |

FOR RETURN WALL REFER SEPARATE DRAWING NO. OSRP/CEG/SH-9/RW/MISC-02



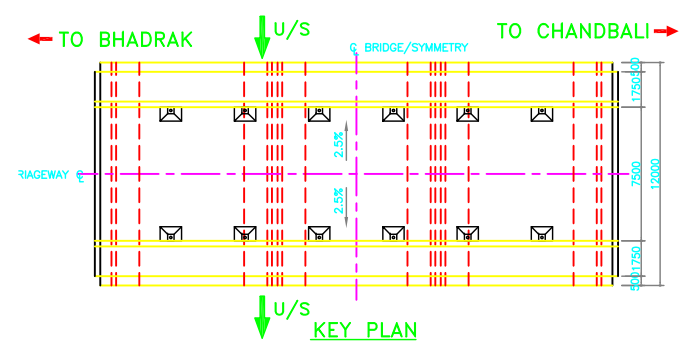
LOCATION PLAN OF BORE HOLE AT BRIDGE NO.6/050



BOX LEVELS DETAILS

| EXISTING LOCATION (m) | PROPOSED CHAINAGE (m) | FORMATION LEVEL (m) | DESIGN HFL (m) | BED LVL (m) | INVERT LVL. (m) | FOUNDING LVL. (m) | CLEAR HEIGHT (MAX) |       |        | DIRECTION OF FLOW |
|-----------------------|-----------------------|---------------------|----------------|-------------|-----------------|-------------------|--------------------|-------|--------|-------------------|
|                       |                       |                     |                |             |                 |                   | LH (m)             | H (m) | RH (m) |                   |
| 6+050                 | 6+096                 | 14.75               | 12.57          | 10.45       | 9.55            | 8.95              | 4.5                | 4.7   | 4.5    | L TO R            |

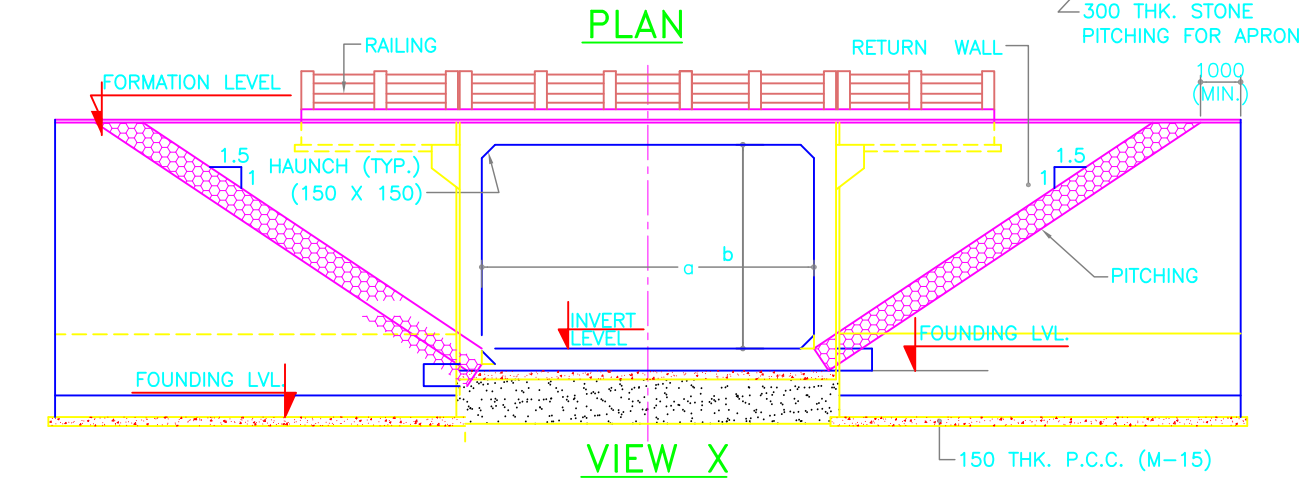
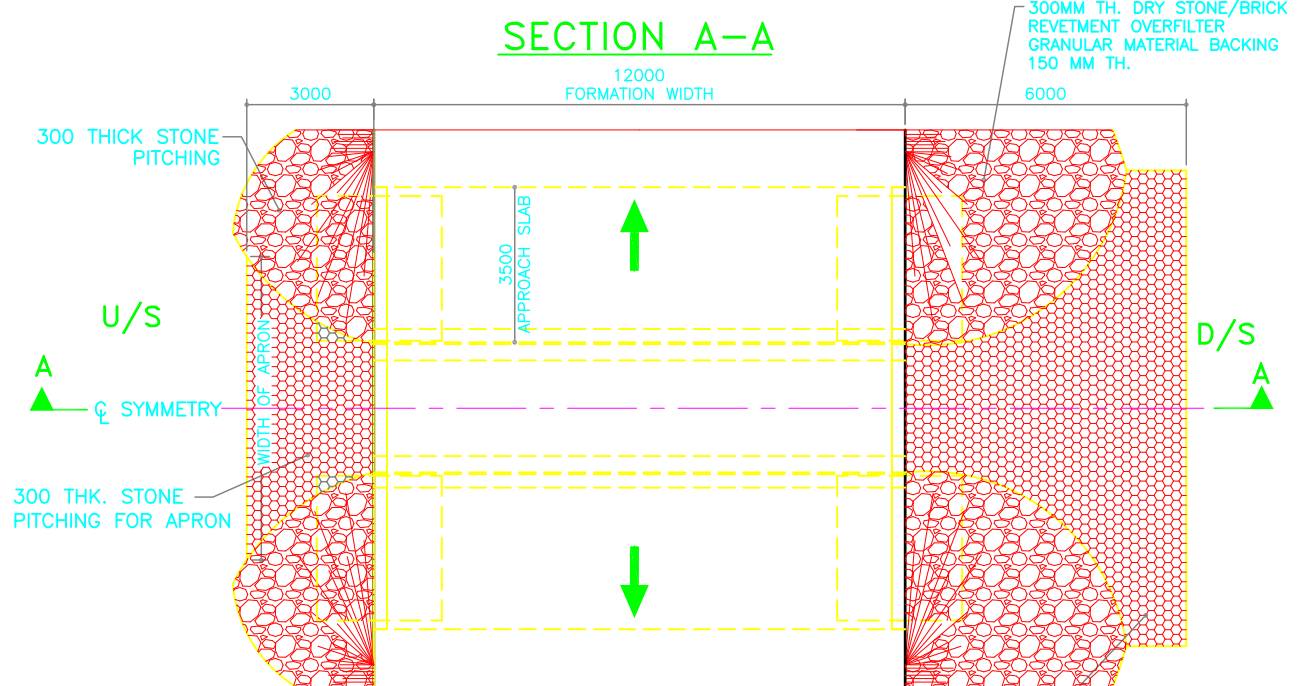
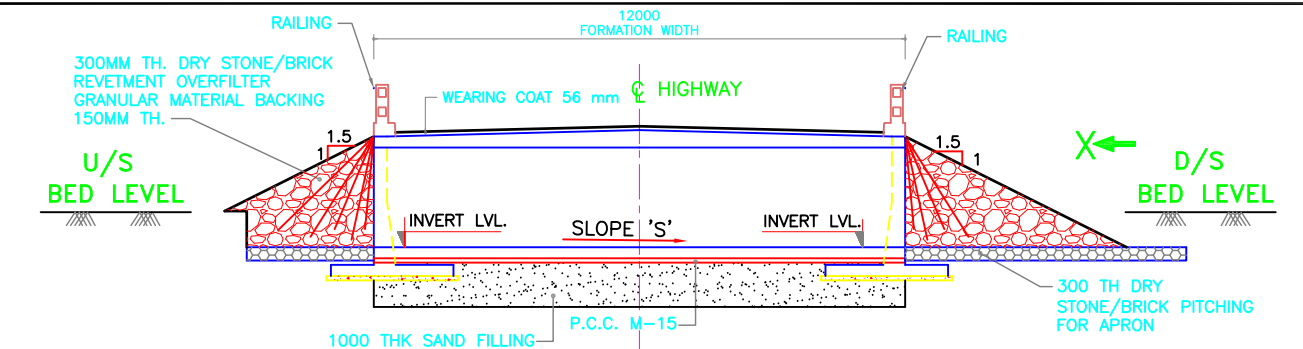
**NOTE:**  
SOIL BELOW FOUNDING LEVEL UPTO DEPTH OF 2.0 M. SHALL BE REPLACED BY SUITABLE COARSE RIVER SAND TO GET THE REQUIRED S.B.C.



- NOTES:**
- ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METERS.
  - ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
  - CHAINAGES SHOWN ARE C/L OF PROPOSED ROAD.
  - LOOSE / UNSUITABLE SOIL BELOW BOX STRUCTURES IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
  - FORMATION LEVEL & SUPERELEVATION IS PROVIDED AS PER THE APPROVED 'PLAN & PROFILE' DRAWING.
  - ASPHALTIC PLUG TYPE EXPANSION JOINT IS PROVIDED AS PER DRAWING NO. OSRP/CEG/BR/MISC-02
  - GRADE OF CONCRETE:**  
P.C.C. LEAN CONC. ----- M-15  
BOX STRUCTURE ----- M-35  
APPROACH SLAB ----- M-30  
RETURN WALL ----- M-30  
CRASH BARRIER ----- M-40
  - FOR FLOOR PROTECTION DETAILS REFER SEPERATE DRAWING.
- REFERENCE DRAWINGS**
- OSRP/CEG/SH-9/BR/6+050/02
  - OSRP/CEG/SH-9/BR/6+050/03
  - OSRP/CEG/BR/MISC-02
  - OSRP/CEG/SH-9/BR/FPW/01
  - OSRP/CEG/SH-9/BR/SCW
  - OSRP/CEG/SH-9/RW/MISC-02

|  |  |      |  |   |  |    |  |  |  |            |  |  |  |           |  |  |  |                                |  |                  |  |  |  |   |  |  |  |
|--|--|------|--|---|--|----|--|--|--|------------|--|--|--|-----------|--|--|--|--------------------------------|--|------------------|--|--|--|---|--|--|--|
| R2 SEP-2015 SECOND REVISION LASA RAJU MATHUR M.R MISHRA (EE) O.P. PATEL (CE)<br>R1 JAN-2013 FIRST REVISION OWD VINAY PK.MISHRA (AE) M.R MISHRA (EE) N.K PRADHAN (CE)<br>- JUNE 2008 ORIGINAL CEG |  |      |  | DPR CONSULTANT :<br><b>CEG</b><br>CONSULTING ENGINEERS GROUP LTD.<br>E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com |  |    |  | DESIGN REVIEW CONSULTANT :<br><b>LEA</b><br>LEA Associates South Asia Pvt. Ltd., India B-1, E-27, 1st FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . |  |            |  | CLIENT :<br><b>ODISHA WORKS DEPARTMENT</b> |  |           |  | PROJECT :<br>CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A |  |                                |  | SCALE :<br>N.T.S |  |  |  | DRAWING TITLE :<br><b>GAD OF BRIDGE AT PROPOSED CH. 28+837 (KALAPAHADA GHUSURA)</b><br>(SHEET 1 OF 1) |  |  |  |
| NO.  |  | DATE |  | REVISION  |  | BY |  | DRAWN:   |  | PREPARED : |  | CHECKED:                                   |  | APPROVED: |  | DWG. NUMBER :  |  | OSRP/CEG/SH9/P02A/BR/28+800/01 |  | REV. R2          |  |  |  |   |  |  |  |





| BOX CULVERT 1/22/0 |          |                   |                          |           |       |              |                        |       |                   |              |            |            |            |            |                       |                       |
|--------------------|----------|-------------------|--------------------------|-----------|-------|--------------|------------------------|-------|-------------------|--------------|------------|------------|------------|------------|-----------------------|-----------------------|
| Sl. No.            | Location | Proposed Chainage | Proposed Formation Level | Bed Level |       | Invert Level | Camber/Super Elevation |       | Direction of flow | Clear Height | Thick ness | Thick ness | Thick ness | Thick ness | Height of Return Wall | Length of Return Wall |
|                    |          |                   |                          | Left      | Right |              | Left                   | Right |                   |              |            |            |            |            |                       |                       |
| 1                  | 10/250   | 10260             | 11.00                    | 9.10      | 9.18  | 8.80         | -2.5%                  | -2.5% | L TO R            | 1.6          | 0.5        | 0.35       | 0.38       | 0.3        | 3.3                   | 3.7                   |
| 2                  | 11/650   | 11535             | 10.10                    | 8.11      | 8.14  | 7.81         | -4.9%                  | -2.1% | L TO R            | 2.0          | 0.5        | 0.35       | 0.38       | 0.3        | 3.6                   | 4.2                   |
| 3                  | 12/600   | 12397             | 9.47                     | 7.49      | 8.33  | 7.19         | -2.3%                  | 2.3%  | L TO R            | 2.0          | 0.5        | 0.35       | 0.38       | 0.3        | 3.6                   | 4.2                   |
| 4                  | 12/900   | 12923             | 8.80                     | 6.82      | 6.82  | 6.52         | -2.5%                  | -2.5% | L TO R            | 1.7          | 0.5        | 0.35       | 0.38       | 0.3        | 3.3                   | 3.8                   |
| 5                  | 14/800   | 14791             | 8.37                     | 6.67      | 6.67  | 6.37         | -2.5%                  | -2.5% | L TO R            | 1.6          | 0.5        | 0.35       | 0.38       | 0.3        | 3.0                   | 3.4                   |
| 6                  | 15/600   | 15360             | 8.62                     | 6.55      | 6.52  | 6.25         | -2.5%                  | -2.5% | L TO R            | 1.8          | 0.5        | 0.35       | 0.38       | 0.3        | 3.4                   | 3.9                   |
| 7                  | 20/100   | 20144             | 8.48                     | 7.32      | 6.36  | 6.32         | -2.5%                  | -2.5% | L TO R            | 1.6          | 0.5        | 0.35       | 0.38       | 0.3        | 3.5                   | 3.6                   |
| 8                  | 21/700   | 21829             | 7.93                     | 6.03      | 5.94  | 5.73         | -2.5%                  | -2.5% | L TO R            | 1.6          | 0.5        | 0.35       | 0.38       | 0.3        | 3.3                   | 3.7                   |
| 9                  | 24/050   | 24096             | 7.59                     | 5.85      | 5.52  | 5.51         | -2.5%                  | -2.5% | L TO R            | 1.5          | 0.5        | 0.35       | 0.38       | 0.3        | 3.4                   | 3.5                   |
| 10                 | 24/500   | 24770             | 7.51                     | 5.50      | 5.50  | 5.20         | -2.5%                  | -2.5% | L TO R            | 1.7          | 0.5        | 0.35       | 0.38       | 0.3        | 3.4                   | 3.8                   |
| 11                 | 26/400   | 26430             | 7.79                     | 5.59      | 5.77  | 5.47         | -2.5%                  | -2.5% | R TO L            | 1.8          | 0.5        | 0.35       | 0.38       | 0.3        | 3.6                   |                       |
| 12                 | 30/600   | 30821             | 7.51                     | 6.36      | 5.55  | 5.54         | -2.5%                  | -2.5% | L TO R            | 1.5          | 0.5        | 0.35       | 0.38       | 0.3        | 3.3                   | 3.9                   |
| 13                 | 43/050   | 43061             | 8.93                     | 6.35      | 6.62  | 6.32         | -2.5%                  | -2.5% | R TO L            | 2.0          | 0.5        | 0.35       | 0.38       | 0.3        | 3.9                   | 3.3                   |

| BOX CULVERT 1/23/0 |          |                   |                          |           |       |              |                        |       |                   |              |            |            |            |            |                       |                       |
|--------------------|----------|-------------------|--------------------------|-----------|-------|--------------|------------------------|-------|-------------------|--------------|------------|------------|------------|------------|-----------------------|-----------------------|
| Sl. No.            | Location | Proposed Chainage | Proposed Formation Level | Bed Level |       | Invert Level | Camber/Super Elevation |       | Direction of flow | Clear Height | Thick ness | Thick ness | Thick ness | Thick ness | Height of Return Wall | Length of Return Wall |
|                    |          |                   |                          | Left      | Right |              | Left                   | Right |                   |              |            |            |            |            |                       |                       |
| 1                  | 0/0      | 0                 | 19.55                    | 16.94     | 16.94 | 16.64        | -2.5%                  | -2.5% | L TO R            | 2.3          | 1.3        | 0.37       | 0.42       | 0.35       | 4.0                   | 4.3                   |
| 2                  | 9/500    | 9602              | 12.00                    | 9.09      | 8.90  | 8.79         | -2.5%                  | -2.5% | L TO R            | 2.6          | 1.3        | 0.37       | 0.42       | 0.35       | 4.4                   | 4.7                   |
| 3                  | 11/100   | 11142             | 9.82                     | 7.90      | 8.08  | 7.60         | 7.0%                   | -7.0% | L TO R            | 2.2          | 1.3        | 0.37       | 0.42       | 0.35       | 3.8                   | 5.1                   |
| 4                  | 13/150   | 13132             | 8.99                     | 7.12      | 6.79  | 6.79         | 5.7%                   | -5.7% | L TO R            | 2.1          | 1.3        | 0.37       | 0.42       | 0.35       | 4.0                   | 4.5                   |
| 5                  | 44/400   | 44315             | 8.06                     | 5.42      | 7.00  | 5.12         | -2.5%                  | -2.5% | L TO R            | 2.4          | 1.3        | 0.37       | 0.42       | 0.35       | 4.0                   | 4.4                   |

| BOX CULVERT 1/33/0 |          |                   |                          |           |       |              |                        |       |                   |              |            |            |            |            |                       |                       |
|--------------------|----------|-------------------|--------------------------|-----------|-------|--------------|------------------------|-------|-------------------|--------------|------------|------------|------------|------------|-----------------------|-----------------------|
| Sl. No.            | Location | Proposed Chainage | Proposed Formation Level | Bed Level |       | Invert Level | Camber/Super Elevation |       | Direction of flow | Clear Height | Thick ness | Thick ness | Thick ness | Thick ness | Height of Return Wall | Length of Return Wall |
|                    |          |                   |                          | Left      | Right |              | Left                   | Right |                   |              |            |            |            |            |                       |                       |
| 1                  | 19/400   | 19367             | 8.30                     | 6.19      | 7.50  | 5.89         | -2.5%                  | -2.5% | L TO R            | 1.8          | 0.9        | 0.42       | 0.42       | 0.42       | 3.5                   | 3.9                   |

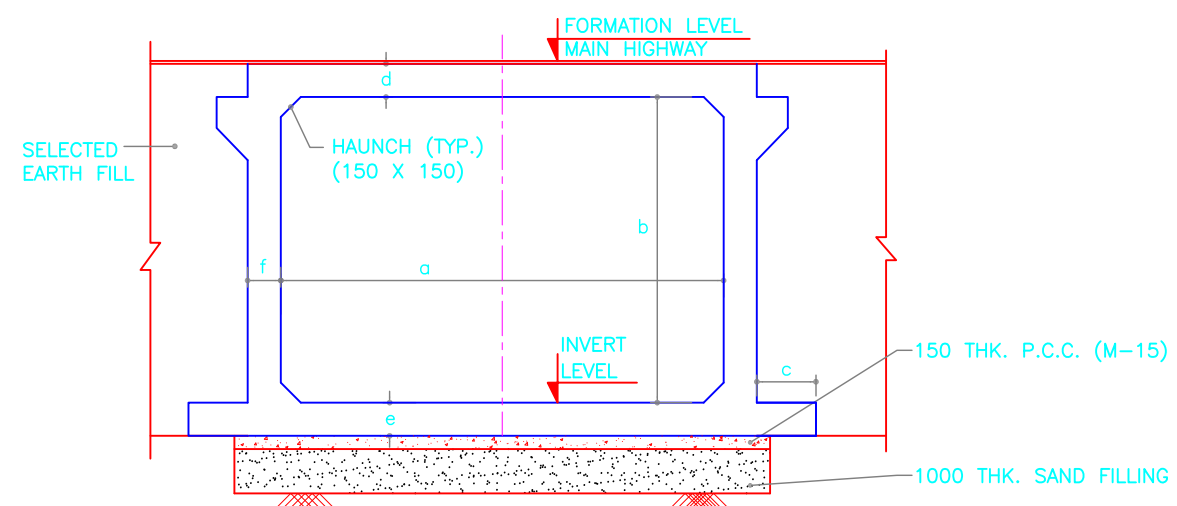
| BOX CULVERT 1/34/0 |          |                   |                          |           |       |              |                        |       |                   |              |            |            |            |            |                       |                       |
|--------------------|----------|-------------------|--------------------------|-----------|-------|--------------|------------------------|-------|-------------------|--------------|------------|------------|------------|------------|-----------------------|-----------------------|
| Sl. No.            | Location | Proposed Chainage | Proposed Formation Level | Bed Level |       | Invert Level | Camber/Super Elevation |       | Direction of flow | Clear Height | Thick ness | Thick ness | Thick ness | Thick ness | Height of Return Wall | Length of Return Wall |
|                    |          |                   |                          | Left      | Right |              | Left                   | Right |                   |              |            |            |            |            |                       |                       |
| 1                  | 41/990   | 41996             | 9.37                     | 5.29      | 5.12  | 4.99         | -2.5%                  | -2.2% | L TO R            | 3.7          | 1.7        | 0.45       | 0.48       | 0.46       | 5.6                   | 6.8                   |

| BOX CULVERT 1/43/0 |          |                   |                          |           |       |              |                        |       |                   |              |            |            |            |            |                       |                       |
|--------------------|----------|-------------------|--------------------------|-----------|-------|--------------|------------------------|-------|-------------------|--------------|------------|------------|------------|------------|-----------------------|-----------------------|
| Sl. No.            | Location | Proposed Chainage | Proposed Formation Level | Bed Level |       | Invert Level | Camber/Super Elevation |       | Direction of flow | Clear Height | Thick ness | Thick ness | Thick ness | Thick ness | Height of Return Wall | Length of Return Wall |
|                    |          |                   |                          | Left      | Right |              | Left                   | Right |                   |              |            |            |            |            |                       |                       |
| 1                  | 15/125   | 15125             | 8.72                     | 6.71      | 6.71  | 6.41         | -2.5%                  | -2.5% | R TO L            | 1.6          | 0.4        | 0.45       | 0.5        | 0.5        | 3.4                   | 3.6                   |
| 2                  | 15/425   | 15425             | 8.57                     | 6.65      | 6.65  | 6.35         | 0.0%                   | -2.5% | R TO L            | 1.7          | 0.4        | 0.45       | 0.5        | 0.5        | 3.4                   | 3.7                   |
| 3                  | 15/700   | 15714             | 8.09                     | 6.05      | 6.10  | 5.80         | -2.5%                  | -2.5% | R TO L            | 1.6          | 0.4        | 0.45       | 0.5        | 0.5        | 3.4                   | 3.6                   |
| 4                  | 15/750   | 15750             | 8.05                     | 6.44      | 6.44  | 6.14         | -2.5%                  | -2.5% | R TO L            | 1.5          | 0.4        | 0.45       | 0.5        | 0.5        | 3.0                   | 3.0                   |
| 5                  | 15/850   | 15850             | 8.00                     | 6.19      | 6.19  | 5.89         | -2.5%                  | -2.5% | R TO L            | 1.5          | 0.4        | 0.45       | 0.5        | 0.5        | 3.2                   | 3.3                   |
| 6                  | 28/225   | 28225             | 8.00                     | 5.31      | 5.31  | 5.01         | -2.5%                  | -0.8% | R TO L            | 2.4          | 0.4        | 0.45       | 0.5        | 0.5        | 4.1                   | 4.8                   |
| 7                  | 31/400   | 31400             | 8.20                     | 5.65      | 5.65  | 5.35         | -2.5%                  | -2.5% | R TO L            | 2.2          | 0.4        | 0.45       | 0.5        | 0.5        | 3.9                   | 4.4                   |
| 8                  | 31/675   | 31700             | 8.20                     | 6.03      | 6.03  | 5.73         | -2.5%                  | -2.5% | R TO L            | 1.8          | 0.4        | 0.45       | 0.5        | 0.5        | 3.5                   | 3.9                   |
| 9                  | 36/775   | 36775             | 8.90                     | 6.42      | 6.42  | 6.12         | 3.0%                   | -4.0% | R TO L            | 2.4          | 0.4        | 0.45       | 0.5        | 0.5        | 4.2                   | 4.8                   |
| 10                 | 37/850   | 37850             | 7.50                     | 4.69      | 4.69  | 4.39         | 0.0%                   | -2.5% | R TO L            | 2.6          | 0.4        | 0.45       | 0.5        | 0.5        | 4.3                   | 5.1                   |
| 11                 | 41/125   | 41125             | 9.37                     | 6.66      | 6.66  | 6.36         | 5.7%                   | -2.5% | R TO L            | 2.8          | 0.4        | 0.45       | 0.5        | 0.5        | 4.6                   | 5.4                   |
| 12                 | 41/275   | 41275             | 9.29                     | 6.36      | 6.36  | 6.06         | -2.5%                  | -2.5% | R TO L            | 2.6          | 0.4        | 0.45       | 0.5        | 0.5        | 4.3                   | 5.0                   |
| 13                 | 41/375   | 41375             | 9.23                     | 6.03      | 6.03  | 5.73         | -2.5%                  | -2.5% | R TO L            | 2.8          | 0.4        | 0.45       | 0.5        | 0.5        | 4.6                   | 5.4                   |
| 14                 | 41/550   | 41550             | 9.13                     | 6.14      | 6.14  | 5.84         | -2.5%                  | -2.5% | R TO L            | 2.6          | 0.4        | 0.45       | 0.5        | 0.5        | 4.3                   | 5.1                   |
| 15                 | 43/600   | 43771             | 8.78                     | 7.05      | 6.90  | 6.60         | -2.5%                  | -2.5% | R TO L            | 1.5          | 0.4        | 0.45       | 0.5        | 0.5        | 3.2                   | 3.4                   |

| BOX CULVERT 1/44/0 |          |                   |                          |           |       |              |                        |       |                   |              |            |            |            |            |                       |                       |
|--------------------|----------|-------------------|--------------------------|-----------|-------|--------------|------------------------|-------|-------------------|--------------|------------|------------|------------|------------|-----------------------|-----------------------|
| Sl. No.            | Location | Proposed Chainage | Proposed Formation Level | Bed Level |       | Invert Level | Camber/Super Elevation |       | Direction of flow | Clear Height | Thick ness | Thick ness | Thick ness | Thick ness | Height of Return Wall | Length of Return Wall |
|                    |          |                   |                          | Left      | Right |              | Left                   | Right |                   |              |            |            |            |            |                       |                       |
| 1                  | 30/075   | 30075             | 7.67                     | 3.93      | 3.93  | 3.63         | 5.8%                   | -5.8% | R TO L            | 3.8          | 1.2        | 0.48       | 0.55       | 0.55       | 5.6                   | 6.9                   |
| 2                  |          | 30400             | 7.69                     |           |       |              |                        |       | R TO L            |              | 1.2        | 0.48       | 0.55       | 0.55       |                       |                       |
| 3                  | 36/850   | 36850             | 8.85                     | 5.47      | 5.47  | 5.17         | 7.0%                   | -7.0% | R TO L            | 3.5          | 1.2        | 0.48       | 0.55       | 0.55       | 5.3                   | 6.5                   |
| 4                  | 42/225   | 42225             | 9.38                     | 5.79      | 5.79  | 5.49         | -2.5%                  | -2.5% | R TO L            | 3.2          | 1.2        | 0.48       | 0.55       | 0.55       | 4.9                   | 6.0                   |
| 5                  | 42/400   | 42400             | 9.02                     | 5.83      | 5.83  | 5.53         | 7.0%                   | -7.0% | R TO L            | 3.4          | 1.2        | 0.48       | 0.55       | 0.55       | 5.1                   | 6.2                   |

| BOX CULVERT 1/63/0 |          |                   |                          |           |       |              |                        |       |                   |              |            |            |            |            |                       |                       |
|--------------------|----------|-------------------|--------------------------|-----------|-------|--------------|------------------------|-------|-------------------|--------------|------------|------------|------------|------------|-----------------------|-----------------------|
| Sl. No.            | Location | Proposed Chainage | Proposed Formation Level | Bed Level |       | Invert Level | Camber/Super Elevation |       | Direction of flow | Clear Height | Thick ness | Thick ness | Thick ness | Thick ness | Height of Return Wall | Length of Return Wall |
|                    |          |                   |                          | Left      | Right |              | Left                   | Right |                   |              |            |            |            |            |                       |                       |
| 1                  | 9/900    | 9902              | 11.91                    | 9.02      | 12.10 | 8.72         | -5.7%                  | 1.3%  | L TO R            | 2.5          | 0.3        | 0.68       | 0.72       | 0.72       | 4.5                   | 5.1                   |

| BOX CULVERT 1/64/0 |          |                   |                          |           |       |              |                        |       |                   |              |            |            |            |            |                       |                       |
|--------------------|----------|-------------------|--------------------------|-----------|-------|--------------|------------------------|-------|-------------------|--------------|------------|------------|------------|------------|-----------------------|-----------------------|
| Sl. No.            | Location | Proposed Chainage | Proposed Formation Level | Bed Level |       | Invert Level | Camber/Super Elevation |       | Direction of flow | Clear Height | Thick ness | Thick ness | Thick ness | Thick ness | Height of Return Wall | Length of Return Wall |
|                    |          |                   |                          | Left      | Right |              | Left                   | Right |                   |              |            |            |            |            |                       |                       |
| 1                  | 8/900    | 8939              | 12.07                    | 11.43     | 8.93  | 8.63         | 7.0%                   | -7.0% | R TO L            | 3.1          | 0.3        | 0.68       | 0.72       | 0.75       | 5.1                   | 5.9                   |



**NOTES:**

- ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
- ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
- LOOSE / UNSUITABLE SOIL BELOW BOX CULVERTS IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
- IN CASE DEPTH OF EARTH FILLING BETWEEN THE TOP OF THE CULVERT AND THE BOTTOM OF THE PAVEMENT CRUST IS LESS THAN 500 MM, THIS LAYERS IS REPLACED WITH GRANULAR SUB BASE.
- CHAINAGE / FORMATION LEVEL IS PROVIDED AS PER APPROVED PLAN & PROFILE DRAWING.
- FOR CULVERTS SKEW TO THE TRAFFIC DIRECTION LENGTH OF CULVERT SHALL BE ADJUSTED AS PER SITE CONDITION.
- FOR REINF. DETAILS OF RETURN WALL REFER SEPARATE DRAWING. ALL REINF. ARE OF GRADE FE500 CONFORMATION TO IS:1786.
- IN CASES WHERE INVERT LEVEL IS HIGHER THAN GROUND LEVEL AT ENDS OF CULVERT OR WHERE UNSUITABLE SOIL IS TO BE REPLACED BY GRANULAR MATERIAL, PROVIDE ADEQUATE CUT OFF WALLS AT ENDS OF CULVERT TO PREVENT SCOUR/EROSION.
- IN CASE ALLOWABLE SOIL BEARING CAPACITY IS LESS THAN ACTUAL BEARING PRESSURE THE SOIL SHOULD BE STABILIZED TO ACHIEVE SAME.

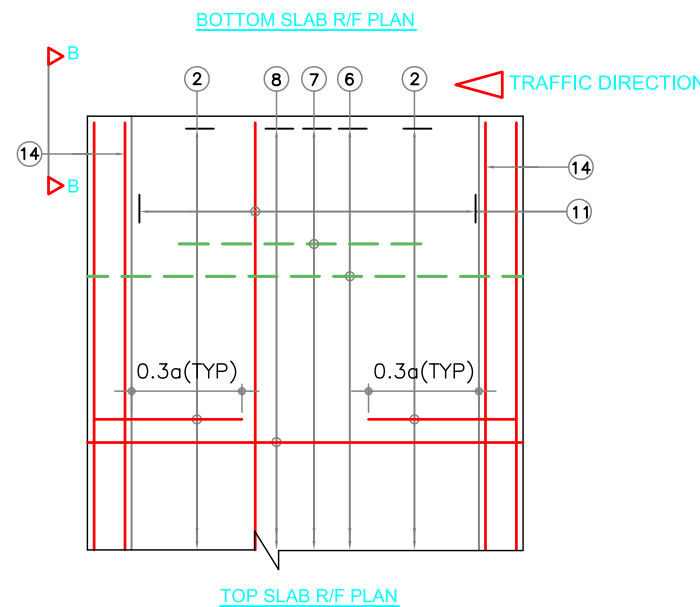
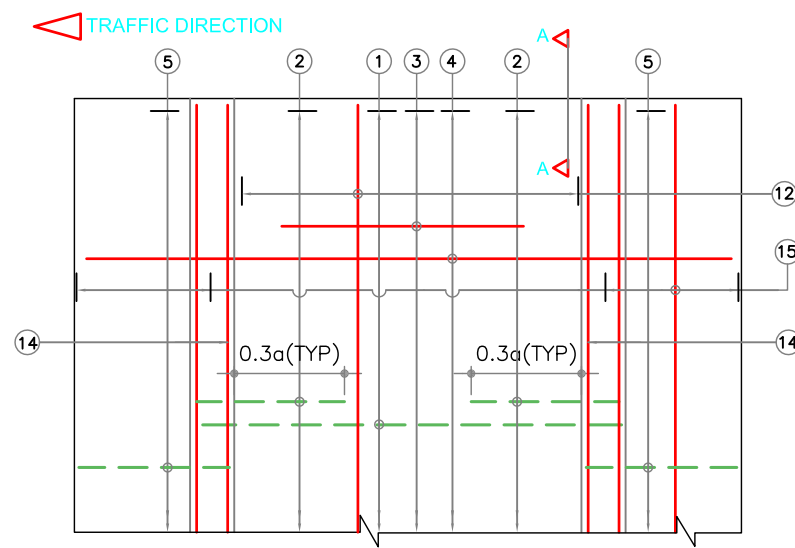
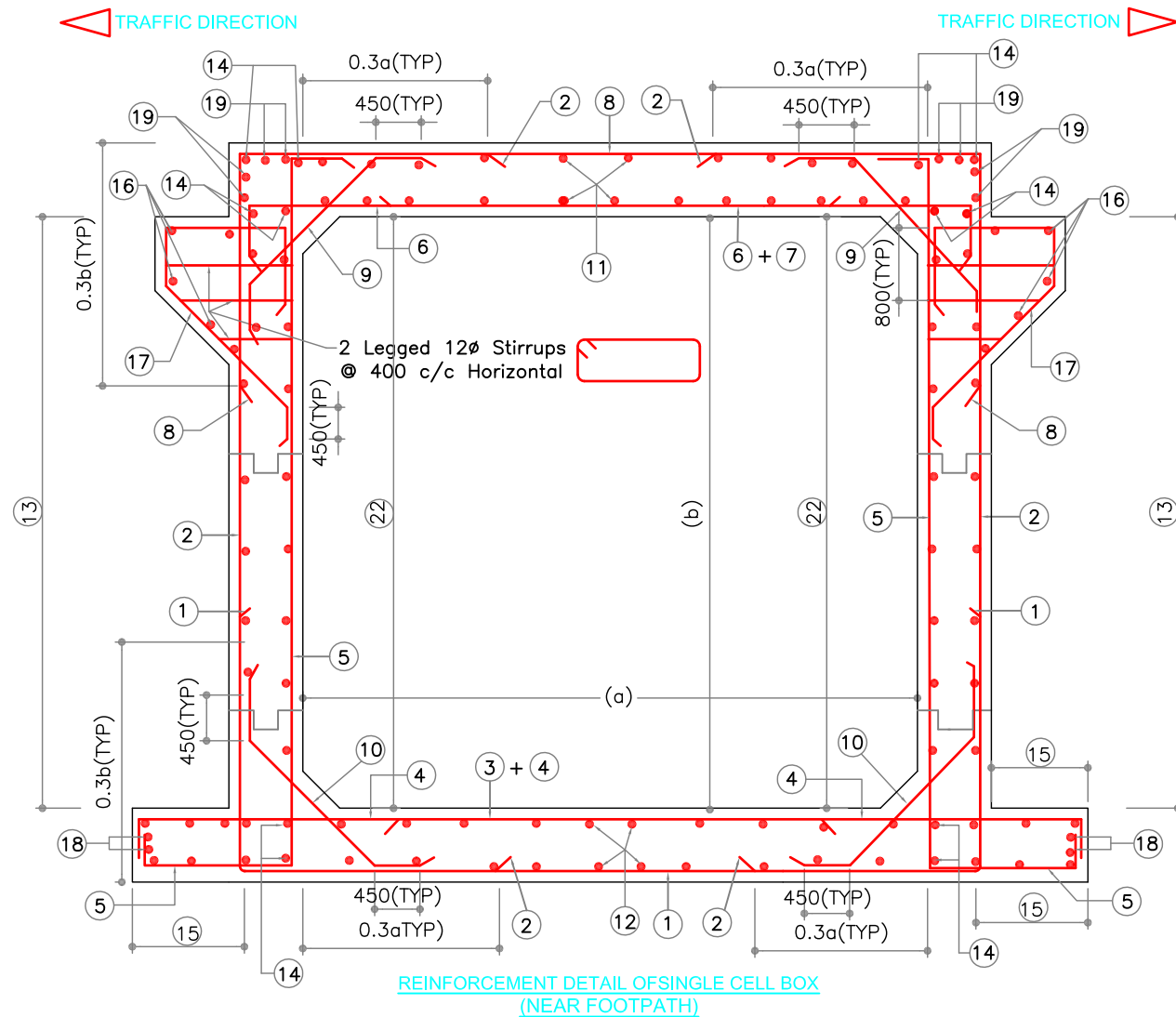
**REFERENCE DRAWING:-**

- FOR GENERAL NOTES, MISCELLANEOUS DETAILS APPROACH SLAB RCC RAILING, DRAINAGE SPOUT REFER MOST STANDARD DRAWING OF CULVERTS NO. SD/101, SD/115(SHEET 1 OF 4), (SHEET 2 OF 4), (SHEET 3 OF 4),(SHEET 4 OF 4) & SD/111.
- OSRP/CEG/SH-9/ BOX CUL-02
- OSRP/CEG/RW/MISC-01

TABLE SHOWING SALIENT DIMENSIONS

| BOX/TYPE | WIDTH a (mm) | HEIGHT b (mm) | c (mm) | THICKNESS d (mm) | THICKNESS E (mm) | THICKNESS f (mm) | NET BEARING CAPACITY T/M <sup>2</sup> |
|----------|--------------|---------------|--------|------------------|------------------|------------------|---------------------------------------|
| 1/22/0   | 2000         | 2000          | 500    | 350              | 380              | 300              | 15                                    |
| 1/23/0   | 2000         | 3000          | 1300   | 370              | 420              | 350              | 15                                    |
| 1/33/0   | 3000         | 3000          | 900    | 420              | 420              | 420              | 15                                    |
| 1/34/0   | 3000         | 4000          | 1700   | 450              | 480              | 460              | 15                                    |
| 1/43/0   | 4000         | 3000          | 400    | 450              | 500              | 500              | 15                                    |
| 1/44/0   | 4000         | 4000          | 1200   | 480              | 550              | 550              | 15                                    |
| 1/45/0   | 4000         | 5000          | 1900   | 520              | 620              | 630              | 15                                    |
| 1/63/0   | 6000         | 3000          | 300    | 680              | 720              | 720              | 10                                    |
| 1/64/0   | 6000         | 4000          | 300    | 680              | 720              | 750              | 15                                    |

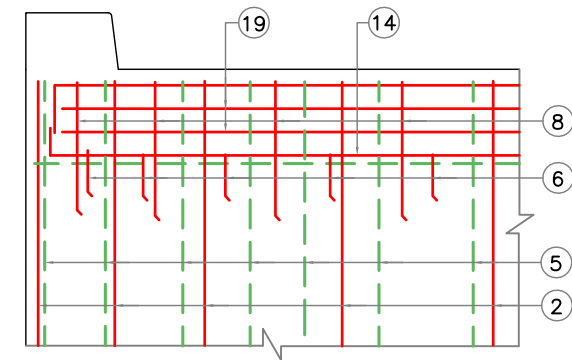
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|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|---|--|--|--|---------------|--|--|--|---|--|--|--|
| R2 SEP-2015 SECOND REVISION LASA RAJU MATHUR M.R MISHRA (EE) O.P. PATEL (CE)   |  |  |  | R1 JAN-2013 FIRST REVISION OWD VINAY PK.MISHRA (AE) M.R MISHRA (EE) N.K PRADHAN (CE) |  |  |  | - JUNE 2008 ORIGINAL CEG   |  |  |  | NO. DATE REVISION BY DRAWN: PREPARED: CHECKED: APPROVED: |  |  |  |   |  |  |  |               |  |  |  |   |  |  |  |
| DPR CONSULTANT : CONSULTING ENGINEERS GROUP LTD. E-12,MOJI COLONY,MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899,2521899,2520556 Fax: 2521348, e-mail: ceg@ceginia.com |  |  |  |  |  |  |  | DESIGN REVIEW CONSULTANT : LEA Associates South Asia Pvt. Ltd., India B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . |  |  |  | CLIENT : ODISHA WORKS DEPARTMENT                         |  |  |  | PROJECT : CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A |  |  |  | SCALE : N.T.S |  |  |  | DRAWING TITLE : GENERAL ARRANGEMENT DRAWING SINGLE CELL R.C.C. BOX CULVERT (SHEET 1 OF 3) |  |  |  |
| DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/03   |  |  |  |  |  |  |  |  |  |  |  | REV. R2  |  |  |  |   |  |  |  |               |  |  |  |   |  |  |  |



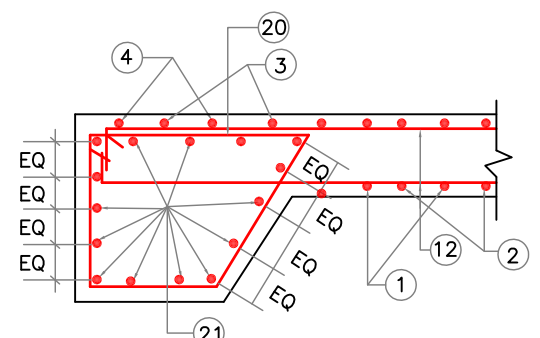
LEGEND :-  
 ——— TOP FACE BARS/OUTER FACE BARS.  
 - - - - - BOTTOM FACE BARS/INNER FACE BARS.

REINFORCEMENT DETAIL OF SINGLE CELL BOX

| BAR MARK | BAR SHAPE | 1/22/0   |         | 1/23/0   |         | 1/33/0   |         | 1/34/0   |         | 1/43/0   |         | 1/44/0   |         | 1/45/0   |         | 1/63/0   |         | 1/64/0   |         |
|----------|-----------|----------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|---------|----------|---------|
|          |           | BAR DIA. | SPACING | BAR DIA. | SPACING | BAR DIA. | SPACING | BAR DIA. | SPACING | BAR DIA. | SPACING | BAR DIA. | SPACING | BAR DIA. | SPACING | BAR DIA. | SPACING | BAR DIA. | SPACING |
| 1        | 10        | 250      | 16      | 225      | 10      | 200      | 12      | 225      | 10      | 200      | 12      | 200      | 10      | 200      | 16      | 200      | 20      | 200      |         |
| 2        | 16        | 250      | 16      | 225      | 16      | 200      | 16      | 225      | 20      | 200      | 20      | 200      | 20      | 200      | 20      | 200      | 20      | 200      |         |
| 3        | -         | -        | -       | -        | 12      | 200      | 12      | 225      | 12      | 200      | 12      | 200      | 12      | 200      | 20      | 200      | 20      | 200      |         |
| 4        | 16        | 250      | 16      | 250      | 16      | 200      | 16      | 225      | 16      | 200      | 16      | 200      | 16      | 200      | 12      | 200      | 16      | 200      |         |
| 5        | 16        | 250      | 16      | 175      | 12      | 150      | 16      | 175      | 12      | 175      | 12      | 150      | 12      | 150      | 12      | 150      | 12      | 150      |         |
| 6        | 16        | 250      | 16      | 250      | 16      | 200      | 16      | 225      | 16      | 200      | 16      | 200      | 20      | 200      | 16      | 200      | 20      | 200      |         |
| 7        | -         | -        | -       | -        | -       | -        | -       | -        | 8       | 200      | 8       | 200      | 12      | 200      | 16      | 200      | 16      | 200      |         |
| 8        | 10        | 250      | 16      | 225      | 10      | 225      | 16      | 225      | 10      | 200      | 16      | 200      | 12      | 200      | 16      | 200      | 16      | 200      |         |
| 9        | 10        | 250      | 10      | 250      | 10      | 225      | 10      | 225      | 10      | 200      | 10      | 200      | 10      | 200      | 10      | 200      | 10      | 200      |         |
| 10       | 12        | 250      | 12      | 250      | 10      | 225      | 10      | 225      | 10      | 200      | 10      | 200      | 12      | 200      | 10      | 200      | 10      | 200      |         |
| 11       | 10        | 250      | 10      | 250      | 10      | 225      | 10      | 225      | 10      | 200      | 10      | 200      | 10      | 200      | 10      | 150      | 10      | 150      |         |
| 12       | 10        | 250      | 12      | 150      | 12      | 225      | 12      | 225      | 12      | 200      | 12      | 200      | 12      | 175      | 10      | 125      | 12      | 125      |         |
| 13       | 10        | 250      | 10      | 250      | 12      | 225      | 12      | 225      | 12      | 200      | 12      | 200      | 12      | 200      | 10      | 125      | 10      | 125      |         |
| 14       | 10        | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        |         |
| 15       | 10        | 250      | 12      | 250      | 10      | 225      | 12      | 225      | 10      | 200      | 10      | 200      | 10      | 200      | 10      | 150      | 10      | 150      |         |
| 16       | 12        | -        | 12      | -        | 12      | -        | 12      | -        | 12      | -        | 12      | -        | 12      | -        | 12      | -        | 12      | -        |         |
| 17       | 12        | 250      | 12      | 250      | 12      | 225      | 12      | 225      | 12      | 200      | 12      | 200      | 12      | 200      | 12      | 200      | 12      | 200      |         |
| 18       | 10        | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        |         |
| 19       | 10        | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        |         |
| 20       | 10        | 150      | 10      | 150      | 10      | 150      | 10      | 150      | 10      | 150      | 10      | 150      | 10      | 150      | 10      | 150      | 10      | 150      |         |
| 21       | 10        | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        | 10      | -        |         |
| 22       | 10        | 250      | 10      | 250      | 10      | 250      | 10      | 250      | 10      | 250      | 10      | 230      | 10      | 200      | 10      | 180      | 10      | 170      |         |



VIEW B-B



SECTION AT A-A

- NOTES :-
- 1 ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
  - 2 THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRG.NO.OSRP/CEG/SH-16/ BOX CUL-01
  - 3 MINIMUM CLEAR COVER TO MAIN REINFORCEMENT SHALL BE 50mm.
  - 4 MINIMUM LAP LENGTH OF REINFORCEMENT SHALL BE KEPT AS 83 D WHERE D IS THE DIAMETER THE BAR, NOT MORE THAN 50% SHALL BE LAPPED AT ANY ONE LOCATION.
  - 5 LINK SHOULD GO ROUND MAIN BAR AND CONTINUE ALONG BARREL.
  - 6 LINK SHALL BE STARTED AT DISTANCE OF HALF THEIR SPACING FROM THE FACE OF SUPPORT.
  - 7 MAXIMUM SIZE OF AGGREGATE TO BE USED IN RCC IS 20mm.
  - 8 GRADE OF CONCRETE M-25.
  - 9 ALL REINFORCEMENT BARS SHALL BE HIGH YIELD STRENGTH DEFORMED BARS OF GRADE Fe 500 CONFIRMING TO IS:1786-1985 WITH A MINIMUM YIELD STRENGTH OF 415 N/mm<sup>2</sup>
  - 10 JOINT OR LAPPING OF BARS SHALL BE SUITABLY STAGGTRED AS PER CLAUSE 304.6 OF IRC:21-2000.

REFERENCE DRAWING:-  
 1. OSRP/CEG/SH-9/ BOX CUL-01

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12,MOJI COLONY,MALVIYA NAGAR  
 JAIPUR-17 Tel:  
 +91-141-2520899,2521899,2520556 Fax:  
 2521348, e-mail: ceg@ceginia.com

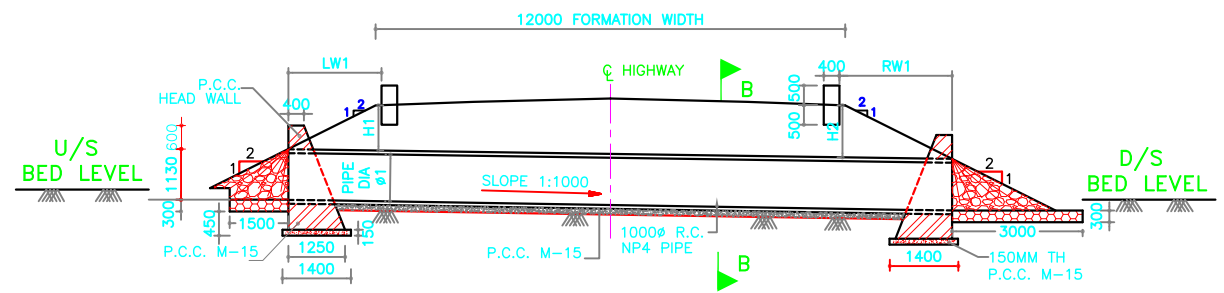
DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

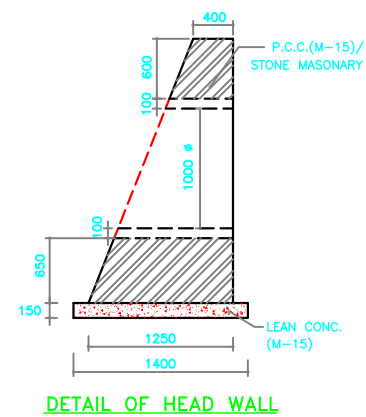
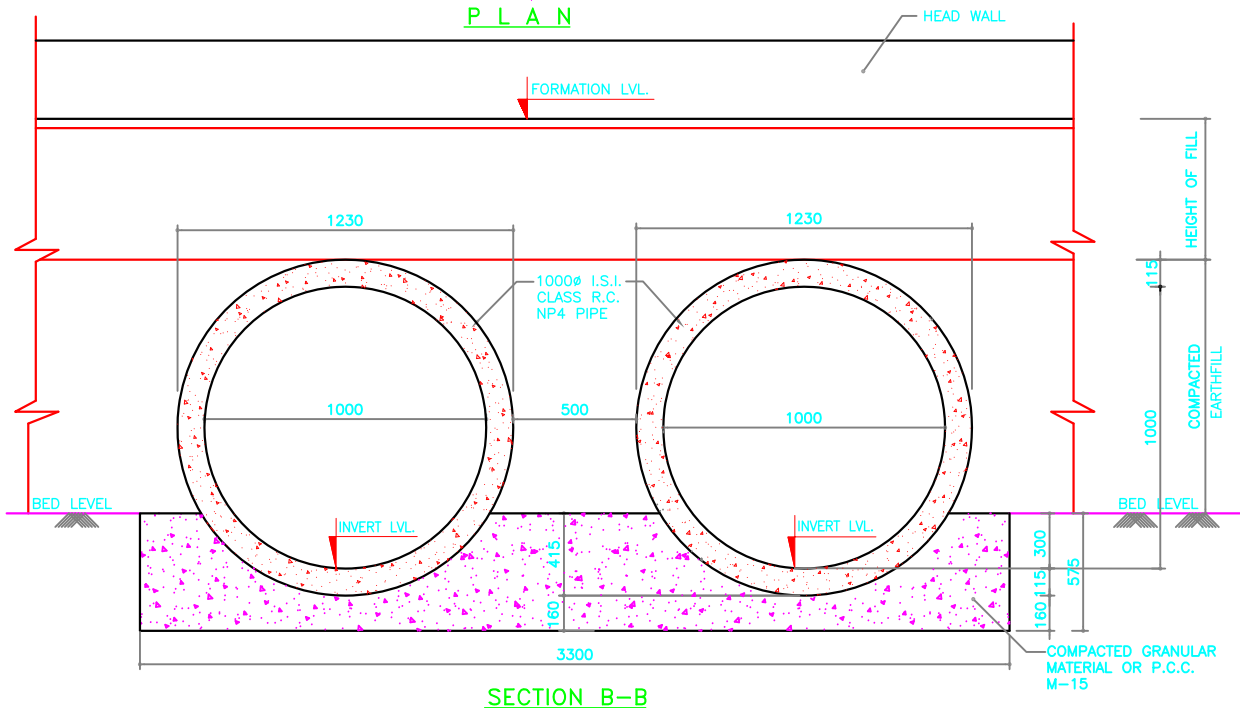
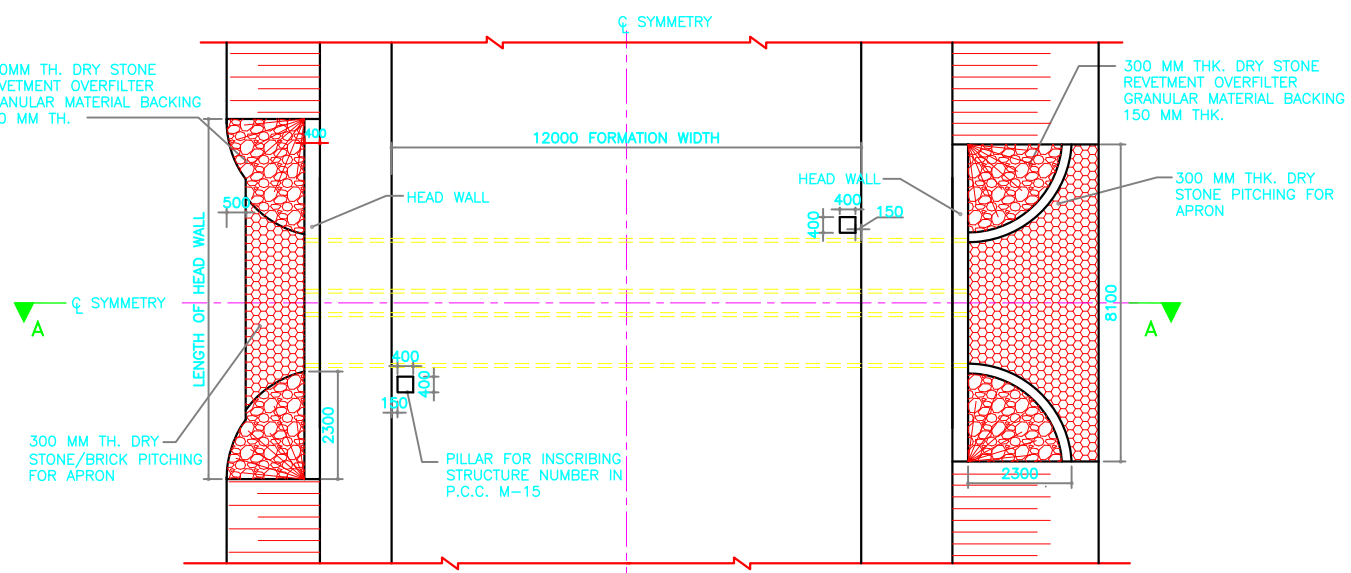
PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :  
 N.T.S

DRAWING TITLE :  
**REINFORCEMENT DETAIL OF SINGLE CELL BOX SINGLE CELL R.C.C. BOX CULVERT**  
 (SHEET 2 OF 3)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/ 03  
 REV. R2



| Sl. No. | Location | Proposed Chainage | Proposed Foramtion Level | Bed Level |       | Camber/Super Elevation |        | Direction of Flow |
|---------|----------|-------------------|--------------------------|-----------|-------|------------------------|--------|-------------------|
|         |          |                   |                          | Left      | Right | Left                   | Right  |                   |
| 1       | 6/990    | 7001              | 13.890                   | 12.07     | 12.07 | -2.50%                 | -2.50% | R TO L            |
| 2       |          | 9027              | 11.963                   |           |       |                        |        |                   |



- NOTES:**
1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
  2. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
  3. LOOSE / UNSUITABLE SOIL BELOW CULVERTS IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
  4. CHAINAGE / FORMATION LEVEL IS PROVIDED AS PER APPROVED PLAN & PROFILE.
  5. FOR CULVERTS SKEW TO THE TRAFFIC DIRECTION LENGTH OF CULVERT SHALL BE ADJUSTED AS PER SITE CONDITION.
  6. LONGITUDINAL SLOPE OF PIPE SHALL BE MIN. 1 IN 1000.
  7. FIRST CLASS BEDDING CAN BE USED FOR MAXIMUM HEIGHT OF FILL OF 4.0 M.
  8. THE FINISHED ROAD LEVEL SHALL BE VERIFIED WITH ALIGNMENT DRAWING & GROUND LEVEL WITH SITE CONDITIONS BEFORE EXECUTION.

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceindia.com

DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
**CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A**

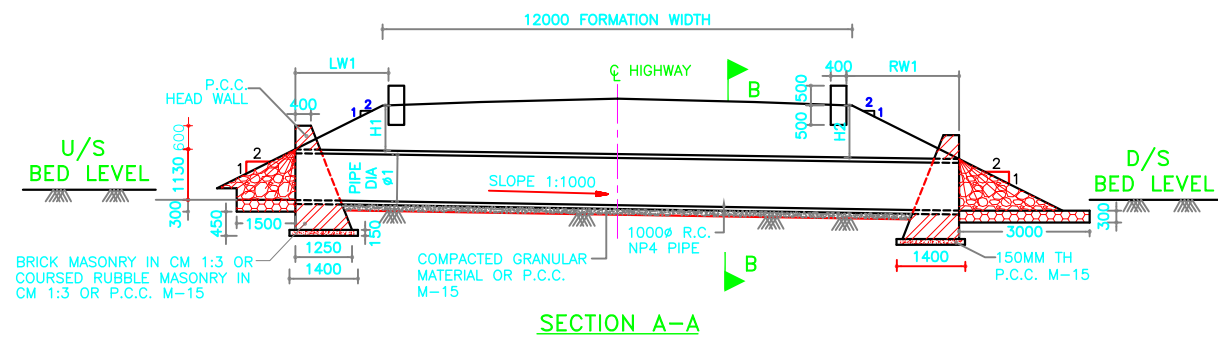
SCALE :  
 N.T.S

DRAWING TITLE :  
**TYPICAL ARRANGEMENT FOR R.C.C DOUBLE PIPE CULVERTS (2X1.0m DIA)**  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/ 3  
 REV. R2

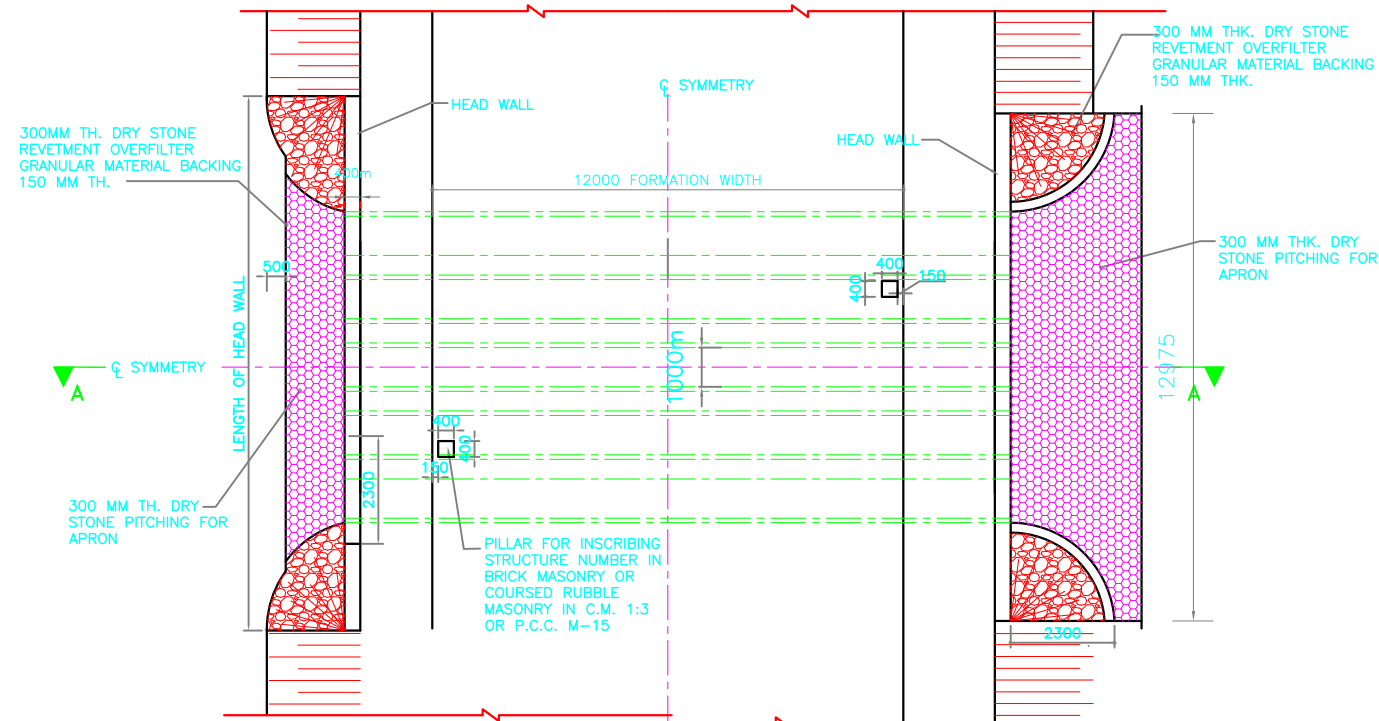




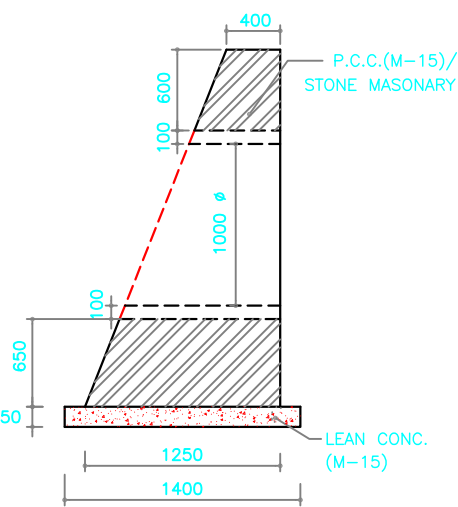




SECTION A-A



PLAN

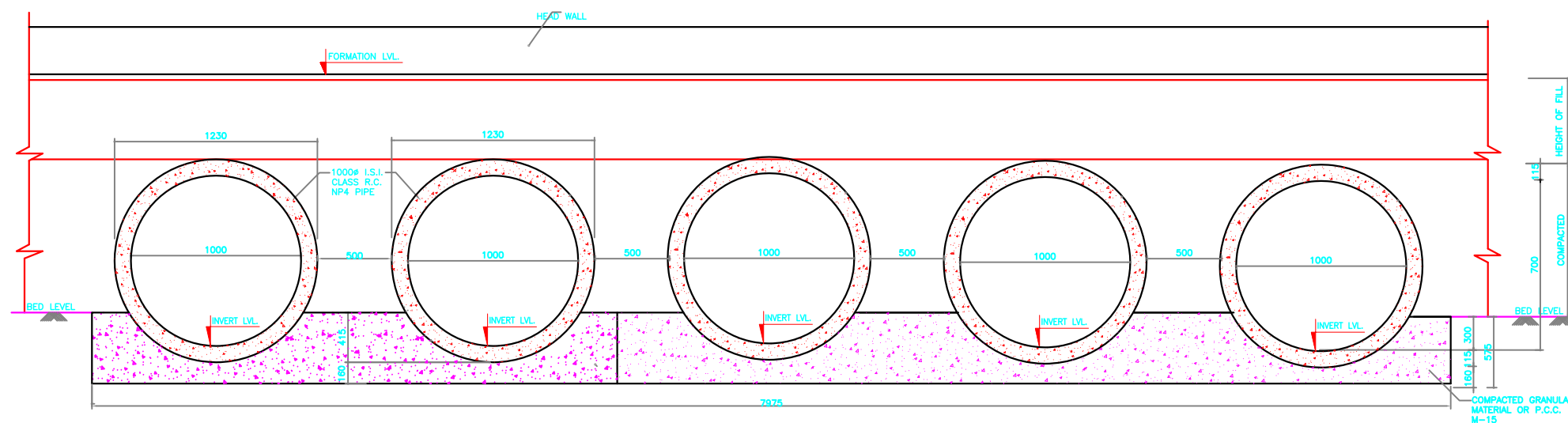


DETAIL OF HEAD WALL

| Sl. No. | Location | Proposed Chainage | Proposed Formation Level | Bed Level |        | Invert Level | Camber/Super Elevation |       | Direction of flow |
|---------|----------|-------------------|--------------------------|-----------|--------|--------------|------------------------|-------|-------------------|
|         |          |                   |                          | Left      | Right  |              | Left                   | Right |                   |
|         |          |                   |                          | 1         | 16/700 |              | 16733                  | 8.57  |                   |
| 2       | 17/100   | 17078             | 8.60                     | 6.80      | 6.90   | 6.50         | -4.3%                  | 1.4%  | L TOR             |
| 3       | 17/700   | 17666             | 8.08                     | 6.57      | 6.35   | 6.27         | -2.5%                  | -2.5% | L TOR             |
| 4       | 17/900   | 17928             | 7.90                     | 6.05      | 6.51   | 5.75         | -2.5%                  | -2.5% | L TOR             |
| 5       | 18/200   | 18195             | 7.76                     | 6.07      | 5.93   | 5.77         | -2.5%                  | -2.5% | L TOR             |
| 6       | 18/600   | 18627             | 8.02                     | 6.08      | 6.09   | 5.78         | -2.5%                  | -2.5% | L TOR             |
| 7       | 19/100   | 19096             | 8.64                     | 6.69      | 6.45   | 6.39         | -2.2%                  | 2.2%  | L TOR             |
| 8       | 20/200   | 20365             | 8.26                     | 7.54      | 6.55   | 6.54         | -2.5%                  | -2.5% | L TOR             |
| 9       | 20/700   | 20691             | 7.92                     | 6.08      | 6.16   | 5.78         | -2.5%                  | -2.5% | L TOR             |
| 10      | 21/050   | 21074             | 7.69                     | 5.92      | 5.92   | 5.62         | -2.5%                  | -2.5% | L TOR             |
| 11      | 21/150   | 21235             | 7.69                     | 5.68      | 5.99   | 5.38         | -2.5%                  | -2.5% | L TOR             |
| 12      | 21/400   | 21490             | 7.72                     | 5.55      | 5.89   | 5.25         | -2.5%                  | -2.5% | L TOR             |
| 13      | 22/700   | 22570             | 8.57                     | 6.34      | 6.34   | 6.04         | -2.5%                  | -2.5% | L TOR             |
| 14      | 24/350   | 24478             | 7.61                     | 5.73      | 5.80   | 5.43         | -2.5%                  | -2.5% | L TOR             |
| 15      | 25/200   | 25249             | 7.44                     | 5.46      | 5.68   | 5.16         | -2.5%                  | -2.5% | L TOR             |

NOTES:

- ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
- ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
- LOOSE / UNSUITABLE SOIL BELOW CULVERTS IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
- CHAINAGE / FORMATION LEVEL IS PROVIDED AS PER APPROVED PLAN & PROFILE.
- FOR CULVERTS SKEW TO THE TRAFFIC DIRECTION LENGTH OF CULVERT SHALL BE ADJUSTED AS PER SITE CONDITION.
- LONGITUDINAL SLOPE OF PIPE SHALL BE MIN. 1 IN 1000.
- FIRST CLASS BEDDING CAN BE USED FOR MAXIMUM HEIGHT OF FILL OF 4.0 M.
- THE FINISHED ROAD LEVEL SHALL BE VERIFIED WITH ALIGNMENT DRAWING & GROUND LEVEL WITH SITE CONDITIONS BEFORE EXECUTION.



SECTION B-B

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CEG**  
 CONSULTING ENGINEERS GROUP LTD.  
 E-12, MOJI COLONY, MALVIYA NAGAR  
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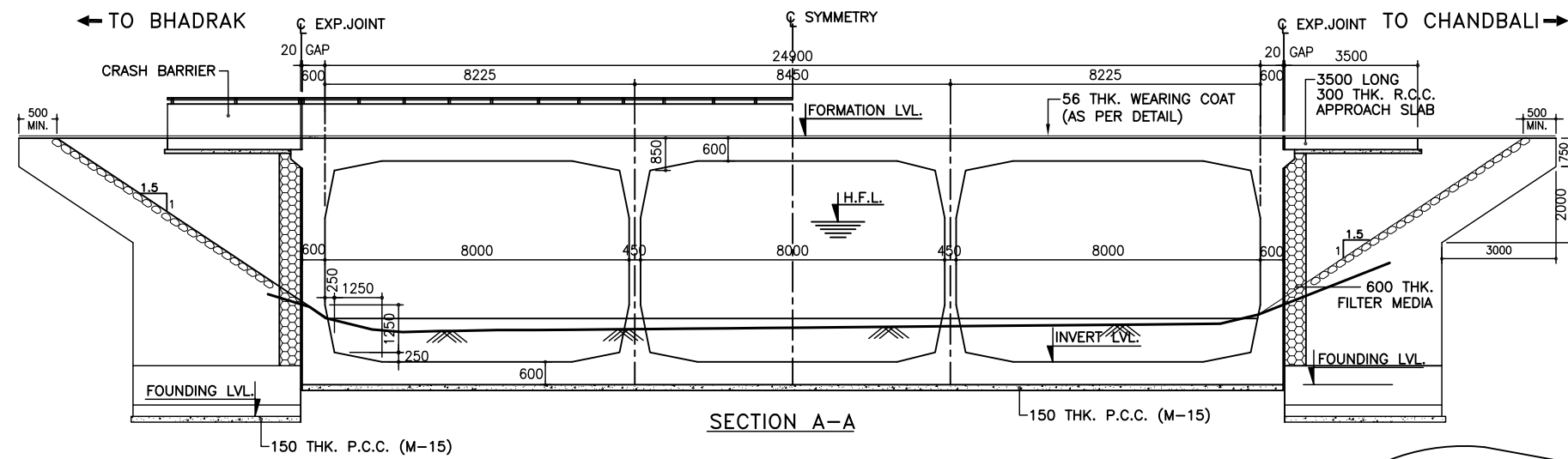
DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - PO2A

SCALE :  
 N.T.S

DRAWING TITLE :  
 TYPICAL ARRANGEMENT FOR R.C.C MULTY PIPE CULVERTS (5X1.0m DIA)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/ 3  
 REV. R2



SECTION A-A

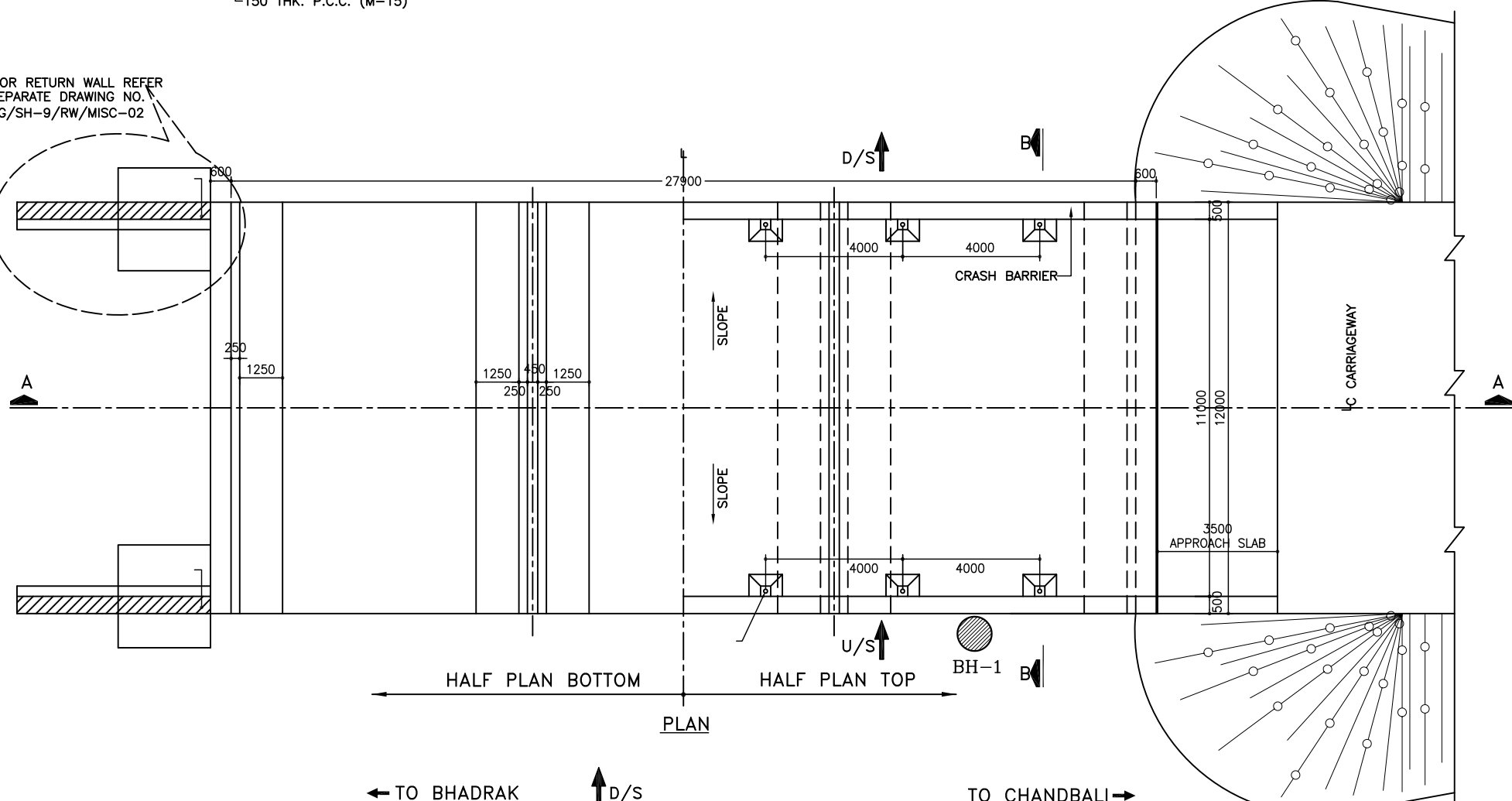
**NOTES:**

1. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METERS.
2. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
3. CHAINAGES SHOWN ARE C/L OF PROPOSED ROAD.
4. LOOSE / UNSUITABLE SOIL BELOW BOX STRUCTURES IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
5. FORMATION LEVEL & SUPERELEVATION IS PROVIDED AS PER THE APPROVED 'PLAN & PROFILE' DRAWING.
6. ASPHALTIC PLUG TYPE EXPANSION JOINT IS PROVIDED AS PER DRAWING NO. OSRP/CEG/BR/MISC-02
7. **GRADE OF CONCRETE:**  
 P.C.C. LEAN CONC. ----- M-15  
 BOX STRUCTURE ----- M-35  
 RETURN WALL ----- M-35  
 CRASH BARRIER ----- M-40
8. FOR FLOOR PROTECTION DETAILS REFER SEPERATE DRAWING.
9. ALL REINFORCEMENTS SHALL BE CRS FE-500D GRADE AND CONFIRM TO IS:1786.
10. THE AREA IS UNDER SEVERE EXPOSURE CONDITION.

**REFERENCE DRAWINGS**

1. OSRP/CEG/SH-9/TRIPLE CELL/02
2. OSRP/CEG/BR/MISC-02
3. OSRP/CEG/SH-9/RW/MISC-01
4. OSRP/CEG/SH-9/BR/FPW/01
5. OSRP/CEG/SH-9/RW/MISC-02

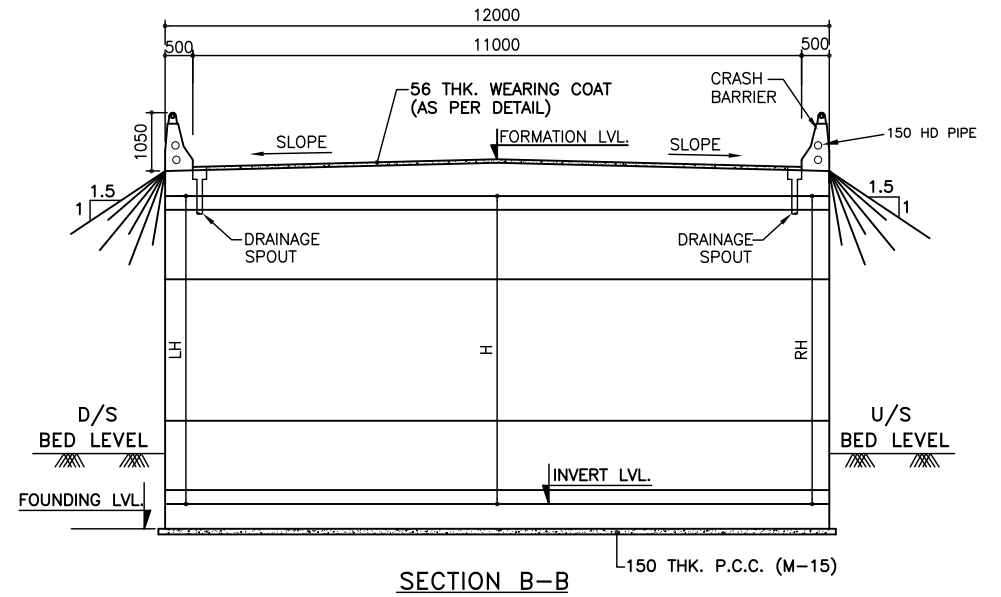
FOR RETURN WALL REFER SEPERATE DRAWING NO. CEG/SH-9/RW/MISC-02



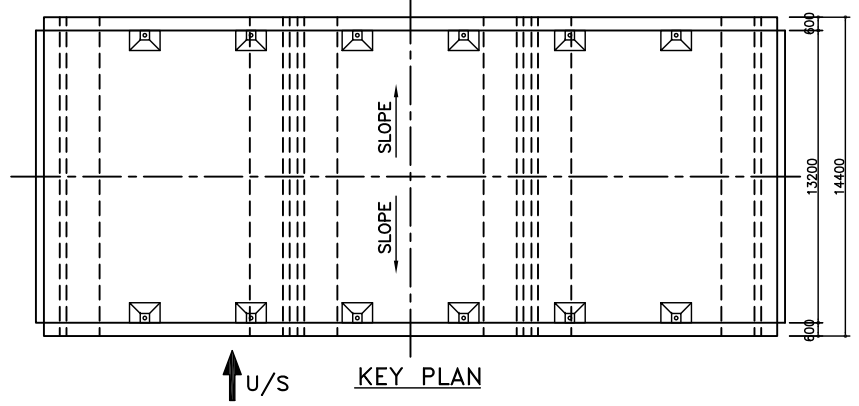
PLAN

**BOX LEVELS DETAILS**

| Sl. No | PROPOSED CHAINAGE (m) | FORMATION LEVEL (m) | BED LVL (m) | INVERT LVL. (m) | FOUNDING LVL. (m) | SUPER ELEVATION/ CAMBER |       | CLEAR HEIGHT (MAX) |       |        | DIRECTION OF FLC |
|--------|-----------------------|---------------------|-------------|-----------------|-------------------|-------------------------|-------|--------------------|-------|--------|------------------|
|        |                       |                     |             |                 |                   | LEFT                    | RIGHT | LH (m)             | H (m) | RH (m) |                  |
| 1      | 28+500                | 8.100               | 5.435       | 4.535           | 3.935             | -2.5%                   | -2.5% | 2.9                | 3.1   | 2.9    | R TO             |
| 2      | 35+340                | 8.139               | 5.351       | 4.451           | 3.851             | -2.5%                   | -2.5% | 3.0                | 3.2   | 3.0    | R TO             |
| 3      | 35+425                | 8.088               | 5.094       | 4.194           | 3.594             | -2.5%                   | -2.5% | 3.2                | 3.4   | 3.2    | R TO             |
| 4      | 35+510                | 8.036               | 5.175       | 4.276           | 3.675             | -2.5%                   | -2.5% | 3.1                | 3.3   | 3.1    | R TO             |
| 5      | 35+600                | 7.981               | 5.02        | 4.120           | 3.520             | -2.5%                   | -2.5% | 3.2                | 3.4   | 3.2    | R TO             |
| 6      | 35+680                | 7.932               | 4.798       | 3.898           | 3.298             | -2.5%                   | -2.5% | 3.4                | 3.5   | 3.4    | R TO             |
| 7      | 35+900                | 8.689               | 4.89        | 3.990           | 3.390             | -2.5%                   | -2.5% | 4.0                | 4.2   | 4.0    | R TO             |
| 8      | 35+975                | 8.585               | 5.54        | 4.640           | 4.040             | -2.5%                   | -2.5% | 3.3                | 3.4   | 3.3    | R TO             |
| 9      | 36+040                | 8.486               | 4.86        | 3.960           | 3.360             | -2.5%                   | -2.5% | 3.9                | 4.0   | 3.9    | R TO             |



SECTION B-B



KEY PLAN

| NO. | DATE      | REVISION        | BY   | DRAWN:       | PREPARED:       | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|--------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJUJ MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY        | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |              |                 |                 |                  |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceginidia.com

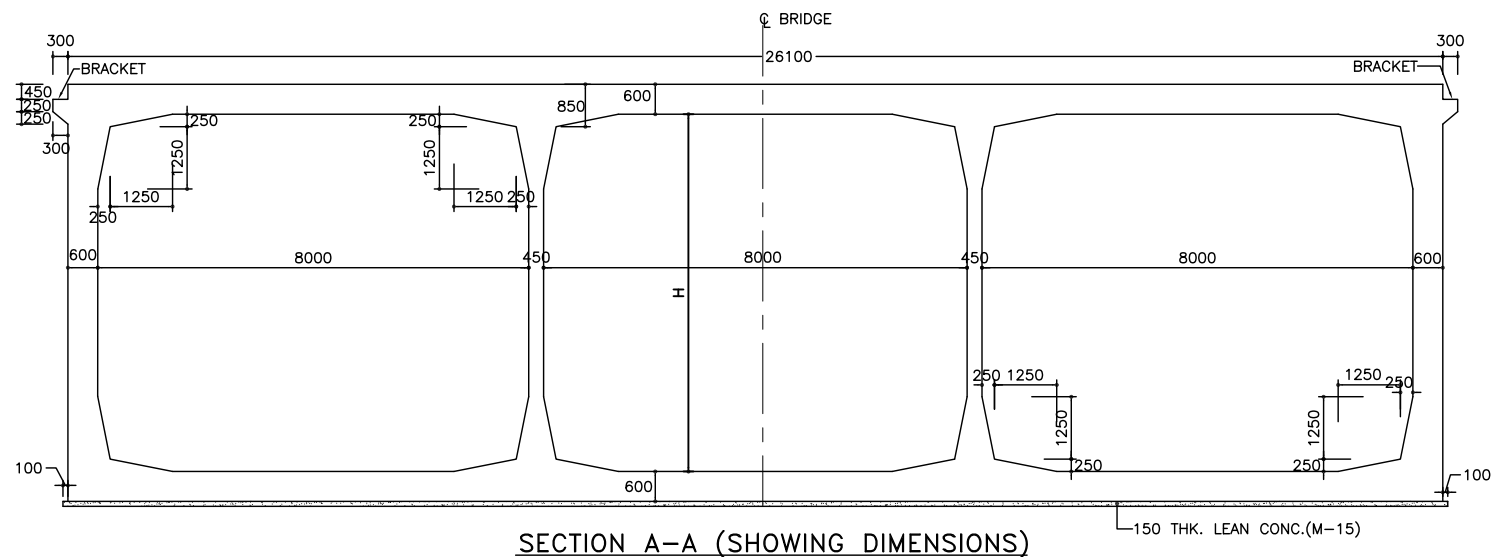
DESIGN REVIEW CONSULTANT :  
**LEA Associates** South Asia Pvt. Ltd., India  
 B-1, E-27, 11nd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

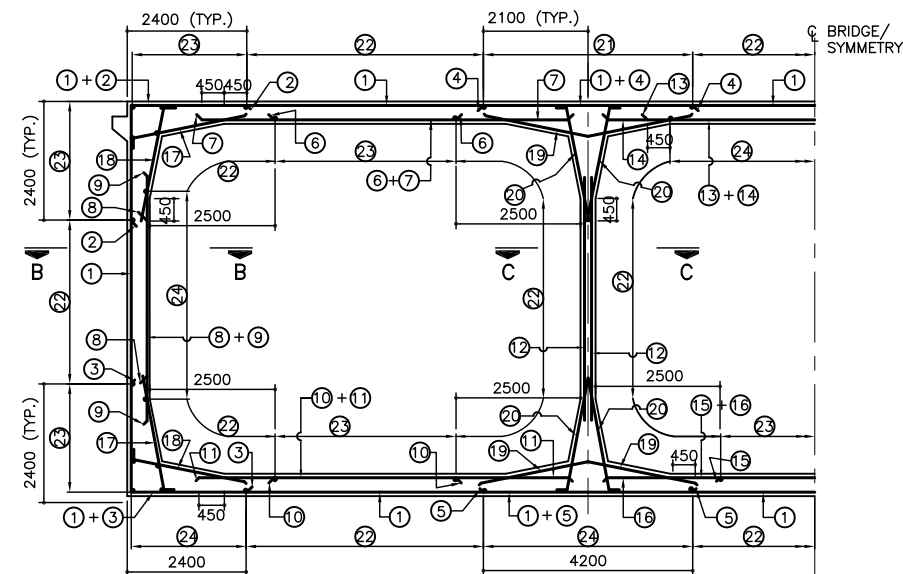
PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM PIRAHAT TO CHANDBALI - KM 27+500 TO KM 45+000 OF SH-09 (BALANCE WORK) PACKAGE - P02B

SCALE :  
 N.T.S

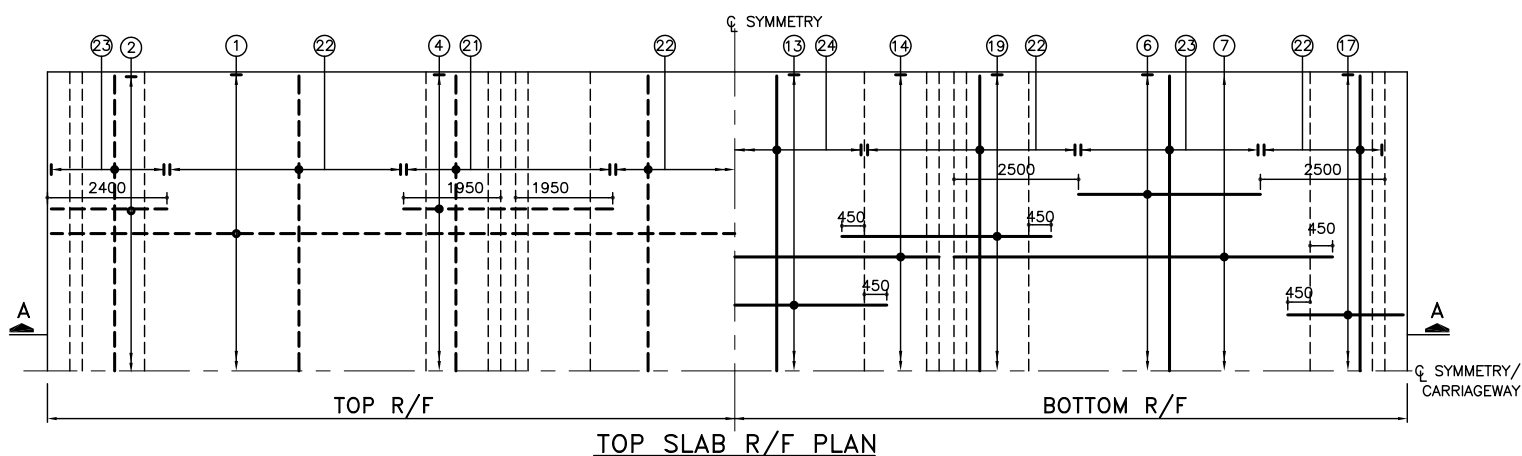
DRAWING TITLE :  
**GENERAL ARRANGEMENT DRAWING TRIPLE CELL R.C.C. BOX BRIDGES 3m X8m (WITH OUT EARTH CUSHION)** (SHEET 1 OF 3)  
 DWG. NUMBER : OSRP/CEG/SH09P02A/STR/ 03 REV. R2



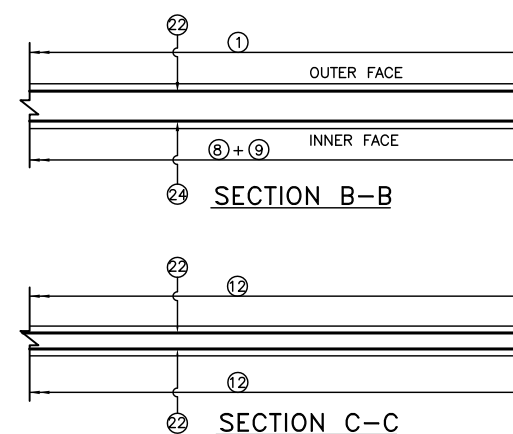
SECTION A-A (SHOWING DIMENSIONS)



SECTION A-A (SHOWING REINFORCEMENT)

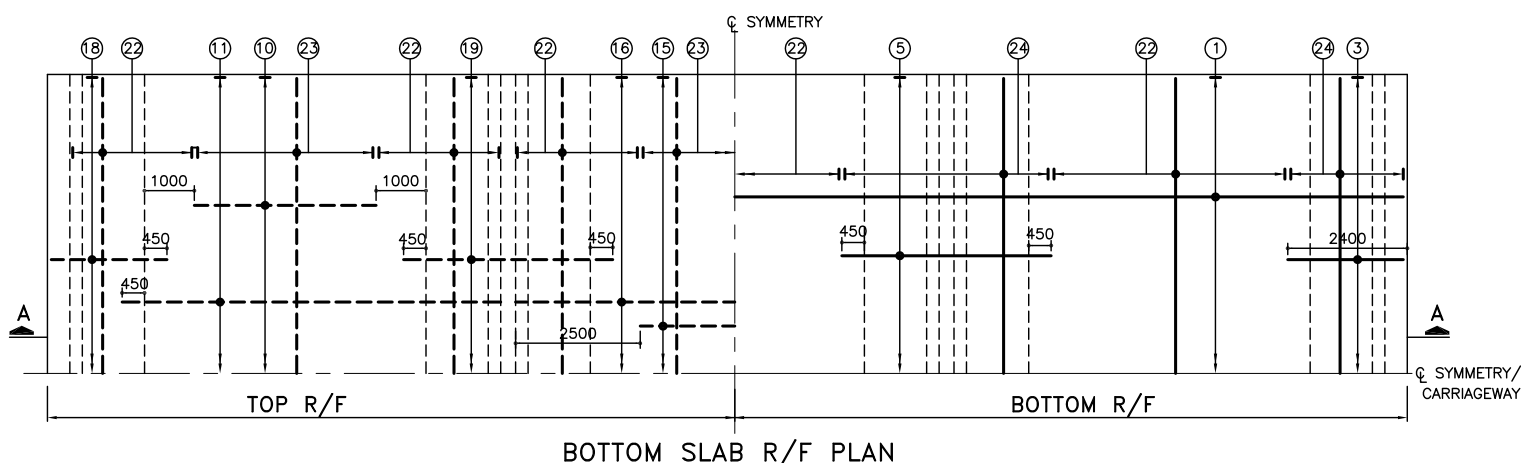


TOP SLAB R/F PLAN



SECTION B-B

SECTION C-C



BOTTOM SLAB R/F PLAN

REINF. DETAILS

| BAR NO. | BAR DIA. | SPACING | SHAPE |
|---------|----------|---------|-------|
| 1       | 16       | 150 C/C | —     |
| 2       | 16       | 150 C/C | —     |
| 3       | 20       | 150 C/C | —     |
| 4       | 12       | 150 C/C | —     |
| 5       | 20       | 150 C/C | —     |
| 6       | 32       | 300 C/C | —     |
| 7       |          |         | —     |
| 8       | 32       | 300 C/C |       |
| 9       |          |         | —     |
| 10      | 32       | 300 C/C | —     |
| 11      |          |         | —     |
| 12      | 12       | 150 C/C |       |
| 13      | 32       | 600 C/C | —     |
| 14      | 16       | 150 C/C | —     |
| 15      | 16       | 150 C/C | —     |
| 16      | 12       | 150 C/C | —     |
| 17      | 16       | 150 C/C | —     |
| 18      | 16       | 150 C/C | —     |
| 19      | 12       | 150 C/C | —     |
| 20      | 12       | 150 C/C | —     |
| 21      | 10       | 150 C/C | —     |
| 22      | 10       | 150 C/C | —     |
| 23      | 12       | 180 C/C | —     |
| 24      | 12       | 150 C/C | —     |

**LEGEND:**

|       |                    |
|-------|--------------------|
| —     | BAR ON BOTTOM FACE |
| - - - | BAR ON TOP FACE    |
| R/F   | REINFORCEMENT      |

NOTES:

- ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METERS.
- DO NOT SCALE THE DIMENSIONS. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
- GRADE OF CONC. FOR R.C.C. WORKS. = M-35  
GRADE OF CONC. FOR LEAN CONC. = M-15
- HYSD REINFORCEMENT IS CONFORMED TO IS:1786 GRADE Fe 500.
- ANTI CORROSIVE REINFORCING BAR SHALL BE PROVIDE.
- CLEAR COVER TO ANY REINFORCEMENT:  
(a) BASE SLAB =75mm  
(b) ALL OTHER COMPONENTS =50mm.
- NOT MORE THAN 50% OF BAR IS LAPPED AT A SECTION AND LAPPING IS STAGGERED. AND MINIMUM LAP LENGTH IS 63X DIA OF BAR FOR MAIN BARS AND 30 TIMES DIA OF BAR FOR ALL OTHER BARS.
- FOR DETAILS OF CRASH BARRIER, EXPANSION JOINT, BRACKET, APPROACH SLAB AND WEARING COAT REFER DRAWING No. OSRP/CEG/BR/MISC-02

REFERENCE DRAWINGS:

- OSRP/CEG/SH-9/TRIPLE CELL/01 G. A. D.
- OSRP/CEG/BR/MISC-02 MISC DETAILS

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :

**CONSULTING ENGINEERS GROUP LTD.**

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DESIGN REVIEW CONSULTANT :

**LEA Associates South Asia Pvt. Ltd., India**

B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

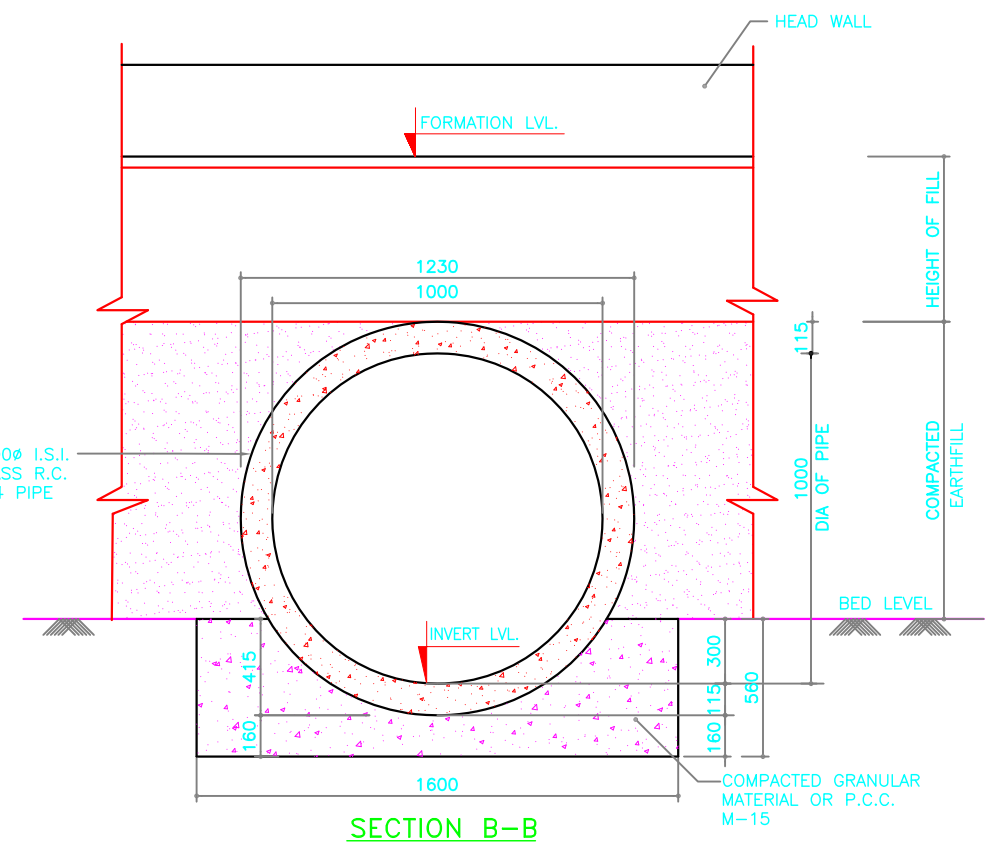
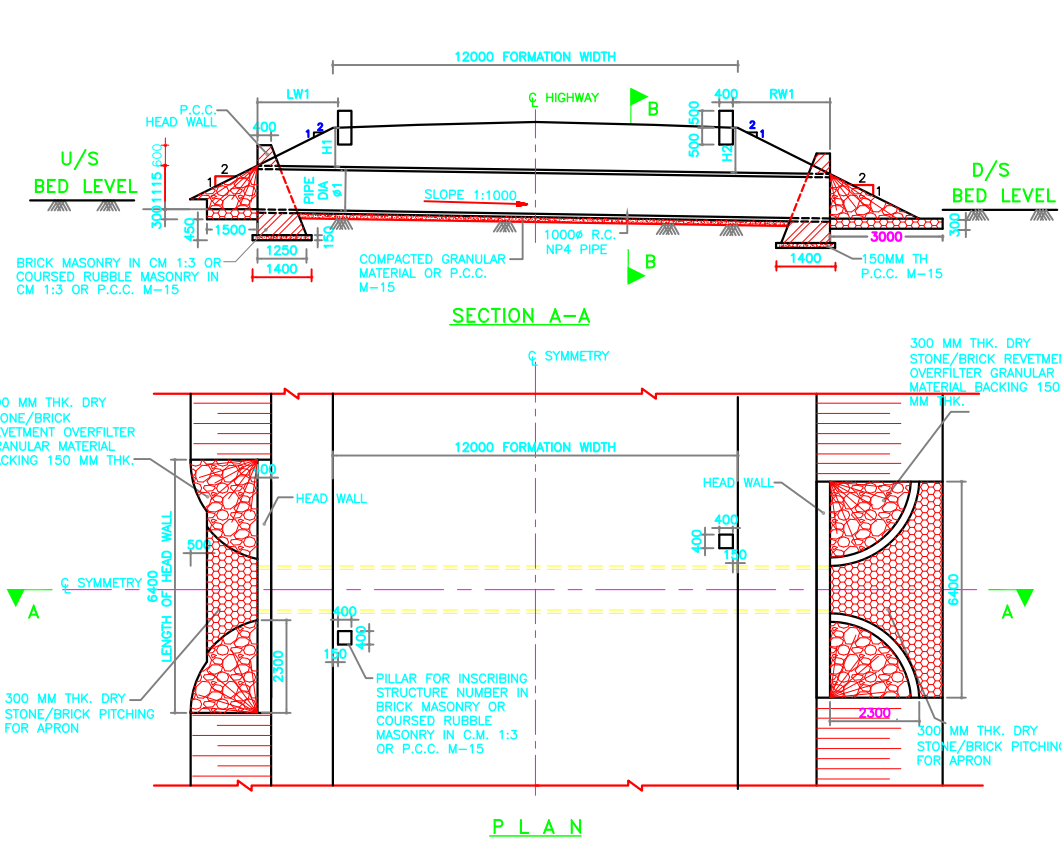
N.T.S

DRAWING TITLE :

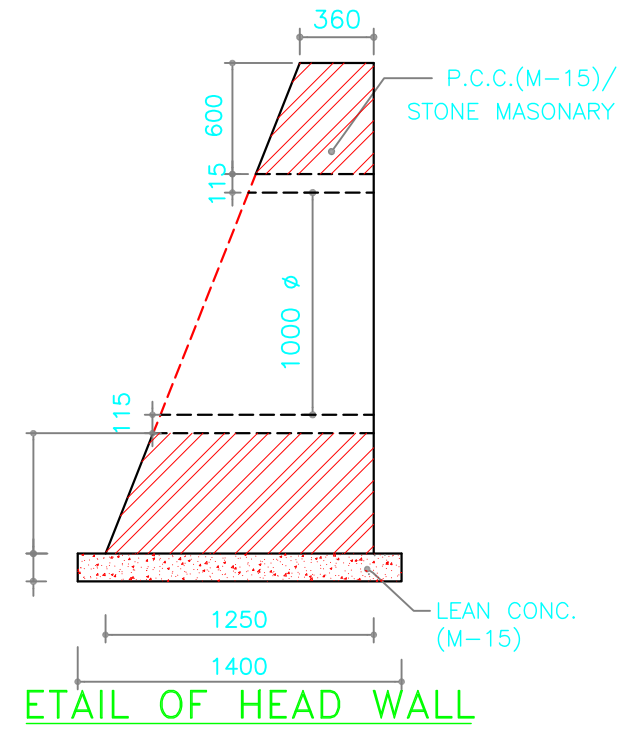
**DIMENSION AND REINFORCEMENT DETAILS TRIPLE CELL R.C.C. BOX BRIDGES (WITHOUT EARTH CUSHION)**

DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/ 3

REV. R2



- NOTES:**
1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
  2. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
  3. LOOSE / UNSUITABLE SOIL BELOW CULVERTS IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
  4. CHAINAGE / FORMATION LEVEL IS PROVIDED AS PER APPROVED PLAN & PROFILE.
  5. FOR CULVERTS SKEW TO THE TRAFFIC DIRECTION LENGTH OF CULVERT SHALL BE ADJUSTED AS PER SITE CONDITION.
  6. LONGITUDINAL SLOPE OF PIPE SHALL BE MIN. 1 IN 1000.
  7. FIRST CLASS BEDDING CAN BE USED FOR MAXIMUM HEIGHT OF FILL OF 4.0 M.
  8. THE FINISHED ROAD LEVEL SHALL BE VERIFIED WITH ALIGNMENT DRAWING & GROUND LEVEL WITH SITE CONDITIONS BEFORE EXECUTION.



**SINGLE PIPE CULVERTS LEVEL DETAIL**

| Sl. No. | Location | Proposed Chainage | Proposed Foramtion Level | Bed Level |       | Camber/Super Elevation |        | Direction of Flow |
|---------|----------|-------------------|--------------------------|-----------|-------|------------------------|--------|-------------------|
|         |          |                   |                          | Left      | Right | Left                   | Right  |                   |
| 1       | 2/500    | 2507              | 17.76                    | 13.67     | 15.60 | -2.5%                  | -2.5%  | R TO L            |
| 2       | 7/900    | 7927              | 13.02                    | 11.11     | 11.56 | -2.50%                 | -2.50% | R TO L            |

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :

**CONSULTING ENGINEERS GROUP LTD.**

E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :

**LEA Associates South Asia Pvt. Ltd.,** India  
 B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

N.T.S

DRAWING TITLE :

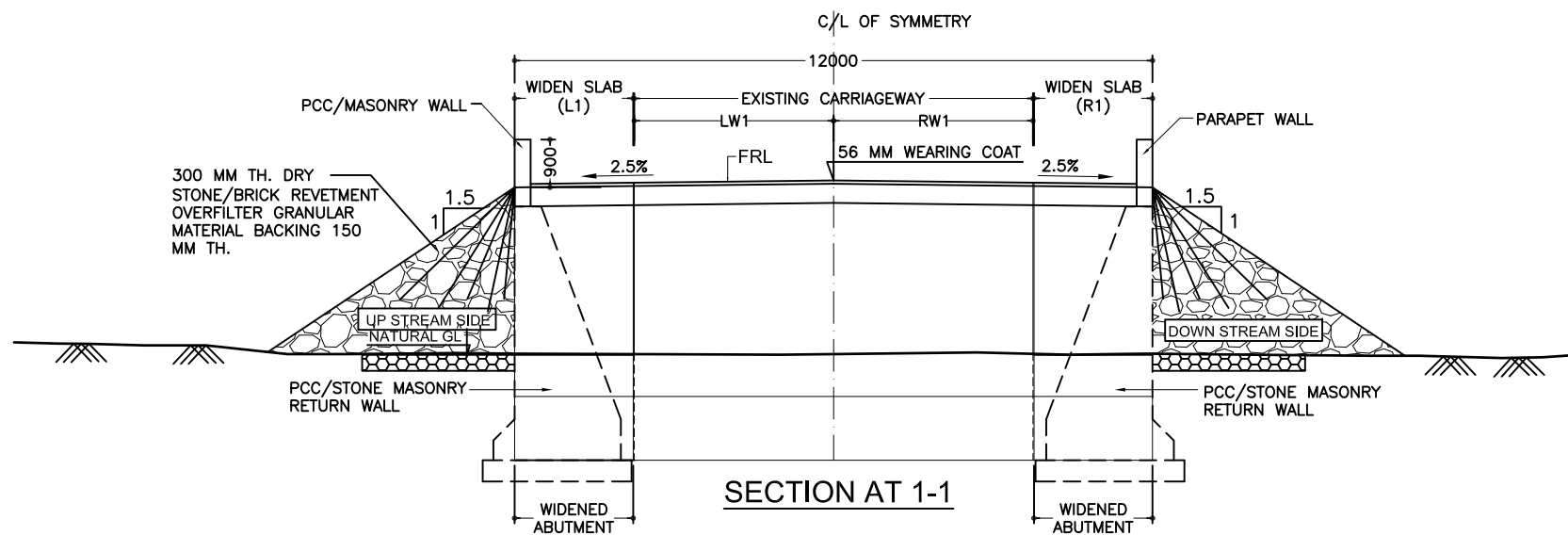
TYPICAL ARRANGEMENT FOR R.C.C SINGLE PIPE CULVERTS (1X1.0m DIA)

DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/ 3

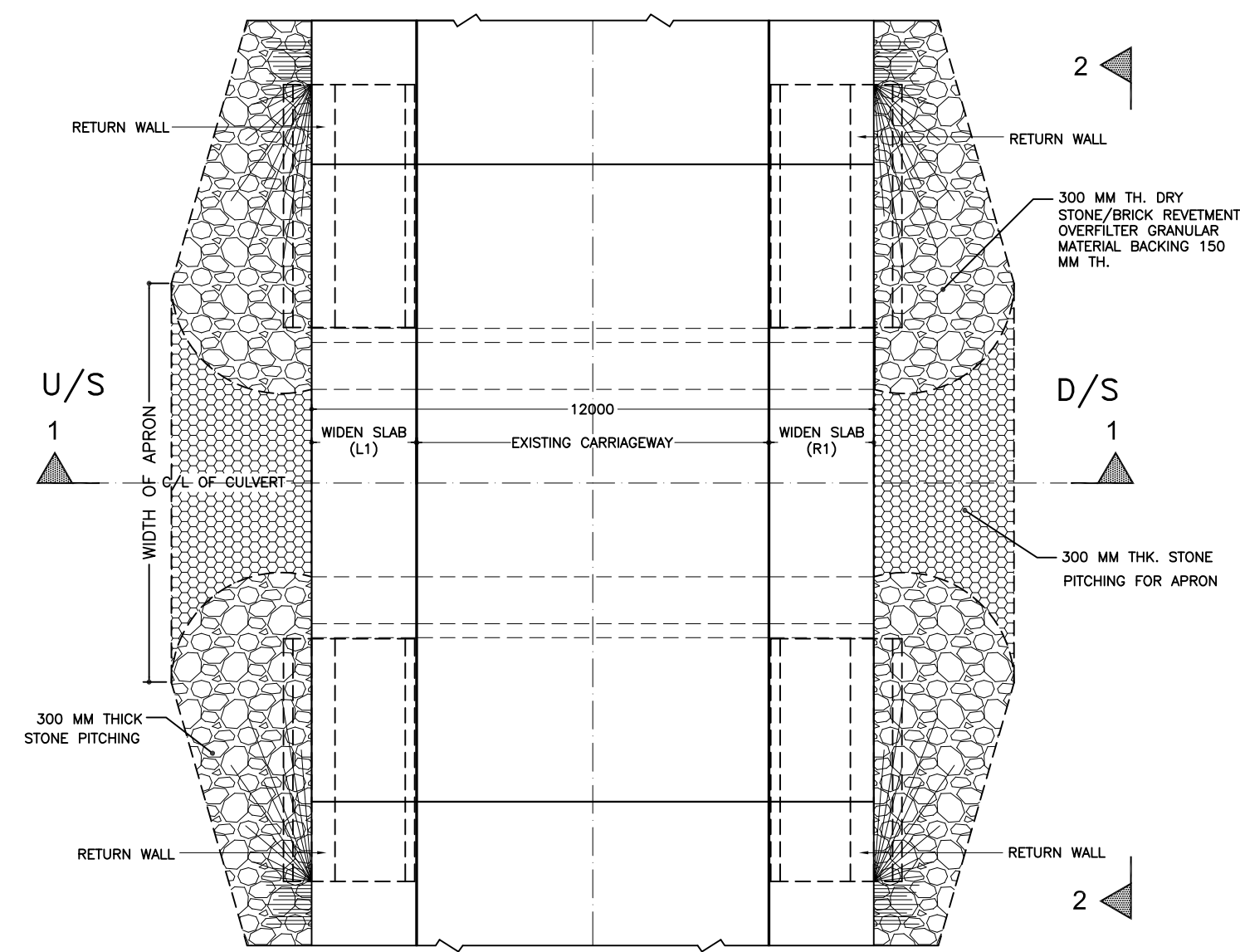
REV. R2







SECTION AT 1-1



PLAN

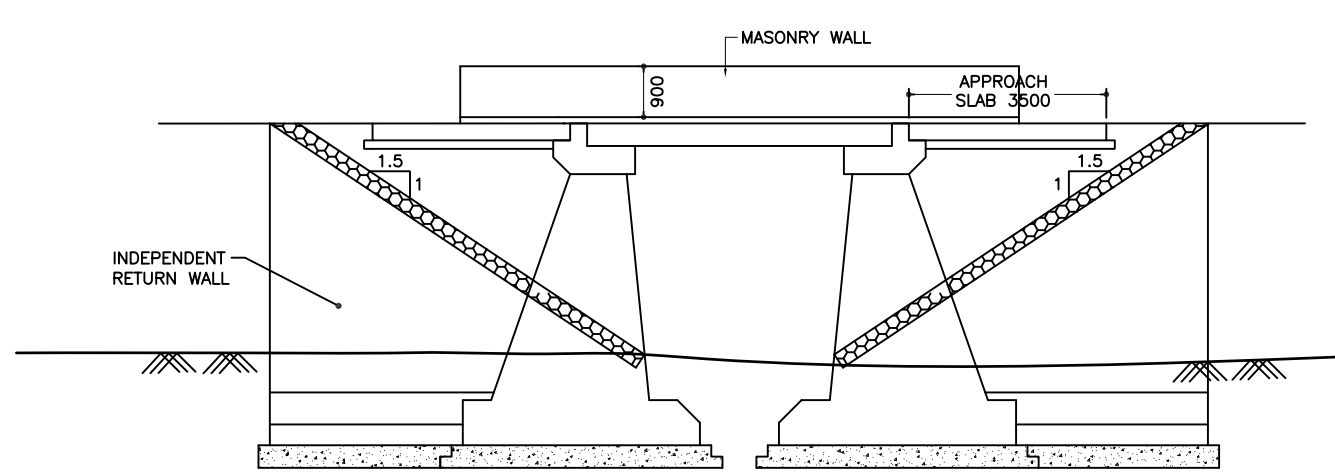
**NOTES :-**

- 1 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED.
- 2 DIMENSIONS ARE NOT TO BE SCALED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
- 3 CONCRETE GRADE IN SUPER STRUCTURE IS M-25. STEEL GRADE IS Fe 500.
- 4 SUB STRUCTURE SHALL BE IN CONCRETE GRADE M-15 WITH SURFACE REINFORCEMENT #8 @200C/C BOTHWAYS.
- 5 GRADE OF CONC.  
RCC SLAB - M-25  
PCC - M-15

**REFERENCE DRAWING:-**

- 1 OSRP/CEG/SH-9/SLAB CUL/W-02

| SLAB RR EXTENSION |          |                   |              |                          |                   |       |                        |       |              |     |     |                   |                            |            |                       |       |
|-------------------|----------|-------------------|--------------|--------------------------|-------------------|-------|------------------------|-------|--------------|-----|-----|-------------------|----------------------------|------------|-----------------------|-------|
| Sl. No.           | Location | Proposed Chainage | Exlstng Span | Proposed Formation Level | Bed /Invert Level |       | Camber/Super Elevation |       | Clear Height | LW1 | RW1 | Direction of flow | Total Length to be widened |            | Length of Return wall |       |
|                   |          |                   |              |                          | Left              | Right | Left                   | Right |              |     |     |                   | Left (L1)                  | Right (L2) | Left                  | Right |
| 1                 | 2/800    | 2865              | 1 x 3.0      | 17.36                    | 15.06             | 15.06 | -2.5%                  | -2.5% | 2.1          | 3.7 | 3.7 | R TO L            | 2.3                        | 2.3        | 4.2                   | 4.2   |
| 2                 | 19/900   | 19888             | 2 x 2.3      | 8.11                     | 6.66              | 6.84  | -2.5%                  | -2.5% | 1.3          | 4.4 | 4.6 | L TO R            | 1.6                        | 1.4        | 2.9                   | 2.9   |



VIEW 2-2

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
 E-12, MOJI COLONY, MALVIYA NAGAR JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@ceindia.com

DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
 B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
**CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A**

SCALE :  
 N.T.S

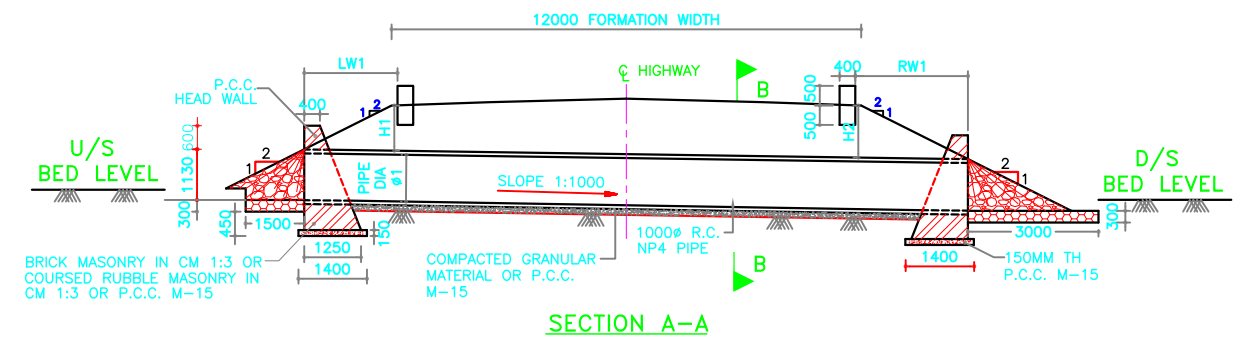
DRAWING TITLE :  
**GENERAL ARRANGEMENT DRAWING TYPICAL WIDENING FOR EXISTING SLAB CULVERTS**

DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/01

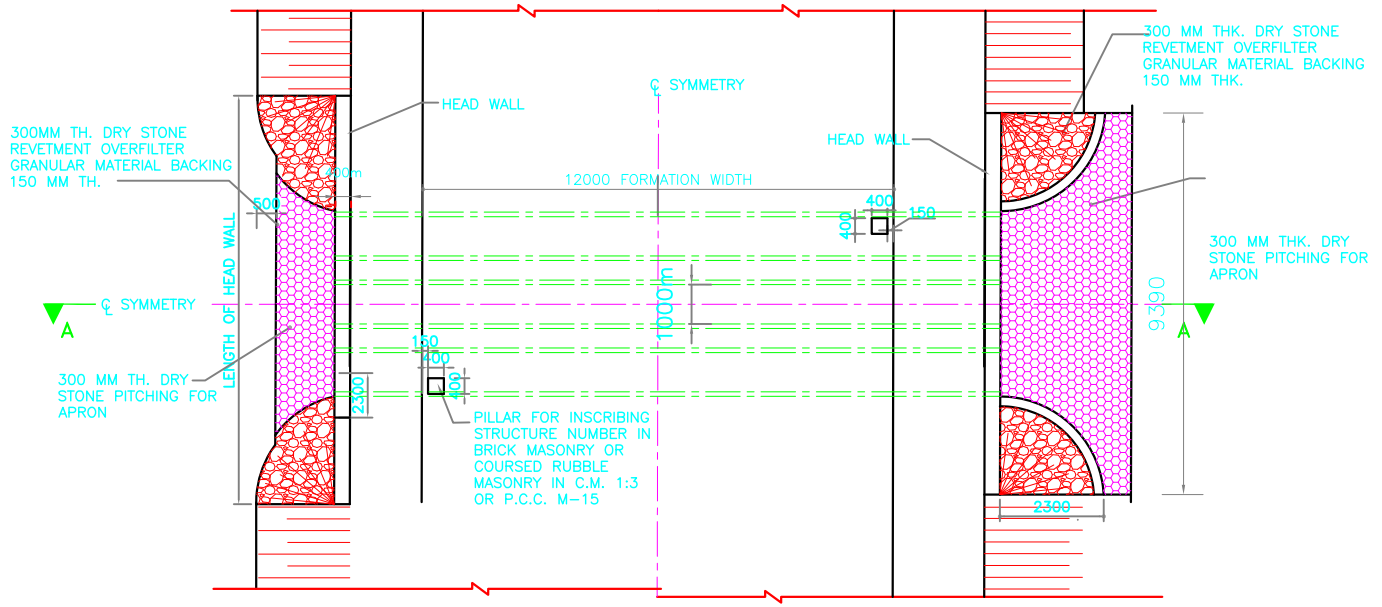
(SHEET 1 OF 3)

REV. R2

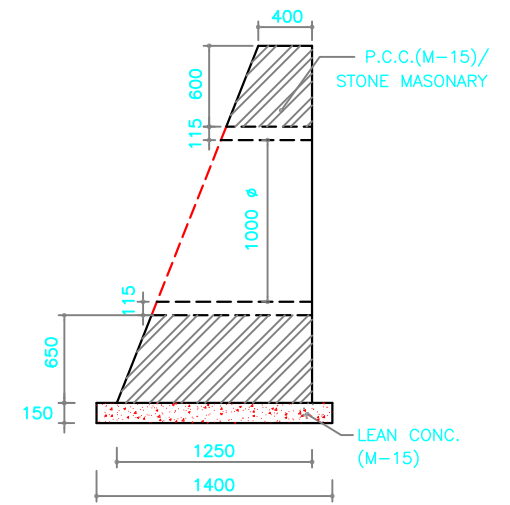
| Sl. No. | Location | Proposed Chainage | Proposed Formation Level | Bed Level |       | Invert Level | Camber/Super Elevation |       | Direction of flow |
|---------|----------|-------------------|--------------------------|-----------|-------|--------------|------------------------|-------|-------------------|
|         |          |                   |                          | Left      | Right |              | Left                   | Right |                   |
|         |          |                   |                          | 1         | 4/300 |              | 4350                   | 15.82 |                   |
| 2       | 4/900    | 4935              | 15.31                    | 13.29     | 12.99 | 12.69        | -4.3%                  | 1.4%  | R TO L            |
| 3       | 6/448    | 6448              | 14.398                   |           |       |              |                        |       |                   |



SECTION A-A



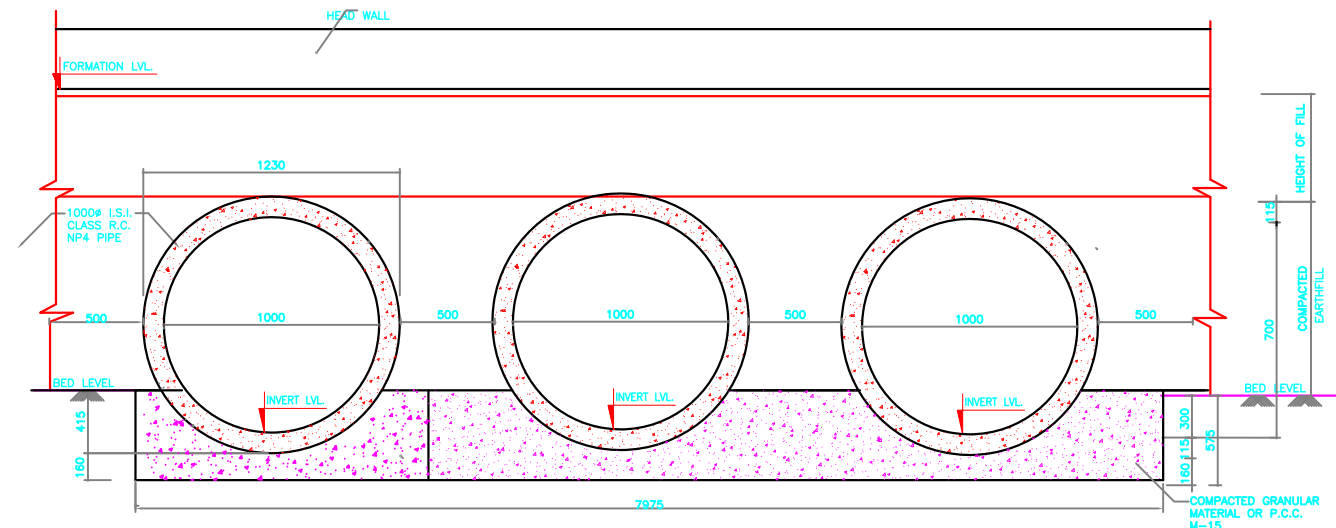
PLAN



DETAIL OF HEAD WALL

**NOTES:**

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
2. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
3. LOOSE / UNSUITABLE SOIL BELOW CULVERTS IS REPLACED WITH SUITABLE GRANULAR MATERIAL.
4. CHAINAGE / FORMATION LEVEL IS PROVIDED AS PER APPROVED PLAN & PROFILE.
5. FOR CULVERTS SKEW TO THE TRAFFIC DIRECTION LENGTH OF CULVERT SHALL BE ADJUSTED AS PER SITE CONDITION.
6. LONGITUDINAL SLOPE OF PIPE SHALL BE MIN. 1 IN 1000.
7. FIRST CLASS BEDDING CAN BE USED FOR MAXIMUM HEIGHT OF FILL OF 4.0 M.
8. THE FINISHED ROAD LEVEL SHALL BE VERIFIED WITH ALIGNMENT DRAWING & GROUND LEVEL WITH SITE CONDITIONS BEFORE EXECUTION.



SECTION B-B

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :

**CEG**

CONSULTING ENGINEERS GROUP LTD.  
E-12, MOJI COLONY, MALVIYA NAGAR  
JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :

**LEA**

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B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

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SCALE :

N.T.S

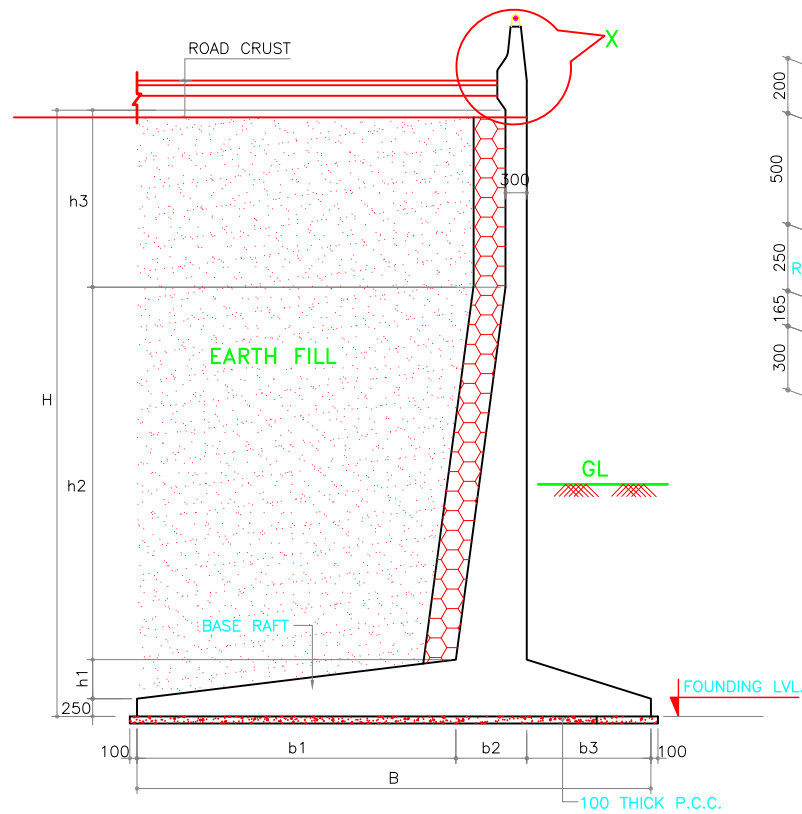
DRAWING TITLE :

TYPICAL ARRANGEMENT FOR R.C.C MULTY PIPE CULVERTS (3 X1.0m DIA)

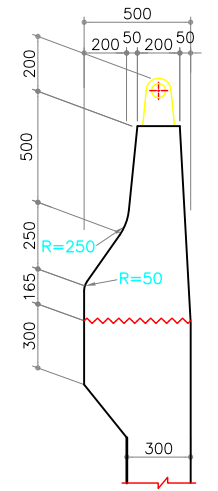
(SHEET 1 OF 3)

DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/ 3

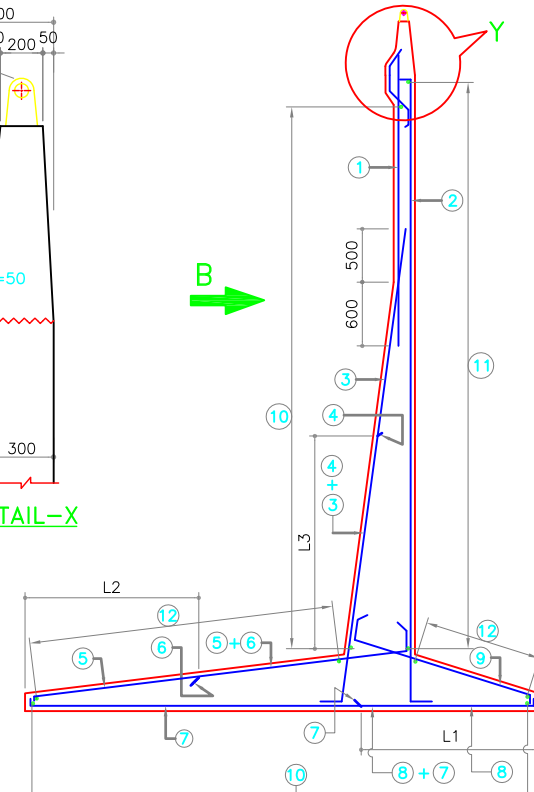
REV. R2



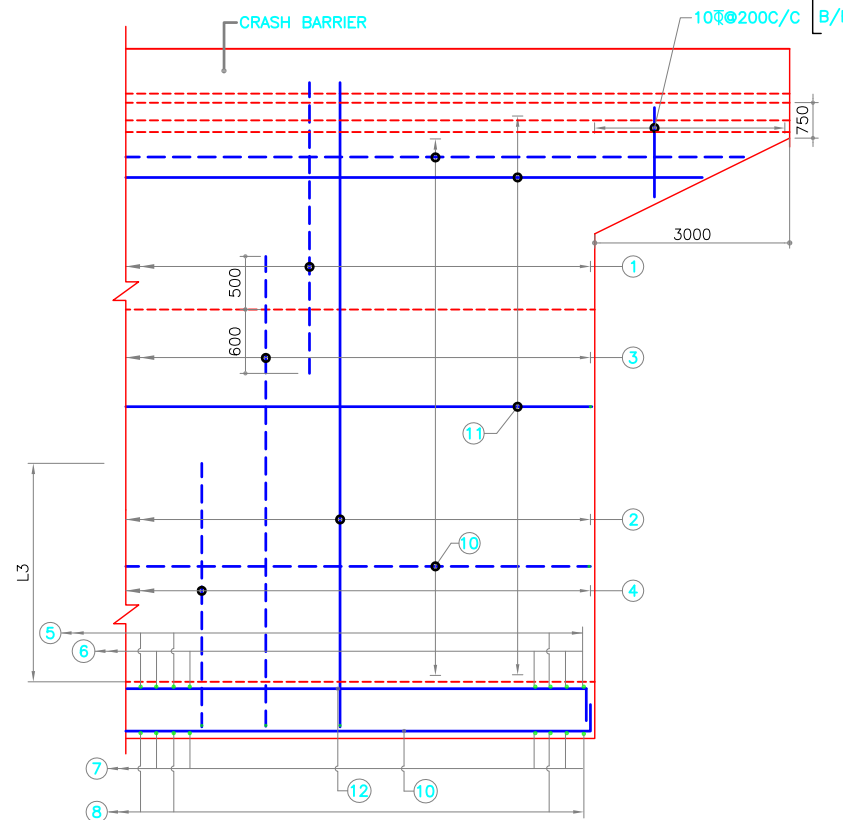
**CROSS SECTION OF RETURN WALL**  
(SHOWING DIMENSIONS)  
(FOR CATEGORY A, B, C, D)



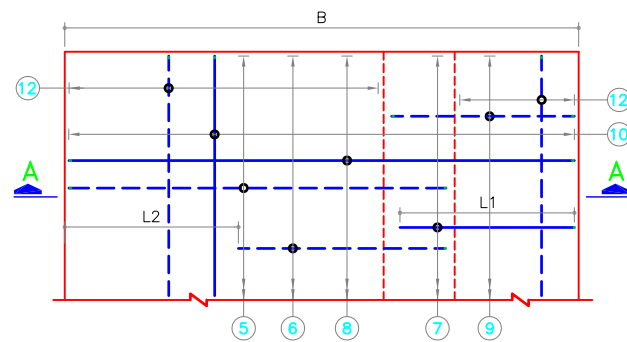
**DETAIL-X**



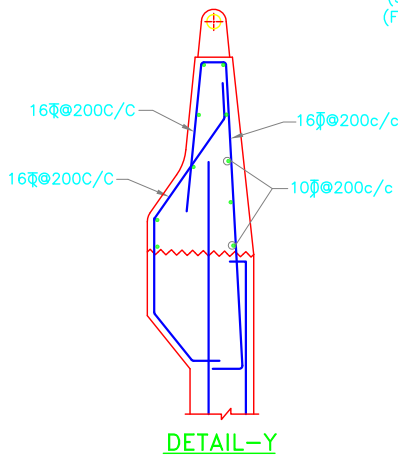
**SECTION A-A**  
(SHOWING REINFORCEMENT)  
(FOR CATEGORY A, B, C, D)



**VIEW -B**  
(SHOWING REINFORCEMENT)  
(FOR CATEGORY A, B, C, D)



**PLAN SHOWING REINFORCEMENT IN BASE RAFT**  
(FOR CATEGORY A, B, C, D)



**DETAIL-Y**

**LENGTH OF CURTAILMENT**

| CATEGORY | L1   | L2   | L3   |
|----------|------|------|------|
| A        | -    | -    | -    |
| B        | 1000 | 1175 | 2950 |
| C        | 1000 | 1600 | 4300 |
| D        | 1000 | 1750 | 5200 |

**DIMENSIONAL DETAILS**

| CATEGORY | H <sub>max</sub> | B    | h1  | h2   | h3   | b1   | b2   | b3   |
|----------|------------------|------|-----|------|------|------|------|------|
| A        | 4500             | 3500 | 150 | 1600 | 2500 | 1500 | 500  | 1500 |
| B        | 6000             | 5000 | 300 | 2950 | 2500 | 2350 | 650  | 2000 |
| C        | 7500             | 6200 | 450 | 4300 | 2500 | 3200 | 800  | 2200 |
| D        | 8500             | 7250 | 550 | 5200 | 2500 | 3500 | 1000 | 2750 |

**REINFORCEMENT DETAILS**

| BAR MKD.  | ①            | ②                 | ③            | ④            | ⑤                 | ⑥            | ⑦            | ⑧                 | ⑨                 | ⑩                     | ⑪                     | ⑫                    |
|-----------|--------------|-------------------|--------------|--------------|-------------------|--------------|--------------|-------------------|-------------------|-----------------------|-----------------------|----------------------|
| BAR SHAPE |              | └─┘<br>150<br>300 | └─┘<br>300   | └─┘<br>300   | └─┘<br>300<br>150 | └─┘<br>300   | —            | └─┘<br>150<br>150 | └─┘<br>300<br>150 | └─┘<br>150 TO<br>1100 | └─┘<br>150 TO<br>1100 | └─┘<br>150 TO<br>900 |
| A         | 16 ϕ @200C/C | 10 ϕ @150C/C      | 25 ϕ @200C/C | —            | 16 ϕ @150C/C      | —            | 20 ϕ @200C/C | —                 | 10 ϕ @200C/C      | 10 ϕ @200C/C          | 10 ϕ @200C/C          | 10 ϕ @200C/C         |
| B         | 16 ϕ @200C/C | 10 ϕ @150C/C      | 25 ϕ @200C/C | 16 ϕ @200C/C | 16 ϕ @200C/C      | 16 ϕ @200C/C | 16 ϕ @200C/C | 16 ϕ @200C/C      | 10 ϕ @150C/C      | 10 ϕ @150C/C          | 10 ϕ @150C/C          | 10 ϕ @150C/C         |
| C         | 16 ϕ @200C/C | 12 ϕ @200C/C      | 25 ϕ @200C/C | 25 ϕ @200C/C | 20 ϕ @200C/C      | 16 ϕ @200C/C | 16 ϕ @200C/C | 25 ϕ @200C/C      | 12 ϕ @200C/C      | 12 ϕ @200C/C          | 12 ϕ @200C/C          | 12 ϕ @200C/C         |
| D         | 16 ϕ @200C/C | 12 ϕ @150C/C      | 25 ϕ @150C/C | 25 ϕ @150C/C | 25 ϕ @200C/C      | 20 ϕ @200C/C | 16 ϕ @200C/C | 25 ϕ @200C/C      | 12 ϕ @150C/C      | 12 ϕ @150C/C          | 12 ϕ @150C/C          | 12 ϕ @150C/C         |

**LEGENDS:**

- BAR ON TOP/ EARTH FACE
- BAR ON BOTTOM/ OUTER FACE
- B/F BAR ON BOTH FACE

**NOTES**

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METER.
2. DO NOT SCALE THE DIMENSIONS. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
3. GRADE OF CONC. FOR R.C.C. WORKS -----M25  
GRADE OF CONC. FOR P.C.C. WORKS -----M15  
GRADE OF CONC. FOR CRASH BARRIER -----M40
4. ALL HYSD BARS IS CONFORMED TO IS 1786 GRADE Fe-415.
5. CLEAR COVER TO ANY REINF:  
IN BASE RAFT = 75 mm  
ALL OTHER COMPONENTS = 40mm.
6. NOT MORE THAN 50% OF BAR IS LAPPED AT A SECTION AND LAPPING IS STAGGERED. LAP LENGTH IS MINIMUM 72 x DIA OF BAR FOR MAIN BARS 30 TIMES DIA OF BAR FOR ALL OTHER BARS.
7. THE BEARING CAPACITY SHALL NOT BE LESS THAN THE FOLLOWING.  
CATEGORY - A = 11t/m<sup>2</sup>  
CATEGORY - B = 12t/m<sup>2</sup>  
CATEGORY - C = 14t/m<sup>2</sup>  
CATEGORY - D = 14t/m<sup>2</sup>

**REFERENCE DRAWING:-**

4. OSRP/CEG/SH-9A/BR/3+200/01
5. OSRP/CEG/SH-9A/BR/3+900/01
6. OSRP/CEG/SH-9A/BR/6+050/01
7. OSRP/CEG/SH-9A/TRIPLE CELL/01

**BHADRAK - CHANDBALI**

| S. no. | Proposed Chainage | Proposed Span | Height of Return wall |       | Maximum height of Return Wall | Length of Return wall |       | Category for the max. height |
|--------|-------------------|---------------|-----------------------|-------|-------------------------------|-----------------------|-------|------------------------------|
|        |                   |               | Left                  | Right |                               | Left                  | Right |                              |
| 1      | 3241.0            | 2 x 8.0 m Box | 5.75                  | 5.75  | 5.75                          | 2.75                  | 2.75  | B                            |
| 2      | 3862.0            | 2 x 8.0 m Box | 4.17                  | 4.17  | 4.17                          | 0.0                   | 0.0   | A                            |
| 3      | 6096.0            | 3 x 8.0 m Box | 5.65                  | 5.65  | 5.65                          | 3.8                   | 3.8   | B                            |

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CEG**  
 CONSULTING ENGINEERS GROUP LTD.  
 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
**CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A**

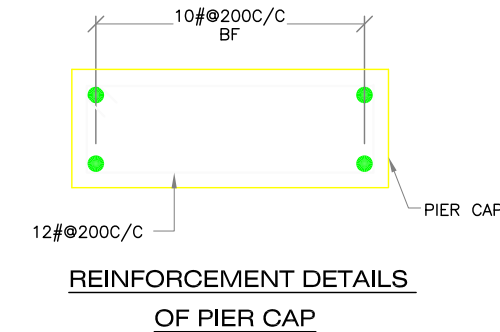
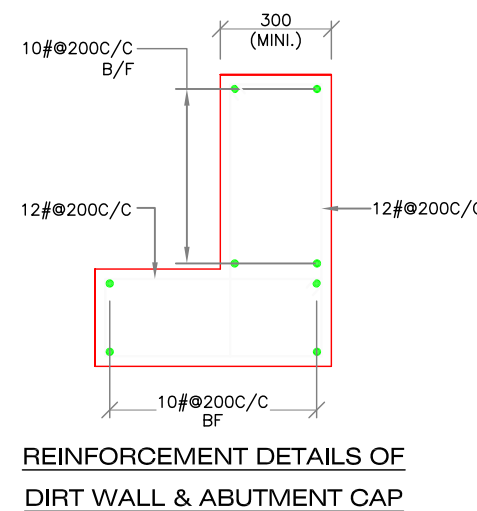
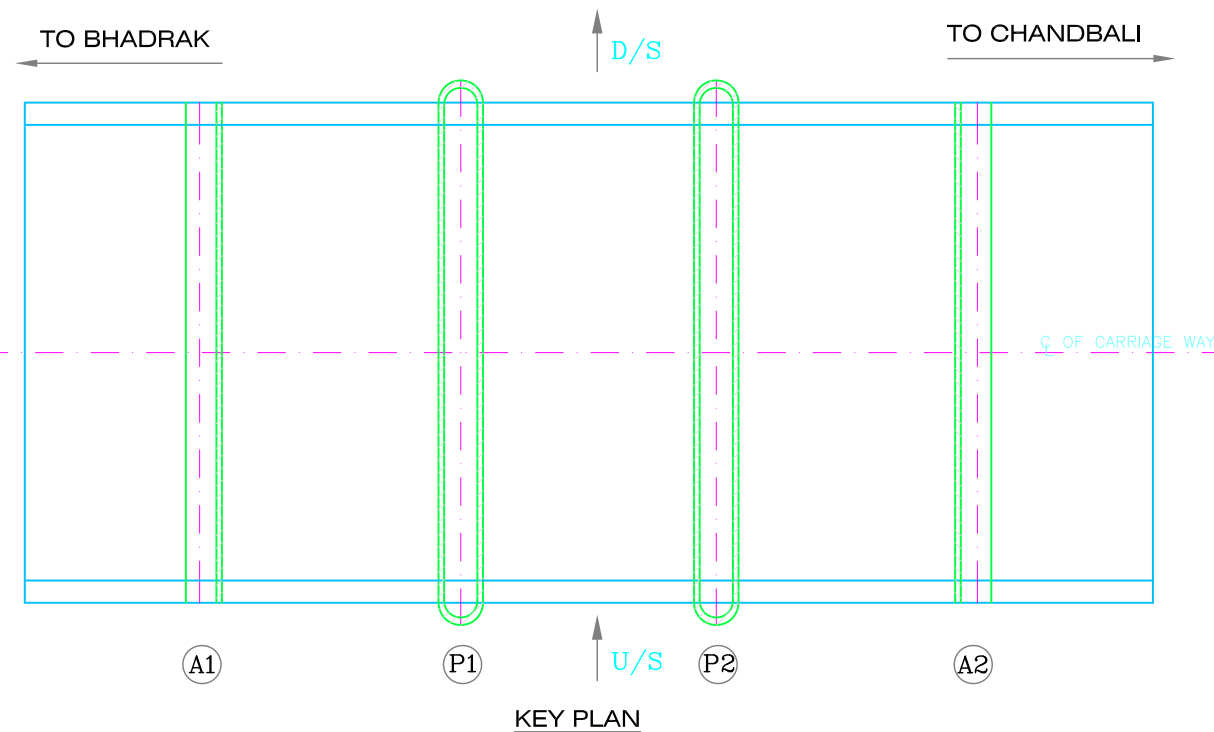
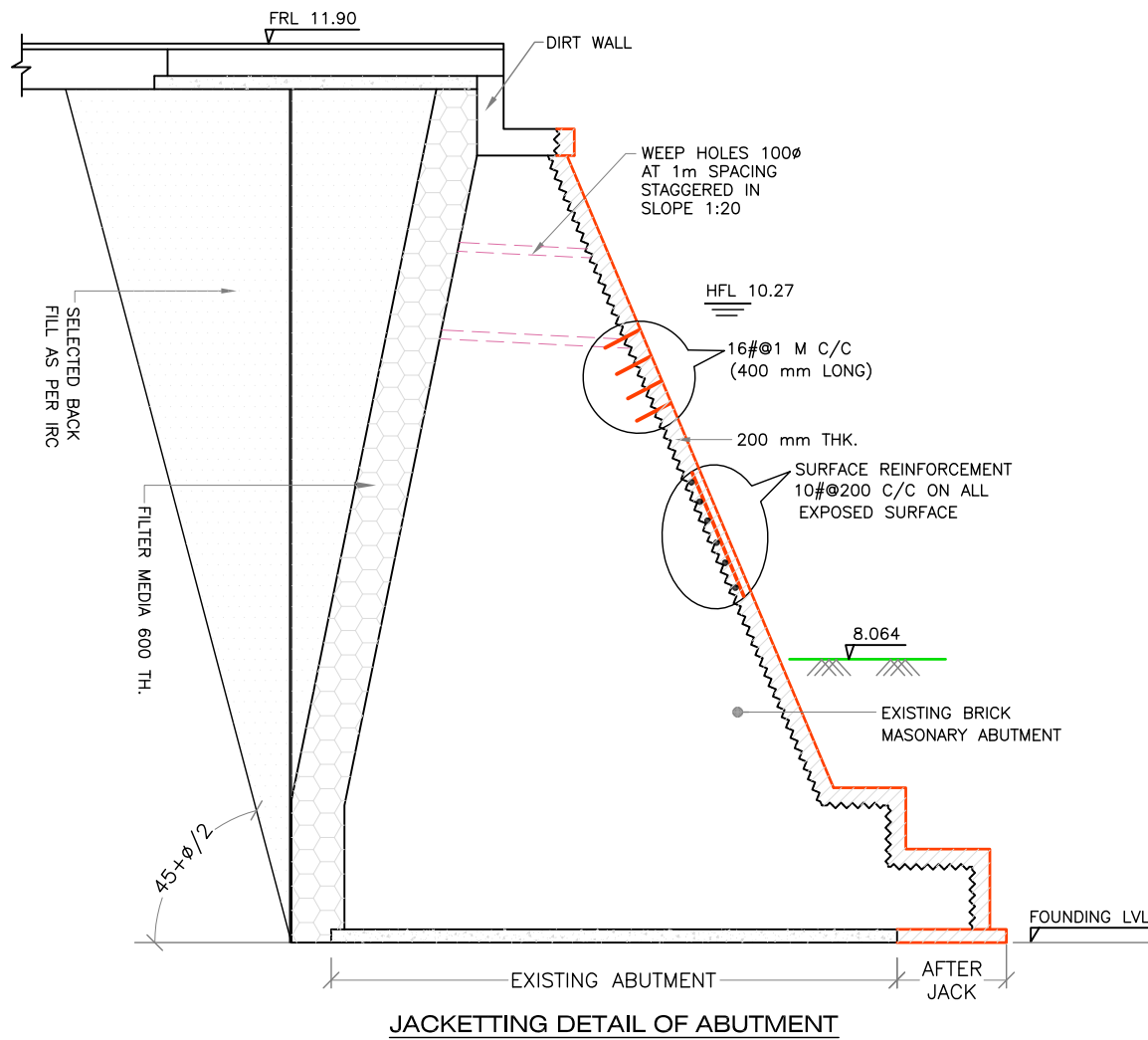
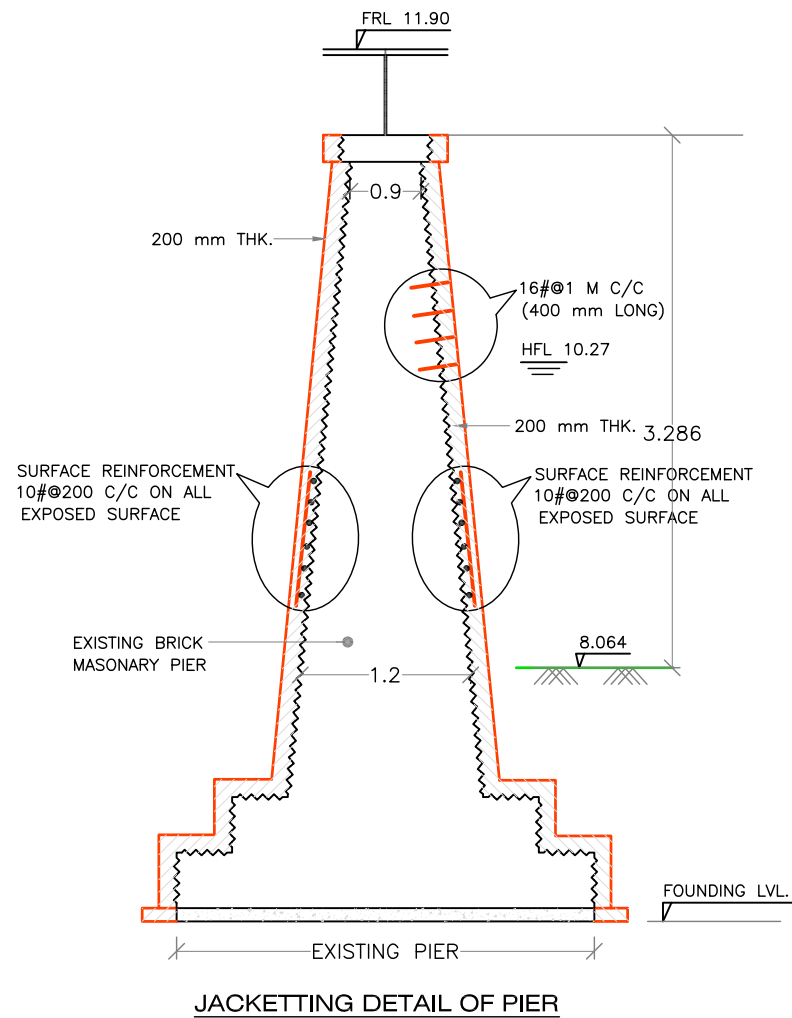
SCALE :  
**N.T.S**

DRAWING TITLE :  
**DIMENSION & REINFORCEMENT DETAILS OF RETURN WALL**  
 (SHEET 1 OF 2)  
 DWG. NUMBER : OSRP/CEG/SH9/P02A/STR/01 REV. R2



**NOTES :-**

- 1 ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SPECIFIED. LEVELS ARE IN METRES.
- 2 DIMENSIONS ARE NOT TO BE SCALED. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED.
- 3 AS PER CLAUSE 710.1.1 OF IRC 78-2000, SURFACE REINFORCEMENT @ 2.5KG/SQM HAS TO BE PROVIDED ON ALL EXPOSED SURFACE HORIZONTALLY AND VERTICALLY.
- 4 GRADE OF CONCRETE :  
 PIER - M-15  
 ABUTMENT - M-15  
 ABUTMENTCAP - M-25  
 PIER CAP - M-25  
 APPROACH SLAB - M-30  
 SOLID SLAB - M-25
- 5 GRADE OF STEEL - Fe-415.



| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CEG**  
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 E-12, MOJI COLONY, MALVIYA NAGAR  
 JAIPUR-17 Tel: +91-141-2520899, 2521899, 2520556 Fax: 2521348, e-mail: ceg@cegindia.com

DESIGN REVIEW CONSULTANT :  
**LEA**  
 LEA Associates South Asia Pvt. Ltd., India  
 B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
 CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - PO2A

SCALE :  
 N.T.S

DRAWING TITLE :  
**JACKETTING DETAIL OF ABUTMENT & PIER**

(SHEET 1 OF 3)

DWG. NUMBER : OSRP/CEG/PO2A/STR/02 REV. R2

SCHEDULE OF RUMBLE STRIP

| SL NO | CURVE START | CURVE END | RADIUS | CURVE LENGTH | TRANSITION | TOTAL NOS |
|-------|-------------|-----------|--------|--------------|------------|-----------|
| 1     | 5704.254    | 5737.754  | 155    | 296.465      | 70         | 145       |
| 2     | 6462.92     | 6530.241  | 155    | 271.01       | 70         | 137       |

SCHEDULE OF ROAD DELINEATORS AT CURVES UPTO 300m

| ARC        |            | RADIUS | ARC LENGTH |
|------------|------------|--------|------------|
| START      | END        |        |            |
| 2+981.056  | 3+099.208  | 300    | 935.048    |
| 5+704.254  | 5+737.754  | 155    | 296.465    |
| 6+462.920  | 6+530.241  | 155    | 271.01     |
| 8+922.135  | 8+986.401  | 240    | 392.782    |
| 9+915.435  | 10+056.917 | 200    | 416.008    |
| 11+564.245 | 11+677.166 | 240    | 120.451    |

SCHEDULE OF ROAD HUMPS

| SL NO | CHAINAGE | TYPE OF JUNCTION | LHS/RHS |
|-------|----------|------------------|---------|
| 1     | 3950     | Y-Type           | RHS     |
| 2     | 6500     | Y-Type           | LHS     |
| 3     | 12235    | T-Type           | LHS     |
| 4     | 16417    | Y-Type           | RHS     |
| 5     | 17668    | T-Type           | RHS     |
| 6     | 18425    | T-Type           | RHS     |
| 7     | 19376    | T-Type           | RHS     |
| 8     | 21420    | T-Type           | LHS     |
| 9     | 21990    | T-Type           | LHS     |
| 10    | 23252    | T-Type           | LHS     |
| 11    | 24600    | Cross Jun        | Both    |

| SL NO | CHAINAGE | REMARKS     |
|-------|----------|-------------|
| 1     | 480      | SCHOOL ZONE |
| 2     | 510      | SCHOOL ZONE |
| 3     | 16800    | SCHOOL ZONE |
| 4     | 16900    | SCHOOL ZONE |
| 5     | 25200    | SCHOOL ZONE |
| 6     | 25260    | SCHOOL ZONE |

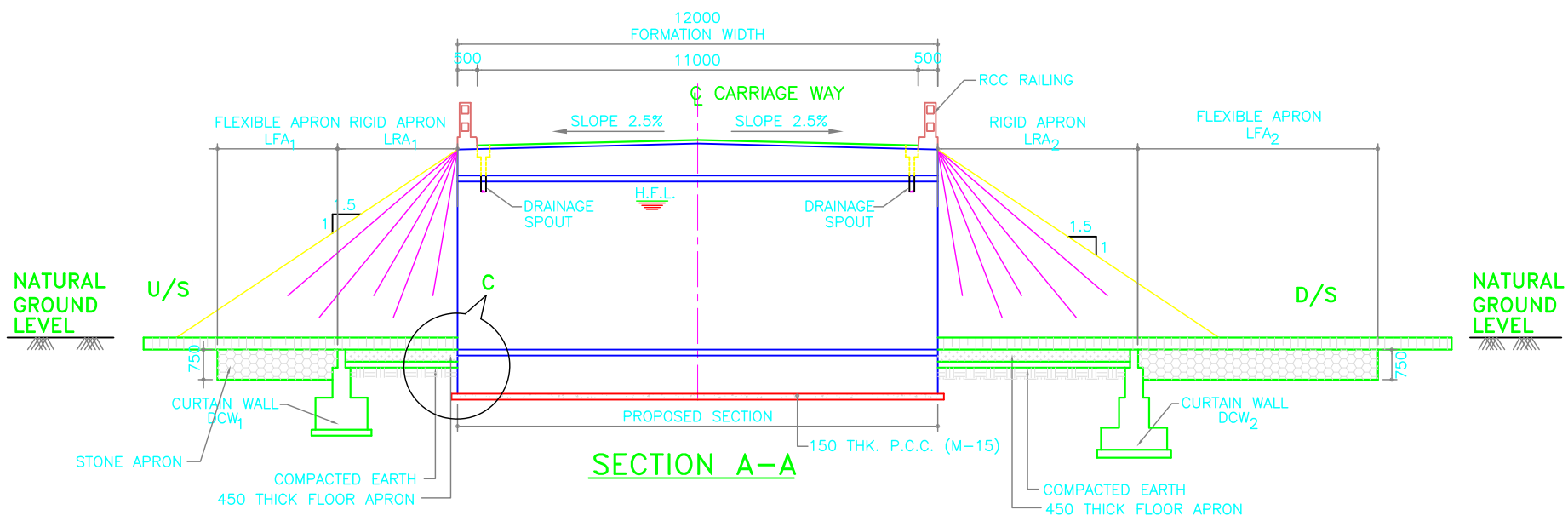
BUILTUP AREA

| CHAINAGE |       | LENGTH |
|----------|-------|--------|
| FROM     | TO    |        |
| 0        | 1200  | 1200   |
| 5600     | 5880  | 280    |
| 6300     | 6650  | 350    |
| 9600     | 10250 | 650    |
| 11500    | 12900 | 1400   |
| 14000    | 14300 | 300    |
| 16100    | 18500 | 2400   |
| 21200    | 21600 | 400    |
| 24450    | 24800 | 350    |
| 25800    | 27100 | 1300   |

NOTE:

- JUNCTION SHALL BE IMPROVED AS PER THE DRAWING NO OSRP/CEG/JN/01 TO 03
- ALL OTHER JUNCTIONS WITH WBM CROSS ROAD, CEMENT, EARTHEN SHALL BE IMPROVED AS PER THE STANDARD DRAWINGS
- PROPOER SIGNAGE SHALL BE PROVIDED FOR THE SAFETY OF THE TRAFFIC MOVEMENT AT THESE JUNCTIONS

|                                  |      |             |    |                 |            |                 |           |                  |  |   |  |  |  |                         |  |  |  |         |  |   |  |         |
|----------------------------------|------|-------------|----|-----------------|------------|-----------------|-----------|------------------|--|---|--|--|--|-------------------------|--|--|--|---------|--|---|--|---------|
| R2 SEP-2015 SECOND REVISION LASA |      | RAJU MATHUR |    | M.R MISHRA (EE) |            | O.P. PATEL (CE) |           | DPR CONSULTANT : |  | CONSULTING ENGINEERS GROUP LTD.   |  | DESIGN REVIEW CONSULTANT :   |  | CLIENT :                |  | PROJECT :  |  | SCALE : |  | DRAWING TITLE :                             |  |         |
| R1 JAN-2013 FIRST REVISION OWD   |      | VINAY       |    | PK.MISHRA (AE)  |            | M.R MISHRA (EE) |           | N.K PRADHAN (CE) |  | E-12,MOJI COLONY,MALVIYA NAGAR  |  | LEA Associates South Asia Pvt. Ltd., India   |  | ODISHA WORKS DEPARTMENT |  | CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT |  | N.T.S   |  | SCHEDULE OF RRPMS,ROAD HUMPS & RUMBLE STRIP |  |         |
| - JUNE 2008 ORIGINAL CEG         |      |             |    |                 |            |                 |           |                  |  | JAIPUR-17 Tel: +91-141-2520899,2521899,2520556 Fax: 2521348, e-mail: ceg@cegindia.com |  | B-1, E-27, IInd FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 . |  |                         |  | - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A   |  |         |  | (SHEET 4 OF 5)                              |  |         |
| NO.                              | DATE | REVISION    | BY | DRAWN:          | PREPARED : | CHECKED:        | APPROVED: |                  |  |   |  |  |  |                         |  |  |  |         |  | DWG. NUMBER : OSRP/CEG/SH09/P02A/SCH/04     |  | REV. R2 |

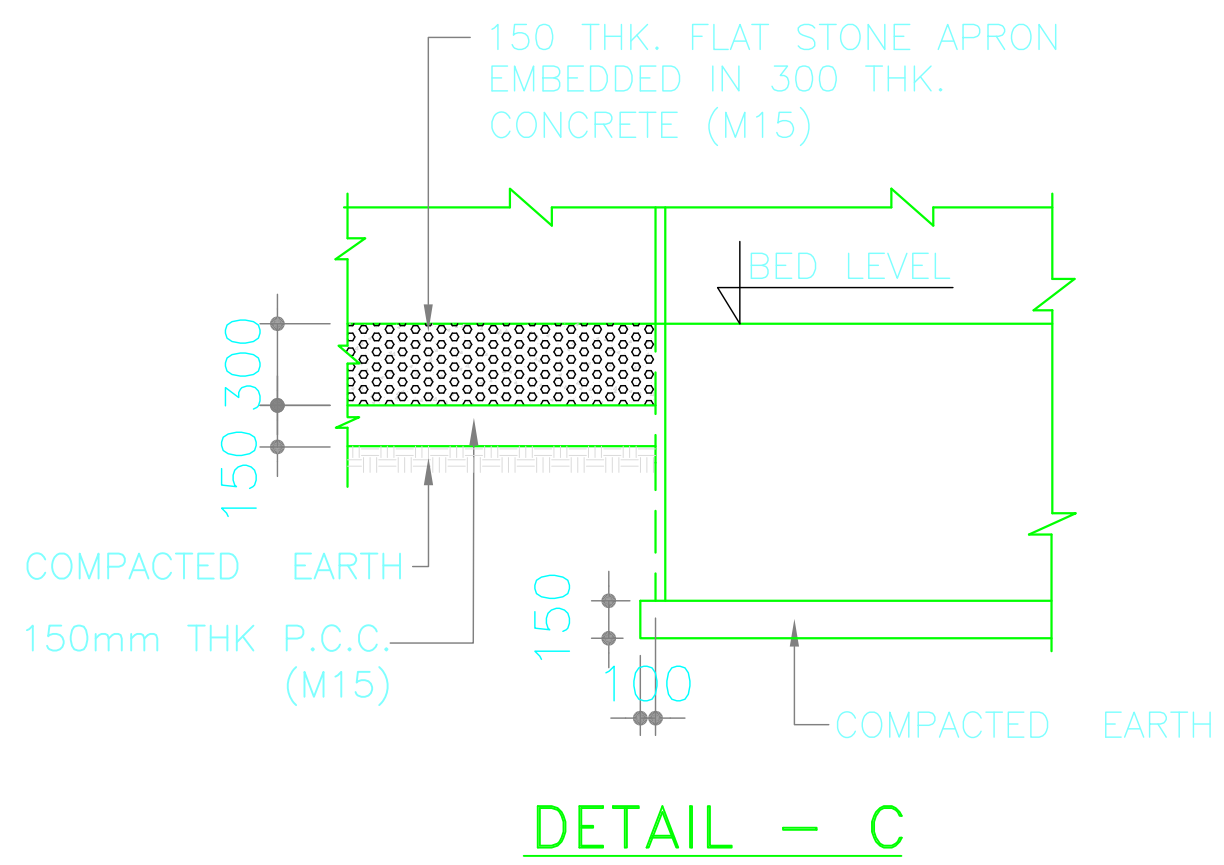
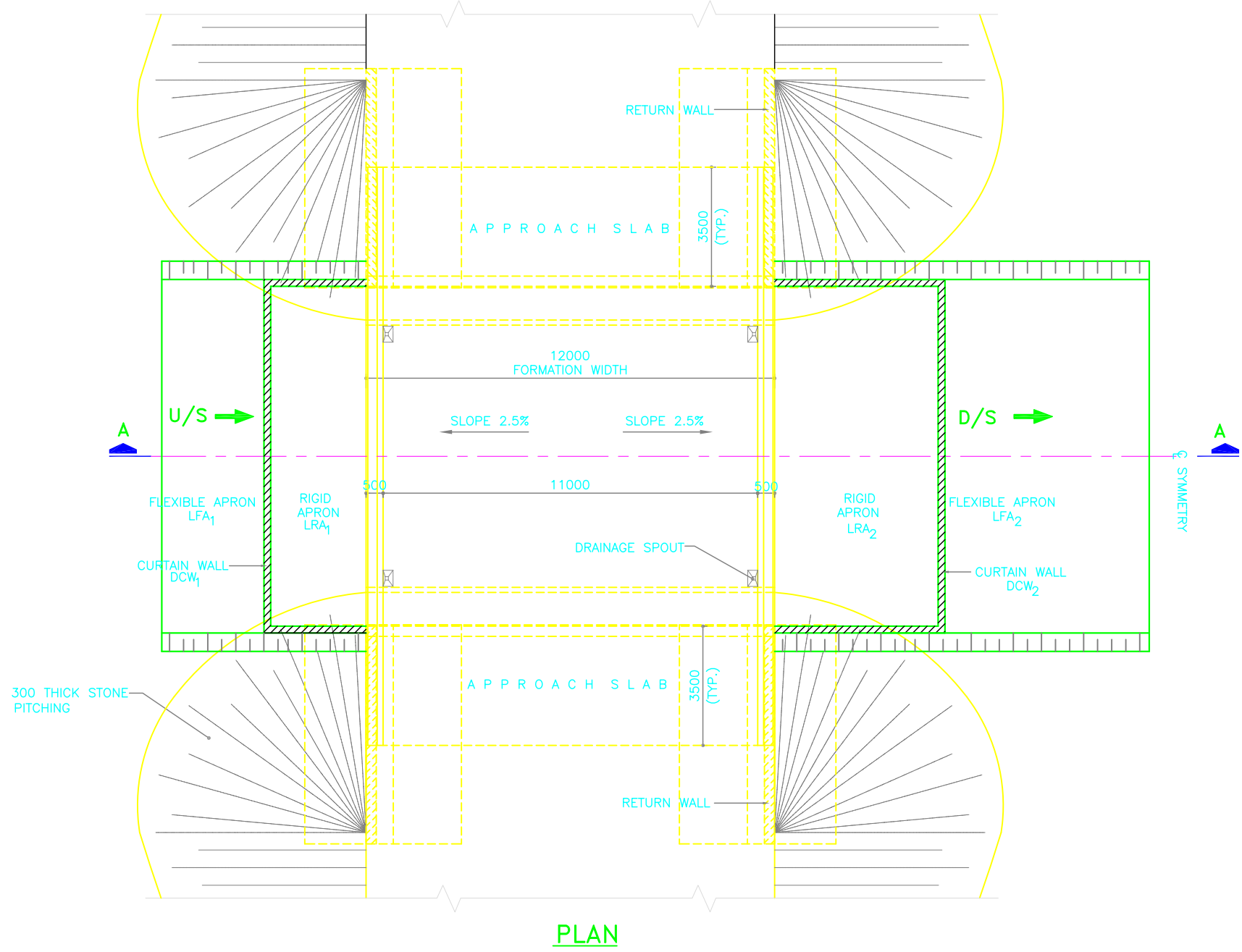


**NOTES:**

1. ALL DIMENSIONS ARE IN MM.
2. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.
3. THE LENGTHS OF RIGID AND FLEXIBLE APRONS SHALL BE AS PER AVAILABILITY OF LAND AND DECISION OF THE ENGINEER.

**REFERENCE DRAWING:-**

- OSRP/CEG/SH-9/BR/SCW
- |                                |                                  |
|--------------------------------|----------------------------------|
| 1. OSRP/CEG/SH-9/BR/1+005/01   | 13. OSRP/CEG/SH-9/BR/32+100/01   |
| 2. OSRP/CEG/SH-9/BR/1+800/01   | 14. OSRP/CEG/SH-9/BR/33+500/01   |
| 3. OSRP/CEG/SH-9/BR/3+200/01   | 15. OSRP/CEG/SH-9/BR/33+900/01   |
| 4. OSRP/CEG/SH-9/BR/3+900/01   | 16. OSRP/CEG/SH-9/BR/34+700/01   |
| 5. OSRP/CEG/SH-9/BR/6+050/01   | 17. OSRP/CEG/SH-9/BR/36+005/01   |
| 6. OSRP/CEG/SH-9/BR/9+200/01   | 18. OSRP/CEG/SH-9/BR/38+100/01   |
| 7. OSRP/CEG/SH-9/BR/9+300/01   | 19. OSRP/CEG/SH-9/BR/42+400/01   |
| 8. OSRP/CEG/SH-9/BR/13+600/01  | 20. OSRP/CEG/SH-9/BR/43+500/01   |
| 9. OSRP/CEG/SH-9/BR/28+100/01  | 21. OSRP/CEG/SH-9/BR/46+700/01   |
| 10. OSRP/CEG/SH-9/BR/28+800/01 | 22. OSRP/CEG/SH-9/TRIPLE CELL/01 |
| 11. OSRP/CEG/SH-9/BR/30+050/01 | 23. OSRP/CEG/SH-9/TRIPLE BOX/01  |
| 12. OSRP/CEG/SH-9/BR/30+200/01 |                                  |



| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :  
**CONSULTING ENGINEERS GROUP LTD.**  
E-12, MOJI COLONY, MALVIYA NAGAR  
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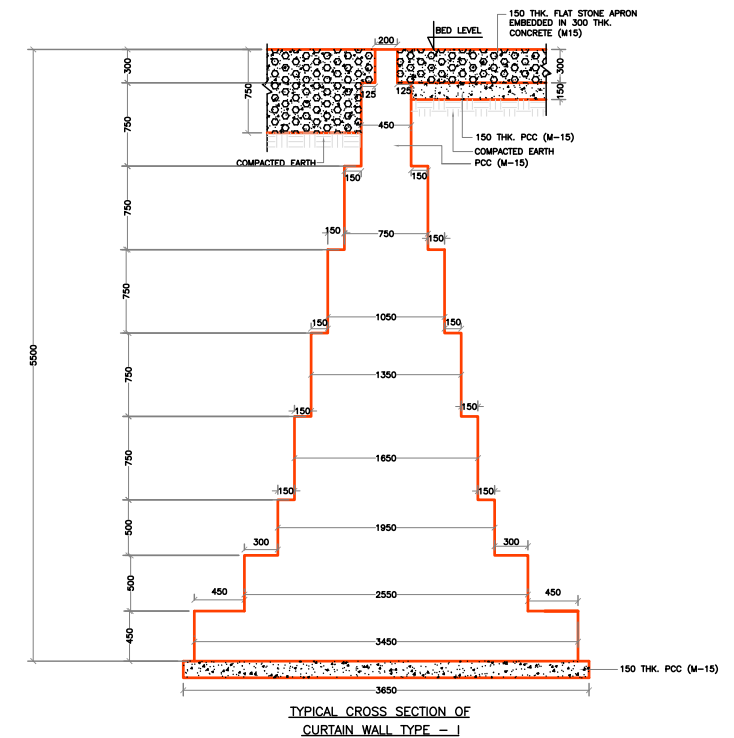
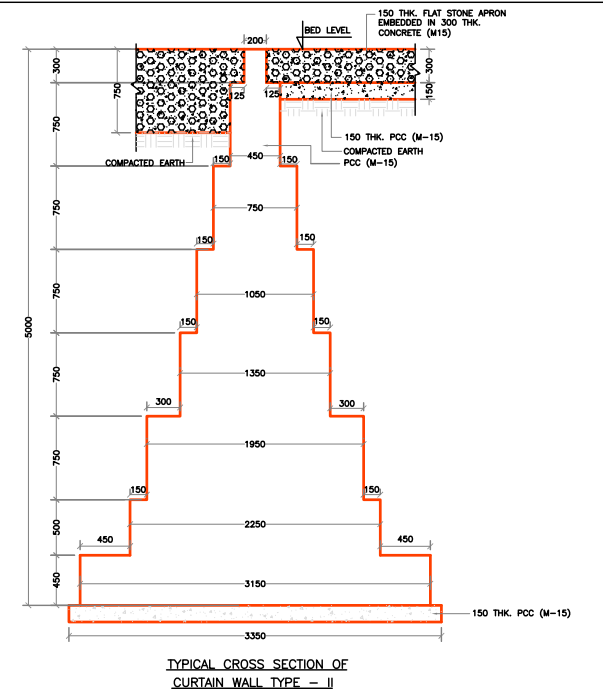
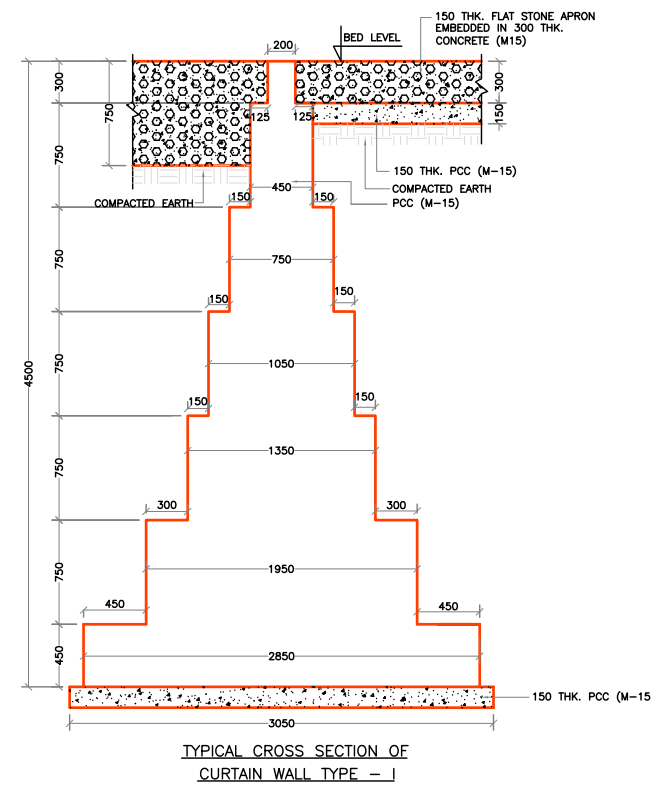
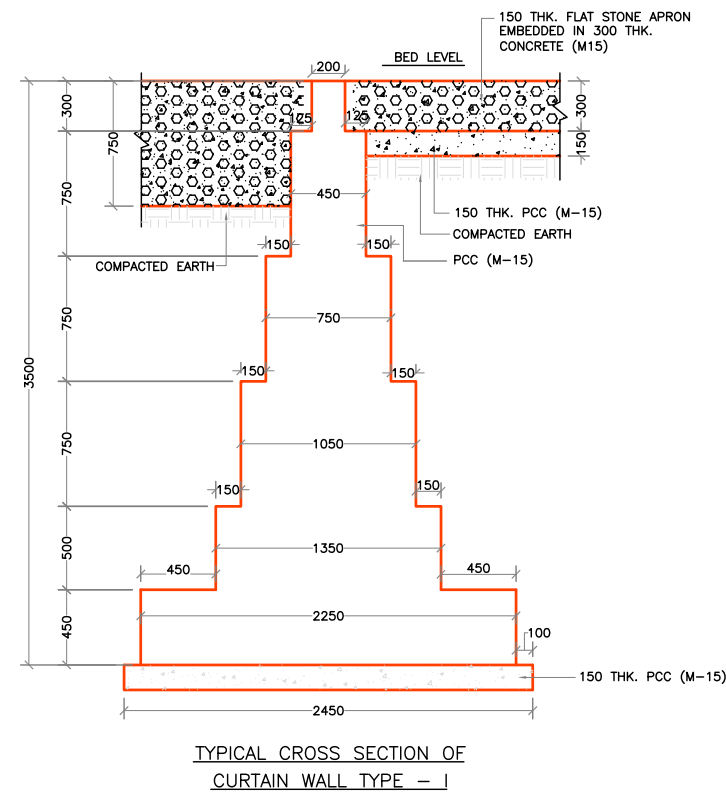
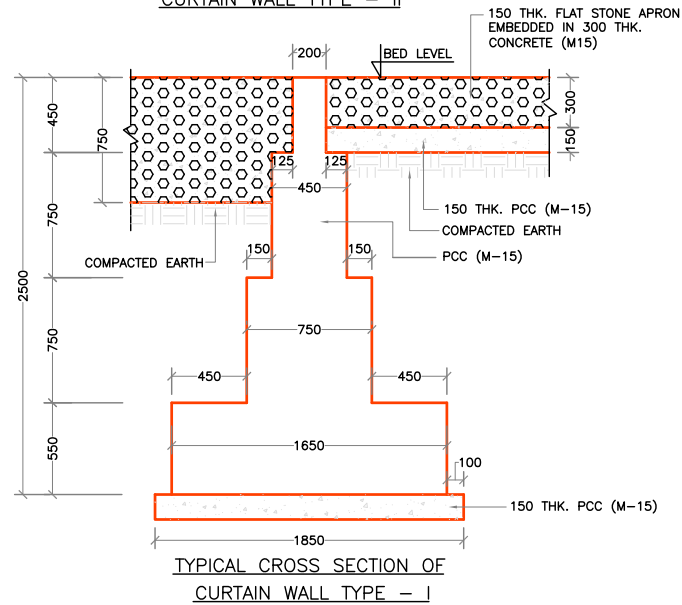
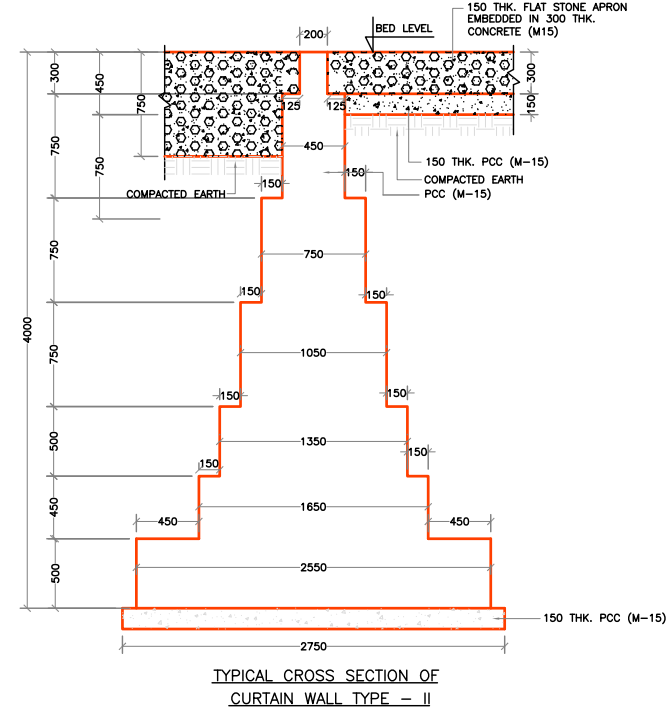
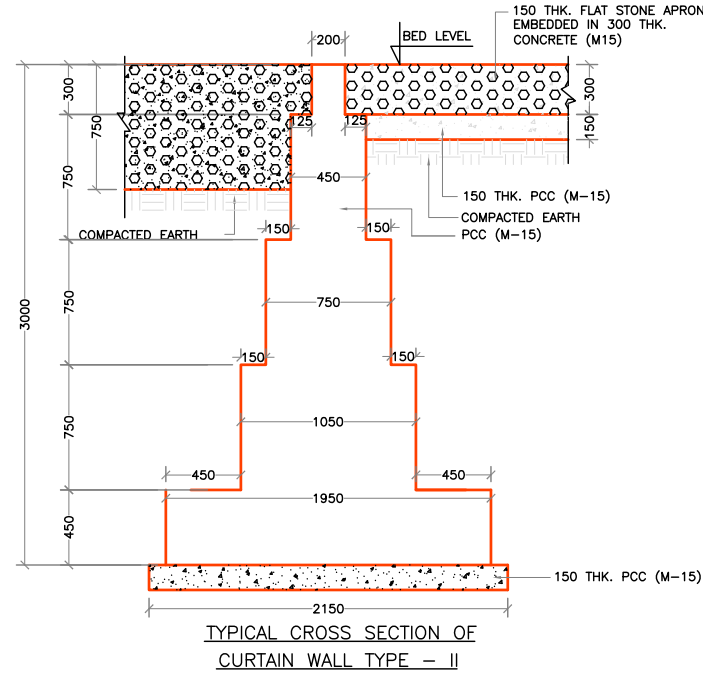
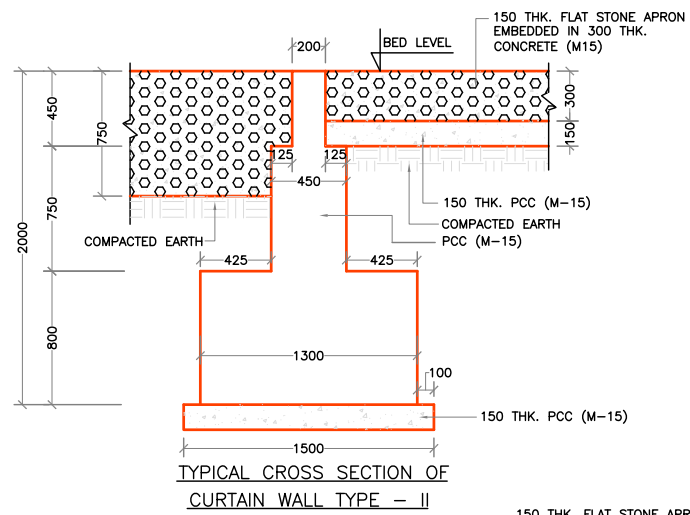
DESIGN REVIEW CONSULTANT :  
**LEA Associates South Asia Pvt. Ltd., India**  
B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :  
**ODISHA WORKS DEPARTMENT**

PROJECT :  
**CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A**

SCALE :  
N.T.S

DRAWING TITLE :  
**TYPICAL DETAILS OF FLOOR PROTECTION WORK**  
(SHEET 1 OF 2)  
DWG. NUMBER : OSRP/CEG/SH9/P02A/BR/SCW/01  
REV. R2



**NOTES:**

1. ALL DIMENSIONS ARE IN MM.
2. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.

**REFERENCE DRAWING:-**

1. OSRP/CEG/SH-9/BR/1+005/01
2. OSRP/CEG/SH-9/BR/1+800/01
3. OSRP/CEG/SH-9/BR/3+200/01
4. OSRP/CEG/SH-9/BR/3+900/01
5. OSRP/CEG/SH-9/BR/6+050/01
6. OSRP/CEG/SH-9/BR/9+200/01
7. OSRP/CEG/SH-9/BR/9+300/01
8. OSRP/CEG/SH-9/BR/13+600/01
9. OSRP/CEG/SH-9/BR/28+100/01
10. OSRP/CEG/SH-9/BR/28+800/01
11. OSRP/CEG/SH-9/BR/30+050/01
12. OSRP/CEG/SH-9/BR/30+200/01
13. OSRP/CEG/SH-9/BR/32+100/01
14. OSRP/CEG/SH-9/BR/33+500/01
15. OSRP/CEG/SH-9/BR/33+900/01
16. OSRP/CEG/SH-9/BR/34+700/01
17. OSRP/CEG/SH-9/BR/36+005/01
18. OSRP/CEG/SH-9/BR/38+100/01
19. OSRP/CEG/SH-9/BR/42+400/01
20. OSRP/CEG/SH-9/BR/43+500/01
21. OSRP/CEG/SH-9/BR/46+700/01
22. OSRP/CEG/SH-9/TRIPLE CELL/01
23. OSRP/CEG/SH-9/TRIPLE BOX/01
24. OSRP/CEG/SH-9/BR/FPW/01

| NO. | DATE      | REVISION        | BY   | DRAWN:       | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|--------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJUJ MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY        | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |              |                 |                 |                  |

DPR CONSULTANT :

**CONSULTING ENGINEERS GROUP LTD.**

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DESIGN REVIEW CONSULTANT :

**LEA Associates South Asia Pvt. Ltd., India**

B-1, E-27, 1st FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

**CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A**

SCALE :

N.T.S

DRAWING TITLE :

**TYPICAL SECTIONS OF CURTAIN WALL**

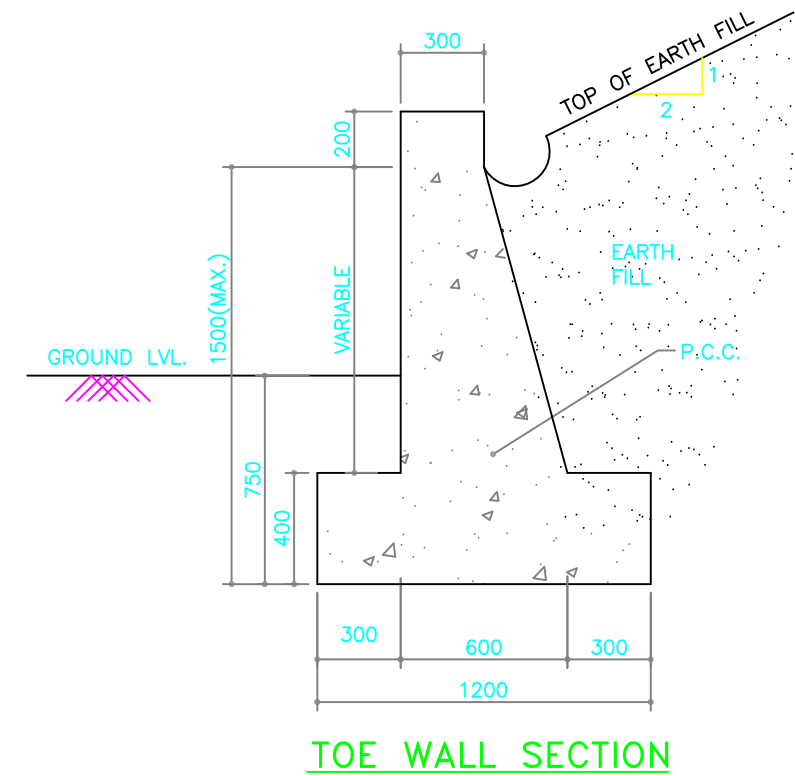
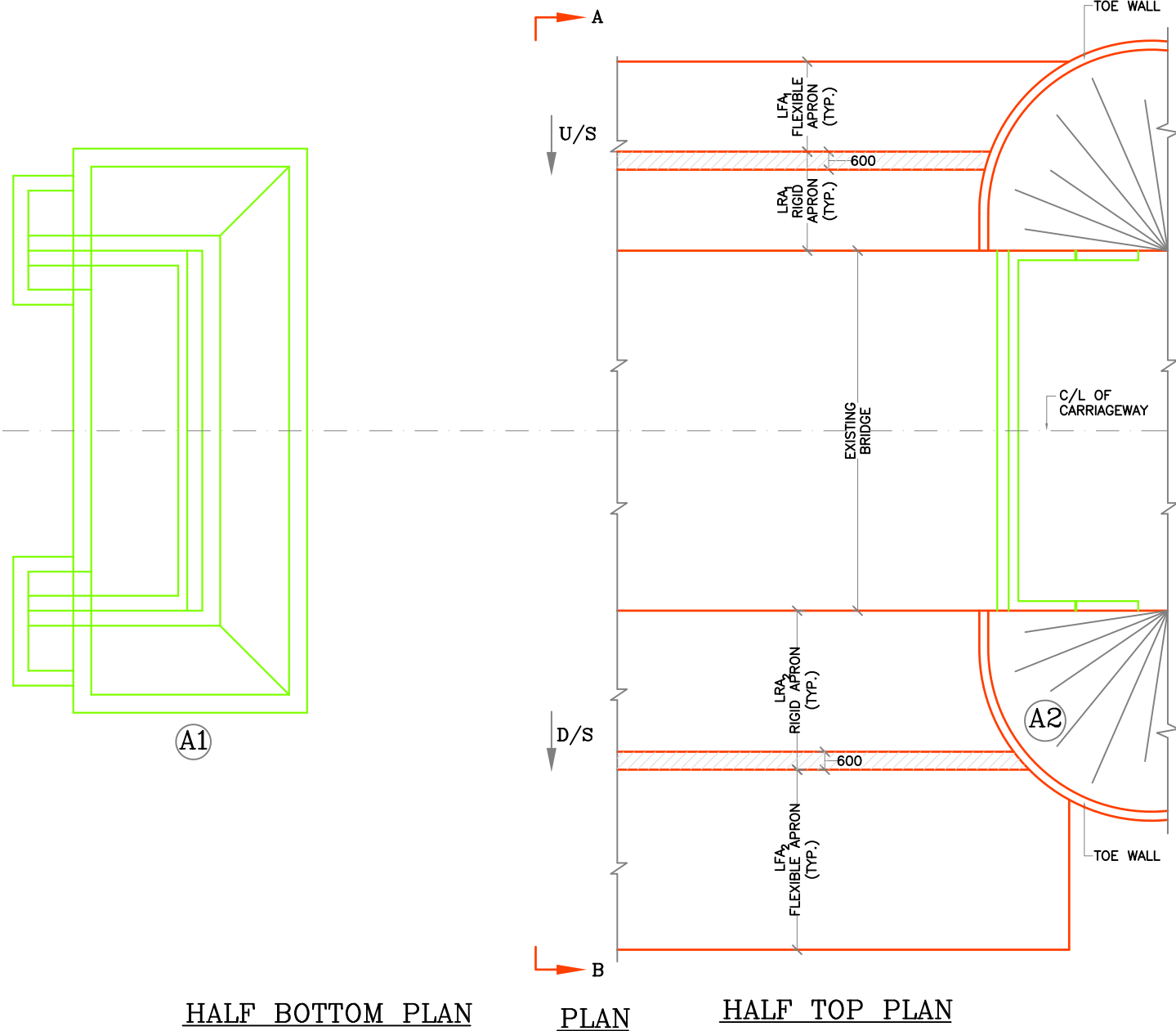
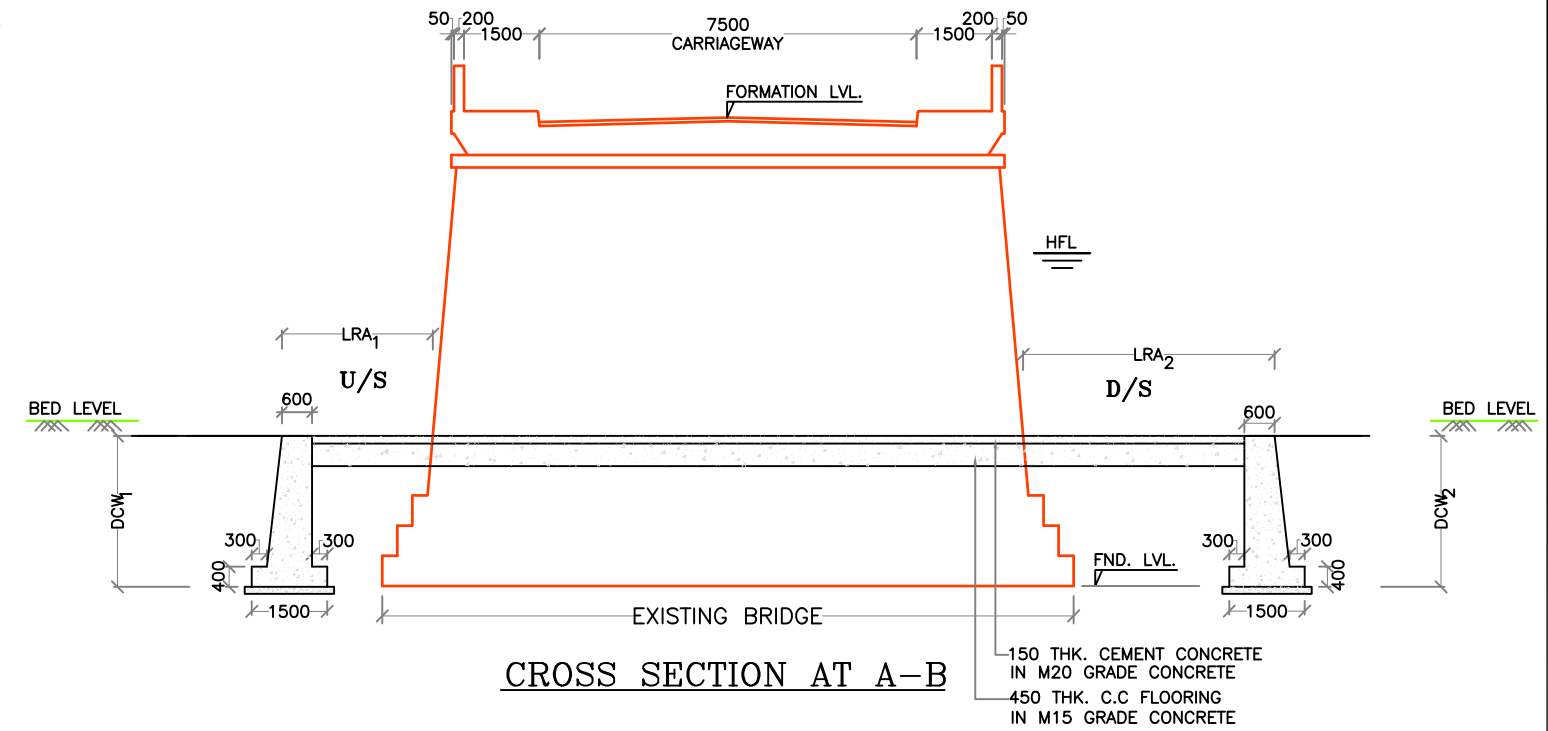
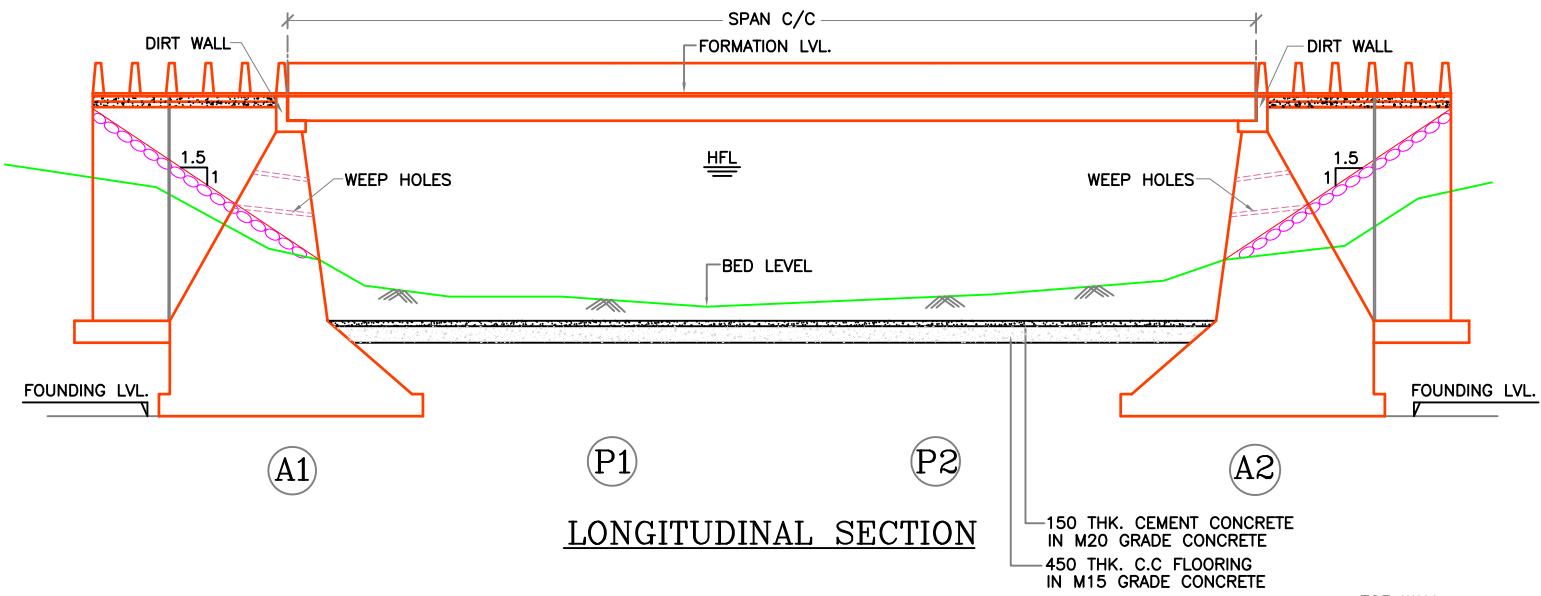
(SHEET 2 OF 2)

DWG. NUMBER : OSRP/CEG/SH9/P02A/BR/SCW/02 REV. R2



TO BHADARK

TO CHANDBALI



**NOTES:-**

1. ALL DIMENSIONS ARE IN MM.
2. ONLY WRITTEN DIMENSIONS ARE TO BE FOLLOWED, DO NOT SCALE THE DIMENSIONS.

| NO. | DATE      | REVISION        | BY   | DRAWN:      | PREPARED :      | CHECKED:        | APPROVED:        |
|-----|-----------|-----------------|------|-------------|-----------------|-----------------|------------------|
| R2  | SEP-2015  | SECOND REVISION | LASA | RAJU MATHUR | M.R MISHRA (EE) | O.P. PATEL (CE) |                  |
| R1  | JAN-2013  | FIRST REVISION  | OWD  | VINAY       | PK.MISHRA (AE)  | M.R MISHRA (EE) | N.K PRADHAN (CE) |
| -   | JUNE 2008 | ORIGINAL        | CEG  |             |                 |                 |                  |

DPR CONSULTANT :

**CONSULTING ENGINEERS GROUP LTD.**

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DESIGN REVIEW CONSULTANT :

**LEA Associates South Asia Pvt. Ltd.,** India B-1, E-27, 1<sup>st</sup> FLOOR, MOHAN COOPERATIVE INDUSTRIAL ESTATE, MATHURA ROAD, NEW DELHI-110044 .

CLIENT :

**ODISHA WORKS DEPARTMENT**

PROJECT :

CONSTRUCTION FOR WIDENING AND STRENGTHENING OF EXISTING CARRIAGEWAY TO 2 LANE ROAD FROM BHADRAK TO PIRAHAT - KM 0+000 TO KM 27+500 OF SH-09 (BALANCE WORK) PACKAGE - P02A

SCALE :

N.T.S

DRAWING TITLE :

**TYPICAL DETAILS OF FLOOR PROTECTION WORK**

(SHEET 1 OF 1)

DWG. NUMBER : OSRP/CEG/SH9/P02A/FPW/01 REV. R2